

Our ref: 15-1-2022

15-1-2022

By hand

Environmental Protection Department

Environmental Assessment Division

Metro Assessment Group

Kowloon Section (2)

27th floor, Southorn Centre,

130 Hennessy Road,

Wan Chai, Hong Kong

(Attn: Mr. TANG Ho Him, Matthew)

Dear Mr. TANG,

**Contract No. EDO 2/2020**

**Environmental Monitoring Works for Contract No. ED/2018/05 – Kai Tak Development – Stage 5B Infrastructure Works at the Former North Apron Area**

**Submission of Monthly EM&A Report for December 2021 (Version 1.1)**

I refer to the Environment Permit (EP) No. EP-337/2009 and EP-445/2013/A for the captioned project.

Pursuant to Condition 3.3 of the EP-337/2009 and Condition of the 3.2 of the EP-445/2013/A, please find enclosed four hard copies and one electronic copy of Monthly EM&A Report for December 2021 (Version 1.1), which has been verified by the IEC for your reference.

Thank you very much for your attention and please feel free to contact Mr. Lee at 2618 2166 should you require further information.

Yours faithfully,

For and on behalf of

Ka Shing Management Consultant Limited

**AKCL**

Applied knowledge center limited

Company Secretary

Encl. Monthly EM&A report for December 2021 (Version 1.1)



**ACUITY**  
SUSTAINABILITY  
CONSULTING LIMITED



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Date: 14 January 2022  
Your ref:  
Our ref: PL-202201029

AECOM Asia Company Limited  
12/F, Grand Central Plaza, Tower 2,  
138 Shatin Rural Committee Road,  
Shatin, New Territories,  
Hong Kong

**Attn.: Mr. LEUNG Wai Kit, CRE**

Dear Mr. Leung,

**Re: Agreement No. EDO 6/2019  
Independent Environmental Checker for Contract No. ED/2018/05 Kai Tak  
Development – Stage 5B Infrastructure works at the Former North Apron Area  
Verification of Monthly EM&A Report (December 2021)**

Reference is made to the Monthly EM&A Report (December 2021) (Version 1.1) provided by the Environmental Team on 14 January 2022.

Please be informed that we have no adverse comment on the captioned submission. We hereby verify the Monthly EM&A Report (December 2022) in accordance with Condition 3.3 of Environmental Permit No. EP-337/2009.

Thank you for your attention.

Yours sincerely,  
For and on behalf of  
Acuity Sustainability Consulting Limited

Kevin Li  
Independent Environmental Checker


c.c.	CEDD	Attn.: Mr. Kinox Wong	By email
	Ka Shing	Attn.: Mr. Chan Pang (ETL)	By email

**Environmental Monitoring and Audit Report**  
**for**  
**Contract No. ED/2018/05 –**  
**Kai Tak Development – Stage 5B infrastructure**  
**works at the former north apron area**

**Contract No.: EDO 2/2020**

December 2021

(Version 1.1)

Certified By:  \_\_\_\_\_

(Environmental Team Leader)

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## EXECUTIVE SUMMARY

1. This is the 11<sup>th</sup> Monthly Environmental Monitoring & Audit (EM&A) report which summaries the findings of the EM&A Programme during the reporting period from 1 to 31 December 2021.

### **Breaches of Action and Limit Levels**

2. 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
3. 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
4. Construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
5. Summary of the non-compliance in the reporting month for the Project is tabulated in Table I.

*Table I Non-compliance Record in the Reporting Month*

Parameter	No. of Exceedance		Action Taken
	Action Level	Limit Level	
1-hr TSP	0	0	N/A
24-hr TSP	0	0	N/A
Construction noise	0	0	N/A

### **Complaint log**

6. No complaint was received in the reporting month. Summary of complaints in the reporting month is tabulated in Table II.

*Table II Summary of complaints in the Reporting Month*

Date of complaint received	Date of compliant	Description of complaint	Recommendations / Action take	Close-out date / Status
N/A	N/A	N/A	N/A	N/A



**Notifications of summons and successful prosecutions**

7. No notification of summons and successful prosecutions was received in the reporting month. Summary of summons and successful prosecutions in the reporting month is tabulated in Table III.

*Table III Summary of summons and successful prosecutions in the Reporting Month*

Date of receiving notification of summons or prosecutions	Date of event	Description of event	Action taken	Close-out date / Status
No notification of summons and successful prosecutions were received in the reporting month.	NA	NA	NA	NA

**Report changes**

8. There was no reporting change in the reporting month.

**Key construction works in the reporting month**

9. Major construction activities undertake during the reporting month included:

- Underground utility diversion works and pillar box relocation works at Sa Po Road
- Bored pile works for landscape elevated walkway LW-02
- Sheetpile installation at launching shaft for subway SB-01
- Drainage works for Pedestrian Street No. 1, No. 2 & No. 3
- Construction of Crowd Dispersal Route
- Twin rising mains diversion works

## **Future key issues**

10. The future key issues and potential impact in the coming month are given in Table IV.

*Table IV Summary of future key issues and potential impact in the coming month*

Future key issues in the coming month	Potential impact
Advance works for traffic diversion at Sa Po Road	Noise and Air Quality
Bored pile works for landscape elevated walkway	Noise and Air Quality
Pre-drilling work for S14	Noise and Air Quality
Drainage works for Pedestrian Street No. 1, No. 2 & No.3	Noise and Air Quality
Construction of Crowd Dispersal Route	Noise and Air Quality
Rising main construction	Noise and Air Quality
Sheetpile installation for launching shaft of SB-01	Noise and Air Quality

# 1. INTRODUCTION

## Project Background

- 1.1 The Kai Tak Development (KTD) is located in the southern part of Kowloon Peninsula of the HKSAR, comprising the apron and runway areas of the former Kai Tak Airport and existing waterfront areas at To Kwa Wan, Ma Tau Kok, Kowloon Bay, Kwun Tong and Cha Kwo Ling.
- 1.2 Contract No. ED/2018/05 - Kai Tak Development – stage 5B infrastructure works at the former north apron area (The Project), comprises mainly the design and construction of a section of dual two-lane Road D1; single two-lane Road L9 and Road L16; a single-lane slip road S14; a pedestrian subway SB-01; an elevated walkway LW-02; renovation of the existing pedestrian subways KS9, KS10 and KS32, as well as modification of the southern end of the existing pedestrian subway KS10; associated footpaths, street lighting, traffic aids, drainage, sewerage, water mains, landscaping, electrical and mechanical works, and ancillary works. The proposed works are shown in Figure 1 and Figure 2. The proposed works and site boundary are shown in Figure 3 and Figure 4. Civil Engineering and Development Department (CEDD) had completed an Environmental Impact Assessment (EIA) and is the Permit Holder.
- 1.3 In accordance with the approved EIA Reports, Environmental Monitoring and Audit (EM&A) programmes are recommended to ensure compliance with the EIA study recommendations. The project proponent was the Civil Engineering and Development Department (CEDD). AECOM Asia Co. Ltd. (AECOM) was commissioned by CEDD as Supervisor (act as Engineers' Representative (ER) listed in EM&A Manual). Acuity Sustainability Consulting Limited (Acuity) was commissioned as the Independent Environmental Checker (IEC). Build King – STEC Joint Venture (Build King) was appointed as the main Contractor for the construction works of Contract No. ED/2018/05. Ka Shing was commissioned by CEDD to undertake the role of the Environmental Team (ET) to implement the EM&A programme for The Project.
- 1.4 The construction work under ED/2018/05 comprises the EM&A Manual (EIA Register No. AEIAR-130/2009 for Kai Tak Development) and Environmental Permit No. EP- 337/2009.
- 1.5 Air quality and noise monitoring has been proposed in the EM&A Manual with EIA Register No. AEIAR-130/2009 for Kai Tak Development.

## **Project Organization**

1.6 The project organization chart and with respect to the EM&A programme is shown in Appendix A. Information of key personnel contact names and telephone numbers are summarized in Table 1.1.

*Table 1.1 Contact Information of Key Personnel*

Party	Role	Contact Person	Position	Phone No.	Fax No.
Civil Engineering and Development Department (CEDD)	Project Proponent	Mr. George Ng	Senior Engineer	3842 7107	2739 0076
		Mr. Albert Tse	Engineer	3842 7137	2739 0076
		Mr. Perry Lo	Engineer	3842 7143	2739 0076
AECOM Asia Co. Ltd. (AECOM)	Supervisor (act as Engineers' Representative (ER) listed in EM&A Manual)	Mr. Leung Wai Kit	CRE	2412 3410	2798 0783
Acuity Sustainability Consulting Limited (Acuity)	Independent Environmental Checker (IEC)	Mr. Kevin Li	IEC	2698 6833	2698 9383
Ka Shing Management Consultant Limited (Ka Shing)	Environmental Team (ET)	Ir. Chan Pang	ET Leader	2618 2166	2120 7752
Build King – STEC Joint Venture (BK-STECC)	Contractor	Mr. Raymond Lam	Environmental Officer	9713 6817	3850 8508

## **Works Area and Construction Programme**

1.7 The construction works commenced on 16 February 2021. The construction programme of the Project is given in Appendix B.

### **Construction works undertaken during reporting month**

1.8 Major construction works of the Project in the reporting month are summarized in Table 1.2:

*Table 1.2 Major activities of the Project during reporting month*

Underground utility diversion works and pillar box relocation works at Sa Po Road	Twin rising mains diversion works
Bored pile works for landscape elevated walkway LW-02	
Sheetpile installation at launching shaft for subway SB-01	
Drainage works for Pedestrian Street No. 1, No. 2 & No. 3	
Construction of Crowd Dispersal Route	

### **Submission Status under the Environmental Permits**

1.9 The status of required submission under Environmental Permit (EP) conditions under EP-337/2009 are summarized in Table 1.3.

*Table 1.3 Summary of Status of Required Submission of EPs*

EP Condition EP-337/2009	Submission	Submission Date
Condition 1.11	Notification of Commencement Date of Construction of the Project	12 Jan 2021
Condition 2.3	Management Organization of Main Construction Companies	21 Sep 2020
Condition 2.4	Design Drawings	12 Jan 2021
Condition 2.11	Landscape Mitigation Plans	17 Dec 2020
Condition 3.2	Baseline Monitoring Report	12 Jan 2021
Condition 3.2	Monthly EM&A Report	14 December 2021

## 2. AIR QUALITY MONITORING

### Monitoring Requirements

2.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), impact air quality monitoring shall be carried out during the construction phase of the Project. For regular impact monitoring, a sampling frequency of at least once in every six days will be strictly observed at all of the monitoring stations for 24-hour TSP. For 1-hour TSP monitoring, the sampling frequency of at least three times in every six days will be undertaken when the highest dust impact occurs.

### Monitoring Locations

2.2 Two designated monitoring stations were selected for air quality monitoring programme. Impact air quality monitoring was conducted at two air quality monitoring stations in the reporting month. Table 2.1 describes the air quality monitoring locations, which are also depicted in Figure 5.

*Table 2.1 Locations of Air Quality Monitoring Stations*

Air Quality Monitoring Locations for the Project	Location of Measurement
AM2(A) – Ng Wah Catholic Secondary School	Rooftop
AM3 – Sky Tower	Podium floor near T7

### Monitoring Parameters, Frequency and Duration

2.3 The air quality monitoring locations and monitoring frequency are listed in Table 2.2.

*Table 2.2 Air Quality Monitoring Parameters, Frequency and Duration*

Air Monitoring Station	Location for Measurement	Parameter	Duration	Frequency
AM2(A) – Ng Wah Catholic Secondary School	Rooftop	- 24-hour average TSP	- 24 hours	- Once every 6 days
AM3 – Sky Tower	Podium Floor near Tower 7	- 1-hour average TSP	- 1 hour	- Three times every 6 days

2.4 The monitoring schedule for reporting month and next month is presented in Appendix C.

2.5 Photographic records of the impact monitoring setup are shown in Appendix D.

### **Monitoring Equipment**

2.6 24-hour average TSP and 1-hour average TSP levels were measured for impact monitoring. 24-hour average TSP levels were measured by the High Volume Samplers (HVS) and 1-hour average TSP levels were measured by direct reading method to indicate short-term impacts. Wind data monitoring equipment was set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. Table 2.3 summarizes the equipment to be used in the air quality monitoring.

*Table 2.3 Air Quality Monitoring Equipment*

Equipment	Model	Quantity	Calibration Interval
HVS Sampler	TE-5170 X c/w of TSP sampling inlet	4	2 months
HVS Calibrator	TISCH TE-5025A	1	1 year
1-hour TSP Dust Meter	TSI Model AM510 SidePak Personal Aerosol Monitor	2	1 year
Weather Station	Davis Vantage Pro2 Weather Station	1	6 months

2.7 High volume samplers (HVS) (TE-5170 X c/w of TSP sampling inlet) comprising with appropriate sampling inlets were employed for 24-hour TSP monitoring. The sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complied with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

2.8 Calibration certificates, catalogue of equipment are given in Appendix E.

### **Monitoring Methodology and QA/QC Procedure**

#### ***24-hour TSP Monitoring***

#### **Operating/Analytical Procedures**

2.9 Setup criteria of HVS are shown as follows:

- A horizontal platform with appropriate support to secure the samplers against gusty wind was provided.
- No two samplers were placed less than 2m apart.
- The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2m of separation from walls, parapets and penthouses was set for the rooftop samples.
- A minimum of 2m separation from any supporting structure, measured horizontally was set.
- No furnaces or incineration flues was nearby.
- Airflow around the sampler was unrestricted.
- Any wire fence and gate, to protect the samplers, was not caused any obstruction during monitoring.
- Permission were obtained to setup the samplers and to obtain access to the monitoring stations.
- A secured supply of electricity was provided to operate the samplers.

