

# **Development at West Kowloon Cultural District**

**Monthly Environmental Monitoring and Audit (EM&A) Report  
for August 2021  
09 September 2021**

In accordance with the Environmental Permit, Condition 3.4, this Monthly EM&A Report has been certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC) as complying with the requirements as set out in Sections 1, 10, 11, 12 and 13 of the EM&A Manual.

**Certified by:**



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Environmental Team Leader (ETL)

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**Date**

13 September 2021

**Verified by:**



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Independent Environmental Checker (IEC)

Meinhardt Infrastructure and Environment Ltd

**Date**

13 Sep 2021

This Report Consists of :

**Part-1: EM&A at Lyric Theatre Complex**

**and**

**Part-2: EM&A for Foundation, Excavation  
and Lateral Works for Integrated  
Basement and Underground Road  
in Zone 2A**

# Part-1: EM&A at Lyric Theatre Complex



# Lyric Theatre Complex

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# Executive summary

Mott MacDonald Hong Kong Limited (MMHK) was commissioned to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the construction of M+ Museum Main Works (Contract No.: CC/2015/3A/022) and Lyric Theatre Complex including the Foundation Works (Contract No.: CC/2015/3A/014), L1 Contract (Contract No. CC/2017/3A/030) and L2 Contract (Contract No. CC/2017/3A/031) at West Kowloon Cultural District (WKCD) (The Project) as part of the WKCD development. The Project Proponent is the West Kowloon Cultural District Authority (WKCDA). The construction works and EM&A programme for M+ Museum was commenced on 31 October 2015 and completed on 28 February 2021; while the construction works and EM&A programme for Lyric Theatre Complex (L1 and L2 Contracts) was commenced on 1 March 2016, and the EM&A programme for L1 Contract was completed on 30 June 2021.

The overall works for the WKCD fall under two separate categories of Designated Project (DP) of the Environmental Impact Assessment Ordinance (EIAO), namely an “engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100 000” (Item 1 of Schedule 3) and “an underpass more than 100m in length under the built areas” (Item A.9, Part I, Schedule 2). An Environmental Permit No. EP-453/2013/B (EP) was issued with respect to the “Underpass Road and Austin Road Flyover Serving the West Kowloon Cultural District” which specifically includes the abovementioned category of DP under Item A.9, Part I, Schedule 2 of the EIAO.

This Monthly EM&A Report presents the monitoring works at Lyric Theatre Complex (L2 Contract) from 1 August to 31 August 2021.

## **Exceedance of Action and Limit Levels**

There was no breach of Action or Limit levels for Air Quality (1-hour TSP and 24-hour TSP) and Noise in this reporting month.

## **Implementation of Mitigation Measures**

Construction phase weekly site inspections were carried out on 4, 11, 18 and 25 August 2021 for Lyric Theatre Complex (L2 Contract) to confirm the implementation measures undertaken by the Contractors 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**.

Landscape and visual impact inspections were conducted as part of the abovementioned weekly site inspections during the reporting month. No adverse comment on landscape and visual aspects was made during these inspections.

## **Record of Complaints**

Four environmental complaints were recorded in the reporting month.

## **Record of Notifications of Summons and Successful Prosecutions**

No notifications of summons and successful prosecutions were recorded in the reporting month.

### **Future Key Issues**

The major site works for L2 to be commissioned in the coming month include:

- LTC construction
  - Structure (Slab, wall, columns and beam)
    - Falsework and formwork erection
    - Reinforcement work
    - Concrete work
  - ABWF & MEP work
  - LT temporary deck
- ASDA and Lyric Theatre Promenade
  - Structure and BS works
- DSC cofferdam (Cofferdam A)
  - DCS related works
- Modification to existing pump cell
  - ABWF works
- Extended basement
  - ABWF & MEP work
  - RC water tank
  - RC duct slab (Forms/Rebar/Concrete)
  - Carpark area plaster and paint
- Underpass and Associated Area
  - RC Structure (Waffle Ceiling)
  - ABWF & MEP work
- M+ Day 2 Works
  - Hoarding Work
- P32 Interim Development
  - Structure works (Scaffold/forms/rebar concrete)

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

# 1 Introduction

## 1.1 Background

Mott MacDonald Hong Kong Limited (MMHK) was commissioned to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the construction of M+ Museum Main Works (Contract No.: CC/2015/3A/022) and Lyric Theatre Complex including the Foundation Works (Contract No.: CC/2015/3A/014), L1 Contract (Contract No. CC/2017/3A/030) and L2 Contract (Contract No. CC/2017/3A/031) at West Kowloon Cultural District (WKCD) (The Project) as part of the WKCD development. The Project Proponent is the West Kowloon Cultural District Authority (WKCDA). The construction works and EM&A programme for M+ Museum was commenced on 31 October 2015 and completed on 28 February 2021; while the construction works and EM&A programme for Lyric Theatre Complex (L1 and L2 Contracts) were commenced on 1 March 2016, and the EM&A programme for L1 Contract was completed on 30 June 2021.

The overall works for the WKCD fall under two separate categories of Designated Project (DP) of the Environmental Impact Assessment Ordinance (EIAO), namely an “engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100 000” (Item 1 of Schedule 3) and “an underpass more than 100m in length under the built areas” (Item A.9, Part I, Schedule 2). An Environmental Permit No. EP-453/2013/B (EP) was issued with respect to the “Underpass Road and Austin Road Flyover Serving the West Kowloon Cultural District” which specifically includes the abovementioned category of DP under Item A.9, Part I, Schedule 2 of the EIAO. The captioned projects include part of the abovementioned underpass road located within the site boundary also falls under this same category.

The M+ Museum development aims to provide an iconic presence for the M+ Museum, semi-transparent vertical plane, housing education facilities, a public restaurant and museum offices. At ground and lower levels, generous access will be provided to the park and other West Kowloon Cultural District facilities, alongside a public resource centre, theatres, retail and dining, and back-of-house functions.

The 1,200-seat Lyric Theatre Complex will be Hong Kong’s first world-class facility for dance performances, including ballet, contemporary and Chinese dance forms. In the run up to the opening of further major performing arts venues in the WKCD, it will also be used for a wide variety of performing arts events including drama, opera and musical performances. The Lyric Theatre Complex will act as a platform for Hong Kong’s leading arts organisations and be a new major venue to show programmes from Asia and worldwide.

The Monthly EM&A Report is prepared in accordance with the Condition 3.4 of the Environmental Permit No. EP-453/2013/B. This Monthly EM&A Report presents the monitoring works at Lyric Theatre Complex (L2 Contract) from 1 August to 31 August 2021. 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 Status of Construction Works in the Reporting Period

During the reporting period, construction works at L2 undertaken include:

- LTC construction
  - Structure (Slab, wall, columns and beam)
    - Falsework and formwork erection
    - Reinforcement work
    - Concrete work
  - ABWF & MEP work
- ASDA and Lyric Theatre Promenade
  - Structure and BS works
- DSC cofferdam (Cofferdam A)
  - Install DCS pipes/ valve/ fittings (DN500/ DN1400) outside chamber Construction of Valve Chamber
  - Construction of valve chamber (upper and middle portion)
- Modification to existing pump cell
  - ABWF works
- Extended basement
  - ABWF & MEP work
  - RC Water Tank
  - RC Duct Slab (Forms/Rebar/Concrete)
- Underpass and Associated Area
  - RC Structure (Waffle Ceiling)
- M+ Day 2 Works
  - Hoarding Work
- P32 Interim Development
  - Structure works (Scaffold/forms/rebar concrete)

The Construction Works Programme of Lyric Theatre Complex (L2 Contract) is provided in **Appendix B**. A layout plan of the Project is provided in **Figure 1**. Please refer to **Table 4.1** on the status of the environmental licenses.

### 1.4 Summary of EM&A Requirements and Alternative Monitoring Locations

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

#### 1.4.1 EM&A Requirements

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	AM1 - International Commerce Centre	At least once every 6 days
	1-Hour TSP	AM1 - International Commerce Centre	At least 3 times every 6 days
	24-Hour TSP	AM2 - The Harbourside Tower 1	At least once every 6 days
	1-Hour TSP	AM2 - The Harbourside Tower 1	At least 3 times every 6 days
Noise	Leq, 30 minutes	NM1- The Harbourside Tower 1	Weekly
Landscape & Visual	Monitor implementation of proposed mitigation measures during the construction stage	As described in Table 9.1 and 9.2 of the EM&A Manual	Bi-weekly

### 1.4.2 Alternative Monitoring Locations

In the context of the monitoring activities at M+ Museum and the Lyric Complex, three monitoring stations had been considered, including AM1 (International Commerce Centre), AM2 (The Harbourside Tower 1) for air monitoring, and NM1 (The Harbourside Tower 1) for noise monitoring. Other monitoring locations (i.e. AM3 to AM5 and NM2 to NM5) were so far away from M+ Museum and the Lyric Complex and could not be representative for impact monitoring.

The Harbourside management office formally rejected our proposal of setting up air quality and noise monitoring equipment on its premises at the podium level of Tower 1 (AM2/NM1) on 10 November 2015. Nevertheless, a suitable air quality monitoring location at AM2 was identified on the ground floor in front of The Harbourside Tower 1, which is at the same location as that of baseline monitoring for consistency. No management approval is required on the ground floor for conducting the air monitoring. However, the electricity supply at AM2 was suspended from 31 August 2016. In order to have a more secure electricity supply, an alternative air monitoring location (AM2A) was identified at Austin Road West opposite to The Harbourside Tower 1, which is close to Lyric Theatre Complex site entrance. This alternative air monitoring location was approved by EPD on 28 September 2016. Due to the works programme, the air monitoring location AM2A has been relocated to the alternative monitoring location AM2B at the 1st floor of Gammon's site office, which was approved by EPD on 21 February 2019. In view of the upcoming construction works to be undertaken at the air monitoring station AM2B, AM2B was no longer available for conducting the impact air quality monitoring. Hence, an alternative air monitoring location was identified on the ground floor in front of The Harbourside Tower 1 (AM2) which is at the same location as the baseline monitoring and this previously approved monitoring location had also been used for the EM&A Programme from November 2015 to August 2016, the relocation was approved by EPD on 27 May 2021.

Alternative noise monitoring location was identified at The Arch (NM2); however, The Arch management office formally rejected our proposal of setting up noise monitoring equipment on its premises on 23 November 2015. On the other hand, noise monitoring at G/F of Harbourside could not be representative. However, approval from the management office of the International Commerce Centre has been granted on 29 February 2016 for conducting noise monitoring at the alternative noise monitoring location identified at the podium floor (NM1A) which is free from screening to the construction activities.

In short, 2 air quality monitoring stations and 1 noise impact monitoring station were confirmed for the impact monitoring.

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, and landscape and visual are shown in **Appendix D**.

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**.

## 2 Impact Monitoring Methodology

### 2.1 Introduction

For air quality and noise, the monitoring methodology, including the monitoring locations, monitoring equipment used, monitoring parameters, and frequency and duration etc., for air quality and noise are detailed 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**.

For landscape and visual impact, the relevant EM&A monitoring requirements and details are also presented in this Section.

### 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**

Parameter	Frequency	Duration
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

Currently, the works under the captioned project are confined in the western part of the WKCD site. Therefore, only the monitoring stations AM1 and AM2 were set up at the proposed locations in accordance with updated EM&A Manual. Location of the monitoring station is given in **Table 2.2** and shown in **Figure 1**.

**Table 2.2: Air Quality Monitoring Station**

Monitoring Station	Location
AM1	International Commerce Centre (ICC)
AM2	The Harbourside Tower 1 – Ground Floor

#### 2.2.3 Monitoring Equipment

For 24-hour TSP air quality monitoring, High Volume Sampler (HVS) was used at air monitoring station AM1 and portable direct reading dust meter was used at air monitoring station AM2 due to the unavailability of power supply for HVS at / in the vicinity of the AM2. The portable direct reading dust meter is capable of producing comparable results as that by the HVS method. For 1-hour TSP monitoring, portable direct reading dust meter was used for the measurement.

**Table 2.3** summarizes the equipment used in the impact air quality monitoring. Copies of the calibration certificates for the calibration kit and portable dust meters are attached in **Appendix F**.

**Table 2.3: TSP Monitoring Equipment**

Equipment	Model
<b>24-hour TSP monitoring</b>	
High Volume Sampler	TE-5170 (Serial No: 0767)
Calibrator	TE-5025A (Orifice I.D.: 2454)
Portable direct reading dust meter	Sibata LD-5R (Serial No.: 620401)
<b>1-hour TSP monitoring</b>	
Portable direct reading dust meter	Sibata LD-3B (Serial No.: 245833 and 276015)

Calibration of the HVS (five point calibration) using Calibration Kit was carried out every two months. The HVS calibration orifice will be calibrated annually. Calibration certificate of the TE-5025A Calibration Kit and the HVS are provided in **Appendix F**.

The portable direct reading dust meter should be determined periodically (e.g. annually) by the HVS to check the validity and accuracy of the results measured by direct reading method.

#### 2.2.4 Monitoring Methodology

##### 24-hour TSP Monitoring (HVS)

###### 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<sup>3</sup>/min. The range specified in the EM&A Manual was between 0.6-1.7 m<sup>3</sup>/min.
- The programmable timer was set for a sampling period of 24 hours, 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 upon installation and thereafter at bi-monthly intervals. The calibration kits were calibrated annually.

## Weather Condition

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

## 24-hour TSP Monitoring (Portable direct reading dust meter)

### Field Monitoring

The measuring procedures of the portable direct reading 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 24 hours for the 24-hour TSP measurement.
- Push “START/STOP” to start the 24-hour TSP measurement.
- Regular checking of the time period setting to ensure monitoring time of 24 hours.

#### **Maintenance and Calibration**

- The portable direct reading 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**

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

### **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**

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

## 2.3 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 hours.

**Table 2.4: Noise Monitoring Parameters, Period and Frequency**

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

### 2.3.2 Monitoring Location

Currently, the works under the captioned project are confined in the western part of the WKCD site. Therefore, only the monitoring station NM1A was set up at the proposed location in accordance with updated EM&A Manual. Location of the monitoring station is given in **Table 2.5** and shown in **Figure 1**.

**Table 2.5: Noise Monitoring Station**

Monitoring Station	Location
NM1A	International Commerce Centre (ICC)

### 2.3.3 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 2.6** summarizes the noise monitoring equipment model being used.

**Table 2.6: Noise Monitoring Equipment**

Monitoring Station	Equipment Model	
	Integrating Sound Level Meter	Calibrator
NM1A	Rion NL-52 (Serial No. 00131627)	LARSON DAVIS CAL200 (Serial No.11334)

### 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.

#### 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

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

## 2.4 Landscape and Visual

### 2.4.1 Monitoring Program

**Table 2.7** details the monitoring program (as proposed in the WKCD EIA report) for landscape and visual impact during the construction phase.

**Table 2.7: Monitoring Program for Landscape and Visual Impact during Construction Phase**

Stage	Monitoring Task	Frequency	Report	Approval
Construction	Monitor implementation of proposed mitigation measures during the construction stage.	Bi-weekly	ET to report on Contractor's compliance	Counter-signed by IEC

During the landscape and visual impact monitoring, any changes in relation to the landscape and visual amenity should be monitored with reference to the baseline conditions of the site. In addition, mitigation measures were proposed in the WKCD EIA report to minimise the landscape and visual impacts during the construction phase. The proposed mitigation measures as shown in Table 9.1 and Table 9.2 of the EM&A Manual should be checked for proper implementation.

## 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 AM1 and AM2 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 Station	Monitoring Date	Start Time	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )			Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
			1st Result	2nd Result	3rd Result			
AM1	02-Aug-21	8:32	32	39	26	19-55	273.7	500
	06-Aug-21	8:28	48	50	55			
	12-Aug-21	8:37	24	31	26			
	18-Aug-21	8:31	24	29	31			
	24-Aug-21	8:23	29	26	24			
	30-Aug-21	8:22	19	21	25			
AM2	02-Aug-21	8:44	51	49	42	25-79	274.2	500
	06-Aug-21	8:38	73	68	79			
	12-Aug-21	8:51	37	44	40			
	18-Aug-21	8:45	35	32	26			
	24-Aug-21	8:37	31	26	35			
	30-Aug-21	8:36	28	31	25			

#### 3.2.2 24-hour TSP

Results of 24-hour TSP at the monitoring location AM1 and AM2 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 Station	Monitoring Date	Start Time	Monitoring Results ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM1	02-Aug-21	08:30	9	7-30	143.6	260
	06-Aug-21	08:25	30			
	12-Aug-21	08:35	18			
	18-Aug-21	08:28	17			
	24-Aug-21	08:21	16			
	30-Aug-21	08:20	7			
AM2	02-Aug-21	08:42	21	8-113	151.1	260

Monitoring Station	Monitoring Date	Start Time	Monitoring Results ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
	06-Aug-21	08:41	113			
	12-Aug-21	08:48	22			
	18-Aug-21	08:42	18			
	24-Aug-21	08:34	8			
	30-Aug-21	08:33	26			

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

### 3.3 Noise Monitoring

The construction noise monitoring results at the monitoring location NM1A are summarized in **Table 3.3**. Graphical plots of the monitoring data and the station set-up of a free-field measurement are shown in **Appendix G**.

**Table 3.3: Summary of noise monitoring results during normal weekdays**

Monitoring Date	Start Time	End Time	$L_{eq}$ (30 mins)*, dB(A)	Limit Level for $L_{eq}$ (dB(A))
02-Aug-21	09:28	09:58	67	
12-Aug-21	09:35	10:05	68	
18-Aug-21	09:28	09:58	67	75
24-Aug-21	09:21	09:51	68	
30-Aug-21	09:20	09:50	68	

Remarks:

\* +3dB (A) correction was applied to free-field measurement.

No exceedance (Action/Limit Level) of construction noise was recorded in the reporting month.

### 3.4 Landscape and Visual Impact

Landscape and visual impact inspections were conducted as part of the weekly site inspections on 11 and 25 August 2021 for Lyric Theatre Complex (L2 Contract) during the reporting month. As reviewed by the registered Landscape Architect, no adverse comment on landscape and visual aspects was made during these inspections.

The landscape and visual mitigation measures were implemented during the reporting period. The summary of implementation status of the environmental mitigation measures is provided in **Appendix J**.

## 4 Site Environmental Management

### 4.1 Site Inspection

Construction phase weekly site inspections were carried out on 4, 11, 18 and 25 August 2021 at Lyric Theatre Complex (L2 Contract). The joint site inspection with IEC, ET, ER and Contractor was held on 18 August 2021. 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 the site inspections and associated recommendations are summarized in **Table 4.1: Summary of Site Inspections and Recommendations for L2**.

**Table 4.1: Summary of Site Inspections and Recommendations for L2**

Inspection Date	Parameter	Observation / Recommendation	Contractor's Responses / Action(s) Undertaken	Close-out (Date)
04-Aug-21	Waste Management	The contractor should clean up the waste regularly.	The contractor has cleaned up the waste regularly.	10-Aug-21
11-Aug-21	Noise	Proper noise insulating fabric should be adopted for the breaker.	The contractor has provided proper noise insulating fabric for the breaker.	12-Aug-21
11-Aug-21	Air Quality	The contractor was reminded to replace a suitable NRMM label.	The contractor has replaced a suitable NRMM label.	11-Aug-21
18-Aug-21	Air Quality	Dust impact was observed. The contractor was reminded to increase water spraying frequency to avoid dust impact.	The contractor has increased water spraying frequency to avoid dust impact.	19-Aug-21
25-Aug-21	Air Quality	The contractor should increase water spraying frequency to avoid dust impact.	The contractor has increased water spraying frequency to avoid dust impact.	25-Aug-21
25-Aug-21	Water Quality	Stagnant water was observed in the drip tray, the contractor was reminded to clear the stagnant water to prevent leakage of chemicals.	The contractor has cleared the stagnant water in the drip tray.	26-Aug-21

### 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.

As advised by the Lyric Theatre Complex (L2 Contract) Contractor, 242.34 tonnes, 992.32 tonnes and 61.55 tonnes of inert C&D materials were disposed of as public fill to Tseung Kwan O Area 137 Public Fill, Tuen Mun Area 38 Public Fill and Chai Wan Public Fill Barging Point respectively in the reporting month, while 459.1 tonnes of general refuse were disposed of at SENT and WENT landfill. 121.0 tonnes of metals, 0.0 tonne of paper/cardboard packaging, 0.0 tonne of plastics and 0.0 tonne of timber were collected by recycling contractors in the reporting month. 0.0 tonne of inert C&D material was reused on site. 0.0 tonne of inert C&D material was reused in other projects and 0.0 tonne of inert C&D material was imported for reuse at site. 0.0 tonne of inert C&D

material was disposed to sorting facility and 0.0 tonne of chemical waste was collected by licensed contractors in the reporting period.

The actual amounts of different types of waste generated by the activities of construction works at Lyric Theatre Complex in the reporting month are shown 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 for L2**

Permit / License No. / Notification / Reference No.	Valid Period		Status	Remarks
	From	To		
<b>Chemical Waste Producer Registration</b>				
WPN5213-217-G2347-39	17-Feb-16	--	Valid	
<b>Billing Account Construction Waste Disposal</b>				
7032787	02-Jan-19	--	Account Active	--
<b>Construction Noise Permit</b>				
GW-RE0520-21	1-Jun-21	30-Nov-21	Valid	
<b>Wastewater Discharge License</b>				
WT-00030694-2018	11-Apr-18	30-Apr-23	Valid	
<b>Notification under Air Pollution Control (Construction Dust) Regulation</b>				
448474	27-Aug-19	--	Notified	--

### 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**. In particular, the following mitigation measures were brought to attention during the site inspections:

#### Air Quality

- NRMMS operating on-site should be affixed with the requisite approval labels
- High standard of housekeeping should be maintained to prevent emission of fugitive dust
- Water spraying should be adopted for active construction areas

#### Noise Impact

- Proper noise insulating fabric should be adopted for certain PME

#### Water Quality

- Oil and fuels should be stored in designated areas which have pollution prevention facilities

#### Waste Management

- All wastes generated at site shall be collected and disposed to an appropriate facility regularly

## 5 Compliance with Environmental Permit

The status of the required submission under the EP during the reporting period is summarized in **Table 5.1**.

**Table 5.1: Status of Submissions under the Environmental Permit**

EP Condition	Submission	Submission Date
Condition 3.4	Monthly EM&A Report for July 2021	16 August 2021

## 6 Report in Non-compliance, Complaints, Notification of Summons and Successful Prosecutions

### 6.1 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.

### 6.2 Record on Environmental Complaints Received

Four environmental complaints were received in the reporting month.

On 2 August 2021, WKCDA received a complaint from the office of Mr. Derek Hung (Yau Tsim Mong District Council (YTMD) member) regarding noise generated from WKCD construction site. The complainant has expressed concern about the construction noise between 19 and 31 July 2021, especially before 9am on 21 & 31 July 2021. The complainant understands that the working hours permitted by the government is 7am-7pm, except public holidays. However, he/she and Derek Hung would like to seek if the noise disturbance could be reduced before 9am. Video shot was also taken by the complainant at 8:50 am on 31 July 2021 to show the evidence of noise generated from WKCD construction site. After the investigation, it was preliminarily believed that the construction noise on 21 July 2021 could be attributable to Lyric Theatre Complex (L2 Contract), which involved breaking works at around 8:45am on 21 July 2021 for residue concrete removal at G/F of LTC area. As the breaker noise was similar to the noise in the video provided by the complainant, it is believed that the breaker was the plausible source of the complaint noise. However, by considering that the permitted working hours for construction works are 7am to 7pm (except for public holidays), the works carried out in Lyric Theatre Complex (L2 Contract) were still within compliance to the local regulations and construction noise permit (CNP) conditions. Nonetheless, the Contractor is recommended to enhance specific noise mitigation measures and avoid noisy works before 9am to minimize disturbance to nearby residents.

On 18 August 2021, EPD has received a complaint regarding dust emission generated from WKCD Zone 2A site and the complaint was referred by EPD on 20 August 2021. The complainant has expressed concern of construction dust generated by rock breaking work at B1/F of Zone 2A site without proper dust mitigation measures. As the complainant specified that the dust impact was from the construction B1/F site of Zone 2A, that is not within the Lyric Theatre Complex site boundary, hence the complaint was not attributable to Lyric Theatre Complex. However, dust control measures will continue to be strictly implemented on site to reduce impacts to nearby residents.

On 19 August 2021, WKCDA has received a complaint from the Office of Mr. Derek Hung (YTMD) member) regarding noise generated from WKCD construction site. The complainant has expressed concern about the construction noise before 9am on 18 & 19 August 2021. The complainant understands that the working hours permitted by the government is 7am – 7pm, except public holidays. However, he/she and Mr. Derek Hung would like to seek if the noise disturbance could be reduced before 9am. Video shot was also taken by the complainant at 8:30am on 18 & 19 August 2021 to show the evidence of noise generated from WKCD construction site. After investigation, it was found that no noisy works were undertaken before

9am on 18 and 19 August 2021 for Lyric Theatre Complex (L1 and L2 Contracts). Also, since the major construction works for Lyric Theatre Complex (L1 Contract) were completed by June 2021, no noisy works were undertaken in L1 Contract. In sum, the complaint could not be attributable to Lyric Theatre Complex (L1 and L2 Contract). However, noise mitigation measures will continue to be strictly implemented on site. The contractors are reminded to strengthen the implementation of the recommendations for noise mitigation measures to reduce impacts on nearby residents.

On 27 August 2021, WKCDA received a complaint from the same resident living in The Harbourside through WKCDA Enquiry Hotline and referral by YTMDC Member. The complainant concerned the pile driving carried out in the construction site next to the Lyric Theatre Complex, and claiming that the noise persisted from 8 am to 6 pm. The complainant also enquired about the tentative completion date of the pile driving works. As the complainant specified that the noise was generated from pile driving activities next to the Lyric Theatre Complex, and no pile driving works were involved in Lyric Theatre Complex, hence the complaint was considered to be not attributable to Lyric Theatre Complex. However, noise control measures will continue to be strictly implemented on site to reduce impacts to nearby residents.

The cumulative statistics on complaints were provided in **Appendix K**.

### 6.3 Record on Notifications of Summons and Successful Prosecution

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

## 7 Future Key Issues

### 7.1 Construction Works for the Coming Month(s)

The major site works for L2 to be commissioned in the coming month include:

- LTC construction
  - Structure (Slab, wall, columns and beam)
    - Falsework and formwork erection
    - Reinforcement work
    - Concrete work
  - ABWF & MEP work
  - LT temporary deck
- ASDA and Lyric Theatre Promenade
  - Structure and BS works
- DSC cofferdam (Cofferdam A)
  - DCS related works
- Modification to existing pump cell
  - ABWF works
- Extended basement
  - ABWF & MEP work
  - RC water tank
  - RC duct slab (Forms/Rebar/Concrete)
  - Carpark area plaster and paint
- Underpass and Associated Area
  - RC Structure (Waffle Ceiling)
  - ABWF & MEP work
- M+ Day 2 Works
  - Hoarding Work
- P32 Interim Development
  - Structure works (Scaffold/forms/rebar concrete)

### 7.2 Key Issues for the Coming Month

Key issues to be considered at Lyric Theatre Complex in the coming month include:

- Generation of dust from construction works;
- Noise impact from operating equipment and machinery on-site;
- 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;

- Management of chemicals and avoidance of oil spillage on-site; and
- Operating conditions of drainage facilities.

### 7.3 Monitoring Schedule for the Coming Month

The environmental site inspection and environmental monitoring will be continued in the coming month. The tentative monitoring schedule for the coming month is shown in the **Appendix E**.

## 8 Conclusions and Recommendations

### 8.1 Conclusions

The EM&A programme as recommended in the EM&A Manual has been undertaken. The construction works and EM&A programme for M+ Museum was commenced on 31 October 2015 and completed on 28 February 2021; while the construction works and EM&A programme for Lyric Theatre Complex (L1 and L2 Contracts) was commenced on 1 March 2016, and the EM&A programme for L1 Contract was completed on 30 June 2021.

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

Four environmental complaints were recorded in the reporting month. No notifications of summons or successful prosecutions were received during the reporting month.

Weekly construction phase site inspections and bi-weekly landscape and visual impact inspections were conducted during the reporting month as required. It was observed that the Contractors had implemented all possible and feasible mitigation measures to mitigate the potential environmental impacts during construction phase works.

### 8.2 Recommendations

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

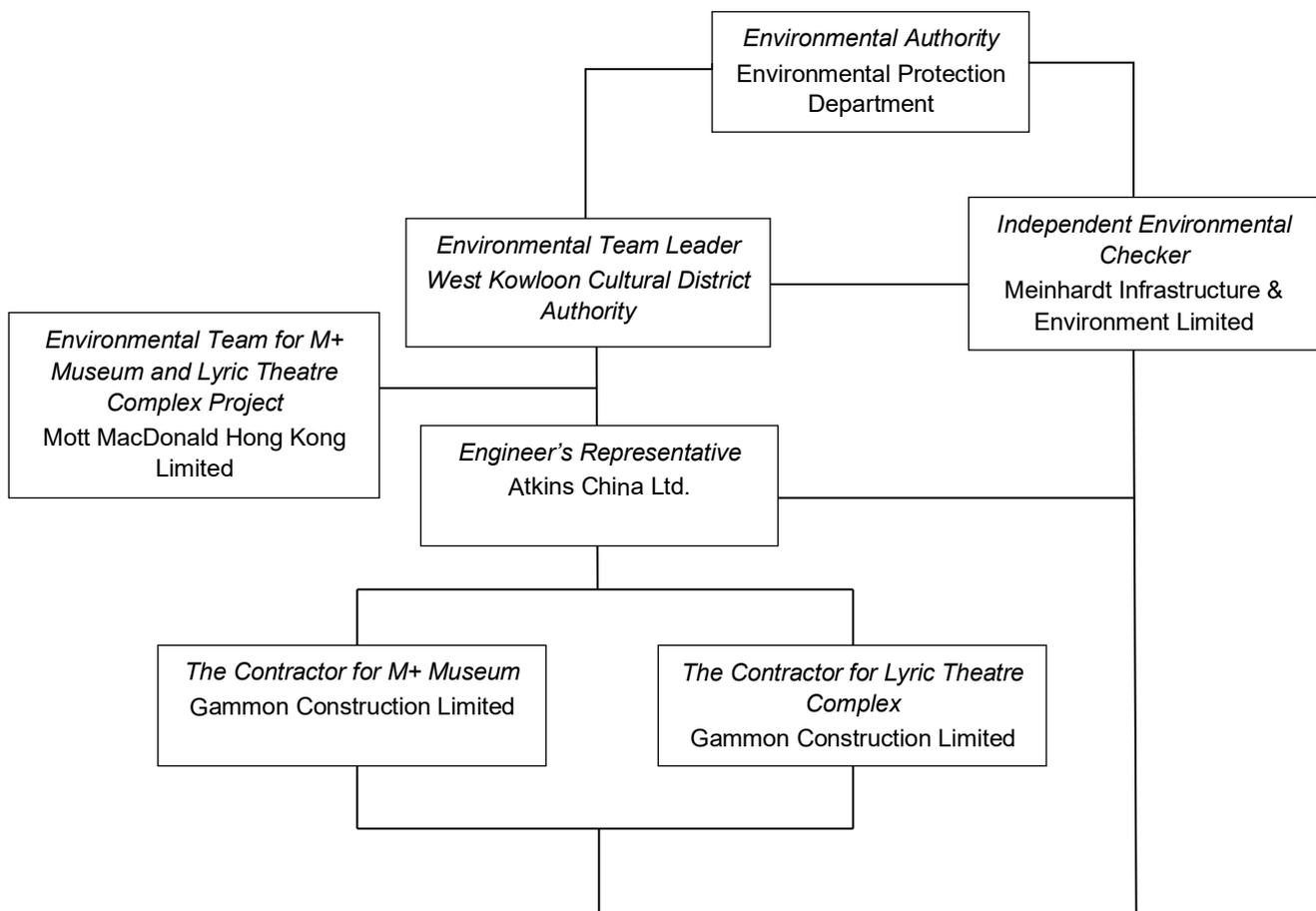
## **Figure 1    Site Layout Plan and Monitoring Stations**



# Appendices

- A. Project Organisation
- B. Tentative Construction Programme
- C. Action and Limit Levels for Construction Phase
- D. Event and Action Plan for Air Quality, Noise, Landscape and Visual Impact
- E. Monitoring Schedule
- F. Calibration Certifications
- G. Graphical Plots of the Monitoring Results
- H. Meteorological Data Extracted from Hong Kong Observatory
- I. Waste Flow table
- J. Environmental Mitigation Measures – Implementation Status
- K. Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions

## A. Project Organisation



**Table A-1: Contact information**

Company Name	Role	Name	Telephone	Email
Atkins China Ltd.	Resident Engineer	Ms. Gloria Lui	5506 6361	gloria.lui@atkinglobal.com
Meinhardt Infrastructure & Environment Limited	Independent Environmental Checker	Ms. Claudine Lee	2859 5409	claudinelee@meinhardt.com.hk
Gammon Construction Limited (M+ Museum)	Environmental Manager	Mr. Andy Leung	9489 0035	andy.leung@gammonconstruction.com
Gammon Construction Limited (L1)	Environmental Manager	Ms. Sammie Chan	9864 4296	sammie.chan@gammonconstruction.com
Gammon Construction Limited (L2)	Environmental Manager	Mr. Ivan Chiu	9416 1664	ivan.chiu@gammonconstruction.com
Mott MacDonald Hong Kong Ltd.	Contractor's Environmental Team Leader	Mr. Thomas Chan	2828 5757	thomas.chan@mottmac.com
West Kowloon Cultural District Authority	Senior Project Manager (Safety, Health and Environment)	Mr. C.K. Wu	5506 9178	ck.wu@wkcd.a.hk

## **B. Tentative Construction Programme**



ID	Activity	RD	Start	Finish	2020				2021				2022				2023				2024										
					Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3									
					M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
L2 CMWP_R01_11 Approved 29Sep20 - 11th Update DD=31Jul21																															
<b>GENERAL &amp; PRELIMINARIES</b>																															
<b>Contract Significant Dates</b>																															
<b>Commencement &amp; Completion Dates</b>																															
<b>Section Keydates</b>																															
KD05C	PC for HO of Landscape Area at Avenue & Pedestrian level between P31 & P34 [if instructed]	0		16-Feb-22*																											
KD05B	Complete Required Pedestrian Access Corridor & associated top slab at Avenue Level [if instructed]	0		08-Mar-22*																											
KD05	PC for HO of the Remaining Works for M+ Promenade South	0		18-Mar-22*																											
KD05A	Complete Required Pedestrian Access Corridor and Floor Finishes at AURW	0		06-Jun-22*																											
KD08	PC for HO Loc ICT/Risers Rms to APC for ICT Sys Instrn Wrks	0		11-Apr-24*																											
KD10	PC for HO of ASDA, Lyric Theatre Promenade South to Authority	0		11-Apr-24*																											
KD09	PC for HO of RDE areas for Tenancy Fit-out Wrks	0		11-Apr-24*																											
KD11	PC for HO of Extended Basement for HO to Authority & HO of Carriageway to Relevant Govt Authority	0		13-Jun-24*																											
KD07	PRACTICAL COMPLETION for CWay 3A (M+ Day 2 Works)	0		11-Jul-24*																											
KD13	PRACTICAL COMPLETION for Lyric Theatre, Extended Basement & CWay 3B	0		11-Jul-24*																											
<b>Stage Keydates</b>																															
KD01	Compl Dsgn Coord/Subm and obtn NNO for L1 Contr Bsmt constn wrks	0		20-Jul-19 A																											
KD06	PC for Fountain Related Plantroom(s)	0		14-May-22*																											
KD03	OBTAIN OP for Lyric Theatre & Extended Basement	0		11-Apr-24*																											
KD14	Complete U/G road and the associated plantrooms at Zone 3A&3B Integrated Basement	0		26-Apr-24*																											
KD02	Obtain BA14 Acknowledge from BD for M+ Day2 A&A Works	0		08-Jun-24*																											
<b>Summary Program - Level 1</b>																															
SUM10	[LoE] CC_B Lyric Theatre - Substructure RC Structural Concrete	84	06-May-20 A	22-Nov-21																											
SUM14	[LoE] CC_B Lyric Theatre - ABWF Work Including Theatres (Excl. Punch List Works)	794	28-May-21 A	17-Apr-24																											
SUM11	[LoE] CC_B Lyric Theatre - Superstructure RC Structural Concrete	400	02-Jul-21 A	16-Jan-23																											
SUM15	[LoE] CC_B Lyric Theatre - MEP 1st to Final Fix (Excl. TH SYS, TH Non-FSD in Walls, etc.)	641	02-Oct-21	05-Dec-23																											
SUM41	[LoE] CC_B Lyric Theatre - Structural Steel by CSD	397	19-Nov-21	02-May-23																											
SUM12	[LoE] CC_B Lyric Theatre - EWS Weather Tight Type	271	18-Mar-22	16-Mar-23																											
SUM17	[LoE] CC_B Lyric Theatre - Theatre Specialist Systems Incl. T&C, Precom. & Commissioning	603	22-Jun-22	10-Jul-24																											
SUM13	[LoE] CC_B Lyric Theatre - EWS Non-Weather Tight Type 4.1 & 4.3	328	26-Aug-22	09-Nov-23																											
SUM16	[LoE] CC_B Lyric Theatre - T&C (Excluding Non-FSD ELV & Electrical)	134	27-Jun-23	04-Dec-23																											
SUM18	[LoE] CC_B Lyric Theatre, EB, CWay 3B - Stat. Insp. & Approval (from Form 314/501 to BD OP)	98	05-Dec-23	11-Apr-24																											
SUM21	[LoE] CC_C - LT EVA1 & EVA2	721	12-Apr-21 A	21-Mar-24																											
SUM23	[LoE] CC_C - Artist SQ. Bridge (ASB_1/2/3; ASB_3; P31_2; P34_2; AS_1/2; ASB-6/P31 EVA)	682	21-Jun-21 A	29-Jan-24																											
SUM22	[LoE] CC_C - HoR Development (P32-1, P29-1, P31-EVA)	589	02-Oct-21	28-Nov-23																											
SUM20	[LoE] CC_C - LT Promenade & Pocket Square Bridge	651	23-Nov-21	11-Apr-24																											
SUM24	[LoE] CC_D - Remaining Works for M+ Promenade South	175	18-Feb-21 A	18-Mar-22																											
SUM25	[LoE] CC_E - DCS Cofferdam A Works & Obtain BA14	335	23-Jun-20 A	28-Oct-22																											
SUM42	[LoE] CC_E - DCS Outside of Cofferdam A Works (Connect DIA1,600 & Remove Temp O'fall)	480	09-Sep-21	12-Jun-23																											
SUM26	[LoE] CC_F - Mods to Existing Pump Cell Civil & MEP Works (Excl. Options 2 Add. Pumps)	208	16-Aug-21	18-May-22																											
SUM27	[LoE] CC_G Extended Basement - ABWF Works (Incl. Deferred Areas Under Deck)	614	15-May-21 A	01-Sep-23																											
SUM28	[LoE] CC_G Extended Basement - MEP 1st Fix to Final Fix (Incl. Deferred Areas Under Deck)	596	17-May-21 A	11-Aug-23																											
SUM29	[LoE] CC_G Extended Basement - T&C	283	15-Sep-22	01-Sep-23																											
SUM30	[LoE] CC_H - Vibration Isolation Spring System Remaining as of 30Apr2020 (AS=30Sep19)	0	09-May-20 A	10-Feb-21 A																											
SUM31	[LoE] CC_I Carriageway 3B - ABWF Works	427	02-Aug-21	10-Jan-23																											
SUM32	[LoE] CC_I Carriageway 3B - MEP Works (1st Fix to Final Fix)	306	06-Nov-21	19-Nov-22																											
SUM33	[LoE] CC_I Underpass 3B & Associated Area - T&C	108	08-Dec-22	27-Apr-23																											
SUM35	[LoE] CC_J - M+ Day 2 Works (excl. connections to M+ and SZ_1 FS Changeover)	742	03-Jun-21 A	05-Feb-24																											
SUM38	[LoE] CC_J - M+ Day 2 FS Changeover in 3A SZ_1, Connections to M+, Integrated T&C	99	19-Dec-23	26-Apr-24																											
SUM34	[LoE] CC_J Carriageway 3A - Stat. Insp. & Approvals (from Form 314A to BA14)	56	02-Apr-24	08-Jun-24																											
SUM39	[LoE] CC_K - Water Main at Promenade	250	29-Oct-22	28-Sep-23																											
SUM40	[LoE] CC_N Lifts & Escalators	460	11-Feb-22	01-Sep-23																											



	Base Line ACT		Current - MEP Works
	Base Line MS		Current - ABWF Works
	Milestone		Current - Facade Works
	Current - Other Works		Critical Works
	Current - Struct Works		Actual

L2 CMWP\_R01\_11 Approved 29Sep20 - 11th Update DD=31Jul21

Date	Revision	Checked	Approved
06-Aug-21	CMWP Rev_1_11 - 11th Update DD 31Jul21	NS	IH

## **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 (mg/m <sup>3</sup> )	Limit Level (mg/m <sup>3</sup> )
AM1	273.7	500
AM2	274.2	500

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

Monitoring Station	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )
AM1	143.6	260
AM2	151.1	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
NM1A 0700-1900 hours on normal weekdays	When one valid documented complaint is received.	75 dB(A)

## **D. Event and Action Plan for Air Quality, Noise, Landscape and Visual Impact**

## 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	IEC	WKCD	Contractor
<b>Action Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform IEC and WKCD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate.</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and WKCD;</li> <li>3. Advise the WKCD on the effectiveness of the proposed remedial measures;</li> <li>4. Repeat measurements to confirm findings;</li> <li>5. Increase monitoring frequency to daily;</li> <li>6. Discuss with IEC and Contractor on remedial actions required;</li> <li>7. If exceedance continues, arrange meeting with IEC and WKCD;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ET on the effectiveness of the proposed remedial measures;</li> <li>5. Monitor the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial to WKCD within three working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>
<b>Limit Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform WKCD, Contractor and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCD informed of the results.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the WKCD on the effectiveness of the proposed remedial measures;</li> <li>5. Monitor the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within three working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>

**Event****Action**

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2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"><li>1. Notify IEC, WKCDA, Contractor and EPD;</li><li>2. Identify source;</li><li>3. Repeat measurement to confirm findings;</li><li>4. Increase monitoring frequency to daily;</li><li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li><li>6. Arrange meeting with IEC and WKCDA to discuss the remedial actions to be taken;</li><li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCDA informed of the results;</li><li>8. If exceedance stops, cease additional monitoring.</li></ol>	<ol style="list-style-type: none"><li>1. Check monitoring data submitted by ET;</li><li>2. Check Contractor's working method;</li><li>3. Discuss amongst WKCDA, ET, and Contractor on the potential remedial actions;</li><li>4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the WKCDA accordingly;</li><li>5. Monitor the implementation of remedial measures.</li></ol>	<ol style="list-style-type: none"><li>1. Confirm receipt of notification of failure in writing;</li><li>2. Notify Contractor;</li><li>3. In consolidation with the IEC, agree on the remedial measures to be implemented;</li><li>4. Ensure remedial measures properly implemented;</li><li>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</li></ol>	<ol style="list-style-type: none"><li>1. Take immediate action to avoid further exceedance;</li><li>2. Submit proposals for remedial actions to IEC within three working days of notification;</li><li>3. Implement the agreed proposals;</li><li>4. Resubmit proposals if problem still not under control;</li><li>5. Stop the relevant portion of works as determined by the WKCDA until the exceedance is abated.</li></ol>
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## 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	IEC	WKCD A	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify WKCD A, IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, WKCD A and Contractor;</li> <li>4. Discuss with the IEC and Contractor on remedial measures required;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the WKCD A accordingly;</li> <li>3. Advise the WKCD A on the effectiveness of the proposed remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC and WKCD A;</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Inform IEC, WKCD A, Contractor and EPD;</li> <li>2. Repeat measurements to confirm findings;</li> <li>3. Increase monitoring frequency;</li> <li>4. Identify source and investigate the cause of exceedance;</li> <li>5. Carry out analysis of Contractor's working procedures;</li> <li>6. Discuss with the IEC, Contractor and WKCD A on remedial measures required;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCD A informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst WKCD A, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the WKCD A accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures;</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC and WKCD A within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Submit further proposal if problem still not under control;</li> <li>5. Stop the relevant portion of works as instructed by the WKCD A until the exceedance is abated.</li> </ol>

## Landscape and Visual Impact

In case of non-compliance of landscape and visual impacts, procedures in accordance with the Event and Action Plan should be followed:

**Table D-3: Event and Action Plan for Landscape and Visual Impact**

Event	Action			
	ET	IEC	WKCD A	Contractor
Design Check	<ol style="list-style-type: none"> <li>1. Design check to make sure the design complies with all the proposed mitigation measures in the EIA report;</li> <li>2. Prepare and submit report.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report submitted by ET;</li> <li>2. Recommend remedial design if necessary.</li> </ol>	<ol style="list-style-type: none"> <li>1. Undertake remedial design if necessary.</li> </ol>	-
Non-conformity on one occasion	<ol style="list-style-type: none"> <li>1. Identify source of non-conformity;</li> <li>2. Report to IEC and WKCD A;</li> <li>3. Discuss remedial actions with IEC, WKCD A and Contractor;</li> <li>4. Monitor remedial actions until rectification has been completed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and verify source of non-conformity;</li> <li>2. Discuss remedial actions with ET and Contractor;</li> <li>3. Advise WKCD A on effectiveness of proposed remedial actions;</li> <li>4. Check implementation of remedial actions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor;</li> <li>2. Ensure remedial actions are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working method as necessary;</li> <li>2. Rectify damage and undertake necessary replacement and remedial actions.</li> </ol>
Repeated conformity	<ol style="list-style-type: none"> <li>1. Identify source of non-conformity;</li> <li>2. Report to IEC and WKCD A;</li> <li>3. Increase monitoring frequency;</li> <li>4. Discuss remedial actions with IEC, WKCD A and Contractor;</li> <li>5. Monitor remedial actions until rectification has been completed;</li> <li>6. If non-conformity rectified, reduce monitoring frequency back to normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and verify source of non-conformity;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss remedial actions with ET and Contractor;</li> <li>4. Advise WKCD A on effectiveness of proposed remedial actions;</li> <li>5. Supervise implementation of remedial actions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor;</li> <li>2. Ensure remedial actions are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working method as necessary;</li> <li>2. Rectify damage and undertake necessary replacement and remedial actions.</li> </ol>

## E. Monitoring Schedule

# August 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	3	4	5	6 AM1, AM2 - 24hrTSP, 1hr TSP x3	7
8	9	10	11 Lyric Landscape & Visual Inspection	12 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	13	14
15	16	17	18 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	19	20	21
22	23	24 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	25 Lyric Landscape & Visual Inspection	26	27	28
29	30 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	31	1	2	3	4
5	6	Notes: AM1 - International Commerce Centre (ICC) AM2 - The Harbourside Tower 1 - Ground Floor NM1A - International Commerce Centre (ICC)				

# September 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	1	2	3 AM1, AM2 - 24hrTSP, 1hr TSP x3	4
5	6	7	8	9 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	10	11
12	13	14	15 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	16	17	18
19	20 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	21	22	23	24	25 AM1, AM2 - 24hrTSP, 1hr TSP x3
26	27	28	29	30 AM1, AM2 - 24hrTSP, 1hr TSP x3 NM1A - Noise Impact Monitoring	1	2
3	4	Notes: AM1 - International Commerce Centre (ICC) AM2 - The Harbourside Tower 1 - Ground Floor NM1A - International Commerce Centre (ICC)				

## F. Calibration Certifications

High-Volume TSP Sampler  
5-Point Calibration Record

Location : AM1(ICC)  
Calibrated by : K.T.Ho  
Date : 16/07/2021

Sampler

Model : TE-5170  
Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 28 Jan 2021  
Slope (m) : 2.06072  
Intercept (b) : -0.01465  
Correlation Coefficient(r) : 0.99993

Standard Condition

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

Calibration Condition

Pa (hpa) : 1008  
Ta(K) : 303

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1   18 holes	11.4	3.340	1.628	60	59.36
2   13 holes	8.8	2.935	1.431	50	49.46
3   10 holes	6.6	2.541	1.240	42	41.55
4   7 holes	4.6	2.122	1.037	30	29.68
5   5 holes	2.8	1.655	0.810	20	19.79

Notes:  $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$ ,  $X = Z/m - b$ ,  $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 48.741      Intercept(b): -19.953      Correlation Coefficient(r): 0.9990

Checked by:   
Magnum Fan

Date: 19/07/2021



# Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 28, 2021	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 763.5	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>2454</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4540	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9110	8.0	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7200	12.9	8.00

Data Tabulation						
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)	
1.0140	0.6974	1.4271	0.9958	0.6849	0.8776	
1.0098	0.9890	2.0182	0.9916	0.9712	1.2411	
1.0076	1.1061	2.2564	0.9895	1.0862	1.3875	
1.0066	1.1530	2.3666	0.9885	1.1323	1.4553	
1.0011	1.3904	2.8542	0.9831	1.3654	1.7551	
<b>QSTD</b>	m=	<b>2.06072</b>	<b>QA</b>	m=	<b>1.29039</b>	
	b=	<b>-0.01465</b>		b=	<b>-0.00901</b>	
	r=	<b>0.99993</b>		r=	<b>0.99993</b>	

Calculations			
<b>Vstd=</b>	$\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	<b>Va=</b>	$\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
<b>Qstd=</b>	$Vstd / \Delta Time$	<b>Qa=</b>	$Va / \Delta Time$
<b>For subsequent flow rate calculations:</b>			
<b>Qstd=</b>	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	<b>Qa=</b>	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH: calibrator manometer reading (in H2O)	
ΔP: rootsmeter manometer reading (mm Hg)	
Ta: actual absolute temperature (°K)	
Pa: actual barometric pressure (mm Hg)	
b: intercept	
m: slope	

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### SUB-CONTRACTING REPORT

CONTACT	: MR K.W. FAN	WORK ORDER	: <b>HK2035838</b>
CLIENT	: ENVIROTECH SERVICES CO.		
ADDRESS	: RM113, 1/F, MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 18-SEP-2020
		DATE OF ISSUE	: 28-SEP-2020
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

#### General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

#### Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd  
Part of the ALS Laboratory Group

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Tel. +852 2610 1044 Fax +852 2610 2021 www.alsglobal.com

