MOTT MACDONALD

CEDD

Environmental Team Services for Contract No. CV/2012/02 Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun

Monthly EM&A Report for March 2017 (Rev A)

April 2017

Civil Engineering and Development Department

20/F AIA Kowloon Tower
Landmark East
100 How Ming Street
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
F +852 2827 1823
mottmac.hk

2/F, Civil Engineering and
Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Environmental Team Services for Contract No. CV/2012/02 Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun

Monthly EM&A Report for March 2017 (Rev A)

April 2017

Civil Engineering and Development Department

Pursuant to Condition 3.6 of Environmental Permit No. EP-381/2009, this Monthly EM&A Report for March 2017 has been reviewed and certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC).

Certified by:

Brandon Wong
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date 12 April 2017

Verified by:

F N Wong
Independent Environmental Checker (IEC)
Arcadis

Date 13 April 2017

Contents

Executive Summary 1

1 Introduction 3

1.1 Background 3
1.2 Project Organisation 3
1.3 Environmental Status in the Reporting Period 3
1.4 Summary of EM&A Requirements 3

2 Impact Monitoring Methodology 5

2.1 Introduction 5
2.2 Air Quality 5
2.3 Construction Noise 8

3 Monitoring Results 10

3.1 Impact Monitoring 10
3.2 Air Quality Monitoring 10
3.3 Construction Noise 11
3.4 Landscape and Visual 11

4 Environmental Site Inspection 12

4.1 Site Inspection 12
4.2 Advice on the Solid and Liquid Waste Management Status 12
4.3 Status of Environmental Licenses and Permits 12
4.4 Recommended Mitigation Measures 13

5 Report on Non-compliance, Complaints, Notification of Summons and Successful Prosecutions 14

5.1 Record on Non-compliance of Action and Limit Levels 14
5.2 Record on Environmental Complaints Received 14
5.3 Record on Notifications of Summons and Successful Prosecution 14
5.4 Review of Reasons for and Implications of Non-compliance, Complaints, Summons and Prosecutions 14
5.5 Follow-up Actions Taken 14

6 Future Key Issues 15

6.1 Construction Works for the Coming Month(s) 15

6.2 Key Issues for the Coming Month 15
6.3 Monitoring Schedule for the Coming Month 15

7 Conclusions and Recommendations 16
7.1 Conclusions 16
7.2 Recommendations 16

Tables

Table 1-1: Summary of Impact EM&A Requirements 4
Table 2-1: Air Quality Monitoring Parameters, Frequency and Duration 5
Table 2-2: Air Quality Monitoring Station 5
Table 2-3: TSP Monitoring Equipment 6
Table 2-4: Noise Monitoring Parameters, Period and Frequency 8
Table 2-5: Noise Monitoring Equipment 8
Table 2-6: Locations of Noise Monitoring Stations 8
Table 3-1: Summary of 1-hour TSP monitoring results 10
Table 3-2: Summary of 24-hour TSP monitoring results 10
Table 3-3: Summary of Construction noise monitoring results 11
Table 4-1: Summary of Site Inspections and Recommendations 12
Table 4-2: Status of Environmental Submissions, Licenses and Permits 12

Figures

Figure 1.1 Location of Proposed Sewage Pumping Station
Figure 2.1 Locations of Air Quality and Noise Monitoring Stations

Appendices

Appendix A. Project Organisation
Appendix B. Tentative Construction Programme
Appendix C. Action and Limit Levels for Construction Phase
Appendix D. Event and Action Plan for Air Quality and Noise
Appendix E. Monitoring Schedule
Appendix F. Calibration Certificates
Appendix G. Graphical plots of the monitoring results
Appendix H. Wind data from Hong Kong Observatory Weather Station
Appendix I. Waste Flow Table
Appendix J. Environmental Mitigation Measures – Implementation Status
Appendix K. Cumulative statistics on complaints, notifications of summons and successful prosecutions
Appendix L. Landscape and Visual Impact Monitoring

Executive Summary

On 26 October 2012, Mott MacDonald Hong Kong Limited (MMHK) was commissioned by the Civil Engineering and Development Department (CEDD) under Agreement No. LW 02/2012 to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun (The Project).

The Environmental Permit (Environmental Permit (EP) No. EP-381/2009) for the "Tuen Mun Area 54 Sewage Pumping Station" was granted by the Environmental Protection Department (EPD) on 4 January 2010. The construction works commenced on 22 February 2013. This is the March 2017 Monthly EM&A Report submitted under Condition 3.6 of the EP which summarises the findings on EM&A during the period from 1 to 31 March 2017.

Exceedance of Action and Limit Levels

There was no breach of Action or Limit levels for Air Quality (1-hr TSP and 24-hr TSP) and Noise level (as L_{eq}, 30 minutes) in this reporting month.

Implementation of Mitigation Measures

Site inspection was carried out on 1, 8, 16, 22 and 30 March 2017 to confirm the implementation measures undertaken by the Contractor in the reporting month. The outcomes are presented in Section 4 and the status of implementation of mitigation measures in the site is shown in Appendix J.

Record of Complaints

No environmental complaint was recorded in the reporting month.

Record of Notification of Summons and Successful Prosecutions

No notification of summons and successful prosecution were recorded in the reporting month.

Reporting Changes

There are no reporting changes.

Future Key Issues

The major site works scheduled to be commissioned in the coming month include:

Portion A

- Site clearance
- Make good of defects

Portion B

- Site clearance
- Make good of defects

As the Project is approaching the end of construction period, construction activities are anticipated to be minimised. The number of plants and equipment on-site are expected to be reduced.

Potential environmental impacts due to the construction activities, including air quality, noise, water quality and waste will be monitored or reviewed. The recommended environmental mitigation measures shall be implemented on site and weekly site inspections will be carried out to ensure that the environmental conditions are acceptable.

1 Introduction

1.1 Background

On 26 October 2012, Mott MacDonald Hong Kong Limited (MMHK) was commissioned by the Civil Engineering and Development Department (CEDD) under Agreement No. LW 02/2012 to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun (The Project). The construction works commenced on 22 February 2013.

The Monthly EM&A Report is required under the approved EM&A Manual and is submitted to fulfil Condition 3.6 of the Environmental Permit (EP) No. EP-381/2009 for the "Tuen Mun Area 54 Sewage Pumping Station". The EP was granted by the Environmental Protection Department (EPD) on 4 January 2010.

This is the February 2017 Monthly EM&A Report presenting the monitoring works conducted from 1 to 28 February 2017. The purpose of this report is to summarise the findings in the EM&A of the project over the reporting period.

1.2 Project Organisation

The organisation chart and lines of communication with respect to the on-site environmental management structure together with the contact information of the key personnel are shown in Appendix A.

1.3 Environmental Status in the Reporting Period

During the reporting period, construction works of the Project undertaken include:

Portion A

- Site clearance
- Make good of defects

Portion B

- Site clearance
- Make good of defects

The Construction Works Programme of the Project is provided in Appendix B. A layout plan of the Project is provided in Figure 1.1. Please refer to **Table 4-2** on the status of the environmental licenses.

1.4 Summary of EM&A Requirements

The EM&A programme requires environmental monitoring of air quality, noise, landscape and visual as specified in the approved EM&A Manual.

A summary of impact EM&A requirements is presented in **Table 1-1**.

Table 1-1: Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Frequencies
Air Quality	24-hour TSP	A5	At least once every 6 days
	1-hour TSP	A5	At least 3 times every 6 days
Noise	L_{eq}, 30 minutes	N1, N2	Weekly
Landscape and Visual	Monitoring includes auditing the design, implementation and maintenance of L&V mitigation measures	Project site of Tuen Mun Area 54 Sewage Pumping Station (TM54SPS) and the associated sewerage works in Area 54.	Once per month

The Environmental Quality Performance Limits for air quality and noise are shown in **Appendix C**.

The Event and Action Plan for air quality, construction noise, landscape and visual impact are shown in **Appendix D**.

2 Impact Monitoring Methodology

2.1 Introduction

For air quality and construction noise, the monitoring methodology, including the monitoring locations, monitoring equipment used, monitoring parameters, and frequency and duration etc., are explained in this Section. The environmental monitoring schedules for the reporting period and the tentative monitoring Schedule for the coming month are provided in Appendix E.

2.2 Air Quality

2.2.1 Monitoring Parameters, Frequency and Duration

Table 2-1 summarizes the monitoring parameters, frequency and duration of the TSP monitoring.

Table 2-1: Air Quality Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Frequency	Duration
Project Site Office (A5)	24-hour TSP	At least once in every six-days	24 hours
	1-hour TSP	At least 3 times every six-days	60 minutes

2.2.2 Monitoring Locations

Due to rejection of station set up at Unicorn Garden, alternative location was proposed and agreed by IEC and ER. EPD had no objection to the proposal in their reply on 4 January 2013. Location of the monitoring station is given in **Table 2-2** and shown in Figure 2.1.

Table 2-2: Air Quality Monitoring Station

Monitoring Station	Location
A5	Project Site Office

2.2.3 Monitoring Equipment

Continuous 24-hour TSP air quality monitoring was conducted using High Volume Sampler (HVS) (Model: GMWS-2310 Accu-vol) located at the designated monitoring station. The HVS meets all the requirements stated in Section 3.2 of the EM&A Manual. Portable direct reading dust meter was used to carry out the 1-hour TSP monitoring. **Table 2-3** summarizes the equipment used in the impact air quality monitoring. Copies of the calibration certificates for the HVS and portable dust meters are attached in Appendix F.

Table 2-3: TSP Monitoring Equipment

Equipment	Model
24-hour TSP monitoring	
High Volume Sampler	GMWS 2310 Accu-vol (Serial no. 0764)
Calibration Orifice	TE-5025A (Serial no. 2454)
1-hour TSP monitoring	
Portable direct reading dust meter	Sibata LD-5R (Serial no. 620401)

2.2.4 Monitoring Methodology

24-hour TSP Monitoring

Installation

The HVS was installed at the site boundary. The following criteria were considered in the installation of the HVS.

- A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.
- The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
- A minimum of 2 metres separation from walls, parapets and penthouse was required for rooftop sampler.
- A minimum of 2 metres separation from any supporting structure, measured horizontally was required.
- No furnace or incinerator flues or building vent were nearby.
- Airflow around the sampler was unrestricted.
- The sampler has been more than 20 metres from any drip line.
- Permission was obtained to set up the sampler and to obtain access to the monitoring station.
- A secured supply of electricity is needed to operate the sampler.

Preparation of Filter Papers

- Glass fibre filters were labelled and sufficient filters that were clean and without pinholes were selected.
- The filters used are specified to have a minimum collection efficiency of 99 percent for 0.3 µm (DOP) particles.
- All filters were 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 with relative humidity (RH) < 50% and was not variable by more than ±5 %. A convenient working RH was 40%. All preparation of filters was done by Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory.

Field Monitoring Procedures

- The power supply was checked to ensure the HVS works properly.
- The filter holder and the area surrounding the filter were cleaned.
- 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.
- The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.

- The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
- The shelter lid was closed and was secured with the aluminium strip.
- The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- A new flow rate record sheet was set into the flow recorder.
- The flow rate of the HVS was checked and adjusted at around 1.3 m^3/min. The range specified in the EM&A Manual was between 0.6-1.7 m^3/min.
- The programmable timer was set for a sampling period of 24 hrs, and the starting time, weather condition and the filter number were recorded.
- The initial elapsed time was recorded.
- At the end of sampling, the sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
- It was then placed in a clean plastic envelope and sealed.
- All monitoring information was recorded on a standard data sheet.
- Filters were sent to a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory for analysis.

Maintenance and Calibration

- 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.
- HVSs were calibrated prior to monitoring.
- Calibration records for HVS are shown in **Appendix F**.

1-hour TSP Monitoring

Field Monitoring

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

- Turn the power on.
- Close the air collecting opening cover.
- Push the "TIME SETTING" switch to [BG].
- Push "START/STOP" switch to perform background measurement for 6 seconds.
- Turn the knob at SENSI ADJ position to insert the light scattering plate.
- Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- Pull out the knob and return it to MEASURE position.
- Setting time period of 1 hour for the 1-hour TSP measurement.
- Push "START/STOP" to start the 1-hour TSP measurement.
- Regular checking of the time period setting to ensure monitoring time of 1 hour.

Maintenance and Calibration

- The 1-hour dust meter would be checked at 3-month intervals and calibrated at 1-year intervals throughout all stages of the air quality monitoring.
- Calibration records for direct dust meters are shown in **Appendix F**.

Weather Condition

- The wind data during the monitoring period were recorded and provided in **Appendix H**.

2.3 Construction Noise

2.3.1 Monitoring Parameters, Frequency and Duration

Table 2-4 summarizes the monitoring parameters, frequency and duration of noise monitoring. The noise in A-weighted levels L_{eq}, L_{10} and L_{90} are recorded in a 30-minute interval between 0700 and 1900 hrs at the designated monitoring stations shown in **Figure 2.1**.

Table 2-4: Noise Monitoring Parameters, Period and Frequency

Time Period	Parameters	Frequency
Daytime on normal weekdays (0700-1900 hrs)	L_{eq}(30 min), L_{90}(30 min) & L_{10}(30 min)	Once every week

2.3.2 Monitoring Equipment

Integrating Sound Level Meter was used for noise monitoring. It was a Type 1 sound level meter capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level (L_{Aeq}) and percentile sound pressure level (L_x). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). **Table 2-5** summarizes the noise monitoring equipment model being used.

Table 2-5: Noise Monitoring Equipment

Monitoring Station	Equipment Model	
	Integrating Sound Level Meter	Calibrator
N1	Rion NL-18 (Serial no. 00360030)	Rion NC-73 (Serial no. 10997142)
N2		

2.3.3 Monitoring Locations

Two monitoring stations (N1 and N2) were proposed in the EM&A Manual. Due to access problems and rejection from premises owners, alternative locations were proposed and agreed by IEC and ER. EPD had no objection to the proposal in their reply on 4 January 2013. The locations of the monitoring stations are described in **Table 2-6** and shown in **Figure 2.1.**

Table 2-6: Locations of Noise Monitoring Stations

Monitoring Station	Locations	Type of measurement
N1	G/F of Block 6 of Unicorn Garden	Free Field
N2	No. 140 of Kei Lun Wai	Free Field

2.3.4 Monitoring Methodology

Field Monitoring

- The microphone of the Sound Level Meter was set at least 1.2 m above the ground.
- Free Field measurement was made at the monitoring locations.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:

  - frequency weighting: A
  - time weighting: Fast
  - time measurement: 30 minutes intervals (between 0700-1900 on normal weekdays)
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1 kHz. If the difference in the calibration level before and after measurement was more than 1 dB, the measurement would be considered invalid and has to be repeated after re-calibration or repair of the equipment.
- During the monitoring period, the L_{eq}, L_{10} and L_{90} were recorded. In addition, any site observations and noise sources were recorded on a standard record sheet.
- A correction of +3dB(A) was made to the free field measurements.
- Noise measurements were not made in presence of fog, rain, wind with a steady speed exceeding $5ms^{-1}$ or wind with gusts exceeding $10ms^{-1}$.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The sound level meter and calibrator are sent to the supplier or HOKLAS laboratory to check and calibrate at yearly intervals.
- Calibration records are shown in **Appendix F**.

Weather Condition

The wind data during the monitoring period were recorded and provided in **Appendix H**.

3 Monitoring Results

3.1 Impact Monitoring

Construction impact monitoring for air quality, noise and landscape and visual impact was undertaken in compliance with the EM&A Manual during the reporting month.

3.2 Air Quality Monitoring

3.2.1 1-hour TSP

Results of 1-hour TSP at the monitoring location are summarised in **Table 3-1**. Graphical plots of the monitoring results are shown in Appendix G.

Table 3-1: Summary of 1-hour TSP monitoring results

Monitoring Date	Start Time	1-hour TSP (μg/m³)			Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
		1st Result	2nd Result	3rd Result			
A5							
01-Mar-17	12:35	75	90	66	59-129	375	500
07-Mar-17	12:35	75	92	86			
13-Mar-17	12:35	82	88	93			
17-Mar-17	08:17	75	95	70			
23-Mar-17	12:35	64	65	59			
29-Mar-17	12:30	110	121	129			

3.2.2 24-hour TSP

Results of 24-hour TSP at the monitoring location are summarised in **Table 3-2**. Graphical plots of the monitoring results are shown in Appendix G.

Table 3-2: Summary of 24-hour TSP monitoring results

Monitoring Date	Start Time	Monitoring Results (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
A5					
01-Mar-17	12:30	51	51-66	188	260
07-Mar-17	12:30	64			
13-Mar-17	12:30	65			
17-Mar-17	8:15	66			
23-Mar-17	12:30	54			
29-Mar-17	12:32	56			

No exceedance of 1-hour and 24-hour TSP (Action or Limit Level) was recorded in the reporting period.

3.3 Construction Noise

The construction noise monitoring results are summarized in **Table 3-3**. Graphical plots of the monitoring data are shown in Appendix G.