2.10 Prior to the commencement of the dust sampling, the flow rate of the HVS was properly set (between 1.1 m<sup>3</sup>/min. and 1.7 m<sup>3</sup>/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

2.11 For TSP sampling, Glass Fiber Filter Media 8" x 10" having a collection efficiency of > 99 % for particles of 0.3 µm diameter were used.

2.12 The power supply was checked to ensure the sampler worked properly and then placed any filter media at the designated air monitoring station.

2.13 The filter holding frame was removed by loosening the four nuts and a weighted and conditioned filter was carefully centered with the stamped number upwards, on a supporting screen.

2.14 The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure was sufficient to avoid air leakage at the edges.

2.15 The shelter lid was closed and secured with the aluminium strip.

2.16 The timer was programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).



2.17 After sampling, the filter was removed from the HVS and put into a clean and labeled seal plastic bag to avoid cross contamination. The elapsed time was also be recorded. The sampled filters were sent to the HOKLAS accredited or other internationally accredited laboratory for weighting.

#### Maintenance/Calibration

2.18 The following maintenance/calibration are required for the HVS:

- The HVS and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
- High volume samplers were calibrated with at bi-monthly intervals using TE-5025A Calibration Kit throughout all stages of the air quality monitoring.

#### *1-hour TSP Monitoring*

#### Measurement Procedures

2.19 The measurement procedures of the 1-hour TSP were conducted in accordance with the Manufacturer's Instruction Manual as follows:

- Set up the dust meter on a tripod at 1.2m level.
- Turned on the dust meter and check the battery, if too low, change new ones. Pointed the meter to the source area or the planned measurement area.
- The zero calibration of the instrument was conducted before and after each sampling.
- TSP levels were recorded for 1-hour with 5-minute data logging interval.
- Recorded down the general meteorological conditions, Test ID no., start/end time, spot check reading at each sampling location for data processing.
- Recorded any activities that may generate dust during measurement period.

#### Maintenance/Calibration

2.20 The following maintenance/calibration are required for the direct dust meters:

- To validate the accuracy of dust meter, compare the results measured by dust meter and HVS every 12 months throughout all stages of the air quality monitoring.

## **Wind Data Monitoring**

2.21 Wind Anemometer was installed at the roof-top of AM2(A) – Ng Wah Catholic Secondary School with 10m above ground and clear of constructions or turbulence caused by the buildings.

2.22 The wind data was captured by a data logger and the data was downloaded at least once per month for analysis.

2.23 The wind data monitoring equipment will be re-calibrated at least once every six months.

2.24 Wind direction is divided into 16 sectors of 22.5 degrees each.

2.25 Details of weather information during the monitoring period are shown in Appendix F.

## **Action and Limit Levels**

2.26 The Action and Limit Levels of 24-hour average TSP and 1-hour average TSP are summarized in Table 2.4 and Table 2.5 respectively.

*Table 2.4 Action and Limit Levels of 24-hour average TSP for Construction Dust Monitoring*

Parameter	Air Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
24-hour average TSP	AM2(A)	175	260
	AM3	172	260

*Table 2.5 Action and Limit Levels of 1-hour average TSP for Construction Dust Monitoring*

Parameter	Air Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
1-hour average TSP	AM2(A)	302	500
	AM3	301	500

## **Impact Air Quality Monitoring results**

2.27 Impact monitoring results for 24-hour average TSP and 1-hour average TSP levels at the designed air quality monitoring stations are summarized in Table 2.6 and Table 2.7 respectively.

*Table 2.6 Summary of 24-hour average TSP Monitoring Data during the reporting month*

Air Monitoring Station	Average TSP Concentration, $\mu\text{g}/\text{m}^3$	Range, $\mu\text{g}/\text{m}^3$	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AM2(A)	72	25-104	175	260
AM3	75	26-93	172	260

*Table 2.7 Summary of 1-hour average TSP Monitoring Data during the reporting month*

Air Monitoring Station	Average TSP Concentration, $\mu\text{g}/\text{m}^3$	Range, $\mu\text{g}/\text{m}^3$	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AM2(A)	54	20-88	302	500
AM3	56	21-82	301	500

2.28 There was no Action and Limit Level exceedance of 24-hour average TSP and 1-hour average TSP levels recorded during the reporting month.

2.29 Graphical presentation and detailed monitoring results of 24-hour average TSP and 1-hour average TSP levels are shown in Appendix G and Appendix H respectively.

2.30 The Event and Action Plan is provided in Appendix I.

2.31 Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.

2.32 Weather conditions during the monitoring periods were generally fine and did not affect the monitoring results.

### 3. NOISE MONITORING

#### Monitoring Requirements

- 3.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), impact noise monitoring shall be carried out during the construction phase of the Project.
- 3.2 Regular monitoring,  $L_{Aeq, 30\text{-minute}}$ , for each station will be on a weekly basis and conduct one set of measurements between 0700 – 1900 hrs on normal weekdays.
- 3.3 If construction works are extended to include works during 1900 – 0700 hrs as well as public holidays and Sundays, additional weekly impact monitoring will be carried out during the respective restricted hours periods.

#### Monitoring Locations

- 3.4 Two designated monitoring stations were selected for noise monitoring programme. Impact noise monitoring was conducted at two noise monitoring stations in the reporting month. Table 3.1 describes the noise monitoring locations, which are also depicted in Figure 6.

*Table 3.1 Locations of Noise Monitoring Stations*

Noise Monitoring Locations for the Project	Location of Measurement
M4(A) – Le Billionnaire	Podium (Façade)
M5(A) – Prince Ritz	Podium (Façade)

#### Monitoring Parameters, Frequency and Duration

- 3.5 The noise monitoring locations and monitoring frequency are listed in Table 3.2.

*Table 3.2 Noise Monitoring Parameters, Frequency and Duration*

Noise Monitoring Station	Location for Measurement	Parameter	Frequency and Duration
M4(A) – Le Billionnaire	Podium (Façade)	L <sub>Aeq</sub> , L <sub>A10</sub> and L <sub>A90</sub>	30-minute measurement at each monitoring station between 0700 – 1900 hrs on normal weekdays (Monday to Saturday) at frequency of once per week.
M5(A) – Prince Ritz	Podium (Façade)		

3.6 The monitoring schedule for reporting month and next month is presented in Appendix C.

3.7 Photographic records of the monitoring setup are shown in Appendix D.

### **Monitoring Equipment**

3.8 As referred to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the IEC 61672-1 (Type 1) standard [this standard replaced the International Electrotechnical Commission Publications 60651:1979 (Type 1) and 60804:1985 (Type 1)] were used for noise monitoring. Table 3.3 summarizes the equipment to be used in the noise monitoring.

*Table 3.3 Noise Monitoring Equipment*

Equipment	Model	Quantity	Calibration Interval
Sound Level Meter	RION NL52	2	1 year
Sound Level Calibrator	RION NC 75	1	1 year
Air Flow meter	TSI TA440 Air Velocity	1	1 year

3.9 Calibration certificates, catalogue of equipment are given in Appendix J.

### **Monitoring Methodology and QA/QC Procedure**

3.10 The noise level measurement was conducted at 1m from the exterior of the nearby noise sensitive receivers building façade and at 1.2m above the ground and facing to the source area or the planned measurement area.

3.11 No noise measurement was conducted in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. Air flow was measured by air flow meter.

3.12 Turned on the sound level meter and check the battery, if too low, change new ones.

3.13 Calibration was conducted immediately prior to and after each noise measurement, the accuracy of the sound level meters was checked by using sound calibrator generating 1,000 Hz with 94dB. Measurement data was found to be valid only if the calibration levels from before and after the noise measurement agreed to within 1.0 dB.

3.14 Noise level was recorded.

3.15 Recorded any activities that may generate noise during measurement period.

### **Maintenance and Calibration**

3.16 The microphone of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.

3.17 The sound level meter and sound calibrator were calibrated annually.

3.18 Calibration for sound level meter was conducted immediately prior to and following each noise measurement by using sound calibrator generating a known sound pressure level at a known frequency (1,000 Hz with 94dB). Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

### **Action and Limit Levels**

3.19 The Baseline Noise Levels and Action and Limit Levels for construction noise is presented in Table 3.4.

*Table 3.4 Baseline Noise Level and Action and Limit Levels for Construction Noise Monitoring*

Time Period	Noise Monitoring Station	Baseline Noise Levels, dB (A)	Action Level	Limit Level <sup>^</sup>
0700 – 1900 hrs on normal weekdays	M4(A)	69.5	When one documented complaint is received.	75 dB(A)
	M5(A)	72.5		

Note: ^ 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.

### **Impact Noise Monitoring results**

3.20 Impact noise monitoring results at the designated noise monitoring stations are summarized in Table 3.5 respectively.

*Table 3.5 Summary of Noise Monitoring Data during the reporting month*

Noise Monitoring Station	Measured $L_{Aeq, 30-min}$ , Average, dB(A)	Measured $L_{Aeq, 30-min}$ , Range, dB(A)	Action Level	Limit Level <sup>^</sup>
M4(A)	70.0	69.4 – 71.0	When one documented complaint is received	75 dB(A)
M5(A)	73.0	72.2 – 74.5		

Note: ^ 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.

3.21 There was no Action and Limit Level exceedance of  $L_{Aeq, 30-min}$  recorded during the reporting month.

3.22 Graphical presentation and detailed monitoring results are shown in Appendix K.

3.23 The Event and Action Plan is provided in Appendix L.

3.24 Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.

3.25 Weather conditions during the monitoring periods were generally fine and did not affect the monitoring results.

## 4. COMPARISON OF EM&A RESULTS WITH EIA PREDICTIONS

4.1 The environmental impacts predictions were given in Agreement No. CE 35/2006(CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works - Investigation, Design and Construction - Kai Tak Development Environmental Impact Assessment Report, EIA Register No. AEIAR-130/2009 for Kai Tak Development (The EIA Report). The EM&A data was compared with the EIA predictions as summarized in Table 4.1 to Table 4.3.

*Table 4.1 Comparison of 24-hour average TSP Monitoring Data with EIA predictions*

Air Monitoring Station	ASR No. in EIA report	Predicted Cumulative Maximum 24-hour average TSP concentration		Measured 24-hr average TSP in Reporting Month (Dec 2021) $\mu\text{g}/\text{m}^3$
		Scenario 1 (Mid 2009 to Mid 2013), $\mu\text{g}/\text{m}^3$	Scenario 2 (Mid 2013 to Late 2016), $\mu\text{g}/\text{m}^3$	
AM2(A) - Ng Wah Catholic Secondary School	NA	NA	NA	25-104
AM3 - Sky Tower	A40 <sup>^</sup>	106 <sup>^</sup>	138 <sup>^</sup>	26-93

Note:

<sup>^</sup> Prediction results are given in the Table 3.13 of the EIA report EIA Register No. AEIAR-130/2009 for Kai Tak Development.

*Table 4.2 Comparison of 1-hour average TSP Monitoring Data with EIA predictions*

Air Monitoring Station	ASR No. in EIA report	Predicted Cumulative Maximum 1-hour average TSP concentration		Measured 1-hr average TSP in Reporting Month (Dec 2021) $\mu\text{g}/\text{m}^3$
		Scenario 1 (Mid 2009 to Mid 2013), $\mu\text{g}/\text{m}^3$	Scenario 2 (Mid 2013 to Late 2016), $\mu\text{g}/\text{m}^3$	
AM2(A) - Ng Wah Catholic Secondary School	NA	NA	NA	20-88
AM3 - Sky Tower	A40 <sup>^</sup>	217 <sup>^</sup>	247 <sup>^</sup>	21-82

Note:

<sup>^</sup> Prediction results are given in the Table 3.13 of the EIA report EIA Register No. AEIAR-130/2009 for Kai Tak Development.



*Table 4.3 Comparison of Noise Monitoring Data with EIA predictions*

Noise Monitoring Station	NSR No. in EIA report	Predicted Mitigated Construction Noise Levels during Normal Daytime Working Hour L <sub>Aeq, 30min</sub> , dB(A)	Measured Noise Level in Reporting Month (Dec 2021) L <sub>Aeq, 30min</sub> , dB(A)
M4(A) – Le Billionnaire	NA	NA	69.4 – 71.0
M5(A) – Prince Ritz	NA	NA	72.2 – 74.5

- 4.2 No prediction in the EIA Report for 24-hour TSP monitoring results at AM2(A).
- 4.3 24-hour TSP monitoring results at AM3 was recorded lower than the prediction in the EIA Report.
- 4.4 No prediction in the EIA Report for 1-hour TSP monitoring results at AM2(A).
- 4.5 1-hour TSP monitoring results at AM3 was recorded lower than the prediction in the EIA Report.
- 4.6 No prediction in the EIA Report for noise monitoring results at M4(A) and M5(A).

## 5. LANDSCAPE AND VISUAL MONITORING

5.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), Landscape and Visual Monitoring shall be carried out during the construction phase of the Project. Regular impact monitoring will be conducted at least once per week.