WORK ORDER : HK2035838  
SUB-BATCH : 1  
CLIENT : ENVIROTECH SERVICES CO.  
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2035838-001	S/N: 620401	Equipments	18-Sep-2020	S/N: 620401

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-5R  
 Serial No. 620401  
 Equipment Ref: Nil  
 Job Order HK2035838

### Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 30 June 2020

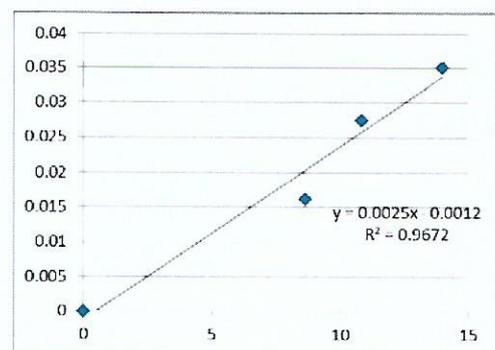
### Equipment Verification Results:

Verification Date: 22 September 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
2hr01min	09:15 ~ 11:16	28.6	1010.4	0.035	1690	14.0
2hr01min	11:20 ~ 13:21	28.6	1010.4	0.027	1306	10.8
2hr01min	13:25 ~ 15:26	28.6	1010.4	0.016	1043	8.6

### Linear Regression of Y or X

Slope (K-factor): 0.0025  
 Correlation Coefficient 0.9835  
 Date of Issue 25 September 2020



### Remarks:

- Strong Correlation ( $R > 0.8$ )**
  - Factor 0.0025 should be applied for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment

Operator: Fai So Signature: [Signature] Date: 25 September 2020

QC Reviewer: Ben Tam Signature: [Signature] Date: 25 September 2020

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung      Date of Calibration: 30-Jun-20  
 Location ID : Calibration Room      Next Calibration Date: 30-Sep-20

### CONDITIONS

Sea Level Pressure (hPa)	1004.6	Corrected Pressure (mm Hg)	753.45
Temperature (°C)	30.7	Temperature (K)	304

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.03014
Model->	5025A	Qstd Intercept ->	-0.04616
Calibration Date->	7-Feb-20	Expiry Date->	7-Feb-21

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.761	56	55.23	Slope = 38.2549 Intercept = -10.8486 Corr. coeff. = 0.9947
13	4.9	4.9	9.8	1.544	49	48.33	
10	3.7	3.7	7.4	1.344	43	42.41	
8	2.4	2.4	4.8	1.087	32	31.56	
5	1.5	1.5	3.0	0.864	21	20.71	

**Calculations :**

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$$

$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

**For subsequent calculation of sampler flow:**

$$1/m(( I )[\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

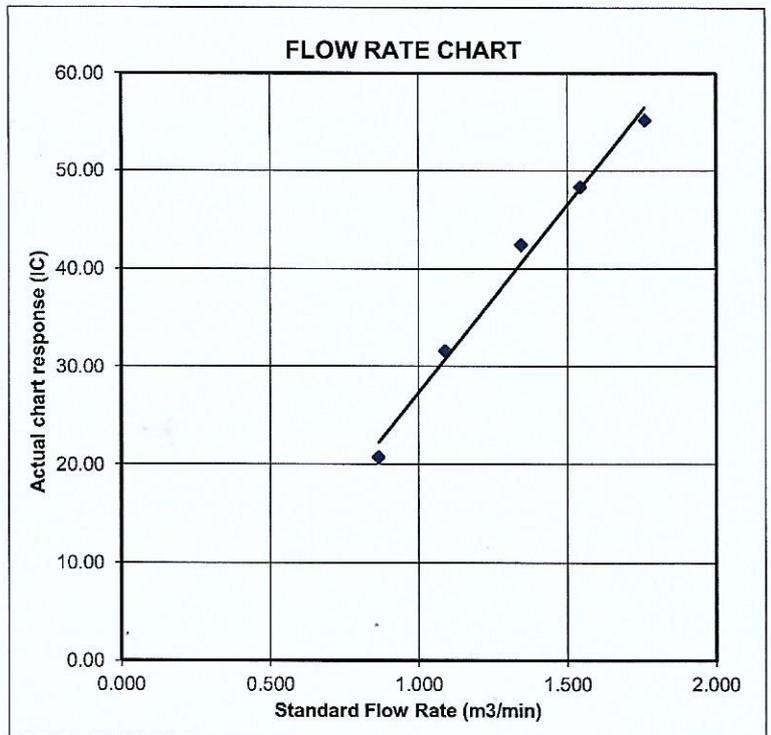
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



# Certificate of Calibration

Calibration Certification Information			
Cal. Date: February 7, 2020	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 745.5	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>1612</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
<b>QSTD</b>	m=	<b>2.03014</b>	<b>QA</b>	m=	<b>1.27124</b>
	b=	<b>-0.04616</b>		b=	<b>-0.02917</b>
	r=	<b>0.99995</b>		r=	<b>0.99995</b>

Calculations			
Vstd=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	Va=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
Qstd=	Vstd/ΔTime	Qa=	Va/ΔTime
For subsequent flow rate calculations:			
Qstd=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### SUB-CONTRACTING REPORT

CONTACT	: MR K.W. FAN	WORK ORDER	: <b>HK2045301</b>
CLIENT	: <b>ENVIROTECH SERVICES CO.</b>		
ADDRESS	: RM113, 1/F, MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 24-NOV-2020
		DATE OF ISSUE	: 30-NOV-2020
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

#### General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

#### Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

**ALS Technichem (HK) Pty Ltd**  
Part of the **ALS Laboratory Group**

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WORK ORDER : HK2045301  
SUB-BATCH : 1  
CLIENT : ENVIROTECH SERVICES CO.  
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2045301-001	S/N: 245833	Equipments	24-Nov-2020	S/N: 245833

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 245833  
 Equipment Ref: Nil  
 Job Order HK2045301

### Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 8 October 2020

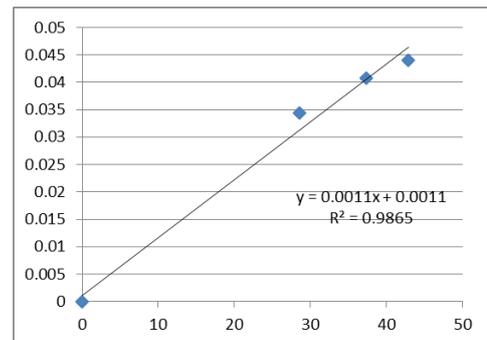
### Equipment Verification Results:

Verification Date: 26 November 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
2hr01min	09:18 ~ 11:19	24.0	1019.3	0.041	4525	37.3
2hr	11:22 ~ 13:22	24.0	1019.3	0.034	3430	28.6
2hr01min	13:25 ~ 15:26	24.0	1019.3	0.044	5196	42.9

### Linear Regression of Y or X

Slope (K-factor): 0.0011  
 Correlation Coefficient 0.9932  
 Date of Issue 30 November 2020



### Remarks:

- Strong** Correlation ( $R > 0.8$ )
  - Factor 0.0011 should be applied for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 30 November 2020

QC Reviewer : Ben Tam Signature :  Date : 30 November 2020



## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### SUB-CONTRACTING REPORT

CONTACT	: MR K.W. FAN	WORK ORDER	: <b>HK2045304</b>
CLIENT	: <b>ENVIROTECH SERVICES CO.</b>		
ADDRESS	: RM113, 1/F, MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 24-NOV-2020
		DATE OF ISSUE	: 30-NOV-2020
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

#### General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

#### Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

*Signatories*

*Position*

Richard Fung

Managing Director

This is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

**ALS Technichem (HK) Pty Ltd**  
Part of the **ALS Laboratory Group**

11/F, Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong  
Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK2045304  
SUB-BATCH : 1  
CLIENT : ENVIROTECH SERVICES CO.  
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2045304-001	S/N: 276015	Equipments	24-Nov-2020	S/N: 276015

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 276015  
Equipment Ref: Nil  
Job Order HK2045304

### Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 8 October 2020

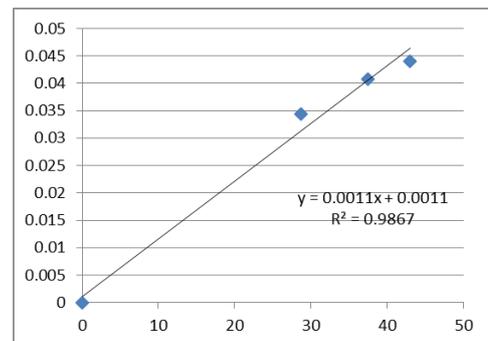
### Equipment Verification Results:

Verification Date: 26 November 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
2hr01min	09:18 ~ 11:19	24.0	1019.3	0.041	4541	37.5
2hr	11:22 ~ 13:22	24.0	1019.3	0.034	3443	28.7
2hr01min	13:25 ~ 15:26	24.0	1019.3	0.044	5211	43.0

### Linear Regression of Y or X

Slope (K-factor): 0.0011  
Correlation Coefficient 0.9933  
Date of Issue 30 November 2020



### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
  2. Factor 0.0011 should be applied for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 30 November 2020

QC Reviewer : Ben Tam Signature :  Date : 30 November 2020



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration 校正證書

Certificate No. : C213255

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-1016)

Date of Receipt / 收件日期 : 24 May 2021

Description / 儀器名稱 : Sound Level Meter

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00131627

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 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 4 June 2021

## 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).

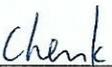
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By

測試

:

  
K P Cheuk  
Project Engineer

Certified By

核證

:

  
K C Lee  
Engineer

Date of Issue

簽發日期

:

9 June 2021

The test equipment used for calibration is traceable to the National 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室書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C213255  
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	C210084
CL281	Multifunction Acoustic Calibrator	AV210017

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 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.2	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.2 (Ref.)
				104.00		104.2
				114.00		114.2

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.2	Ref.
			Slow				

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C213255  
證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>A</sub>	A	Fast	94.00	63 Hz	68.0	-26.2 ± 1.5
					125 Hz	78.0	-16.1 ± 1.5
					250 Hz	85.5	-8.6 ± 1.4
					500 Hz	91.0	-3.2 ± 1.4
					1 kHz	94.2	Ref.
					2 kHz	95.4	+1.2 ± 1.6
					4 kHz	95.2	+1.0 ± 1.6
					8 kHz	93.2	-1.1 (+2.1 ; -3.1)
					16 kHz	86.2	-6.6 (+3.5 ; -17.0)

#### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>C</sub>	C	Fast	94.00	63 Hz	93.3	-0.8 ± 1.5
					125 Hz	94.0	-0.2 ± 1.5
					250 Hz	94.2	0.0 ± 1.4
					500 Hz	94.2	0.0 ± 1.4
					1 kHz	94.2	Ref.
					2 kHz	94.0	-0.2 ± 1.6
					4 kHz	93.4	-0.8 ± 1.6
					8 kHz	91.3	-3.0 (+2.1 ; -3.1)
					16 kHz	84.3	-8.5 (+3.5 ; -17.0)

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C213255  
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 10446

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 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
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

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

Note :

Only the original copy or the laboratory's certified true copy is valid.

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 is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



# Certificate of Calibration 校正證書

Certificate No. : C210001  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC20-2688)      Date of Receipt / 收件日期 : 18 December 2020

Description / 儀器名稱 : Precision Acoustic Calibrator  
Manufacturer / 製造商 : LARSON DAVIS  
Model No. / 型號 : CAL200  
Serial No. / 編號 : 11334  
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 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$   
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 January 2021

## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification & user's specified acceptance criteria.  
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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By :   
測試 : \_\_\_\_\_  
H T Wong  
Assistant Engineer

Certified By :   
核證 : \_\_\_\_\_  
K C Lee  
Engineer

Date of Issue : 4 January 2021  
簽發日期

The test equipment used for calibration is traceable to the National 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。



# Certificate of Calibration

## 校正證書

Certificate No. : C210001  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C203952
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C201309

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	User's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.7	± 0.5	± 0.2
114 dB, 1 kHz	113.7		

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remarks : - The user's specified acceptance criteria (user's spec.) is a customer pre-defined operating tolerance of the UUT, suitable for one's own intended use.

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

### Note :

Only the original copy or the laboratory's certified true copy is valid.

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 is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

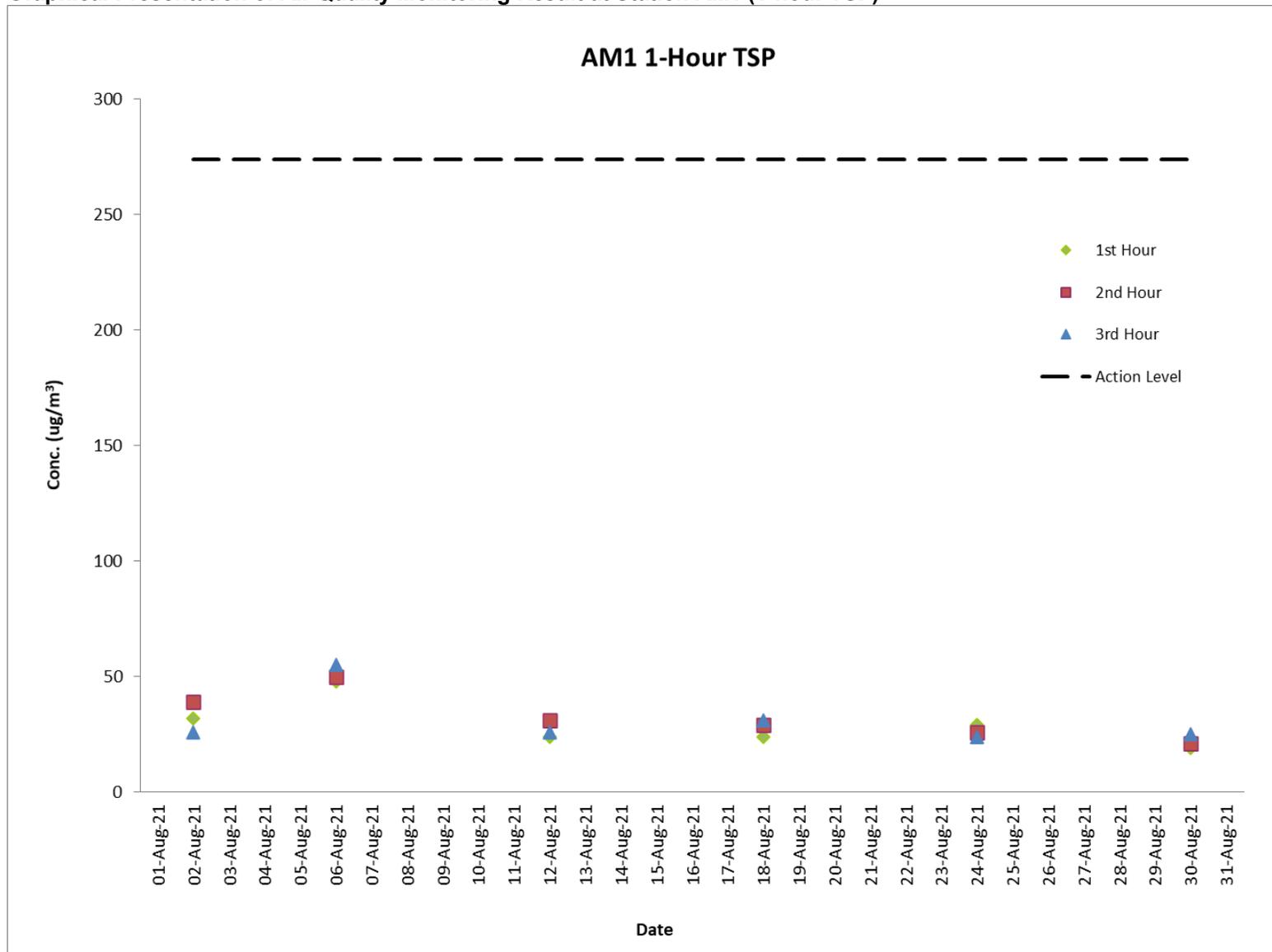
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

## **G. Graphical Plots of the Monitoring Results**

**Air Quality Monitoring Result at Station AM1 (1-hour TSP)**

Date	Weather Condition	Time	Conc. ( $\mu\text{g}/\text{m}^3$ )			Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
			1 <sup>st</sup> Hour	2 <sup>nd</sup> Hour	3 <sup>rd</sup> Hour		
02-Aug-21	Fine	8:32 - 11:32	32	39	26	273.7	500
06-Aug-21	Cloudy	8:28 - 11:28	48	50	55	273.7	500
12-Aug-21	Fine	8:37 - 11:37	24	31	26	273.7	500
18-Aug-21	Fine	8:31 - 11:31	24	29	31	273.7	500
24-Aug-21	Fine	8:23 - 11:23	29	26	24	273.7	500
30-Aug-21	Fine	8:22 - 11:22	19	21	25	273.7	500

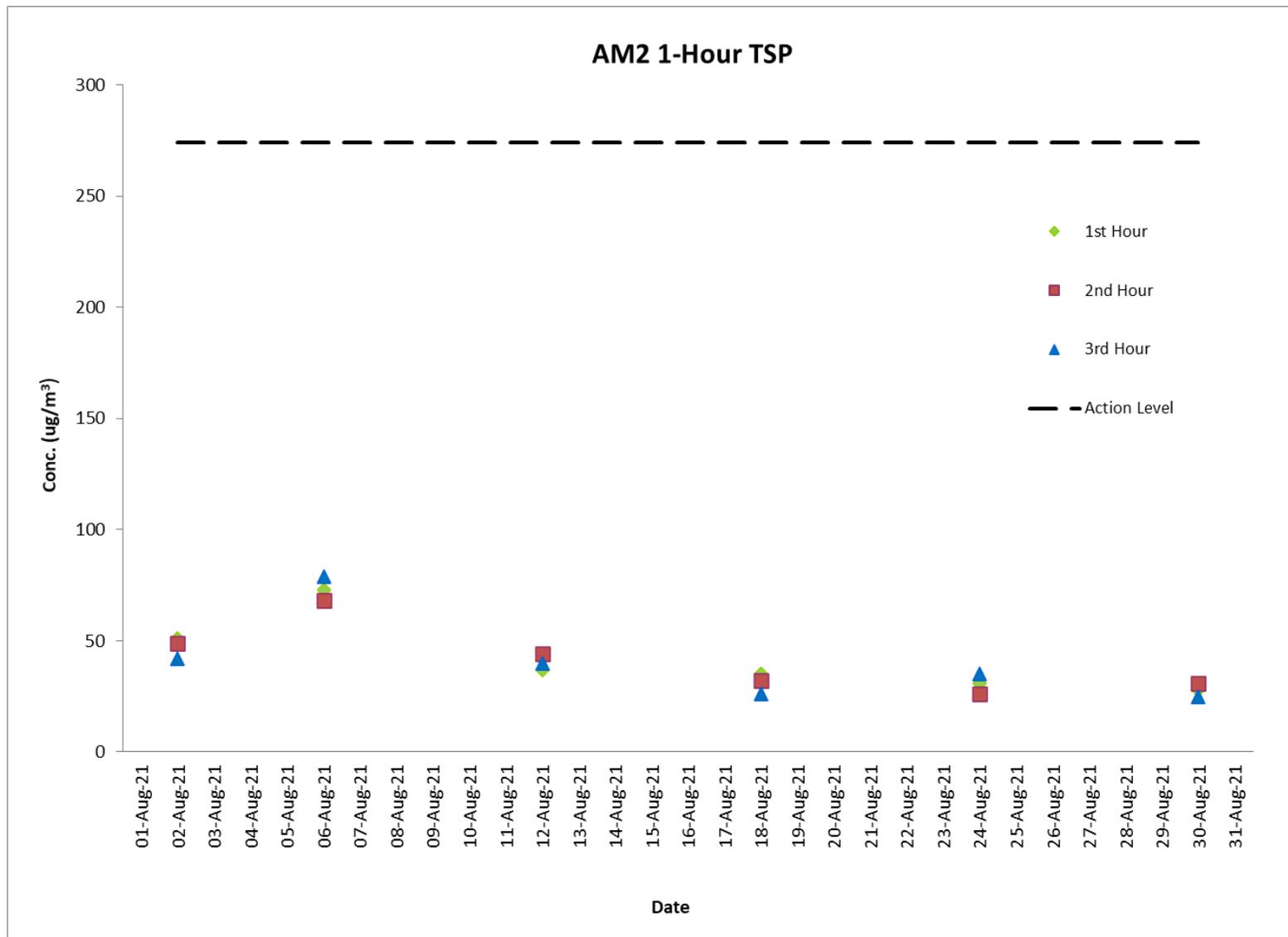
Graphical Presentation of Air Quality Monitoring Result at Station AM1 (1-hour TSP)



**Air Quality Monitoring Result at Station AM2 (1-hour TSP)**

Date	Weather Condition	Time	Conc. ( $\mu\text{g}/\text{m}^3$ )			Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
			1 <sup>st</sup> Hour	2 <sup>nd</sup> Hour	3 <sup>rd</sup> Hour		
02-Aug-21	Fine	8:44 - 11:44	51	49	42	274.2	500
06-Aug-21	Cloudy	8:38 - 11:38	73	68	79	274.2	500
12-Aug-21	Fine	8:51 - 11:51	37	44	40	274.2	500
18-Aug-21	Fine	8:45 - 11:45	35	32	26	274.2	500
24-Aug-21	Fine	8:37 - 11:37	31	26	35	274.2	500
30-Aug-21	Fine	8:36 - 11:36	28	31	25	274.2	500

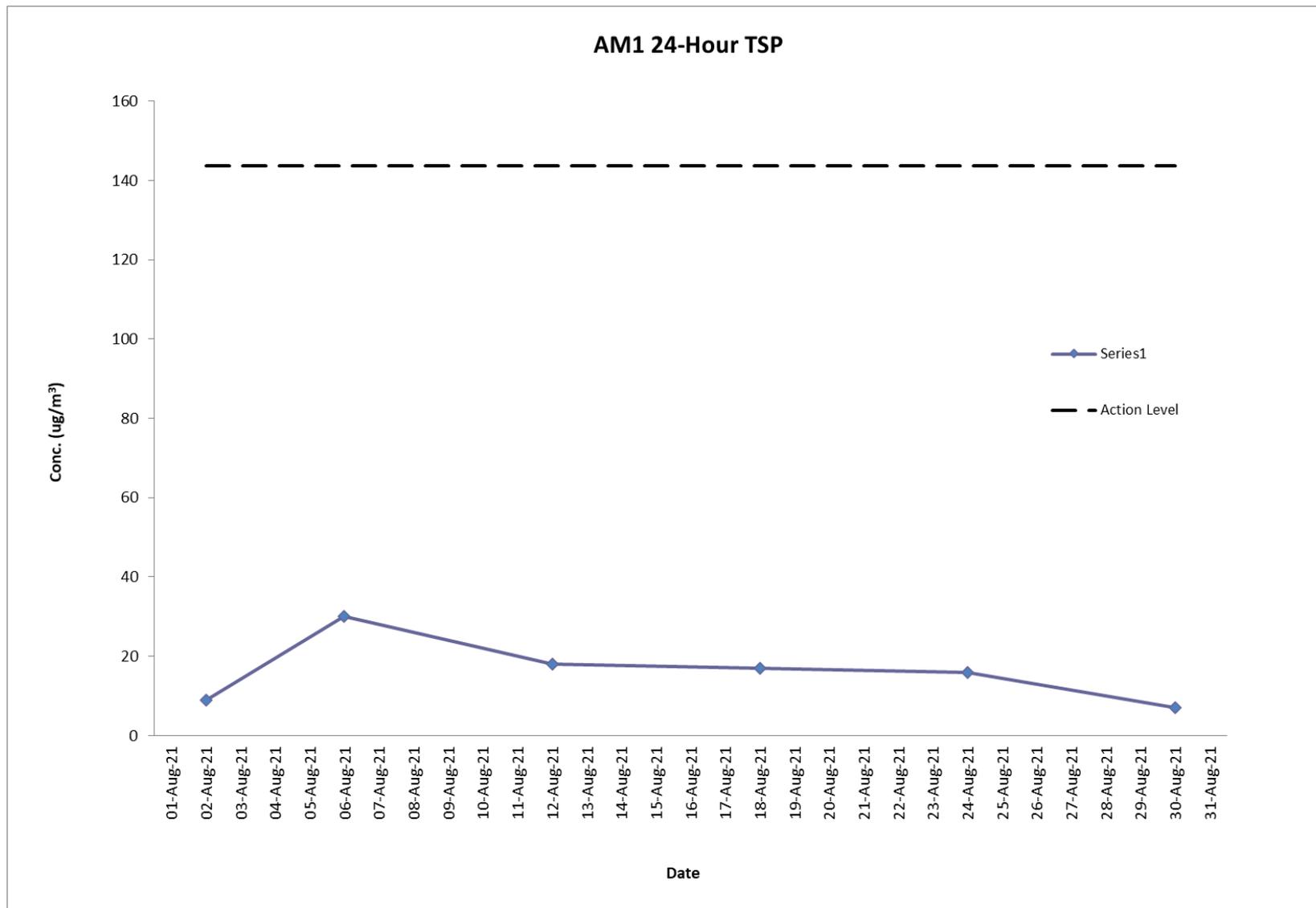
### Graphical Presentation of Air Quality Monitoring Result at Station AM2 (1-hour TSP)



**Air Quality Monitoring Result at Station AM1 (24-hour TSP)**

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min)			Conc. (µg/m <sup>3</sup> )	Weather Condition	Action Level	Limit Level
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
02-Aug-21	08:30	03-Aug-21	08:30	2.7473	2.7635	23696.38	23720.38	24	1.27	1.27	1.27	9	Fine	143.6	260
06-Aug-21	08:25	07-Aug-21	08:25	2.7303	2.7860	23720.38	23744.38	24	1.27	1.27	1.27	30	Cloudy	143.6	260
12-Aug-21	08:35	13-Aug-21	08:35	2.7305	2.7638	23744.38	23768.38	24	1.27	1.27	1.27	18	Fine	143.6	260
18-Aug-21	08:28	19-Aug-21	08:28	2.7380	2.7685	23768.38	23792.38	24	1.27	1.27	1.27	17	Fine	143.6	260
24-Aug-21	08:21	25-Aug-21	08:21	2.7282	2.7570	23792.38	23816.38	24	1.27	1.27	1.27	16	Fine	143.6	260
30-Aug-21	08:20	31-Aug-21	08:20	2.7570	2.7690	23816.38	23840.38	24	1.26	1.26	1.26	7	Fine	143.6	260

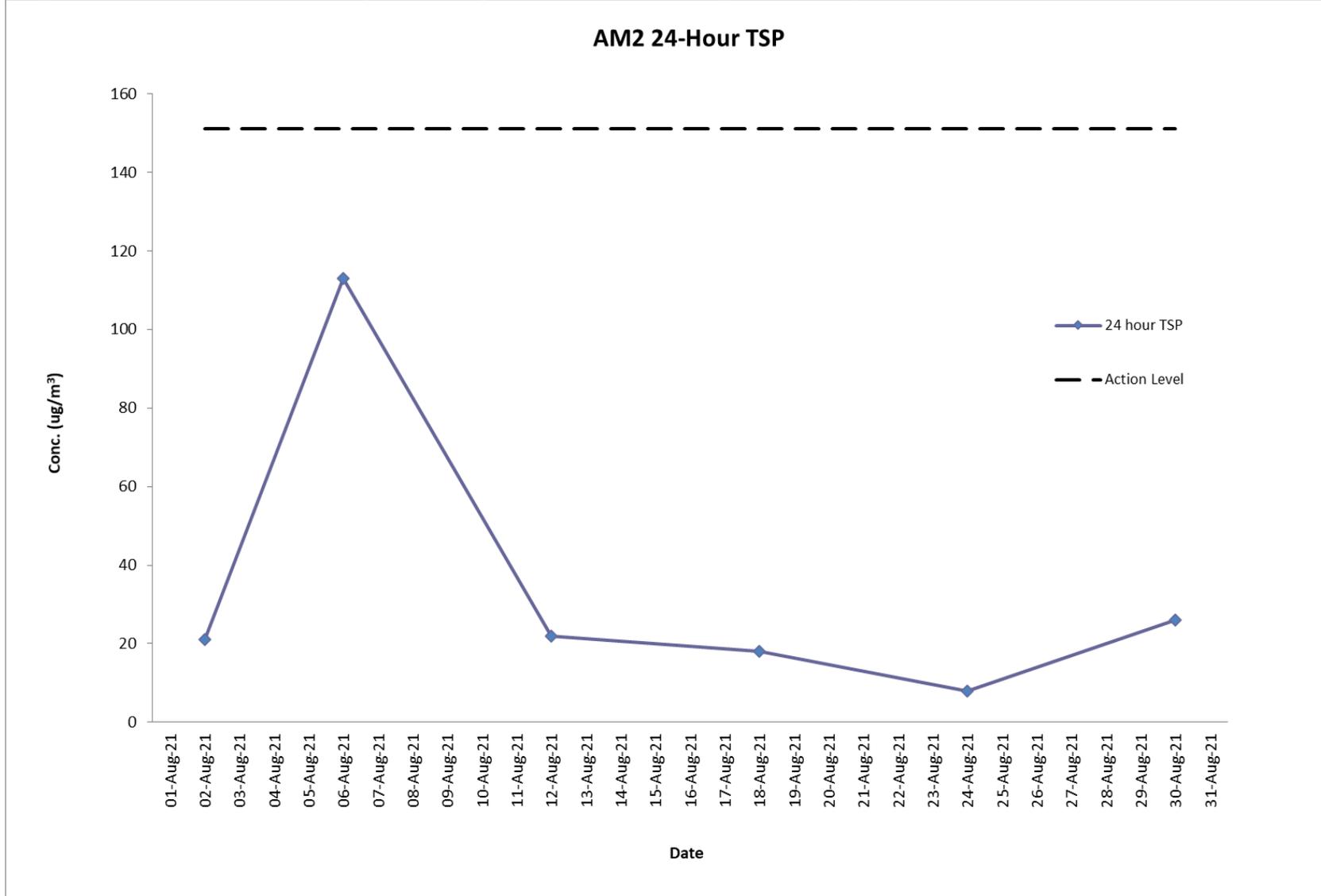
Graphical Presentation of Air Quality Monitoring Result at Station AM1 (24-hour TSP)



**Air Quality Monitoring Result at Station AM2 (24-hour TSP)**

Start		Finish		Sampling Time (hrs)	Conc. ( $\mu\text{g}/\text{m}^3$ )	Weather Condition	Action Level	Limit Level
Date	Time	Date	Time					
02-Aug-21	08:42	03-Aug-21	08:42	24	21	Fine	151.1	260
06-Aug-21	08:41	07-Aug-21	08:41	24	113	Cloudy	151.1	260
12-Aug-21	08:48	13-Aug-21	08:48	24	22	Fine	151.1	260
18-Aug-21	08:42	19-Aug-21	08:42	24	18	Fine	151.1	260
24-Aug-21	08:34	25-Aug-21	08:34	24	8	Fine	151.1	260
30-Aug-21	08:33	31-Aug-21	08:33	24	26	Fine	151.1	260

Graphical Presentation of Air Quality Monitoring Result at Station AM2 (24-hour TSP)



### Noise Monitoring Result at Station NM1A

Date	Time	Measured L <sub>10</sub> , dB(A)	Measured L <sub>90</sub> , dB(A)	L <sub>eq</sub> (30 min.)*, dB(A)
02-Aug-21	09:28	66.3	62.5	67
02-Aug-21	09:33	67.4	63.2	
02-Aug-21	09:38	66.0	62.7	
02-Aug-21	09:43	65.8	61.7	
02-Aug-21	09:48	66.2	62.9	
02-Aug-21	09:53	66.4	62.2	
12-Aug-21	09:35	66.6	62.4	68
12-Aug-21	09:40	67.3	63.1	
12-Aug-21	09:45	66.4	62.6	
12-Aug-21	09:50	66.2	62.7	
12-Aug-21	09:55	67.0	63.2	
12-Aug-21	10:00	66.7	62.9	
18-Aug-21	09:28	66.2	62.1	67
18-Aug-21	09:33	65.0	61.3	
18-Aug-21	09:38	66.7	62.4	
18-Aug-21	09:43	66.5	62.1	
18-Aug-21	09:48	65.4	61.2	
18-Aug-21	09:53	65.9	61.6	
24-Aug-21	09:21	65.6	61.3	68
24-Aug-21	09:26	66.2	62.4	
24-Aug-21	09:31	66.7	62.5	
24-Aug-21	09:36	68.6	64.1	
24-Aug-21	09:41	67.5	63.8	
24-Aug-21	09:46	65.9	61.6	
30-Aug-21	09:20	66.7	62.9	68
30-Aug-21	09:25	67.1	63.7	
30-Aug-21	09:30	67.8	63.4	
30-Aug-21	09:35	66.3	62.6	
30-Aug-21	09:40	66.5	62.6	
30-Aug-21	09:45	67.2	63.6	

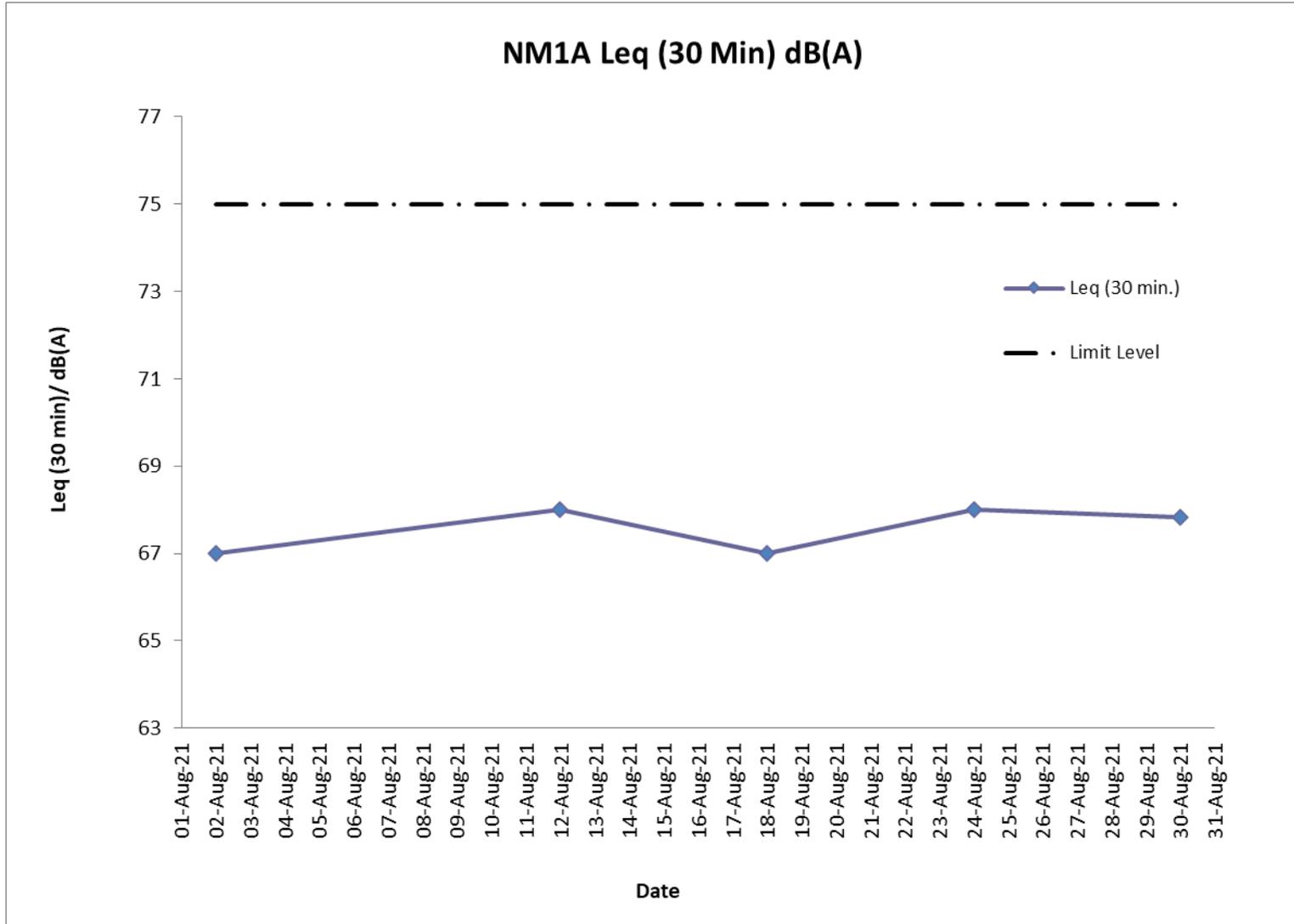
**Remarks:**

\* +3dB (A) correction was applied to free-field measurement.



The station set-up of a free-field measurement at Station NM1A.

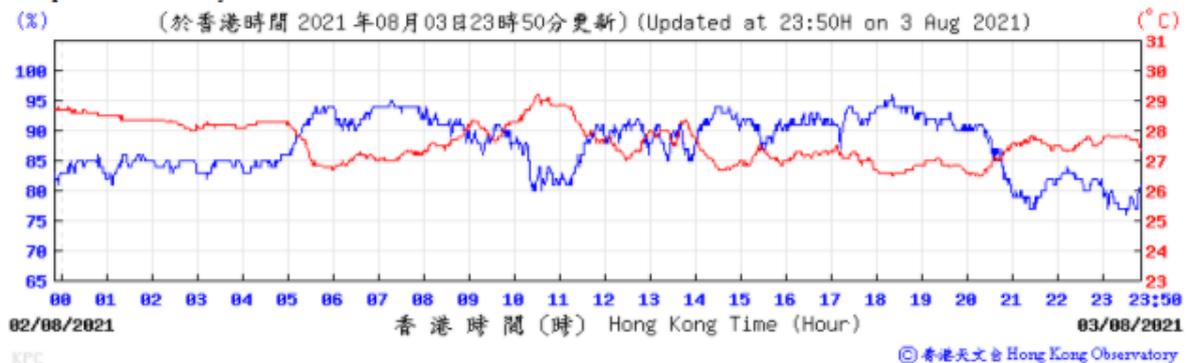
Graphical Presentation Noise Monitoring Result at Station NM1A



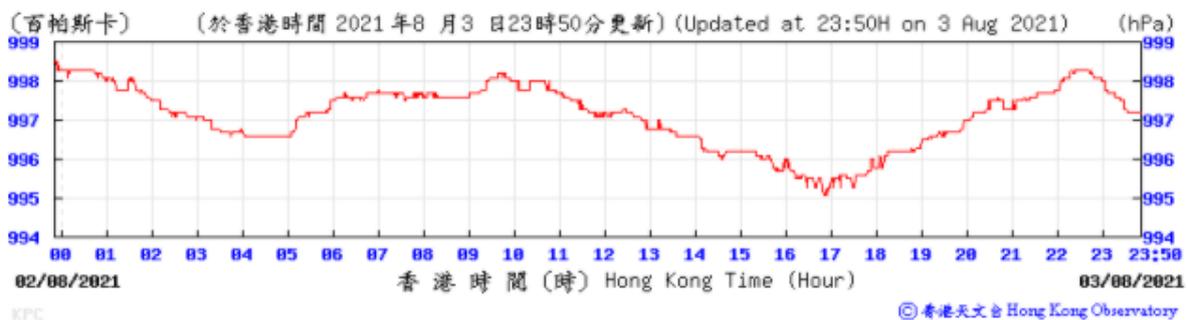
## **H. Meteorological Data Extracted from Hong Kong Observatory**

## Extract of Meteorological Observations for King's Park Automatic Weather Station, August 2021

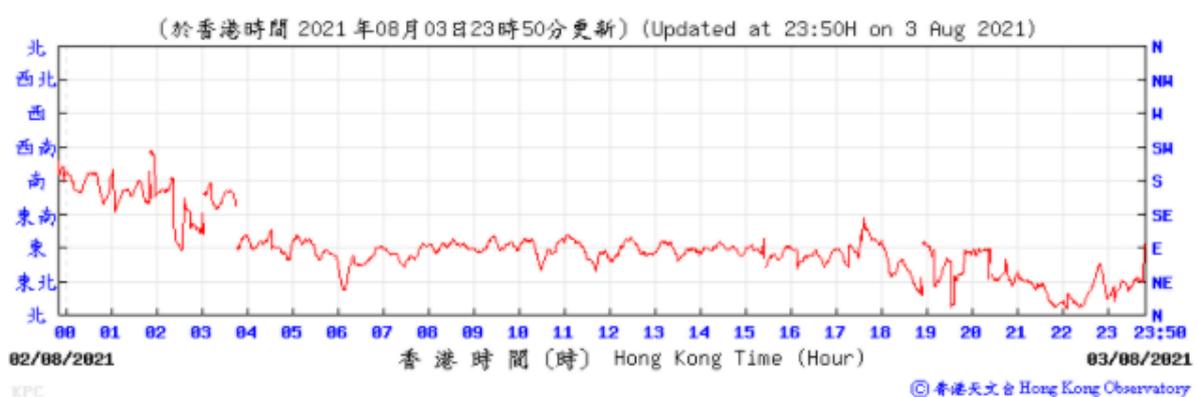
Temperature/Humidity:



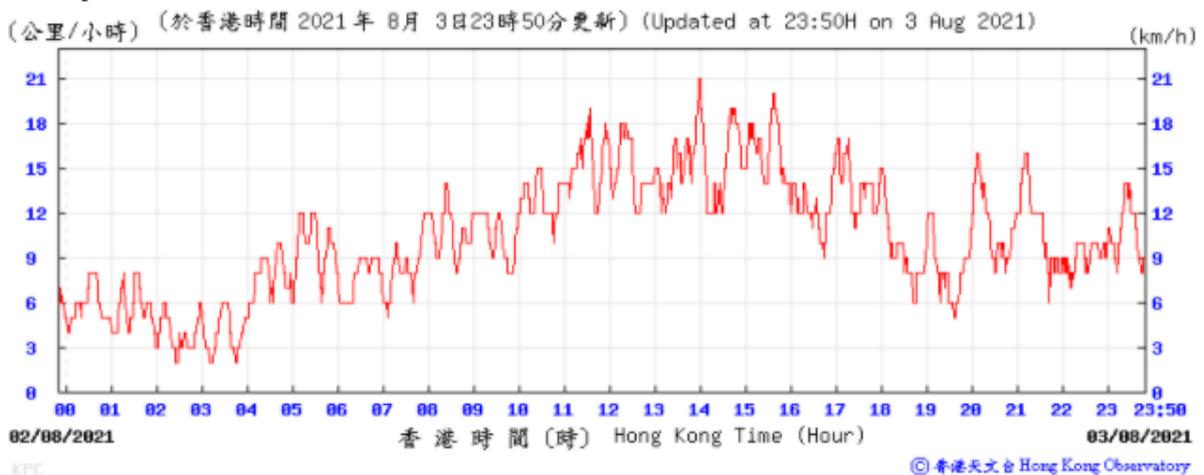
Pressure:



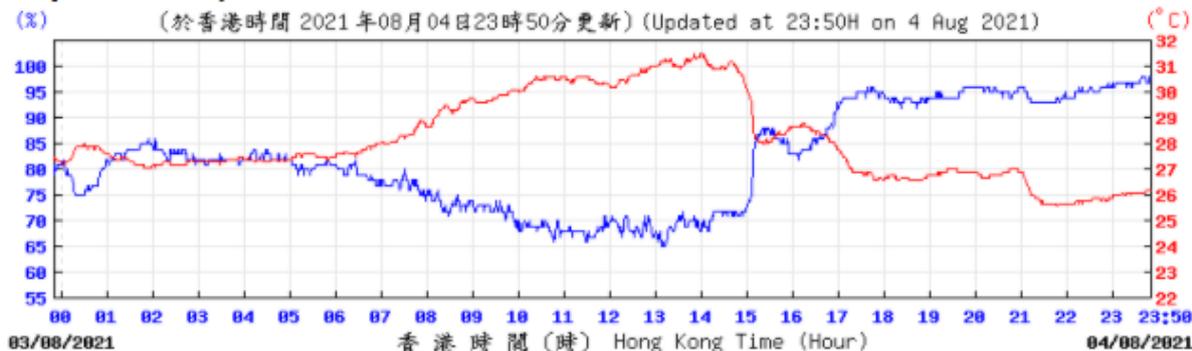
Wind Direction:



Wind Speed:



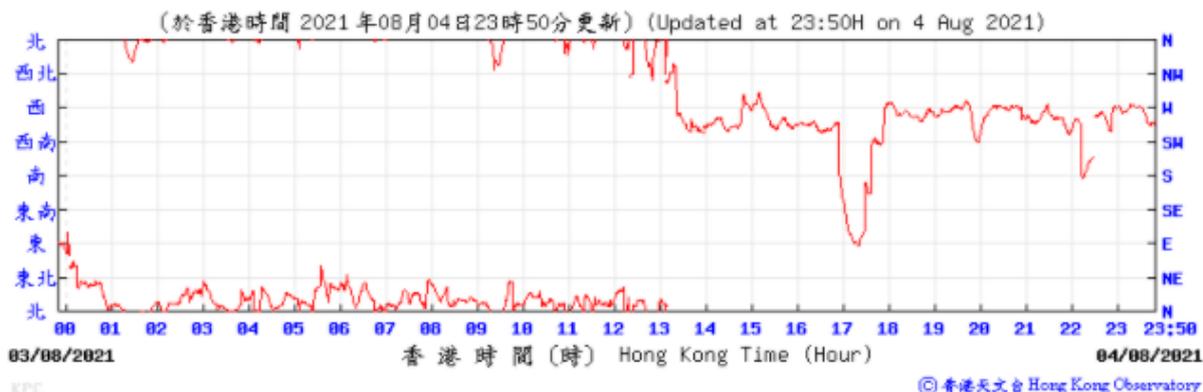
Temperature/Humidity:



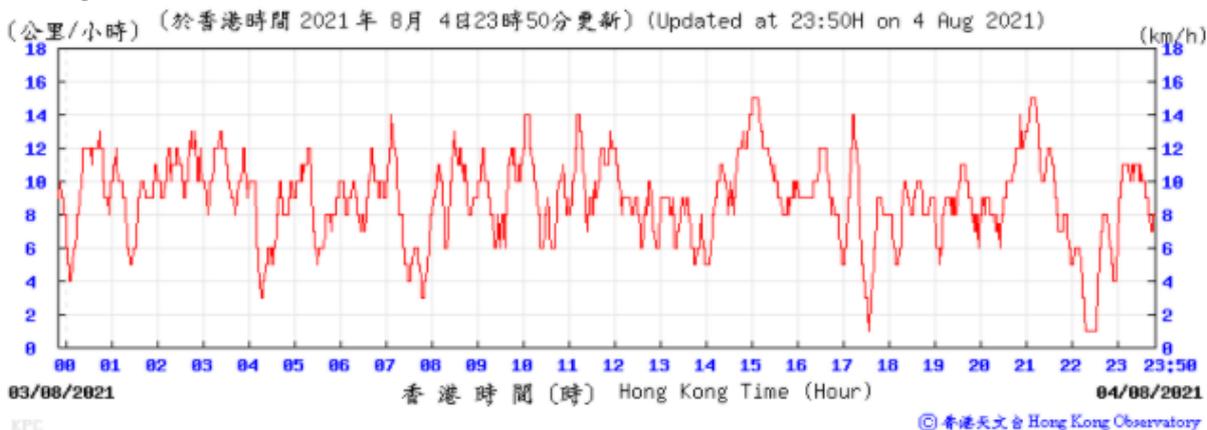
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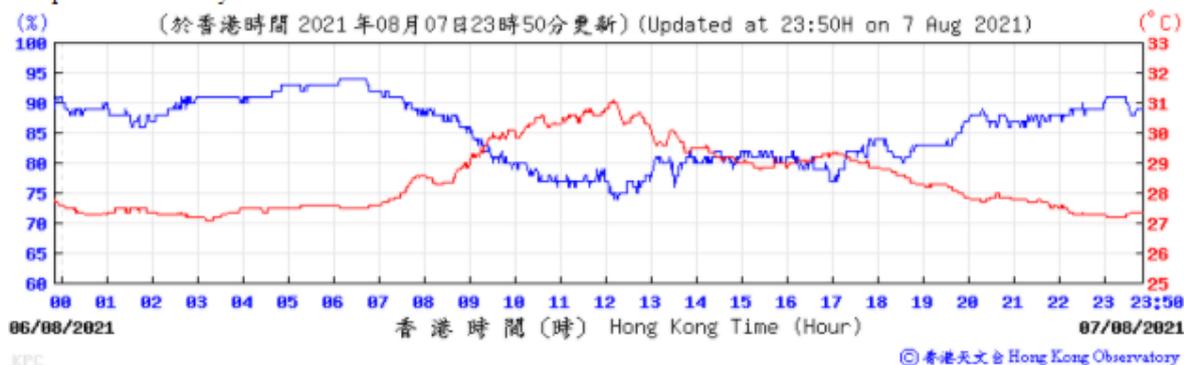
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Wind Speed:



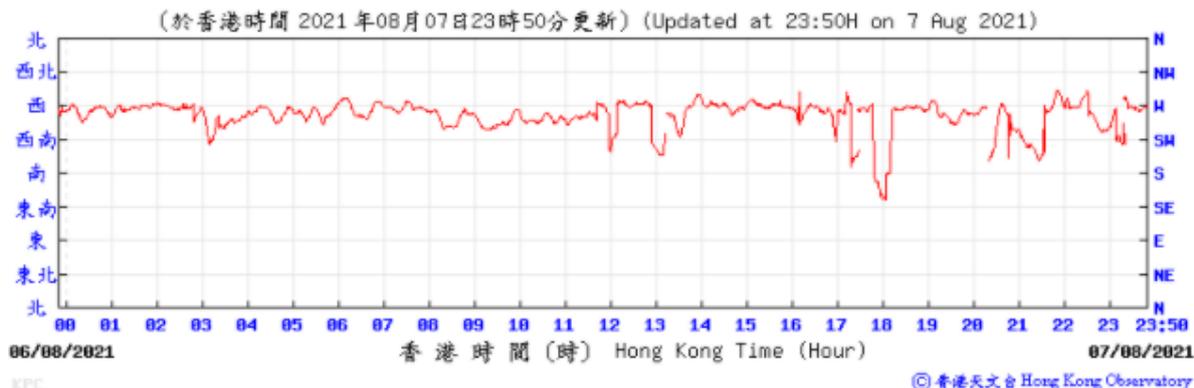
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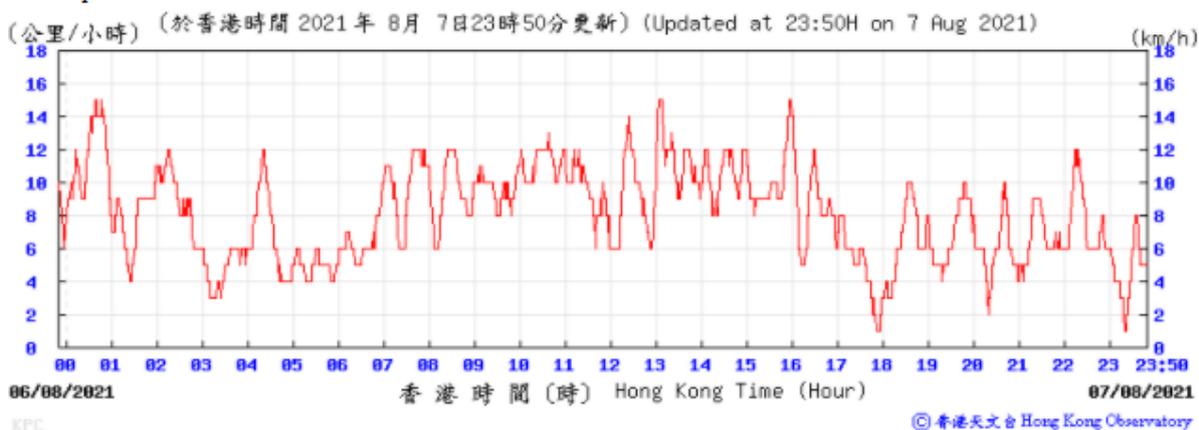
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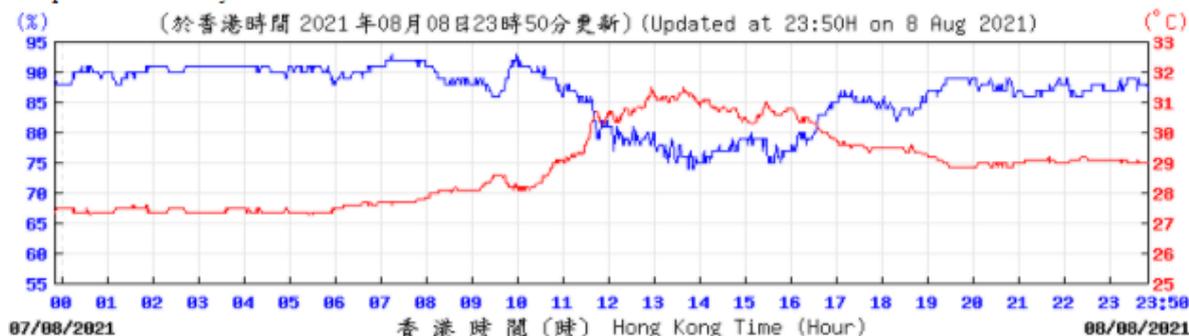
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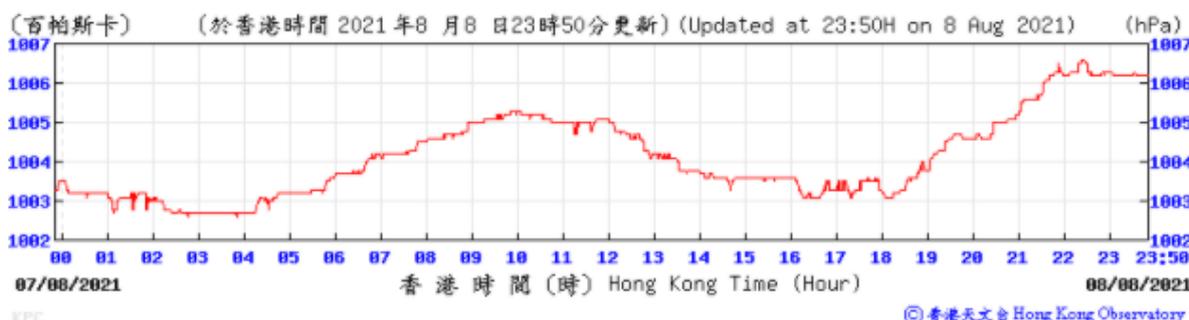
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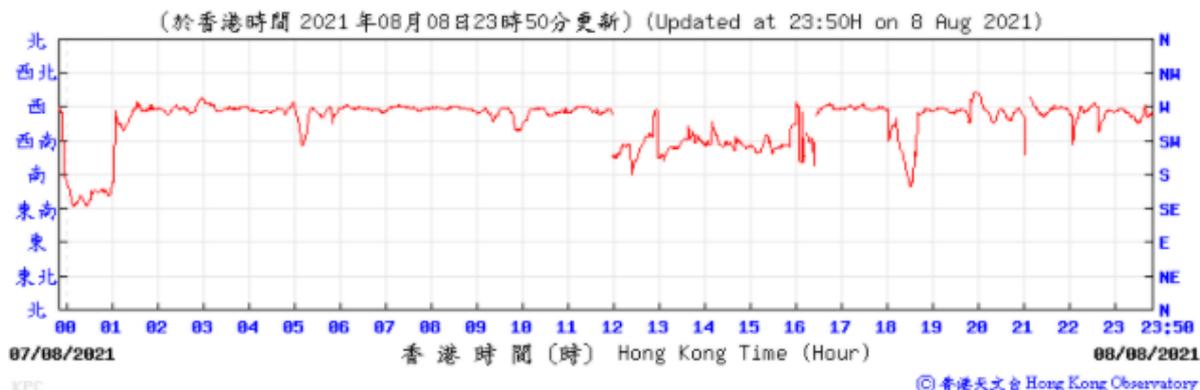
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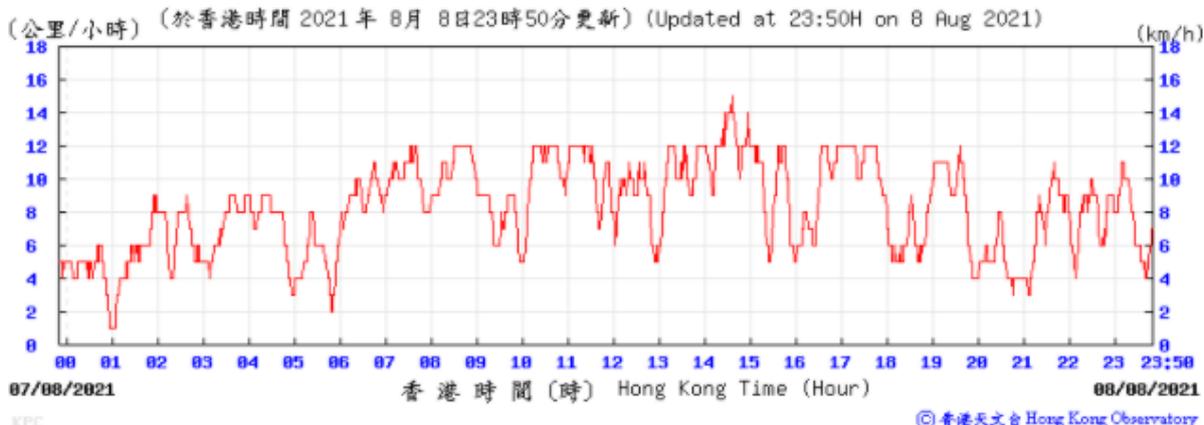
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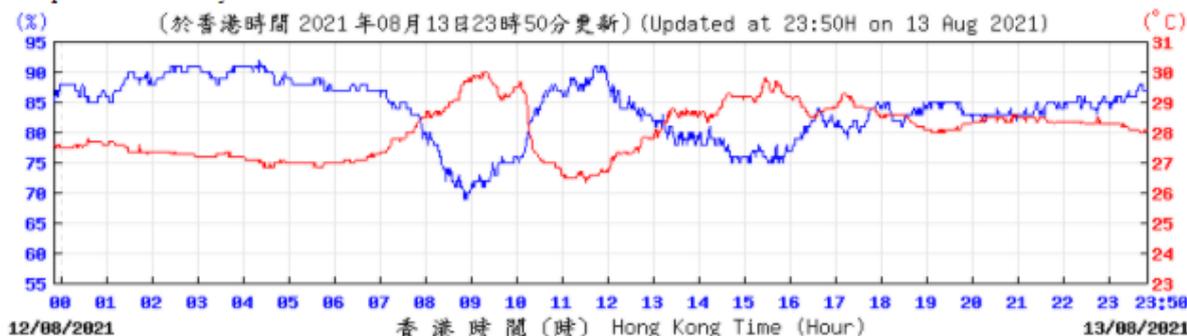
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Wind Speed:



Temperature/Humidity:



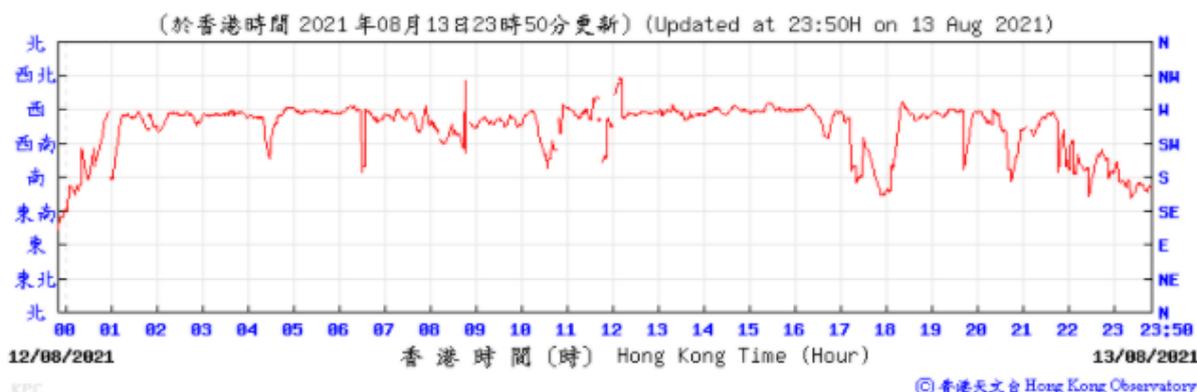
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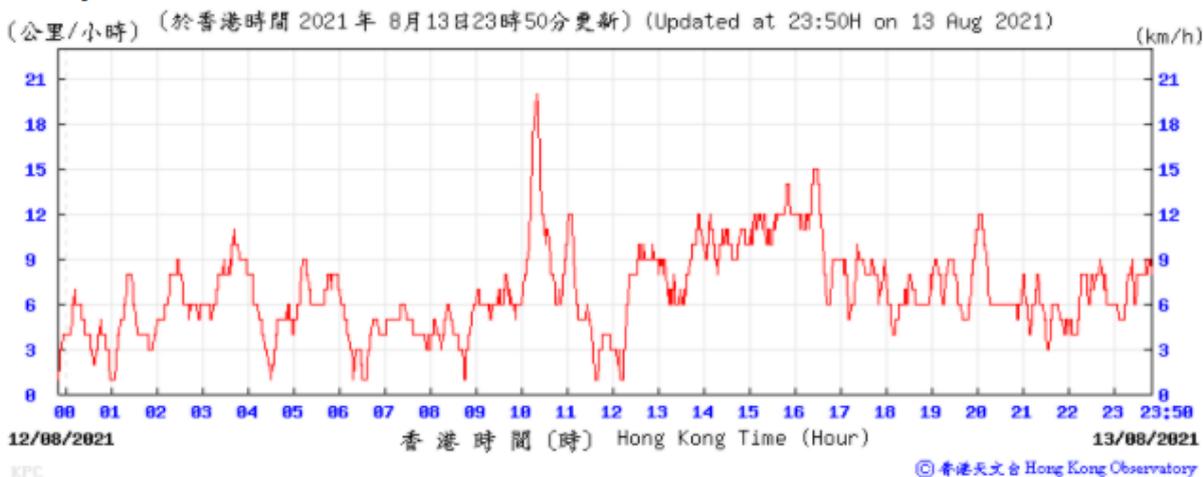
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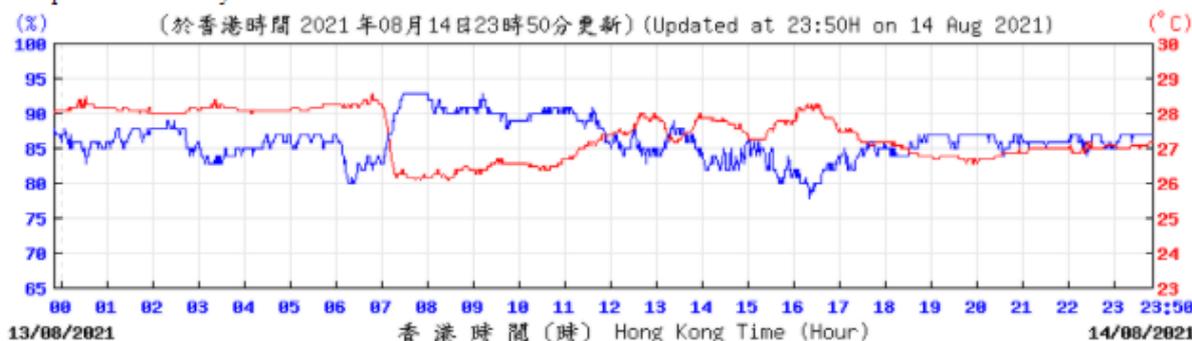


KPC

Wind Speed:



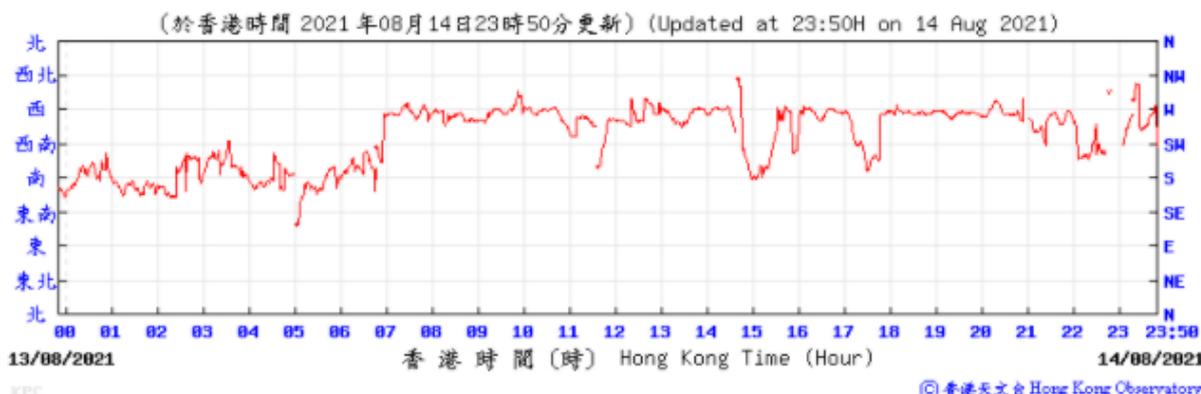
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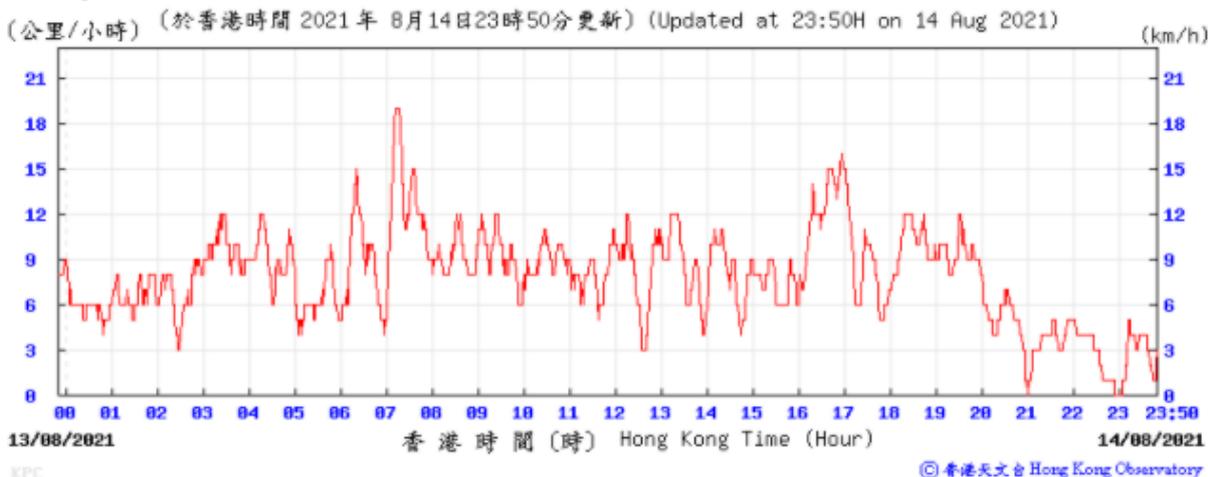
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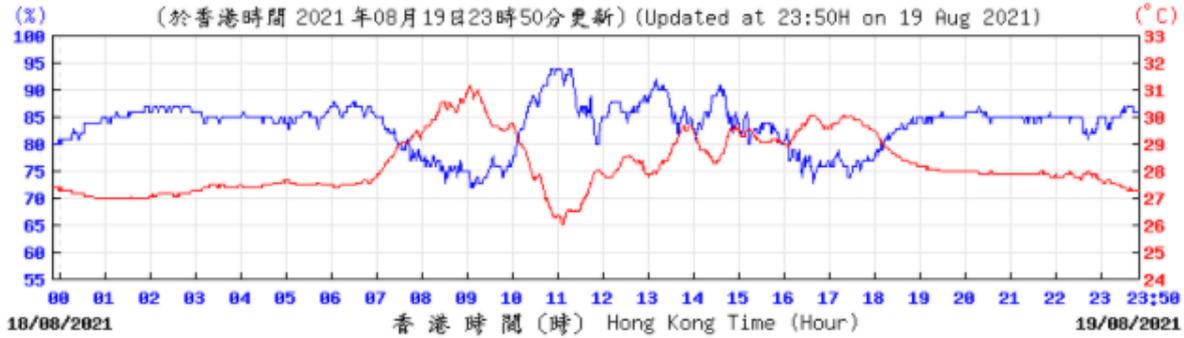
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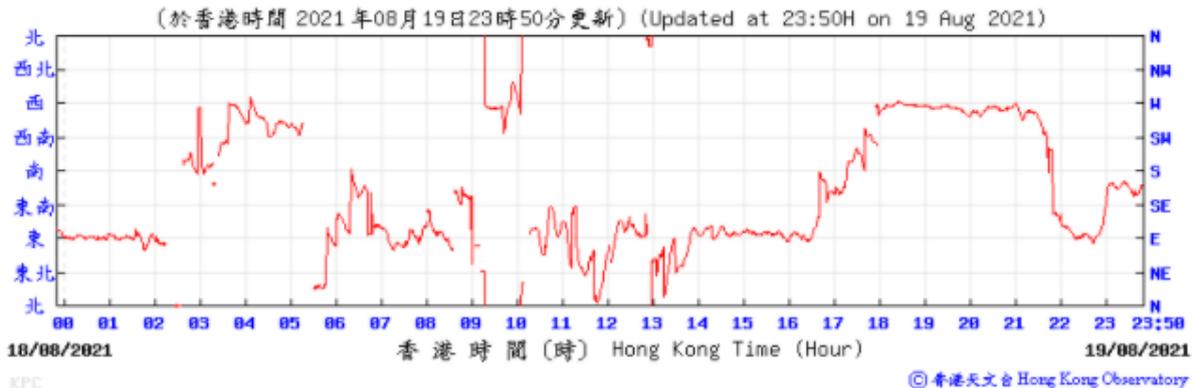
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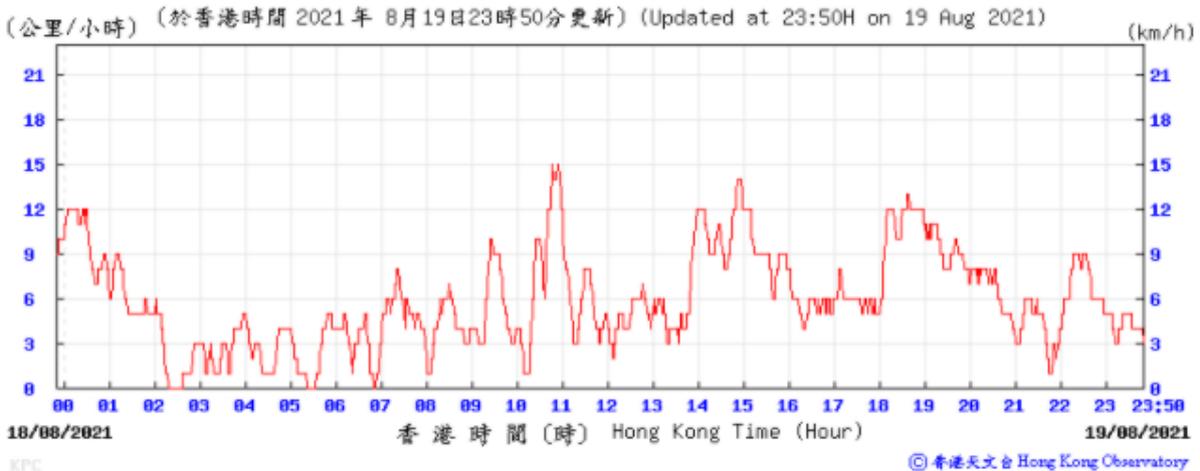
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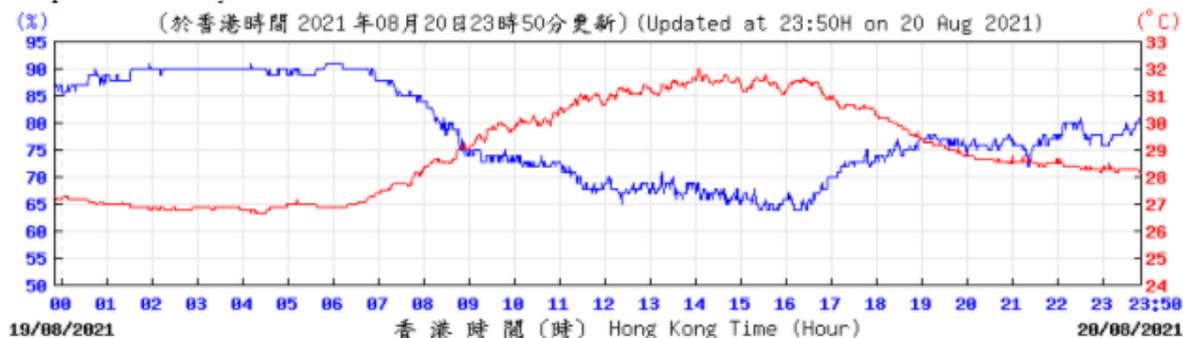
Wind Direction:



Wind Speed:

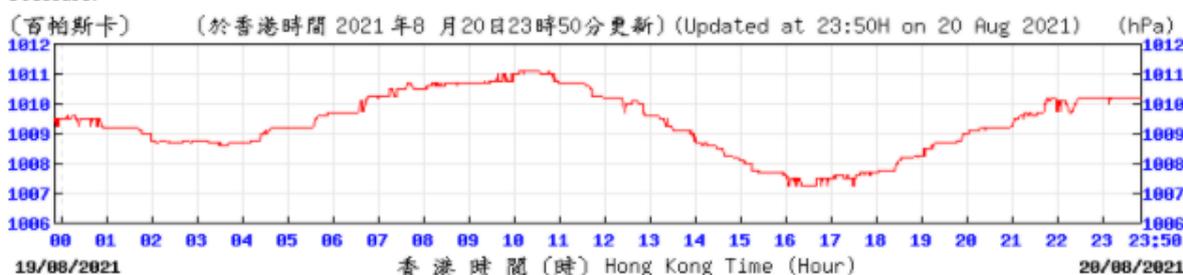


Temperature/Humidity:



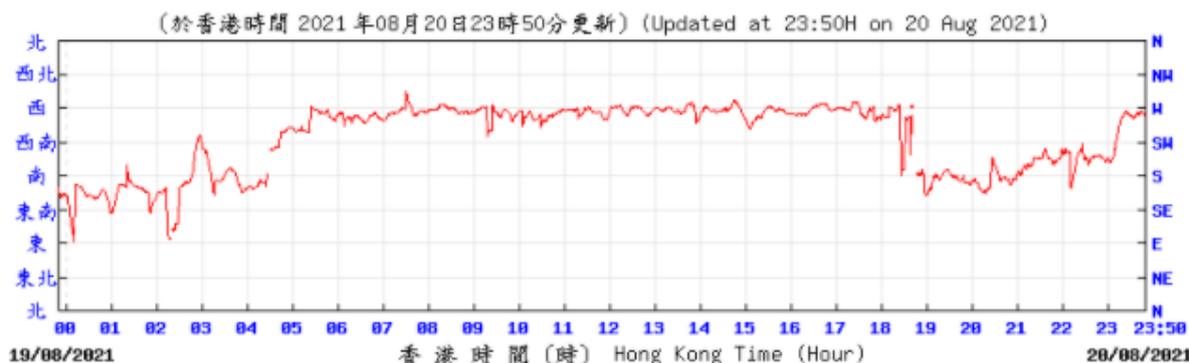
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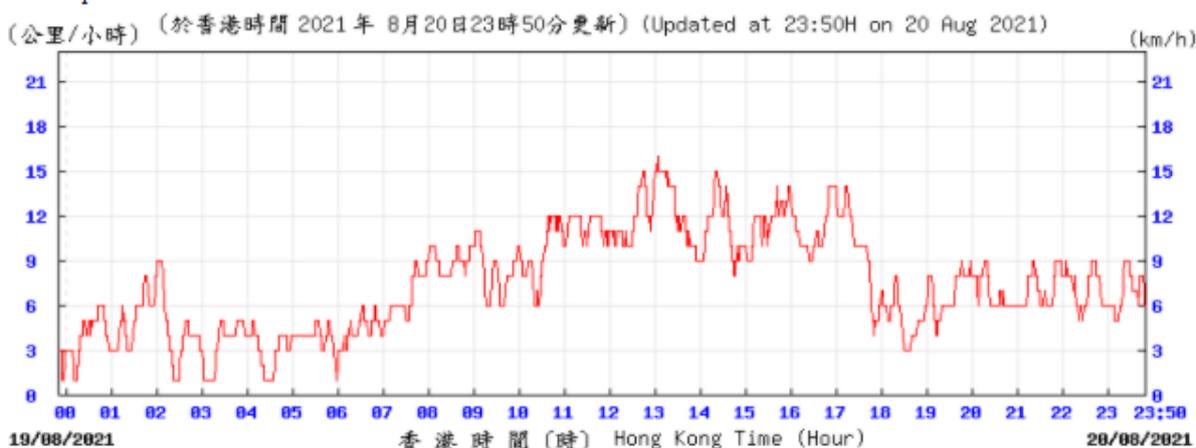
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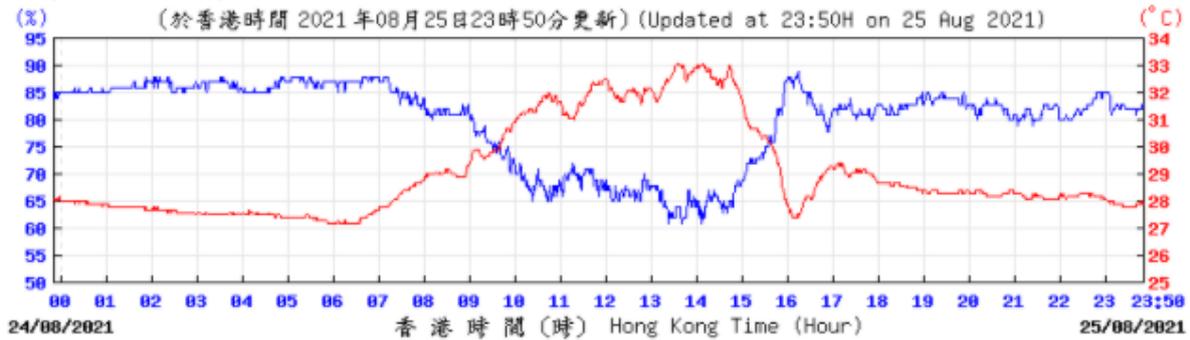
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Wind Speed:

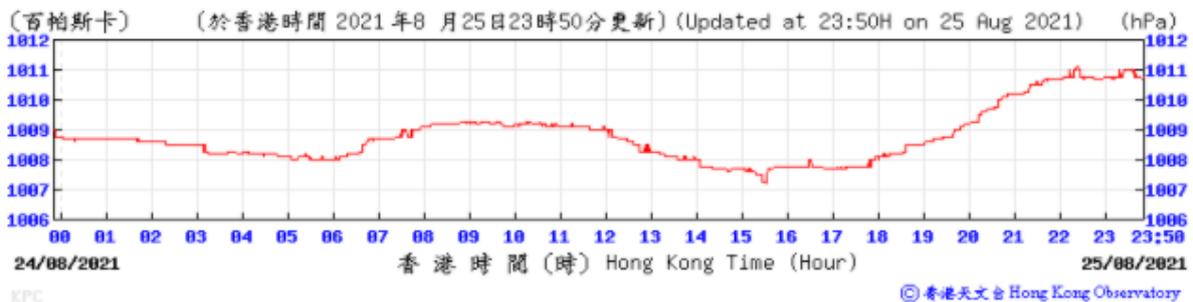


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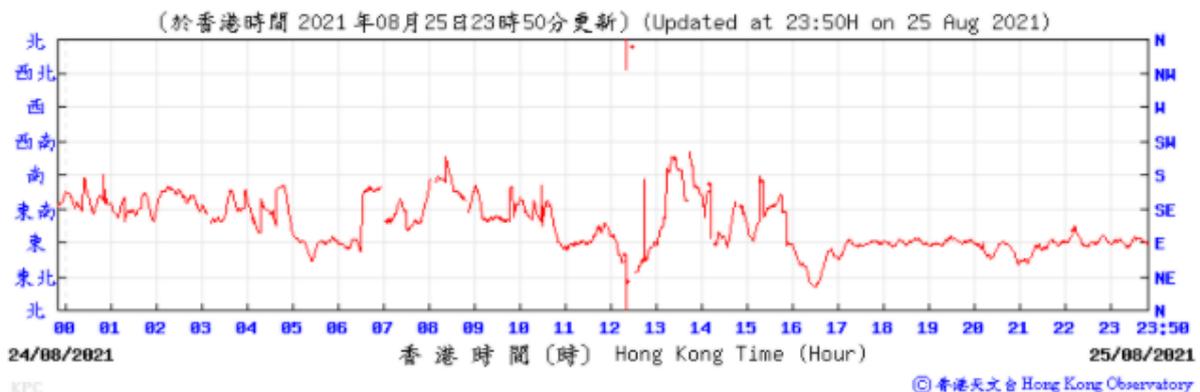
Temperature/Humidity:



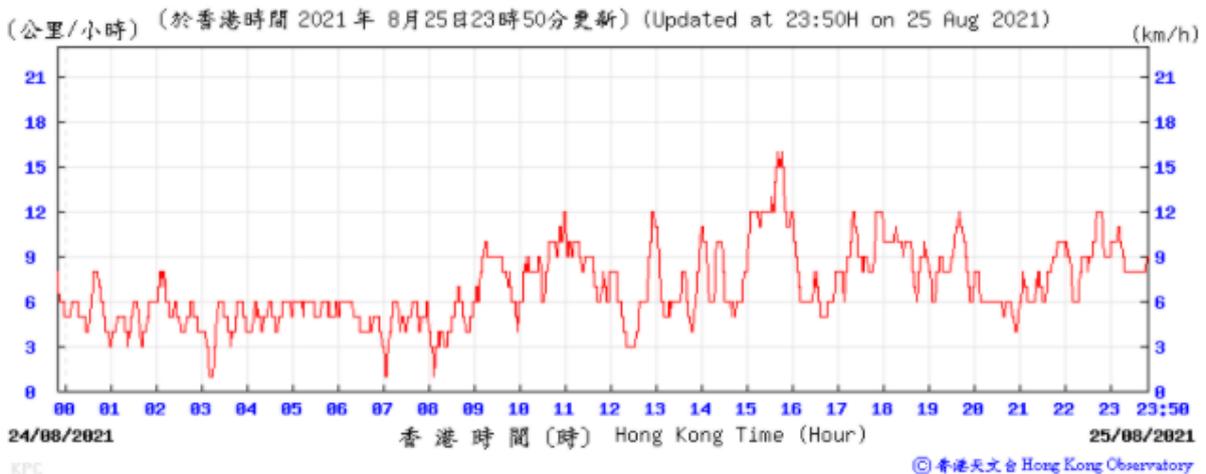
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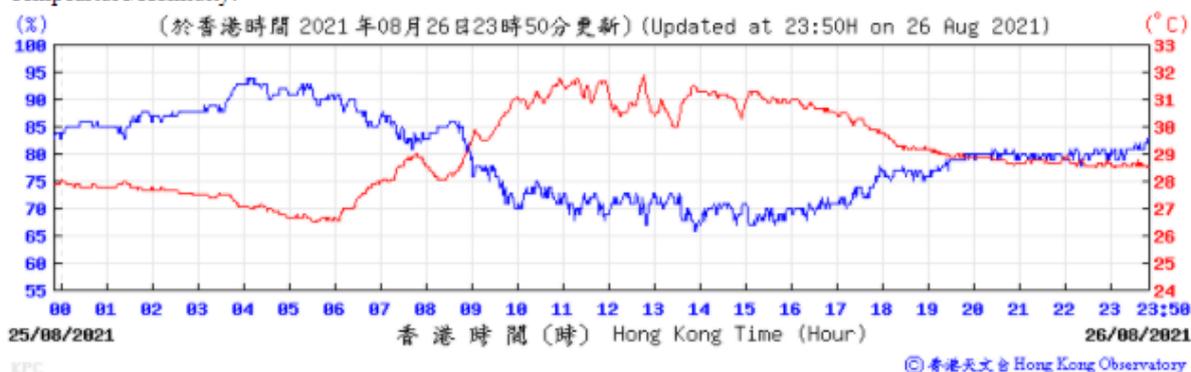
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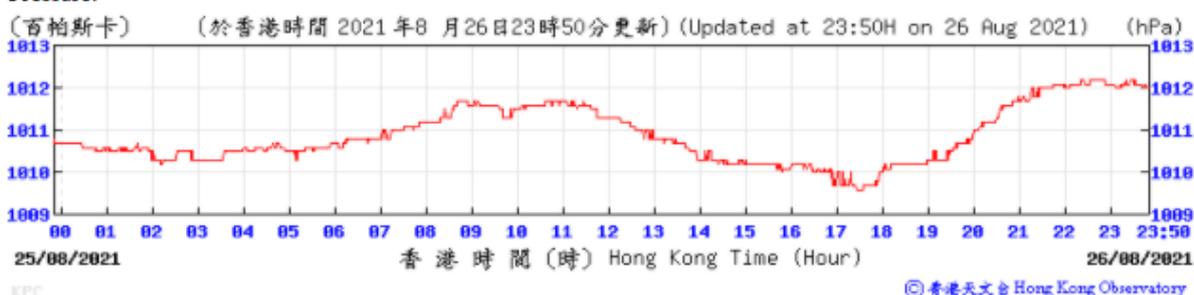
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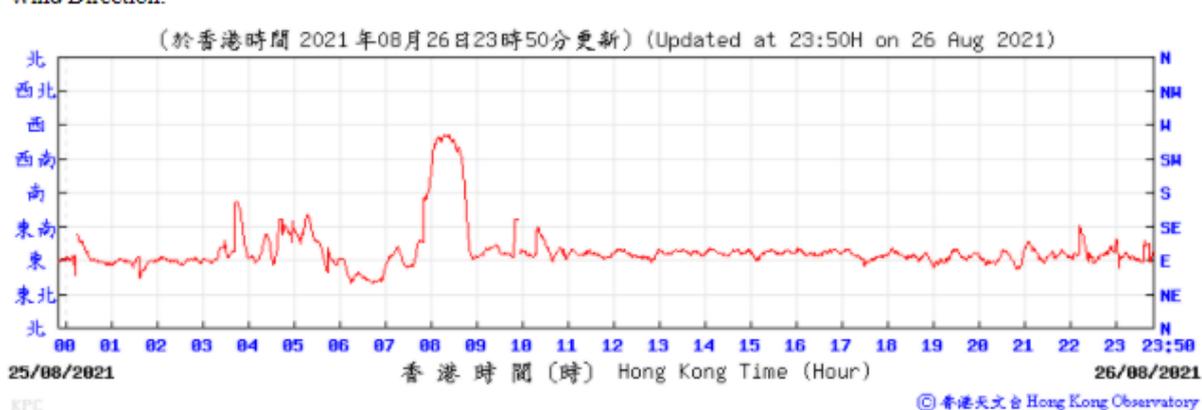
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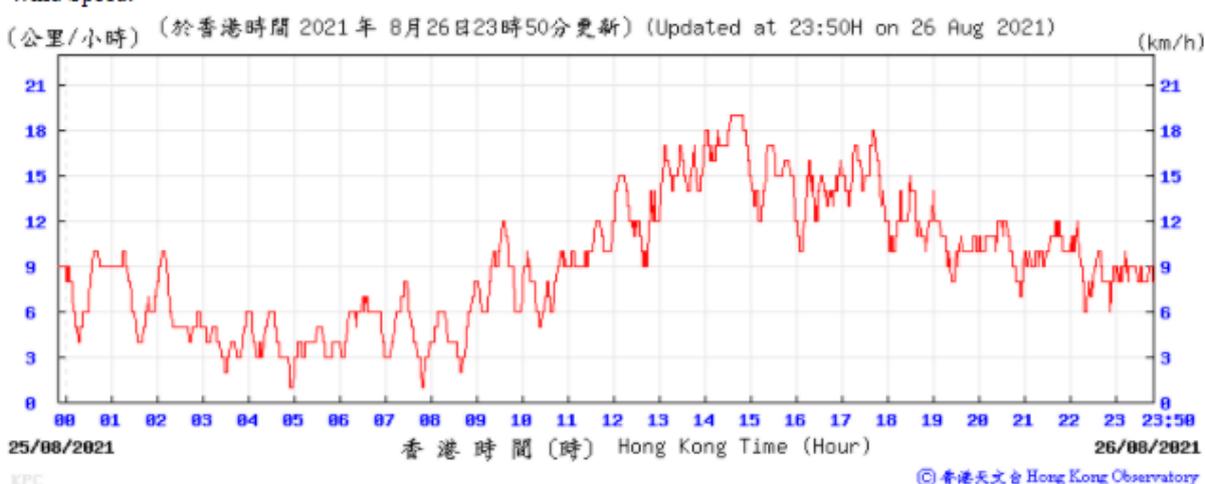
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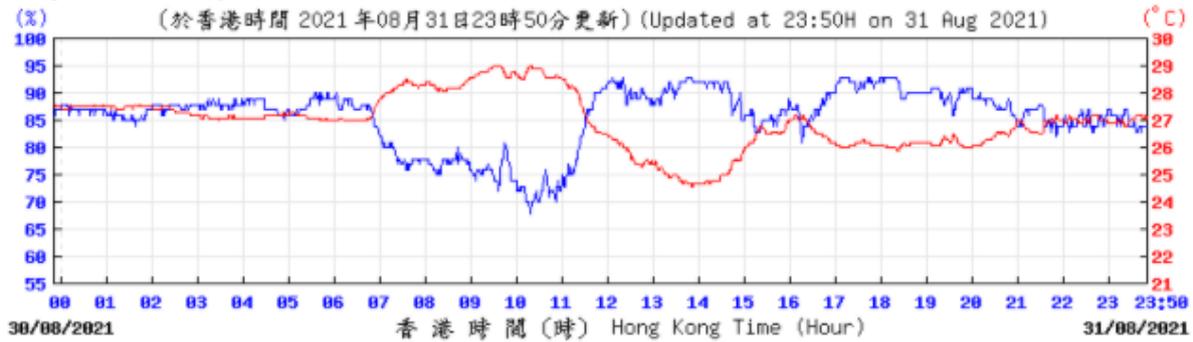
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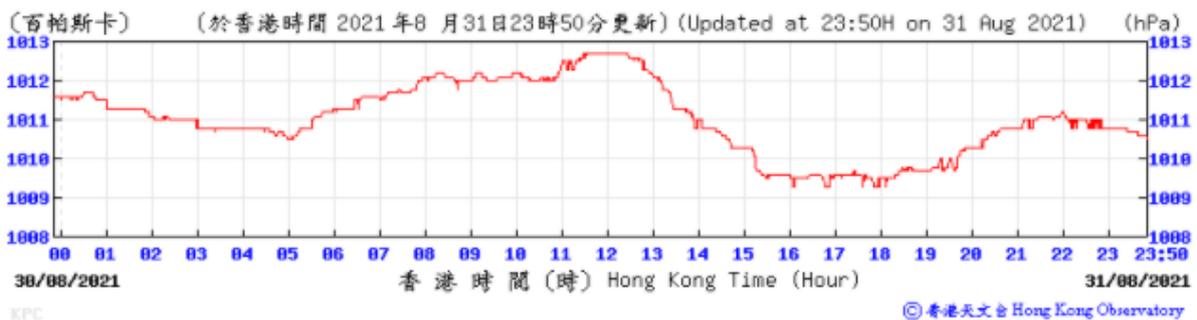
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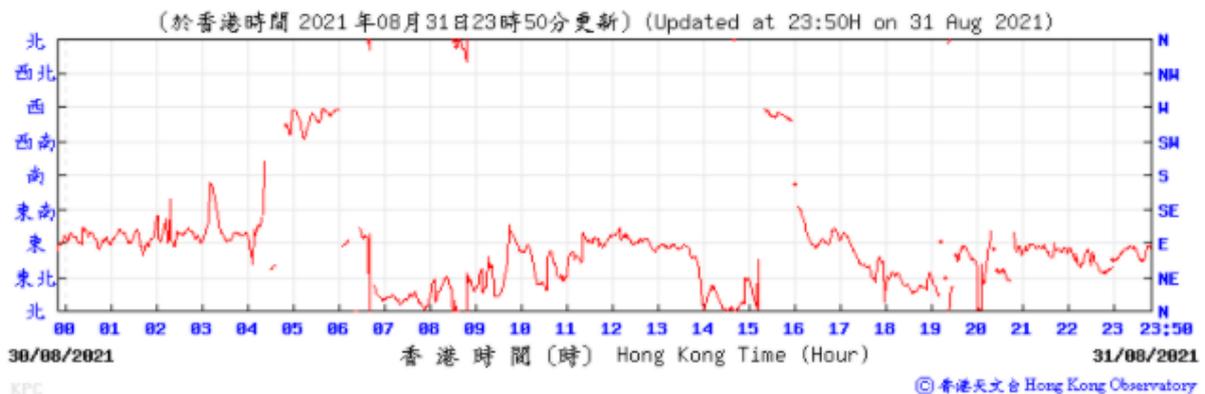
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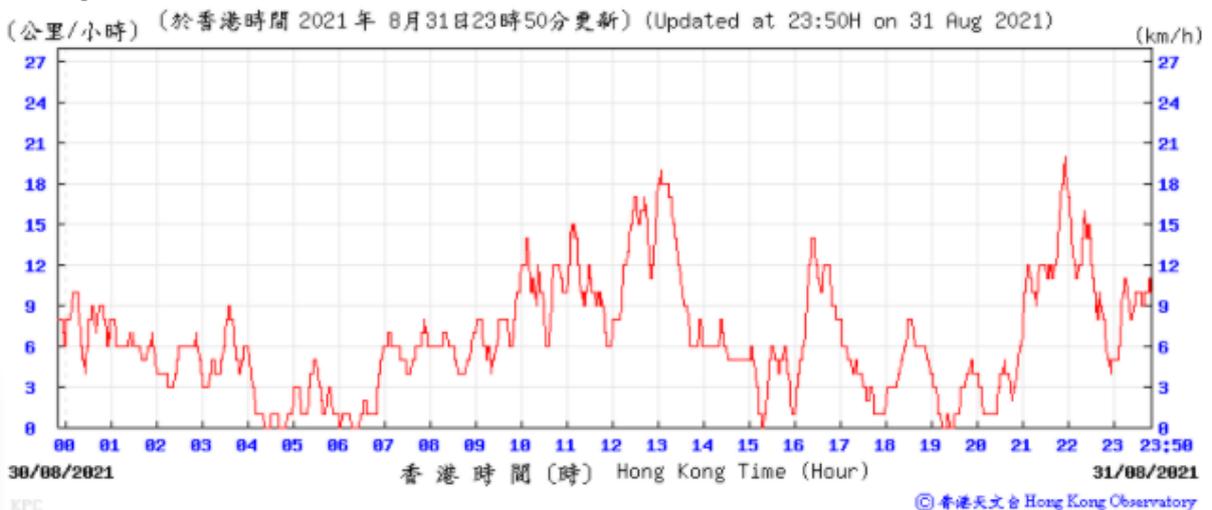
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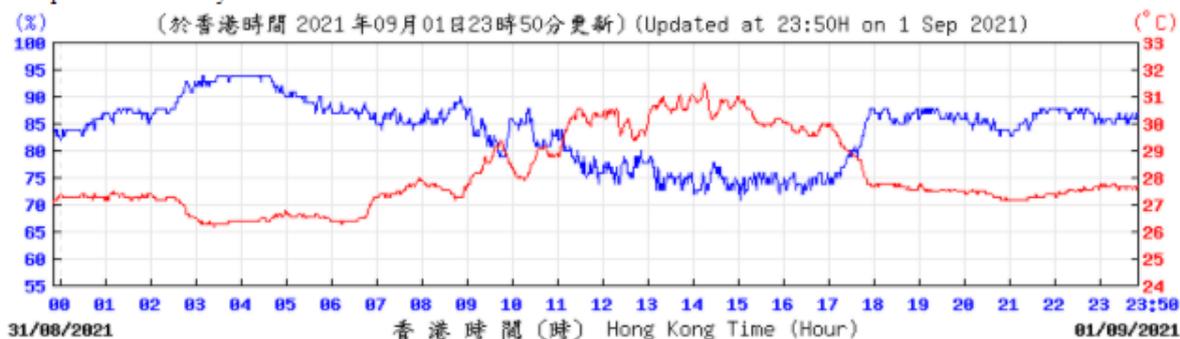
Wind Direction:



Wind Speed:



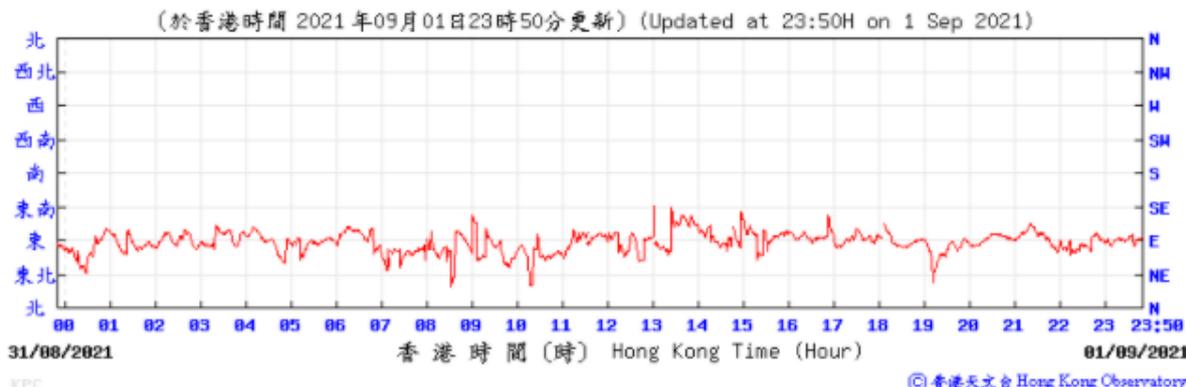
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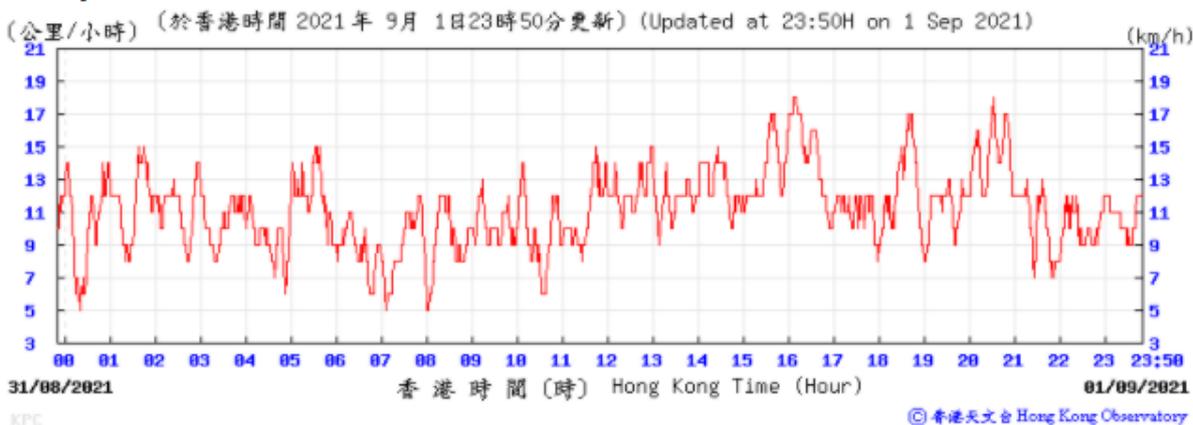
Pressure:



Wind Direction:



Wind Speed:



## I. Waste Flow table

**Table I-1: Monthly Waste Flow Table for Lyric Theatre Complex**

Month	Actual Quantities of Inert C&D Materials Generated Monthly							Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Disposed to Sorting Facility	Imported Fill	Metals	Paper/ Cardboard Packaging	Plastics	Wood/ Timber	Chemical Waste	Others, e.g. General Refuse
	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)
<b>2016</b>													
Mar	2702.1	0.0	0.0	0.0	2702.1	0.0	0.0	4.5	0.1	0.0	0.0	0.0	30.6
Apr	8631.5	0.0	0.0	0.0	8631.5	0.0	0.0	16.0	0.0	0.0	0.0	0.0	19.2
May	12487.8	0.0	0.0	0.0	12487.8	0.0	0.0	34.0	0.0	0.0	0.0	0.7	60.5
Jun	8600.8	0.0	0.0	0.0	8600.8	0.0	0.0	31.4	0.2	0.0	0.0	0.5	13.5
Jul	12624.2	0.0	0.0	0.0	12624.2	0.0	0.0	19.6	0.0	0.0	0.0	2.0	9.9
Aug	14419.9	0.0	0.0	0.0	14419.9	0.0	0.0	43.9	0.0	0.0	0.0	0.0	11.1
Sep	13671.3	0.0	0.0	0.0	13671.3	0.0	0.0	59.8	0.0	0.0	0.0	1.6	12.4
Oct	13088.9	0.0	0.0	0.0	13088.9	0.0	0.0	36.9	0.2	1.5	0.0	0.0	15.2
Nov	12424.7	0.0	0.0	0.0	12424.7	0.0	0.0	74.7	0.0	0.0	0.0	1.4	10.2
Dec	12487.6	0.0	0.0	0.0	12487.6	0.0	0.0	13.9	0.0	0.0	0.0	1.3	9.0
Sub-total (2016)	111138.8	0.0	0.0	0.0	111138.8	0.0	0.0	334.5	0.4	1.5	0.0	7.6	191.6
<b>2017</b>													
Jan	9607.8	0.0	0.0	0.0	9607.8	0.0	0.0	29.5	0.0	0.0	0.0	0.0	7.3
Feb	9108.2	0.0	0.0	0.0	9108.2	0.0	0.0	50.2	0.2	0.0	0.0	0.7	9.8
Mar	11361.7	0.0	0.0	0.0	11361.7	0.0	0.0	16.1	0.0	0.0	0.0	1.4	8.5
Apr	2591.5	0.0	0.0	0.0	2591.5	0.0	0.0	35.7	0.0	0.0	0.0	0.0	4.7
May	2579.3	0.0	0.0	99.0	2480.3	0.0	0.0	20.9	0.1	0.0	0.0	0.5	10.0
Jun	476.0	0.0	0.0	341.0	129.7	5.3	0.0	0.0	0.0	0.0	0.0	0.0	7.6
Jul	3419.0	0.0	0.0	804.0	2615.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.8
Aug	3730.9	0.0	0.0	1377.5	2353.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
Sep	2108.2	0.0	0.0	1133.5	974.7	0.0	0.0	34.6	0.2	0.0	0.0	0.0	10.8
Oct	9159.0	0.0	0.0	7868.0	1291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	9.3
Nov	5095.4	0.0	0.0	4352.0	725.2	18.1	0.0	0.0	0.0	0.0	0.0	0.0	38.8
Dec	3856.2	0.0	0.0	3076.0	780.2	0.0	0.0	0.0	0.2	0.0	0.0	0.4	8.4
Sub-total (2017)	63093.1	0.0	0.0	19051.0	44018.7	23.4	0.0	187.1	0.7	0.0	0.0	3.8	137.3

**Table I-1: Monthly Waste Flow Table for Lyric Theatre Complex**

Month	Actual Quantities of Inert C&D Materials Generated Monthly							Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Disposed to Sorting Facility	Imported Fill	Metals	Paper/ Cardboard Packaging	Plastics	Wood/ Timber	Chemical Waste	Others, e.g. General Refuse
	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)
<b>2018</b>													
Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Mar	6120.2	0.0	0.0	5782.0	338.2	0.0	0.0	0.0	0.0	1.0	0.0	0.5	17.6
Apr	14460.3	0.0	0.0	12484.1	1976.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	7.6
May	59783.7	0.0	0.0	46989.0	12794.7	0.0	0.0	59.6	0.0	0.0	0.0	0.0	9.4
Jun	53117.5	0.0	0.0	37642.8	15474.7	0.0	0.0	51.5	0.2	0.0	0.0	0.0	12.8
Jul	89901.5	0.0	0.0	85317.1	4584.4	0.0	165.1	114.6	0.0	0.0	0.0	0.0	41.3
Aug	35137.3	0.0	0.0	33731.6	1405.7	0.0	214.3	148.1	0.0	0.0	0.0	0.0	48.5
Sep	4924.3	0.0	0.0	4641.2	196.1	87.0	174.6	40.0	0.0	0.0	0.0	0.0	179.2
Oct	19099.9	0.0	0.0	11301.0	7642.8	156.1	0.0	106.3	0.4	0.0	0.0	0.0	528.5
Nov	104168.0	0.0	0.0	79811.6	24351.0	5.3	0.0	54.5	0.0	0.6	0.0	0.0	31.5
Dec	62989.9	0.0	0.0	51284.4	11699.9	5.6	0.0	95.1	0.0	0.6	0.0	0.0	65.9
Sub-total (2018)	449702.6	0.0	0.0	368984.8	80463.7	254.0	553.9	669.7	0.5	2.4	0.0	0.5	943.7
<b>2019</b>													
Jan	74479.1	0.0	0.0	69249.5	5229.7	0.0	318.0	326.7	0.2	0.0	0.0	0.0	76.3
Feb	21969.9	0.0	0.0	17723.9	4246.0	0.0	16.5	55.2	0.0	0.0	0.0	0.0	26.7
Mar	19311.9	0.0	0.0	8569.9	10742.0	0.0	337.8	61.5	0.0	0.0	0.0	0.0	36.3
Apr	28559.9	0.0	0.0	21280.3	7279.6	0.0	0.0	32.6	0.0	0.8	0.0	0.0	24.9
May	45418.0	0.0	0.0	11200.6	34217.4	0.0	0.0	27.4	0.2	0.5	0.0	0.0	33.7
Jun	66633.4	0.0	0.0	23874.5	42748.0	10.9	59.2	11.9	0.0	0.9	0.0	0.0	35.3
Jul	36619.6	0.0	0.0	1632.7	34960.9	26.0	64.4	120.7	0.0	0.0	0.0	0.0	57.9
Aug	2526.8	0.0	0.0	0.0	2499.0	27.8	31.9	40.2	0.0	0.8	0.0	0.0	66.3
Sep	4117.6	0.0	0.0	0.0	4088.7	28.9	95.2	19.0	0.0	0.6	0.0	0.0	127.4
Oct	6974.2	0.0	0.0	0.0	6948.1	26.1	15.9	11.4	0.2	1.0	0.0	0.6	223.6
Nov	5334.4	0.0	0.0	0.0	5304.1	30.3	0.0	8.9	0.0	0.0	0.0	0.0	151.6
Dec	6236.8	0.0	0.0	0.0	6236.8	0.0	0.0	70.6	0.0	0.0	0.0	0.0	98.9
Sub-total (2019)	318181.6	0.0	0.0	153531.3	164500.1	150.1	938.9	785.8	0.6	4.6	0.0	0.6	959.0

**Table I-1: Monthly Waste Flow Table for Lyric Theatre Complex**

Month	Actual Quantities of Inert C&D Materials Generated Monthly							Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Disposed to Sorting Facility	Imported Fill	Metals	Paper/ Cardboard Packaging	Plastics	Wood/ Timber	Chemical Waste	Others, e.g. General Refuse
	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)
<b>2020</b>													
Jan	7089.9	0.0	0.0	0.0	7089.9	0.0	0.0	10.6	0.2	0.0	0.0	0.0	65.7
Feb	16822.3	0.0	0.0	0.0	16822.3	0.0	0.0	232.2	0.1	0.0	0.0	0.0	66.3
Mar	6559.0	0.0	0.0	0.0	6559.0	0.0	110.4	63.1	0.0	0.9	0.0	0.0	138.3
Apr	4997.9	0.0	0.0	1615.7	3382.2	0.0	159.2	1123.9	1.9	0.0	0.0	0.0	113.2
May	2236.0	0.0	0.0	452.3	1783.6	0.0	0.0	406.5	0.0	0.0	0.0	0.0	188.8
Jun	1134.3	0.0	0.0	0.0	1134.3	0.0	31.5	262.6	0.2	0.6	0.0	0.0	210.6
Jul	148.8	0.0	0.0	0.0	148.8	0.0	31.5	458.5	0.5	0.0	0.0	0.0	220.0
Aug	540.7	0.0	0.0	0.0	540.7	0.0	0.0	340.8	0.0	0.0	0.0	0.0	238.3
Sep	1432.3	0.0	0.0	0.0	1432.3	0.0	0.0	750.7	0.2	0.0	0.0	0.0	291.9
Oct	1381.5	0.0	0.0	0.0	1381.5	0.0	0.0	717.9	0.2	0.0	0.0	0.0	400.2
Nov	1444.1	0.0	0.0	0.0	1437.4	6.7	475.8	473.6	0.2	0.5	0.0	0.0	377.8
Dec	793.8	0.0	0.0	0.0	793.8	0.0	0.0	478.3	0.2	0.0	0.0	0.0	435.8
Sub-total (2020)	44580.6	0.0	0.0	2068.1	42505.8	6.7	808.3	5318.7	3.7	2.0	0.0	0.0	2746.8
<b>2021</b>													
Jan	881.4	0.0	0.0	0.0	881.4	0.0	0.0	835.1	0.4	0.0	0.0	0.0	497.0
Feb	544.7	0.0	0.0	0.0	544.7	0.0	0.0	100.5	0.3	0.0	0.0	0.0	504.7
Mar	406.1	0.0	0.0	0.0	406.1	0.0	0.0	455.8	0.3	0.0	0.0	0.0	881.8
Apr	633.0	0.0	0.0	0.0	633.0	0.0	0.0	429.9	0.7	0.0	0.0	0.0	613.0
May	1125.8	0.0	0.0	0.0	1125.8	0.0	0.0	355.1	0.2	0.1	0.0	0.0	355.3
Jun	877.3	0.0	0.0	0.0	877.3	0.0	0.0	98.4	0.2	0.0	0.0	0.4	420.3
Jul	8.9	0.0	0.0	0.0	0.0	8.9	0.0	43.9	2.0	0.0	0.0	0.0	287.1
Aug	1296.2	0.0	0.0	0.0	1296.2	0.0	0.0	121.0	0.0	0.0	0.0	0.0	459.1
Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total (2021)	5773.3	0.0	0.0	0.0	5764.4	8.9	0.0	2439.6	4.0	0.1	0.0	0.4	4018.2
<b>Total</b>	<b>992469.9</b>	<b>0.0</b>	<b>0.0</b>	<b>543635.2</b>	<b>448391.5</b>	<b>443.2</b>	<b>2301.1</b>	<b>9735.2</b>	<b>9.9</b>	<b>10.5</b>	<b>0.0</b>	<b>12.9</b>	<b>8996.5</b>

Note:

- 242.34 tonnes, 992.32 tonnes and 61.55 tonnes of inert C&D materials were disposed of as public fill to Tseung Kwan O Area 137 Public Fill, Tuen Mun Area 38 Public Fill and Chai Wan Public Fill Barging Point respectively in the reporting month.

## **J. Environmental Mitigation Measures – Implementation Status**

**Table J-1: Environmental Mitigation Measures Implementation Status (August 2021)**

EM&A Ref.	Recommendation Measures	Implementation Stage
<b>Air Quality Impact (Construction)</b>		
2.1 & 10.3.1	<b>General Dust Control Measures</b> Frequent water spraying for active construction areas (12 times a day or once every one hour), including Heavy construction activities such as construction of buildings or roads, drilling, ground excavation, cut and fill operations (i.e., earth moving)	Obs
2.1 & 10.3.1	<b>Best Practice For Dust Control</b> The relevant best practices for dust control as stipulated in the Air Pollution Control (construction Dust) Regulation should be adopted to further reduce the construction dust impacts from the Project. These best practices include: <i>Good Site Management</i> <ul style="list-style-type: none"> <li>• Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.</li> </ul> <i>Disturbed Parts of the Roads</i> <ul style="list-style-type: none"> <li>• Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</li> <li>• Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.</li> </ul> <i>Exposed Earth</i> <ul style="list-style-type: none"> <li>• Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.</li> </ul> <i>Loading, Unloading or Transfer of Dusty Materials</i> <ul style="list-style-type: none"> <li>• All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.</li> </ul> <i>Debris Handling</i> <ul style="list-style-type: none"> <li>• Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.</li> <li>• Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.</li> </ul>	Obs
		N/A No exposed earth in this project.
		✓
		✓
		✓
		✓
		✓

EM&A Ref.	Recommendation Measures	Implementation Stage
	<p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> <li>Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.</li> </ul> <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul> <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> <li>The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site.</li> <li>Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> <li>Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.</li> </ul> <p><i>Site hoarding</i></p> <ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.</li> </ul>	<p>L2</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
2.1 & 10.3.1	<p><b>Best Practicable Means for Cement Works (Concrete Batching Plant)</b></p> <p>The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant) BPM 3/2(93) should be followed and implemented to further reduce the construction dust impacts of the Project. These best practices include:</p> <p>Exhaust from Dust Arrestment Plant</p> <ul style="list-style-type: none"> <li>Wherever possible the final discharge point from particulate matter arrestment plant, where is not necessary to achieve dispersion from residual pollutants, should be at low level to minimise the effect on the local community in the case of abnormal emissions and to facilitate maintenance and inspection</li> </ul> <p>Emission Limits</p> <ul style="list-style-type: none"> <li>All emissions to air, other than steam or water vapour, shall be colourless and free from persistent mist or smoke</li> </ul> <p>Engineering Design/Technical Requirements</p> <ul style="list-style-type: none"> <li>As a general guidance, the loading, unloading, handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in a manner so as to prevent the release of visible dust and/or other noxious or offensive emissions</li> </ul>	<p>N/A</p> <p>No concrete batching plant in this project.</p> <p>N/A</p> <p>No concrete batching plant in this project.</p> <p>N/A</p> <p>No concrete batching plant in this project.</p>

EM&A Ref. Recommendation Measures		Implementation Stage
		L2
<b>Non-Road Mobile Machinery (NRMM):</b>		
All NRMMs operating on-site which are subject to emission control of Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation are approved/exempted (as the case may be) and affixed with the requisite approval/exemption labels.		Rem
<b>Noise Impact (Construction)</b>		
3.1 & 10.4.1	<b>Good Site Practice</b> Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction: <ul style="list-style-type: none"> <li>only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works;</li> <li>machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum</li> <li>plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs;</li> <li>mobile plant should be sited as far away from NSRs as possible; and</li> <li>material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.</li> </ul>	✓ ✓ ✓ ✓ ✓
3.1 & 10.4.1	<b>Adoption of Quieter PME</b> The recommended quieter PME adopted in the assessment were taken from the EPD's QPME Inventory and " <i>Sound Power Levels of Other Commonly Used PME</i> " are presented in <b>Table 4.26</b> in the EIA report. It should be noted that the silenced PME selected for assessment can be found in Hong Kong.	✓
3.1 & 10.4.1	<b>Use of Movable Noise Barriers</b> Movable noise barriers can be very effective in screening noise from particular items of plant when constructing the Project. Noise barriers located along the active works area close to the noise generating component of a PME could produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant provided the direct line of sight between the PME and the NSRs is blocked.	✓
3.1 & 10.4.1	<b>Use of Noise Enclosure/ Acoustic Shed</b> The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the EIAO Guidance Note No. 9/2010.	✓
3.1 & 10.4.1	<b>Use of Noise Insulating Fabric</b> Noise insulating fabric can also be adopted for certain PME (e.g. drill rig, piling machine etc). The fabric should be lapped such that there are no openings or gaps on the joints. According to the approved Tsim Sha Tsui Station Northern Subway EIA report (AEIAR-127/2008), a noise reduction of 10 dB(A) can be achieved for the PME lapped with the noise insulating fabric.	Obs
<b>Scheduling of Construction Works outside School Examination Periods</b>		

Implementation Stage

EM&A Ref.	Recommendation Measures	L2
3.1 & 10.4.1	During construction phase, the contractor should liaise with the educational institutions (including NSRs LCS and CRGPS) to obtain the examination schedule and avoid the noisy construction activities during school examination periods.	N/A No educational institutions nearby the site.

**Water Quality Impact (Construction)**

4.1 & 10.5.1	<p><b>Construction site runoff and drainage</b></p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and sensitive uses of the coastal area, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>• 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. The design of the temporary on-site drainage system should be undertaken by the WKCDA's Contractor prior to the commencement of construction;</li> <li>• Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the WKCDA's Contractor prior to the commencement of construction.</li> <li>• 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. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.</li> <li>• Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.</li> <li>• 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. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly 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.</li> <li>• Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.</li> <li>• Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers.</li> </ul>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
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EM&A Ref.	Recommendation Measures	Implementation Stage
		L2
	<ul style="list-style-type: none"> <li>Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</li> <li>Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.</li> </ul>	✓
	<p><b>Barging facilities and activities</b></p> <p>Recommendations for good site practices during operation of the proposed barging point include:</p> <ul style="list-style-type: none"> <li>All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;</li> <li>Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation;</li> <li>All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material; and</li> <li>Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site.</li> </ul>	N/A No bentonite slurries are used in this project.
		N/A
		No barging facilities in this project.
		N/A
		No barging facilities in this project.
		N/A
		No barging facilities in this project.
		N/A
		No barging facilities in this project.
4.1 & 10.5.1	<p><b>Sewage effluent from construction workforce</b></p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	✓
4.1 & 10.5.1	<p><b>General construction activities</b></p> <ul style="list-style-type: none"> <li>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</li> <li>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</li> </ul>	✓
		Obs

## EM&amp;A Ref. Recommendation Measures

L2

**Waste Management Implications (Construction)**

6.1 & 10.7.1	<b>Good Site Practices</b> Recommendations for good site practices during the construction activities include: <ul style="list-style-type: none"> <li>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</li> <li>Training of site personnel in proper waste management and chemical handling procedures</li> <li>Provision of sufficient waste disposal points and regular collection of waste</li> <li>Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by either covering trucks or by transporting wastes in enclosed containers</li> <li>Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction to public roads</li> <li>Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting the inert or non-inert C&amp;D materials is not anticipated</li> </ul>	✓ ✓ Obs ✓ ✓ ✓
6.1 & 10.7.1	<b>Waste Reduction Measures</b> Recommendations to achieve waste reduction include: <ul style="list-style-type: none"> <li>Sort inert C&amp;D material to recover any recyclable portions such as metals</li> <li>Segregation and storage of different types of waste in different containers or skips to enhance reuse or recycling of materials and their proper disposal</li> <li>Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force</li> <li>Proper site practices to minimise the potential for damage or contamination of inert C&amp;D materials</li> <li>Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of wastes</li> </ul>	✓ ✓ ✓ ✓ ✓
6.1 & 10.7.1	<b>Inert and Non-inert C&amp;D Materials</b> In order to minimise impacts resulting from collection and transportation of inert C&D material for off-site disposal, the excavated materials should be reused on-site as fill material as far as practicable. In addition, inert C&D material generated from excavation works could be reused as fill materials in local projects that require public fill for reclamation. <ul style="list-style-type: none"> <li>The surplus inert C&amp;D material will be disposed of at the Government's PFRFs for beneficial use by other projects in Hong Kong.</li> <li>Liaison with the CEDD Public Fill Committee (PFC) on the allocation of space for disposal of the inert C&amp;D materials at PFRF is underway. No construction work is allowed to proceed until all issues on management of inert C&amp;D materials have been resolved and all relevant arrangements have been endorsed by the relevant authorities including PFC and EPD.</li> <li>The C&amp;D materials generated from general site clearance should be sorted on site to segregate any inert materials for reuse or disposal of at PFRFs whereas the non-inert materials will be disposed of at the designated landfill site.</li> </ul>	✓ ✓ ✓

Implementation Stage

EM&A Ref. Recommendation Measures

L2

	<ul style="list-style-type: none"> <li>In order to monitor the disposal of inert and non-inert C&amp;D materials at respectively PFRFs and the designated landfill site, and to control fly-tipping, it is recommended that the Contractor should follow the Technical Circular (Works) No. 6/2010 for Trip Ticket System for Disposal of Construction &amp; Demolition Materials issued by Development Bureau. In addition, it is also recommended that the Contractor should prepare and implement a Waste Management Plan detailing their various waste arising and waste management practices in accordance with the relevant requirements of the Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site.</li> </ul>	✓
6.1 & 10.7.1	<p><b>Chemical Waste</b></p> <ul style="list-style-type: none"> <li>If chemical wastes are produced at the construction site, the Contractor will be required to 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”. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor should use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</li> <li>Potential environmental impacts arising from the handling activities (including storage, collection, transportation and disposal of chemical waste) are expected to be minimal with the implementation of appropriate mitigation measures as recommended.</li> </ul>	✓
6.1 & 10.7.1	<p><b>General Refuse</b></p> <p>General refuse should be stored in enclosed bins or compaction units separated from inert C&amp;D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&amp;D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of ‘wind blown’ light material.</p>	✓

**Land Contamination (Construction)**

7.1 & 10.8.1	<p>The potential for land contamination issues at the TST Fire Station due to its future relocation will be confirmed by site investigation after land acquisition. Where necessary, mitigation measures for minimising potential exposure to contaminated materials (if any) or remediation measures will be identified. If contaminated land is identified (e.g., during decommissioning of fuel oil storage tanks) after the commencement of works, mitigation measures are proposed in order to minimise the potentially adverse effects on the health and safety of construction workers and impacts arising from the disposal of potentially contaminated materials.</p> <p>The following measures are proposed for excavation and transportation of contaminated material:</p> <ul style="list-style-type: none"> <li>To minimize the chance for construction workers to come into contact with any contaminated materials, bulk earth-moving excavation equipment should be employed;</li> </ul>	<p>N/A</p> <p>TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
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Implementation Stage

L2

EM&A Ref. Recommendation Measures

<ul style="list-style-type: none"> <li>Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when interacting directly with contaminated material), provision of washing facilities and prohibition of smoking and eating on site;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Stockpiling of contaminated excavated materials on site should be avoided as far as possible;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>The use of contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Vehicles containing any contaminated excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Truck bodies and tailgates should be sealed to stop any discharge;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Speed control for trucks carrying contaminated materials should be exercised;</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<ul style="list-style-type: none"> <li>Observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354) and obtain all necessary permits where required; and</li> </ul>	<p>N/A TST Fire Station is out of this project boundary, no mitigation measure is required.</p>

EM&A Ref. Recommendation Measures		Implementation Stage
		L2
	<ul style="list-style-type: none"> <li>Maintain records of waste generation and disposal quantities and disposal arrangements.</li> </ul>	N/A TST Fire Station is out of this project boundary, no mitigation measure is required.
<b>Ecological Impact (Construction)</b>		
No mitigation measure is required.		
<b>Landscape and Visual Impact (Construction)</b>		
Table 9.1 & 10.8 (CM1)	Trees should be retained in situ on site as far as possible. Should tree removal be unavoidable due to construction impacts, trees will be transplanted or felled with reference to the stated criteria in the Tree Removal Applications to be submitted to relevant government departments for approval in accordance to ETWB TCW No. 29/2004 and 3/2006.	✓
Table 9.1 & 10.8 (CM2)	Compensatory tree planting shall be incorporated to the proposed project and maximize the new tree, shrubs and other vegetation planting to compensate tree felled and vegetation removed. Also, implementation of compensatory planting should be of a ratio not less than 1:1 in terms of quality and quantity within the site.	N/A Compensatory tree planting is being reviewed.
Table 9.1 & 10.8 (CM3)	Buffer trees for screening purposes to soften the hard architectural and engineering structures and facilities.	N/A Roof garden is designed to be built, but it has not been completed yet.
Table 9.1 & 10.8 (CM4)	Softscape treatments such as vertical green wall panel /planting of climbing and/or weeping plants, etc, to maximize the green coverage and soften the hard architectural and engineering structures and facilities.	N/A Climbing or weeping plants are designed to be planted, but proposal is being reviewed for the planting location.
Table 9.1 & 10.8 (CM5)	Roof greening by means of intensive and extensive green roof to maximize the green coverage and improve aesthetic appeal and visual quality of the building/structure.	N/A Roof garden is designed to be built, but it has not been completed yet.
Table 9.1 & 10.8 (CM6)	Sensitive streetscape design should be incorporated along all new roads and streets.	N/A Greening along the seafront is proposed, but it has not been completed yet.
Table 9.1 & 10.8 (CM7)	Structure, ornamental planting shall be provided along amenity strips to enhance the landscape quality.	N/A Gardens are designed to be built, but it has not been completed yet.

EM&A Ref.	Recommendation Measures	Implementation Stage
		L2
Table 9.1 & 10.8 (CM8)	Landscape design shall be incorporated to architectural and engineering structures in order to provide aesthetically pleasing designs.	N/A Roof garden is designed to be built, but it has not been completed yet.
Table 9.1 (CM9)	Minimize the structure of marine facilities to be built on the seabed and foreshore in order to minimize the affected extent to the waterbody	N/A No marine facilities for this project.
Table 9.2 & 10.9 (MCP1)	Use of decorative screen hoarding/boards	✓
Table 9.2 & 10.9 (MCP2)	Early introduction of landscape treatments	N/A No landscape treatments during this stage.
Table 9.2 & 10.9 (MCP3)	Adoption of light colour for the temporary ventilation shafts for the basement during the transition period.	N/A No ventilation shafts for this project.
Table 9.2 & 10.9 (MCP4)	Control of night time lighting	✓
Table 9.2 & 10.9 (MCP5)	Use of greenery such as grass cover for the temporary open areas will help achieve the visual balance and soften the hard edges of the structures.	N/A No temporary open areas for this project.

- N/A - Not Applicable
- ✓ - Implemented
- Obs - Observed
- Rem - Reminder

## **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 to the end of the reporting month are summarised in the **Table K-1** below respectively.

**Table K-1: Statistics for complaints, notifications of summons and successful prosecutions for Lyric Theatre Complex**

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting month	4	0	0
From 1 March 2016 to end of the reporting month (Aug 2021)	28	0	0

**END OF PART-1**

## **Part-2: EM&A for Foundation, Excavation and Lateral Works for Integrated Basement and Underground Road in Zone 2A**

# Foundation, Excavation and Lateral Works for Integrated Basement and Underground Road in Zone 2A

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The information supplied and contained within this report is, to the best of our knowledge, correct at time of printing

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# Executive summary

Apex Testing & Certification Limited (Apex) was commissioned to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the construction activities in Zone 2A at WKCD, consisting of Foundation, Excavation and Lateral Support Works for Integrated Basement and Underground Road (Contract No.: GW/2020/05/073). The construction works and EM&A programme for Zone 2A commenced on 3 October 2020.

The Project Proponent is the West Kowloon Cultural District Authority (WKCDA). The overall works for the WKCD fall under two separate categories of Designated Project (DP) of the Environmental Impact Assessment Ordinance (EIAO), namely an “engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100 000” (Item 1 of Schedule 3) and “an underpass more than 100m in length under the built areas” (Item A.9, Part I, Schedule 2). An Environmental Permit No. EP-453/2013/B (EP) was issued with respect to the “Underpass Road and Austin Road Flyover Serving the West Kowloon Cultural District” which specifically includes the abovementioned category of DP under Item A.9, Part I, Schedule 2 of the EIAO.

This Monthly EM&A Report presents the monitoring works at Zone 2A from 1 to 31 August 2021.

## **Exceedance of Action and Limit Levels**

There was no breach of Action or Limit levels for Air Quality (1-hour TSP and 24-hour TSP) and Construction Noise monitoring in this reporting month.

## **Implementation of Mitigation Measures**

Construction phase weekly site inspections were carried out on 05, 12, 19 and 26 August 2021 for Foundation, Excavation and Lateral Support Works in Zone 2A to confirm the implementation measures undertaken by the Contractors 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**.

Landscape and visual impact inspections were conducted as part of the abovementioned weekly site inspections during the reporting month. No adverse comment on landscape and visual aspects was made during these inspections.

FEHD inspection was conducted at Zone 2A on 16, 20 and 26 August 2021.

EPD inspection was conducted at Zone 2A on 20 August 2021.

## **Record of Complaints**

Four environmental complaints were recorded in the reporting month.

## **Record of Notifications of Summons and Successful Prosecutions**

No notifications of summons and successful prosecutions were recorded in the reporting month.

## **Future Key Issues**

The major site works for Zone 2A scheduled to be commissioned in the coming month include:  
Zone 2A-1

- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post & Erection of Steel Column for Working Platform
- Socketed H-Pile Works
  - Remaining Socket H-Pile Works
- Bored Pile Works
  - Bored Pile Construction

#### Zone 2A-2

- Bored Pile Works
  - Additional Bored Pile Construction
- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post
  - Stage 1a & 1b Grouting
  - Pipe Pile Construction

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

# 1 Introduction

## 1.1 Background

Apex Testing & Certification Limited (Apex) was commissioned to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for the construction activities in Zone 2A at WKCD, consisting of Foundation, Excavation and Lateral Support Works for Integrated Basement and Underground Road (Contract No.: GW/2020/05/073). The purpose of the development in Zone 2A is to reserve for Integrated Basement (IB) and Underground Road (UR). The Zone 2A construction activities involve the foundation, excavation and lateral support (ELS) works, road works, drainage diversion works, and temporary car parking. The construction works and EM&A programme for Zone 2A commenced on 3 October 2020.

The overall works for the WKCD fall under two separate categories of Designated Project (DP) of the Environmental Impact Assessment Ordinance (EIAO), namely an “engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100 000” (Item 1 of Schedule 3) and “an underpass more than 100m in length under the built areas” (Item A.9, Part I, Schedule 2). An Environmental Permit No. EP-453/2013/B (EP) was issued with respect to the “Underpass Road and Austin Road Flyover Serving the West Kowloon Cultural District” which specifically includes the abovementioned category of DP under Item A.9, Part I, Schedule 2 of the EIAO. The captioned projects include part of the abovementioned underpass road located within the site boundary falls under this same category.

The Monthly EM&A Report is prepared in accordance with the Condition 3.4 of the Environmental Permit No. EP-453/2013/B. This Monthly EM&A Report presents the monitoring works at Zone 2A from 1 to 31 August 2021. 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 Construction Works Status in the Reporting Period

During the reporting period, construction works at Zone 2A undertaken include:

Zone 2A-1

- Grouting Works (Trial 1)
  - Install Pump Wells
  - Pumping Test
- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post & Erection of Steel Column for Working Platform
- Socketed H-Pile Works
  - Remaining Socketed H-Pile Works
- Bored Pile Works

- Bored Pile Construction

#### Zone 2A-2

- Bored Pile Works
  - Additional Bored Pile Construction
- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post
  - Stage 1a & 1b Grouting
  - Pipe Pile Construction

The Construction Works Programme of Zone 2A is provided in **Appendix B**. A layout plan of the Project is provided in **Figure 1**. Please refer to **Table 4.2** on the status of the environmental licenses.

## 1.4 Summary of EM&A Requirements and Alternative Monitoring Locations

### 1.4.1 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-Hours TSP	AM3-The Victoria Towers Tower 1	At least once every 6 days
	1-Hour TSP	AM3-The Victoria Towers Tower 1	At least 3 times every 6 days
	24-Hours TSP	AM4-Canton Road Government Primary School	At least once every 6 days
	1-Hour TSP	AM4-Canton Road Government Primary School	At least 3 times every 6 days
	24-Hours TSP	AM5-Topside Developments at West Kowloon Terminus Site	At least once every 6 days
	1-Hour TSP	AM5-Topside Developments at West Kowloon Terminus Site	At least 3 times every 6 days
Noise	Leq, 30 minutes	NM2-The Arch, Sun Tower	Weekly
	Leq, 30 minutes	NM3-The Victoria Towers Tower 1	Weekly
	Leq, 30 minutes	NM4-Canton Road Government Primary School	Weekly
	Leq, 30 minutes	NM5-Development next to Austin Station	Weekly
Landscape & Visual	Monitor implementation of proposed mitigation measures during the construction stage	As described in Table 9.1 and 9.2 of the EM&A Manual	Bi-Weekly

### 1.4.2 Alternative Monitoring Locations

The EM&A programme for the Project should require 5 noise monitoring station and 5 air quality monitoring stations located closest to the Project area. With regard to the monitoring activities at M+ Museum and the Lyric Complex, three monitoring stations had been considered, including AM1 (International Commerce Centre), AM2 (The Harbourside Tower 1) for air monitoring, and NM1 (The Harbourside Tower 1) for noise monitoring.

In the context of the construction activities in Zone 2A, all other monitoring locations including AM3 (The Victoria Towers Tower 1), AM4 (Canton Road Government Primary School), and AM5 (Topside Developments at West Kowloon Terminus Site) for air monitoring; and NM2 (The Arch, Sun Tower), NM3 (The Victoria Towers Tower 1), NM4 (Canton Road Government Primary School) and NM5 (Development next to Austin Station) for noise monitoring, have been taken into account. However, access to all these originally designated monitoring stations was declined as described below point-by-point.

The Arch management office and owners' committee have formally declined the proposal of setting up noise monitoring instrument on its premises at the podium level of Sun Tower (NM2) on 24 July 2014. Thus, alternative noise monitoring location was identified at the ground floor in front of The Arch – Sun Tower (NM2A), which is at the same location as stated in the EM&A Manual for consistency. No management approval is required at the ground floor for conducting the noise monitoring. This alternative air monitoring location was approved by EPD on 29 September 2020.

The Victoria Towers management office formally declined the proposal of setting up air quality and noise monitoring instruments on its premises at the podium area of Tower 1 (AM3/NM3) on 16 June 2020. Alternative air monitoring location was identified at ground floor at the Northeast corner of West Kowloon Station's station box (AM3A), in the same direction to the area of major construction site activities in Zone 2A. This alternative air monitoring location was approved by EPD on 29 September 2020. An alternative noise monitoring location was identified at the ground floor in front of the Xiqu Centre (NM3A), which is set closer to the construction site boundary with more direct line sight to the major site activities and higher exposure to the construction noise with no disturbance to the premises' occupants during noise monitoring activities. No management approval is required at the ground floor for conducting the noise monitoring. This alternative air monitoring location was approved by EPD on 29 September 2020.

Canton Road Government Primary School formally declined the proposal of setting up air quality and noise monitoring instruments on its premise at the podium level (AM4/NM4) on 16 June 2020. Alternative air monitoring location was identified at ground floor at the Southeast corner of West Kowloon Station's station box (AM4A), in same direction to the area of major construction site activities in Zone 2A. This alternative air monitoring location was approved by EPD on 29 September 2020. An alternative noise monitoring location was identified at the ground floor next to Tsim Sha Tsui Fire Station (NM4A), which is set closer to the construction site boundary with more direct line sight to the major site activities and higher exposure to the construction noise with no disturbance to the premises' occupants during noise monitoring activities. No management approval is required at the ground floor for conducting the noise monitoring. This alternative air monitoring location was approved by EPD on 29 September 2020.

MTR also formally declined the access to the designated AM5 location (topside developments at West Kowloon Terminus Site) on 15 July 2020. Alternative air monitoring location was identified at ground floor at the North of West Kowloon Station's station box (AM5A), in same direction to

the area of major construction site activities in Zone 2A. This alternative air monitoring location was approved by EPD on 29 September 2020.

Grand Austin property management office formally declined our proposal of setting up noise monitoring instrument on its premises at the podium level (NM5) on 10 July 2020. Alternative noise monitoring location was identified at the Pedestrian road (ground floor) outside West Kowloon Station (NM5A), which is set closer to the construction site boundary with more direct line sight to the major site activities and higher exposure to the construction noise with no disturbance to the premises' occupants during noise monitoring activities. No management approval is required at the ground floor for conducting the noise monitoring. This alternative air monitoring location was approved by EPD on 29 September 2020.

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, and landscape and visual are shown in **Appendix D**.

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**.

## 2 Impact Monitoring Methodology

### 2.1 Introduction

Air quality and noise monitoring methodology, including the monitoring locations, equipment used, parameters, frequency and duration etc., are described 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**.

The relevant EM&A monitoring requirements and details for landscape and audit impact, are also presented in this Section.

### 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**

Parameter	Frequency	Duration
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

Monitoring stations and locations are given in **Table 2.2** and shown in **Figure 1**.

**Table 2.2: Air Quality Monitoring Station**

Monitoring Station	Location Description
AM3A	Northeast corner of West Kowloon Station's station box (G/F)
AM4A	Southeast corner of West Kowloon Station's station box (G/F)
AM5A	North of West Kowloon Station's station box (G/F)

#### 2.2.3 Monitoring Equipment

Continuous 24-hour TSP air quality monitoring was conducted using High Volume Sampler (HVS) (Model: TE-5170) located at the designated monitoring station. The HVS meets all the requirements stated in 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, calibration kit and portable dust meters are attached in **Appendix F**.

**Table 2.3: TSP Monitoring Equipment**

Equipment	Model
<b>24-hour TSP monitoring</b>	
High Volume Sampler	TE-5170 (Serial No.: 4340; 3998; 4344)
Calibrator	TE-5025A (Orifice I.D.: 3543)

Equipment	Model
<b>1-hour TSP monitoring</b>	
Portable direct reading dust meter	Sibata LD-3B (Serial No.: 235811, 336338, 567188)

Calibration of the HVS (five-point calibration) using Calibration Kit was carried out every two months. The HVS calibration orifice will be calibrated annually. Calibration certificate of the TE-5025A Calibration Kit and the HVS are provided in **Appendix F**.

The 1-hour TSP monitoring should be determined periodically (e.g. annually) by the HVS to check the validity and accuracy of the results measured by direct reading method.

## 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<sup>3</sup>/min. The range specified in the EM&A Manual was between 0.6-1.7 m<sup>3</sup>/min.
- The programmable timer was set for a sampling period of 24 hours, 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 upon installation and thereafter at bi-monthly intervals. The calibration kits were calibrated annually.
- Calibration records for HVS and calibration kit 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

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

## 2.3 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 hours.

**Table 2.4: Noise Monitoring Parameters, Period and Frequency**

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

Note: \*70 dB(A) for schools and 65 dB(A) during school examination periods.  
If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

### 2.3.2 Monitoring Location

Noise monitoring stations and locations are given in **Table 2.5** and shown in **Figure 1**.

**Table 2.5: Noise Monitoring Station**

Monitoring Station	Location
NM2A	The Arch – Sun Tower (G/F)
NM3A	Xiqu Centre (G/F)
NM4A	Next to Tsim Sha Tsui Fire Station (G/F)
NM5A	Pedestrian road (G/F) outside West Kowloon Station

### 2.3.3 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 2.6** summarizes the noise monitoring equipment model being used.

**Table 2.6: Noise Monitoring Equipment**

Equipment Model	
Integrating Sound Level Meter	Calibrator
AWA5661 (Serial No.: 301135)	Pulsar 100B (Serial No.: 039507)

### 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 NM5A monitoring location.
- 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.

### 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

- Meteorological data extracted from Hong Kong Observatory for the reporting month is provided in **Appendix H**.

## 2.4 Landscape and Visual

### 2.4.1 Monitoring Program

**Table 2.7** details the monitoring program (as proposed in the WKCD EIA report) for landscape and visual impact during the construction phase.

**Table 2.7: Monitoring Program for Landscape and Visual Impact during Construction Phase**

Stage	Monitoring Task	Frequency	Report	Approval
Construction	Monitor implementation of proposed mitigation measures during the construction stage.	Bi-weekly	ET to report on Contractor's compliance	Counter-signed by IEC

During the landscape and visual impact monitoring, any changes in relation to the landscape and visual amenity should be monitored with reference to the baseline conditions of the site. In addition, mitigation measures were proposed in the WKCD EIA report to minimise the landscape and visual impacts during the construction phase. The proposed mitigation measures as shown in Table 9.1 and Table 9.2 of the EM&A Manual should be checked for proper implementation.

## 3 Monitoring Results

### 3.1 Impact Monitoring

Air quality, noise and landscape and visual impact monitoring 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 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 Station	Monitoring Date	Start Time	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )			Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
			1st Result	2nd Result	3rd Result			
AM3A	06-Aug-21	8:07	58	62	59	35-62	280.4	500
	12-Aug-21	14:11	49	40	42			
	18-Aug-21	8:03	42	38	44			
	24-Aug-21	13:59	42	38	40			
	30-Aug-21	8:11	40	35	39			
AM4A	06-Aug-21	8:15	59	60	53	32-60	278.5	500
	12-Aug-21	14:19	45	44	47			
	18-Aug-21	8:11	40	47	41			
	24-Aug-21	14:07	39	45	41			
	30-Aug-21	8:19	36	38	32			
AM5A	06-Aug-21	8:30	65	52	61	32-65	275.4	500
	12-Aug-21	14:36	46	50	43			
	18-Aug-21	8:26	46	43	39			
	24-Aug-21	14:24	47	40	44			
	30-Aug-21	8:34	37	34	32			

#### 3.2.2 24-hour TSP

Results of 24-hour TSP 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 Station	Monitoring Date	Start Time	Monitoring Results ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM3A	06-Aug-21	10:00	54.6	35.1-54.6	152.4	260
	12-Aug-21	10:00	41.0			
	18-Aug-21	10:00	36.7			
	24-Aug-21	10:00	36.8			

Monitoring Station	Monitoring Date	Start Time	Monitoring Results ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM4A	30-Aug-21	10:00	35.1	30.5-52.1	152.6	260
	06-Aug-21	10:00	52.1			
	12-Aug-21	10:00	45.2			
	18-Aug-21	10:00	39.3			
	24-Aug-21	10:00	40.9			
AM5A	30-Aug-21	10:00	30.5	31.3-53.6	141.1	260
	06-Aug-21	10:00	53.6			
	12-Aug-21	10:00	42.9			
	18-Aug-21	10:00	45.2			
	24-Aug-21	10:00	38.8			
	30-Aug-21	10:00	31.3			

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

### 3.3 Noise Monitoring

The construction noise monitoring results are summarized in **Table 3.3**. Graphical plots of the monitoring data and the station set-up as façade and free-field measurements are shown in **Appendix G**.

**Table 3.3: Summary of noise monitoring results during normal weekdays**

Monitoring Stations	Monitoring Date	Start Time	End Time	$L_{eq}$ (30 mins) dB(A)	Limit Level for $L_{eq}$ (dB(A))
NM2A	06-Aug-21	08:37	09:07	58.2	75
	12-Aug-21	14:41	15:11	58.5	
	18-Aug-21	08:33	09:03	58.4	
	24-Aug-21	14:29	14:59	58.1	
	30-Aug-21	08:41	09:11	58.2	
NM3A	06-Aug-21	10:07	10:37	69.5	75
	12-Aug-21	16:14	16:44	69.2	
	18-Aug-21	10:03	10:33	69.7	
	24-Aug-21	16:02	16:32	69.6	
	30-Aug-21	10:11	10:41	69.5	
NM4A	06-Aug-21	10:42	11:12	68.4	70/65 <sup>#</sup>
	12-Aug-21	16:49	17:19	68.2	
	18-Aug-21	10:38	11:08	69.0	
	24-Aug-21	16:37	17:07	68.9	
	30-Aug-21	10:46	11:16	68.7	
NM5A*	06-Aug-21	09:27	09:57	65.7	75
	12-Aug-21	15:33	16:03	66.0	
	18-Aug-21	09:23	09:53	66.2	
	24-Aug-21	15:21	15:51	66.6	
	30-Aug-21	09:31	10:01	66.0	

Remarks:

\* +3dB (A) correction was applied to free-field measurement.

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<sup>^</sup> 70 dB(A) for schools and 65 dB(A) during school examination periods.

<sup>#</sup> No School examination was conducted during the reporting period.

No exceedance (Action or Limit Level) of construction noise was recorded in the reporting period.

Construction works were extended to 1900-2300 hours on 17 to 21, and 23 to 28 August 2021; and 2300-0700 hours on 17 to 21, and 23 to 28 August 2021; and to holidays 0900-2300 hours on 22 and 29 August 2021; 2300-0700 hours on 22 and 29 August 2021. In accordance with the EM&A Manual, additional monitoring was carried out during the restricted hours on 18, 22, 24, and 29 August 2021. The  $L_{eq}$  (5 mins) is in the range of 51.1-67.4 dB(A). Construction Noise Permits for the works carried out during restricted hours were obtained and listed in **Table 4.2**.

### 3.4 Landscape and Visual Impact

Landscape and visual impact inspections were conducted as part of the weekly site inspections on 05 and 19 August 2021 for Zone 2A during the reporting month. As reviewed by the registered Landscape Architect, no adverse comment on landscape and visual aspects was made during these inspections.

The landscape and visual mitigation measures were implemented during the reporting period. The summary of implementation status of the environmental mitigation measures is provided in **Appendix J**.

## 4 Site Environmental Management

### 4.1 Site Inspection

Construction phase weekly site inspections were carried out on 05, 12, 19 and 26 August 2021. The joint site inspection with IEC, ET, ER and Contractor was held on 26 August 2021. All observations have been recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary.

2 FEHD inspectors has arrived Zone 2A Site on 16/8 at 9:30am. It was a throughout surprise check and the inspectors only focused on checking mosquito larvae. Sample bottle was taken at Southwestern corner of Zone 2A and waiting for result.

EPD inspection was carried out on 20 Aug 2021 at B1/F of Zone 2A site. The EPD inspector focus on dust issue generated from rock breaker. No adverse comments or prosecution was given.

FEHD inspection was carried out on 20 Aug 2021 at B1/F of Zone 2A site. The FEHD inspector focus on mosquito issue. No adverse comments or prosecution was given.

3 FEHD inspectors has arrived Zone 2A Site on 26/8 at 9:40am. No prosecution or warning was given during the inspection. They have inspected the WEK u-channel and southwestern corner of 2A-1 area. Kind reminders were given by the FEHD inspectors: (1) Remove the broken water barriers off site and seal the opening of existing water barriers; (2) Spray mosquito larvicide oil / sprinkle sand granules regularly at the area which has yet to be handed over to Zone 2B/2C. Follow-up action for mosquito prevention has been taken by contractors.

The key observations from the site inspections and associated recommendations are summarized in **Table 4.1**.

**Table 4.1: Summary of Site Inspections and Recommendations for Zone 2A**

Inspection Date	Parameter	Observation / Recommendation	Contactor's Responses / Action(s) Undertaken	Close-out (Date)
05-Aug-21	Water Quality	The contractor was reminded that storm water should direct to silt removal facilities.	The contractor has removed the storm water to silt removal facilities.	06-Aug-21
05-Aug-21	Air Quality	The contractor was reminded that idle stockpile shall remove from site / fully covered.	The contractor has removed the idle stockpile from site.	06-Aug-21
12-Aug-21	Air Quality	The contractor was reminded that the idle stockpile shall be fully covered/ removed from site.	The contractor has fully covered the idle stockpile on site.	12-Aug-21
19-Aug-21	Water Quality	The contractor was reminded to clean the u-channel regularly to maintain proper function.	The contractor has provided cleaning for the u-channel regularly.	23-Aug-21
19-Aug-21	Noise	The contractor was reminded to erect the noise barrier properly to minimise noise impact to the nearby resident.	The contractor has provided more noise screen to minimise noise impact to the nearby resident.	21-Aug-21
26-Aug-21	Noise	The contractor was reminded that idle machine shall shut down to minimise accumulate noise impact.	The contractor has shut down the idle machine to minimise accumulate noise impact.	26-Aug-21

## 4.2 Advice on the Solid and Liquid Waste Management Status

The Contractors have 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.

As advised by the Contractor, 35.81 tonnes, 1355.53 tonnes and 4056.30 tonnes of inert C&D material were disposed of as public fill to Chai Wan Public Fill Barging Point, Tseung Kwan O Area 137 Public Fill, and Tuen Mun Area 38 Public Fill respectively, while 18.85 tonnes of general refuse were disposed of at SENT landfill respectively. 10.70 tonnes of metals, 0.0 tonne of paper/cardboard packaging, 0.0 tonne of plastics and 0.0 tonne of timber was collected by recycling contractors in the reporting month. 0.0 tonne of inert C&D material was reused on site. 1082.63 tonnes of inert C&D material were reused in other projects and 0.0 tonne of inert C&D material was imported for reuse at site in the reporting month. 0.0 tonne of inert C&D material was disposed to sorting facility and 0.40 tonne of chemical waste was collected by licensed contractors in the reporting period.

The cumulative waste generation records for Zone 2A are shown 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 for Zone 2A**

Permit / License No. / Notification / Reference No.	Valid Period		Status	Remarks
	From	To		
<b>Chemical Waste Producer Registration</b>				
WPN5113-256-B2597-01	10-Sep-20	--	Valid	--
<b>Billing Account Construction Waste Disposal</b>				
7037500	09-Jun-20	--	Account Active	--
<b>Construction Noise Permit</b>				
GW-RE-0627-21	11-Jul-21	10-Nov-21	Valid	Piling Works
<b>Wastewater Discharge License</b>				
WT00037344-2021	01-Feb-21	28-Feb-26	Valid	--
<b>Notification under Air Pollution Control (Construction Dust) Regulation</b>				
456376	21-May-20	--	Notified	--
<b>Permit to Dump Material at sea under Dumping at Sea Ordinance</b>				
461895	--	--	Under EPD Approval	--

## 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**. In particular, the following mitigation measures were brought to attention during the site inspections:

**Air Quality**

- Idle stockpile should be fully covered when not in use or removed from the site.

**Noise Control**

- Noise barrier shall erect properly to to screen noise effectively.
- Idle machine/plant should shut down to minimise accumulate noise impact to the nearby noise sensitive receiver.

**Temporary Water Drainage System & Water Quality**

- The temporary drainage system should be well managed and updated with the site condition.
- U-channel should be cleaned regularly.

## 5 Compliance with Environmental Permit

The status of the required submission under the EP during the reporting period is summarized in **Table 5.1**.

**Table 5.1: Status of Submissions under the Environmental Permit**

EP Condition	Submission	Submission Date
Condition 3.4	Monthly EM&A Report for July 2021	16 August 2021

## 6 Report in Non-compliance, Complaints, Notification of Summons and Successful Prosecutions

### 6.1 Record on Non-compliance of Action and Limit Levels

There was no breach of Action or Limit levels for Air Quality (1-hour TSP and 24-hour TSP) and Construction Noise in this reporting month.

### 6.2 Record on Environmental Complaints Received

Four environmental complaints were recorded in the reporting month.

On 2 August 2021, WKCD received a complaint from the office of Mr. Derek hung (YTMDC member) regarding noise generated from WKCD construction site. The complainant has expressed concern about the construction noise between 19 and 31 Jul 2021, especially before 9am on 21 & 31 Jul 2021 (Wed & Sat). The complainant understands that the working hours permitted by the government is 7am – 7pm, except public holidays. However, he/she and Derek Hung would like to seek if the noise disturbance could be reduced before 9am. Video shot was also taken by the complainant at 8:50am on 31 Jul 2021 to show the evidence of noise generated from WKCD construction site. Investigation result reveal that the identified major noise source by the complainant over 19-31 July 2021, was not from WKCD Zone 2A site. Noise mitigation measures for construction works have already been implemented and maintained on site. In addition, noise measurement and monitoring were carried out with no exceedance. Thereby, the complaint might not be attributable to the Zone 2A site. However, noise mitigation measures will continue to be strictly implemented on site. Nonetheless, the Contractor is recommended to maintain good practice on site, and strengthen the implementation of noise mitigation measures to reduce impacts to the nearby neighbors.