Table 3-3: Summary of Construction noise monitoring results

Monitoring Date	Start Time	End Time	Mean & Range of Noise Levels, dB(A)			Construction Noise, dB(A)	Wind Speed, (m/s)	Limit Level for Leq (dB(A))
			L_{eq}	L_{10}	L_{90}			
N1								
01-Mar-17	14:22	14:52	53	55	51	56	0.5	75
07-Mar-17	14:25	14:25	53	55	51	56	0.5	
13-Mar-17	14:22	14:52	53	55	51	56	0.8	
23-Mar-17	14:24	14:54	53	55	51	56	0.5	
29-Mar-17	14:25	14:55	53	55	51	56	0.5	
N2								
01-Mar-17	14:57	15:27	49	52	46	52	0.5	75
07-Mar-17	15:00	15:30	49	51	46	52	0.5	
13-Mar-17	14:58	15:28	49	51	46	52	0.5	
23-Mar-17	15:00	15:30	50	51	46	52	0.5	
29-Mar-17	15:00	15:30	49	51	46	52	0.5	

No exceedance (Action/Limit Level) of construction noise was recorded in the reporting period as no noise related environmental complaint was received during the reporting period and noise levels recorded during the monitoring period were below 75 dB(A).

3.4 Landscape and Visual

The landscape and visual impact inspection was conducted on 30 March 2017 to check the design, implementation and maintenance of L&V mitigation measures at Project site of Tuen Mun Area 54 Sewage Pumping Station (TM54SPS) and the associated sewerage works in Area 54. No major deficiency was observed. Details of inspection can be referred to Appendix L.

4 Environmental Site Inspection

4.1 Site Inspection

Construction phase weekly site inspection was carried out on 1, 8, 16, 22 and 30 March 2017. All observations have been recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary. The key observations from site inspection and associated recommendations are summarized in **Table 4-1**.

Table 4-1: Summary of Site Inspections and Recommendations

Inspection Date	Observation / Recommendation	Contactor's Responses / Action(s) Undertaken	Close-out (Date)
16 March 2017	Some loose C&D material was observed on the access road outside the sewage pumping station. The contractor was reminded to clear the loose material.	The loose C&D material was not observed on the access road outside the sewage pumping station. The contractor has cleared the loose material.	22 March 2017
16 March 2017	Stockpile of excavated dusty material was observed. The contractor was reminded to provide suitable dust mitigation measure.	The contractor has provided suitable dust mitigation measures and covered the stockpile with tarpaulin.	22 March 2017
30 March 2017	Oil stain under an excavator was observed. The contractor was reminded to remove the oil stain.	Oil stain under the excavator was removed.	05 April 2017

4.2 Advice on the Solid and Liquid Waste Management Status

The Contractor has been registered as a chemical waste producer for the Project. Construction and demolition (C&D) material sorting will be carried out on site. A sufficient number of receptacles were available for general refuse collection. The waste flow table is present in Appendix I.

4.3 Status of Environmental Licenses and Permits

The environmental permits, licenses, and/or notifications on environmental protection for this Project which were valid during the period are summarised in **Table 4-2.**

Table 4-2: Status of Environmental Submissions, Licenses and Permits

Statutory Reference	Description	Permit /Reference No.	Status
EIAO	Environmental Permit	EP-381/2009	Valid
APCO	Notification of Construction Work under APCO	356594	Valid
WPCO	Discharge License	WT00015603-2013	Valid
WDO	Registration as Chemical Waste Producer	5213-423-S3567-02	Valid
WDO	Bill Account for disposal	7016271	Valid

Legend: EIAO – Environmental Impact Assessment Ordinance
APCO – Air Pollution Control Ordinance
WPCO – Water Pollution Control Ordinance
WDO – Waste Disposal Ordinance

The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation requires all non-road mobile machinery to bear a unique label with a reference number issued by EPD as specified in the Regulation. Compliance to this regulation was examined during site inspection and any deficiencies would be recorded in the site inspection checklist.

4.4 Recommended Mitigation Measures

The EM&A programme followed the recommended mitigation measures in the EM&A Manual. The EM&A requirements as well as the summary of implementation status of the environmental mitigation measures are provided in **Appendix J**.

5 Report on Non-compliance, Complaints, Notification of Summons and Successful Prosecutions

5.1 Record on Non-compliance of Action and Limit Levels

There was no breach of Action or Limit Levels for Air Quality and Noise monitoring in the reporting month.

All landscape and visual mitigation measures have been implemented in full in accordance with the recommendations of the approved EIA report (EIA-150/2008).

5.2 Record on Environmental Complaints Received

No environmental complaint was received this month. The cumulative statistics on complaints were provided in Appendix K.

5.3 Record on Notifications of Summons and Successful Prosecution

No notifications of summons or successful prosecution were received this month. The cumulative statistics on notifications of summons and successful prosecutions were provided in Appendix K.

5.4 Review of Reasons for and Implications of Non-compliance, Complaints, Summons and Prosecutions

As no notifications of summons or successful prosecution were received, the associated review was not required.

5.5 Follow-up Actions Taken

As no notifications of summons or successful prosecution were received, the associated follow-up actions were not required.

6 Future Key Issues

6.1 Construction Works for the Coming Month(s)

The major site works scheduled to be commissioned in the coming month include:

Portion A

- Site clearance
- Make good of defects

Portion B

- Site clearance
- Make good of defects

As the Project is approaching the end of construction period, construction activities are anticipated to be minimised. The number of plants and equipment on-site are expected to be reduced.

6.2 Key Issues for the Coming Month

Key issues to be considered in the coming month include:

- Generation of dust from construction works;
- Generation of site surface runoffs and wastewater from activities on-site;
- Management of stockpiles and slopes, particularly on rainy days;
- Sorting, recycling, storage and disposal of general refuse and construction waste; and
- Management of chemicals and avoidance of oil spillage on-site.

6.3 Monitoring Schedule for the Coming Month

The environmental site inspection and environmental monitoring will be continued in the coming month. Impact monitoring for air quality and noise in accordance with the approved EM&A Manual has commenced since 22 February 2013. The tentative monitoring schedule for the coming month is shown in the **Appendix E**.

7 Conclusions and Recommendations

7.1 Conclusions

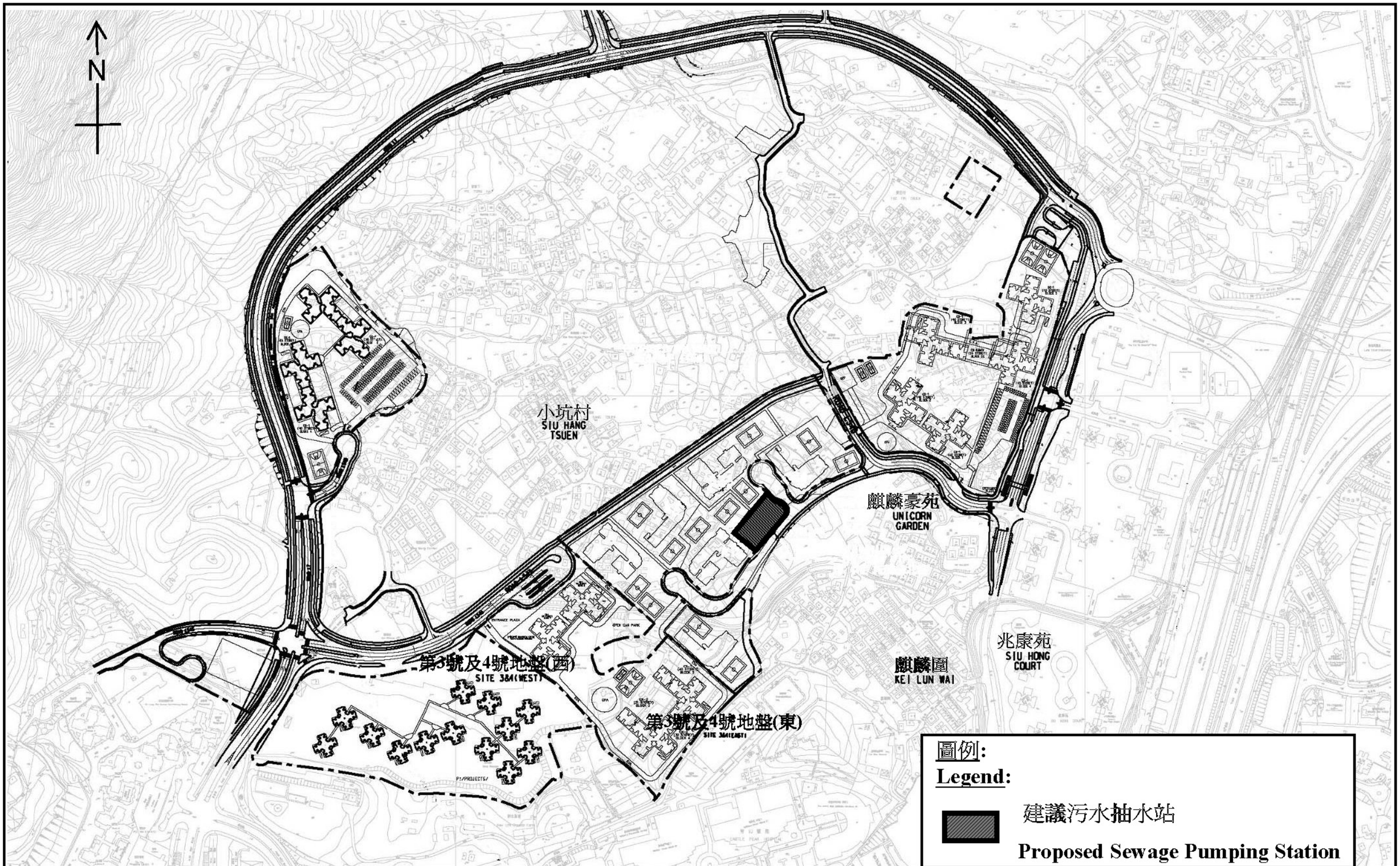
The EM&A programme as recommended in the EM&A Manual has been undertaken since the construction works commenced on 22 February 2013.

Monitoring of air quality and noise with respect to the Project is underway. In particular, the 1-hr TSP, 24-hr TSP, noise level (as L_{eq}, 30 minute) under monitoring have been checked against established Action and Limit levels. There was no breach of Action and Limit Levels for 1-hr TSP, 24-hr TSP and noise in the reporting month.

The March 2017 monthly landscape and visual site audit was undertaken on 30 March 2017 and all L&V mitigation measures have been implemented in full.

7.2 Recommendations

Potential environmental impacts due to the construction activities, including air quality, noise, water quality and waste will be monitored or reviewed. The recommended environmental mitigation measures shall be implemented on site and weekly site inspections will be carried out to ensure that the environmental conditions are acceptable.



屯門第54區污水抽水站 –
Tuen Mun Area 54 Sewage Pumping Station –
建議污水抽水站位置
Location of Proposed Sewage Pumping Station

Figure 1.1

環境許可證： EP-381/2009
Environmental Permit: EP-381/2009

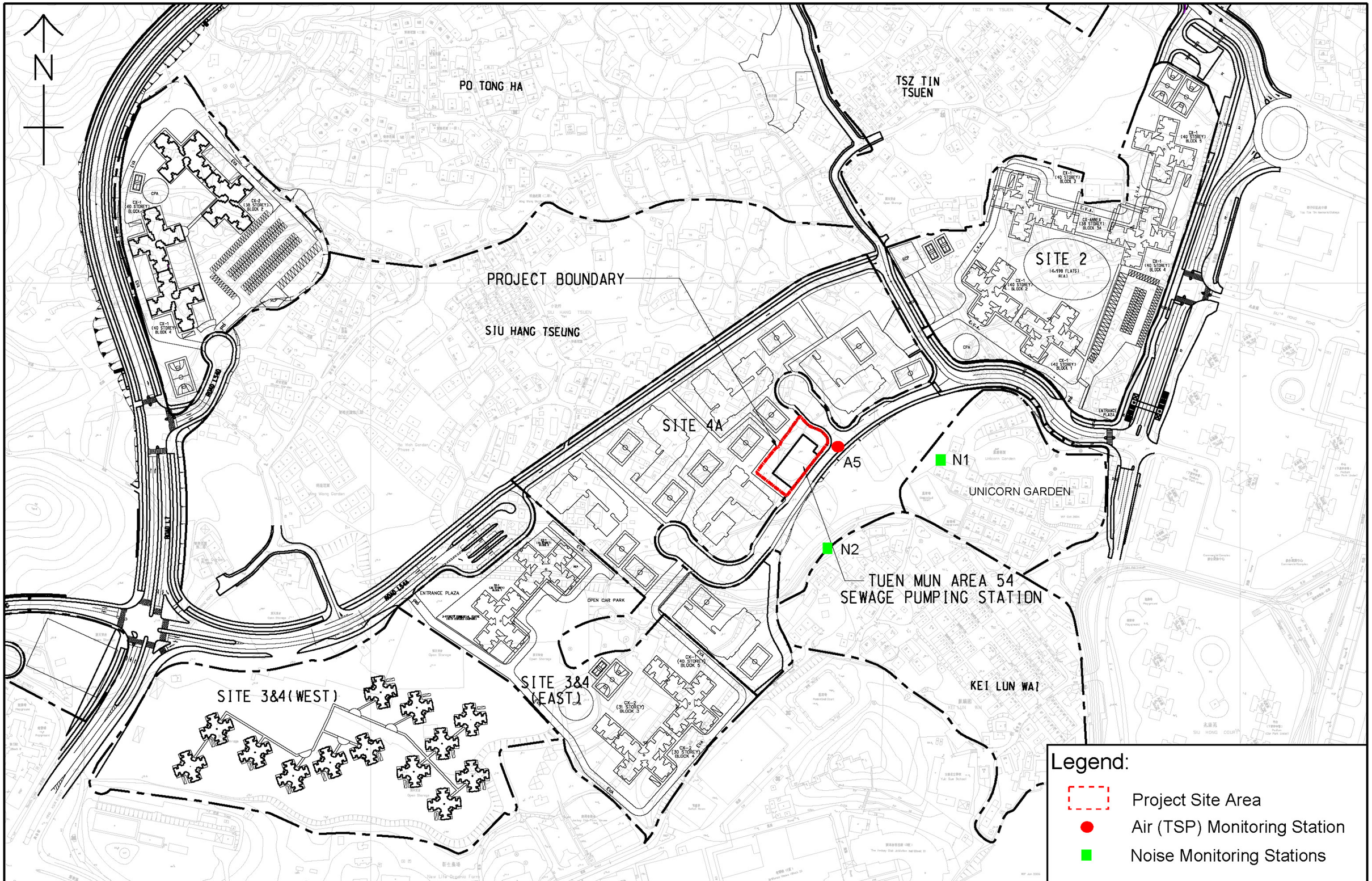


Figure 2.1 Locations of Monitoring Stations

(Not to Scale)