### **Results and Observations**

5.2 Site inspections were carried out on a weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.

5.3 Site inspections were conducted on 2, 9, 17, 23 and 30 December 2021 in the reporting month.

5.4 The summary of site audits is attached in Table 5.1.

*Table 5.1 Summary of observations of Landscape and Visual impact during the reporting month*

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
2 December 2021	No	NA	NA
9 December 2021	No	NA	NA
17 December 2021	No	NA	NA
23 December 2021	No	NA	NA
30 December 2021	No	NA	NA

5.5 No non-compliance of the landscape and visual impact was recorded in the reporting month.

5.6 Should non-compliance of the landscape and visual impact occur, action in accordance with the action plan presented in Appendix M shall be performed.

## 6. ENVIRONMENTAL SITE INSPECTION AND AUDIT





### Site Inspection







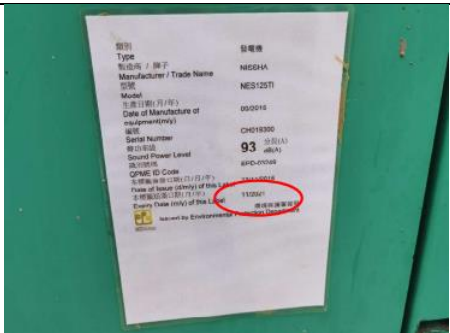

6.1 Site inspections were carried out on a weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.




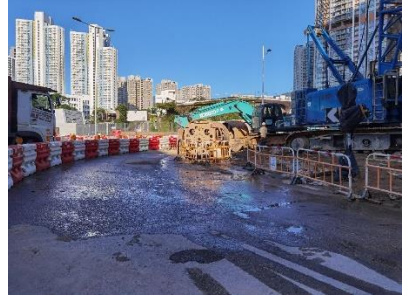
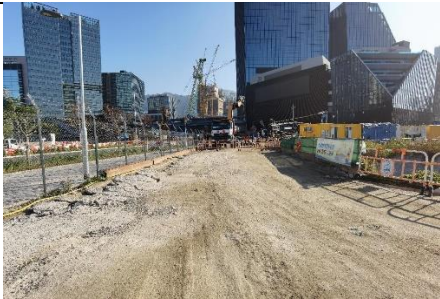

6.2 Site inspections were conducted on 2, 9, 17, 23 and 30 December 2021 in the reporting month.

6.3 The summaries of site audits are attached in Table 6.1.

*Table 6.1 Summary of site inspections observations during the reporting month*

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
2 December 2021	 <p>Observation: Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.</p>	 <p>Action Taken: Stockpiles has been removed.</p>	Closed out on 9 December 2021
9 December 2021	 <p>Observation: Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.</p>	 <p>Action Taken: Stockpiles has been removed</p>	Closed out on 17 December 2021

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
9 December 2021	 <p>Observation: Secondary container shall be provided for the plastic diesel drum to prevent soil contamination in rising main.</p>	 <p>Observation: Plastic diesel drum has been removed.</p>	Closed out on 17 December 2021
	 <p>Observation: Chemical label was missed.</p>	 <p>Observation: Plastic diesel drum has been removed.</p>	Closed out on 17 December 2021
17 December 2021	 <p>Observation: Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.</p>	 <p>Action Taken: Stockpiles has been removed.</p>	Closed out on 23 December 2021
			Closed out on 30 December 2021

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
17 December 2021	Observation: An expired QPME label of the generator was observed in LW02.	Action Taken: An expired QPME label of the generator was observed in LW02.	
23 December 2021	 <p>Observation: An expired QPME label of the generator was observed in LW02.</p>	 <p>Action Taken: An expired QPME label of the generator was observed in LW02.</p>	Closed out on 30 December 2021
	 <p>Observation: Secondary container shall be provided for the diesel drum to prevent soil contamination in LW02.</p>	 <p>Action Taken: Diesel drum has been removed.</p>	Closed out on 30 December 2021
30 December 2021	 <p>Observation: Water spraying at the non-hard pave road at bored piles area shall be implemented at regular time interval.</p>	 <p>Action Taken: Water spraying at the non-hard pave road at bored piles area had been implemented at regular time.</p>	Closed out on 6 January 2022

## **Status of Waste Management**

- 6.4 The amount of wastes generated by the major site activities of the work contracts within the Project during the reporting month is shown in Appendix N.
- 6.5 The Contractor was registered as a chemical waste producer for the Project. The Contractor was reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

## **Status of Environmental Licenses, Notification and Permits**

- 6.6 A summary of the relevant permits, licenses and/or notifications on environmental protection for the Project is shown in Table 6.2.

*Table 6.2 Summary of Environmental Licenses, Notifications and Permits*

Environmental Licenses, Notifications and Permits	Ref. No.	Valid From	Valid Till
Environmental Permit under EIAO	EP-337/2009	23 Apr 2009	N/A
Construction Dust Notification under APCO	HA/1826/1	29 Dec 2020	N/A
Waste Disposal Billing Account	7038086	21 Aug 2020	N/A
Registration as a Chemical Waste Producer	5111-286-B2596-01	15 Sep 2020	N/A
Wastewater Discharge License under WPCO	WT00037618-2021	29 March 2021	31 March 2026
	WT00037370-2021	29 March 2021	31 March 2026
	WT00038562-2021	15 July 2021	31 July 2026
Construction Noise Permit	GW-RE0973-21	12 Oct 2021	10 Dec 2021
	GW-RE1233-21	21 Dec 2021	10 March 2022
	GW-RE1262-21	22 Dec 2021	19 June 2022
	GW-RE1275-21	30 Dec 2021	19 June 2022

**Implementation Status of Environmental Mitigation Measures**

6.7 The Contractor has implemented environmental mitigation measures and requires as stated in the EIA report, the EP and the EM&A Manual. The implementation status of the mitigation measures is summarized in Appendix O.

**Environmental Complaint and Non-compliance**

6.8 No complaint was received in the reporting month. Summary of complaints in the reporting month is tabulated in Table 6.3.

*Table 6.3 Summary of complaints in the Reporting Month*

Date of complaint received	Date of complaint	Description of complaint	Recommendations / Action taken	Close-out date / Status
N/A	N/A	N/A	N/A	N/A

6.9 Complaint log is shown in Appendix P.

**Notifications of summons and successful prosecutions**

6.10 No notification of summons and successful prosecutions was received in the reporting month. Summary of summons and successful prosecutions in the reporting month is tabulated in Table 6.4.

*Table 6.4 Summary of summons and successful prosecutions in the Reporting Month*

Date of receiving notification of summons or prosecutions	Date of event	Description of event	Action taken	Close-out date / Status
No notification of summons and successful prosecutions were received in	NA	NA	NA	NA

Date of receiving notification of summons or prosecutions	Date of event	Description of event	Action taken	Close-out date / Status
the reporting month.				

6.11 The summaries of cumulative environmental complaint, warning, summon and notification of successful prosecution for the Project is presented in Appendix P.

## 7. FUTURE KEY ISSUES

### **Construction Programme in the coming month**

7.1 The major construction activities and potential impacts in the next reporting month as follows:

*Table 7.1 Summary of future key issues and potential impact in the coming month*

Future key issues in the coming month	Potential impact
Advance works for traffic diversion at Sa Po Road	Noise and Air Quality
Bored pile works for landscape elevated walkway	Noise and Air Quality
Pre-drilling work for S14	Noise and Air Quality
Drainage works for Pedestrian Street No. 1, No. 2 & No.3	Noise and Air Quality
Construction of Crowd Dispersal Route	Noise and Air Quality
Rising main construction	Noise and Air Quality
Sheetpile installation for launching shaft of SB-01	Noise and Air Quality

7.2 The mitigation measures for environmental impact including Air Quality, Construction Noise, Water Quality, Chemical and Waste Management, Landscape and Visual shall be implemented:

- Sufficient watering of the works site with the active dust emitting activities,
- Limitation of the speed for vehicles on unpaved site roads,
- Properly cover the stockpiles,
- Good maintenance to the plant and equipment,
- Use of quieter plant and Quality Powered Mechanical Equipment (QPME),
- Provide movable noise barriers,
- Appropriate desilting/ sedimentation devices provided on site for treatment before discharge,
- Well maintain the drainage system to prevent the spillage of wastewater during heavy rainfall,
- Onsite waste sorting and implementation of trip ticket system,
- Good management and control on construction waste reduction,



- Erection of decorative screen hoarding,
- Strictly following the Environmental Permits and Licenses, and
- Provide sufficient mitigation measures as recommended in Approved EIA Reports.

7.3 The recommended environmental measures proposed in the EM&A Manual (EIA Register No. AEIAR-130/2009) shall be effectively implemented to minimize the potential environmental impacts. The Contractor is reminded to implement the mitigation measures properly.

#### **Environmental Site Inspection and Monitoring Schedule for next month**

7.4 The tentative schedule for weekly site inspection and air quality and noise monitoring in the next month is provided in Appendix C.

## **8. CONCLUSIONS**

- 8.1 Environmental monitoring works were performed in the reporting month and all monitoring results were checked and reviewed.
- 8.2 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.3 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.4 Construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.5 No complaint was received in the reporting month.
- 8.6 No notification of summons and successful prosecutions was received in the reporting month.
- 8.7 Based on the site inspection and audits, impact air quality and noise monitoring results, it was considered that the mitigation measures were effective to control the potential environmental impacts from the Project during the reporting period.