On 19 August 2021, WKCD has received a complaint from the Office of Mr. Derek Hung (YTMDC member) regarding noise generated from WKCD construction site. The complainant has expressed concern about the construction noise before 9am on 18 & 19 August 2021. The complainant understands that the working hours permitted by the government is 7am – 7pm, except public holidays. However, he/she and Mr. Derek Hung would like to seek if the noise disturbance could be reduced before 9am. Video shot was also taken by the complainant at 8:30am on 18 & 19 August 2021 to show the evidence of noise generated from WKCD construction site. After carrying out the investigation with the contractors, the noise source before 9am on 18 & 19 August 2021 might be from the site clearance and preparation activities carried out on Zone 2B & 2C site for safe logistic operations on the main haul road. As such, the complaint might be attributable to Zone 2B & 2C site. In response, the Contractor has promptly implemented noise mitigation measures on site to minimize the noise impact on neighbors. On the other hand, although the site clearance and preparation activities on Zone 2B & 2C site in this time interval (before 9am) is in compliance with the local regulation, the Contractor has been recommended to avoid noisy works before 9am as practicable as possible (as expected by the complainant) to prevent disturbance to nearby residents.

On 20 August 2021, WKCD has received a complaint referred by EPD. On 18 August 2021, EPD has received a complaint regarding dust emission generated from WKCD Zone 2A site. The

complainant has expressed concern of construction dust generated by rock breaking work at B1/F of Zone 2A site without proper dust mitigation measures. As a response, dust control measures on B1/F of Zone 2A site have been improved and properly maintained on site. Moreover, existing dust control measures have been properly maintained and will continue to be strictly implemented on site (through trainings to frontline staff, apply water spray on rock breaking works, water spraying at working area to suppress dust, dust monitoring with no exceedance). Nonetheless, the Contractor is recommended to maintain good practice on site, and strengthen the implementation of dust mitigation measures to reduce impacts to the nearby neighbors.

On 27 August 2021, WKCD has received a complaint from the Office of Mr. Derek Hung (YTMDC member) and WKCD Enquiry Hotline regarding noise generated from WKCD construction site. The complainant has expressed concern about the pile driving noise on 27 August 2021 at the construction site next to the Lyric Theatre. The complainant claimed that she could hear the noise from 08:00 to 18:00 even when the windows are closed. The complainant would like to enquire when the pile driving works will be completed. Based on above site investigation, the most plausible noise source might be the demolition of ex-MTR storage shed and concrete footing removal for site clearance and preparation on WKCD Zone 2B & 2C site (which is located nearby and close to Lyric Complex site as specified by the complainant). The complaint might be therefore attributable to Zone 2B & 2C site. In response, prompt action has been taken to erect noise barrier on site for these clearance and preparation works. The Contractor has been also recommended to avoid noisy activities before 9am to prevent disturbance to nearby residents. Although noise measurement and monitoring were carried out nearby the Harbourside with no exceedance, the Contractor has been recommended to maintain good practice on site, and strengthen the implementation of noise mitigation measures to reduce impacts to the nearby neighbors.

The cumulative statistics on complaints were provided in **Appendix K**.

### 6.3 Record on Notifications of Summons and Successful Prosecution

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

## 7 Future Key Issues

### 7.1 Construction Works for the Coming Month(s)

#### Zone 2A-1

- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post & Erection of Steel Column for Working Platform
- Socketed H-Pile Works
  - Remaining Socket H-Pile Works
- Bored Pile Works
  - Bored Pile Construction

#### Zone 2A-2

- Bored Pile Works
  - Additional Bored Pile Construction
- ELS (Stage 1) – Grouting / Pipe Pile Works
  - King Post
  - Stage 1a & 1b Grouting
  - Pipe Pile Construction

### 7.2 Key Issues for the Coming Month

Key issues to be considered in the coming month include:

- Generation of dust from construction works;
- Noise impact from piling works;
- Generation of site surface runoffs and wastewater from activities on-site;
- The temporary drainage system should be well managed and updated with the site condition, particularly on rainy days;
- 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.

### 7.3 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 3 October 2020 for Zone 2A. The tentative monitoring schedule for the coming month is shown in the **Appendix E**.

## 8 Conclusions and Recommendations

### 8.1 Conclusions

The EM&A programme as recommended in the EM&A Manual has been undertaken with the commencement of the construction activities at Zone 2A on 3 October 2020.

Monitoring of air quality and noise with respect to the Projects is underway. In particular, the 1-hour TSP, 24-hour TSP, noise level (as  $L_{eq}$ , 30 minutes) under monitoring have been checked against established Action and Limit levels. There was no breach of Action or Limit levels for Air Quality (1-hour TSP and 24-hour TSP) and Construction Noise monitoring in this reporting month.

Four environmental complaint was recorded in the reporting month. No notifications of summons or successful prosecutions were received during the reporting month.

Weekly construction phase site inspections and bi-weekly landscape and visual impact inspections were conducted during the reporting month as required. It was observed that the Contractors had implemented all possible and feasible mitigation measures to mitigate the potential environmental impacts during construction phase works.

### 8.2 Recommendations

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

## **Figure 1    Site Layout Plan and Monitoring Stations**

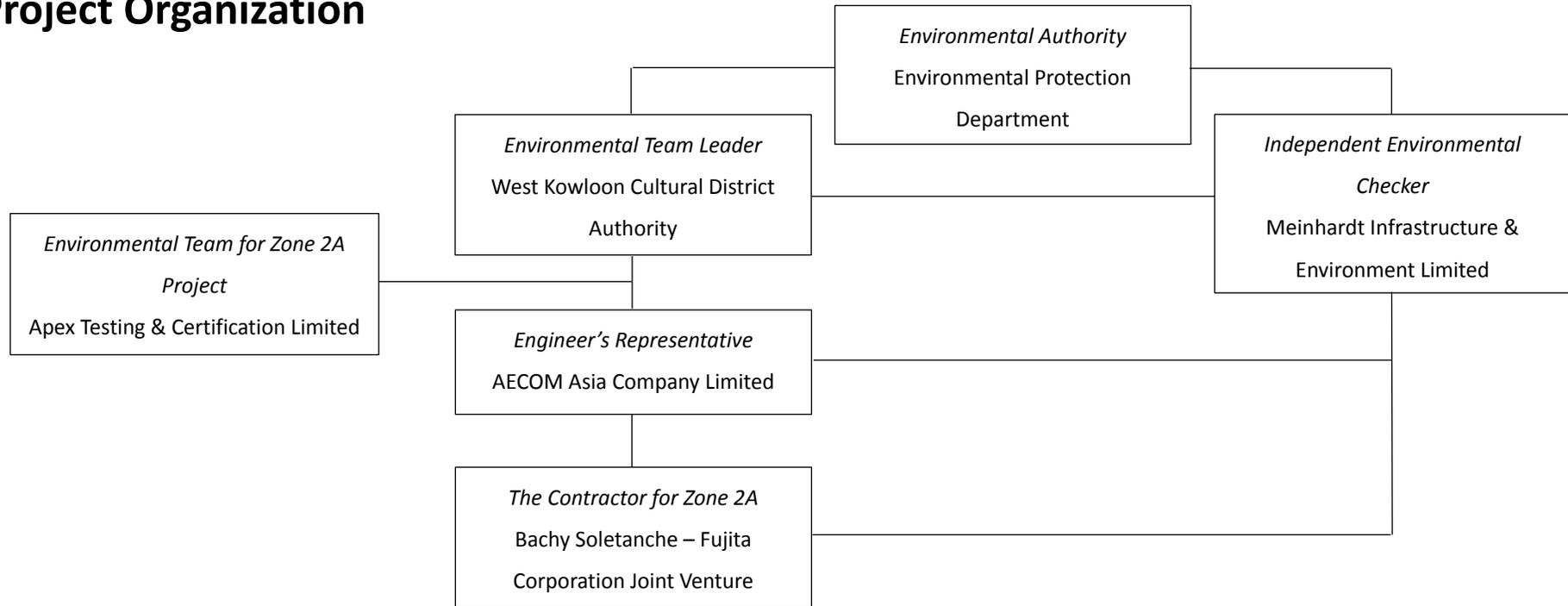


# Appendices

- A. Project Organisation
- B. Tentative Construction Programme
- C. Action and Limit Levels for Construction Phase
- D. Event and Action Plan for Air Quality, Noise, Landscape and Visual Impact
- E. Monitoring Schedule
- F. Calibration Certifications
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- I. Waste Flow table
- J. Environmental Mitigation Measures – Implementation Status
- K. Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions

## A. Project Organisation

# Project Organization



**Table A-1: Contract Information**

Company Name	Role	Name	Telephone	Email
West Kowloon Cultural District Authority	WKCD Authority Representative & Project ETL	Mr. C.K. WU	5506 9178	ck.wu@wkcd.hk
Meinhardt Infrastructure & Environment Limited	Independent Environmental Checker	Ms. Claudine LEE	2859 5409	caludinelee@meinhardt.com.hk
AECOM Asia Company Limited	Resident Engineer	Mr. Alex GBAGUIDI	3619 6287	alex.gbaguidi@aecom.com
Bachy Soletanche – Fujita Corporation Joint Venture	Quality, Safety, Health & Environmental Manager	Mr. Vincent CHAN	9733 7310	Chuen.Kwok.CHAN@soletanche-bachy.com
Bachy Soletanche – Fujita Corporation Joint Venture	Environmental Engineer	Mr. William CHAN	54083045	william-hou.chan@soletanche-bachy.com
Apex Testing & Certification Limited	Contractor's Environmental Team Leader	Mr. Calvin LUI	9629 9718	calvinlui@apextestcert.com

## **B. Tentative Construction Programme**

Project Name: Foundation and ELS Works for Integrated Basement and Underground Road in Zone 2A of the West Kowloon Cultural District

3-Month Rolling Programme

Activity Description	Duration (Cal. Day)	Start Date	Finish Date	2021													
				August				September				October					
				6	13	20	27	3	10	17	24	1	8	15	22	29	
W65	W66	W67	W68	W69	W70	W71	W72	W73	W74	W75	W76	W77					
<b>Zone 2A-1 Foundation, ELS Works and Blinding to Formation (KD01)</b>																	
<b>Grouting Works (Trial 1)</b>																	
Install Pump Wells	15	26-Jul-21	9-Aug-21	■	■	■	■										
Pumping Test	10	17-Aug-21	26-Aug-21			■	■										
<b>ELS (Stage 1) - Grouting / Pipe Pile Works</b>																	
King Post (8/64 Nos Completed) & Erection of Steel Column for Working Platform (11/41 Nos completed)	209	15-May-21	9-Dec-21	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<b>Socketed H-Pile Works</b>																	
Remaining Socketed H-Pile Works (22/53 Nos completed)	150	16-Jun-21	12-Nov-21	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<b>Bored Pile Works</b>																	
<b>Bored Pile Construction (Total 32 Nos. 2~4 Workfront)</b>																	
BP31L, BP33L, BP34I1, BP34G, BP31P, BP36F1, BP31R, BP33G, BP31M, BP36E1, BP31Q, BP33J, BP33M, BP32P, BP34F, BP35F1, BP33P, BP34K, BP34P, BP33F, BP35I1, BP34D, BP32D, BP36J1, BP35E1, BP35J1, BP35K1, BP33D, BP32E, BP34E (27 Nos. Cast; 2 Nos. completed RCD; 0 Nos. RCD in progress)	345	9-Nov-20	19-Oct-21	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<b>Zone 2A-2 Foundation, ELS Works and Blinding to Formation (KD02)</b>																	
<b>Bored Pile Works</b>																	
Additional Bored Pile Construction (Total 16 Nos.) BP15Y, BP16TA, BP13U, BP14Y, BP12M, BP12T, BP20XA, BP12Y, BP13Y, BP16WA, BP12K, BP13W, BP12P (11 Nos. Cast; 1 Nos. completed RCD; 1 Nos. RCD in progress)	236	23-Mar-21	13-Nov-21	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<b>ELS (Stage 1) - Grouting / Pipe Pile Works</b>																	
King Post (0/86 Nos Completed) & Erection of Steel Column for Working Platform (0/65 Nos Completed)	190	28-Aug-21	5-Mar-22														
Stage 1a & 1b grouting (812/1058 Nos Completed)	477	22-Oct-20	10-Feb-22	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Pipe Pile Construction (279/523 Nos Completed)	462	17-Nov-20	21-Feb-22	■	■	■	■	■	■	■	■	■	■	■	■	■	■

- - Actual
- - Remaining Works
- - Critical Remaining Works

## **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 stations are presented in following tables:

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

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM3A	280.4	500
AM4A	278.5	500
AM5A	275.4	500

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

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AM3A	152.4	260
AM4A	152.6	260
AM5A	141.1	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
NM2A, NM3A, NM4A and NM5A		
0700-1900 hours on normal weekdays	When one valid documented complaint is received from any one of the sensitive receiver	75

Note:

\*Reduce to 70dB(A) for school and 65 dB(A) during school examination period.

## **D. Event and Action Plan for Air Quality, Noise, Landscape and Visual Impact**

## 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: Typical Event and Action Plan for Air Quality**

Event	Action			
	ET	IEC	WKCD A	Contractor
<b>Action Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform IEC and WKCD A;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate.</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and WKCD A;</li> <li>3. Advise the WKCD A on the effectiveness of the proposed remedial measures;</li> <li>4. Repeat measurements to confirm findings;</li> <li>5. Increase monitoring frequency to daily;</li> <li>6. Discuss with IEC and Contractor on remedial actions required;</li> <li>7. If exceedance continues, arrange meeting with IEC and WKCD A;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ET on the effectiveness of the proposed remedial measures;</li> <li>5. Monitor the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial to WKCD A within three working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>

Event	Action			
	ET	IEC	WKCDA	Contractor
<b>Limit Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform WKCDA, Contractor and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCDA informed of the results.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the WKCDA on the effectiveness of the proposed remedial measures;</li> <li>5. Monitor the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within three working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Notify IEC, WKCDA, Contractor and EPD;</li> <li>2. Identify source;</li> <li>3. Repeat measurement to confirm findings;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Arrange meeting with IEC and WKCDA to discuss the remedial actions to be taken;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCDA informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss amongst WKCDA, ET, and Contractor on the potential remedial actions;</li> <li>4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the WKCDA accordingly;</li> <li>5. Monitor the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within three working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by the WKCDA until the exceedance is abated.</li> </ol>

## 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	IEC	WKCDA	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify WKCDA, IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, WKCDA and Contractor;</li> <li>4. Discuss with the IEC and Contractor on remedial measures required;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the WKCDA accordingly;</li> <li>3. Advise the WKCDA on the effectiveness of the proposed remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC and WKCDA;</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Inform IEC, WKCDA, Contractor and EPD;</li> <li>2. Repeat measurements to confirm findings;</li> <li>3. Increase monitoring frequency;</li> <li>4. Identify source and investigate the cause of exceedance;</li> <li>5. Carry out analysis of Contractor's working procedures;</li> <li>6. Discuss with the IEC, Contractor and WKCDA on remedial measures required;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and WKCDA informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst WKCDA, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the WKCDA accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures;</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC and WKCDA within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Submit further proposal if problem still not under control;</li> <li>5. Stop the relevant portion of works as instructed by the WKCDA until the exceedance is abated.</li> </ol>

## Landscape and Visual Impact

In case of non-compliance of landscape and visual impacts, procedures in accordance with the Event and Action Plan should be followed:

**Table D-3: Event and Action Plan for Landscape and Visual Impact**

Event	Action			
	Action	Event	Action	Event
Design Check	<ol style="list-style-type: none"> <li>1. Design check to make sure the design complies with all the proposed mitigation measures in the EIA report;</li> <li>2. Prepare and submit report.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report submitted by ET;</li> <li>2. Recommend remedial design if necessary.</li> </ol>	<ol style="list-style-type: none"> <li>1. Undertake remedial design if necessary.</li> </ol>	-
Non-conformity on one occasion	<ol style="list-style-type: none"> <li>1. Identify source of non-conformity;</li> <li>2. Report to IEC and WKCDA;</li> <li>3. Discuss remedial actions with IEC, WKCDA and Contractor;</li> <li>4. Monitor remedial actions until rectification has been completed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and verify source of non-conformity;</li> <li>2. Discuss remedial actions with ET and Contractor;</li> <li>3. Advise WKCDA on effectiveness of proposed remedial actions;</li> <li>4. Check implementation of remedial actions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor;</li> <li>2. Ensure remedial actions are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working method as necessary;</li> <li>2. Rectify damage and undertake necessary replacement and remedial actions.</li> </ol>
Repeated non-conformity	<ol style="list-style-type: none"> <li>1. Identify source of non-conformity;</li> <li>2. Report to IEC and WKCDA;</li> <li>3. Increase monitoring frequency;</li> <li>4. Discuss remedial actions with IEC, WKCDA and Contractor;</li> <li>5. Monitor remedial actions until rectification has been completed;</li> <li>6. If non-conformity rectified, reduce monitoring frequency back to normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and verify source of non-conformity;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss remedial actions with ET and Contractor;</li> <li>4. Advise WKCDA on effectiveness of proposed remedial actions;</li> <li>5. Supervise implementation of remedial actions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor;</li> <li>2. Ensure remedial actions are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working method as necessary;</li> <li>2. Rectify damage and undertake necessary replacement and remedial actions.</li> </ol>

## E. Monitoring Schedule

Notes:

- AM3A - Northeast corner of West Kowloon Station's station box (G/F)
- AM4A - Southeast corner of West Kowloon Station's station box (G/F)
- AM5A - North of West Kowloon Station's station box (G/F)
- NM2A - The Arch – Sun Tower (G/F)
- NM3A - Xiqu Centre (G/F)
- NM4A - Next to Tsim Sha Tsui Fire Station (G/F)
- NM5A - Pedestrian road (G/F) outside West Kowloon Station

# August 2021 (Hong Kong)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5 <span style="color: green; font-size: small;">Landscape &amp; Visual Inspection</span>	6 <span style="color: blue; font-size: small;">AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring</span>	7
8	9	10	11	12 <span style="color: blue; font-size: small;">AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring</span>	13	14
15	16	17	18 <span style="color: blue; font-size: small;">AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring</span>	19 <span style="color: green; font-size: small;">Landscape &amp; Visual Inspection</span>	20	21 <span style="font-size: small;">Hungry Ghost Festival</span>
22	23	24 <span style="color: blue; font-size: small;">AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring</span>	25	26	27	28
29	30 <span style="color: blue; font-size: small;">AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring</span>	31	1	2	3	4

Notes:

- AM3A - Northeast corner of West Kowloon Station's station box (G/F)
- AM4A - Southeast corner of West Kowloon Station's station box (G/F)
- AM5A - North of West Kowloon Station's station box (G/F)
- NM2A - The Arch – Sun Tower (G/F)
- NM3A - Xiqu Centre (G/F)
- NM4A - Next to Tsim Sha Tsui Fire Station (G/F)
- NM5A - Pedestrian road (G/F) outside West Kowloon Station

# September 2021 (Hong Kong)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2 Landscape & Visual Inspection	3	4 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring
5	6	7	8	9	10 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring	11
12	13	14	15	16 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring Landscape & Visual Inspection	17	18
19	20 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring	21 Mid-Autumn Festival	22 ● Day after Mid-Autumn Festival	23	24	25 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring
26	27	28 AM3A,AM4A,AM5A - 24-hr TSP, 1-hr TSP X 3 NM2A,NM3A,NM4A,NM5A - Noise Impact Monitoring	29	30 Landscape & Visual Inspection	1 ● National Day of the People's Republic of China	2

## F. Calibration Certifications

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: November 2, 2020	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 756.7	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>3543</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4310	3.2	2.00
2	3	4	1	1.0110	6.4	4.00
3	5	6	1	0.9000	8.0	5.00
4	7	8	1	0.8560	8.9	5.50
5	9	10	1	0.7100	12.9	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H (Ta/Pa)}$ (y-axis)
1.0049	0.7022	1.4207	0.9958	0.6959	0.8815
1.0006	0.9897	2.0091	0.9915	0.9808	1.2467
0.9985	1.1094	2.2463	0.9894	1.0994	1.3938
0.9973	1.1651	2.3559	0.9882	1.1545	1.4619
0.9920	1.3971	2.8414	0.9830	1.3844	1.7631
<b>QSTD</b>	m=	<b>2.03936</b>	<b>QA</b>	m=	<b>1.27701</b>
	b=	<b>-0.01298</b>		b=	<b>-0.00805</b>
	r=	<b>0.99995</b>		r=	<b>0.99995</b>

Calculations	
Vstd= $\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va= $\Delta Vol((Pa-\Delta P)/Pa)$
Qstd= $Vstd/\Delta Time$	Qa= $Va/\Delta Time$
For subsequent flow rate calculations:	
Qstd= $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa= $1/m \left( \left( \sqrt{\Delta H (Ta/Pa)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



# TE-5170 Calibration Worksheet

## Site Information

Location: AM3A	Zones 2A at West Site ID: Kowloon Cultural	Date: 30-Jun-21
Sampler: TE-5170	Serial No: 4340	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.71	Corrected Pressure (mm Hg): 755
Temperature (deg F): 86	Temperature (deg K): 303
Average Press. (in Hg): 29.71	Corrected Average (mm Hg): 755
Average Temp. (deg F): 86	Average Temp. (deg K): 303

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-Nov-20

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.40	1.712	53.0	52.37	Slope: 30.8186
2	10.60	1.584	48.0	47.43	Intercept: -0.4148
3	7.10	1.297	41.0	40.51	Corr. Coeff: 0.9960
4	4.50	1.034	33.0	32.61	
5	2.60	0.788	23.0	22.73	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.283036231
Average Flow Calculation in CFM 45.30400931
Sample Time (Hrs): 1.0
Total Flow in m3/min 76.98217384
Total Flow in CFM 2718.240558

NOTE: Ensure calibration orifice has been certified within 12 months of use



# TE-5170 Calibration Worksheet

## Site Information

Location: AM3A	Zones 2A at West Site ID: Kowloon Cultural	Date: 28-Aug-21
Sampler: TE-5170	Serial No: 4340	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.87	Corrected Pressure (mm Hg): 759
Temperature (deg F): 80	Temperature (deg K): 300
Average Press. (in Hg): 29.87	Corrected Average (mm Hg): 759
Average Temp. (deg F): 80	Average Temp. (deg K): 300

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-Nov-20

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.50	1.733	53.0	52.79	Slope: 32.1441
2	10.30	1.574	48.0	47.81	Intercept: -2.4258
3	7.20	1.317	41.0	40.83	Corr. Coeff: 0.9968
4	4.70	1.065	33.0	32.87	
5	2.80	0.824	23.0	22.91	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.302458551
Average Flow Calculation in CFM 45.98981142
Sample Time (Hrs): 1.0
Total Flow in m3/min 78.14751303
Total Flow in CFM 2759.388685

NOTE: Ensure calibration orifice has been certified within 12 months of use



# TE-5170 Calibration Worksheet

## Site Information

Location: AM4A	Zones 2A at West Site ID: Kowloon Cultural	Date: 30-Jun-21
Sampler: TE-5170	Serial No: 3998	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.71	Corrected Pressure (mm Hg): 755
Temperature (deg F): 86	Temperature (deg K): 303
Average Press. (in Hg): 29.71	Corrected Average (mm Hg): 755
Average Temp. (deg F): 86	Average Temp. (deg K): 303

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-Nov-20

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.30	1.706	53.0	52.37	Slope: 30.5487
2	10.50	1.576	48.0	47.43	Intercept: 0.0717
3	7.30	1.315	41.0	40.51	Corr. Coeff: 0.9970
4	4.40	1.023	33.0	32.61	
5	2.50	0.772	23.0	22.73	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.278446367
Average Flow Calculation in CFM 45.14194122
Sample Time (Hrs): 1.0
Total Flow in m3/min 76.70678202
Total Flow in CFM 2708.516473

NOTE: Ensure calibration orifice has been certified within 12 months of use



# TE-5170 Calibration Worksheet

## Site Information

Location: AM4A	Zones 2A at West Site ID: Kowloon Cultural	Date: 28-Aug-21
Sampler: TE-5170	Serial No: 3998	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.87	Corrected Pressure (mm Hg): 759
Temperature (deg F): 80	Temperature (deg K): 300
Average Press. (in Hg): 29.87	Corrected Average (mm Hg): 759
Average Temp. (deg F): 80	Average Temp. (deg K): 300

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-Nov-20

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.60	1.740	53.0	52.79	Slope: 30.5068
2	10.60	1.596	48.0	47.81	Intercept: -0.2636
3	7.40	1.335	41.0	40.83	Corr. Coeff: 0.9970
4	4.50	1.042	33.0	32.87	
5	2.60	0.794	23.0	22.91	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.301485004
Average Flow Calculation in CFM 45.9554355
Sample Time (Hrs): 1.0
Total Flow in m3/min 78.08910026
Total Flow in CFM 2757.32613

NOTE: Ensure calibration orifice has been certified within 12 months of use



# TE-5170 Calibration Worksheet

## Site Information

Location: AM5A	Zones 2A at West Site ID: Kowloon Cultural	Date: 30-Jun-21
Sampler: TE-5170	Serial No: 4344	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.71	Corrected Pressure (mm Hg): 755
Temperature (deg F): 86	Temperature (deg K): 303
Average Press. (in Hg): 29.71	Corrected Average (mm Hg): 755
Average Temp. (deg F): 86	Average Temp. (deg K): 303

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-11-2020

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.20	1.699	53.0	52.37	Slope: 32.8579
2	10.30	1.561	48.0	47.43	Intercept: -3.3912
3	7.50	1.333	41.0	40.51	Corr. Coeff: 0.9961
4	4.60	1.045	33.0	32.61	
5	2.90	0.831	23.0	22.73	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.293989693
Average Flow Calculation in CFM 45.69077607
Sample Time (Hrs): 1.0
Total Flow in m3/min 77.6393816
Total Flow in CFM 2741.446564

NOTE: Ensure calibration orifice has been certified within 12 months of use



# TE-5170 Calibration Worksheet

## Site Information

Location: AM5A	Zones 2A at West Site ID: Kowloon Cultural	Date: 28-Aug-21
Sampler: TE-5170	Serial No: 4344	Tech: CS Tang

## Site Conditions

Barometric Pressure (in Hg): 29.87	Corrected Pressure (mm Hg): 759
Temperature (deg F): 80	Temperature (deg K): 300
Average Press. (in Hg): 29.87	Corrected Average (mm Hg): 759
Average Temp. (deg F): 80	Average Temp. (deg K): 300

## Calibration Orifice

Make: Tisch	Qstd Slope: 2.03936
Model: TE-5025A	Qstd Intercept: -0.01298
Serial#: 3543	Date Certified: 2-Nov-20

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.40	1.726	53.0	52.79	Slope: 30.6738
2	10.20	1.566	48.0	47.81	Intercept: -0.1550
3	7.60	1.353	41.0	40.83	Corr. Coeff: 0.9974
4	4.40	1.031	33.0	32.87	
5	2.50	0.779	23.0	22.91	# of Observations: 5

## Calculations

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg  
 For subsequent calculation of sampler flow:  
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

Average I (chart): 40
Average Flow Calculation m3/min 1.290857523
Average Flow Calculation in CFM 45.58017915
Sample Time (Hrs): 1.0
Total Flow in m3/min 77.45145141
Total Flow in CFM 2734.810749

NOTE: Ensure calibration orifice has been certified within 12 months of use



# CERTIFICATE OF ACCREDITATION

*This is to attest that*

## **AQUALITY TESTCONSULT LIMITED**

11A&B, KAI FONG GARDEN, PING CHE ROAD  
FANLING, HONG KONG

### **Calibration Laboratory CL-207**

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date October 19, 2020

Expiration Date December 1, 2021



A handwritten signature in black ink, reading 'Raj Nathan'.

**President**

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

## AQUALITY TESTCONSULT LIMITED

[www.aqtlgroup.com](http://www.aqtlgroup.com)

**Contact Name** Lee Mei Yee Julia

**Contact Phone** + 852-6309-2280

*Accredited to ISO/IEC 17025:2017*

*Effective Date October 19, 2020*

### CALIBRATION AND MEASUREMENT CAPABILITY (CMC)\*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> ( $\pm$ )	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
<i>Dimensional</i>			
Caliper -Vernier, Dial & Electronic <sup>3</sup>	0 mm to 300 mm	30 $\mu$ m	Checker by comparison method (BS 887:1982)
Steel Ruler <sup>3</sup>	1 mm to 1000 mm	280 $\mu$ m	Reference Steel Rule by comparison method (BS 4372:1968)
Dial Indicator / Gauge (Plunger) <sup>3</sup>	0 mm to 50 mm	8 $\mu$ m	Reference micrometer head by comparison method (BS 907:2008)
Feeler Gauge <sup>3</sup>	0.01 mm to 1 mm	8 $\mu$ m	Reference Dial Gauge by comparison method (BS BS957-2008)
Measuring tape <sup>3</sup>	0 m to 1.5 m	1200 $\mu$ m	Reference steel ruler by comparison method (BS 4035:1966)
Engineering Square <sup>3</sup>	Length 0 mm to 160 mm	20 $\mu$ m	Reference engineering square and Feeler Gauge (BS 939:2007)
Slump cone <sup>3</sup>	Diameter = 0 mm to 200 mm Thickness = 1.5 mm Height = 0 mm to 300 mm	560 $\mu$ m 100 $\mu$ m 560 $\mu$ m	Reference Caliper & Reference Steel ruler by direct measurement (Verification in accordance with in-house method for the dimensional requirements as specified CS1:1990 Vol.1 A4; CS1: 2010 Vol. 1, A5)
Tamping rod <sup>3</sup>	Diameter = 0 mm to 16 mm Length = 600 mm	600 $\mu$ m 950 $\mu$ m	Reference steel ruler & Reference Caliper by direct measurement (Verification in accordance with in-house method for the dimensional

\* If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.

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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> ( $\pm$ )	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
			requirements as specified CS1:1990 Vol.1 A5;CS1: 2010 Vol. 1, A6)
Cube mould <sup>3</sup>	(Max dimensions 150 mm per side) Dimension Flatness Perpendicularity Parallelism	50 $\mu$ m 10 $\mu$ m 10 $\mu$ m 50 $\mu$ m	Reference Caliper, straight edge & feeler gauge by direct measurement. (Verification in accordance with in-house method for the dimensional requirements as specified in BS1881: Part 108:1983; CS1:1990 Vol1, A21; CS1:2010 Vol 1, A25; BS EN 12390-2:2000)
Compacting Bar <sup>3</sup>	Ramming Face = 25 mm Length = 380 mm Weight = 1.8 kg	100 $\mu$ m 560 $\mu$ m 1 g	Reference Caliper & Steel ruler by direct measurement. (Verification in accordance with in-house method for the dimensional & mass requirements as specified in BS1881: Part 105:1984 Cl 3.3; CS1:1990 Vol 2, E3 CS1:2010 Vol 1, A15.3; BS EN 12350 -5:2000 Cl 4.3.)
Covermeter	20 mm to 103 mm	2.9 mm	Reference concrete block (Verification in accordance with in-house method for the dimensional requirements as specified in BS 1881:Part 204:1988 Cl.6.4- Method C)
Flow table <sup>3</sup>	15 kg to 17 kg 1 mm to 71 mm	12 g 600 $\mu$ m	Weighing Balance, Reference caliper & Reference steel ruler by direct measurement
Test Sieve <sup>3</sup>	4 mm to 50 mm	50 $\mu$ m	Reference Caliper by direct measurement
<b>Mechanical</b>			
Force Measuring Machine <sup>3</sup> (Compression Mode)	1 kN to 3000 kN	0.4 %	Ref. Load cell by direct measurement BS 1610: Part 1:1985; BS 1610: Part 1:1992; BS EN ISO 12390-4:2000 Annex B; BS EN ISO 7500-1:2004
Laser Dust Meter <sup>3</sup>	Dust particles 0.001 mg/m <sup>3</sup> to 10.00 mg/m <sup>3</sup>	0.9 mg/m <sup>3</sup>	By comparison method by using reference laser dust meter

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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> ( $\pm$ )	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Rebound Hammer <sup>3</sup>	80 unit (hardness)	1.6 rebound count	Reference Rebound count by comparison method. BS1881: Part 202:1986; BS EN 12504-2:2001; BS EN 12504-2:2012
Mass (F2 class and coarser)	1 g to 200 g 200 g to 5 kg 5 kg to 10 kg 10 kg to 50 kg	1.3 mg 0.5 g 1 g 7 g	Standard Weight E2/ F1 Class & Weighing Balances by comparison method (OIMLR111)
Weighing Scale & Balance <sup>3</sup>	1 g to 200 g 200 g to 5 kg 5 kg to 50 kg	1 mg 1 g 15 g	Standard weight of E2/F1 Grade by direct measurement
Volumetric Glassware	1 mL to 100 mL 100 mL to 1000 mL	0.004 mL 0.09 mL	Standard weight E2 Class, Weighing Balances & Distilled water by gravimetric method
<b>Thermal</b>			
Digital/Liquid in Glass Thermometers & RTD/ Thermocouples with or without Indicators	15 °C to 55°C 55°C to 95°C	0.4 °C 0.9 °C	Water Baths, Reference Sensor and Indicator by Comparison Method (OIML R133)
Curing Tank <sup>3</sup>	(Calibration at 20 °C & 27 °C @ 30 min) 20 °C Temperature distribution 27 °C Temperature distribution Efficiency of circulation	0.4 °C 0.8 °C 5 s	Reference Temperature datalogger by Mapping Method & Reference Stop Watch (Verification in accordance with in-house method for the Temp & Time requirements as specified in BS1881-111:1983 CS1:1990 Vol 1 App A24 CS1:2010 Vol 1 App A28 BE EN 12390-2:2000
Oven <sup>3</sup>	40.0 °C to 180.0 °C	1.5 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)
Furnace <sup>3</sup>	200 °C to 1300 °C	6 °C	Reference Thermocouple with Indicator By single point Calibration (AS 2853:1986)
Water bath <sup>3</sup>	15 °C to 95 °C	0.2 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)
<b>Time and Frequency</b>			
Stop Watch/ Timer <sup>3</sup>	10 s to 3600 s	0.2 s	Reference stop watch

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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> ( $\pm$ )	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Grout Flow Cone <sup>3</sup>	7 s to 9 s	0.2 s	Reference stop watch by direct method (ASTM C939-10 Cl.9)

<sup>1</sup>The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

<sup>2</sup>When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

<sup>3</sup>Also available as site calibration. Note that actual measurement uncertainties achievable at a customer's site can normally be expected to be larger than the uncertainties listed on this Scope of Accreditation.

# FAQ / Information

## Mutual Recognition Arrangements (MRA) / Multilateral Recognition Arrangements (MLA)

### Mutual Recognition Arrangement (MRA) Partners for HOKLAS ^

Every effort is made to promote acceptance of test data from accredited laboratories, both internationally and locally. HKAS has concluded mutual recognition arrangements with accreditation bodies listed below by being one of the signatories of the [International Laboratory Accreditation Cooperation Mutual Recognition Arrangement \(ILAC MRA\)](#) and the [Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement \(APAC MRA\)](#) for testing, calibration, medical testing, Proficiency Testing Providers (PTP) and Reference Material Producers (RMP). Click [here](#) to view the up-to-date signatories of ILAC and [here](#) to access the up-to-date signatories of APAC.

Visitors checking the names, logos and accreditation symbols shown on an endorsed certificate or report should note that some of our MRA partners may have their names, logos or accreditation symbols changed recently and test reports or certificates endorsed by displaying their old accreditation symbols may still be valid during the change-over period. For details, please visit their websites or contact them directly.

» [Mutual Recognition Arrangement \(MRA\) Partners for HOKLAS](#)

HKAS MRA partners will recognise HOKLAS endorsed test certificates as having the same technical validity as certificates endorsed by their respective schemes.

### Multilateral Recognition Arrangements (MLA) for HKCAS ^

HKAS has been a signatory of [Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement \(APAC MRA\)](#) for Quality Management System (QMS), Environmental Management System (EMS), Food Safety Management System (FSMS), Energy Management System (EnMS), Occupational Health and Safety Management System (OHSMS) certifications, product certifications, and Greenhouse Gas (GHG) validation and verification.

HKAS has also been a signatory of the [International Accreditation Forum Multilateral Recognition Arrangement \(IAF MLA\)](#) for Quality Management System (QMS), Environmental Management System (EMS), Food Safety Management System (FSMS), Energy Management System (EnMS), Occupational Health and Safety Management System (OHSMS) certifications, product certifications, and Greenhouse Gas (GHG) validation and verification.

Click [here](#) to view the up-to-date signatories of IAF and [here](#) to access the up-to-date signatories of APAC.

» [Mutual / Multilateral Recognition Arrangements \(MRA / MLA\) Partners for HKCAS](#)

### Mutual Recognition Arrangement (MRA) Partners for HKIAS ^

HKAS has concluded mutual recognition arrangements with accreditation bodies listed below by being one of the signatories of the [International Laboratory Accreditation Cooperation Mutual Recognition Arrangement \(ILAC MRA\)](#) and [Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement \(APAC MRA\)](#) for inspection. Click [here](#) to view the up-to-date signatories of ILAC and [here](#) to access the up-to-date signatories of APAC.

HKAS MRA partners will recognise HKIAS endorsed inspection reports or certificates having the same technical validity as reports or certificates endorsed by their respective schemes.

» [Mutual Recognition Arrangement \(MRA\) Partners for HKIAS](#)

 back

## Hong Kong Laboratory Accreditation Scheme (HOKLAS) - Mutual Recognition Arrangement (MRA) Partners

Economy	Logo	Name of Partner	URL	Test Area
United Kingdom of Great Britain and Northern Ireland		United Kingdom Accreditation Service (UKAS)	<a href="http://www.ukas.com">http://www.ukas.com</a>	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America		AIHA Laboratory Accreditation Programs, LLC (AIHA-LAP, LLC)	<a href="http://www.aihaaccreditedlabs.org/">http://www.aihaaccreditedlabs.org/</a>	Non-medical Testing
United States of America		American Association for Laboratory Accreditation (A2LA)	<a href="http://www.a2la.org/">http://www.a2la.org/</a>	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America		ANSI-ASQ National Accreditation Board (ANAB)	<a href="https://www.ansi.org/accreditation/Default">https://www.ansi.org/accreditation/Default</a>	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America		International Accreditation Service Inc. (IAS)	<a href="http://www.iasonline.org/">http://www.iasonline.org/</a>	Calibration, Non-medical Testing
United States of America		National Voluntary Laboratory Accreditation Program (NVLAP)	<a href="http://www.nist.gov/nvlap">http://www.nist.gov/nvlap</a>	Calibration, Non-medical Testing



香港新界粉嶺坪輦路啟芳園11A&11B號

No. 11A&B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG

TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-126F  
Date of Report : 12-Nov-20  
Page Number : 1 of 2  
Customer \* : Apex Testing & Certification Ltd.  
Customer Address\* : Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK  
Customers Ref. \* : A005

**Item Under Calibration (IUC)\***

Equipment No. : N/A  
Manufacturer : Sibata Scientific Technology Ltd  
Model No. : LD-3B  
Serial No. : 235811  
Scale Division : 0.001 mg/m<sup>3</sup>  
Range : 0.001 to 1 mg/m<sup>3</sup>  
Condition of Item : Normal

Date Item Received : 8-Nov-20  
Date Calibrated : 8-Nov-20  
Calibration Location : AQuality Calibration Lab.  
Date of Next Calibration : 7-Nov-21  
Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 27.5 °C to 23.9 °C  
Relative Humidity : 51 % to 83 %

**Calibration Results**

Reference True Reading (mg/m <sup>3</sup> )	Average IUC Reading (mg/m <sup>3</sup> )	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158	0.167	-0.008	5.1%	0.020	2.0
5.164	5.647	-0.484	8.5%	0.463	2.0
10.100	11.141	-1.041	9.3%	0.904	2.0

**Remarks**

1. \* Denotes information supplied by customer.  
2. The results relate only to the items calibrated.  
3. The results apply to the items as received.  
4. Correction = Average of (Ref reading - IUC reading)  
5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

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

LEE Mei Yee, Julia  
Managing Director



**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-126F  
Date of Report : 12-Nov-20  
Page Number : 2 of 2  
Customer \* : Apex Testing & Certification Ltd.  
Customers Ref. \* : A005

**Details of Calibration**

1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capability of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
5. The identification, calibration certificate numbers for the reference equipment used were as follows :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

香港新界粉嶺坪輦路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, N.T., HONG KONG

TEL : 852-3582-9589

FAX : 852-2674-1177

EMAIL : cal.aqtl@gmail.com

WEBSITE: www.aqtlgroup.com

**CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	201108MCA-126F
	Date of Issue	12-Nov-20
	Date of Testing	8-Nov-20
	Page	1 of 1

**Item for Calibration**

Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 235811

**Standard Equipment**

Description	: High Volume Sampler / Calibration Orifice
Manufacturer	: Tisch Environmental, Inc.
Model No.	: TE-5170 / TE-5025A
Serial No.	: 4344 / 3543
Last Calibration	: 8-Nov-20 / 2-Nov-20

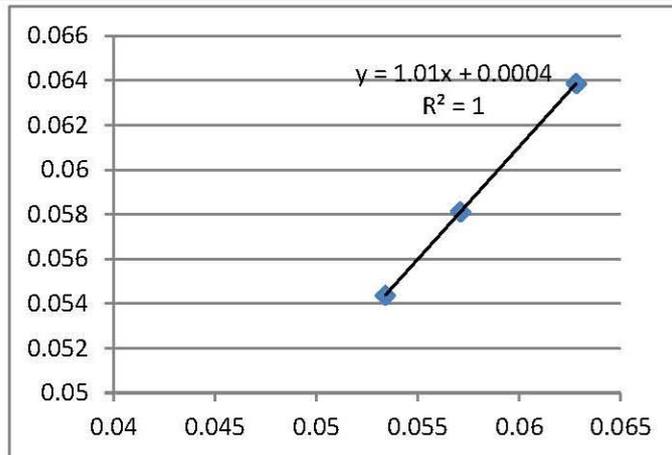
Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0639
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0544
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0581

By Linear Regression of Y or X

Slope (K-factor) : 1.0100

Correlation Coefficient : 1.0000

Validity of Calibration : 7-Nov-21



Recorded by : Jessica Liu Signature: Jessica Liu Date: 8-Nov-20

Checked by : S Tang Signature: S Tang Date: 8-Nov-20



香港新界粉嶺坪輦路啟芳園11A&11B號

No. 11A&B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG

TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-123F  
Date of Report : 12-Nov-20  
Page Number : 1 of 2  
Customer \* : Apex Testing & Certification Ltd.  
Customer Address\* : Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK  
Customers Ref. \* : A005

**Item Under Calibration (IUC)\***

Equipment No. : N/A  
Manufacturer : Sibata Scientific Technology Ltd  
Model No. : LD-3B  
Serial No. : 336338  
Scale Division : 0.001 mg/m<sup>3</sup>  
Range : 0.001 to 1 mg/m<sup>3</sup>  
Condition of Item : Normal

Date Item Received : 8-Nov-20  
Date Calibrated : 8-Nov-20  
Calibration Location : AQuality Calibration Lab.  
Date of Next Calibration : 7-Nov-21  
Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 27.5 °C to 23.9 °C  
Relative Humidity : 51 % to 83 %

**Calibration Results**

Reference True Reading (mg/m <sup>3</sup> )	Average IUC Reading (mg/m <sup>3</sup> )	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158	0.168	-0.010	5.7%	0.026	2.0
5.164	5.562	-0.398	7.1%	0.462	2.0
10.100	10.936	-0.837	7.6%	0.905	2.0

**Remarks**

1. \* Denotes information supplied by customer.  
2. The results relate only to the items calibrated.  
3. The results apply to the items as received.  
4. Correction = Average of (Ref reading - IUC reading)  
5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

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

LEE Mei Yee, Julia  
Managing Director



**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-123F  
 Date of Report : 12-Nov-20  
 Page Number : 2 of 2  
 Customer \* : Apex Testing & Certification Ltd.  
 Customers Ref. \* : A005

**Details of Calibration**

1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capability of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
5. The identification, calibration certificate numbers for the reference equipment used were as follows :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



**CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	201108MCA-123F
	Date of Issue	12-Nov-20
	Date of Testing	8-Nov-20
	Page	1 of 1

**Item for Calibration**

Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 336338

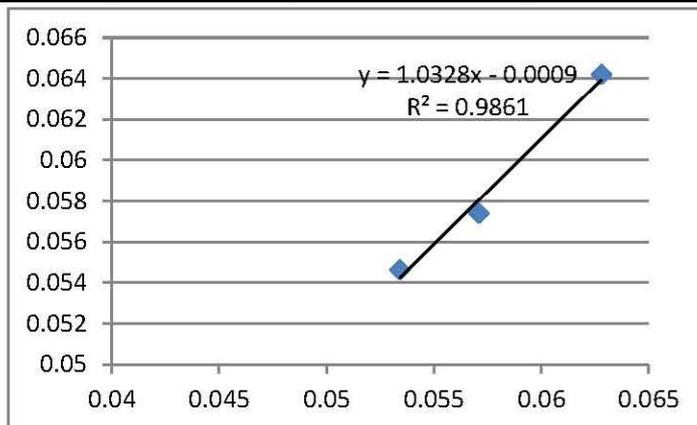
**Standard Equipment**

Description	: High Volume Sampler / Calibration Orifice
Manufacturer	: Tisch Environmental, Inc.
Model No.	: TE-5170 / TE-5025A
Serial No.	: 4344 / 3543
Last Calibration	: 8-Nov-20 / 2-Nov-20

Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0642
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0546
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0574

By Linear Regression of Y or X

Slope (K-factor)	: 1.0328
Correlation Coefficient	: 0.9861
Validity of Calibration	: 7-Nov-21



Recorded by : Jessica Liu Signature: Jessica Liu Date: 8-Nov-20

Checked by : S Tang Signature: S Tang Date: 8-Nov-20



**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-125F  
Date of Report : 12-Nov-20  
Page Number : 1 of 2  
Customer \* : Apex Testing & Certification Ltd.  
Customer Address\* : Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK  
Customers Ref. \* : A005

**Item Under Calibration (IUC)\***

Equipment No. : N/A  
Manufacturer : Sibata Scientific Technology Ltd  
Model No. : LD-3B  
Serial No. : 567188  
Scale Division : 0.001 mg/m<sup>3</sup>  
Range : 0.001 to 1 mg/m<sup>3</sup>  
Condition of Item : Normal

Date Item Received : 8-Nov-20  
Date Calibrated : 8-Nov-20  
Calibration Location : AQuality Calibration Lab.  
Date of Next Calibration : 7-Nov-21  
Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 27.5 °C to 23.9 °C  
Relative Humidity : 51 % to 83 %

**Calibration Results**

Reference True Reading (mg/m <sup>3</sup> )	Average IUC Reading (mg/m <sup>3</sup> )	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158	0.167	-0.008	4.9%	0.023	2.0
5.164	5.693	-0.530	9.3%	0.463	2.0
10.100	11.045	-0.945	8.6%	0.905	2.0

**Remarks**

1. \* Denotes information supplied by customer.  
2. The results relate only to the items calibrated.  
3. The results apply to the items as received.  
4. Correction = Average of (Ref reading - IUC reading)  
5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

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

LEE Mei Yee, Julia  
Managing Director



**CERTIFICATE OF CALIBRATION**

Report Number : 201108MCA-125F  
Date of Report : 12-Nov-20  
Page Number : 2 of 2  
Customer \* : Apex Testing & Certification Ltd.  
Customers Ref. \* : A005

**Details of Calibration**

1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capability of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
5. The identification, calibration certificate numbers for the reference equipment used were as follows :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



**CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	201108MCA-125F
	Date of Issue	12-Nov-20
	Date of Testing	8-Nov-20
	Page	1 of 1

**Item for Calibration**

Description : Laser Dust Monitor  
 Manufacturer : Sibata Scientific Technology Ltd  
 Model No. : LD-3B  
 Serial No. : 567188

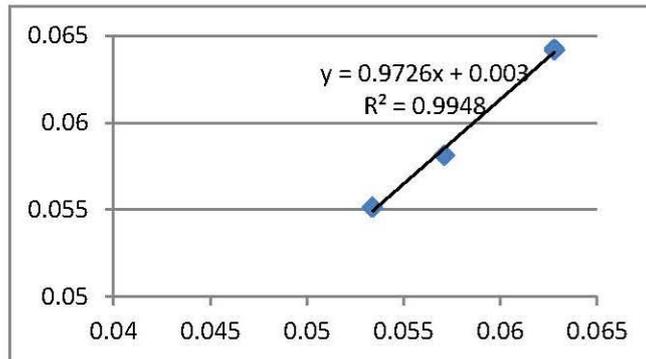
**Standard Equipment**

Description : High Volume Sampler / Calibration Orifice  
 Manufacturer : Tisch Environmental, Inc.  
 Model No. : TE-5170 / TE-5025A  
 Serial No. : 4344 / 3543  
 Last Calibration : 8-Nov-20 / 2-Nov-20

Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0642
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0552
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0581

By Linear Regression of Y or X

Slope (K-factor) : 0.9726  
 Correlation Coefficient : 0.9948  
 Validity of Calibration : 7-Nov-21



Recorded by : Jessica Liu Signature: Jessica Liu Date: 8-Nov-20

Checked by : S Tang Signature: S Tang Date: 8-Nov-20



## CERTIFICATE OF CALIBRATION

Certificate No.: 20CA1005 01-05 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Class 1)	,	Microphone
Manufacturer:	Hangzhou Aihua Instruments Co., Ltd	,	-
Type/Model No.:	AWA5661	,	AWA14425
Serial/Equipment No.:	301135	,	15338
Adaptors used:	-	,	-

### Item submitted by

Customer Name:	Apex Testing & Certification Ltd.
Address of Customer:	Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T.
Request No.:	-
Date of receipt:	05-Oct-2020

Date of test: 09-Oct-2020

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	23-Aug-2021	CIGISMEC
Signal generator	DS 360	61227	24-Dec-2020	CEPREI

### Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	55 ± 10 %
Air pressure:	1005 ± 5 hPa

### Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:



Feng Junqi

Date: 10-Oct-2020

Company Chop:



**Comments:** The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument. The results apply to the item as received.



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 20CA1005 01-05 Page 2 of 2

### 1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	2.1
	C	Pass	0.8	
	Lin	Pass	1.6	
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	2.2
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL Frequency weightings	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

### 2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

### 3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by:

Date:

Fung Chi Yip  
09-Oct-2020

Checked by:

Date:

Feng Junqi  
10-Oct-2020

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: AWA5661 Serial No. 301135 Date 09-Oct-2020  
 Microphone type: AWA14425 Serial No. 15338

Report: 20CA1005 01-05

### SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting 12.3 dB  
 Noise level in C weighting 13.6 dB  
 Noise level in Lin 18.2 dB

### LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals.(SLM set to LEQ/SPL)

Reference/Expected level	Actual level		Tolerance	Deviation	
	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	98.9	98.9	0.7	-0.1	-0.1
104.0	103.9	103.9	0.7	-0.1	-0.1
109.0	108.9	108.9	0.7	-0.1	-0.1
114.0	113.9	113.9	0.7	-0.1	-0.1
115.0	114.9	114.9	0.7	-0.1	-0.1
116.0	115.9	115.9	0.7	-0.1	-0.1
117.0	116.9	116.9	0.7	-0.1	-0.1
118.0	117.9	117.9	0.7	-0.1	-0.1
119.0	118.9	118.9	0.7	-0.1	-0.1
120.0	119.9	119.9	0.7	-0.1	-0.1
89.0	89.0	89.0	0.7	0.0	0.0
84.0	84.0	84.0	0.7	0.0	0.0
79.0	79.0	79.0	0.7	0.0	0.0
74.0	74.0	74.0	0.7	0.0	0.0
69.0	69.0	69.0	0.7	0.0	0.0
64.0	64.0	64.0	0.7	0.0	0.0
59.0	59.0	59.0	0.7	0.0	0.0
54.0	54.1	54.1	0.7	0.1	0.1
49.0	49.0	49.0	0.7	0.0	0.0
44.0	44.0	44.0	0.7	0.0	0.0
39.0	39.0	39.0	0.7	0.0	0.0
34.0	34.0	34.0	0.7	0.0	0.0
29.0	29.0	29.0	0.7	0.0	0.0
28.0	28.0	28.0	0.7	0.0	0.0



Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type: AWA5661 Serial No. 301135 Date 09-Oct-2020  
Microphone type: AWA14425 Serial No. 15338  
Report: 20CA1005 01-05

27.0	27.1	27.1	0.7	0.1	0.1
------	------	------	-----	-----	-----

Measurements for an indication of the reference SPL on all other ranges which include it

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
27-120	94.0	94.0	0.7	0.0
45-140	94.0	93.9	0.7	-0.1

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
27-120	29.0	29.0	0.7	0.0
	118.0	117.9	0.7	-0.1
45-140	47.0	47.1	0.7	0.1
	138.0	137.8	0.7	-0.2

## FREQUENCY WEIGHTING TEST

The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
				+	-	
Hz	dB	dB	dB			dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.4	1.5	1.5	-0.2
63.1	94.0	67.8	67.7	1.5	1.5	-0.1
125.9	94.0	77.9	77.8	1.0	1.0	-0.1
251.2	94.0	85.4	85.3	1.0	1.0	-0.1
501.2	94.0	90.8	90.7	1.0	1.0	-0.1
1995.0	94.0	95.2	95.3	1.0	1.0	0.1
3981.0	94.0	95.0	95.3	1.0	1.0	0.3
7943.0	94.0	92.9	93.6	1.5	3.0	0.7
12590.0	94.0	89.7	89.4	3.0	6.0	-0.3

Frequency weighting C:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
				+	-	
Hz	dB	dB	dB			dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	91.0	90.9	1.5	1.5	-0.1
63.1	94.0	93.2	93.1	1.5	1.5	-0.1
125.9	94.0	93.8	93.8	1.0	1.0	0.0
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0



Test Data for Sound Level Meter

Page 3 of 5

Sound level meter type: AWA5661 Serial No. 301135 Date 09-Oct-2020  
Microphone type: AWA14425 Serial No. 15338  
Report: 20CA1005 01-05

1995.0	94.0	93.8	93.9	1.0	1.0	0.1
3981.0	94.0	93.2	93.5	1.0	1.0	0.3
7943.0	94.0	91.0	91.7	1.5	3.0	0.7
12590.0	94.0	87.8	87.5	3.0	6.0	-0.3

Frequency weighting Lin:

Frequency Hz	Ref. level dB	Expected level dB	Actual level dB	Tolerance(dB)		Deviation dB
				+	-	
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	94.0	93.9	1.5	1.5	-0.1
63.1	94.0	94.0	93.9	1.5	1.5	-0.1
125.9	94.0	94.0	94.0	1.0	1.0	0.0
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0
1995.0	94.0	94.0	94.0	1.0	1.0	0.0
3981.0	94.0	94.0	94.0	1.0	1.0	0.0
7943.0	94.0	94.0	94.0	1.5	3.0	0.0
12590.0	94.0	94.0	93.9	3.0	6.0	-0.1

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level dB	Expected level dB	Actual level dB	Tolerance(dB)		Deviation dB
			+	-	
116.0	115.0	114.9	1.0	1.0	-0.1

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level dB	Expected level dB	Actual level dB	Tolerance(dB)		Deviation dB
			+	-	
116.0	111.9	111.9	1.0	1.0	0.0

PEAK RESPONSE TEST

The onset time of the peak detector is tested on the reference range by comparing the response to a 100 us rectangular test pulse with the response to a 10 ms reference pulse of the same amplitude. The amplitude of the 10 ms reference pulse is such as to produce an indication 1 dB below the upper limit of the primary indicator range.