P:/60021938/DRAWINGS/DRAWING/REPORT/FINAL-EM&A/FIG1-2.DGN

Appendix A. Project Organisation

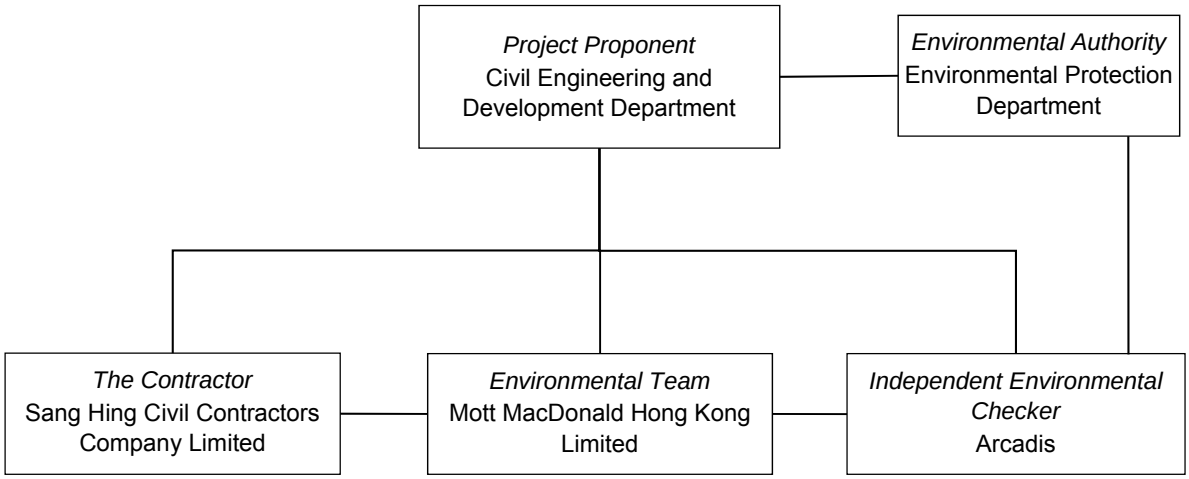


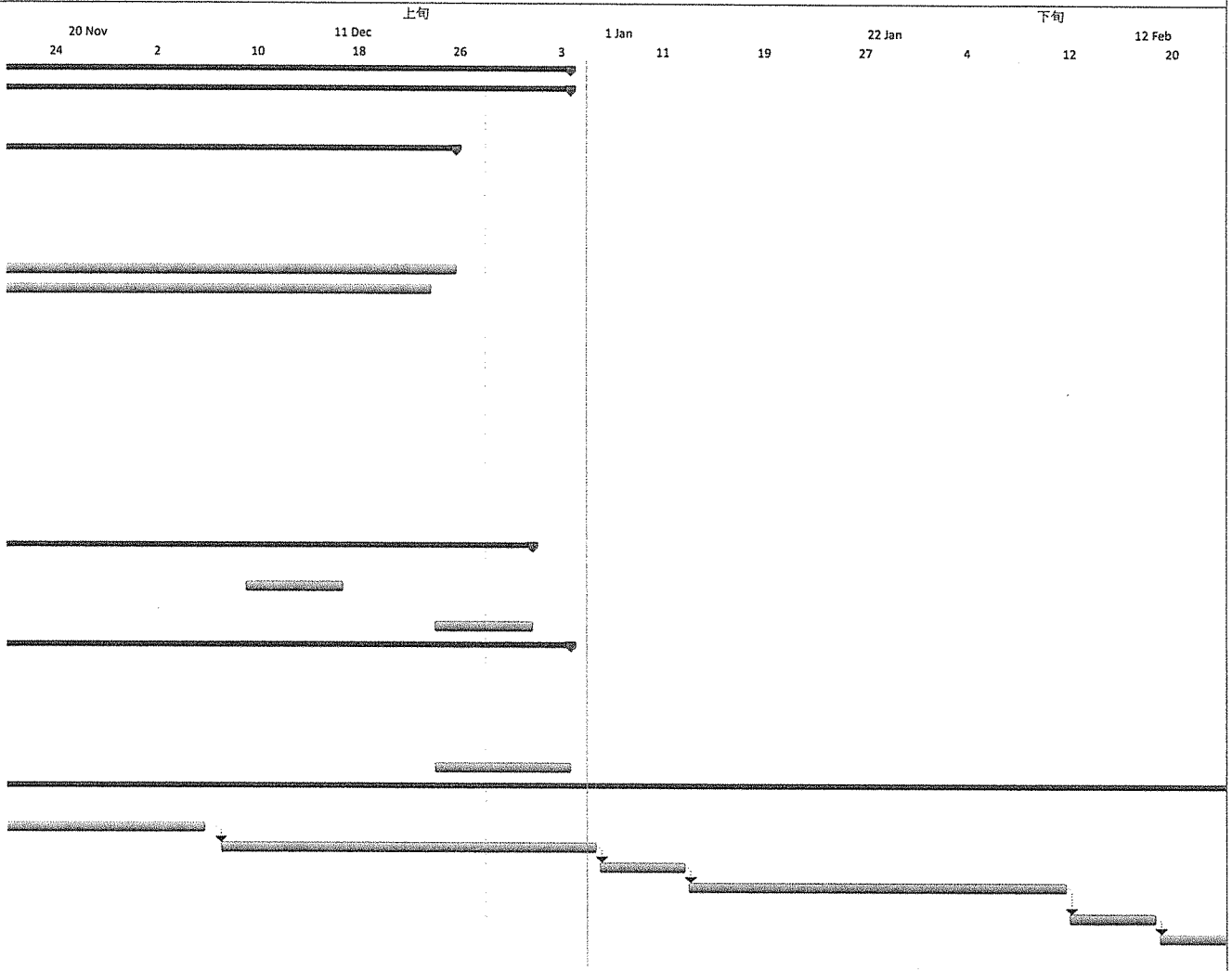
Table A.1: Contact information

Company / Department	Position	Name	Telephone / Mobile
Civil Engineering and Development Department	Engineer's Representative	Mr FU Shing-chi, Sam	2762 5676
Arcadis	Independent Environmental Checker	Mr. F N Wong	2911 2744
Mott MacDonald Hong Kong Ltd.	Environmental Team Leader	Mr. Brandon Wong	2828 5875
Sang Hing Civil Contractors Company Limited	Project Director	Mr. P Y Cheng	9023 4821
Sang Hing Civil Contractors Company Limited	Site Agent	Mr. K H Lai	9187 7116
Sang Hing Civil Contractors Company Limited	Environmental Officer	Mr Y M Leung	9844 7741

Appendix B. Tentative Construction Programme

Three-month rolling Programme

識別碼	任務名稱	工期	開始時間	完成時間
1	Section 2 of the works	125 d	5/9/2016	7/1/2017
2	Access Road construction (North bound)	125 d	5/9/2016	7/1/2017
3	Cable ducts laying (North bound)	25 d	14/9/2016	8/10/2016
4	D8-D3-(SP2-SP9)	25 d	14/9/2016	8/10/2016
5	300 cover u-channel & Kerb laying	88 d	3/10/2016	29/12/2016
6	CP2.1-CP2.6	8 d	3/10/2016	10/10/2016
7	CP2.2-CP5.1 to CP5.6	8 d	11/10/2016	18/10/2016
8	CP5.6-SMH7-CP5.4	4 d	19/10/2016	22/10/2016
9	External wall Finish of boundary wall	12 d	4/10/2016	15/10/2016
10	Installation of steel Gate	10 d	4/10/2016	13/10/2016
11	Installation of steel fence of boundary wall	60 d	31/10/2016	29/12/2016
12	Construction-paving block (North bound of SPS)	40 d	18/11/2016	27/12/2016
13	Cable duct laying (South bound)	13 d	26/9/2016	8/10/2016
14	D9-D10-D11	4 d	26/9/2016	29/9/2016
15	D11-D12-D13-D14	9 d	30/9/2016	8/10/2016
16	Access Road Construction (South bound)	45 d	5/9/2016	19/10/2016
17	Kerbing of Access Road	25 d	5/9/2016	29/9/2016
18	300 cover u-channel construction	14 d	26/9/2016	9/10/2016
19	Construction of wall planter (Switch Room)	3 d	10/10/2016	12/10/2016
20	Construction of wall planter (South bound)	7 d	3/10/2016	9/10/2016
21	CHB0-CHB109	5 d	10/10/2016	14/10/2016
22	CHB109-CHB157	5 d	15/10/2016	19/10/2016
23	Sewage Pumping Station (SPS)	5 d	26/9/2016	30/9/2016
24	Lay S.S. chequer plate at Inlet Chamber	5 d	26/9/2016	30/9/2016
25	Green Roof	101 d	26/9/2016	4/1/2017
26	Lay and installation of irrigation pipe of valves	11 d	26/9/2016	6/10/2016
27	Installation of Control Panel & Connection	8 d	13/12/2016	20/12/2016
28	Planting on Roof	11 d	17/10/2016	27/10/2016
29	Planting on ground	8 d	28/12/2016	4/1/2017
30	Twin Rising Mains	101 d	29/9/2016	7/1/2017
31	(i) Pressure water test (AVIC no.1 to WC)	10 d	29/9/2016	8/10/2016
32	(ii) CCTV for Twin Rising Mains (AVIC no.2 - IP2 - AVIC no.1 - IP1)	16 d	9/10/2016	24/10/2016
33	(iii) Modification works at Inlet of Discharge chamber & Pressure test from WC to DC	8 d	21/10/2016	28/10/2016
34	(iv) CCTV for Twin Rising Main (WC to DC) & (AVIC no.2 - WC)	7 d	29/10/2016	4/11/2016
35	(v) CCTV for Twin Rising Main (IP1 to FMC)	11 d	28/12/2016	7/1/2017
36	Watermains Construction of	164 d	29/9/2016	11/3/2017
37	Re-lay DN300 waterpipe from CHA 5+10 to CHA 6+10	26 d	29/9/2016	24/10/2016
38	Excavation & re-lay watermains CHA 6+11 - CHA 6+25	30 d	10/11/2016	9/12/2016
39	Reinstatement of trench CHA 6+11 to CHA 6+25	30 d	11/12/2016	9/1/2017
40	Implementation of TTA	7 d	10/1/2017	16/1/2017
41	Excavation and installation of D300 waterpipe & Fire hydrant at CHB 4+85 and CHB 4+90	30 d	17/1/2017	15/2/2017
42	Pressure test of watermains CHA 1+72 to CHA 6+70	7 d	16/2/2017	22/2/2017
43	Swabbing of watermains (NS150 & DN300)	6 d	23/2/2017	28/2/2017
44	Sterilisation of water pipe and samples of water (NS150 & DN300)	10 d	2/3/2017	11/3/2017



專案: Project2 (28-9-2015
日期: 9/1/2017

任務 | 里程碑 | 摘要 | 上顯型任務 | 上顯型里程碑 | 上顯型進度 | 分割 | 外部任務 | 專案摘要 | 摘要群組 | 非活动任务 | 非活动里程碑 | 非活动摘要 | 手动任务 | 仅工期 | 手动摘要总成 | 手动摘要 | 仅开始时间 | 仅完成时间 | 進度 | 期限

Appendix C. Action and Limit Levels for Construction Phase

Air Quality

The Action and Limit Levels for 1-hour and 24-hour TSP for the monitoring station are presented in following tables:

Table C.1: Action and Limit Levels for 1-hour TSP

Monitoring Station	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
A5	375	500

Table C.2: Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
A5	188	260

Noise

The Action and Limit Levels for Noise for the monitoring stations are presented in following table:

Table C.3: Action and Limit Levels for Construction Noise

Time Period & Monitoring Locations	Action Level	Limit Level
N1 & N2		
0700-1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)

Appendix D. Event and Action Plan for Air Quality and Noise

Air Quality

In case the Action and Limit Levels are not complied during construction stage, the following Event and Action Plan should be followed:

Table D.1: Event and Action Plan for Air Quality

Event	Action			
	ET Leader	IEC	ER (Engineer's Representative)	Contractor
Action Level				
Exceedance for one sample	1. Identify source and investigate the causes of exceedance. 2. Inform Contractor, IEC and ER. 3. Repeat measurement to confirm finding.	1. Check monitoring data submitted by ET. 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice. 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify the source and investigate the causes of exceedance. 2. Inform Contractor, IEC and ER. 3. Increase monitoring frequency to daily. 4. Discuss with IEC and the Contractor on remedial actions required. 5. Assess the effectiveness of Contractor's remedial actions. 6. If exceedance continues, arrange meeting with IEC and ER. 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise implementation of remedial measures. 5. Conduct meeting with ET and IEC if exceedance continues.	1. Discuss with ET and IEC on proper remedial actions. 2. Submit proposals for remedial actions to ER and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate.
Limit Level				
Exceedance for one sample	1. Identify source and investigate the causes of exceedance. 2. Inform Contractor, IEC, ER and EPD. 3. Repeat measurement to confirm finding. 4. Assess effectiveness of Contractor's remedial actions and keep EPD, IEC and ER informed of the results.	1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET Leader and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise implementation of remedial measures. 5. Conduct meeting with ET and IEC if exceedance continues.	1. Take immediate action to avoid further exceedance. 2. Discuss with ET and IEC on proper remedial actions. 3. Submit proposals for remedial actions to IEC within 3 working days of notification. 4. Implement the agreed proposals.

Event	Action			
Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD. 2. Repeat measurements to confirm findings. 3. Carry out analysis of the Contractor's working procedures to identify source and investigate the causes of exceedance. 4. Increase monitoring frequency to daily. 5. Arrange meeting IEC, ER and Contractor to discuss the remedial actions to be taken. 6. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss amongst ER, ET and Contractor on the potential remedial actions. 4. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly.	1. Confirm receipt of notification of exceedance in writing. 2. Notify Contractor. 3. In consultation with IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise implementation of remedial measures. 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Discuss with ET and IEC on proper remedial actions. 3. Submit proposals for remedial actions to IEC within 3 working days of notification. 4. Implement the agreed proposals. 5. Submit further remedial actions if problem still not under control. 6. Stop the relevant portion of works as instructed by ER until the exceedance is abated.

Construction Noise

In case the Action and Limit Levels are not complied during construction stage, the following Event and Action Plan should be followed:

Table D.2: Event and Action Plan for Construction Noise

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	1. Notify ER, IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to IEC, ER and Contractor. 4. Discuss with the IEC and Contractor on remedial measures required. 5. Increase monitoring frequency to check mitigation measures.	1. Review the investigation results submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise ER accordingly. 3. Advise the ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise the implementation of remedial measures.	1. Submit noise mitigation proposals to ET and ER. 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, Contractor and EPD. 2. Repeat measurement to confirm findings. 3. Increase monitoring frequency. 4. Identify source and investigate the cause of exceedance. 5. Carry out analysis of Contractor's working procedures. 6. Discuss with the IEC, Contractor and ER on remedial measures required. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET and Contractor on the potential remedial actions. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Supervise the implementation of remedial measures. 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to ET and ER within 3 working days of notification. 3. Implement the agreed proposals. 4. Submit further proposal if problem still not under control. 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.

Landscape and Visual Impact

In case the Action and Limit Levels are not complied during construction stage, the following Event and Action Plan should be followed:

Table D.3: Event and Action Plan for Landscape and Visual Impact – Construction Phase

Event	Action			
	ET Leader	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify source 2. Inform the IEC and ER. 3. Discuss remedial actions with the IEC, the ER and Contractor. 4. Monitor remedial action until rectification has been completed.	1. Check report. 2. Check the Contractor's working method. 3. Discuss with the ER and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures.	1. Notify the Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake remedial measures or any necessary replacement.
Repeated non-conformity	1. Identify source. 2. Notify IEC and the ER. 3. Increase monitoring (site audit) frequency. 4. Discuss remedial actions with the IEC, the ER and the Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If exceedance stops, cease additional monitoring (site audit).	1. Check report. 2. Check the Contractor's working method. 3. Discuss with the ER and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Notify the Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake remedial measures or any necessary replacement.

Appendix E. Monitoring Schedule

Table E.1: Monitoring Schedule for the reporting month

Air Quality & Noise Monitoring Schedule for March 2017

Mar-17						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 Weekly Audit 24-hr TSP 1-hr TSP x 3 Noise	2	3	4
5	6	7 24-hr TSP 1-hr TSP x 3 Noise	8 Weekly Audit	9	10	11
12	13 24-hr TSP 1-hr TSP x 3 Noise	14	15	16 Weekly Audit	17 24-hr TSP 1-hr TSP x 3	18
19	20	21	22 Weekly Audit	23 24-hr TSP 1-hr TSP x 3 Noise	24	25
26	27	28	29 24-hr TSP 1-hr TSP x 3 Noise	30 Weekly Audit	31	

Air Quality Monitoring (24-hr Total Suspended Particulates)
Air Quality Monitoring (1-hr Total Suspended Particulates) x 3 times
Noise Monitoring (30-min)
Weekly Audit

Table E.2: Tentative Monitoring Schedule for the coming month

Air Quality & Noise Monitoring Schedule for April 2017

Apr-17						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 24-hr TSP 1-hr TSP x 3 Noise	4 Ching Ming Festival	5 Weekly Audit	6	7	8 24-hr TSP 1-hr TSP x 3
9	10	11	12	13 Weekly Audit 24-hr TSP 1-hr TSP x 3 Noise	14 Good Friday	15 The day following Good Friday
16	17 Easter Monday	18	19 24-hr TSP 1-hr TSP x 3 Noise	20 Weekly Audit	21	22
23	24	25 24-hr TSP 1-hr TSP x 3 Noise	26 Weekly Audit	27	28	29 24-hr TSP 1-hr TSP x 3
30						

- Air Quality Monitoring (24-hr Total Suspended Particulates)
- Air Quality Monitoring (1-hr Total Suspended Particulates) x 3 times
- Noise Monitoring (30-min)
- Weekly Audit

Appendix F. Calibration Certificates

High-Volume TSP Sampler
5-Point Calibration Record

Location : A5
Calibrated by : P.F.Yeung
Date : 23/12/2016

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 0764

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Service Date : 14 Mar 2016
Slope (m) : 2.10326
Intercept (b) : -0.06696
Correlation Coefficient(r) : 0.99989

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1018
Ta(K) : 295

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.2	3.372	1.635	48	48.36
2	13 holes	9.0	3.023	1.469	42	42.32
3	10 holes	7.0	2.666	1.299	36	36.27
4	7 holes	4.4	2.113	1.037	28	28.21
5	5 holes	2.8	1.686	0.833	20	20.15

Sampler Calibration Relationship

Slope(m): 34.588 Intercept(b): -8.334 Correlation Coefficient(r): 0.9992

Checked by: _____ Date: 28/12/2016
Magnum Fan

High-Volume TSP Sampler
5-Point Calibration Record

Location : A5
Calibrated by : P.F.Yeung
Date : 23/02/2017

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 0764

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Service Date : 14 Mar 2016
Slope (m) : 2.10326
Intercept (b) : -0.06696
Correlation Coefficient(r) : 0.99989

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1020
Ta(K) : 291

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.8	3.488	1.690	48	48.74
2	13 holes	9.4	3.113	1.512	43	43.66
3	10 holes	6.8	2.648	1.291	36	36.56
4	7 holes	4.4	2.130	1.045	30	30.46
5	5 holes	2.8	1.699	0.840	24	24.37