## Figures

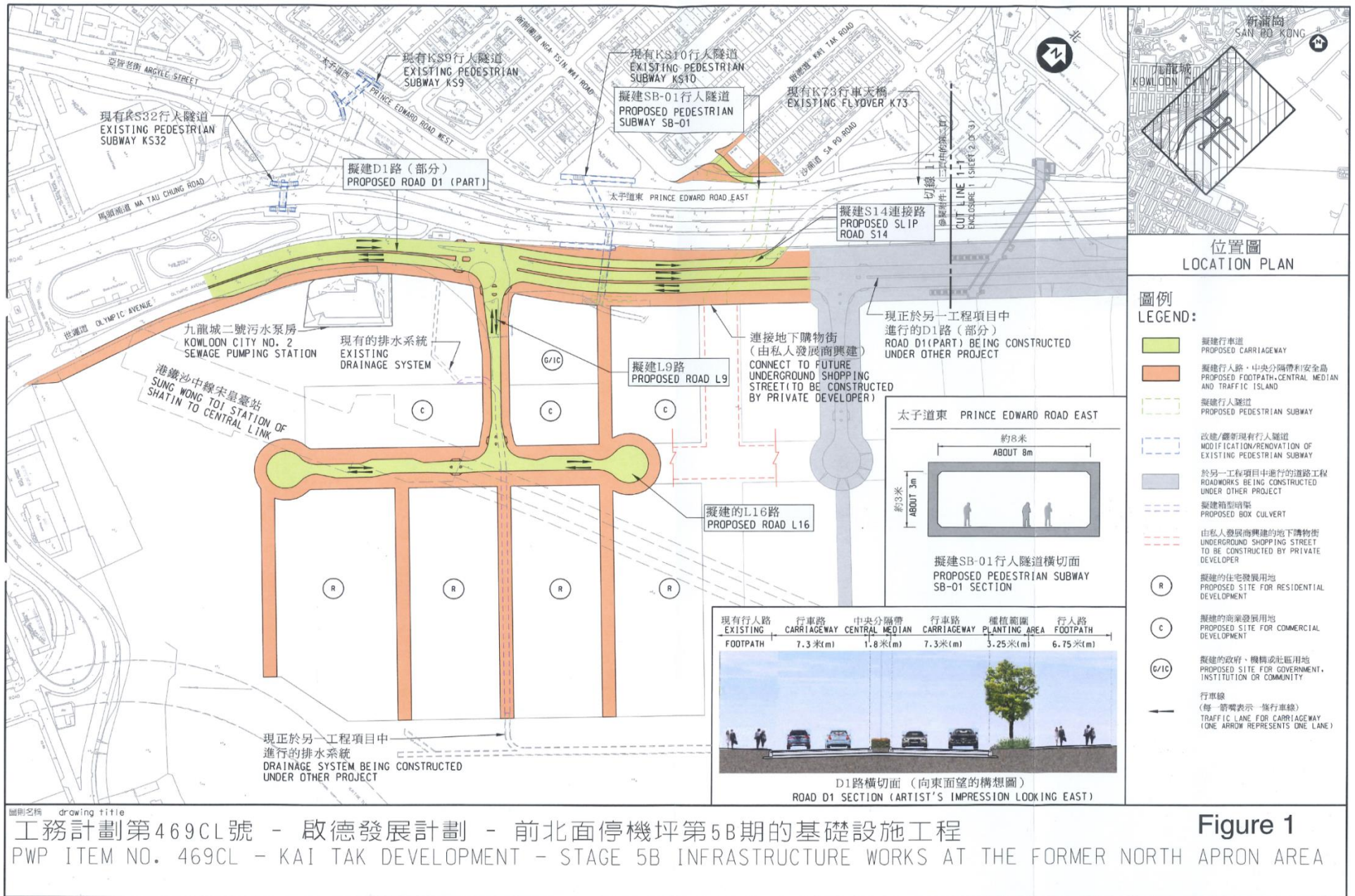


Figure 1 – Proposed works of Contract No. ED/2018/05

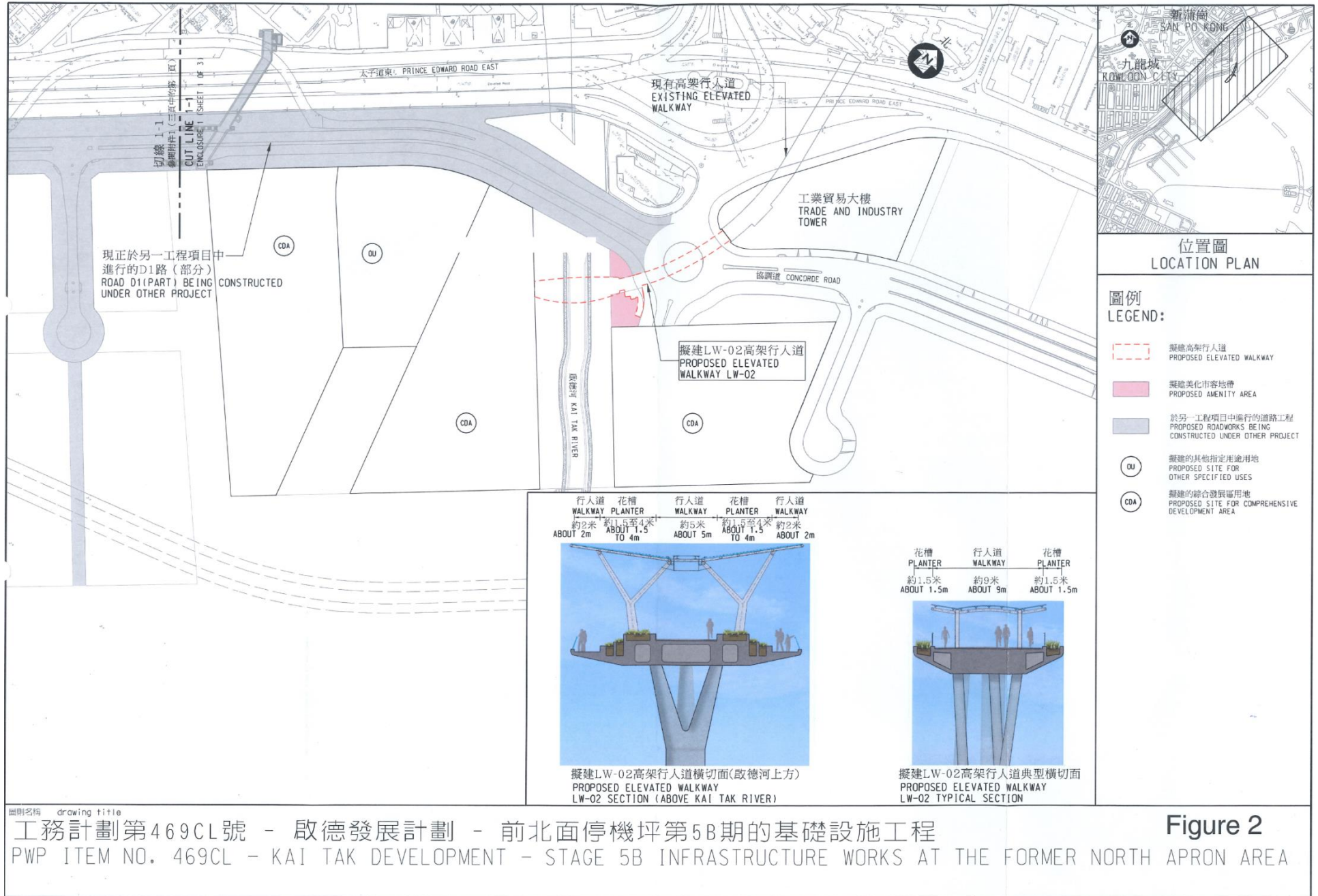


Figure 2

Figure 2 – Proposed works of Contract No. ED/2018/05

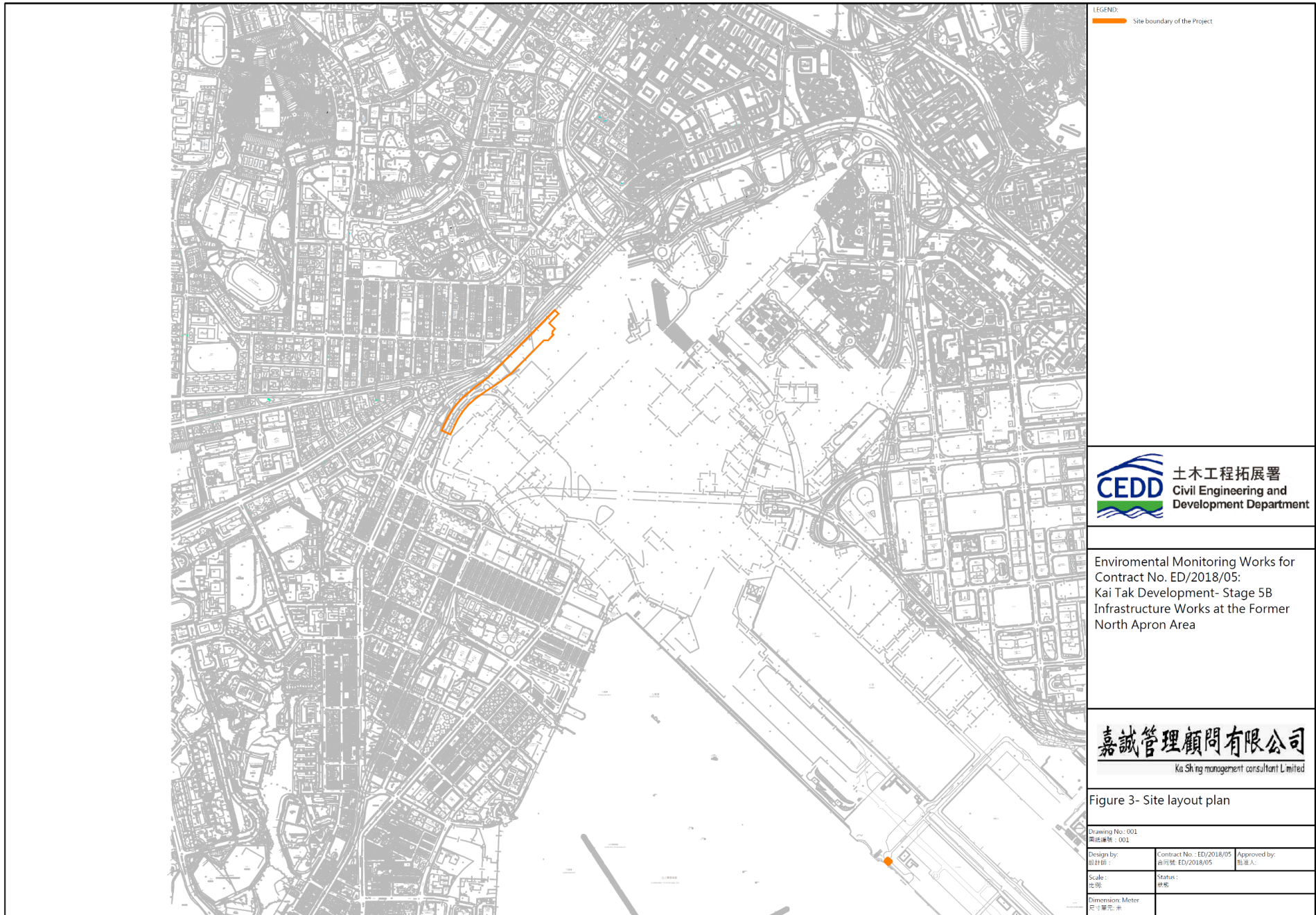


Figure 3 – D1 Road Site Layout Plan

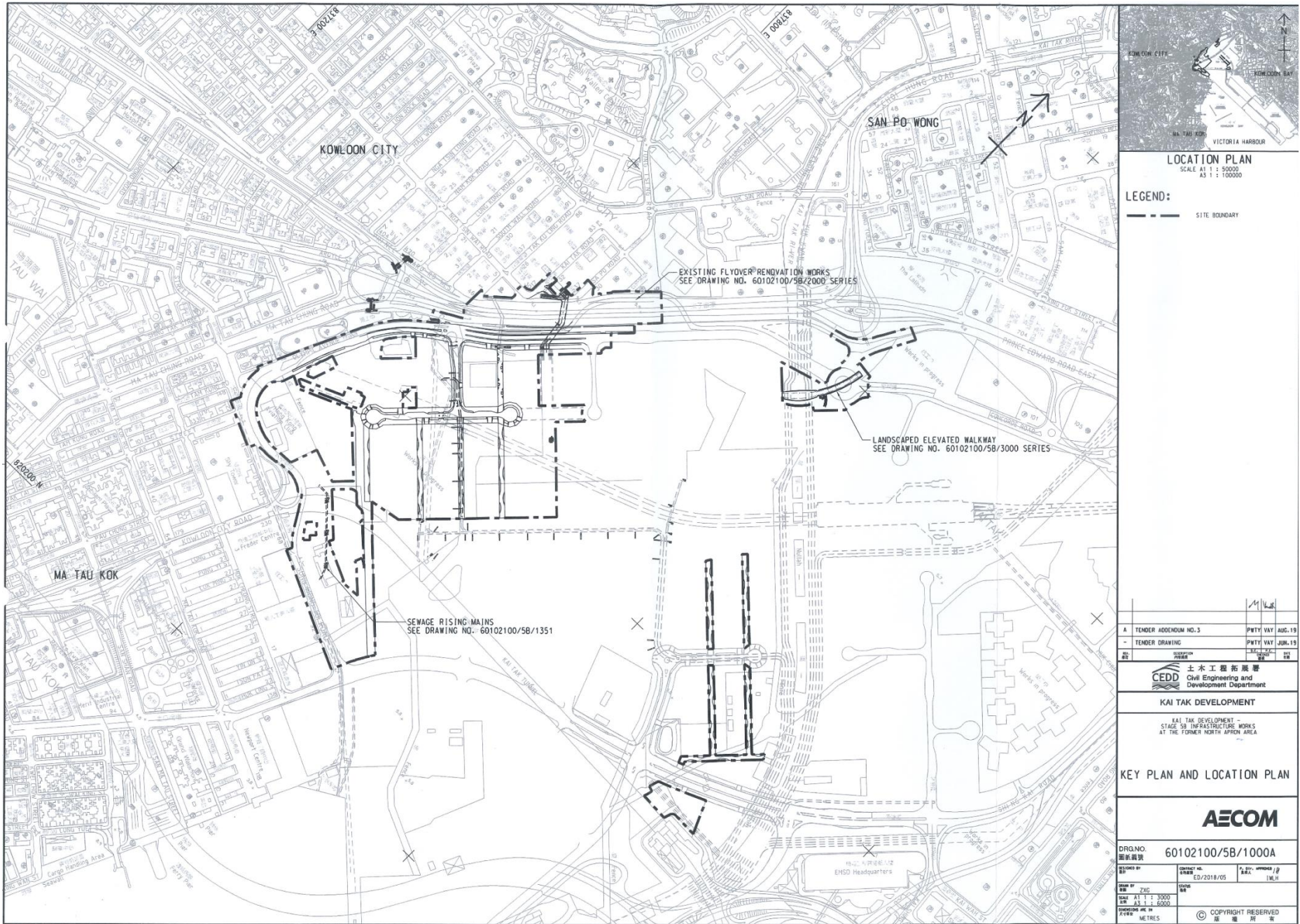


Figure 4 – Site Layout Plan

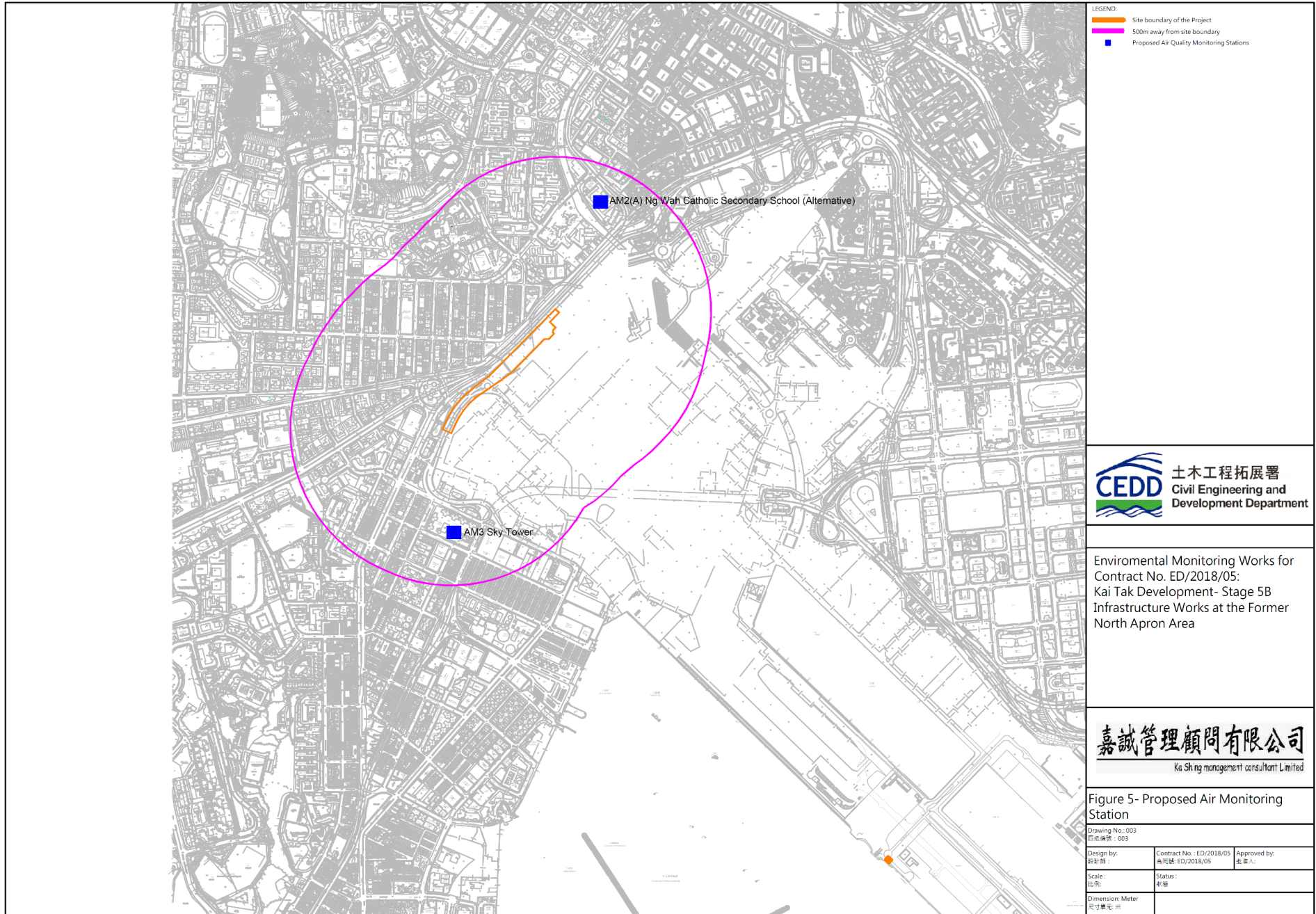


Figure 5 – Air Quality Monitoring Stations



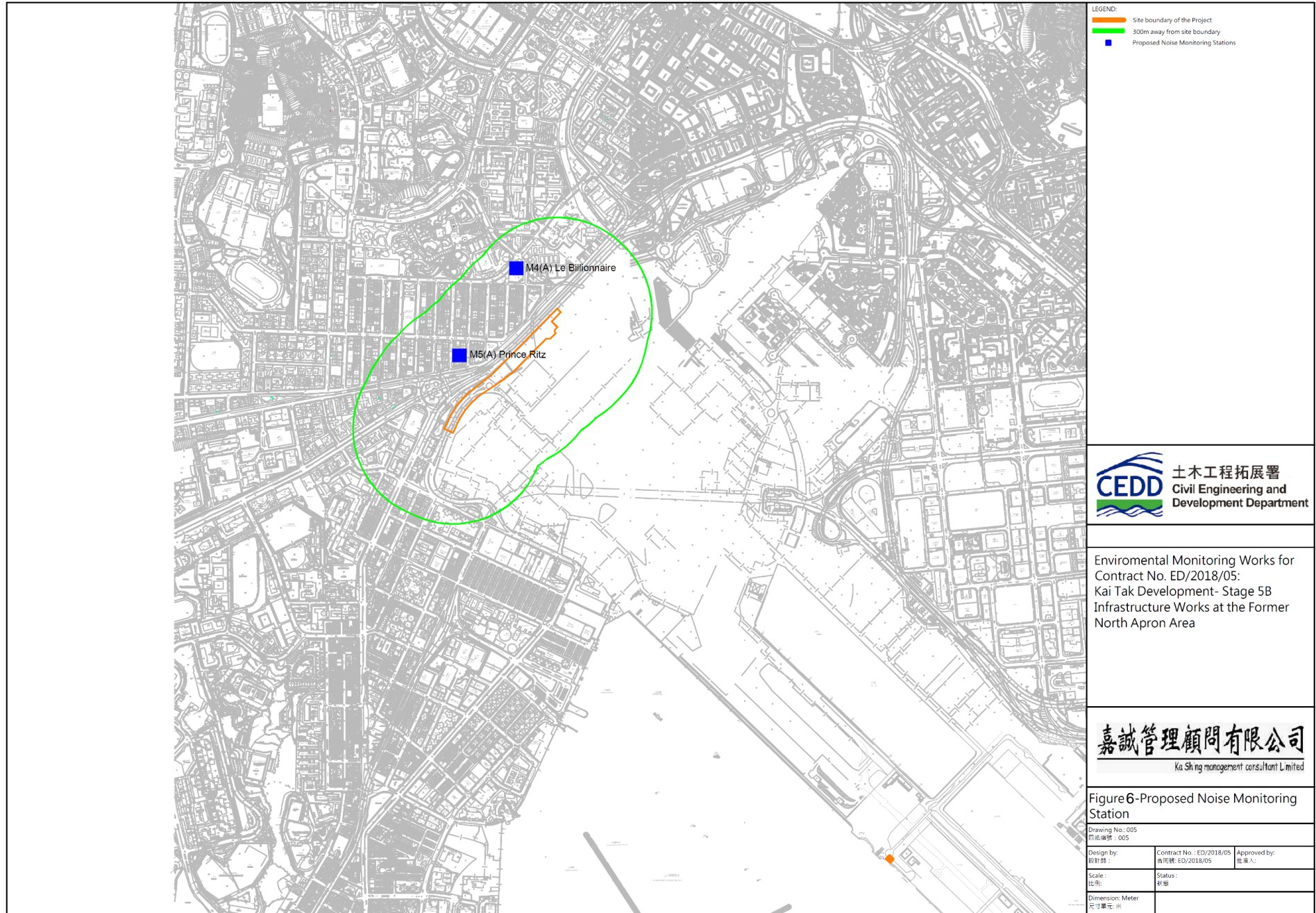
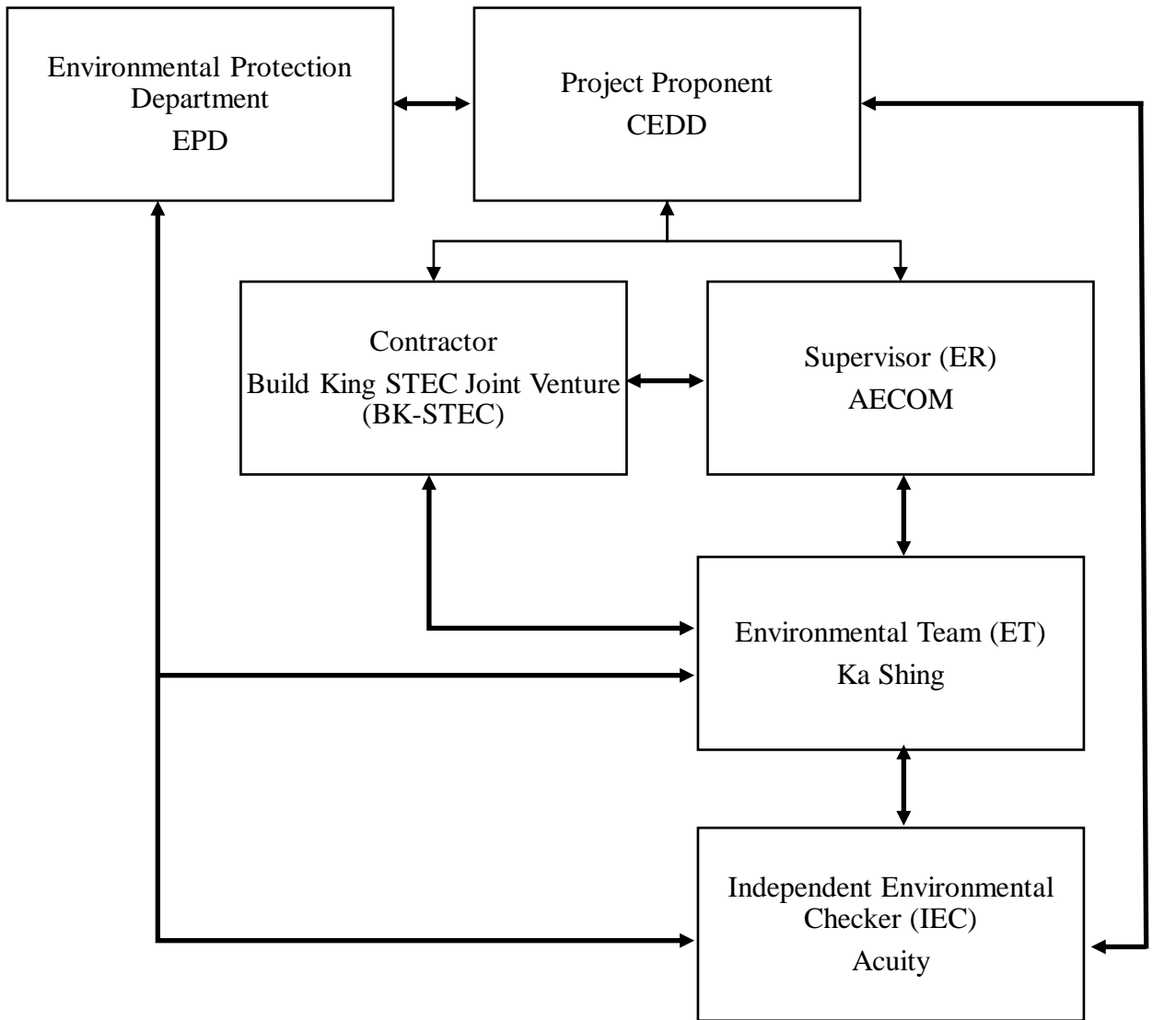


Figure 6 – Noise Monitoring Stations

**Appendix A – Organization Chart of EM&A Team**



Link of communication

# **Appendix B – Construction Programme**













**Appendix C – Environmental monitoring schedules**

Environmental Monitoring and Weekly Site Inspection Schedule for December 2021

December 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2 Weekly Site Inspection 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	3	4
5	6	7	8 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	9 Weekly Site Inspection	10	11
12	13	14 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	15	16	17 Weekly Site Inspection	18
19	20 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	21	22	23 Weekly Site Inspection	24 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3	25
26	27	28	29	30 Weekly Site Inspection + SSMC meeting 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	31	

**Air Quality Monitoring Station**

AM2(A) Ng Wah Catholic Secondary School  
AM3 - Sky Tower

**Noise Quality Monitoring Station**

M4(A) - Le Billionnaire  
M5(A) - Prince Ritz

Environmental Monitoring and Weekly Site Inspection Schedule for January 2022

January 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	6 Weekly Site Inspection	7	8
9	10	11 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	12	13 Weekly Site Inspection	14	15
16	17 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	18	19	20 Weekly Site Inspection	21	22 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3