Positive polarities: (Weighting Z, set the generator signal to single, Lzpeak)

Ref. level dB	Response to 10 ms dB	Response to 100 us dB	Tolerance +/- dB	Deviation dB
119.0	119.0	119.5	2.0	0.5



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: AWA5661 Serial No. 301135 Date 09-Oct-2020  
Microphone type: AWA14425 Serial No. 15338  
Report: 20CA1005 01-05

Negative polarities:

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
119.0	119.0	119.5	2.0	0.5

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)

Time weighting	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
	dB	dB	indication(dB)	+/- dB	dB
Slow	117.0+6.6	117.0	116.6	0.5	-0.4

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz  
Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

Ref. Level	Single burst indication		Tolerance	Deviation
	dB	Expected (dB)	Actual (dB)	+/- dB
120.0	111.2	111.1	2.0	-0.1

Repeated at 100 Hz

Ref. Level	Repeated burst indication		Tolerance	Deviation
	dB	Expected (dB)	Actual (dB)	+/- dB
120.0	117.3	117.1	1.0	-0.2

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz  
Duration of tone burst: 1 ms

Repetition Time	Level of tone burst	Expected Leq	Actual Leq	Tolerance	Deviation	Remarks
msec	dB	dB	dB	+/- dB	dB	
1000	90.0	90.0	89.9	1.0	-0.1	60s integ.
10000	80.0	80.0	79.9	1.0	-0.1	6min. integ.

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

Test frequency: 4000 Hz  
Integration time: 10 sec



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: AWA5661 Serial No. 301135 Date 09-Oct-2020  
Microphone type: AWA14425 Serial No. 15338  
Report: 20CA1005 01-05

The integrating sound level meter set to Leq:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10	90.0	60.0	60.0	1.7	0.0

The integrating sound level meter set to SEL:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	90.0	70.0	70.0	1.7	0.0

### OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	dB	dB
115.7	114.7	111.7	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as following:  
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range  
Test frequency: 4000 Hz  
Integration time: 10 sec  
Single burst duration: 1 msec

Rms level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	dB	dB
122.0	121.0	81.0	81.0	2.2	0.0

### ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

Frequency	Expected level	Actual level	Tolerance (dB)		Deviation
			+	-	
Hz	dB	Measured (dB)			dB
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	78.2	1.0	1.0	0.3
8000	92.9	93.6	1.5	3.0	0.7

-----END-----



## CERTIFICATE OF CALIBRATION

Certificate No.: 21CA0616 01-02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Pulsar  
Type/Model No.: 100B  
Serial/Equipment No.: 039507  
Adaptors used: Yes

### Item submitted by

Customer: Apex Testing & Certification Ltd.  
Address of Customer: Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T.  
Request No.: -  
Date of receipt: 16-Jun-2021

Date of test: 18-Jun-2021

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	04-May-2022	SCL
Preamplifier	B&K 2673	2239857	31-May-2022	CEPREI
Measuring amplifier	B&K 2610	2346941	01-Jun-2022	CEPREI
Signal generator	DS 360	33873	27-May-2022	CEPREI
Digital multi-meter	34401A	US36087050	27-May-2022	CEPREI
Audio analyzer	8903B	GB41300350	28-May-2022	CEPREI
Universal counter	53132A	MY40003662	02-Jun-2022	CEPREI

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $1010 \pm 5$  hPa

### Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:



Feng Junqi

Date: 19-Jun-2021

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument. The results apply to the item as received.



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 21CA0616 01-02 Page: 2 of 2

### 1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20  $\mu$ Pa)

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	94.15	0.10

### 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.019 dB

Estimated expanded uncertainty 0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 999.86 Hz

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

### 4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.9 %

Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: 

Date: 18-Jun-2021

Checked by: 

Date: 19-Jun-2021

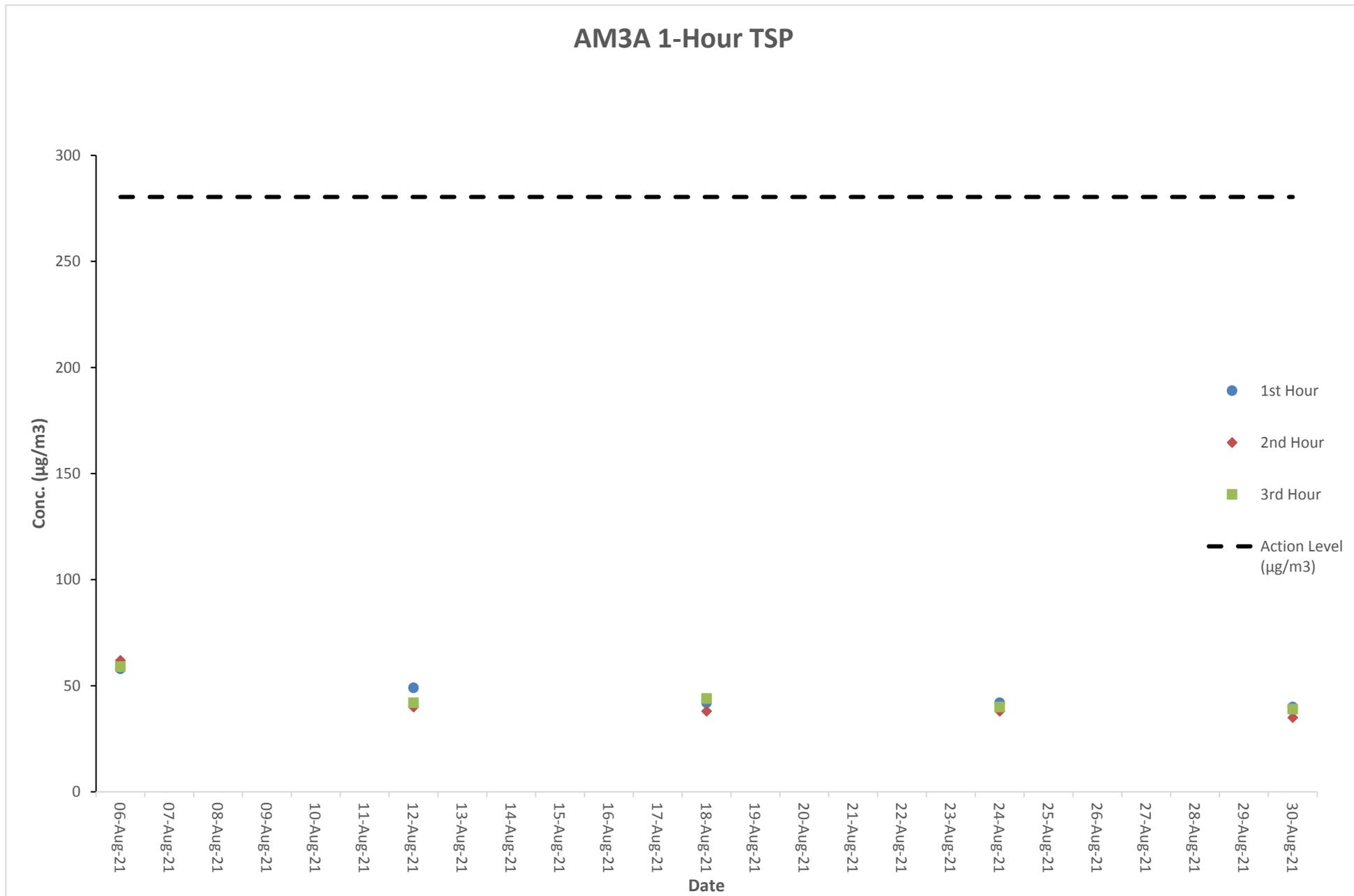
The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

## **G. Graphical Plots of the Monitoring Results**

**Air Quality Monitoring Result at Station AM3A (1-hour TSP)**

Date	Weather Condition	Time		Conc. ( $\mu\text{g}/\text{m}^3$ )			Action Level	Limit Level
		Start	Finish	1st Hour	2nd Hour	3rd Hour		
06-Aug-21	Cloudy	8:07	11:07	58	62	59	280.4	500
12-Aug-21	Cloudy	14:11	17:11	49	40	42	280.4	500
18-Aug-21	Fine	8:03	11:03	42	38	44	280.4	500
24-Aug-21	Cloudy	13:59	16:59	42	38	40	280.4	500
30-Aug-21	Fine	8:11	11:11	40	35	39	280.4	500

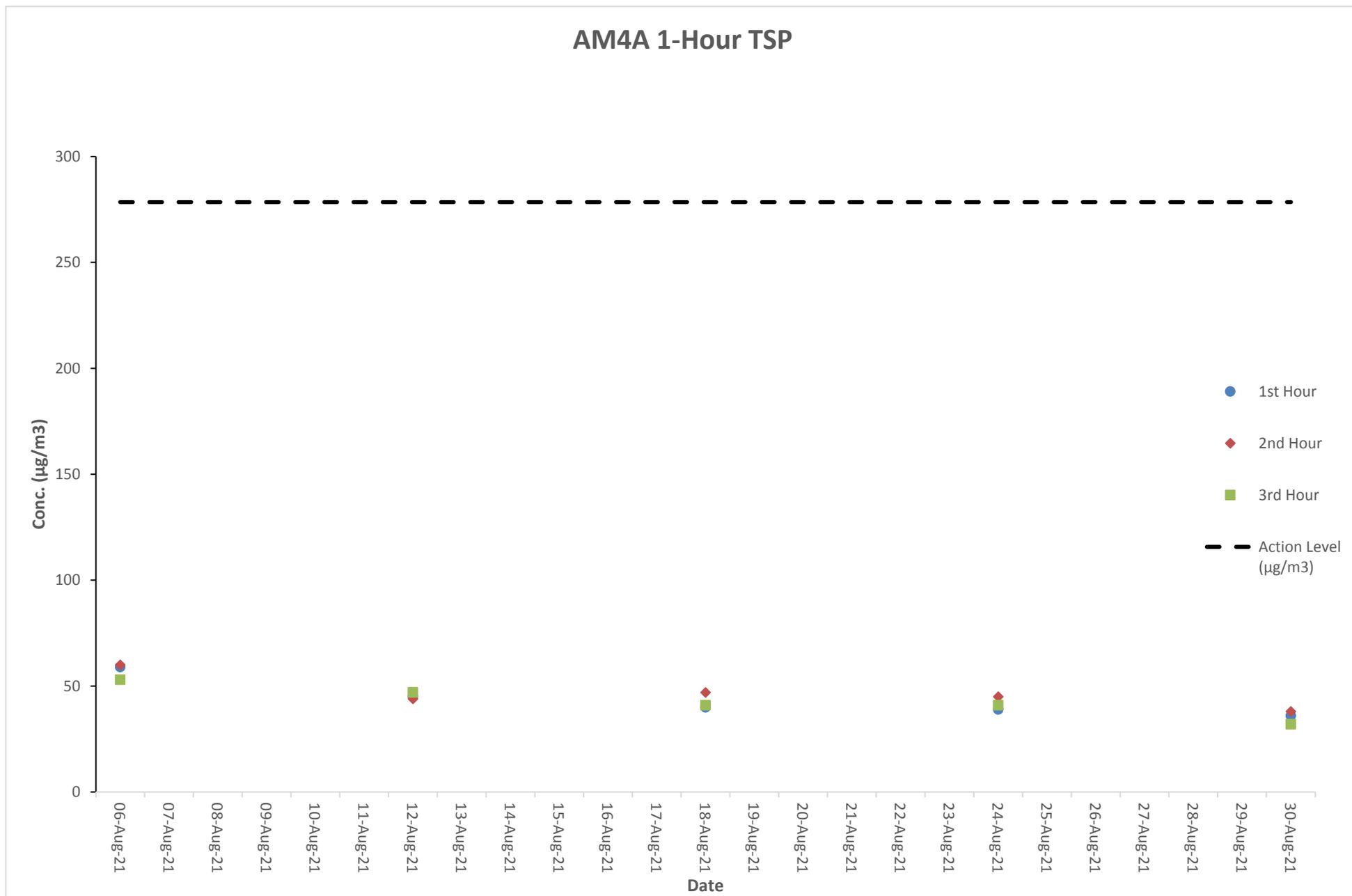
# Graphical Presentation of Air Quality Monitoring Result at Station AM3A (1-hour TSP)



**Air Quality Monitoring Result at Station AM4A (1-hour TSP)**

Date	Weather Condition	Time		Conc. ( $\mu\text{g}/\text{m}^3$ )			Action Level	Limit Level
		Start	Finish	1st Hour	2nd Hour	3rd Hour		
06-Aug-21	Cloudy	8:15	11:15	59	60	53	278.5	500
12-Aug-21	Cloudy	14:19	17:19	45	44	47	278.5	500
18-Aug-21	Fine	8:11	11:11	40	47	41	278.5	500
24-Aug-21	Cloudy	14:07	17:07	39	45	41	278.5	500
30-Aug-21	Fine	8:19	11:19	36	38	32	278.5	500

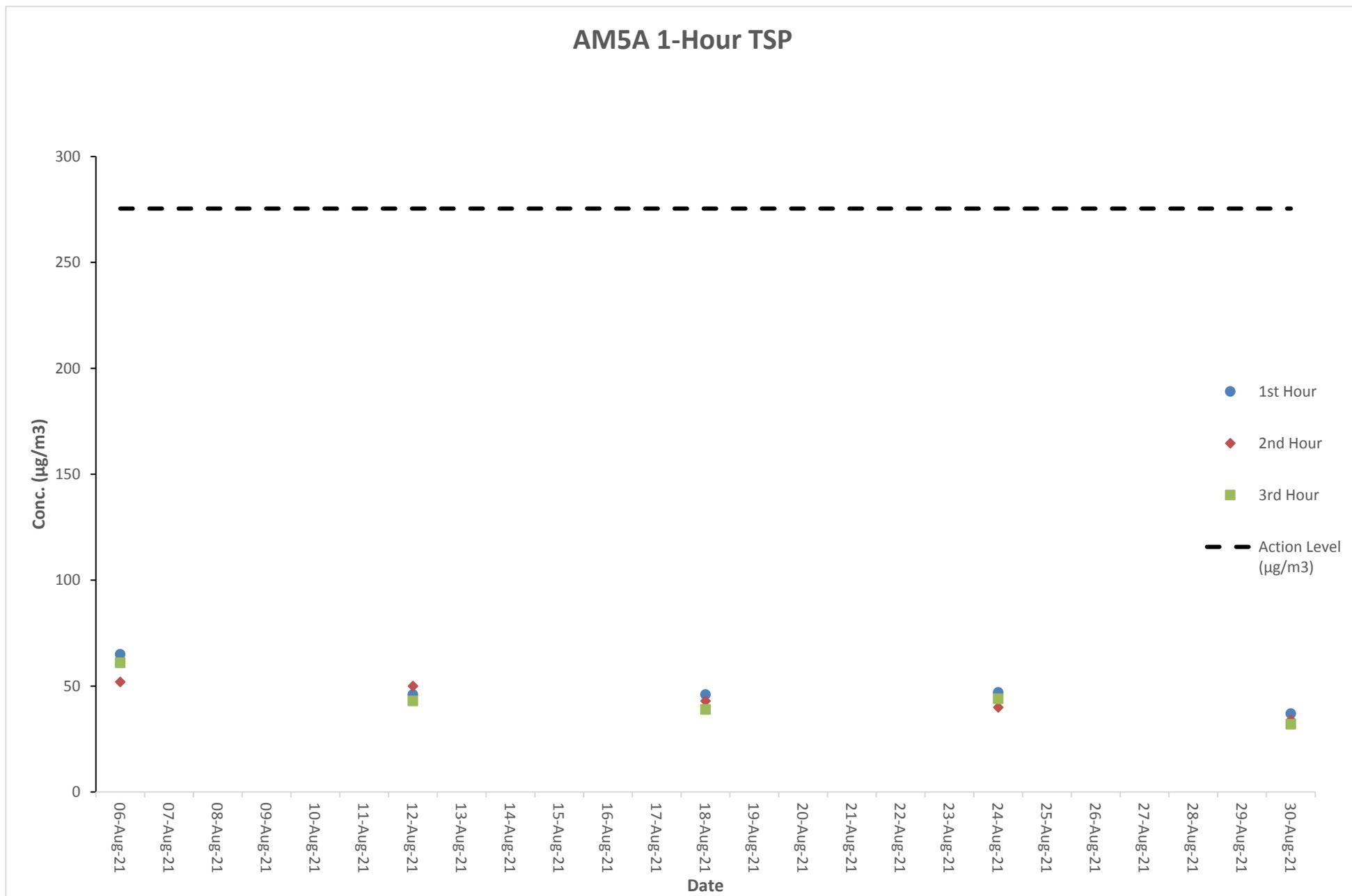
# Graphical Presentation of Air Quality Monitoring Result at Station AM4A (1-hour TSP)



**Air Quality Monitoring Result at Station AM5A (1-hour TSP)**

Date	Weather Condition	Time		Conc. ( $\mu\text{g}/\text{m}^3$ )			Action Level	Limit Level
		Start	Finish	1st Hour	2nd Hour	3rd Hour		
06-Aug-21	Cloudy	8:30	11:30	65	52	61	275.4	500
12-Aug-21	Cloudy	14:36	17:36	46	50	43	275.4	500
18-Aug-21	Fine	8:26	11:26	46	43	39	275.4	500
24-Aug-21	Cloudy	14:24	17:24	47	40	44	275.4	500
30-Aug-21	Fine	8:34	11:34	37	34	32	275.4	500

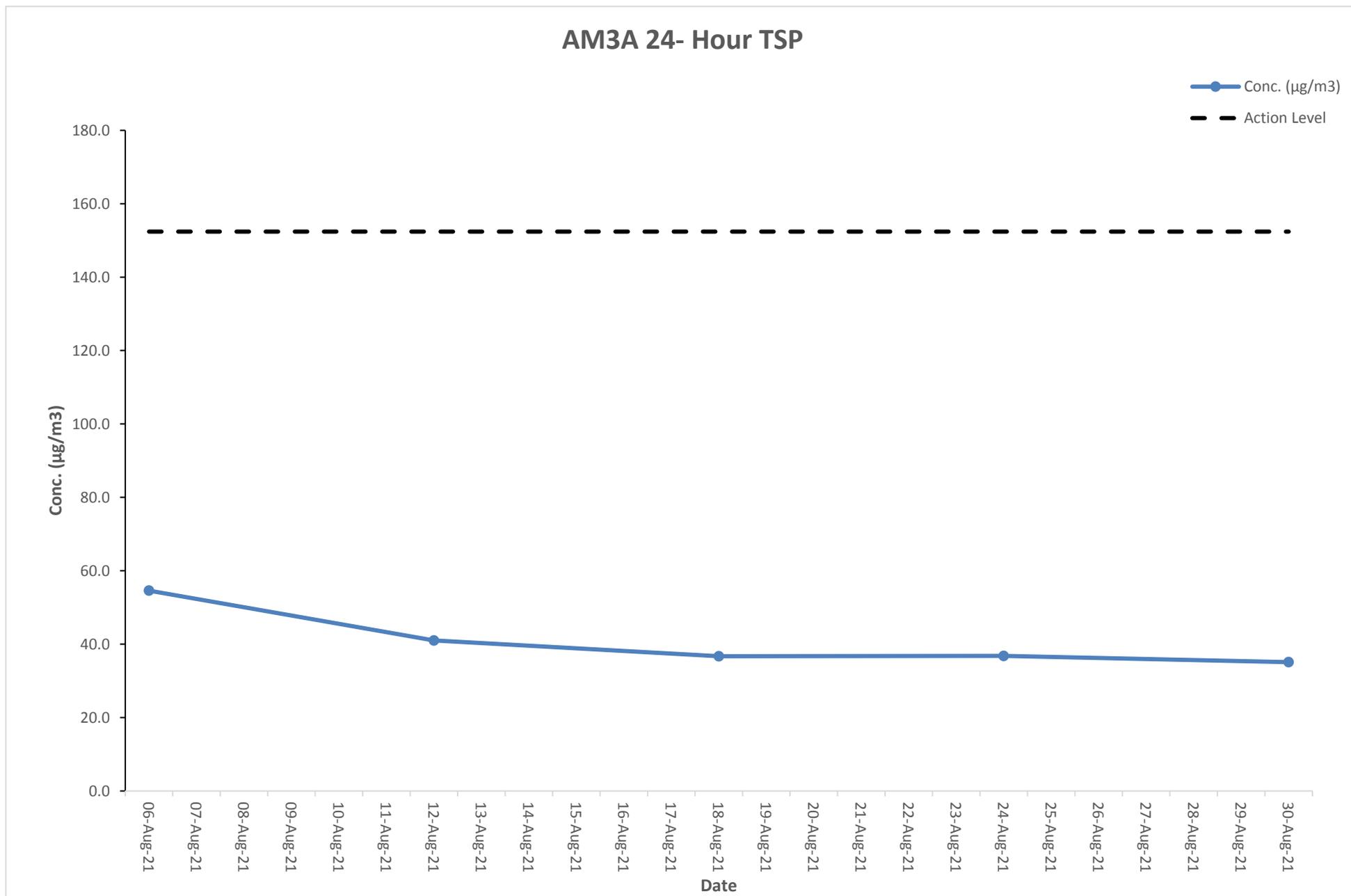
# Graphical Presentation of Air Quality Monitoring Result at Station AM5A (1-hour TSP)



**Air Quality Monitoring Result at Station AM3A (24-hour TSP)**

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min)			Conc. (µg/m <sup>3</sup> )	Weather Condition	Action Level	Limit Level
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
06-Aug-21	10:00AM	07-Aug-21	10:00AM	2.8036	2.8915	2324.8	2348.8	24	1.12	1.12	1.12	54.6	Rainy	152.4	260
12-Aug-21	10:00AM	13-Aug-21	10:00AM	2.8034	2.8693	2348.8	2372.8	24	1.12	1.12	1.12	41.0	Cloudy	152.4	260
18-Aug-21	10:00AM	19-Aug-21	10:00AM	2.8052	2.8643	2372.8	2396.8	24	1.12	1.12	1.12	36.7	Fine	152.4	260
24-Aug-21	10:00AM	25-Aug-21	10:00AM	2.8089	2.8682	2396.8	2420.8	24	1.12	1.12	1.12	36.8	Rainy	152.4	260
30-Aug-21	10:00AM	31-Aug-21	10:00AM	2.8076	2.8641	2420.8	2444.8	24	1.12	1.12	1.12	35.1	Fine	152.4	260

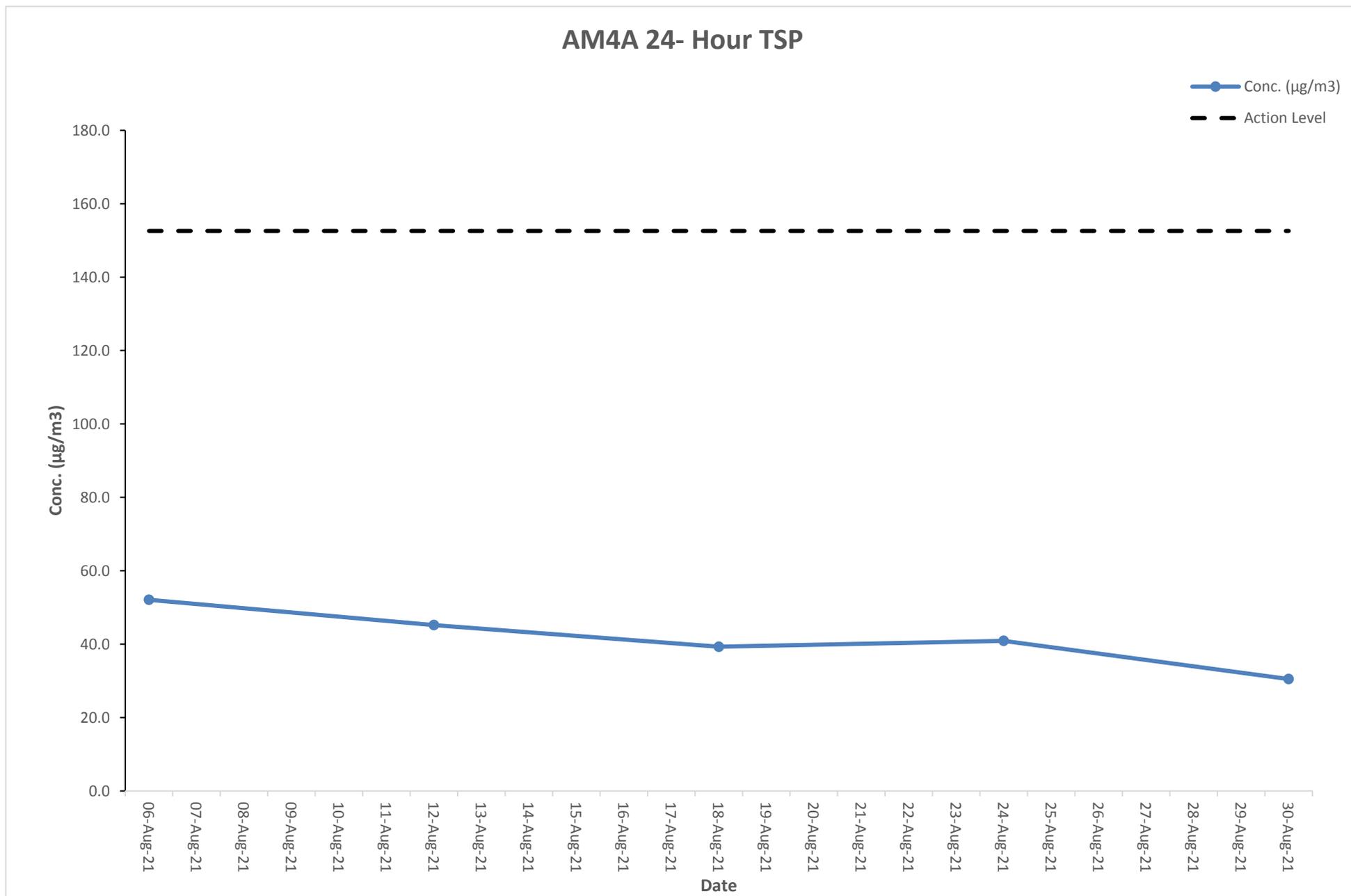
# Graphical Presentation of Air Quality Monitoring Result at Station AM3A (24-hour TSP)



**Air Quality Monitoring Result at Station AM4A (24-hour TSP)**

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min)			Conc. (µg/m <sup>3</sup> )	Weather Condition	Action Level	Limit Level
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
06-Aug-21	10:00AM	07-Aug-21	10:00AM	2.8062	2.8900	2744.4	2768.4	24	1.12	1.12	1.12	52.1	Rainy	152.6	260
12-Aug-21	10:00AM	13-Aug-21	10:00AM	2.8056	2.8783	2768.4	2792.4	24	1.12	1.12	1.12	45.2	Cloudy	152.6	260
18-Aug-21	10:00AM	19-Aug-21	10:00AM	2.8067	2.8700	2792.4	2816.4	24	1.12	1.12	1.12	39.3	Fine	152.6	260
24-Aug-21	10:00AM	25-Aug-21	10:00AM	2.8068	2.8727	2816.4	2840.4	24	1.12	1.12	1.12	40.9	Rainy	152.6	260
30-Aug-21	10:00AM	31-Aug-21	10:00AM	2.8028	2.8519	2840.4	2864.4	24	1.12	1.12	1.12	30.5	Fine	152.6	260

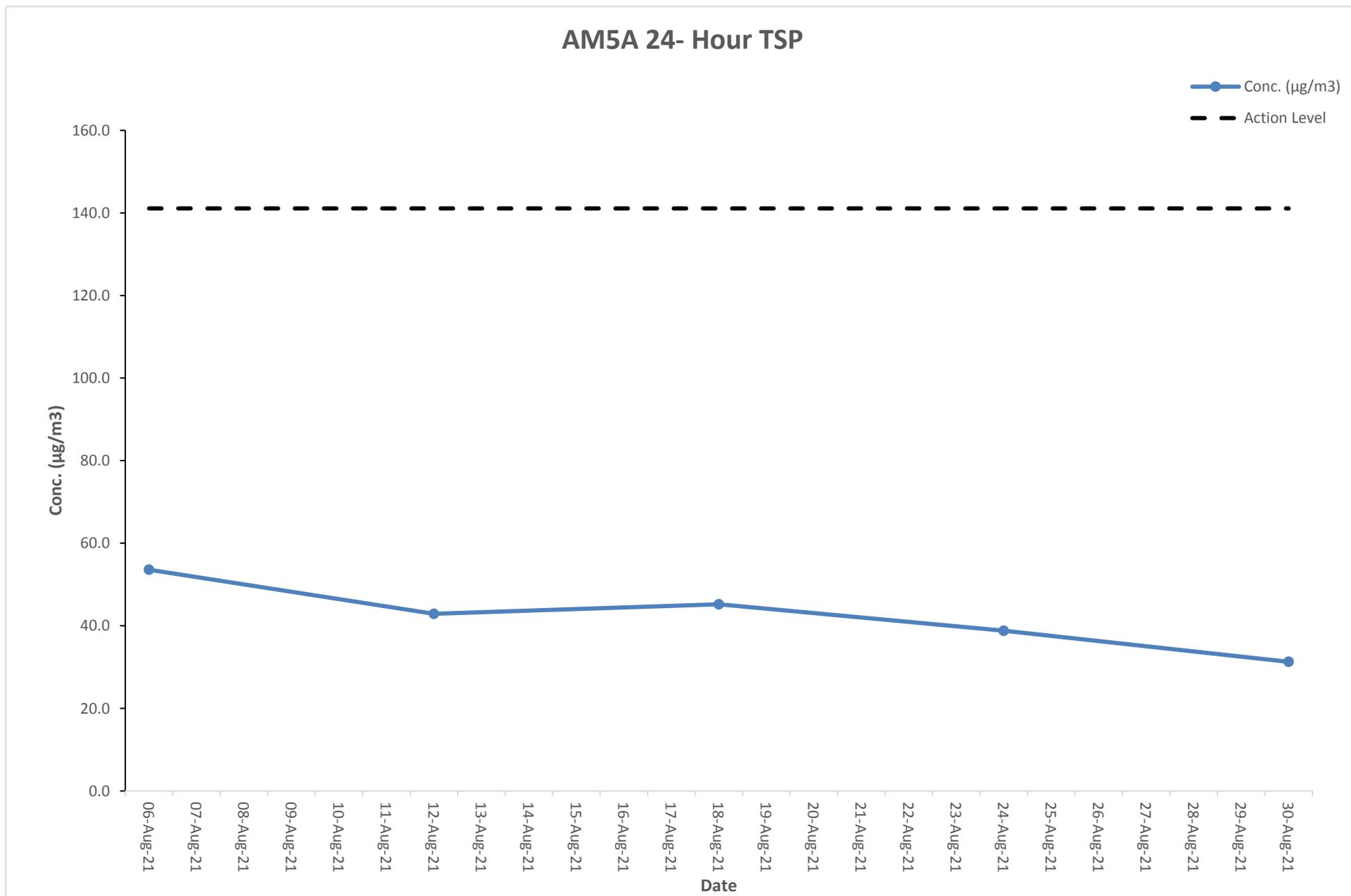
# Graphical Presentation of Air Quality Monitoring Result at Station AM4A (24-hour TSP)



**Air Quality Monitoring Result at Station AM5A (24-hour TSP)**

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min)			Conc. (µg/m <sup>3</sup> )	Weather Condition	Action Level	Limit Level
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
06-Aug-21	10:00AM	07-Aug-21	10:00AM	2.8089	2.8951	2884.6	2908.6	24	1.12	1.12	1.12	53.6	Rainy	141.1	260
12-Aug-21	10:00AM	13-Aug-21	10:00AM	2.8042	2.8733	2908.6	2932.6	24	1.12	1.12	1.12	42.9	Cloudy	141.1	260
18-Aug-21	10:00AM	19-Aug-21	10:00AM	2.8040	2.8768	2932.6	2956.6	24	1.12	1.12	1.12	45.2	Fine	141.1	260
24-Aug-21	10:00AM	25-Aug-21	10:00AM	2.8018	2.8642	2956.6	2980.6	24	1.12	1.12	1.12	38.8	Rainy	141.1	260
30-Aug-21	10:00AM	31-Aug-21	10:00AM	2.8072	2.8575	2980.6	3004.6	24	1.12	1.12	1.12	31.3	Fine	141.1	260

# Graphical Presentation of Air Quality Monitoring Result at Station AM5A (24-hour TSP)



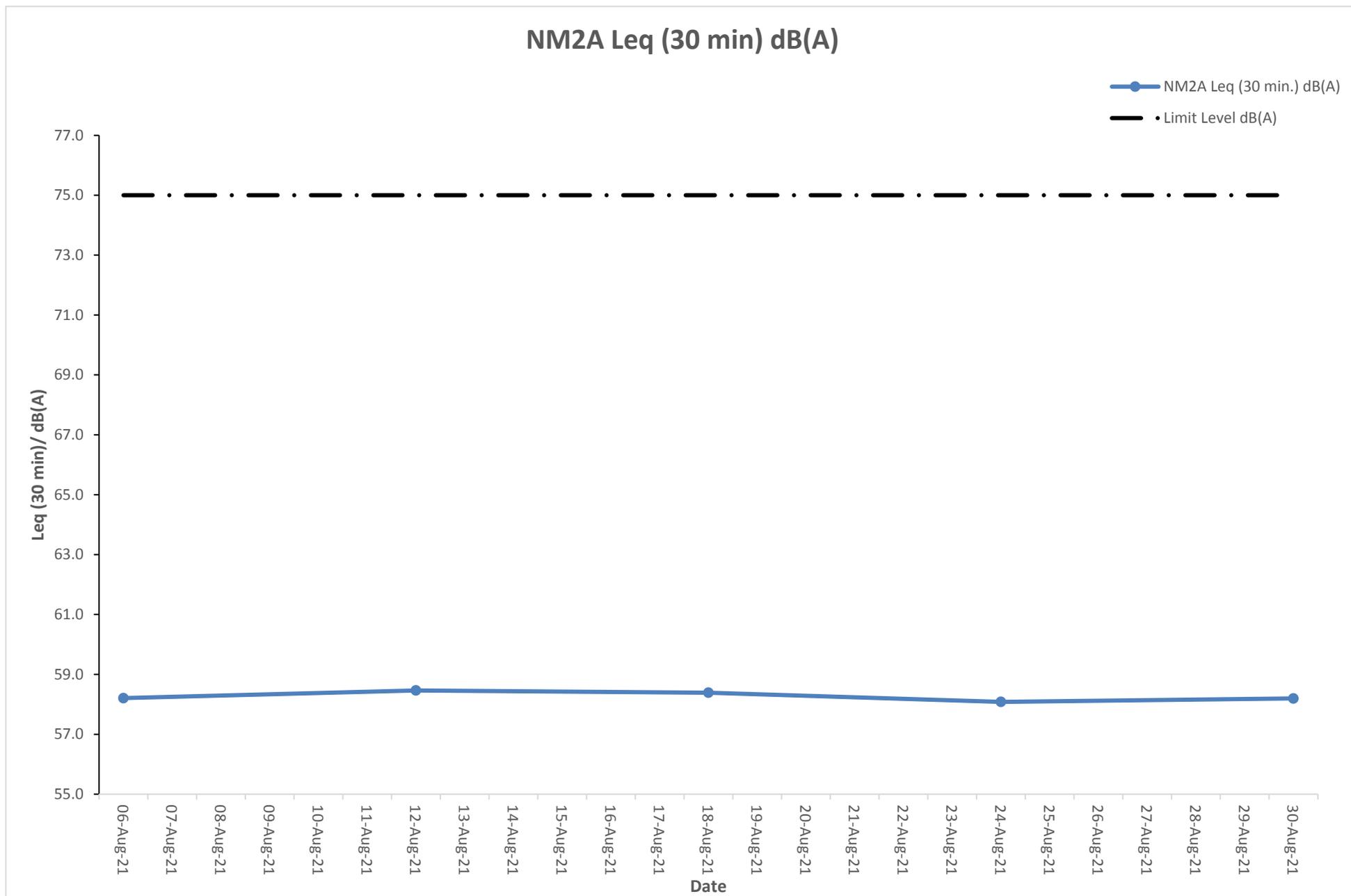
**Noise Monitoring Result at Station NM2A**

Date	Time	Measured L10 dB(A)	Measured L90 dB(A)	Leq (30 min.) dB(A)
06-Aug-21	8:37	64.7	55.8	58.2
06-Aug-21	8:42	64.6	55.6	
06-Aug-21	8:47	65.2	56.1	
06-Aug-21	8:52	64.5	55.0	
06-Aug-21	8:57	63.9	56.1	
06-Aug-21	9:02	63.1	54.4	
12-Aug-21	14:41	64.7	55.1	58.5
12-Aug-21	14:46	65.1	54.5	
12-Aug-21	14:51	63.6	55.8	
12-Aug-21	14:56	65.7	55.7	
12-Aug-21	15:01	64.2	55.6	
12-Aug-21	15:06	63.0	56.1	
18-Aug-21	8:33	64.9	54.9	58.4
18-Aug-21	8:38	64.8	55.7	
18-Aug-21	8:43	63.2	54.5	
18-Aug-21	8:48	64.8	55.1	
18-Aug-21	8:53	66.2	54.6	
18-Aug-21	8:58	64.6	55.8	
24-Aug-21	14:29	67.8	55.0	58.1
24-Aug-21	14:34	65.5	55.9	
24-Aug-21	14:39	63.0	53.6	
24-Aug-21	14:44	64.8]	55.1	
24-Aug-21	14:49	65.1	55.1	
24-Aug-21	14:54	63.2	55.8	
30-Aug-21	8:41	65.2	54.9	58.2
30-Aug-21	8:46	64.4	55.6	
30-Aug-21	8:51	63.9	56.1	
30-Aug-21	8:56	64.6	55.5	
30-Aug-21	9:01	65.3	54.7	
30-Aug-21	9:06	64.2	55.8	



The station set-up of a façade measurement at station NM2A.

# Graphical Presentation of Noise Monitoring Result at Station NM2A



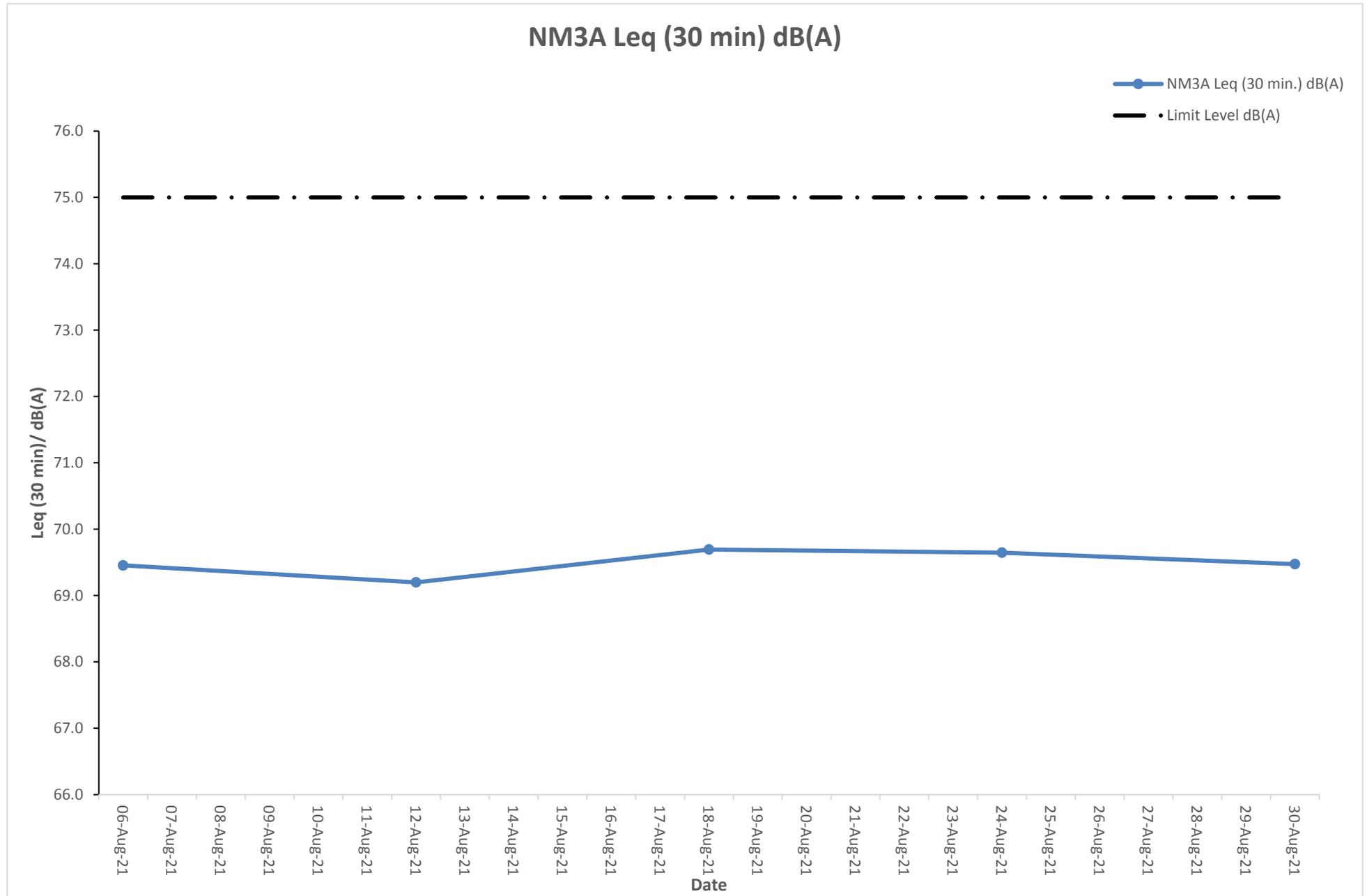
**Noise Monitoring Result at Station NM3A**

Date	Time	Measured L10 dB(A)	Measured L90 dB(A)	Leq (30 min.) dB(A)
06-Aug-21	10:07	74.3	64.5	69.5
06-Aug-21	10:12	74.1	65.8	
06-Aug-21	10:17	72.9	67.4	
06-Aug-21	10:22	74.7	66.3	
06-Aug-21	10:27	73.6	65.3	
06-Aug-21	10:32	74.0	65.2	
12-Aug-21	16:14	74.5	65.4	69.2
12-Aug-21	16:19	74.7	68.2	
12-Aug-21	16:24	73.2	68.0	
12-Aug-21	16:29	73.7	66.8	
12-Aug-21	16:34	74.0	66.9	
12-Aug-21	16:39	73.9	67.9	
18-Aug-21	10:03	74.2	65.4	69.7
18-Aug-21	10:08	72.8	64.8	
18-Aug-21	10:13	73.5	66.9	
18-Aug-21	10:18	73.8	67.2	
18-Aug-21	10:23	73.6	68.2	
18-Aug-21	10:28	74.2	66.7	
24-Aug-21	16:02	75.4	67.7	69.6
24-Aug-21	16:07	73.9	66.8	
24-Aug-21	16:12	74.8	68.1	
24-Aug-21	16:17	72.8	65.1	
24-Aug-21	16:22	73.2	66.4	
24-Aug-21	16:27	73.8	64.8	
30-Aug-21	10:11	74.3	67.2	69.5
30-Aug-21	10:16	73.2	66.1	
30-Aug-21	10:21	74.9	65.9	
30-Aug-21	10:26	74.5	65.1	
30-Aug-21	10:31	73.2	66.5	
30-Aug-21	10:36	73.1	66.8	



The station set-up of a façade measurement at station NM3A.