Sampler Calibration Relationship

Slope(m): 28.533 Intercept(b): 0.366 Correlation Coefficient(r): 0.9993

Checked by: _____ Date: 28/02/2017
Magnum Fan

TISCH Environmental

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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 20, 2017 Rootsmeter S/N 0438320 Ta (K) - 293
Operator Tisch Orifice I.D. - 2454 Pa (mm) - 759.46

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	1.4390	3.2	2.00
2	NA	NA	1.00	1.0240	6.4	4.00
3	NA	NA	1.00	0.9170	7.9	5.00
4	NA	NA	1.00	0.8730	8.8	5.50
5	NA	NA	1.00	0.7200	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0120	0.7033	1.4257		0.9958	0.6920	0.8784
1.0078	0.9842	2.0163		0.9916	0.9683	1.2423
1.0057	1.0967	2.2543		0.9895	1.0791	1.3889
1.0045	1.1507	2.3643		0.9884	1.1322	1.4567
0.9992	1.3878	2.8514		0.9831	1.3654	1.7568

Qstd slope (m) = 2.08464
intercept (b) = -0.03684
coefficient (r) = 0.99994

Qa slope (m) = 1.30537
intercept (b) = -0.02270
coefficient (r) = 0.99994

y axis = SQRT[H2O(Pa/760)(298/Ta)]

y axis = SQRT[H2O(Ta/Pa)]

CALCULATIONS

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

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

For subsequent flow rate calculations:

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

TISCH Environmental

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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 2454 Pa (mm) - 745.49

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	1.4020	3.2	2.00
2	NA	NA	1.00	1.0060	6.4	4.00
3	NA	NA	1.00	0.9010	7.9	5.00
4	NA	NA	1.00	0.8590	8.8	5.50
5	NA	NA	1.00	0.7090	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)
0.9866	0.7037	1.4078
0.9824	0.9765	1.9909
0.9803	1.0880	2.2259
0.9792	1.1399	2.3345
0.9738	1.3735	2.8155

Qstd slope (m) = 2.10326
intercept (b) = -0.06696
coefficient (r) = 0.99989

y axis = SQRT[H2O(Pa/760)(298/Ta)]

Va	(x axis) Qa	(y axis)
0.9957	0.7102	0.8896
0.9914	0.9855	1.2581
0.9893	1.0980	1.4066
0.9882	1.1504	1.4753
0.9828	1.3862	1.7792

Qa slope (m) = 1.31703
intercept (b) = -0.04232
coefficient (r) = 0.99989

y axis = SQRT[H2O(Ta/Pa)]

CALCULATIONS

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

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

For subsequent flow rate calculations:

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

PILOT TESTING

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1610284
PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE : 15/6/2016

CUSTOMER : ENVIROTECH SERVICES COMPANY
ADDRESS : RM. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO. : HK1610284
PROJECT ITEM NO. : HK1610284-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT
TYPE : LASER DUST MONITOR
MANUFACTURER : SIBATA
MODEL NO. : LD-5R
SERIAL NO. : 620401
EQUIPMENT NO. : ---
RECEIPT DATE : 3/6/2016
PERFORMANCE CHECK / CALIBRATION DATE : 7/6/2016

PERFORMANCE CHECK / CALIBRATION Information

CODE	Calibration Parameter	Method Procedure	Reference Method
Dust PC/CAL	Performance Check / Calibration of Dust Meter	CAL003	General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK

Notes : 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory : Issue Date: 15/6/2016

Wong Po Yan Pauline
(Testing Engineer)

PILOT TESTING

REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME	:	PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE	:	15/6/2016
REPORT NO.	:	HK1610284

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE	:	LASER DUST MONITOR
MANUFACTURER	:	SIBATA
MODEL NO.	:	LD-5R
SERIAL NO.	:	620401
EQUIPMENT NO.	:	---
SENSITIVITIY ADJUSTMENT SETTING	:	758 CPM
PERFORMANCE CHECK / CALIBRATION DATE	:	7/6/2016

STANDARD EQUIPMENT	:	
TYPE	:	HIGH VOLUME AIR SAMPLER
MANUFACTURER	:	TISCH
MODEL NO.	:	TE-5170
EQUIPMENT REF NO.	:	PTL_HV002
LAST CALIBRATION DATE	:	30/5/2016

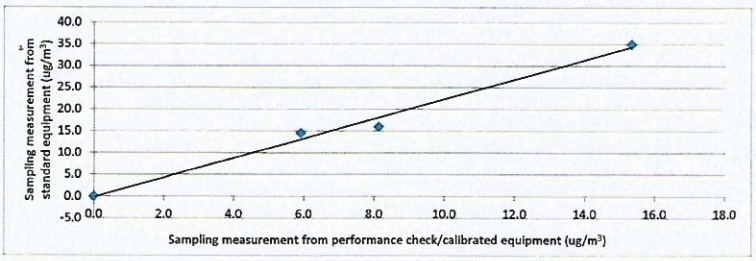
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 758 CPM
Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 758 CPM

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m^3 (Standard equipment) (Y - Axis)	Total Count[2] (Performance Check / Calibrated equipment)	Concentration in Count/Minute [3] (Performance Check / Calibrated equipment) (X - Axis)
Zero Check[1]	7/6/2016, 08:00	28.1	1008	0.0	0	0.0
1	7/6/2016, 10:22 - 11:22	28.1	1008	34.9	921	15.4
2	7/6/2016, 15:22 - 16:22	28.1	1008	16.0	488	8.1
3	7/6/2016, 16:50 - 17:50	28.1	1008	14.5	355	5.9

Linear Regression of Y on X

Slope (K- factor)	:	2.2
Correlation Coefficient	:	0.9944
Validity of Performance Check / Calibration Record	:	7/6/2017



Notes :
1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
2. Total Count was measured by laser dust monitor.
3. Count/minute was calculated by (Total Count/60).
4. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
5. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Kong Wing Yan, Emily Signature: Date: 7/6/2016

Checked by: Wong Po Yan, Pauline Signature: Date: 15/6/2016

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C164166
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-1465) Date of Receipt / 收件日期 : 20 July 2016

Description / 儀器名稱 : Precision Integrating Sound Level Meter
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-18
Serial No. / 編號 : 00360030
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 29 July 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 1 August 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C164166
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 110	LA	A	Fast	94.00	1	94.4	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
60 - 120	LA	A	Fast	94.00	1	94.4 (Ref.)
				104.00		104.4
				114.00		114.4

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 110	LA	A	Fast	94.00	1	94.4	Ref.
			Slow			94.4	± 0.1

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C164166
證書編號

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
50 -110	LA	A	Fast	106.00	Continuous	106.0	Ref.
	LAmx				200 ms	105.1	-1.0 ± 1.0
	LA		Slow		Continuous	106.0	Ref.
	LAmx				500 ms	102.4	-4.1 ± 1.0

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 110	LA	A	Fast	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	68.0	-26.2 ± 1.5
					125 Hz	78.0	-16.1 ± 1.0
					250 Hz	85.6	-8.6 ± 1.0
					500 Hz	91.1	-3.2 ± 1.0
					1 kHz	94.4	Ref.
					2 kHz	95.7	+1.2 ± 1.0
					4 kHz	95.5	+1.0 ± 1.0
					8 kHz	93.3	-1.1 (+1.5 ; -3.0)
					12.5 kHz	90.1	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 110	LC	C	Fast	94.00	31.5 Hz	91.3	-3.0 ± 1.5
					63 Hz	93.5	-0.8 ± 1.5
					125 Hz	94.2	-0.2 ± 1.0
					250 Hz	94.4	0.0 ± 1.0
					500 Hz	94.5	0.0 ± 1.0
					1 kHz	94.4	Ref.
					2 kHz	94.3	-0.2 ± 1.0
					4 kHz	93.6	-0.8 ± 1.0
					8 kHz	91.4	-3.0 (+1.5 ; -3.0)
					12.5 kHz	88.1	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C164166
證書編號

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Integrating Time	Freq. (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
50 - 110	LAeq	A	10 sec.	4	1	1/10	110	100	100.1	± 0.5
						$1/10^2$		90	89.9	± 0.5
			60 sec.			$1/10^3$		80	79.6	± 1.0
			5 min.			$1/10^4$		70	69.7	± 1.0

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 307435

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB	: 31.5 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level		: ± 0.2 dB (Ref. 110 dB continuous sound level)

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

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

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C163248
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-1307) Date of Receipt / 收件日期 : 10 June 2016

Description / 儀器名稱 : Sound Level Calibrator
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-73
Serial No. / 編號 : 10997142
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 June 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 17 June 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C163248
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.7	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.985	1 kHz ± 2 %	± 1

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

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

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Appendix G. Graphical plots of the monitoring results

Figure G-1: Air quality monitoring at Station A5 (1-hour TSP)

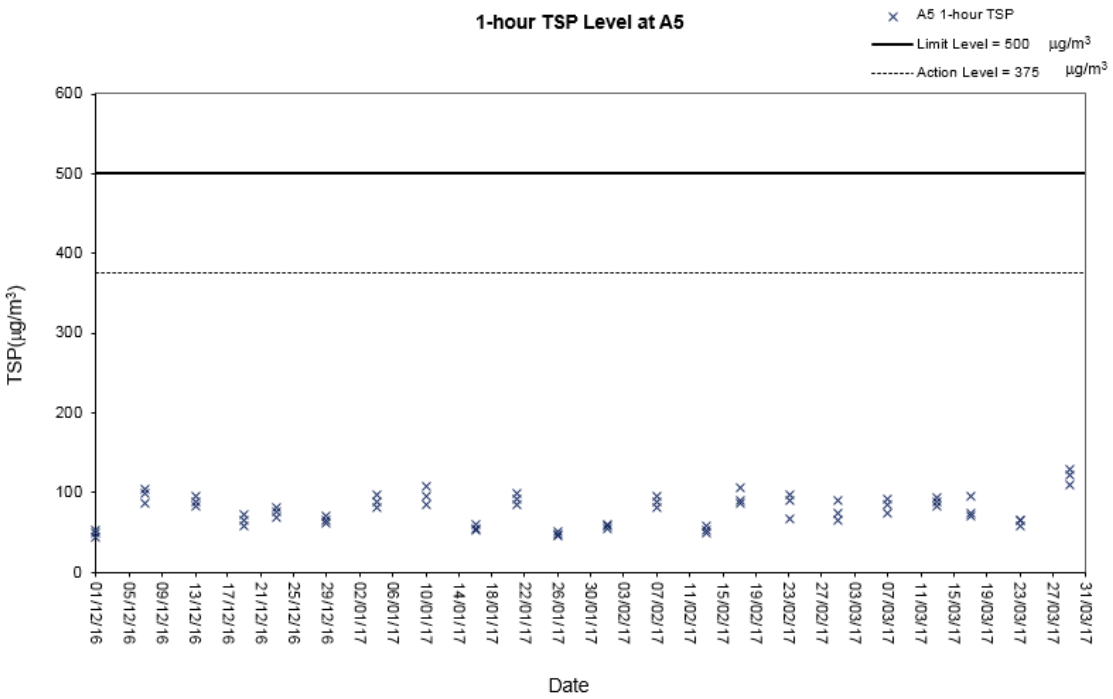


Figure G-2: Air quality monitoring at Station A5 (24-hour TSP)

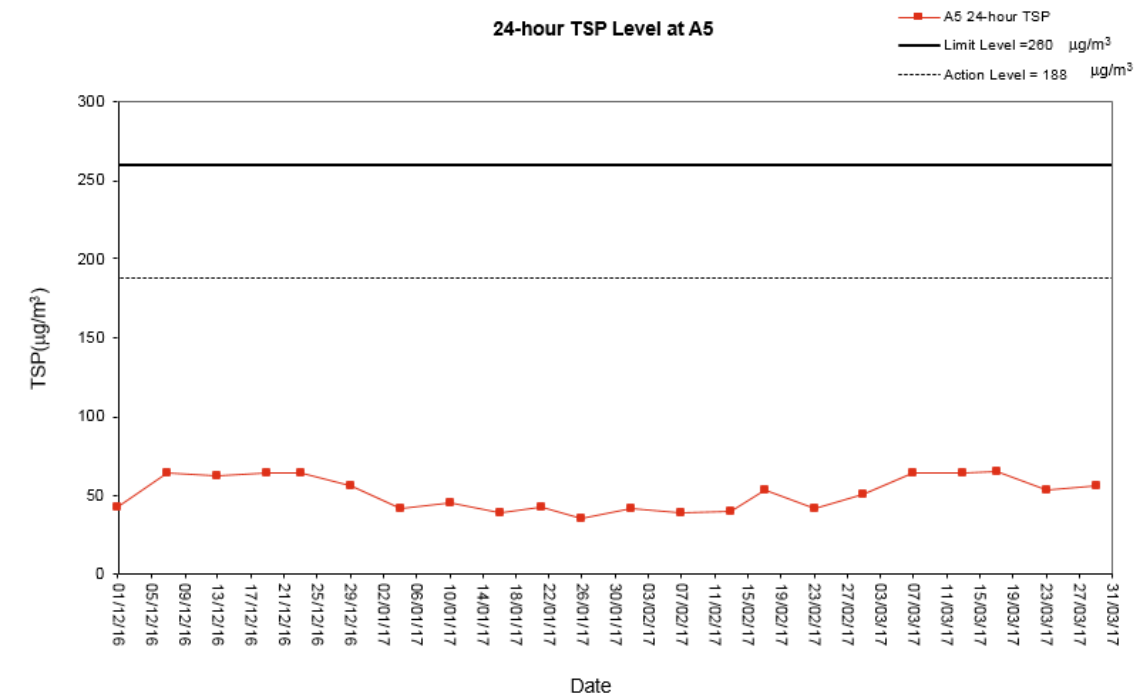


Figure G-3: Construction noise monitoring at Station N1

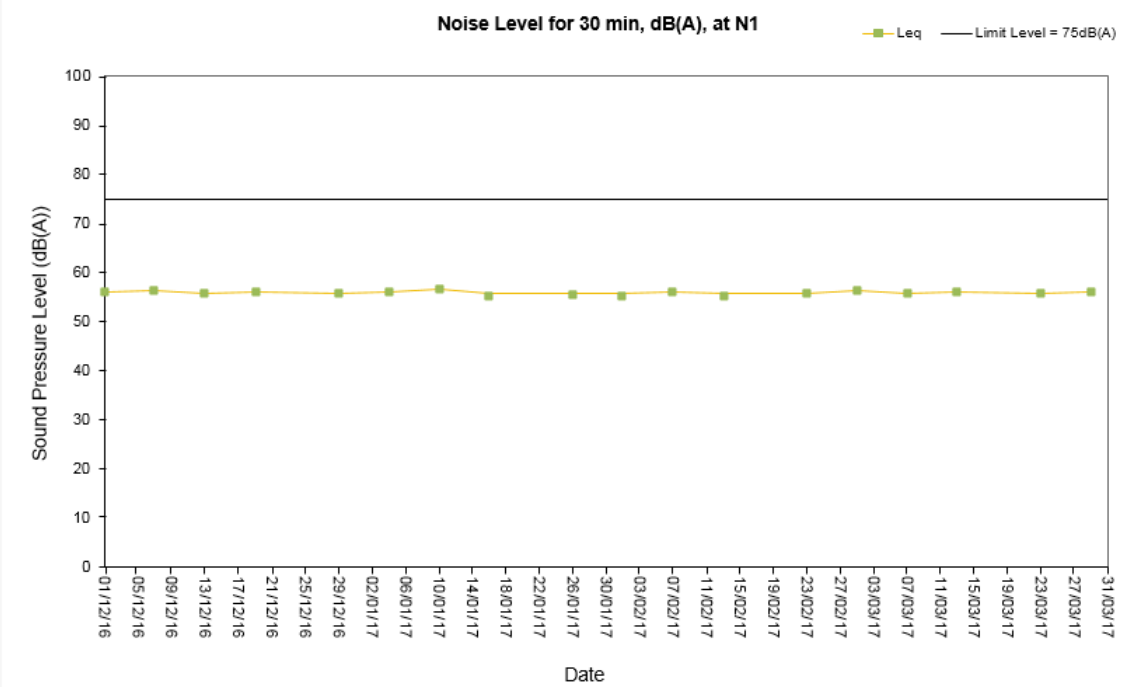
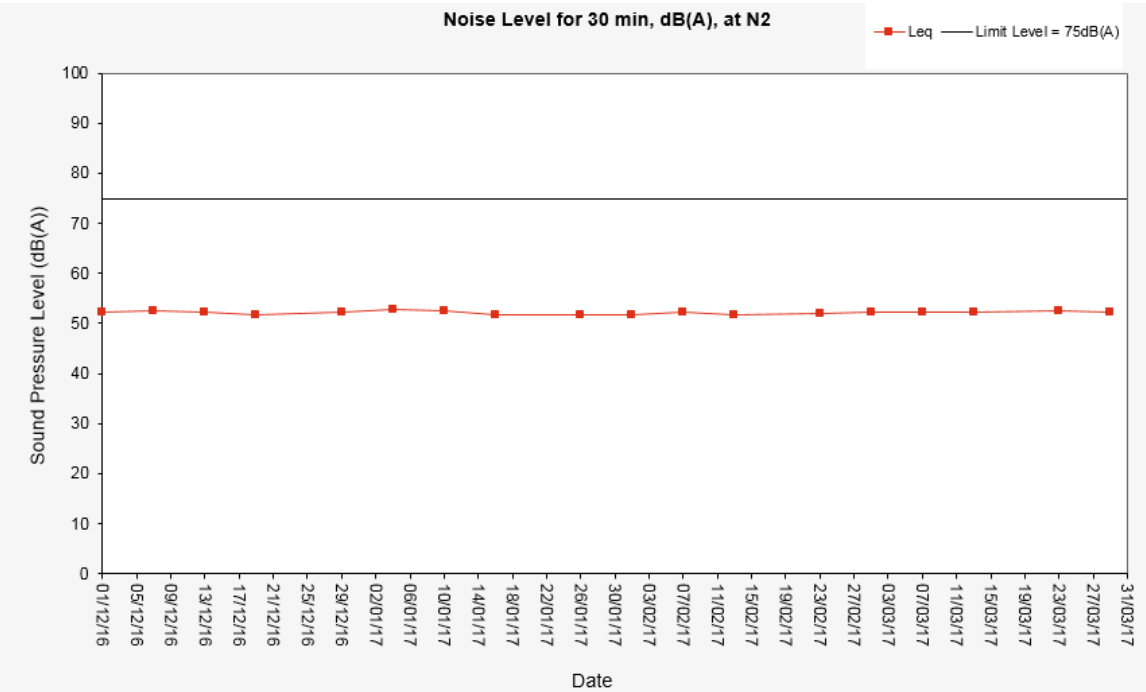
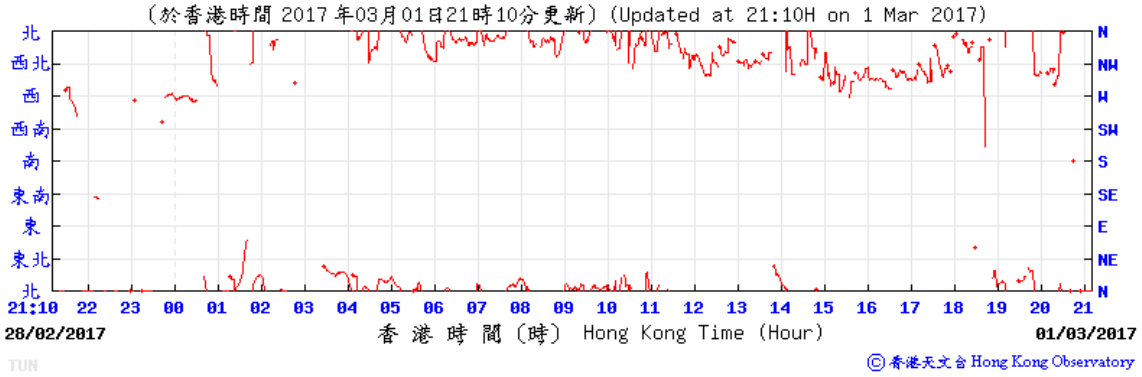