23	24	25	26 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	27 Weekly Site Inspection + SSMC meeting	28	29
30	31 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)					

NOTE:

- 1) Site inspection schedule and Impact monitoring schedule may be changed due to unforeseen circumstance (e.g. adverse weather).

**Air Quality Monitoring Station**

AM2(A) Ng Wah Catholic Secondary School  
AM3 - Sky Tower

**Noise Quality Monitoring Station**

M4(A) - Le Billionnaire  
M5(A) - Prince Ritz

**Appendix D – Photographic records**

## Impact Air Quality Monitoring



Measurement setup at AM2(A)



Measurement setup at AM3



Weather Station at the rooftop of Ng Wah Catholic Secondary School

Impact Noise Monitoring



Measurement setup at M4(A)



Measurement setup at M5(A)

**Appendix E – Calibration certificates, catalogue of air quality  
monitoring equipment**



## Catalogue of High Volume Sampler (HVS)



### TSP MFC

Total Suspended Particulate, Mass Flow Controlled



**MFC TSP**  
Ambient Air Sampler

The TE-5170 is a high volume ambient Total Suspended Particulate (TSP) air sampler featuring a mass flow controller (MFC) for accurate and consistent particulate sampling. The mass flow controller adjust the motor speed as the filter media collects particulate to maintain a constant flow rate throughout the entire sample duration. The system utilizes a stainless steel filter holder for use with standard 8" x 10" filter paper. The anodized aluminum shelter and robust electrical components allow the system to operate a continuous 24 hour sample.

**ABOUT US:** Tisch Environmental Inc. Tisch Environmental is the benchmark for high volume air sampling, particulate, metals, volatiles, and specialty monitoring equipment. Since the company's inception in 1953 as General Metal Works, our product line has expanded from the first high volume air sampler to include high-tech and custom samplers. Our clients are professionals from every sector of the regulatory and industrial markets.