# Graphical Presentation of Noise Monitoring Result at Station NM3A



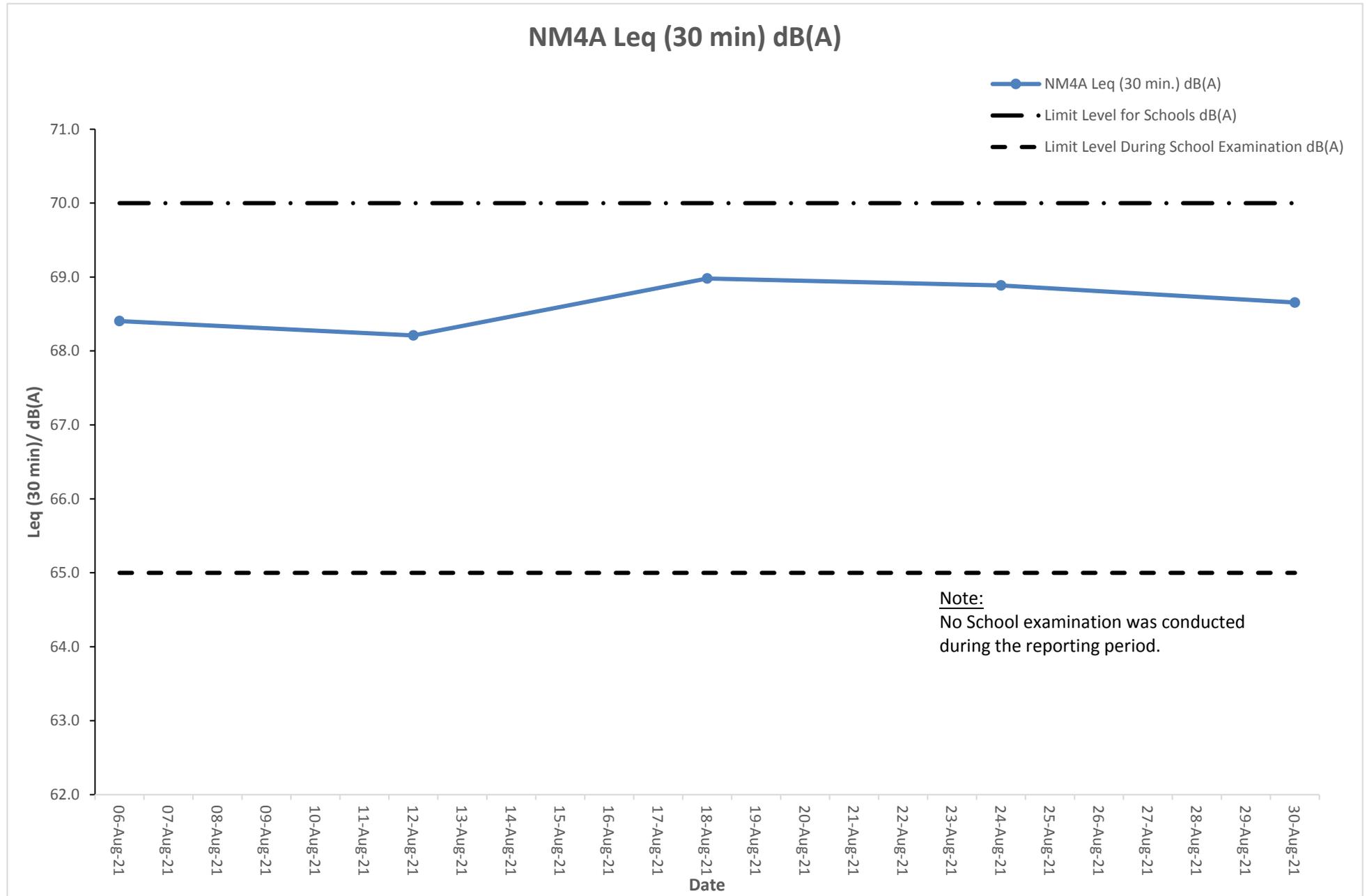
**Noise Monitoring Result at Station NM4A**

Date	Time	Measured L10 dB(A)	Measured L90 dB(A)	Leq (30 min.) dB(A)
06-Aug-21	10:42	70.2	64.3	68.4
06-Aug-21	10:47	71.4	63.2	
06-Aug-21	10:52	70.5	66.8	
06-Aug-21	10:57	69.9	65.2	
06-Aug-21	11:02	70.2	64.8	
06-Aug-21	11:07	70.5	65.2	
12-Aug-21	16:49	71.2	64.6	68.2
12-Aug-21	16:54	71.9	64.8	
12-Aug-21	16:59	70.9	65.2	
12-Aug-21	17:04	69.1	64.8	
12-Aug-21	17:09	69.5	63.4	
12-Aug-21	17:14	69.9	63.5	
18-Aug-21	10:38	70.7	64.5	69.0
18-Aug-21	10:43	70.1	65.2	
18-Aug-21	10:48	71.8	64.8	
18-Aug-21	10:53	72.5	65.1	
18-Aug-21	10:58	71.7	65.8	
18-Aug-21	11:03	70.5	64.6	
24-Aug-21	16:37	70.8	64.1	68.9
24-Aug-21	16:42	69.5	65.2	
24-Aug-21	16:47	70.4	64.6	
24-Aug-21	16:52	70.7	63.8	
24-Aug-21	16:57	71.1	64.2	
24-Aug-21	17:02	71.8	64.8	
30-Aug-21	10:46	71.2	66.4	68.7
30-Aug-21	10:51	70.9	65.2	
30-Aug-21	10:56	70.2	63.8	
30-Aug-21	11:01	69.5	63.1	
30-Aug-21	11:06	71.2	64.2	
30-Aug-21	11:11	71.6	65.2	



The station set-up of a façade measurement at station NM4A.

# Graphical Presentation of Noise Monitoring Result at Station NM4A



**Noise Monitoring Result at Station NM5A**

Date	Time	Measured L10 dB(A)	Measured L90 dB(A)	Leq (30 min.) dB(A)	Leq (30 min.) +3 dB(A)
06-Aug-21	9:27	64.5	57.6	62.7	65.7
06-Aug-21	9:32	65.9	60.5		
06-Aug-21	9:37	66.1	59.2		
06-Aug-21	9:42	67.6	58.3		
06-Aug-21	9:47	66.8	58.1		
06-Aug-21	9:52	65.9	60.3		
12-Aug-21	15:33	67.1	58.3	63.0	66.0
12-Aug-21	15:38	67.4	58.4		
12-Aug-21	15:43	66.8	58.1		
12-Aug-21	15:48	68.2	60.1		
12-Aug-21	15:53	67.9	58.5		
12-Aug-21	15:58	64.2	60.0		
18-Aug-21	9:23	66.5	60.7	63.2	66.2
18-Aug-21	9:28	65.9	57.9		
18-Aug-21	9:33	67.1	58.5		
18-Aug-21	9:38	66.1	58.1		
18-Aug-21	9:43	66.8	59.7		
18-Aug-21	9:48	65.9	60.8		
24-Aug-21	15:21	69.5	57.9	63.6	66.6
24-Aug-21	15:26	68.2	60.3		
24-Aug-21	15:31	66.9	56.4		
24-Aug-21	15:36	65.2	58.4		
24-Aug-21	15:41	66.5	59.2		
24-Aug-21	15:46	65.9	60.1		
30-Aug-21	9:31	67.9	60.9	63.0	66.0
30-Aug-21	9:36	66.4	61.2		
30-Aug-21	9:41	69.1	59.3		
30-Aug-21	9:46	68.4	58.5		
30-Aug-21	9:51	67.2	58.4		
30-Aug-21	9:56	68.5	59.2		

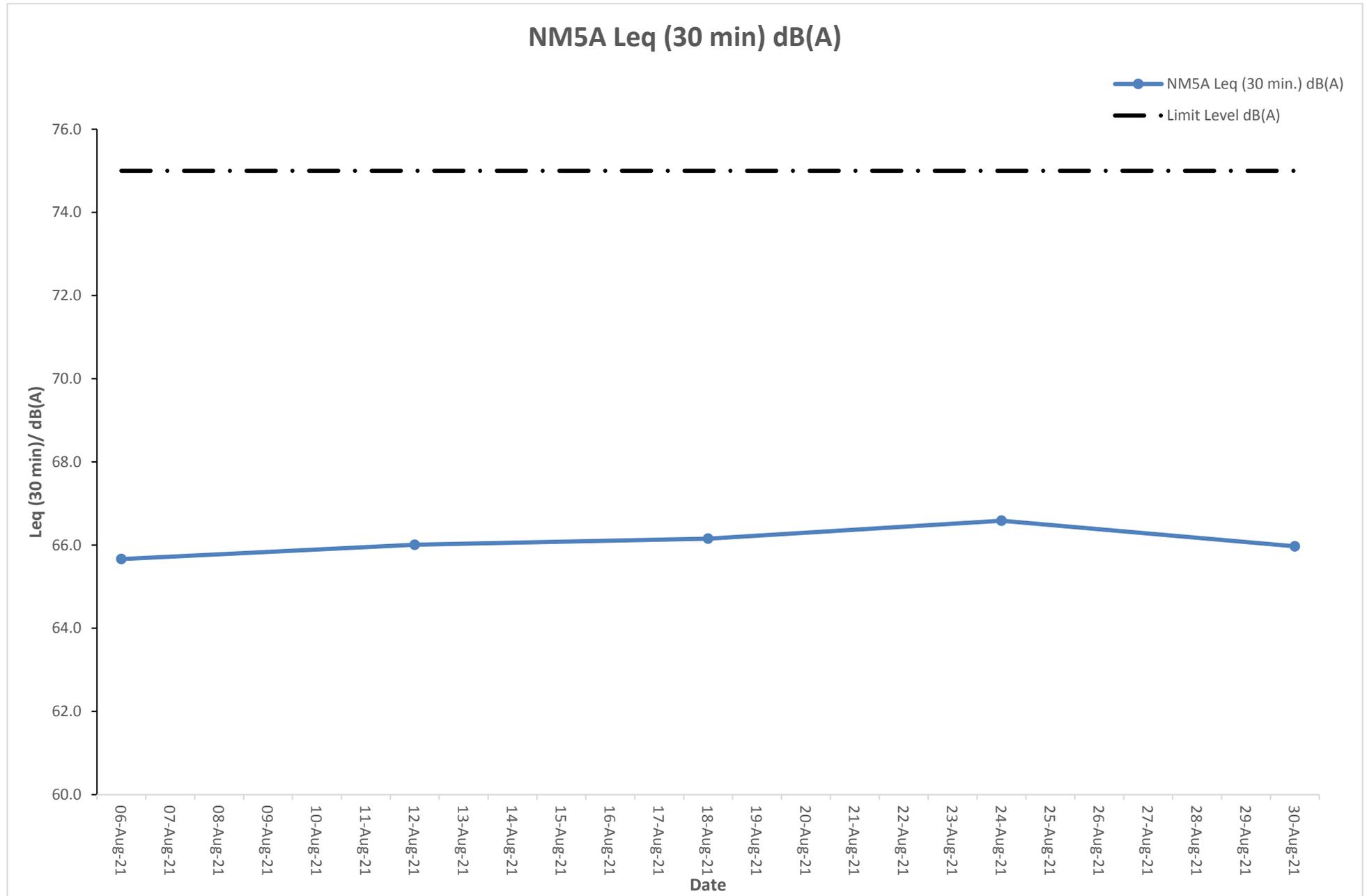
**Remarks:**

+3dB(A) correction was applied to free-field measurement.



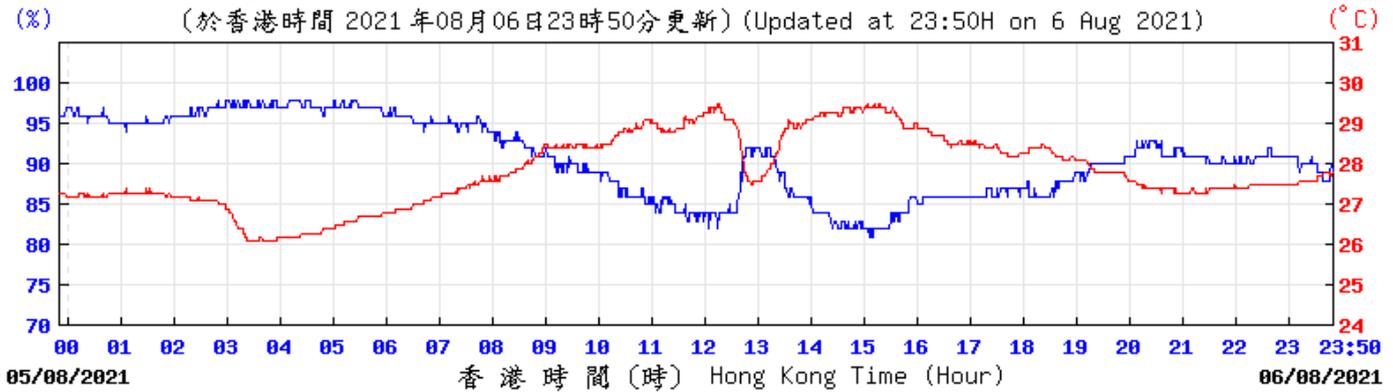
The station set-up of a free-field measurement at station NM5A.

# Graphical Presentation of Noise Monitoring Result at Station NM5A



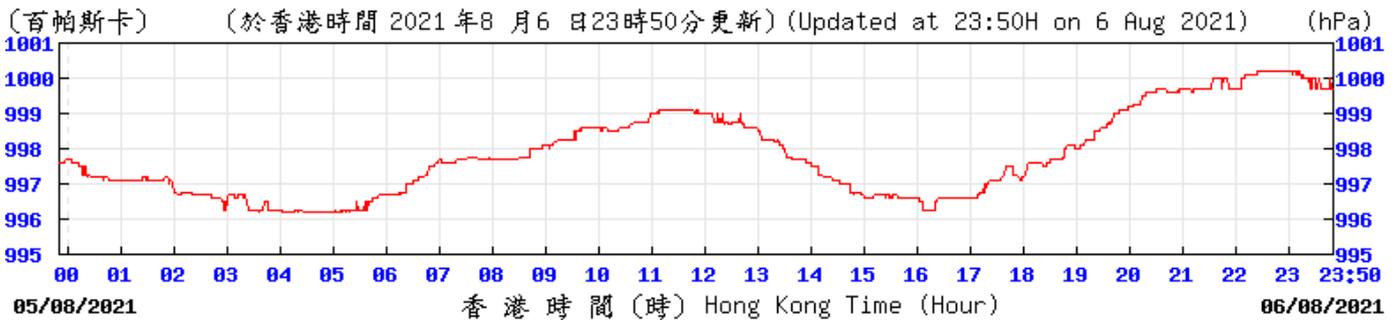
## **H. Meteorological Data Extracted from Hong Kong Observatory**

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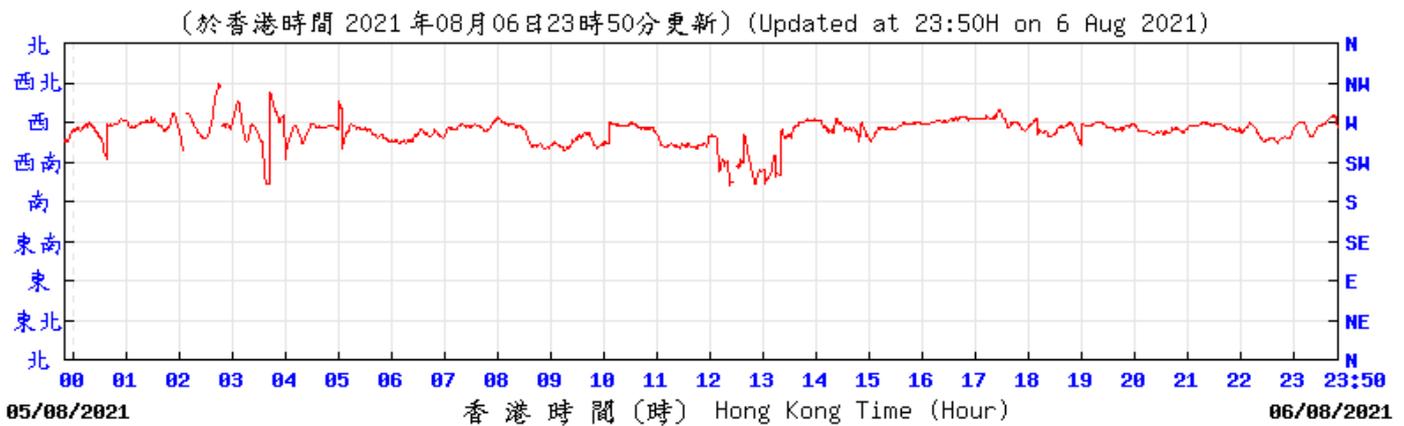
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Pressure:



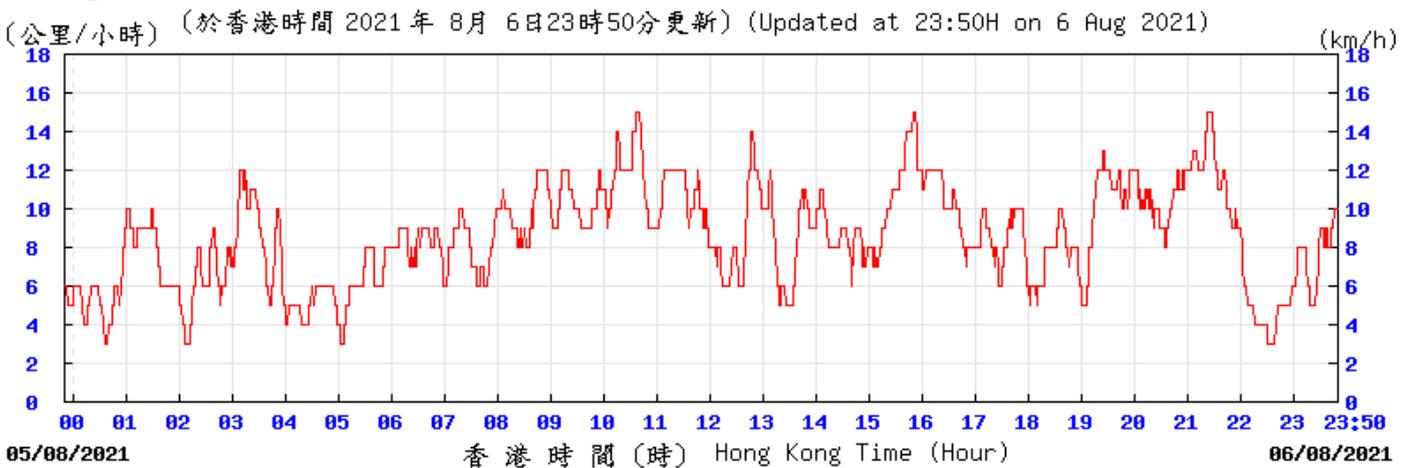
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Wind Direction:



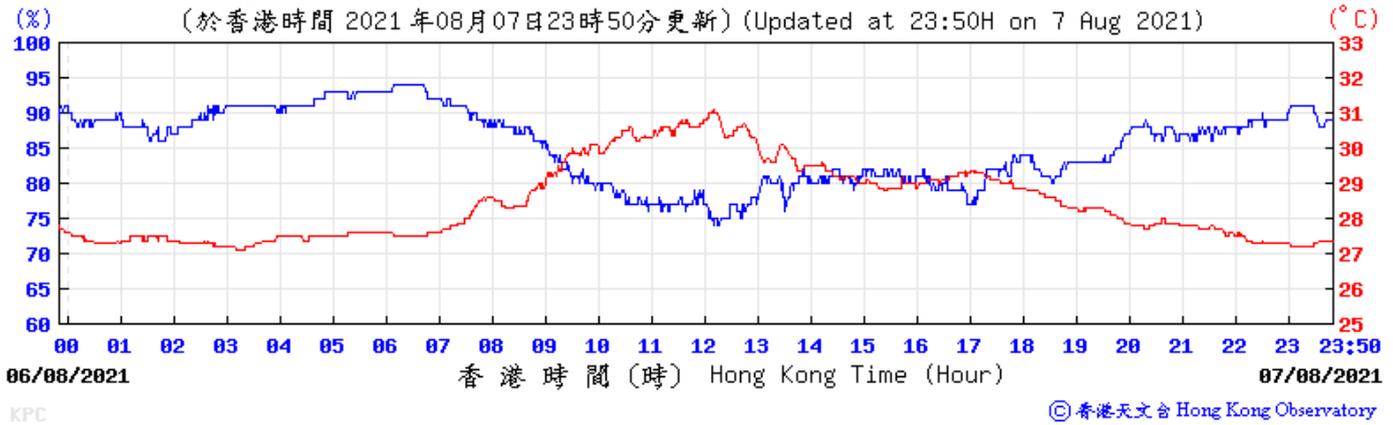
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Wind Speed:



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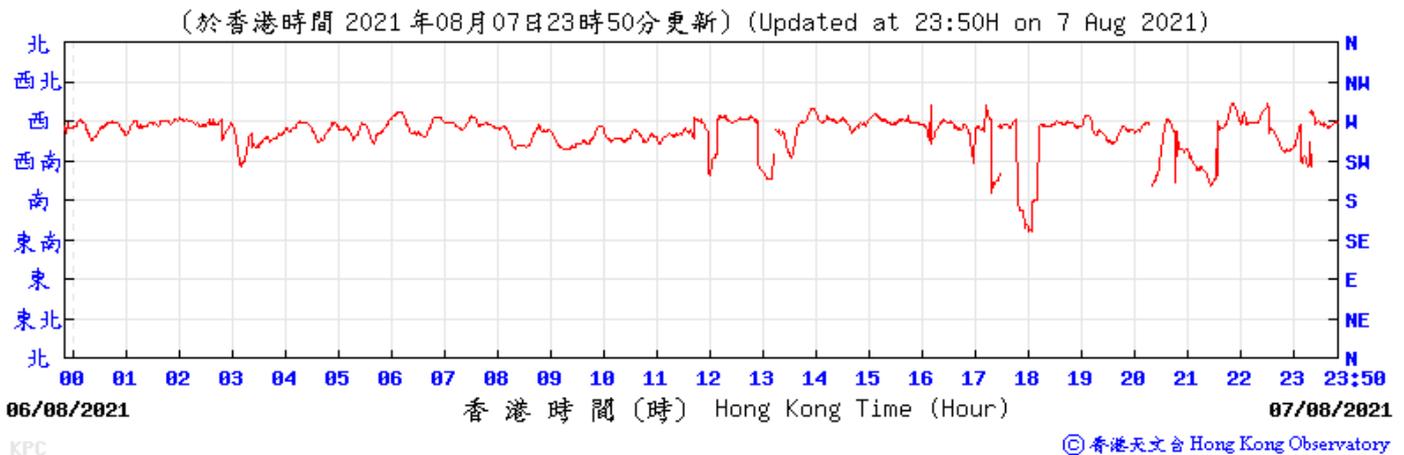
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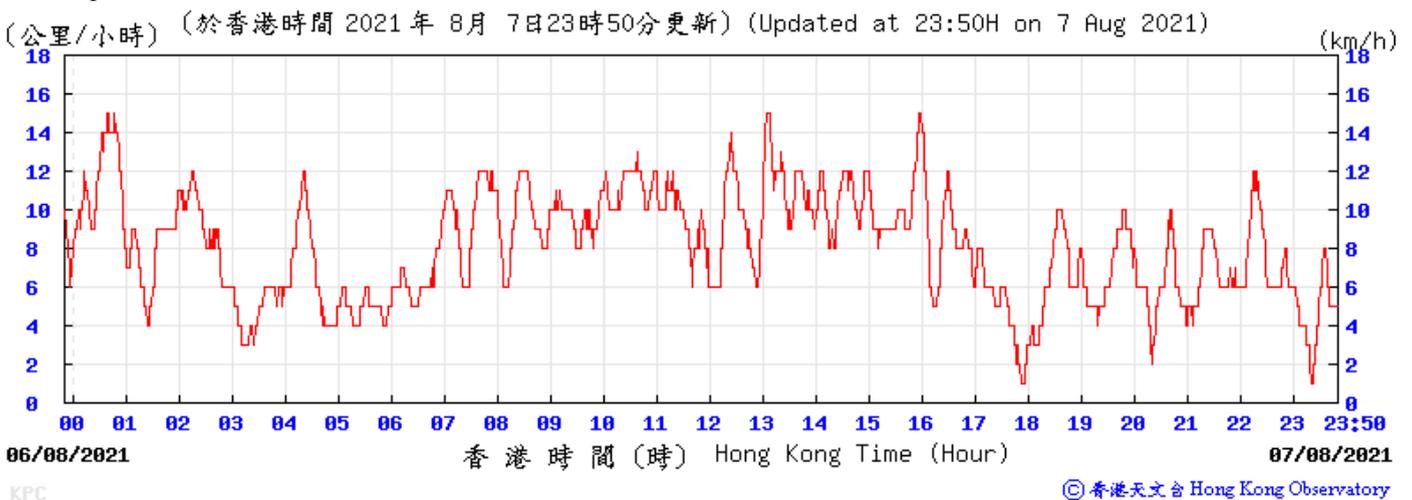
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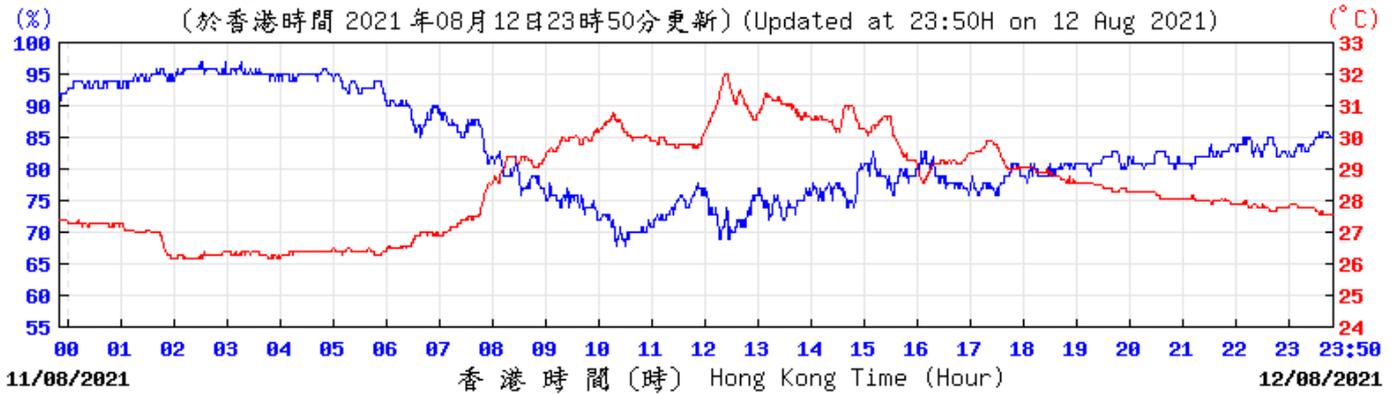
Wind Direction:



Wind Speed:

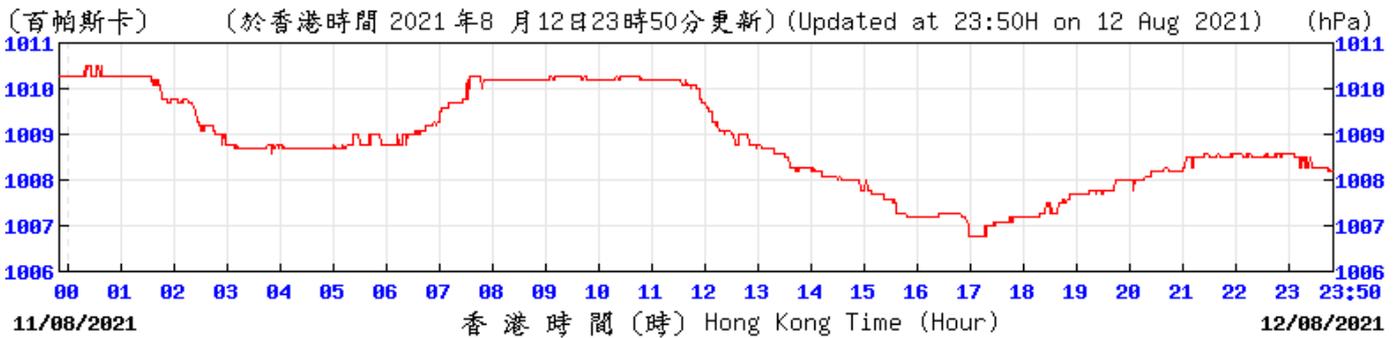


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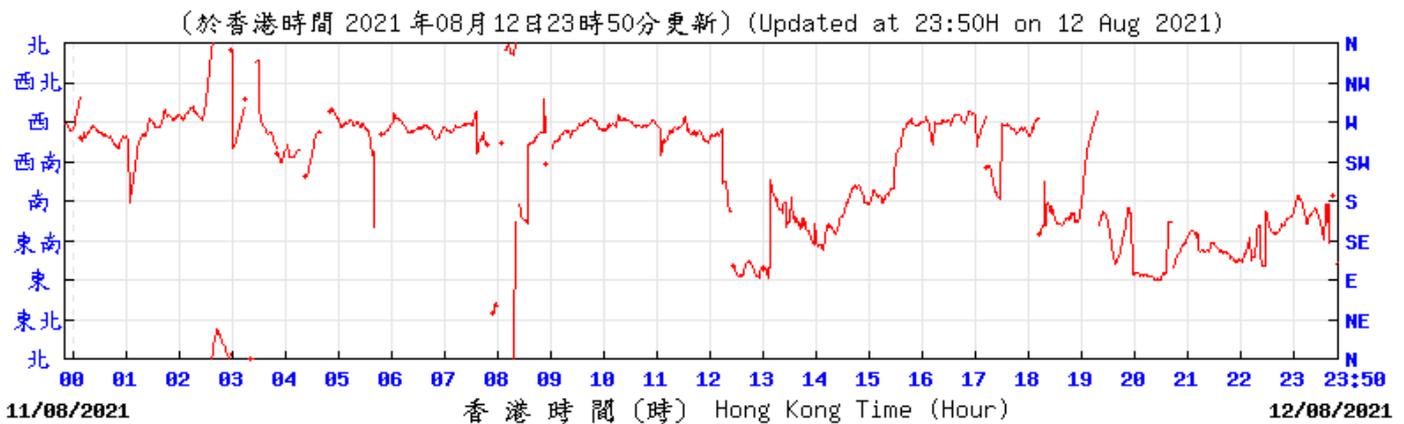
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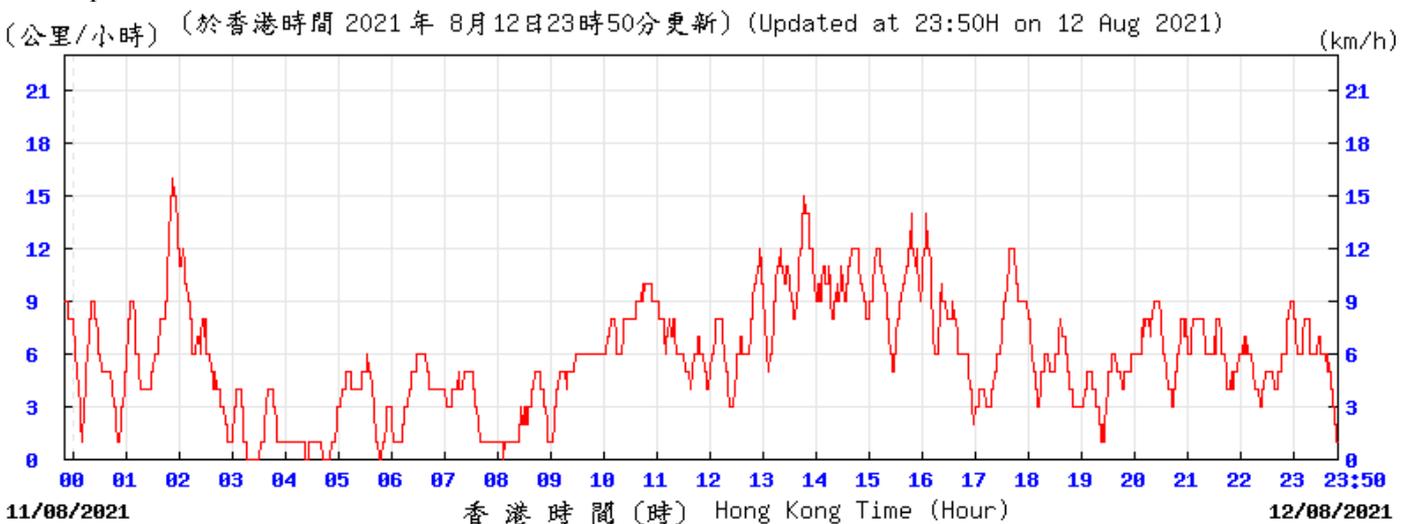
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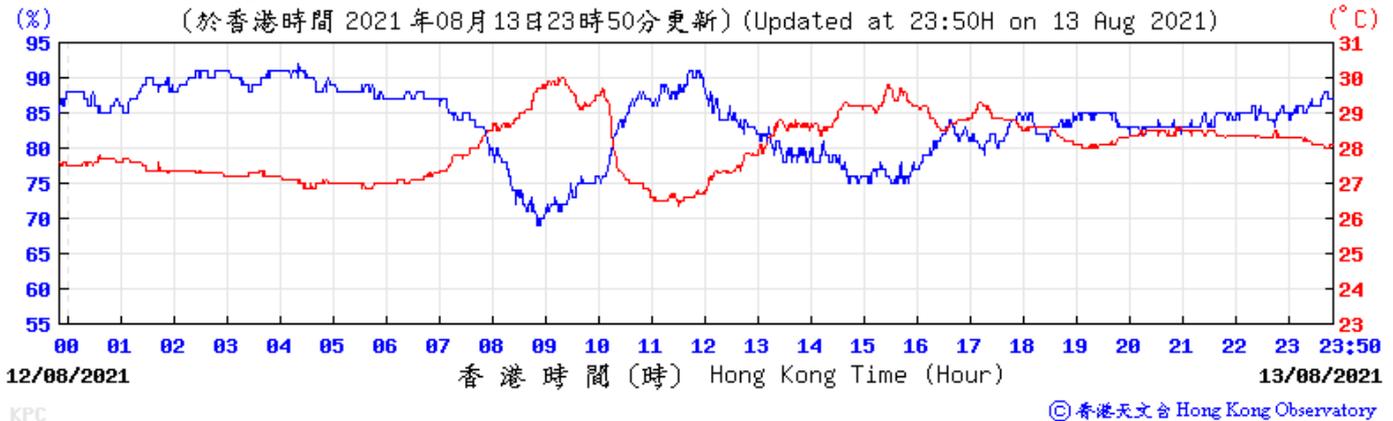
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Wind Speed:

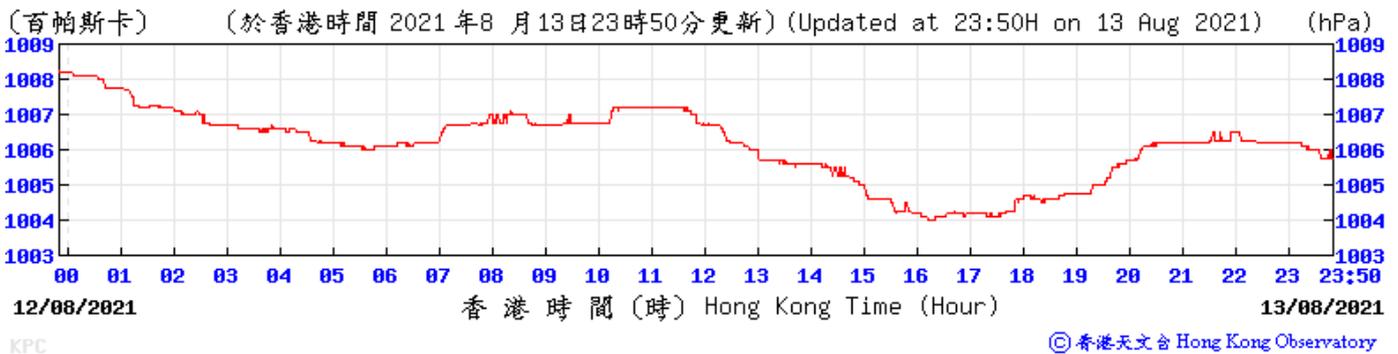


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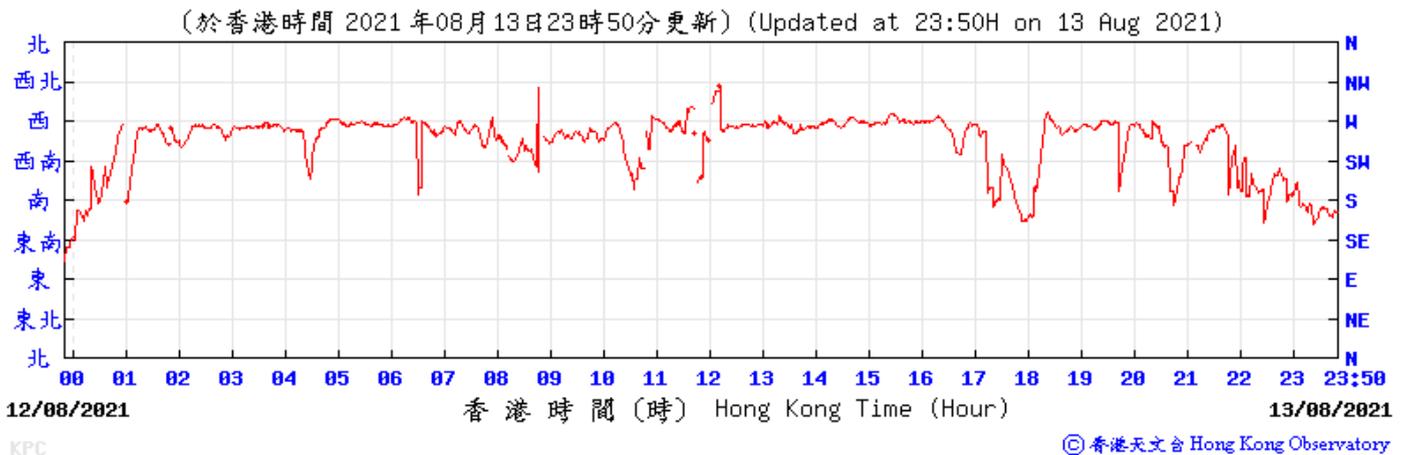
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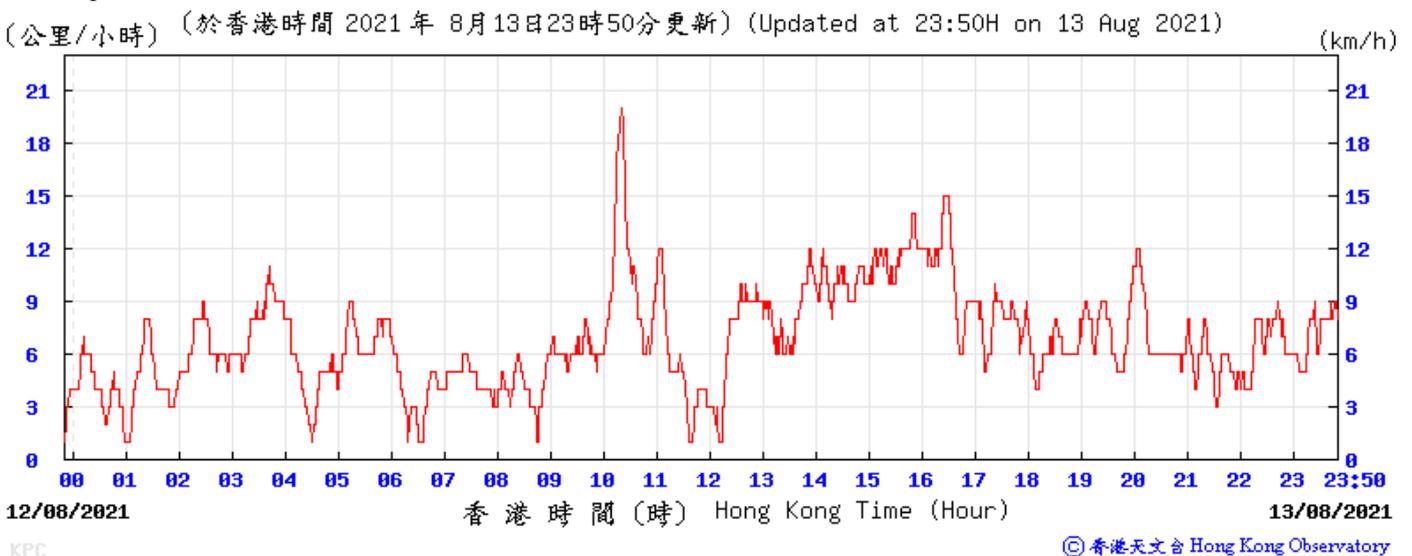
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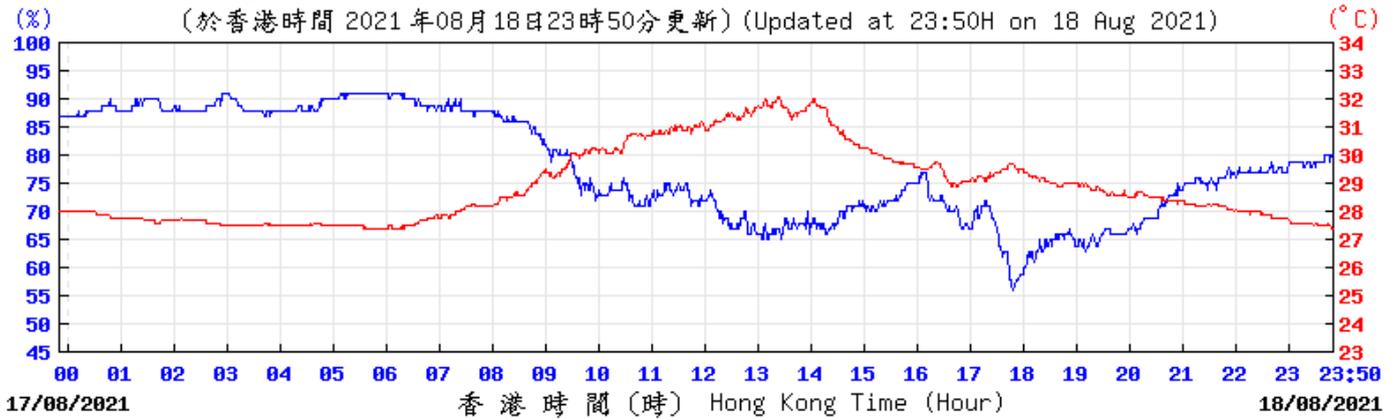
Wind Direction:



Wind Speed:



Temperature/Humidity:



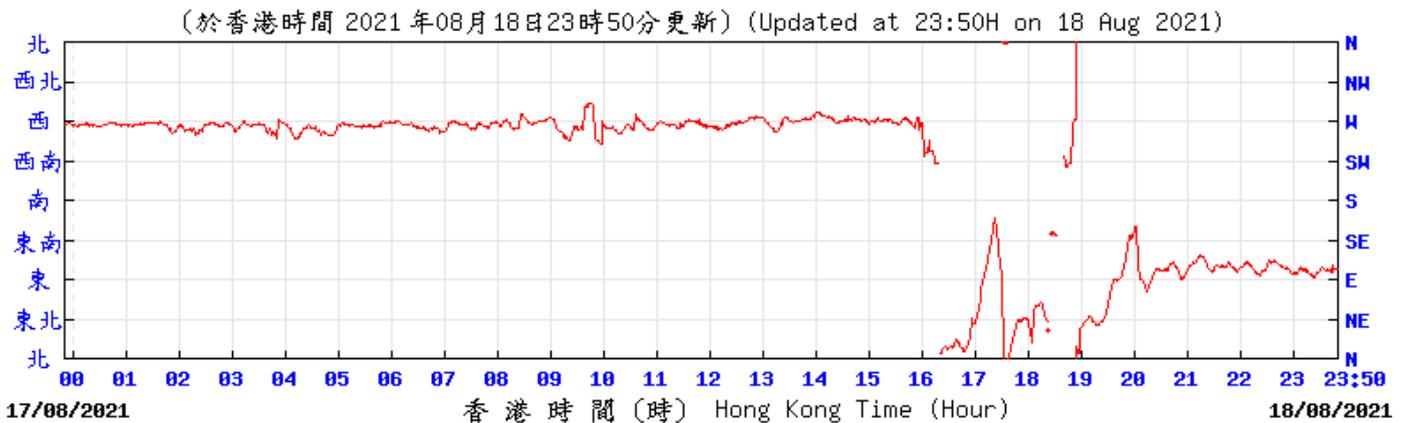
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Pressure:



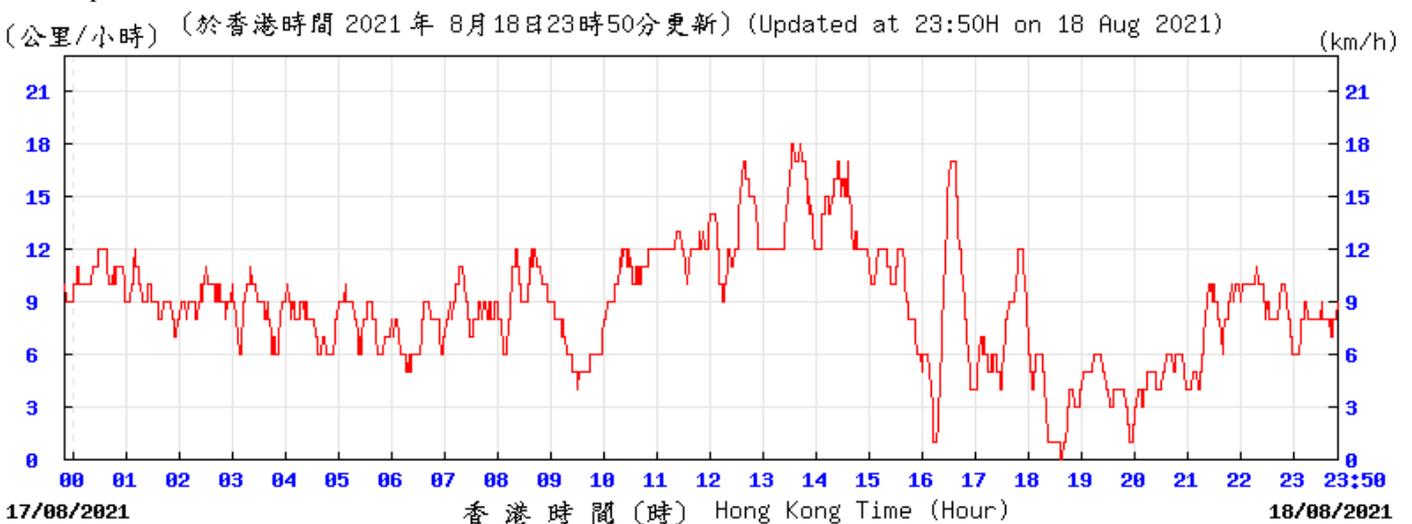
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Wind Direction:



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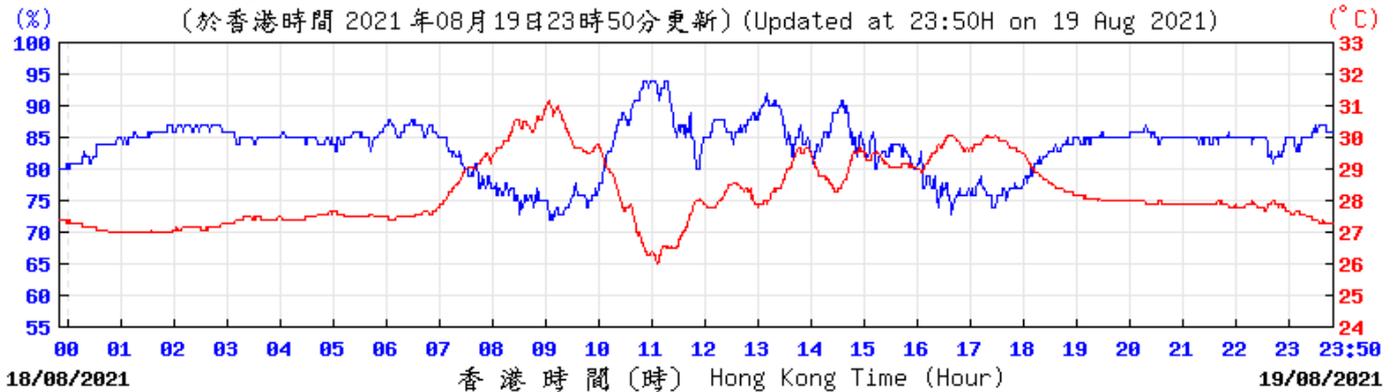
Wind Speed:



KPC

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Temperature/Humidity:



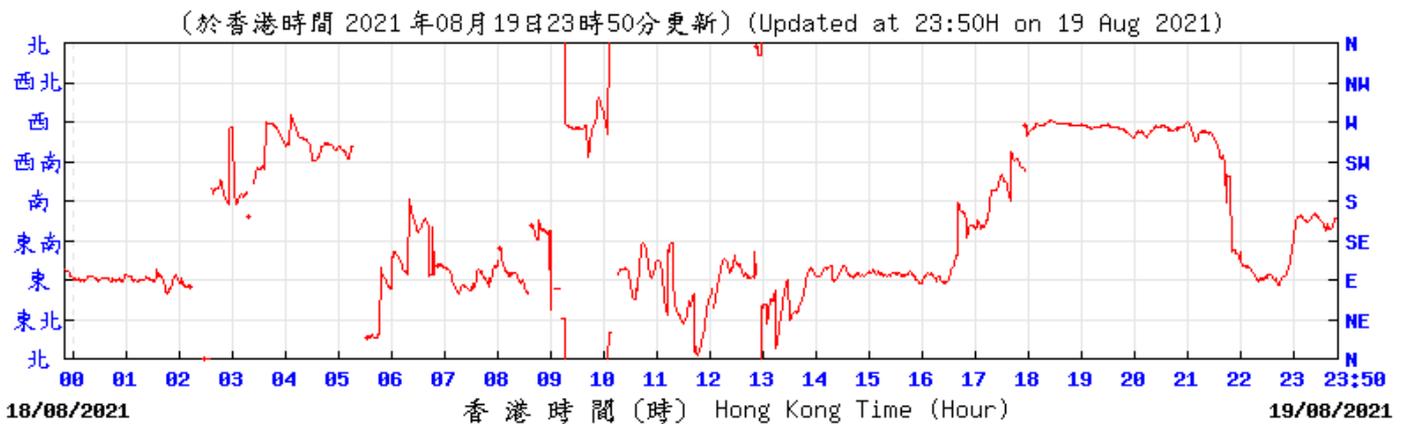
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Pressure:



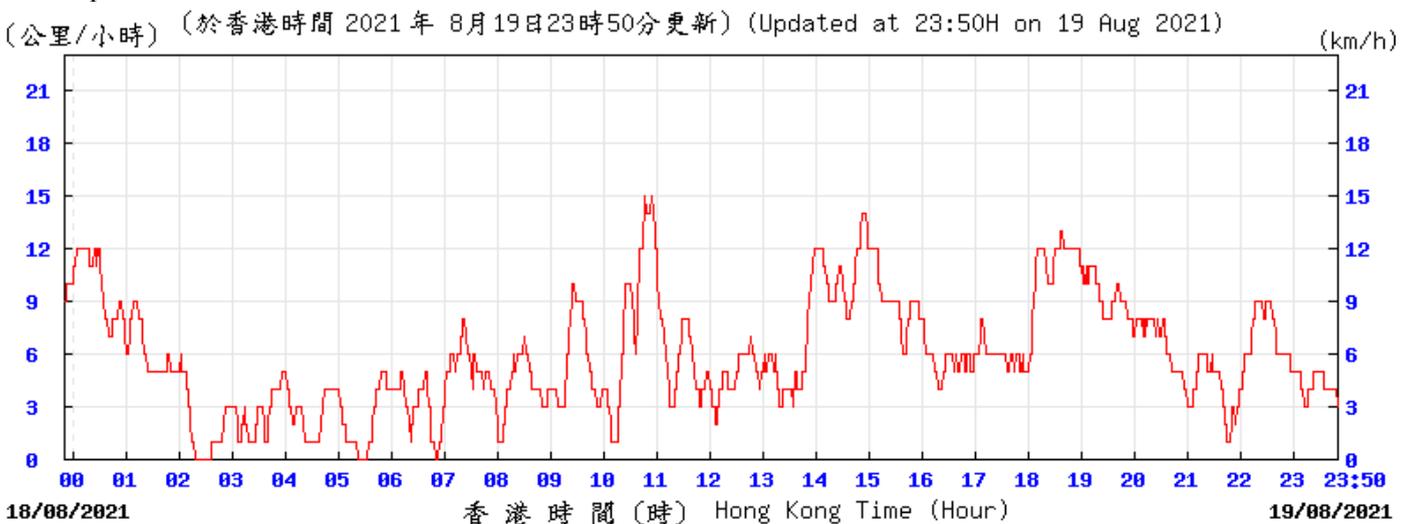
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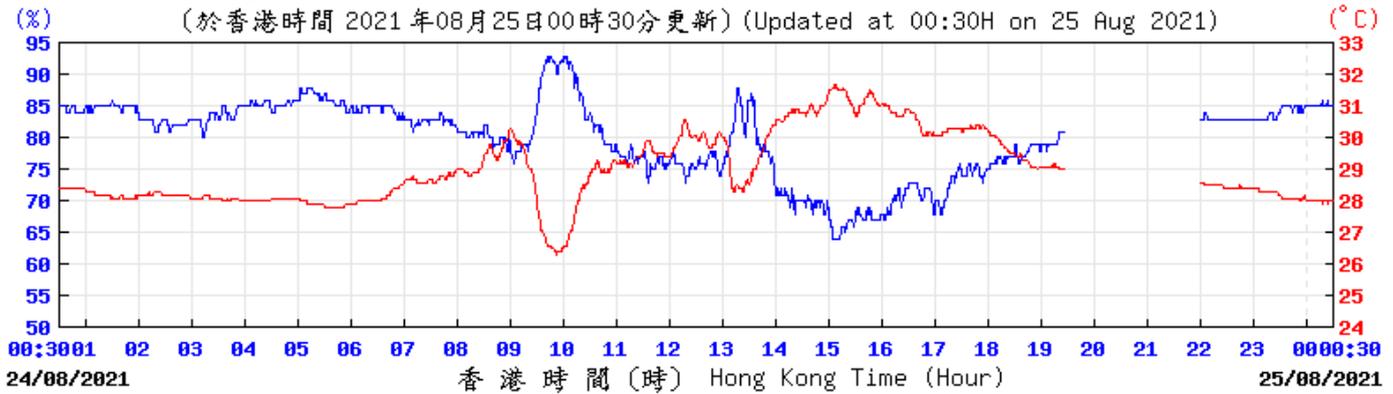
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Wind Speed:



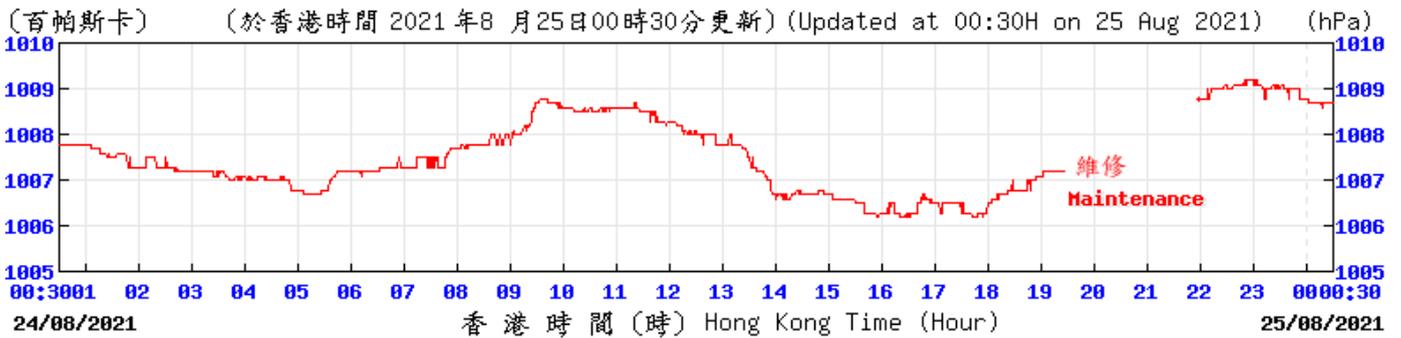
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Temperature/Humidity:



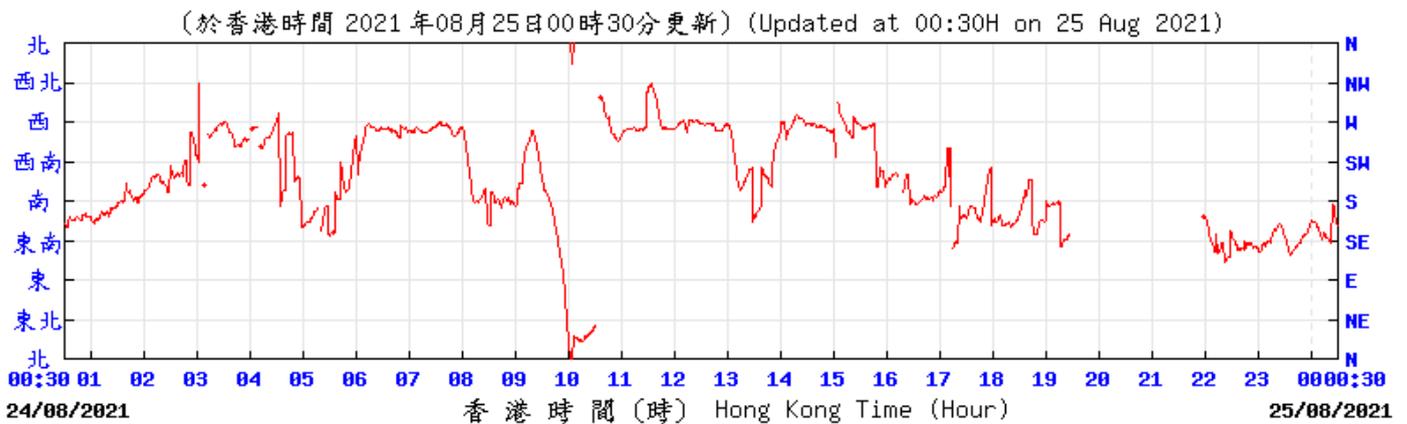
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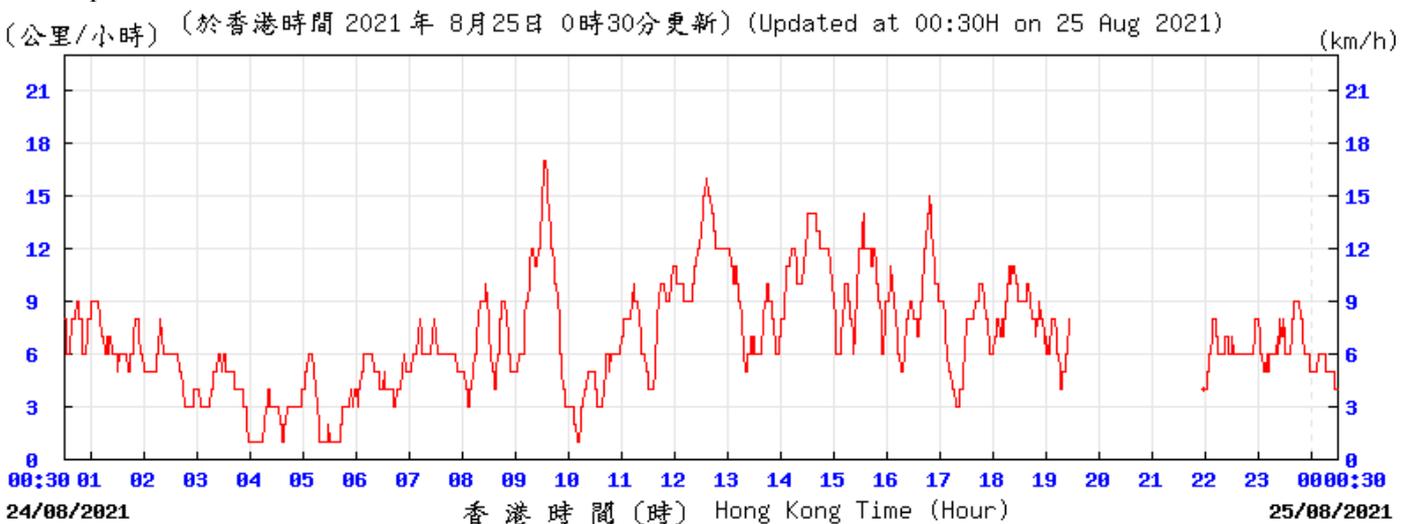
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Wind Direction:



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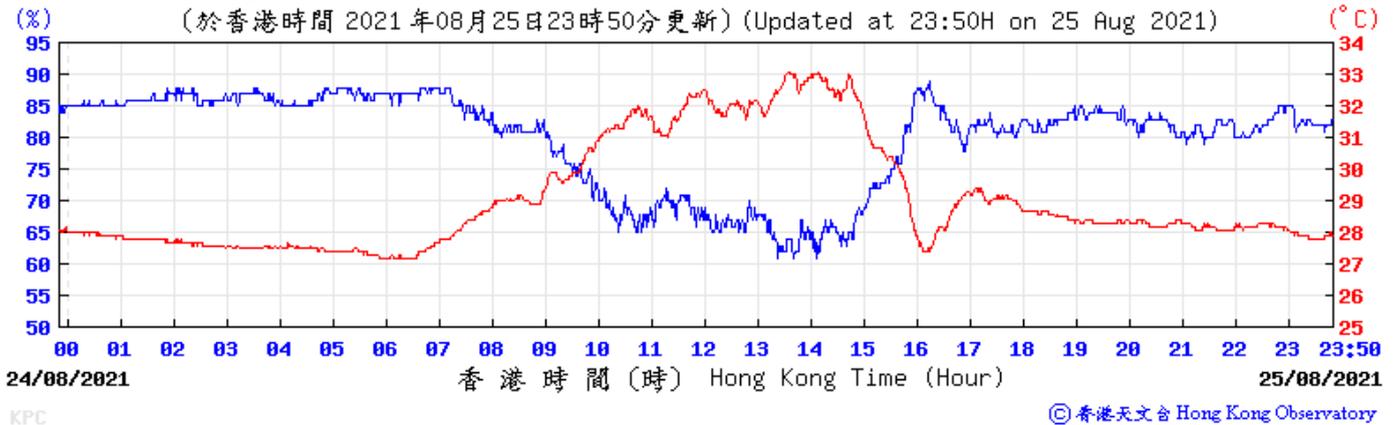
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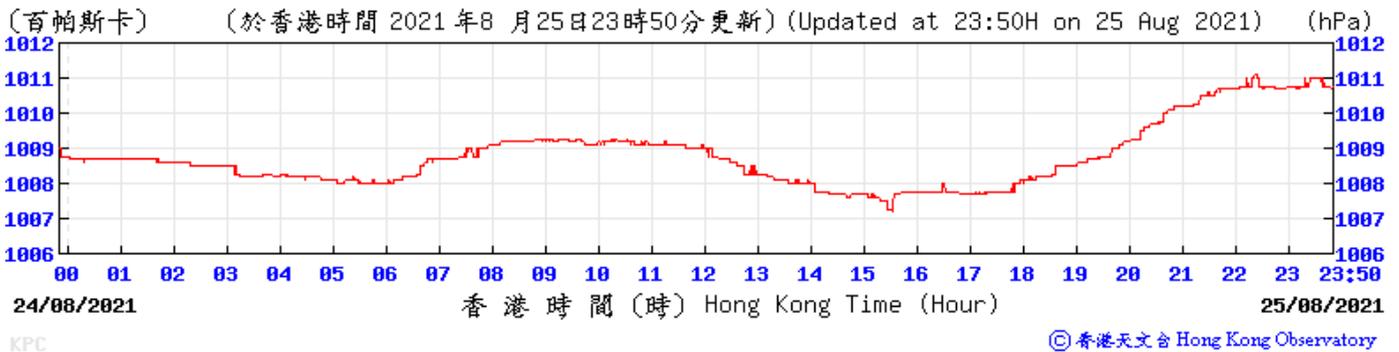
KPC

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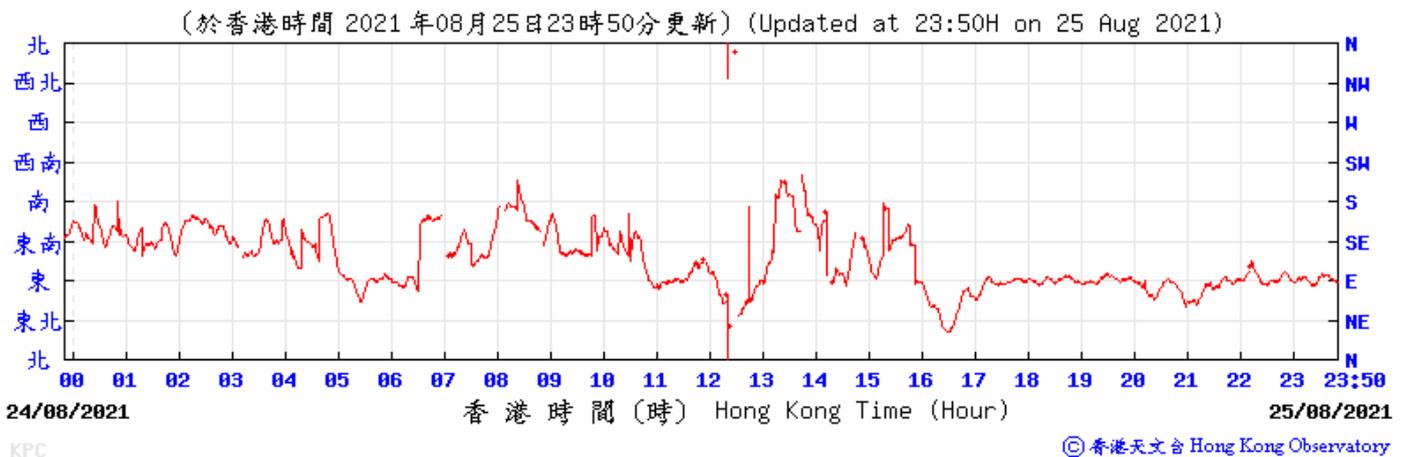
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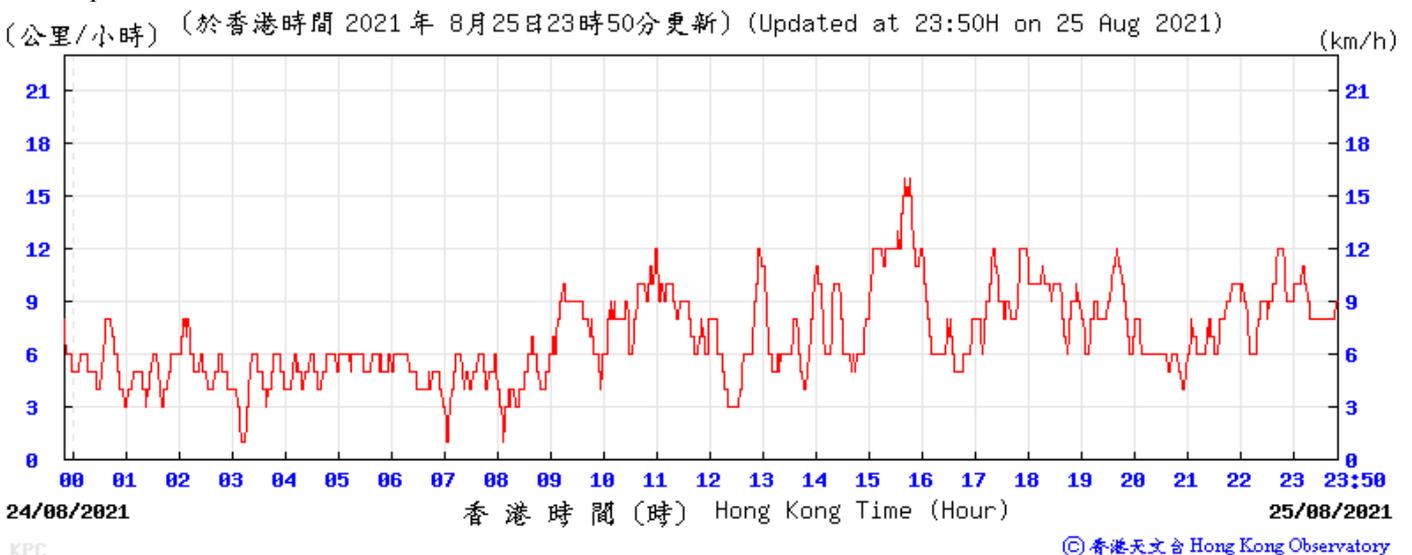
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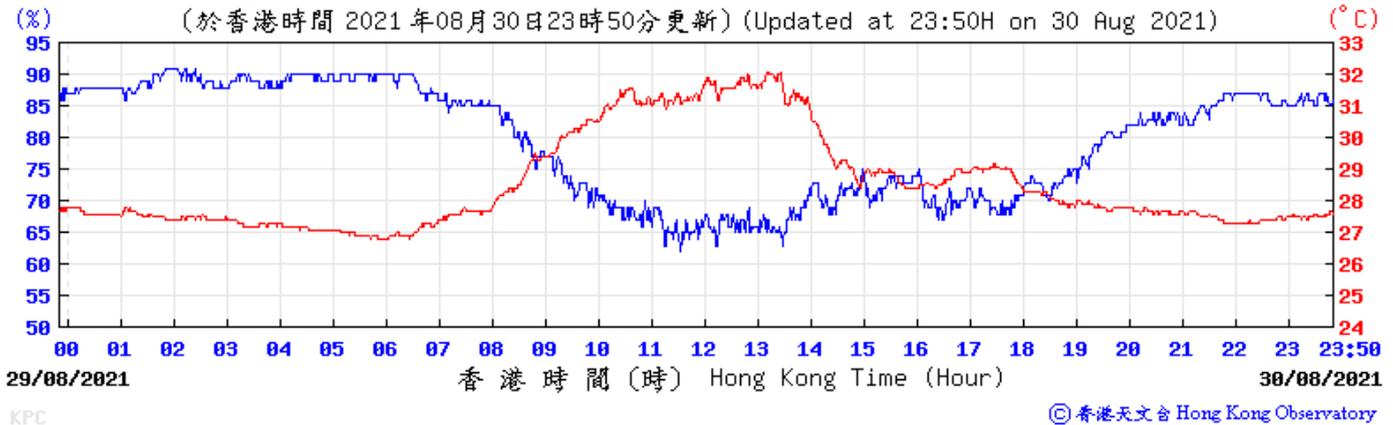
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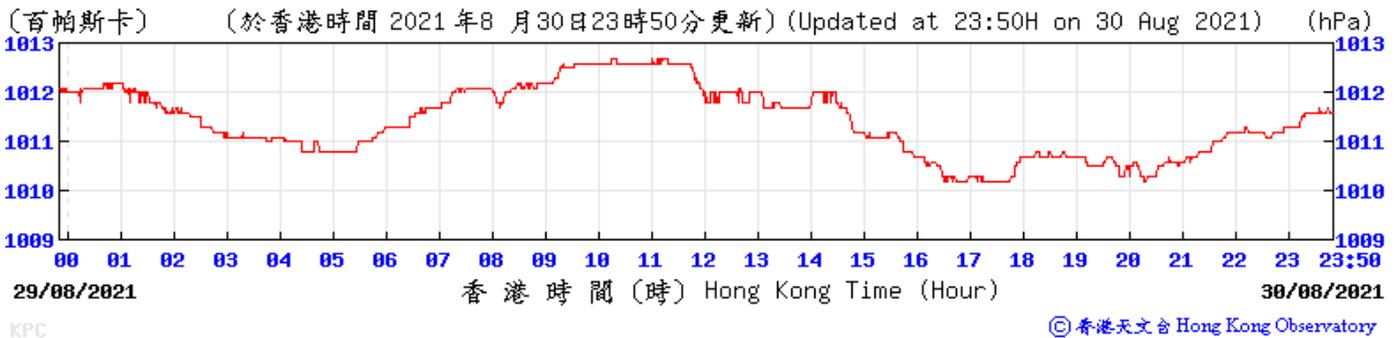
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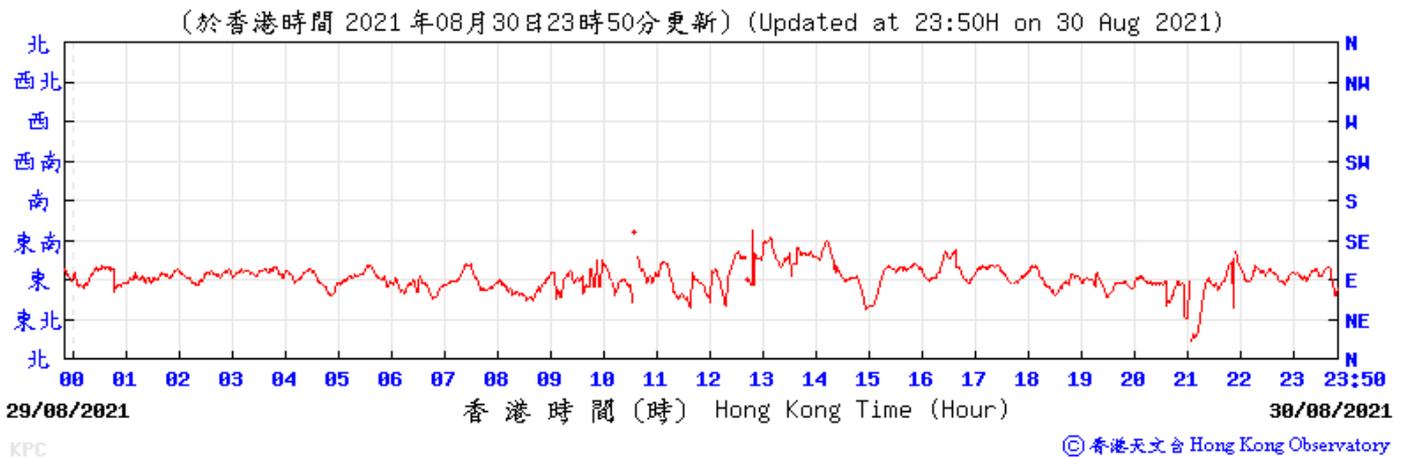
Temperature/Humidity:



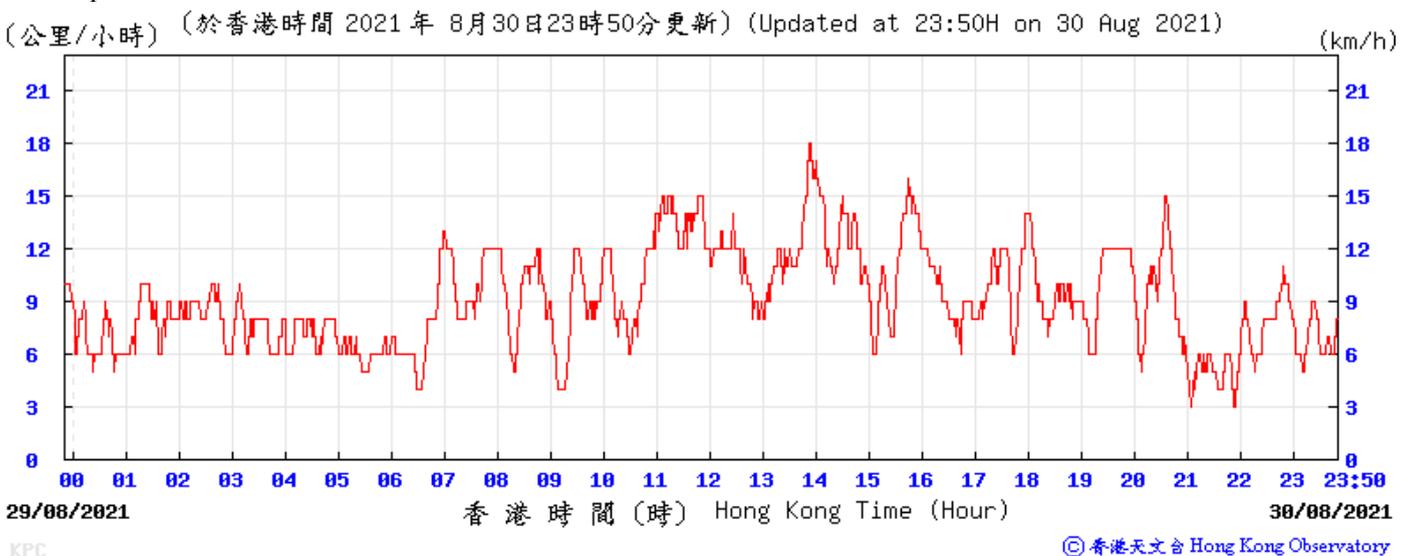
Pressure:



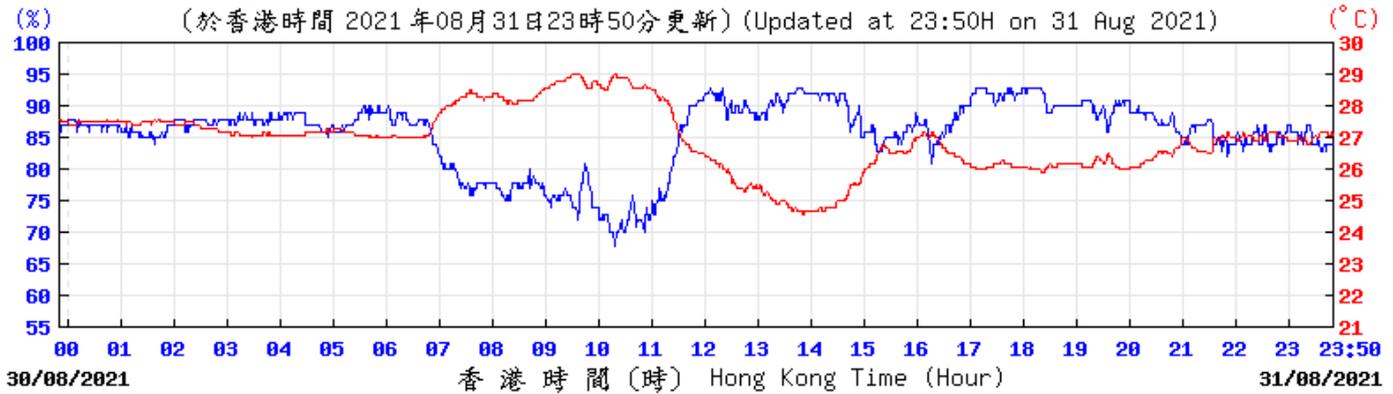
Wind Direction:



Wind Speed:



Temperature/Humidity:



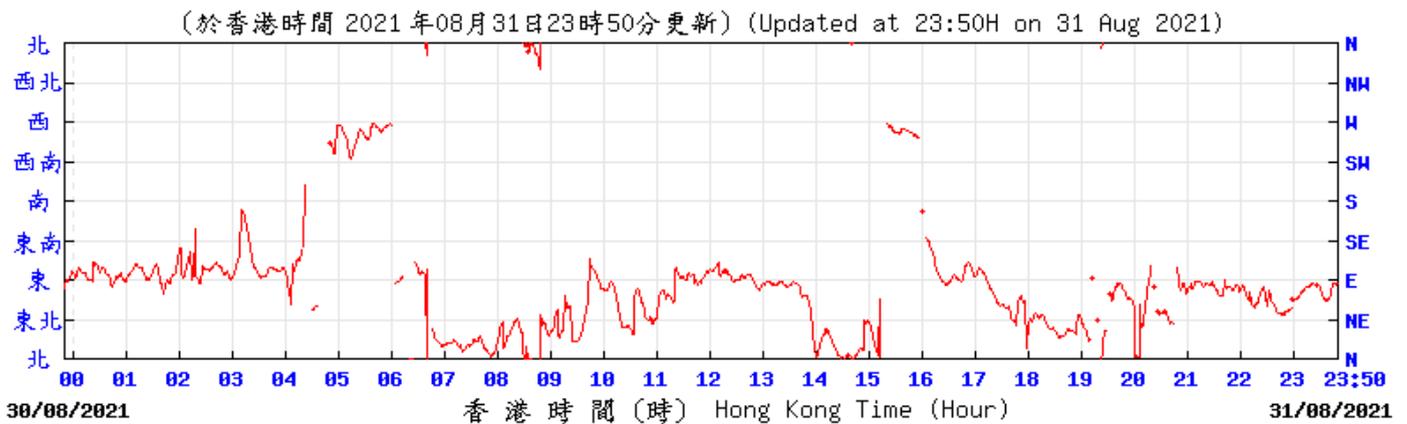
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Pressure:



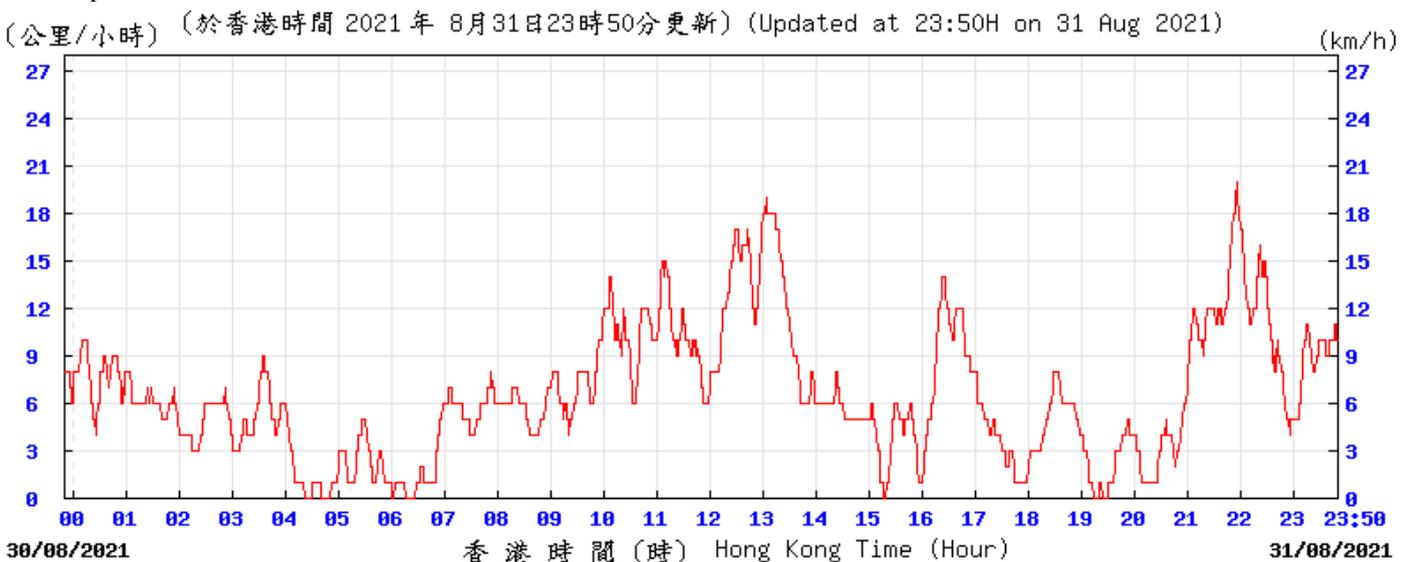
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Wind Direction:



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Wind Speed:



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## I. Waste Flow table

**Table I-1: Monthly Waste Flow Table for Zone 2A**

Month	Actual Quantities of Inert C&D Materials Generated Monthly							Actual Quantities of C&D Materials Generated Monthly					
	Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Disposed to Srotting Facility	Imported Fill	Metals	Paper/ Cardboard Packaging	Plastics	Wood/ Timber	Chemical Waste	Others, e.g. General Refuse
	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)
<b>2020</b>													
Oct	2623.48	0.00	0.00	0.00	2623.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.94
Nov	8838.69	0.00	685.23	1198.56	6954.90	0.00	1194.93	0.00	0.00	0.00	0.00	0.00	17.49
Dec	8890.70	0.00	510.59	1675.21	6704.90	0.00	51.51	0.00	0.00	0.00	0.00	0.00	11.75
Sub-total (2020)	20352.87	0.00	1195.82	2873.77	16283.28	0.00	1246.44	0.00	0.00	0.00	0.00	0.00	51.18
<b>2021</b>													
Jan	6849.66	0.00	52.90	0.00	6796.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.94
Feb	4591.95	0.00	0.00	0.00	4591.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.11
Mar	7318.44	0.00	0.00	339.94	6978.50	0.00	0.00	75.57	0.00	0.00	0.00	0.20	15.79
Apr	7208.22	0.00	0.00	1109.51	6098.71	0.00	0.00	0.00	0.00	0.00	0.00	0.40	19.29
May	7976.23	0.00	0.00	1853.51	6122.72	0.00	0.00	125.49	0.00	0.00	0.00	0.20	18.43
Jun	7741.45	0.00	0.00	1989.41	5752.04	0.00	0.00	4.53	0.00	0.00	0.00	0.00	18.65
Jul	8067.17	0.00	0.00	1289.08	6778.09	0.00	0.00	4.11	0.00	0.00	0.00	0.20	147.95
Aug	6530.27	0.00	0.00	1082.63	5447.64	0.00	0.00	10.70	0.00	0.00	0.00	0.40	18.85
Sep													
Oct													
Nov													
Dec													
Sub-total (2021)	56283.39	0.00	52.90	7664.08	48566.41	0.00	0.00	220.40	0.00	0.00	0.00	1.40	275.01
<b>Total</b>	<b>77882.70</b>	<b>0.00</b>	<b>1248.72</b>	<b>10537.85</b>	<b>64849.69</b>	<b>0.00</b>	<b>1246.44</b>	<b>220.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.40</b>	<b>326.19</b>

Note:

- 35.81 tonnes, 1355.53 tonnes, 4056.30 tonnes of inert C&D material were disposed of as public fill to Chai Wan Public Fill Barging Point, Tseung Kwan O Area 137 Public Fill, and Tuen Mun Area 38 respectively in the reporting month.

- For inert C&D materials reused in other projects, the projects refer to (1) EcoPark at Tuen Mun, (2) Green Valley and (3) DD41 at Sha Tau Kok.

## **J. Environmental Mitigation Measures – Implementation Status**

**Table J-1: Environmental Mitigation Measures Implementation Status (August 2021)**

EM&A Ref.	Recommendation Measures	Implementation Stage
<b>Air Quality Impact (Construction)</b>		
2.1	<b>General Dust Control Measures</b> Frequent water spraying for active construction areas (12 times a day or once every one hour), including Heavy construction activities such as construction of buildings or roads, drilling, ground excavation, cut and fill operations (i.e., earth moving)	✓
2.1	<b>Best Practice For Dust Control</b> The relevant best practices for dust control as stipulated in the Air Pollution Control (construction Dust) Regulation should be adopted to further reduce the construction dust impacts from the Project. These best practices include: <i>Good Site Management</i> <ul style="list-style-type: none"> <li>• Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.</li> </ul> <i>Disturbed Parts of the Roads</i> <ul style="list-style-type: none"> <li>• Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</li> <li>• Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.</li> </ul> <i>Exposed Earth</i> <ul style="list-style-type: none"> <li>• Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.</li> </ul>	Obs
		✓
		✓
		N/A
		No exposed earth in this project.

EM&A Ref.	Recommendation Measures	Implementation Stage
	<i>Loading, Unloading or Transfer of Dusty Materials</i>	✓
	<ul style="list-style-type: none"> <li>All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.</li> </ul>	
	<i>Debris Handling</i>	✓
	<ul style="list-style-type: none"> <li>Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.</li> </ul>	
	<ul style="list-style-type: none"> <li>Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.</li> </ul>	N/A
		No debris chute on-site
	<i>Transport of Dusty Materials</i>	✓
	<ul style="list-style-type: none"> <li>Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.</li> </ul>	
	<i>Wheel washing</i>	✓
	<ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul>	
	<i>Use of vehicles</i>	✓
	<ul style="list-style-type: none"> <li>The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site.</li> </ul>	
	<ul style="list-style-type: none"> <li>Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul>	✓
	<ul style="list-style-type: none"> <li>Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.</li> </ul>	✓
	<i>Site hoarding</i>	✓
	<ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.</li> </ul>	

2.1 **Best Practicable Means for Cement Works (Concrete Batching Plant)**

The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for

EM&A Ref.	Recommendation Measures	Implementation Stage
	<p>Cement Works (Concrete Batching Plant) BPM 3/2(93) should be followed and implemented to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Exhaust from Dust Arrestment Plant</i></p> <ul style="list-style-type: none"> <li>Wherever possible the final discharge point from particulate matter arrestment plant, where is not necessary to achieve dispersion from residual pollutants, should be at low level to minimise the effect on the local community in the case of abnormal emissions and to facilitate maintenance and inspection</li> </ul> <p><i>Emission Limits</i></p> <ul style="list-style-type: none"> <li>All emissions to air, other than steam or water vapour, shall be colourless and free from persistent mist or smoke</li> </ul> <p><i>Engineering Design/Technical Requirements</i></p> <ul style="list-style-type: none"> <li>As a general guidance, the loading, unloading, handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in a manner so as to prevent the release of visible dust and/or other noxious or offensive emissions</li> </ul>	<p>N/A</p> <p>No concrete batching plant in this project.</p> <p>N/A</p> <p>No concrete batching plant in this project.</p> <p>N/A</p> <p>No concrete batching plant in this project.</p>
	<p><b>Non-Road Mobile Machinery (NRMM):</b></p> <p>All NRMMs operating on-site which are subject to emission control of Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation are approved/exempted (as the case may be) and affixed with the requisite approval/exemption labels.</p>	<p>✓</p>
<b>Noise Impact (Construction)</b>		
3.1	<p><b>Good Site Practice</b></p> <p>Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction:</p> <ul style="list-style-type: none"> <li>only well-maintained plant to be operated on-site and plant should be serviced regularly during the</li> </ul>	<p>✓</p>

EM&A Ref.	Recommendation Measures	Implementation Stage
	<p>construction works;</p> <ul style="list-style-type: none"> <li>• machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum</li> <li>• plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs;</li> <li>• mobile plant should be sited as far away from NSRs as possible; and</li> <li>• material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.</li> </ul>	<p>Rem</p> <p>✓</p> <p>✓</p> <p>✓</p>
3.1	<p><b>Adoption of Quieter PME</b></p> <p>The recommended quieter PME adopted in the assessment were taken from the EPD's QPME Inventory and "Sound Power Levels of Other Commonly Used PME" are presented in <b>Table 4.26</b> in the EIA report. It should be noted that the silenced PME selected for assessment can be found in Hong Kong.</p>	✓
3.1	<p><b>Use of Movable Noise Barriers</b></p> <p>Movable noise barriers can be very effective in screening noise from particular items of plant when constructing the Project. Noise barriers located along the active works area close to the noise generating component of a PME could produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant provided the direct line of sight between the PME and the NSRs is blocked.</p>	Rem
3.1	<p><b>Use of Noise Enclosure/ Acoustic Shed</b></p> <p>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the EIAO Guidance Note No. 9/2010.</p>	✓
3.1	<p><b>Use of Noise Insulating Fabric</b></p>	✓

EM&A	Recommendation Measures	Implementation Stage
Ref.	<p>Noise insulating fabric can also be adopted for certain PME (e.g. drill rig, pilling machine etc). The fabric should be lapped such that there are no openings or gaps on the joints. According to the approved Tsim Sha Tsui Station Northern Subway EIA report (AEIAR-127/2008), a noise reduction of 10 dB(A) can be achieved for the PME lapped with the noise insulating fabric.</p>	
3.1	<p><b>Scheduling of Construction Works outside School Examination Periods</b></p> <p>During construction phase, the contractor should liaise with the educational institutions (including NSRs LCS and CRGPS) to obtain the examination schedule and avoid the noisy construction activities during school examination periods.</p>	✓
<b>Water Quality Impact (Construction)</b>		
4.1	<p><b>Construction site runoff and drainage</b></p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and sensitive uses of the coastal area, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>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. The design of the temporary on-site drainage system should be undertaken by the WKCDA's Contractor prior to the commencement of construction;</li> <li>Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94.</li> </ul>	Obs
		✓

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Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the WKCDA's Contractor prior to the commencement of construction.

- 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. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times. Obs
- Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities. ✓
- 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. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly 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 onsite should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. Obs
- Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers. ✓
- Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken Obs

EM&A Ref.	Recommendation Measures	Implementation Stage
	<p>when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</p> <ul style="list-style-type: none"> <li>Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.</li> </ul>	<p>N/A No bentonite slurries are used in this project.</p>
4.1	<p><b>Barging facilities and activities</b></p> <p>Recommendations for good site practices during operation of the proposed barging point include:</p> <ul style="list-style-type: none"> <li>All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;</li> <li>Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation;</li> <li>All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material; and</li> <li>Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site.</li> </ul>	<p>N/A No barging facilities in this project at this stage.</p> <p>N/A No barging facilities in this project at this stage.</p> <p>N/A No barging facilities in this project at this stage.</p> <p>N/A No barging facilities in this project at this stage.</p>
4.1	<p><b>Sewage effluent from construction workforce</b></p>	<p>✓</p>

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Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.

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4.1 **General construction activities**

- Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used. Obs
  - Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event. ✓
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**Waste Management Implications (Construction)**

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6.1 **Good Site Practices**

Recommendations for good site practices during the construction activities include:

- 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 ✓
- Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by either covering trucks or by transporting wastes in enclosed containers ✓
- Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust ✓

EM&A Ref.	Recommendation Measures	Implementation Stage
	<p>introduction to public roads</p> <ul style="list-style-type: none"> <li>Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting the inert or non-inert C&amp;D materials is not anticipated</li> </ul>	✓
6.1	<p><b>Waste Reduction Measures</b></p> <p>Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> <li>Sort inert C&amp;D material to recover any recyclable portions such as metals</li> <li>Segregation and storage of different types of waste in different containers or skips to enhance reuse or recycling of materials and their proper disposal</li> <li>Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force</li> <li>Proper site practices to minimise the potential for damage or contamination of inert C&amp;D materials</li> <li>Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of wastes</li> </ul>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
6.1	<p><b>Inert and Non-inert C&amp;D Materials</b></p> <p>In order to minimise impacts resulting from collection and transportation of inert C&amp;D material for off-site disposal, the excavated materials should be reused on-site as fill material as far as practicable. In addition, inert C&amp;D material generated from excavation works could be reused as fill materials in local projects that require public fill for reclamation.</p> <ul style="list-style-type: none"> <li>The surplus inert C&amp;D material will be disposed of at the Government's PFRFs for beneficial use by other projects in Hong Kong.</li> <li>Liaison with the CEDD Public Fill Committee (PFC) on the allocation of space for disposal of the inert C&amp;D materials at PFRF is underway. No construction work is allowed to proceed until all issues on management of</li> </ul>	<p>✓</p> <p>✓</p>

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Recommendation Measures

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inert C&D materials have been resolved and all relevant arrangements have been endorsed by the relevant authorities including PFC and EPD.

- The C&D materials generated from general site clearance should be sorted on site to segregate any inert materials for reuse or disposal of at PFRFs whereas the non-inert materials will be disposed of at the designated landfill site. ✓
- In order to monitor the disposal of inert and non-inert C&D materials at respectively PFRFs and the designated landfill site, and to control fly-tipping, it is recommended that the Contractor should follow the Technical Circular (Works) No. 6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials issued by Development Bureau. In addition, it is also recommended that the Contractor should prepare and implement a Waste Management Plan detailing their various waste arising and waste management practices in accordance with the relevant requirements of the Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site. ✓

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6.1 **Chemical Waste**

- If chemical wastes are produced at the construction site, the Contractor will be required to 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”. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor should use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. ✓

EM&A Ref.	Recommendation Measures	Implementation Stage
	<ul style="list-style-type: none"> <li>Potential environmental impacts arising from the handling activities (including storage, collection, transportation and disposal of chemical waste) are expected to be minimal with the implementation of appropriate mitigation measures as recommended.</li> </ul>	✓
6.1	<p><b>General Refuse</b></p> <p>General refuse should be stored in enclosed bins or compaction units separated from inert C&amp;D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&amp;D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.</p>	✓
<b>Land Contamination (Construction)</b>		
7.1	<p>The potential for land contamination issues at the TST Fire Station due to its future relocation will be confirmed by site investigation after land acquisition. Where necessary, mitigation measures for minimising potential exposure to contaminated materials (if any) or remediation measures will be identified. If contaminated land is identified (e.g., during decommissioning of fuel oil storage tanks) after the commencement of works, mitigation measures are proposed in order to minimise the potentially adverse effects on the health and safety of construction workers and impacts arising from the disposal of potentially contaminated materials. The following measures are proposed for excavation and transportation of contaminated material:</p> <ul style="list-style-type: none"> <li>To minimize the chance for construction workers to come into contact with any contaminated materials, bulk earth-moving excavation equipment should be employed;</li> <li>Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when interacting directly with contaminated</li> </ul>	<p>N/A</p> <p>TST Fire Station is out of this project boundary, no mitigation measure is required.</p> <p>N/A</p> <p>TST Fire Station is out of this</p>

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Ref.

Recommendation Measures

Implementation Stage

material), provision of washing facilities and prohibition of smoking and eating on site;

project boundary, no mitigation measure is required.

- Stockpiling of contaminated excavated materials on site should be avoided as far as possible;

N/A

TST Fire Station is out of this project boundary, no mitigation measure is required.

- The use of contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out;

N/A

TST Fire Station is out of this project boundary, no mitigation measure is required.

- Vehicles containing any contaminated excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater;

N/A

TST Fire Station is out of this project boundary, no mitigation measure is required.

- Truck bodies and tailgates should be sealed to stop any discharge;

N/A

TST Fire Station is out of this project boundary, no mitigation measure is required.

- Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping;

N/A

TST Fire Station is out of this project boundary, no mitigation measure is required.

EM&A Ref.	Recommendation Measures	Implementation Stage
	<ul style="list-style-type: none"> <li>Speed control for trucks carrying contaminated materials should be exercised;</li> </ul>	<p>N/A</p> <p>TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
	<ul style="list-style-type: none"> <li>Observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354) and obtain all necessary permits where required; and</li> </ul>	<p>N/A</p> <p>TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
	<ul style="list-style-type: none"> <li>Maintain records of waste generation and disposal quantities and disposal arrangements.</li> </ul>	<p>N/A</p> <p>TST Fire Station is out of this project boundary, no mitigation measure is required.</p>
<b>Ecological Impact (Construction)</b>		
	No mitigation measure is required.	
<b>Landscape and Visual Impact (Construction)</b>		
Table 9.1 (CM1)	Trees should be retained in situ on site as far as possible. Should tree removal be unavoidable due to construction impacts, trees will be transplanted or felled with reference to the stated criteria in the Tree Removal Applications to be submitted to relevant government departments for approval in accordance to ETWB TCW No. 29/2004 and 3/2006.	✓
Table 9.1 (CM2)	Compensatory tree planting shall be incorporated to the proposed project and maximize the new tree, shrubs and other vegetation planting to compensate tree felled and vegetation removed. Also, implementation of compensatory planting should be of a ratio not less than 1:1 in terms of quality and quantity within the site.	N/A Compensatory tree planting is being reviewed.

EM&A Ref.	Recommendation Measures	Implementation Stage
Table 9.1 (CM3)	Buffer trees for screening purposes to soften the hard architectural and engineering structures and facilities.	N/A Roof garden is designed to be built, but it has not been completed yet.
Table 9.1 (CM4)	Softscape treatments such as vertical green wall panel /planting of climbing and/or weeping plants, etc, to maximize the green coverage and soften the hard architectural and engineering structures and facilities.	N/A Climbing or weeping plants are designed to be planted, but proposal is being reviewed for the planting location.
Table 9.1 (CM5)	Roof greening by means of intensive and extensive green roof to maximize the green coverage and improve aesthetic appeal and visual quality of the building/structure.	N/A Roof garden is designed to be built, but it has not been completed yet.
Table 9.1 (CM6)	Sensitive streetscape design should be incorporated along all new roads and streets.	N/A Greening along the seafront is proposed, and under review.
Table 9.1 (CM7)	Structure, ornamental planting shall be provided along amenity strips to enhance the landscape quality.	N/A Gardens are designed to be built, and under review.
Table 9.1 (CM8)	Landscape design shall be incorporated to architectural and engineering structures in order to provide aesthetically pleasing designs.	N/A Roof garden is designed to be built, and under review.

EM&A Ref.	Recommendation Measures	Implementation Stage
Table 9.1 (CM9)	Minimize the structure of marine facilities to be built on the seabed and foreshore in order to minimize the affected extent to the waterbody	N/A No marine facilities for this project.
Table 9.2 (MCP1)	Use of decorative screen hoarding/boards	✓
Table 9.2 (MCP2)	Early introduction of landscape treatments	N/A No landscape treatments during this stage.
Table 9.2 (MCP3)	Adoption of light colour for the temporary ventilation shafts for the basement during the transition period.	N/A No ventilation shafts for this project.
Table 9.2 (MCP4)	Control of night time lighting	✓
Table 9.2 (MCP5)	Use of greenery such as grass cover for the temporary open areas will help achieve the visual balance and soften the hard edges of the structures.	N/A No temporary open areas for this project.

N/A - Not Applicable

✓ - Implemented

Obs - Observed

Rem - Reminder

## **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. 3 October 2020 for Zone 2A Foundation, Excavation and Lateral Support Works) to the end of the reporting month and are summarised in the Table K-1 below respectively.

**Table K-1: Statistics for complaints, notifications of summons and successful prosecutions for Zone 2A Foundation, Excavation and Lateral Support Works**

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting month	4	0	0
From 03 October 2020 to end of the reporting month	15	0	0

**END OF THE REPORT**