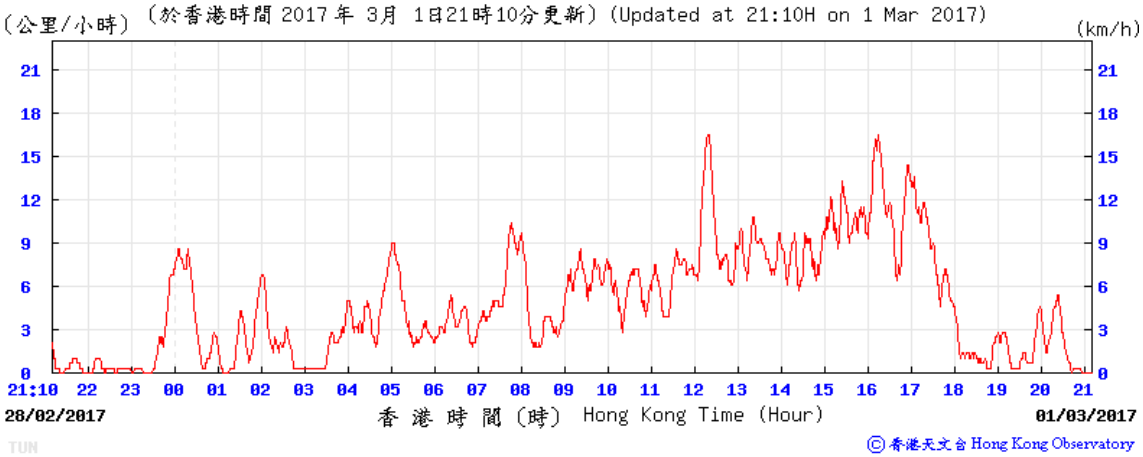
Figure G-4: Construction noise monitoring at Station N2