- ✔ Meets EPA CFR, Appendix B to Part 50
- ✔ Total Suspended Particulate(TSP)
- ✔ Mass Flow Controlled
- ✔ 7-Day Mechanical Timer
- ✔ Elapsed Time Indicator
- ✔ Aluminum Outdoor Shelter
- ✔ Brush Style Motor
- ✔ Dickson Chart Recorder, 24 Hour
- ✔ Stainless Steel Filter Holder
- ✔ 36-60 CFM
- ✔ Made In USA

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513-467-9000  
sales@tisch-env.com



## TSP MFC

MFC TSP Ambient Air Sampler

### General System Specifications

**Particulate Size:**Total Suspended Particulate (TSP)  
**EPA Designation:** CFR 40 Part 50 Appendix B  
**Flow Controller:** Mass Flow Controller  
**Motor Style:**Brush Style Motor Assembly  
**Pressure Recorder:**Dickson Chart Recorder, 24 hour  
**Timer:**7 Day Mechanical  
**Elapsed Time Indicator:**Mechanical, Hours and Tenths  
**Flow Range:**39-60CFM, 1.09M<sup>3</sup>M-1.68M<sup>3</sup>M  
**Housing:**Anodized Aluminum  
**Filter Holder:**Stainless Steel, 8" x 10"  
**4" Recorder Charts:** Box of 100  
**Filter Holder:** 8" x 10" Stainless Steel with hold down frame

### Applications

US EPA Reference Method Sampling, CFR Appendix J Part 50 Regulatory Compliance  
 Institutional Studies  
 Construction Sites  
 Bridge and Water Tower Painting Sites  
 Fence Line Monitoring  
 Industrial Monitoring  
 Landfill Monitoring  
 Public Health Applications

### Optional Equipment

TE-3000 Filter Holder Cartridge  
 TE-G653 8" x 10" Glass Fiber Filter Media  
 TE-33384 Motor Brush Set (110volt)  
 TE-33378 Motor Brush Set (220volt)  
 TE-116311 Replacement Motor (110volt)  
 TE-116312 Replacement Motor (220volt)  
 TE-106 Recorder Charts  
 TE-160 Recorder Pen Points  
 TE-5018 Gasket 8" x 10"

### Available Models

TE-5170 TSP MFC, 110 Volt 60 Hertz, 8 Amps  
 TE-5170X TSP MFC, 220 Volt 50 Hertz 4 Amps  
 TE-5170XZ TSP MFC, 220 Volts 60 Hertz, 4 Amps

### Calibration Equipment

TE-5028 -Variable Flow Calibration Kit  
 TE-HVC-V Xcalibrator HiVol Calibrator

### Physical Specifications

**Weight:** 75lbs, Shelter  
**Shipping Dimensions:** 46"W x 23"L x 20" H, Shelter  
 19"W x 19"L x 20"H, Lid  
**Assembled Dimensions:** 28"W x 28"L x 61"H

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## Calibration Certificate of HVS

### Air Sampler Calibration Curve Plotting & Calculation (Dickson recorder)

Calibration curve ref. No. : ATSPC-01-2021111801      Date of calibration : 18/11/2021

Location : Sky Tower      Sampler : TE-5170X

Serial Number : 4687

Ambient barometric pressure, Pa = 760.6 (mmHg)      Ambient temperature, Ta = 300.45 (deg K)

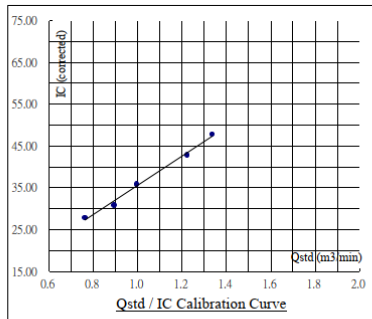
Qstd Slope, m = 2.03518      Qstd Intercept, b = -0.005890

#### Calibration Curve

Plate No.	H <sub>2</sub> O (in)	Qstd (m <sup>3</sup> / min)	I (chart)	IC (corrected)
18	7.40	1.335	48.0	47.82
13	6.20	1.222	43.0	42.84
10	4.10	0.994	36.0	35.87
7	3.30	0.892	31.0	30.89
5	2.40	0.761	28.0	27.90

#### Subsequent calculation of sampler flow

Method	Calibration equation	Slope, m	Intercept, b	Corr. coeff. r
Dickson recorder	$Qstd = 1 / m1 [ (I) ( \text{Sqrt} ( (Pa / 760) (298 / Ta) ) ) - b ]$	34.907	0.7324	0.9962



Calibration curve requirements : (A).  $r > 0.990$  ; (B). At least 3 Qstd numbers are in the TSP range ( 1.1 - 1.7 m<sup>3</sup> / min ).

Remark :  $Qstd ( m^3 / min ) = 1/m [ \text{Sqrt} ( H_2O ( Pa / 760 ) ( 298 / Ta ) ) - b ]$   
 $IC ( corrected ) = I [ \text{Sqrt} ( ( Pa / 760 ) ( 298 / Ta ) ) ]$   
 $FLOW ( corrected ) = \text{Sqrt} ( FLOW ( mano ) ( Pa / 760 ) ( 298 / Ta ) )$

Calibrated by :  18/11/2021      Checked by :  18/11/2021

Name : ( Ben Poon )      Name : ( Tommy Wong )

Fern.No. INS-HVS-CAL 04 16 01 2020

### Air Sampler Calibration Curve Plotting & Calculation (Dickson recorder)

Calibration curve ref. No. : ATSPC-01-2021111804      Date of calibration : 18/11/2021

Location : Ng Wah Catholic Secondary School      Sampler : TE-5170X

Serial Numbers : 4360

Ambient barometric pressure, Pa = 760.6 (mmHg)      Ambient temperature, Ta = 300.45 (deg K)

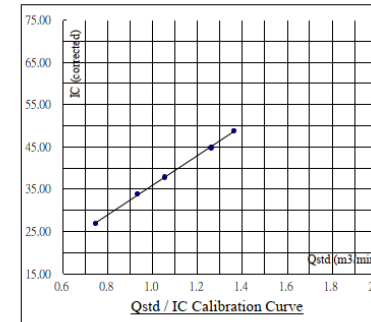
Qstd Slope, m = 2.03518      Qstd Intercept, b = -0.005890

#### Calibration Curve

Plate No.	H <sub>2</sub> O (in)	Qstd (m <sup>3</sup> / min)	I (chart)	IC (corrected)
18	7.70	1.361	49.0	48.82
13	6.60	1.261	45.0	44.83
10	4.60	1.053	38.0	37.86
7	3.60	0.932	34.0	33.87
5	2.30	0.745	27.0	26.90

#### Subsequent calculation of sampler flow

Method	Calibration equation	Slope, m	Intercept, b	Corr. coeff. r
Dickson recorder	$Qstd = 1 / m1 [ (I) ( \text{Sqrt} ( (Pa / 760) (298 / Ta) ) ) - b ]$	35.073	0.9142	0.9996



Calibration curve requirements : (A).  $r > 0.990$  ; (B). At least 3 Qstd numbers are in the TSP range ( 1.1 - 1.7 m<sup>3</sup> / min ).

Remark :  $Qstd ( m^3 / min ) = 1/m [ \text{Sqrt} ( H_2O ( Pa / 760 ) ( 298 / Ta ) ) - b ]$   
 $IC ( corrected ) = I [ \text{Sqrt} ( ( Pa / 760 ) ( 298 / Ta ) ) ]$   
 $FLOW ( corrected ) = \text{Sqrt} ( FLOW ( mano ) ( Pa / 760 ) ( 298 / Ta ) )$

Calibrated by :  18/11/2021      Checked by :  18/11/2021

Name : ( Ben Poon )      Name : ( Tommy Wong )

Fern.No. INS-HVS-CAL 04 16 01 2020



RECALIBRATION
DUE DATE:
June 1, 2022

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: June 1, 2021	Rootsmeter S/N: 438320	Ta: 292 °K	
Operator: Jim Tisch		Pa: 754.9 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 0006		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4370	3.2	2.00
2	3	4	1	1.0130	6.4	4.00
3	5	6	1	0.9060	8.0	5.00
4	7	8	1	0.8590	8.9	5.50
5	9	10	1	0.7110	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)
1.0094	0.7024	1.4239	0.9958	0.6929	0.8796
1.0051	0.9922	2.0136	0.9915	0.9788	1.2439
1.0029	1.1070	2.2513	0.9894	1.0921	1.3907
1.0017	1.1662	2.3612	0.9882	1.1504	1.4586
0.9964	1.4014	2.8477	0.9829	1.3824	1.7591
<b>QSTD</b>	m=	<b>2.03518</b>	<b>QA</b>	m=	<b>1.27440</b>
	b=	<b>-0.00589</b>		b=	<b>-0.00364</b>
	r=	<b>0.99997</b>		r=	<b>0.99997</b>

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

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

Tisch Environmental, Inc.  
 1000 South Miami Avenue  
 Cleveland, Ohio 44115-4500

[www.tisch-env.com](http://www.tisch-env.com)  
 TOLL FREE: (877)263-7610  
 FAX: (513)467-9009

## Catalogue of Dust Meter (TSI Sidepak AM510)

The SidePak AM510 monitor's easy-to-read display shows your data as both real-time aerosol mass-concentration and 8-hour time-weighted average (TWA). With its convenient data logging and long battery life, the AM510 is also ideal for extended sampling. The easy-to-use TrakPro Data Analysis Software lets you create effective graphs and reports.



### User Friendly

- + Small, lightweight and quiet to maximize worker acceptance
- + Rugged design with secure belt clip
- + Easy-to-understand user interface with only four keys
- + Lockable keypad prevents tampering while sampling
- + User-adjustable sample flow rate
- + Define, label and store multiple calibration constants
- + Easy-to-read LCD display
- + Convenient, threaded tripod socket accommodates area sampling

### Advanced Features

- + Smart Battery Management System provides precise run time information, maximizes battery capacity and speeds charging
- + Integrated pump allows use of size-selective aerosol inlet conditioners
- + Built-in impactors let you choose "none," 1.0, 2.5 or 10-micron cut off
- + 10-mm Dorr-Oliver cyclone for respirable sampling
- + Display shows real-time concentrations (mg/m<sup>3</sup>) and "on-the-fly" TWA as you data log
- + Display statistics: max, min and average readings, elapsed time and 8-hour TWA

### Quick and Easy Reports

- + Convenient preprogramming for occupational exposure sampling
- + Data log for long periods and store multiple tests
- + Analyze data, print graphs and create reports with TrakPro Data Analysis Software
- + USB port lets you conveniently connect to your computer

### Power to Spare

- + Long-lasting NiMH rechargeable battery packs eliminate "memory" issues
- + Choice of rechargeable NiMH smart battery packs or AA-cell pack

### Model AM510 SidePak Personal Aerosol Monitor

<b>Sensitivity</b>	90° light scattering,
Sensor Type	670 nm laser diode
Aerosol Concentration Range	0.001 to 20 mg/m <sup>3</sup> (calibrated to respirable fraction of ISO 12103-1, A1 test dust)
Particle Size Range	0.1 to 10 micrometer (µm)
Minimum Resolution	0.001 mg/m <sup>3</sup>
Zero stability	±0.001 mg/m <sup>3</sup> over 24 hours
Temperature Coefficient	using 10-second time-constant
	Approximately +0.0005 mg/m <sup>3</sup> per °C (for variations from temperature at which instrument was last zeroed)

<b>Flow Rate</b>	User-adjustable, 0.7 to 1.8
Range	liters/min (L/min)

<b>Temperature Range</b>	32 to 120°F (0 to 50°C)
Operating Range	
Storage Range	-4 to 140°F (-20 to 60°C)

<b>Operational Humidity</b>	0 to 95% RH, non-condensing
-----------------------------	-----------------------------

<b>Time Constant (LCD display)</b>	User-adjustable, 1 to 60 seconds
Range	

<b>Data Logging</b>	Approx. 31,000
Data Points	
Logging Interval	User-adjustable, 1 second to 1 hour

<b>User-Select Calibration Factors</b>	1.0 (non-adjustable)
Factory Setting	
User-defined Settings	3, with user-defined labels
Range	0.1 to 10.0, user-adjustable

<b>Physical</b>	
External Dimensions	4.2 x 3.7 x 2.8 in. (106 x 92 x 70 mm) with 801723, 801724, 801729 or 801743 battery
	5.1 x 3.7 x 2.8 in. (130 x 92 x 70 mm) with 801708, 801722, 801728, 801735, or 801736 battery
Weight	16 oz (0.46 kg) with 801723, 801724, 801729 or 801743 battery
	19 oz (0.54 kg) with 801708, 01722, 801728, 801735, or 801736 battery
Display	2 line x 12 character LCD
Tripod Socket	1/4-20 female thread

<b>Power Supply/Charger (P/N 2613210)</b>	
Input Voltage Range	100 to 240 VAC, 50 to 60 Hz
Output Voltage	9 VDC @ 1.0 A

### Maintenance

Factory Clean/Calibrate	Recommended annually
User Zero Calibration	Before each use
User Flow Calibration	As needed

### Communications Interface

Type	USB 1.1
Connector, Instrument	USB Mini-B (socket)

### Minimum Computer Requirements for TrakPro™ Data Analysis Software

Communications Port	Universal Serial Bus (USB)
	v 1.1 or higher
Operating System	Microsoft Windows® XP, or 7 (32-bit or 64-bit) operating systems

### Battery Performance

Battery Options	Charge Time (hrs)*	Intrinsic Safety Rating	Run Time (hrs @ 1.7 L/min)
1600 mAh NiMH Pack, 4.8 V (P/N 801723)	3.0	No	7.1
1650 mAh NiMH Pack, 4.8V (P/N 801724, 801729 or 801743)	3.5	CSA**	7.5
2700 mAh NiMH Pack, 4.8 V (P/N 801722 or 801728)	5.5	No	12.0
2700 mAh NiMH Pack, 4.8 V (P/N 801735)	5.5	No	12.0
6-Cell AA-size Alkaline Pack*** (P/N 801708 or 801736 with six user-supplied AA cells)	N/A	No	22.5

\*Of a fully depleted battery  
\*\*All dust plugs and dust gaskets must be installed.  
\*\*\*Using Energizer AA-size, E91 alkaline batteries.

### Battery Level Indicator

The Smart Battery Management System™ technology utilizes a built-in "gauge" in the SidePak™ battery packs. The gauge monitors battery capacity and calculates run time information by dividing capacity of the battery (mAh) by the instantaneous current consumed by the instrument (mA). This calculation is correct for current operating conditions and can change due to current (mA) consumption or changes in battery capacity.

## Calibration Certificate of Dust Meter (TSI Sidepak AM510)

**CERTIFICATE OF CALIBRATION AND TESTING**  
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA  
 Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

<b>Environment Conditions</b>		<b>Model</b>	<b>AM510</b>
Temperature	75.69 (24.3) °F (°C)	<b>Serial Number</b>	<b>11208032</b>
Relative Humidity	49.8 %RH		
Barometric Pressure	28.78 (974.6) inHg (hPa)		

As Left       In Tolerance  
 As Found       Out of Tolerance

**Concentration Linearity Plot**  

System ID: DTH101-02

CONCENTRATION			Unit: mg/m <sup>3</sup>				
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	1.625	1.584	1.462-1.788	3	0.064	0.063	0.045-0.083
2	0.234	0.235	0.199-0.269	4	13.990	13.985	12.591-15.389

*TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1.*

<b>Measurement Variable</b>	<b>System ID</b>	<b>Last Cal.</b>	<b>Cal. Due</b>	<b>Measurement Variable</b>	<b>System ID</b>	<b>Last Cal.</b>	<b>Cal. Due</b>
DC Voltage	E003314	01-11-21	01-31-22	Pneumometer	E003319	02-15-21	08-31-21
Microbalance	M001324	01-29-21	01-31-23	Pressure	E003511	10-26-20	10-31-21
Flowmeter	E005626	03-09-21	03-31-22	DC Voltage	E003315	01-11-21	01-31-22

August 11, 2021  
 Date

### Personal Aerosol Monitor Performance check with High Volume Sampler

Performance Check ref. No. AS0210818-4 Report Issue Date 18/08/2021  
 Date of performance check 16/08/2021

**Objective:**

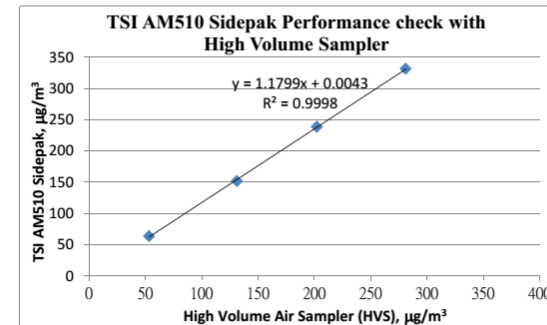
A dust meter and a Total Suspended Particulate High Volume Air Sampler (HVS) were placed together to measure the Total Suspended Particulate (TSP) concentrations simultaneously to check the performance.

**Equipment Used:**

Equipment	Manufacturer and Model	Serial Number
Personal Aerosol Monitor	TSI AM510 Sidepak	11208032
Total Suspended Particulate High Volume Air Sampler	GS2310	10346

**Result:**

Equipment	Measurement Result, µg/m <sup>3</sup>			
TSI AM510 Sidepak	64	152	239	332
High Volume Air Sampler (HVS)	53	131	202	281



Tested by: 18/08/2021      Checked by: 18/08/2021  
 Name: ( Ben Poon )      Name: ( Tommy Wong )

## Calibration Certificate of Dust Meter (TSI Sidepak AM510)

**CERTIFICATE OF CALIBRATION AND TESTING**  
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA  
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		Model	<b>AM510</b>
Temperature	76.78 (24.9) °F (°C)	Serial Number	<b>11506014</b>
Relative Humidity	44.9 %RH		
Barometric Pressure	28.92 (979.3) inHg (hPa)		

As Left       In Tolerance  
 As Found       Out of Tolerance

**Concentration Linearity Plot**

CONCENTRATION				Unit: mg/m <sup>3</sup>			
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	2.032	1.967	1.829-2.235	3	0.117	0.120	0.082-0.152
2	0.297	0.298	0.252-0.342	4	13.076	13.145	11.768-14.384

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E003314	01-11-21	01-31-22	Photometer	E003319	02-15-21	08-31-21
Microbalance	M001324	01-29-21	01-31-23	Pressure	E003511	10-26-20	10-31-21
Flowmeter	E005626	03-09-21	03-31-22	DC Voltage	E003315	01-11-21	01-31-22

\_\_\_\_\_ Date  
 Calibrated

### Personal Aerosol Monitor Performance check with High Volume Sampler

Performance Check ref. No. AS0210625-1 Report Issue Date 25/06/2021  
 Date of performance check 22/06/2021

**Objective:**

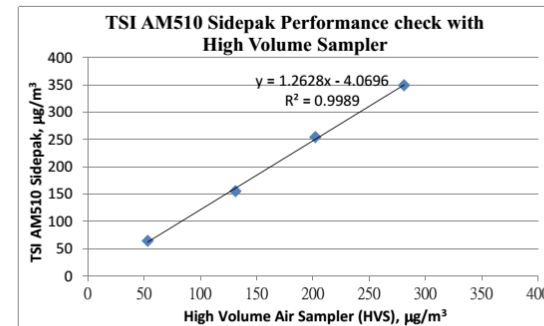
A dust meter and a Total Suspended Particulate High Volume Air Sampler (HVS) were placed together to measure the Total Suspended Particulate (TSP) concentrations simultaneously to check the performance.

**Equipment Used:**

Equipment	Manufacturer and Model	Serial Number
Personal Aerosol Monitor	TSI AM510 Sidepak	11506014
Total Suspended Particulate High Volume Air Sampler	GS2310	10346

**Result:**

Equipment	Measurement Result, µg/m <sup>3</sup>			
TSI AM510 Sidepak	65	156	255	350
High Volume Air Sampler (HVS)	53	131	202	281



Tested by : 25/06/2021      Checked by : 25/06/2021  
 Name : ( Ben Poon )      Name : ( Tommy Wong )

Form No. ENV CAL SAMPLER CC1 d412/12/2003

# Catalogue of Weather Station

## Cabled Vantage Pro2™ & Vantage Pro2 Plus™ Stations



**6152C  
6162C**  
**Vantage Pro2™**

The Vantage Pro2™ (# 6152C) and Vantage Pro2™ Plus (# 6162C) cabled weather stations include two components: the Integrated Sensor Suite (ISS) and the console. The ISS contains the sensor interface module (SIM), rain collector, an anemometer, and a passive radiation shield. The Vantage Pro2 console provides the user interface, data display, and calculations. The Vantage Pro2 Plus weather station includes two additional sensors that are optional on the Vantage Pro2 and purchased separately: the UV Sensor and the Solar Radiation Sensor. The console and ISS are powered by an AC-power adapter connected to the console. Batteries can be installed in the console to provide a backup power supply. Use WeatherLink® to let your weather station interface with a computer, log data, and upload weather information to the Internet. The 6152C and 6162C models rely on passive shielding to reduce solar-radiation induced temperature errors in the outside temperature sensor readings.

### Integrated Sensor Suite (ISS)

Operating Temperature	-40° to +150°F (-40° to +65°C)
Non-operating Temperature	-40° to +158°F (-40° to +70°C)
Current Draw	5 mA (average) at 4 to 6 VDC for ISS only. 10 mA average for both console and ISS
Connectors, Sensor	Modular RJ-11
Cable Type	4-conductor, 26 AWG
Cable Length, Anemometer	40' (12 m) (included); 240' (73 m) (maximum recommended)

Note: Maximum displayable wind decreases as the length of cable increases. At 140' (42 m) of cable, the maximum wind speed displayed is 135 mph (60 m/s); at 240' (73 m), the maximum wind speed displayed is 100 mph (34 m/s).

Wind Speed Sensor	Solid state magnetic sensor
Wind Direction Sensor	Wind vane with potentiometer
Rain Collector Type	Tipping bucket, 0.01" per tip (0.2 mm with metric rain adapter), 33.2 in <sup>2</sup> (214 cm <sup>2</sup> ) collection area
Temperature Sensor Type	PN Junction Silicon Diode
Relative Humidity Sensor Type	Film capacitor element
Housing Material	UV-resistant ABS, polypropylene
Sensor Inputs	
RF Filtering	RC low-pass filter on each signal line

ISS Dimensions(not including anemometer or bird spikes):

Vantage Pro2 with Standard Rad Shield	14.0" x 9.4" x 14.5" (356 mm x 239 mm x 368 mm)
Vantage Pro2 with Fan-Aspirated Rad Shield	20.8" x 9.4" x 16.0" (528 mm x 239 mm x 406 mm)
Vantage Pro2 Plus with Standard Rad Shield	14.3" x 9.7" x 14.5" (363 mm x 246 mm x 368 mm)
Vantage Pro2 Plus with Fan-Aspirated Rad Shield	21.1" x 9.7" x 16.0" (536 mm x 246 mm x 406 mm)

**DAVIS**  **Davis Instruments** 3465 Diablo Ave., Hayward, CA 94545-2778 USA  
(510) 732-9229 • FAX (510) 670-0589 • sales@davisinstruments.com • www.davisinstruments.com

DS6152C, 6162C Rev. W 12/7/18  
1

**7**  
**Vantage Pro2™**

### Ultra Violet (UV) Radiation Index (requires UV sensor)

Resolution and Units	0.1 Index
Range	0 to 16 Index
Accuracy	±5% of full scale (Reference: Yankee UVB-1 at UV index 10 (Extremely High))
Cosine Response	±4% FS (0° to 90° zenith angle)
Update Interval	50 seconds to 1 minute (5 minutes when dark)
Current Graph Data	Instant Reading and Hourly Average; Daily, Monthly High
Historical Graph Data	Hourly Average, Daily, Monthly Highs
Alarm	High Threshold from Instant Calculation

### Wind

Wind Chill (Calculated)	
Resolution and Units	1°F or 1°C (user-selectable); °C is converted from °F and rounded to the nearest 1°C
Range	-110° to +135°F (-79° to +57°C)
Accuracy	±2°F (±1°C) (typical)
Update Interval	10 to 12 seconds
Source	United States National Weather Service (NWS)/NOAA
Equation Used	Osczevski (1995) (adopted by US NWS in 2001)
Variables Used	Instant Outside Temperature and 10-min. Avg. Wind Speed
Current Display Data	Instant Calculation
Current Graph Data	Instant Calculation; Hourly, Daily and Monthly Low
Historical Graph Data	Hourly, Daily and Monthly Lows
Alarm	Low Threshold from Instant Calculation

### Wind Direction

Range	1 - 360°
Display Resolution	16 points (22.5°) on compass rose, 1° in numeric display
Accuracy	±3°
Update Interval	2.5 to 3 seconds
Current Graph Data	Instant Reading (user adjustable); 10-min. Dominant; Hourly, Daily, Monthly Dominant
Historical Graph Data	Past 6 10-min. Dominants on compass rose only; Hourly, Daily, Monthly Dominants

### Wind Speed

Resolution and Units	1 mph, 1 km/h, 0.4 m/s, or 1 knot (user-selectable) Measured in mph; other units are converted from mph and rounded to nearest 1 km/hr, 0.1 m/s, or 1 knot.
Range	0 to 200 mph, 0 to 173 knots, 0 to 89 m/s, 0 to 322 km/h
Update Interval	Instant Reading: 2.5 to 3 seconds, 10-minute Average: 1 minute
Accuracy	±2 mph (2 kts, 3.2 km/h, 0.9 m/s) or ±5%, whichever is greater
Maximum Cable Length	540' (165 m) (Note that maximum wind speed reading decreases as length of cable from anemometer to ISS increases.)
Current Display Data	Instant
Current Graph Data	Instant Reading; 10-minute and Hourly Average; Hourly High; Daily, Monthly and Yearly High with Direction of High
Historical Graph Data	10-min. and Hourly Averages; Hourly Highs; Daily, Monthly and Yearly Highs with Direction of Highs
Alarms	High Thresholds from Instant Reading and 10-minute Average

# Calibration Certificate of Weather Station



**Cal Lab Limited 校正實驗室有限公司**  
 Room 2103, Technology Plaza, 29-35 Sha Tsui Road,  
 Tsuen Wan, NT, Hong Kong  
 Tel: +852 25680106 Email: info@callab.com.hk  
 Fax: +852 30116194 Website: www.callab.com.hk

AAS-T-W5-03, 30/9/2021

**Calibration Certificate No.: CC0262109**

**Customer Information**

Customer: Castco Testing Centre Limited  
 Address: 33, On Kui Street, Fanling, N.T.

**Equipment Identification**

Equipment Description	Manufacturer	Model No.	Serial No.	Assigned equipment No.:
Weather Station	Davis Vantage PRO 2	6152CUK	AZ170710016	N/A

**Certificate Information**

Date of Receipt:	29 September 2021	Calibration Condition:	24.5°C, 54%RH, 1001hPa
Date of Calibration:	30 September 2021	Adjustment:	The arrow head was adjusted to the magnetic north before performing calibration.
Due Date of Calibration:	N/A	Appearance:	Good
Calibration Procedure:	JIF 1183-2007, JIG 1076-2001, SOP-116, SOP-252	Remark:	N/A

**Reference Equipment Identification**

Equipment Description	Model	Serial No.	Expiration Date
Platinum resistance thermometer	KPPRHT-A-1	KCI I-1095, KCI P-1095	28 June 2023
Humidity sensor	KPPRHT-A-1	KCI I-1095, KCI P-1095	4 March 2022
Hot Wire Anemometer	9535	T95351316004	11 July 2022

Note1: The estimated expanded uncertainties have been calculated in "Evaluation and expression of uncertainty in measurement" and give an internal estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.  
 Note2: The standard (s) and instrument used in the calibration are traceable to national or international recognized standard and are calibrated on a schedule to maintain the accuracy and good condition.  
 Note3: The result 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.  
 Note4: The result shown in this calibration certificate relate only to the item calibrated, and the result only applies to the calibration item as received.