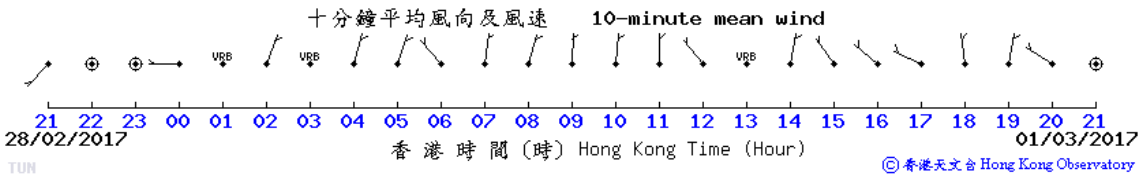


Appendix H. Wind data from Hong Kong Observatory Weather Station

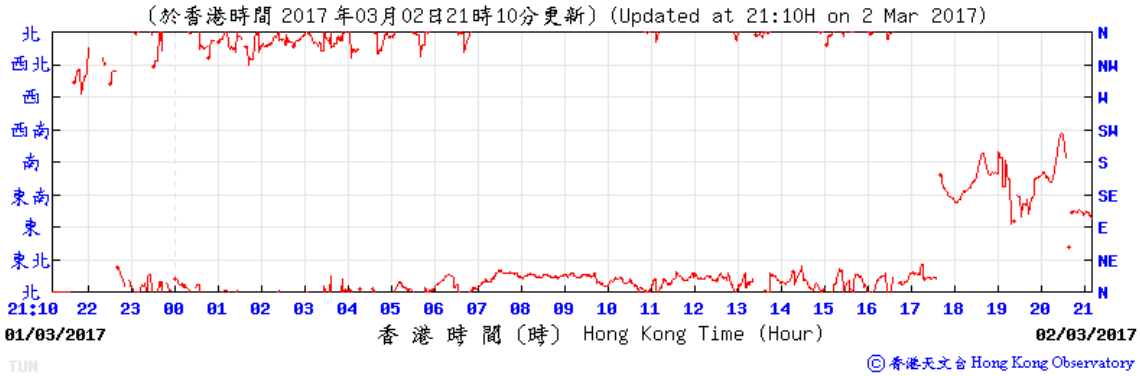
Tuen Mun – 01 March 2017

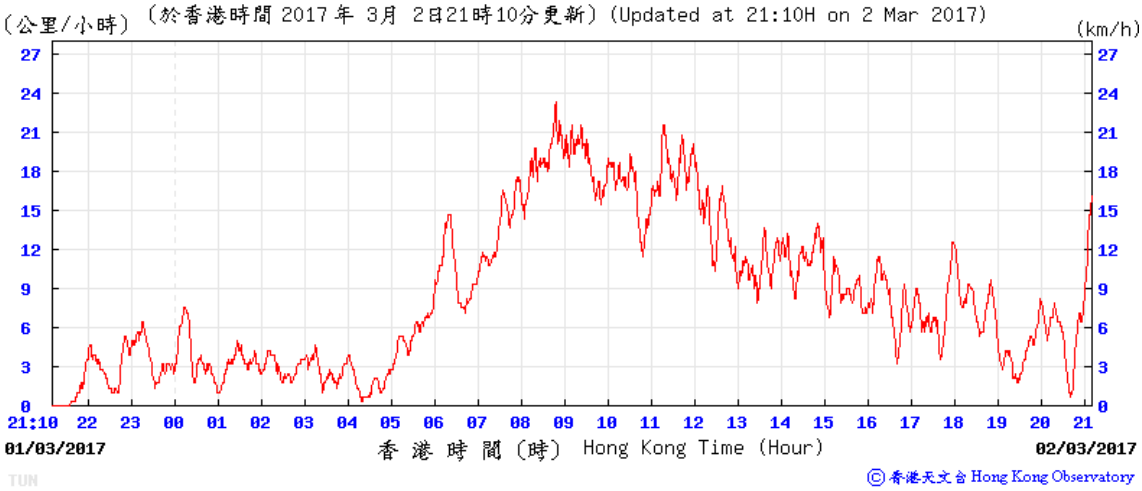


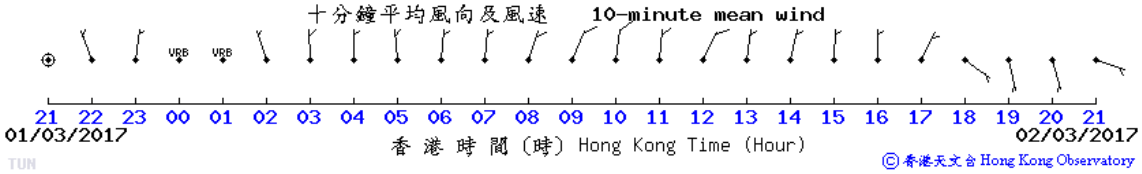




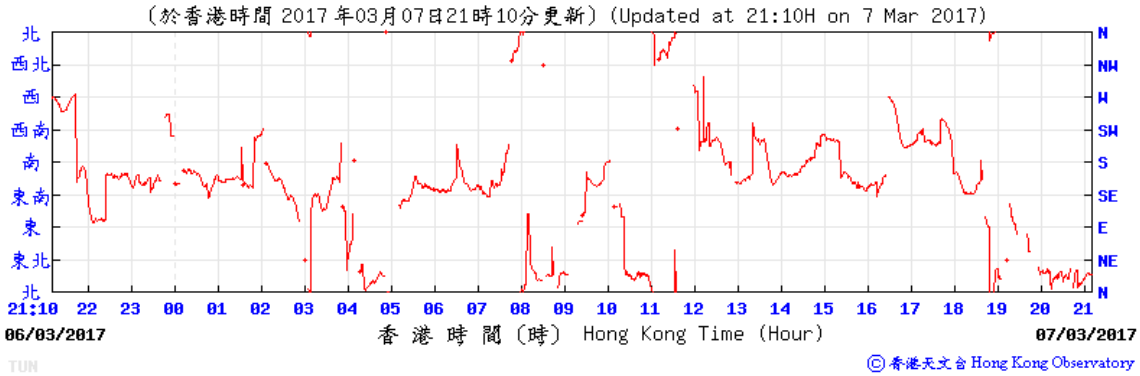
Tuen Mun – 02 March 2017

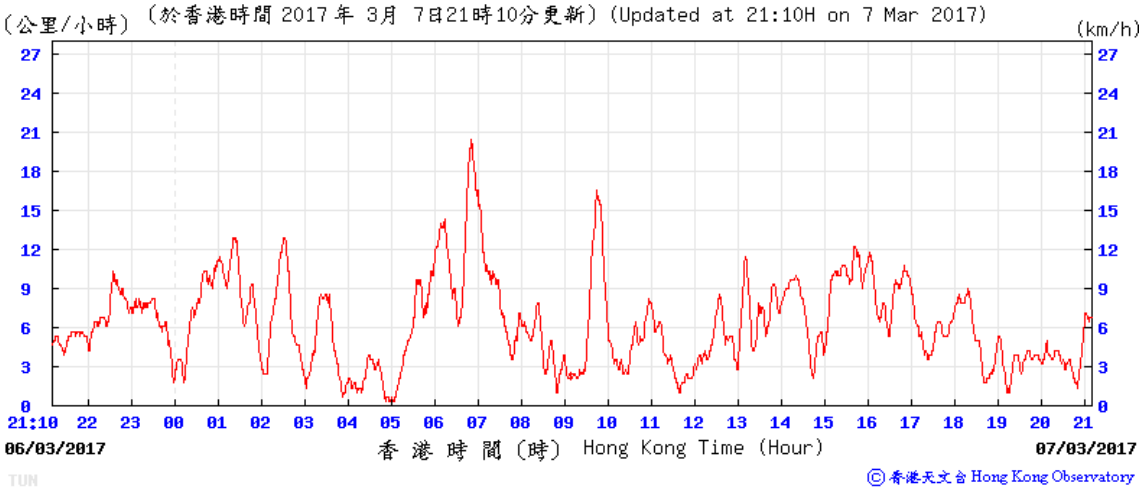


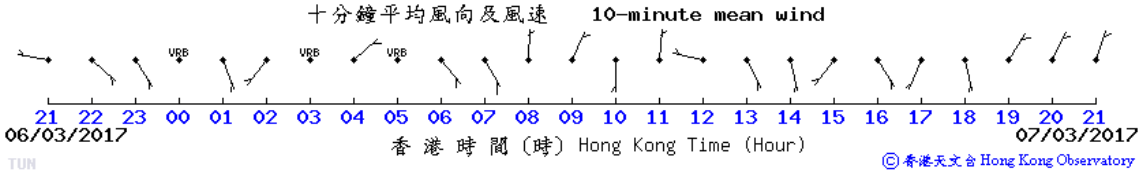




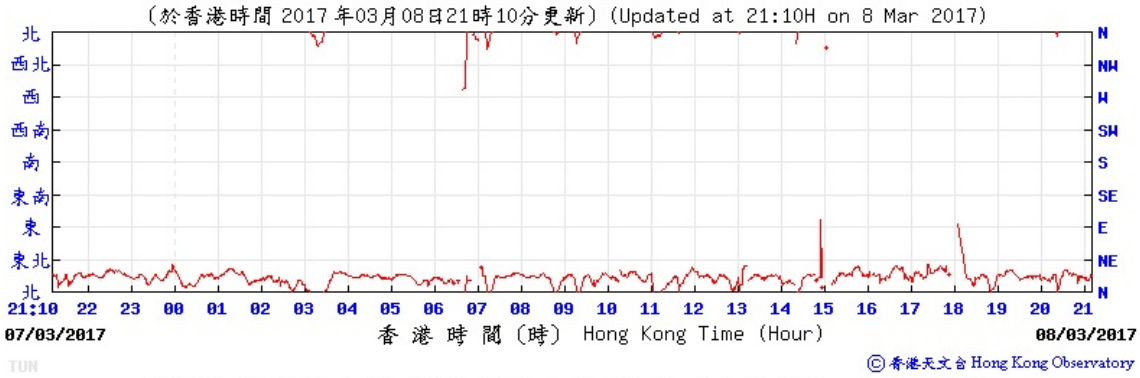
Tuen Mun – 07 March 2017

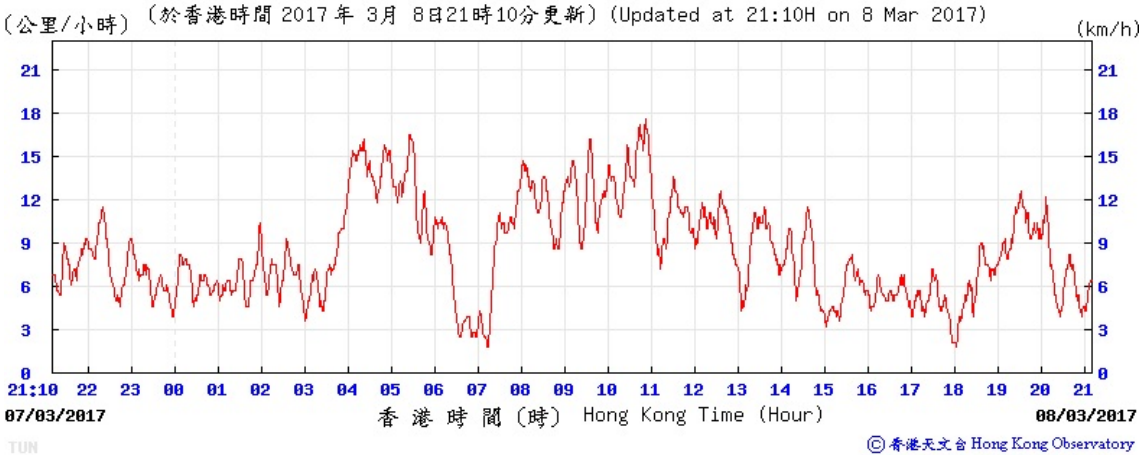


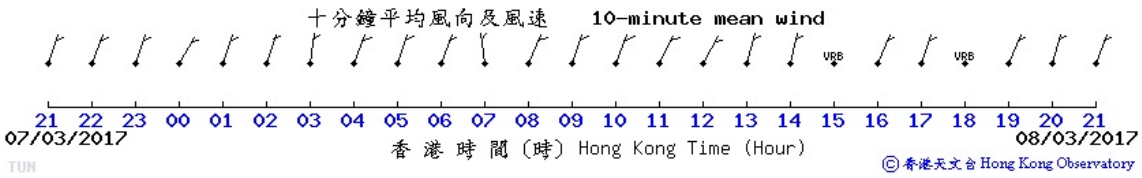




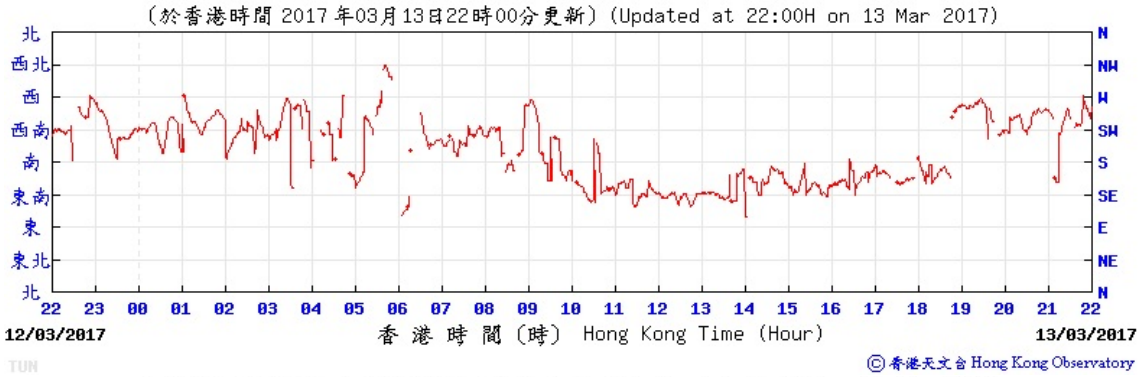
Tuen Mun – 08 March 2017

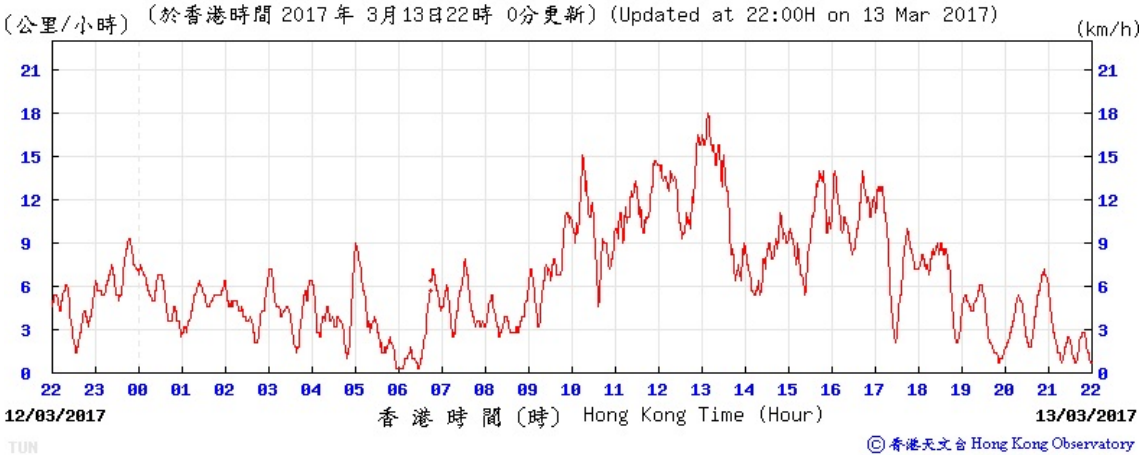


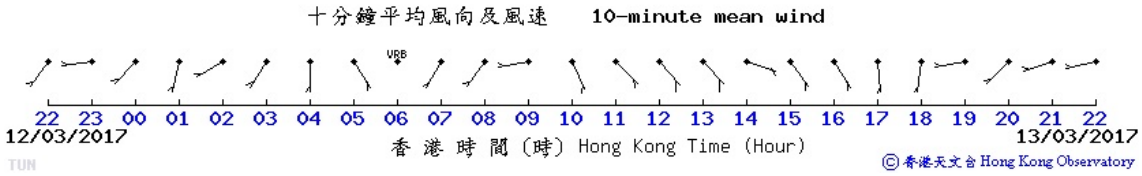




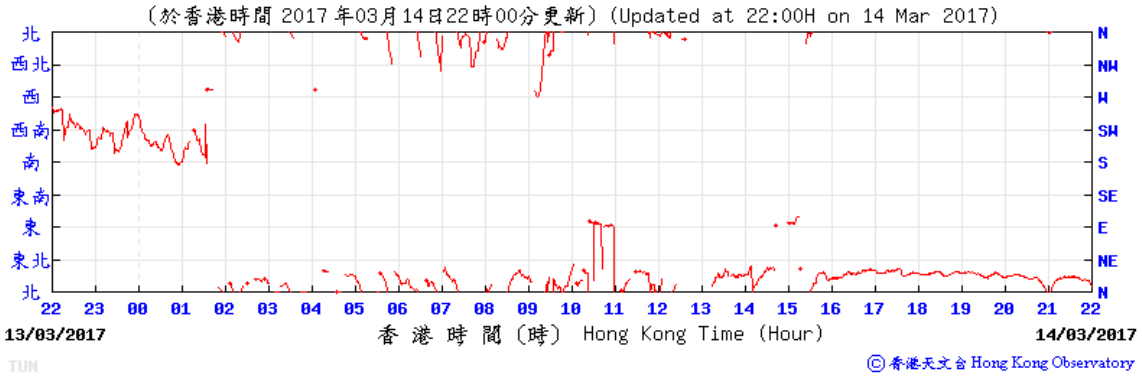
Tuen Mun – 13 March 2017

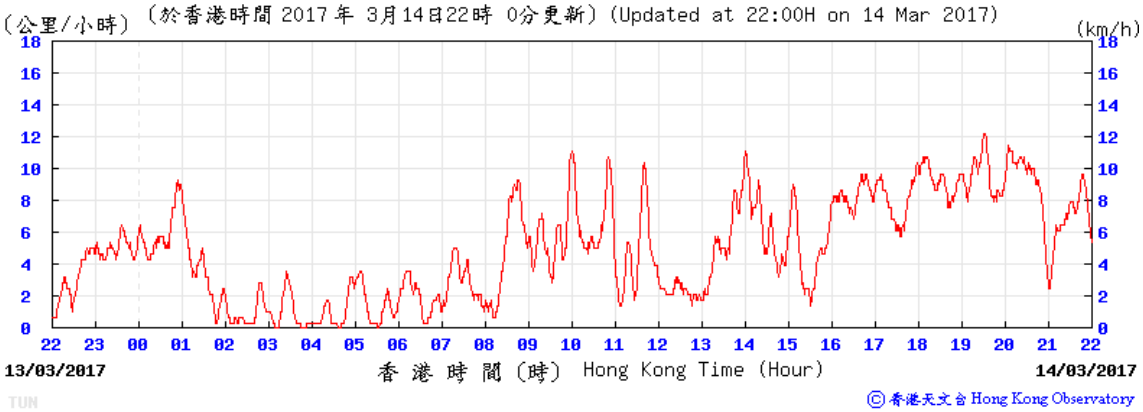


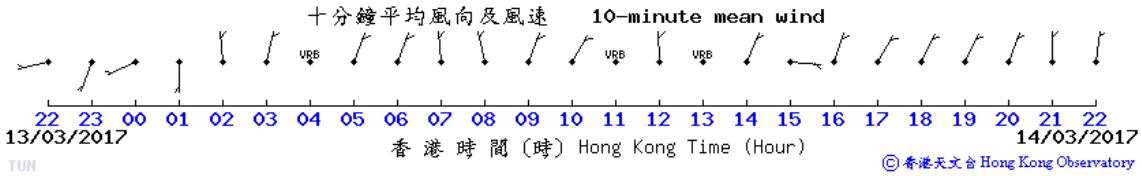




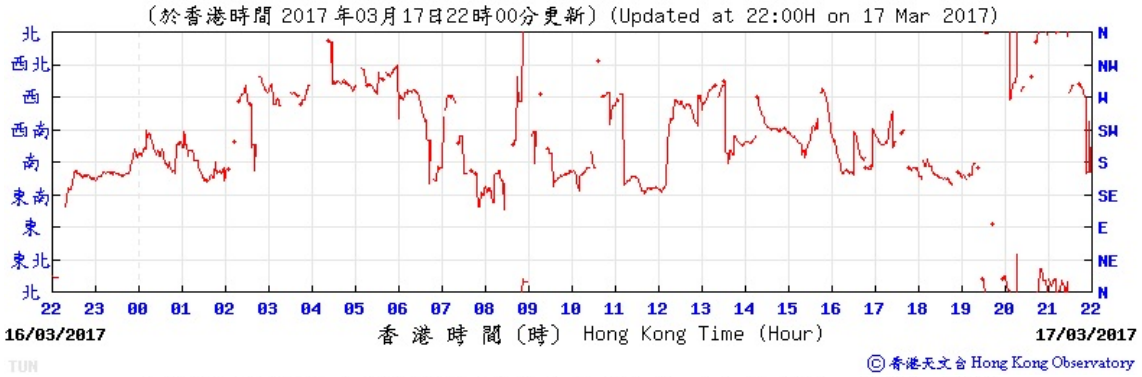
Tuen Mun – 14 March 2017

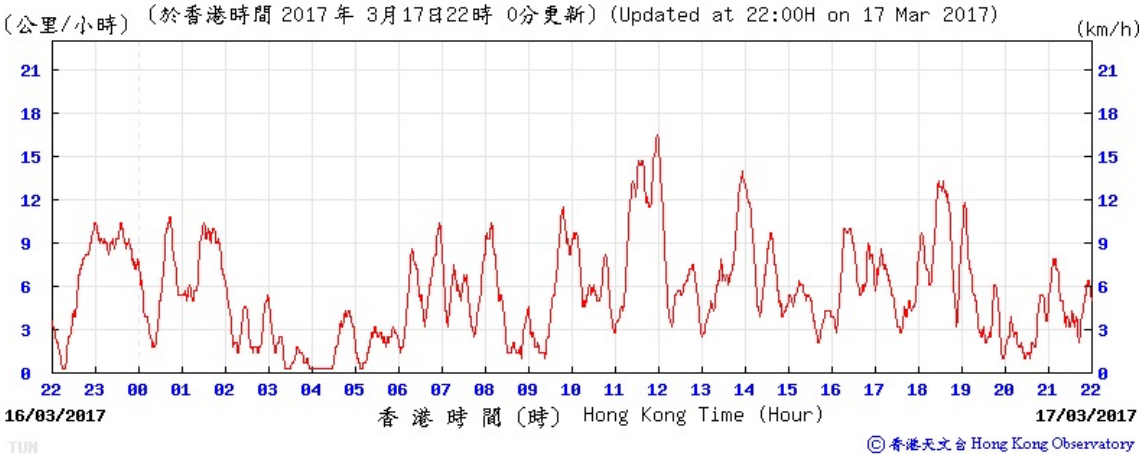


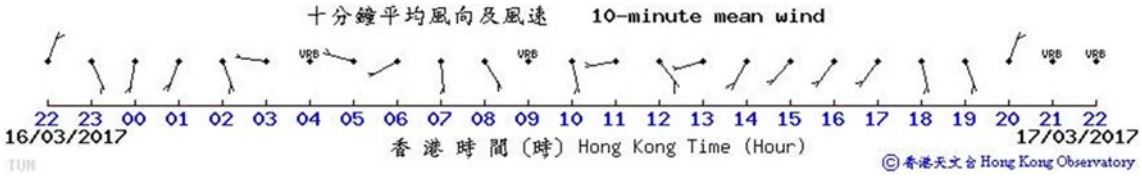




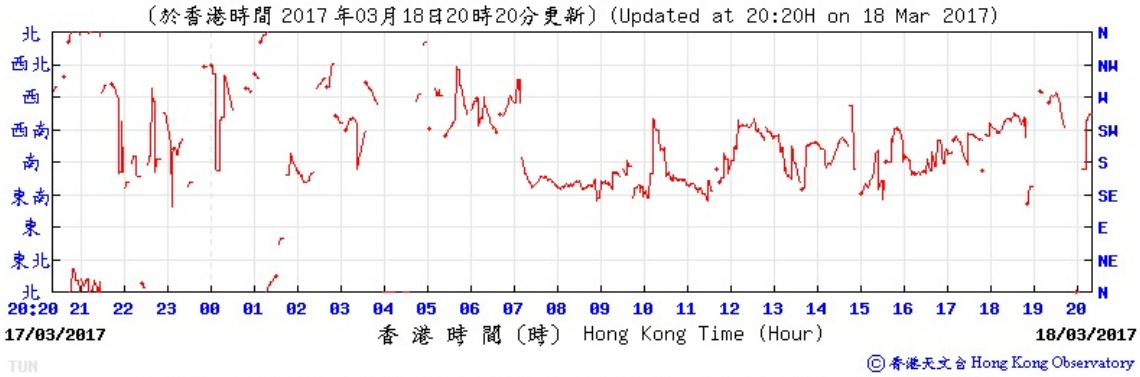
Tuen Mun – 17 March 2017

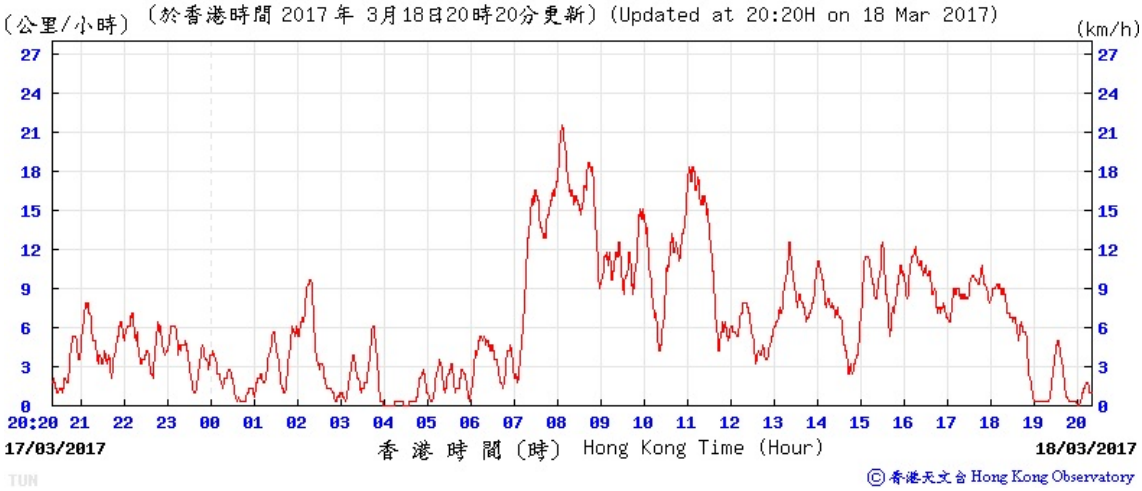


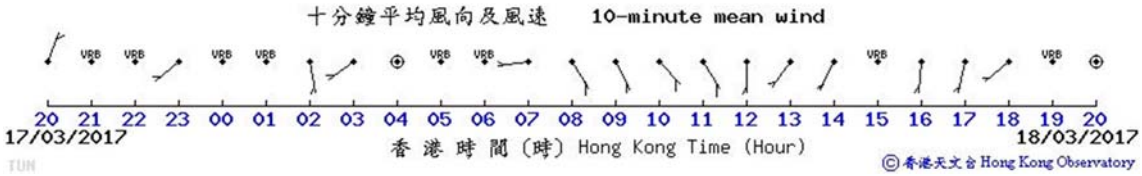




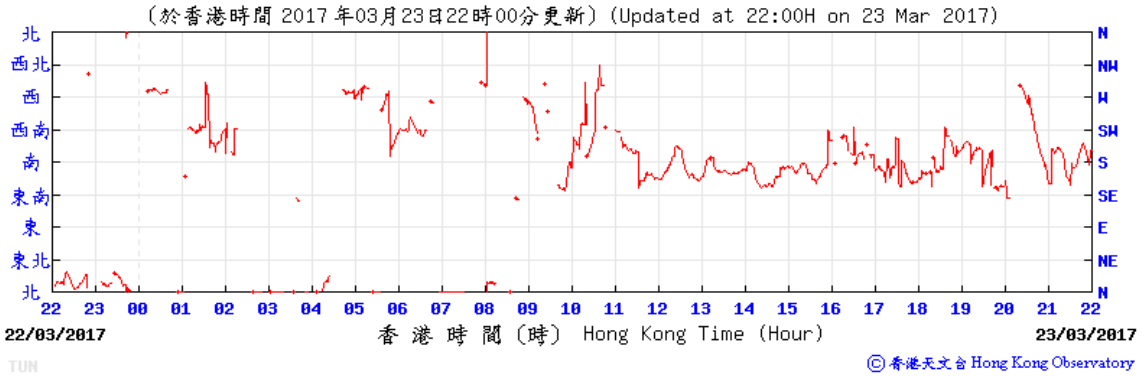
Tuen Mun – 18 March 2017

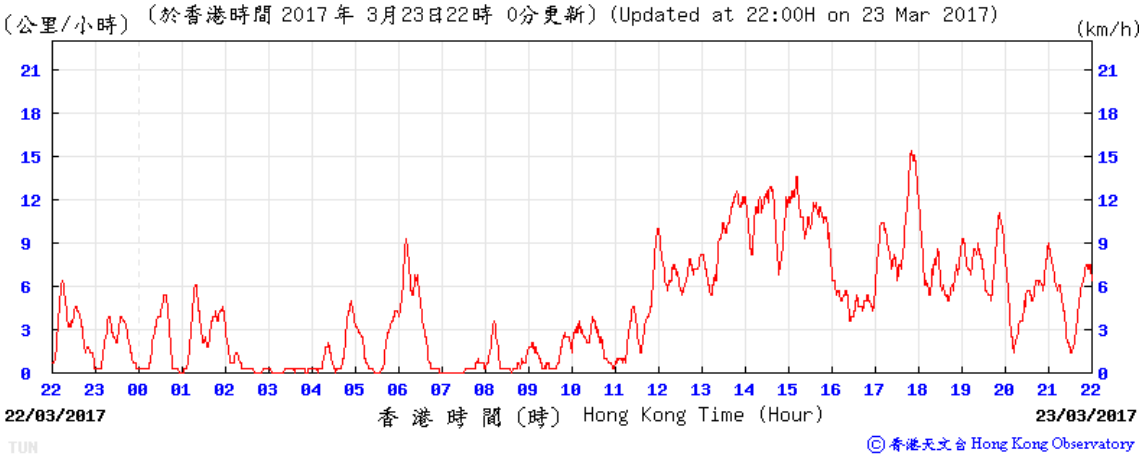


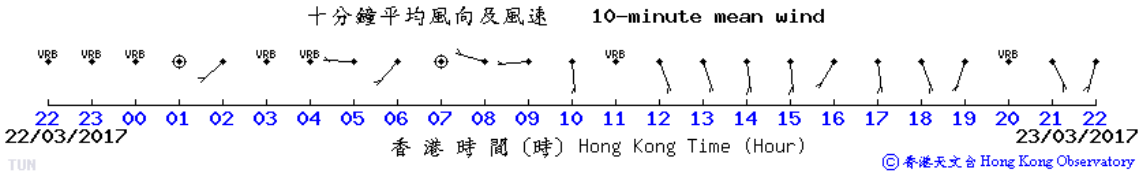




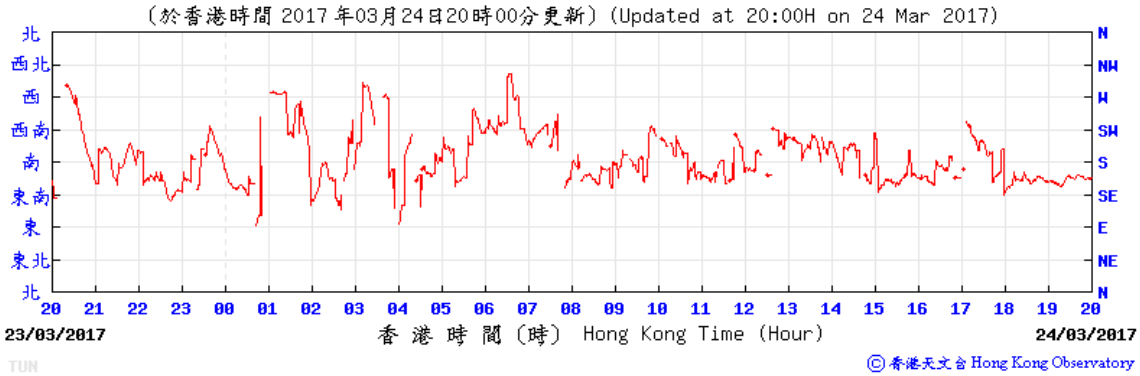
Tuen Mun – 23 March 2017

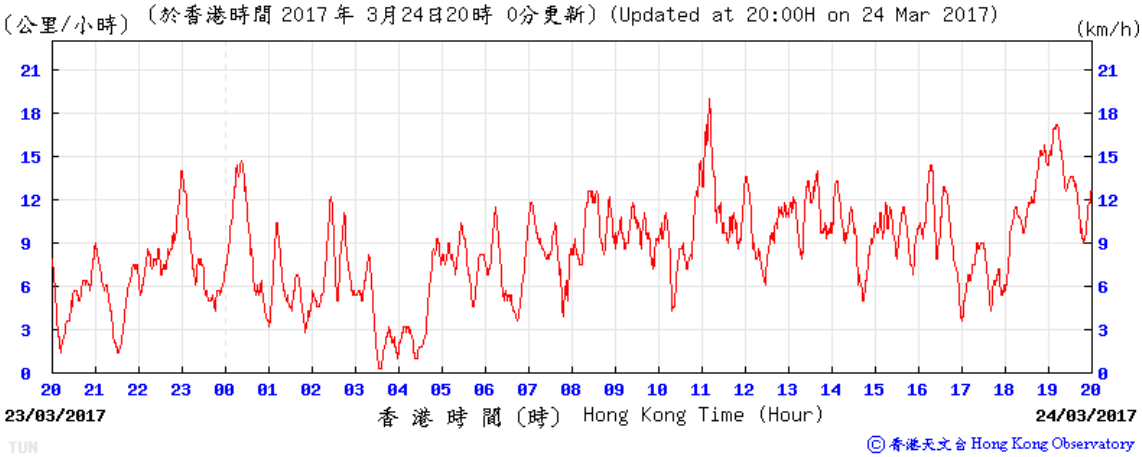


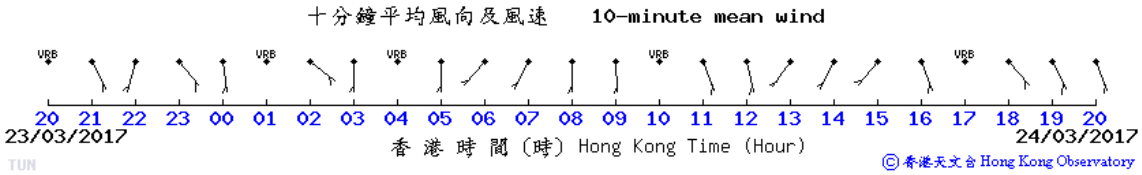




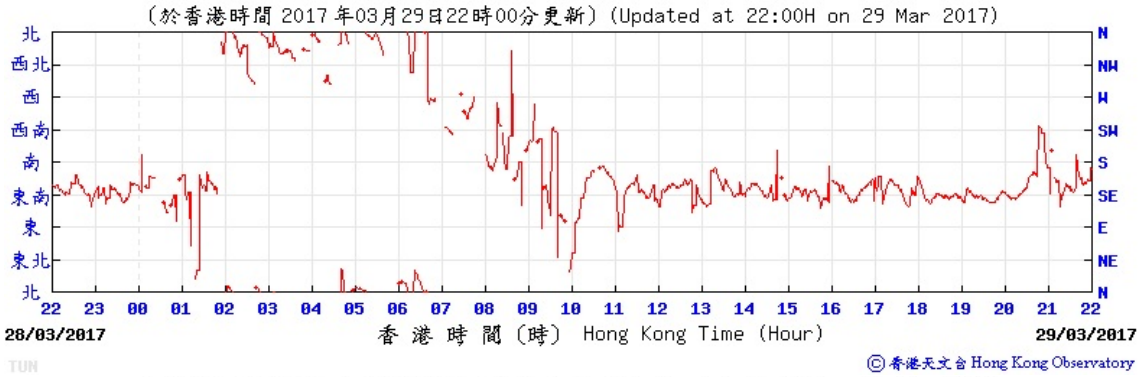
Tuen Mun – 24 March 2017

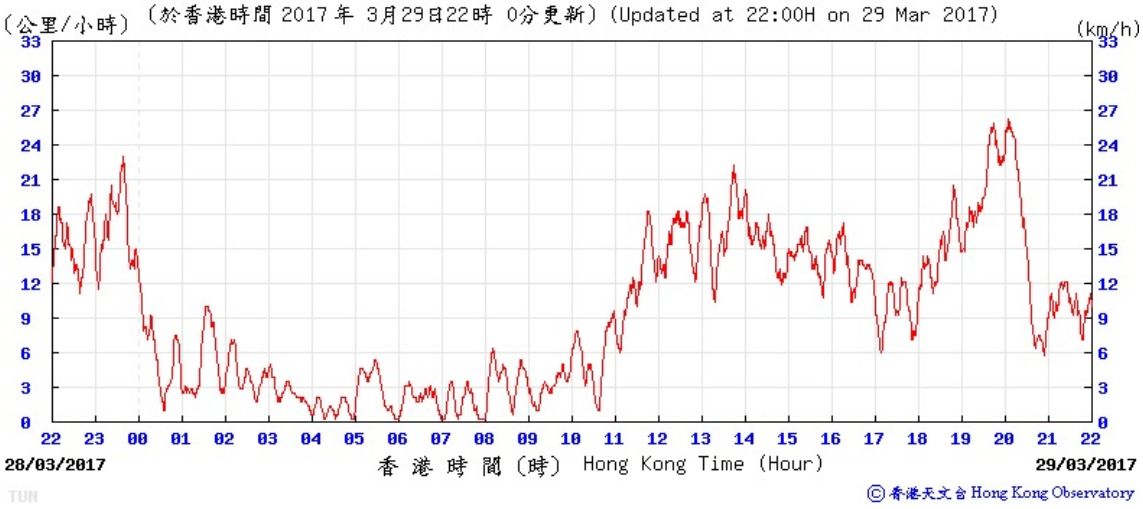


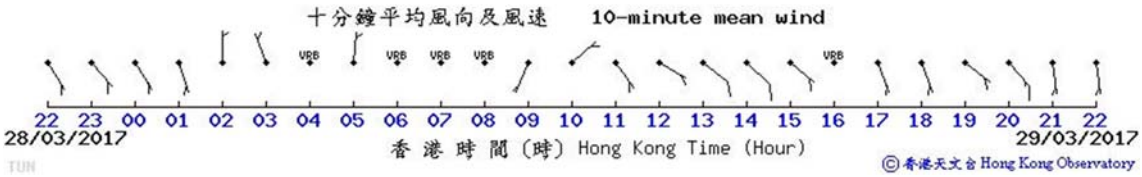




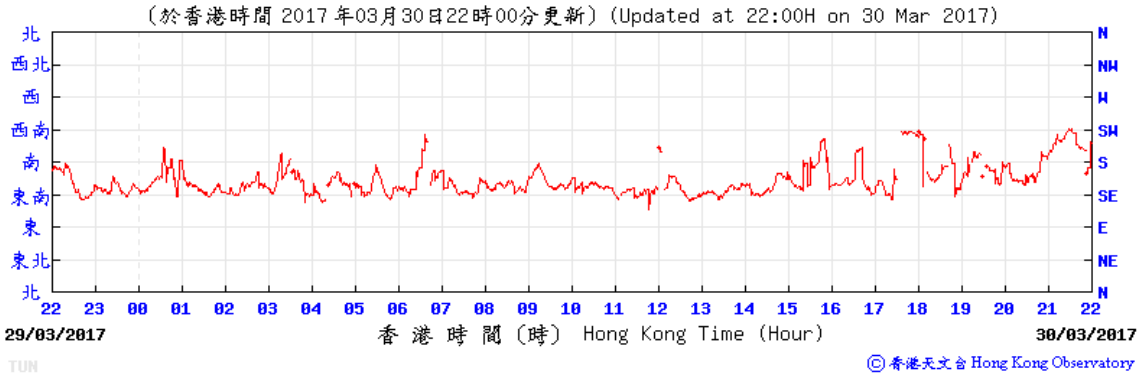
Tuen Mun – 29 March 2017

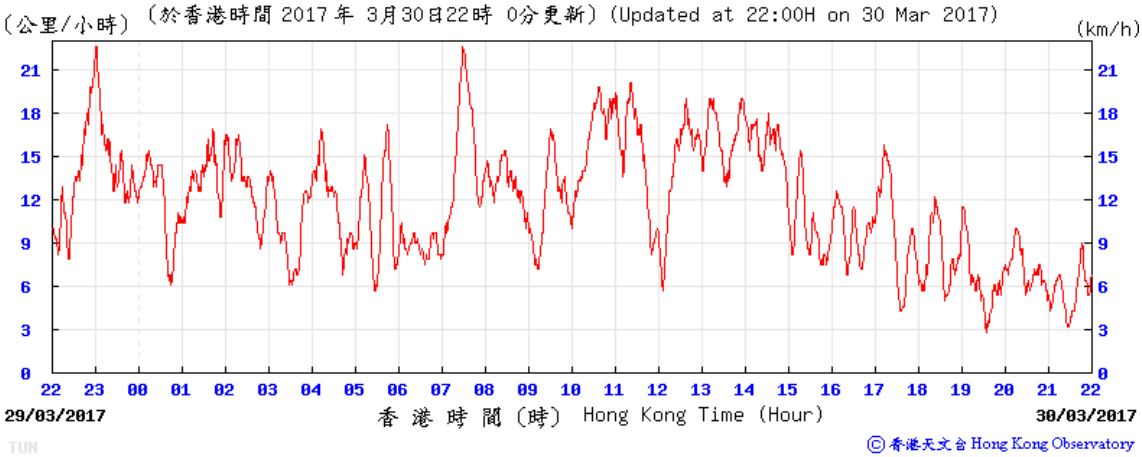


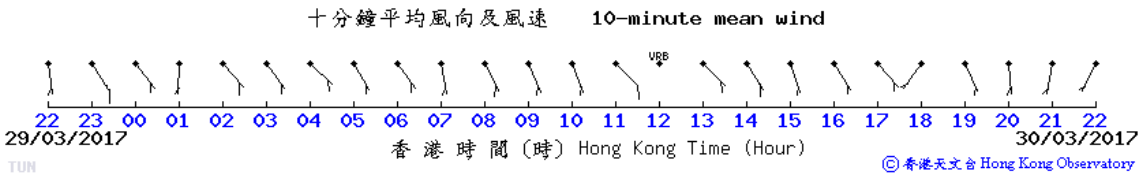




Tuen Mun – 30 March 2017







Appendix I. Waste Flow Table

Appendix A

Name of Department: CEDD

Contract No.: CV/2012/02

Monthly Summary Waste Flow Table for 2017

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
2012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	12.768	0.000	0.000	0.000	12.768	0.000	0.000	0.016	0.000	0.000	0.024
2014	1.380	0.000	1.400	0.000	1.380	0.000	8.570	0.030	0.000	0.175	0.120
2015	6.516	0.000	0.850	0.000	6.516	0.000	0.000	0.000	0.000	0.000	0.276
2016	6.384	0.000	0.750	0.000	6.384	0.000	0.000	0.000	0.000	0.000	0.288
Jan-17	0.024	0.000	0.000	0.000	0.054	0.000	0.000	0.000	0.000	0.000	0.006
Feb-17	0.042	0.000	0.000	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.000
Mar-17	0.162	0.000	0.000	0.000	0.162	0.000	0.000	0.000	0.000	0.000	0.012
Apr-17											
May-17											
Jun-17											
Jul-17											
Aug-17											
Sep-17											
Oct-17											
Nov-17											
Dec-17											
Total	27.276	0.000	3.000	0.000	27.306	0.000	8.570	0.046	0.000	0.175	0.726

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
28.000	0.000	2.400	0.000	28.000	0.500	11.000	1.500	0.000	0.200	0.700

Notes :

(1) The performance targets are given in PS Clause 1.84(14).

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

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

(4) Estimate 6m3 capacity per dump truck

Updated on 7 April 2017

Appendix J. Environmental Mitigation Measures – Implementation Status

Table J.1: Air Quality – Recommended Mitigation Measures

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
*2.57, Table A1	Implementation of the dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation.	✓
*2.57, Table A1	Skip hoist for material transport should be totally enclosed by impervious sheeting;	✓
	Vehicle washing facilities should be provided at every vehicle exit point;	✓
	The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcore;	✓
	Where a site boundary adjoins a road, streets or other areas accessible to the public, hoarding of not less than 2.4 m high from ground level should be provided along the entire length except for a site entrance or exit;	✓
	Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather	P
	Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines;	✓
	Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs	✓
	Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations	✓
	Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the 3 sides;	✓
	Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites	✓
	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.	✓

Table J.2: Noise – Recommended Mitigation Measures

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
*3.16, Table A2	Adoption of quiet plant for following construction activities/scenarios: Site clearance Bulk excavation for sub-structure and site formation Steel fixing concreting of sub-structure Steel fixing and concreting of roof and columns Brick Works & Finishing, M&E Installation & Pipeworks, Landscape Works & Roadworks	✓
	Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program;	✓
	Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction program	✓
	Mobile plant should be sited as far away from NSRs as possible.	✓
	Machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	✓
	Plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from nearby NSRs.	✓

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
	Material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	✓

Table J.3: Water Quality – Recommended Mitigation Measures

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
*4.3, Table A3	At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities.	✓
	Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff.	✓
	All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.	✓
	Measures should be taken to minimize the ingress of site drainage into excavations. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.	✓
	Temporarily exposed slope/soil surfaces should be covered by a tarpaulin or other means and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided to prevent storm runoff from washing across exposed soil surfaces.	✓
	All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.	✓
	Open stockpiles of construction materials or construction wastes on-site of more than 50m^3 should be covered with tarpaulin or similar fabric during rainstorms	✓
^4.4-4.5, Table A3	Construction waste, debris and refuse generated on-site shall be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials shall be kept covered when not being used.	✓
	Oils and fuels shall 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 shall be drained of rainwater after a rain event.	✓
*4.6, Table A3	Construction work force sewage shall be handled by temporary facilities, such as portable chemical toilets should be employed on-site. A licensed contractor shall be responsible for appropriate disposal and maintenance of these facilities	✓

Table J.4: Waste Management – Recommended Mitigation Measures

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
*5.5, Table A4	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 handling procedures	✓
	Provision of sufficient waste disposal points and regular collection of waste	✓

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
	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.	✓
	Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Facility.	✓
*5.6, Table A4	Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.	✓
	Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force	✓
	Proper storage and site practices to minimise the potential for damage or contamination of construction materials.	✓
	Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	✓
	A recording system for the amount of wastes generated, recycled and disposed (including disposal sites) shall be proposed.	✓
	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.	✓
*5.8, Table A4	General refuse should be stored in enclosed bins or compaction units separate from C&D material.	✓
*5.9, Table A4	The excavated C&D material should be reused on-site as fill material as far as possible for general filling. The surplus excavated material should be disposed of at the designated public fill reception facility, as agreed with the Secretary of the Public Fill Committee, for other beneficial uses.	✓
	A trip-ticket system should be included to monitor the disposal of C&D material at the public fill reception facility and landfill.	✓
*5.10, Table A4	The Contractor should register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	✓
	Appropriate labels should be securely attached on each chemical waste container.	✓
	Chemical waste should be disposed of in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	P

Table J.5: Landscape and Visual Impact – Recommended Mitigation Measures

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
*Table 7.2, Table A5	"No-intrusion Zone" should be set up and maintained around the existing trees, woodland, plantation areas and ground vegetation. No activities or storage should be performed inside the "No-intrusion Zone".	N/A
*Table 7.2, Table A 5	Hoarding or boundary fencing for construction should fit into the existing environment when looking from outside.	✓
*Table 7.2, Table A 5	Workers should be properly and cleanly dressed.	✓
	The construction contract should require the main contractor to issue guideline to the construction works to minimize disturbance to existing village, rustic dwellings and workshops. .	✓
*Table 7.2, Table A	Excavation works and demolition of existing squatters / workshops which will be highly visible from surrounding areas should be well planned and with precautions to suppress dust.	✓

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
	Exposed soil shall be covered or 'camouflaged' and watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Silt and erosion shall be controlled by ground barriers around the slope cutting area.	✓
*Table 7.2, Table A	All security floodlights for construction sites shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimize light pollution and night-time glare to nearby village.	✓
	The Contractor shall consider other security measures which shall minimize the visual impacts.	✓
*Table 7.2, Table A	Existing topsoil shall be re-used where possible for new planting areas within the project.	N/A

Table J.6: Others

* EM&A / ^ EP ref:	Recommended measures	Implementation Status
^1.5	A copy of the valid Environmental Permit shall be displayed conspicuously on the Project site(s) at all vehicular site entrances/exits or at a convenient location for public information at all times. The most updated information about the Permit, including any amended Permit, shall be displayed at such locations. If the Permit Holder surrenders a part or whole of the Permit, the notice he send to the Director shall also be displayed at the same locations as the original Permit. The suspended, varied or cancelled Permit shall be removed from display at the Project site(s).	✓
n/a	The required licenses should be obtained by the Contractor (including CNP (if any), WPCO license, etc.)	✓

Legend:

✓	Implemented
×	Not implemented
P	Partially implemented
N/A	Not applicable
N/O	Not observed

Appendix K. Cumulative statistics on complaints, notifications of summons and successful prosecutions

Cumulative statistics for complaints, notifications of summons and successful prosecutions for the Project account for period starting from the date of commencement of construction works (i.e. 22 February 2013) to the end of the reporting month and are summarized in the **Table K.1** below.

Table K.1: Statistics for complaints, notifications of summons and successful prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting month	0	0	0
From 22 Feb 2013 to end of the reporting month	0	0	0

Appendix L. Landscape and Visual Impact Monitoring

Environmental Team Services for Contract No. CV/2012/02 Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun

Landscape and Visual Impact Monitoring Report – March 2017

April 2017

Civil Engineering and Development Department

20/F AIA Kowloon Tower
Landmark East
100 How Ming Street
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
F +852 2827 1823
mottmac.hk

2/F, Civil Engineering and
Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Environmental Team Services for Contract No. CV/2012/02 Construction of Sewage Pumping Station near Tsz Tin Road and Associated Sewerage Works in Area 54, Tuen Mun

Landscape and Visual Impact Monitoring Report – March 2017

April 2017

Civil Engineering and Development Department

Pursuant to Condition 7.7 of EM&A Manual, this "Landscape and Visual Impact Monitoring Report – March 2017" has been reviewed and certified by the Registered Landscape Architect (RLA).

Certified by:

Landscape Architects Registration Board HKSAR
LARB
Aloysius Y.M. Wong
王佑明
R068
香港園境師註冊管理局

Aloysius Wong

Registered Landscape Architect (RLA)

Date 12 April 2017

Contents

1 Introduction 1

1.1 Background 1

1.2 Monitoring Parameters 1

2 Site Findings and Observations 3

2.1 Observations and Recommendations 3

3 Conclusion 5

3.1 Conclusion 5

Annex 6

A. Event and Action Plan 7

B. Landscape Audit Photos 8

Tables

Table 1: Proposed Landscape and Visual Mitigation Measures in Construction Phase 1

Table 2: Proposed Landscape and Visual Mitigation Measures in Operation Phase 2

Table 3: Site Inspection Checklist for Landscape and Visual Mitigation Measures 3

1 Introduction

1.1 Background

Civil Engineering and Development Department (CEDD) has proposed to construct the Tuen Mun Area 54 Sewage Pumping Station (TM54SPS) and the associated sewerage works in Area 54, Tuen Mun under Contract No. CV/2012/02. The construction works commenced on 22 February 2013. This is the March 2017 monthly landscape and visual (L&V) monitoring report presenting the findings of the L&V site audit conducted during the period from 1 to 31 March 2017.

1.2 Monitoring Parameters

According to the EM&A Manual, the L&V monitoring includes auditing the design, implementation and maintenance of L&V mitigation measures to ensure that they are undertaken in accordance with the recommendations of the approved EIA Report (EIA-150/2008). The implementation of L&V mitigation measure ID No. OM3 was revised with the agreement of CEDD and Environmental Protection Department (EPD) in June 2016, due to part of the area for buffer planting (as denoted under part (ii) of mitigation measure ID No. OM3 below in **Tables 1** and **2**) being occupied for provision of pedestrian access upon the request of nearby villagers. A phased implementation approach will be adopted for ID No. OM3, of which part (ii) would be implemented and audited under a subsequent works contract rather than within the contract period of CV/2012/02.

The March 2017 monthly site audit was undertaken on 30 March 2017 at Project site. The L&V mitigation measures recommended in the approved EIA Report (EIA-150/2008) and further revision upon agreement of CEDD and EPD for the construction and operation phases are listed in **Table 1** and **Table 2**.

Table 1: Proposed Landscape and Visual Mitigation Measures in Construction Phase

ID No.	Landscape and Visual Mitigation Measures
CM1	**No-intrusion Zone** To maximize protection to existing trees, woodland, plantation areas and ground vegetation, construction contracts may designate “No-intrusion Zone” to various areas within the site boundary with rigid and durable fencing for each individual no-intrusion zone. The contractor should closely monitor and restrict the site working staff not to enter the “no-intrusion zone”, even for non-direct construction activities and storage of equipment.
CM2	**Hoarding** Hoarding or boundary fencing for construction shall be considered. It should be sensitively designed, subtle, camouflaged and more ‘permeable’ so that they fit into the existing environment when looking from outside.
CM3	**Minimize disturbance of construction workers** To ensure minimum disturbance to existing village, rustic dwellings and workshops users, construction workers may only enter these areas with their helmets and safety vests properly stored or carried in non-transparent bags. They shall also be properly and cleanly dress. The construction contract should require the main contractor to issue guideline to the construction works to minimize disturbance to existing village, rustic dwellings and workshops.
CM4	**Dust and Erosion Control for Exposed Soil** Excavation works and demolition of existing squatters / workshops which will be highly visible form surrounding areas should be well planned and with precautions to suppress dust. Exposed soil shall be covered or ‘camouflaged’ and watered often. Areas that are expected to be left with bare soil for a long

ID No.	Landscape and Visual Mitigation Measures
	period of time after excavation shall be properly covered with suitable protective fabric. Silt and erosion shall be controlled by ground barriers around the slope cutting area.
CM5	**Construction Light** All security floodlights for construction sites shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimize light pollution and night-time glare to nearby village. The Contractor shall consider other security measures which shall minimize the visual impacts.
CM6	**Re-use of Existing Soil** Existing topsoil shall be re-used where possible for new planting areas within the project. The construction program shall consider using the soil removed from one phase for backfilling another. Suitable storage ground, gathering ground and mixing ground may be set up on-site as necessary.
CM7	**Establishment Period** 12 month establishment period for the soft landscape works will be allowed in the main contract. Most construction contracts in Hong Kong require the Contractor to carry out routine horticultural operations, including watering, pruning, weeding, pest control, replacement of dead plants etc. to ensure healthy establishment of new planting during a 12 month establishment period. This period also serves as a kind of warranty / guarantee on the quality of the plants supplied and installed by the Contractor.

Table 2: Proposed Landscape and Visual Mitigation Measures in Operation Phase

ID No.	Landscape and Visual Mitigation Measures
OM1	**Re-instatement of excavated Area** All excavated area and disturbed area for utilities diversion, temporary road diversion, and pipeline works will be reinstated to former conditions, subject to applicable Government Standards.
OM2	**Architectural Treatment for the proposed structures** Compatible design, construction materials and surface finishes of the proposed Sewage Pumping Station should be harmony with proposed GIC development within Site 4A. (Open space and 6 nos. schools development) so as to achieve visual uniformity. Finishing materials shall have due consideration to form, basic color, color/tone variation, micro- and macro-texture, and reflectivity/light absorbance to avoid glare.
OM3 (i)	**Greening for the proposed Sewage Pumping Station** Permeable boundary wall with tree and shrub planting (with 1.2m topsoil depth planting strip) shall be used. The tree planting (21 nos. of trees) should be in heavy standard sized (the stem diameter is exceeding 75mm but not exceeding 150mm measure at a height of 1m from the root collar) to provide early screening effect. The trees would be one or more of following species: *Bauhinia blakeana*, *Bischofia trifoliate*, *Cassia surattensis*, *Callistemon rigidus* and *Magnolia grandiflora*. The shrubs would be one or more of following species: *Codiaeum variegatum*, *Hibiscus rosasinensis*, *Jasminum sambac*, *Osmanthus fragrans* and *Rhododendron pulchrum*. One or more of the following climbers: *Bauhinia glauca*, *Bougainvillea spectabilis*, *Lonicera japonica*, *Parthenocissus himalayana*, *Pyrostegia venusta* and *Wisteria sinensis*, flowers racks or other vertical greening should be installed to soften the monolithic effects of boundary wall. Green roof with shrub and groundcovers is proposed.
OM3 (ii) (See Note)	**Greening for the proposed Sewage Pumping Station** Permeable boundary wall with tree and shrub planting (with 1.2m topsoil depth planting strip) shall be used. Trees with normal standard size (the stem diameter is exceeding 45mm but not exceeding 75mm measure at a height of 1m from the root collar) (14 nos. of trees) and shrub are proposed for buffer planting. The trees would be one or more of following species: *Bauhinia blakeana*, *Bischofia trifoliate*, *Cassia surattensis*, *Callistemon rigidus* and *Magnolia grandiflora*. The shrubs would be one or more of following species: *Codiaeum variegatum*, *Hibiscus rosasinensis*, *Jasminum sambac*, *Osmanthus fragrans* and *Rhododendron pulchrum*. One or more of the following climbers: *Bauhinia glauca*, *Bougainvillea spectabilis*, *Lonicera japonica*, *Parthenocissus himalayana*, *Pyrostegia venusta* and *Wisteria sinensis*, flowers racks or other vertical greening should be installed to soften the monolithic effects of boundary wall.

Note: This item is proposed to be carried out upon future development of Site 4A under the future site formation project for Site 4A(E) and Site 4A(S).

2 Site Findings and Observations

2.1 Observations and Recommendations

During site audit, implementation of recommended mitigation measures where applicable was observed. **Table 3** summarizes the observations and recommendations for the site audit this month.

Table 3: Site Inspection Checklist for Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measures	Observation	Recommendation
CM1	"No-intrusion Zone(s)" with rigid and durable fencing has/have been designated with no working staff entry, no construction activity and no storage of equipment.	Not applicable	No
CM2	Sensitively designed, subtle, camouflaged and more permeable hoardings are used.	Not applicable	No
CM3	Construction workers are properly and cleanly dressed with their helmets and safety vests properly stored or carried in non-transparent bags.	Yes	No
CM4	Exposed soil is covered or 'camouflaged' and watered. Areas that are expected to be left with bare soil for a long period of time after excavation are properly covered with suitable protective fabric. Silt and erosion are controlled by ground barriers around the slope cutting area.	Yes	No
CM5	All security floodlights for construction sites are equipped with adjustable shield, frosted diffusers and reflective covers, and carefully controlled to minimize light pollution and night-time glare to nearby village.	Not applicable	No
CM6	Existing topsoil is re-used where possible for new planting areas within the project site. Soil removed is used for backfilling within the project site. Suitable storage ground, gathering ground and mixing ground have been set up on-site.	Not applicable	No
CM7	Routine horticultural operations is undertaken to ensure healthy establishment of new planting during the 12-month establishment period.	Not applicable	No
OM1	All excavated area and disturbed area for utilities diversion, temporary road diversion, and pipeline works are reinstated to former conditions.	Not applicable	No
OM2	Compatible design, construction materials and surface finishes of the proposed Sewage Pumping Station are in harmony with proposed GIC development within Site 4A. (Open space and 6 nos. schools development).	Not applicable	No
OM3 (i)	Permeable boundary wall with tree and shrub planting (with 1.2m topsoil depth planting strip) is used. The tree planting (21 nos. of trees) is in heavy standard sized (the stem diameter is exceeding 75mm but not exceeding 150mm measure at a height of 1m from the root collar) to provide early screening effect. Flower racks or other vertical greening are installed to soften the monolithic effects of boundary wall. Green roof with shrub and groundcovers is provided.	Not applicable	No
OM3 (ii) (See Note)	Permeable boundary wall with tree and shrub planting (with 1.2m topsoil depth planting strip) is used. Trees with normal standard size (the stem diameter is exceeding 45mm but not exceeding 75mm measure at a height of 1m from the root collar) (14 nos. of trees) and shrub are provided as buffer planting. Flower racks or other vertical greening are installed to soften the monolithic effects of boundary wall.	N/A	N/A

Note: This item would not be achieved within this contract period of CV/2012/02 and is proposed to be carried out upon future development of Site 4A under the future site formation project for Site 4A(E) and Site 4A(S).

In case of non-conformity, specific recommendations will be made and actions will be proposed in accordance with the Event and Action Plan as shown in **Annex A**.

Photographs taken during the site audit are shown in **Annex B**.

3 Conclusion

3.1 Conclusion

The March 2017 monthly landscape and visual site audit was undertaken on 30 March 2017 to check the design, implementation and maintenance of L&V mitigation measures at Project site of Tuen Mun Area 54 Sewage Pumping Station (TM54SPS) and the associated sewerage works in Area 54.

All recommended L&V mitigation measures have been implemented where applicable. No specific recommendations are made.

Annex

A. Event and Action Plan 7
B. Landscape Audit Photos 8

A. Event and Action Plan

Event	Action			
	ET Leader	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify source 2. Inform the IEC and ER. 3. Discuss remedial actions with the IEC, the ER and Contractor. 4. Monitor remedial action until rectification has been completed.	1. Check report. 2. Check the Contractor's working method. 3. Discuss with the ER and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures.	1. Notify the Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake remedial measures or any necessary replacement.
Repeated non-conformity	1. Identify source. 2. Notify IEC and the ER. 3. Increase monitoring (site audit) frequency. 4. Discuss remedial actions with the IEC, the ER and the Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If exceedance stops, cease additional monitoring (site audit).	1. Check report. 2. Check the Contractor's working method. 3. Discuss with the ER and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Notify the Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake remedial measures or any necessary replacement.

B. Landscape Audit Photos

	CM3 All on site staff were wearing uniform and cleanly dressed.
	CM 4 Exposed soil is covered or watered often.