Approved By:

*Warren Yeung*  
 Warren Yeung

Company Chop:



Certificate issue Date: 4 October 2021

CT-88G-03

1. The certificate shall not be reproduced except in full, without written approval of Cal Lab Calibration  
 2. The certificate is issued subject to the latest Terms and Conditions, available at our web site

CC0262109  
 Page 1 of 2



**Cal Lab Limited 校正實驗室有限公司**  
 Room 2103, Technology Plaza, 29-35 Sha Tsui Road,  
 Tsuen Wan, NT, Hong Kong  
 Tel: +852 25680106 Email: info@callab.com.hk  
 Fax: +852 30116194 Website: www.callab.com.hk

**Result of Calibration**

**Temperature**

Reference reading (°C)	Reading (°C)	Error (°C)
15.0	15	0.0
20.0	20	0.0
25.0	25	0.0
30.0	30	0.0

**Relative Humidity**

Reference reading (%RH)	Reading (%RH)	Error (%RH)
40.0	41	1
50.0	52	2
70.0	72	2

**Wind Speed**

Reference reading (m/s)	Measured reading (m/s)	Error (%)
0.0	0.0	N/A
2.0	2.1	5.0
5.0	5.2	4.0
8.0	8.2	2.5

**Wind Direction**

Reference reading	Measured reading	Error
0°	0°	0°
45°	45°	0°
90°	90°	0°
135°	135°	0°
180°	180°	0°
225°	225°	0°
270°	270°	0°
315°	315°	0°

\*\*\* End of Certificate \*\*\*

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 2. The certificate is issued subject to the latest Terms and Conditions, available at our web site

CC0262109  
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**Appendix F – Weather information**

General Information

Date	Absolute Daily Min Temperature (°C)	Absolute Daily Max Temperature (°C)	Total Rainfall (mm)	Mean Relative Humidity (%)
01/12/2021	14.8	20.1	0.0	40
02/12/2021	14.6	20.4	0.0	42
03/12/2021	14.7	21.3	0.0	35
04/12/2021	15.3	20.6	0.0	46
05/12/2021	16.7	22.2	0.0	55
06/12/2021	16.4	22.2	0.0	59
07/12/2021	17.1	22.5	0.0	65
08/12/2021	18.4	22.2	0.0	67
09/12/2021	18.7	22.9	0.0	72
10/12/2021	18.6	23.7	0.0	73
11/12/2021	20.0	24.4	0.0	74
12/12/2021	19.2	24.7	0.0	75
13/12/2021	17.4	21.5	0.0	67
14/12/2021	18.7	23.6	Trace	72
15/12/2021	19.9	23.0	0.2	78
16/12/2021	21.7	25.8	Trace	81
17/12/2021	18.9	23.8	0.0	69
18/12/2021	16.3	20.0	0.0	58
19/12/2021	16.0	19.7	0.0	51
20/12/2021	15.7	19.3	9.4	78
21/12/2021	16.0	19.0	2.4	88
22/12/2021	17.1	21.7	Trace	80
23/12/2021	18.7	21.9	0.8	77
24/12/2021	18.2	21.8	1.7	84
25/12/2021	17.9	21.5	Trace	75
26/12/2021	11.7	18.5	3.5	78
27/12/2021	9.9	14.6	1.3	81
28/12/2021	12.2	17.5	0.2	74
29/12/2021	16.6	20.6	0.0	74
30/12/2021	16.2	21.4	0.0	77
31/12/2021	17.1	19.9	Trace	78

NOTE1: The above weather information was obtained from manned weather station of Hong Kong Observatory.

NOTE2: Trace means rainfall less than 0.05 mm

<https://www.hko.gov.hk/en/cis/dailyExtract.htm?y=2021&m=12>

## Kai Tak Runway Park Information

Date	Absolute Daily Min Temperature (°C)	Absolute Daily Max Temperature (°C)
01/12/2021	14.6	21.3
02/12/2021	14.0	22.3
03/12/2021	14.4	23.0
04/12/2021	14.8	20.4
05/12/2021	16.5	22.4
06/12/2021	15.6	23.3
07/12/2021	16.5	22.5
08/12/2021	18.7	21.8
09/12/2021	18.8	22.4
10/12/2021	18.4	23.5
11/12/2021	20.0	23.9
12/12/2021	19.3	25.9
13/12/2021	17.0	22.2
14/12/2021	18.6	25.3
15/12/2021	18.8	22.9
16/12/2021	21.3	25.2
17/12/2021	18.5	23.7
18/12/2021	16.0	21.3
19/12/2021	19.6	19.6
20/12/2021	14.8	19.6
21/12/2021	16.4	19.9
22/12/2021	16.7	23.4
23/12/2021	18.9	21.7
24/12/2021	18.4	24.0
25/12/2021	16.8	21.2
26/12/2021	12.2	18.0
27/12/2021	10.0	15.6
28/12/2021	12.2	18.3
29/12/2021	16.8	23.2
30/12/2021	16.0	22.2
31/12/2021	17.0	19.2

NOTE1: The above weather information was obtained from manned weather station of Kai Tak Runway Park.

[https://i-lens.hk/hkweather/history\\_chart.php?date=2021-12-01&chart\\_type=DG\\_TEMP](https://i-lens.hk/hkweather/history_chart.php?date=2021-12-01&chart_type=DG_TEMP)

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
01/12/2021	0:00	0.4	135	02/12/2021	0:00	0.9	112.5	03/12/2021	0:00	0.4	157.5	04/12/2021	0:00	1.3	112.5
01/12/2021	1:00	0.4	135	02/12/2021	1:00	1.3	90	03/12/2021	1:00	0.9	135	04/12/2021	1:00	1.3	112.5
01/12/2021	2:00	0.4	112.5	02/12/2021	2:00	0.9	67.5	03/12/2021	2:00	0.4	247.5	04/12/2021	2:00	0.9	112.5
01/12/2021	3:00	0.4	112.5	02/12/2021	3:00	0.9	112.5	03/12/2021	3:00	0.4	247.5	04/12/2021	3:00	0.4	112.5
01/12/2021	4:00	0.4	112.5	02/12/2021	4:00	0.9	90	03/12/2021	4:00	0.9	225	04/12/2021	4:00	0.4	22.5
01/12/2021	5:00	0.4	112.5	02/12/2021	5:00	0.9	112.5	03/12/2021	5:00	0.9	225	04/12/2021	5:00	0.4	67.5
01/12/2021	6:00	0.4	112.5	02/12/2021	6:00	1.3	90	03/12/2021	6:00	0.9	112.5	04/12/2021	6:00	0.9	112.5
01/12/2021	7:00	1.3	112.5	02/12/2021	7:00	1.3	202.5	03/12/2021	7:00	0.9	112.5	04/12/2021	7:00	0.9	90
01/12/2021	8:00	1.3	135	02/12/2021	8:00	0.9	22.5	03/12/2021	8:00	0.4	112.5	04/12/2021	8:00	0.9	67.5
01/12/2021	9:00	0.9	225	02/12/2021	9:00	0.9	180	03/12/2021	9:00	0.4	112.5	04/12/2021	9:00	0.4	112.5
01/12/2021	10:00	0.4	225	02/12/2021	10:00	0.9	270	03/12/2021	10:00	0.9	135	04/12/2021	10:00	0.9	90
01/12/2021	11:00	0.4	202.5	02/12/2021	11:00	0.9	292.5	03/12/2021	11:00	0.4	135	04/12/2021	11:00	0.4	337.5
01/12/2021	12:00	1.3	247.5	02/12/2021	12:00	0.4	270	03/12/2021	12:00	0.4	247.5	04/12/2021	12:00	0.9	247.5
01/12/2021	13:00	1.3	247.5	02/12/2021	13:00	0.9	112.5	03/12/2021	13:00	0.9	315	04/12/2021	13:00	0.9	22.5
01/12/2021	14:00	0.9	225	02/12/2021	14:00	0.4	180	03/12/2021	14:00	0	22.5	04/12/2021	14:00	0.4	225
01/12/2021	15:00	1.3	247.5	02/12/2021	15:00	0.9	112.5	03/12/2021	15:00	1.3	112.5	04/12/2021	15:00	0.9	112.5
01/12/2021	16:00	1.3	247.5	02/12/2021	16:00	1.3	112.5	03/12/2021	16:00	2.2	67.5	04/12/2021	16:00	0.4	67.5
01/12/2021	17:00	0.4	135	02/12/2021	17:00	1.3	112.5	03/12/2021	17:00	1.8	22.5	04/12/2021	17:00	0.9	22.5
01/12/2021	18:00	0.4	135	02/12/2021	18:00	0.9	112.5	03/12/2021	18:00	1.8	67.5	04/12/2021	18:00	1.3	45
01/12/2021	19:00	0.4	112.5	02/12/2021	19:00	0.9	135	03/12/2021	19:00	0.9	315	04/12/2021	19:00	1.3	22.5
01/12/2021	20:00	0.9	112.5	02/12/2021	20:00	0.9	135	03/12/2021	20:00	1.3	270	04/12/2021	20:00	0.4	337.5
01/12/2021	21:00	0.9	112.5	02/12/2021	21:00	0.9	247.5	03/12/2021	21:00	1.3	315	04/12/2021	21:00	0.4	225
01/12/2021	22:00	0.9	202.5	02/12/2021	22:00	0.4	225	03/12/2021	22:00	1.3	135	04/12/2021	22:00	1.3	292.5
01/12/2021	23:00	0.9	202.5	02/12/2021	23:00	0.4	180	03/12/2021	23:00	1.3	135	04/12/2021	23:00	0.4	337.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
05/12/2021	0:00	0.9	270	06/12/2021	0:00	0.9	45	07/12/2021	0:00	1.8	112.5	08/12/2021	0:00	1.3	112.5
05/12/2021	1:00	0.9	22.5	06/12/2021	1:00	0.9	45	07/12/2021	1:00	0.9	337.5	08/12/2021	1:00	1.3	112.5
05/12/2021	2:00	0.9	112.5	06/12/2021	2:00	0.9	45	07/12/2021	2:00	1.3	22.5	08/12/2021	2:00	1.3	112.5
05/12/2021	3:00	0.9	22.5	06/12/2021	3:00	0.4	90	07/12/2021	3:00	0.9	112.5	08/12/2021	3:00	0.9	112.5
05/12/2021	4:00	0.9	247.5	06/12/2021	4:00	0.4	45	07/12/2021	4:00	0.9	67.5	08/12/2021	4:00	0.9	112.5
05/12/2021	5:00	0.9	112.5	06/12/2021	5:00	0.4	90	07/12/2021	5:00	1.3	90	08/12/2021	5:00	0.9	90
05/12/2021	6:00	1.8	337.5	06/12/2021	6:00	0.9	202.5	07/12/2021	6:00	0.9	22.5	08/12/2021	6:00	0.9	90
05/12/2021	7:00	1.8	45	06/12/2021	7:00	0.9	337.5	07/12/2021	7:00	0.9	67.5	08/12/2021	7:00	1.3	112.5
05/12/2021	8:00	1.8	45	06/12/2021	8:00	0.4	112.5	07/12/2021	8:00	0.4	112.5	08/12/2021	8:00	1.3	112.5
05/12/2021	9:00	1.8	45	06/12/2021	9:00	0.4	112.5	07/12/2021	9:00	0.9	45	08/12/2021	9:00	0.9	135
05/12/2021	10:00	2.2	67.5	06/12/2021	10:00	0.9	112.5	07/12/2021	10:00	0.9	112.5	08/12/2021	10:00	0.9	112.5
05/12/2021	11:00	0.9	270	06/12/2021	11:00	0.9	45	07/12/2021	11:00	0.4	292.5	08/12/2021	11:00	0.4	112.5
05/12/2021	12:00	0.9	45	06/12/2021	12:00	0.9	45	07/12/2021	12:00	0.9	112.5	08/12/2021	12:00	0.9	112.5
05/12/2021	13:00	0.9	90	06/12/2021	13:00	0.9	45	07/12/2021	13:00	1.3	90	08/12/2021	13:00	1.3	247.5
05/12/2021	14:00	1.3	67.5	06/12/2021	14:00	1.3	225	07/12/2021	14:00	1.8	90	08/12/2021	14:00	1.3	247.5
05/12/2021	15:00	0.9	67.5	06/12/2021	15:00	1.3	247.5	07/12/2021	15:00	1.8	45	08/12/2021	15:00	0.9	247.5
05/12/2021	16:00	0.4	45	06/12/2021	16:00	0.9	202.5	07/12/2021	16:00	2.2	67.5	08/12/2021	16:00	0.9	247.5
05/12/2021	17:00	0.9	112.5	06/12/2021	17:00	0.9	202.5	07/12/2021	17:00	2.2	90	08/12/2021	17:00	0.9	247.5
05/12/2021	18:00	0.9	67.5	06/12/2021	18:00	0.4	247.5	07/12/2021	18:00	2.2	67.5	08/12/2021	18:00	1.3	247.5
05/12/2021	19:00	0.4	67.5	06/12/2021	19:00	0.4	247.5	07/12/2021	19:00	1.8	67.5	08/12/2021	19:00	1.8	247.5
05/12/2021	20:00	0.9	337.5	06/12/2021	20:00	0.4	247.5	07/12/2021	20:00	2.2	112.5	08/12/2021	20:00	1.8	270
05/12/2021	21:00	0.9	90	06/12/2021	21:00	0.4	225	07/12/2021	21:00	2.2	90	08/12/2021	21:00	1.8	225
05/12/2021	22:00	1.3	45	06/12/2021	22:00	0.4	202.5	07/12/2021	22:00	0.9	112.5	08/12/2021	22:00	0.9	247.5
05/12/2021	23:00	0.9	67.5	06/12/2021	23:00	0.4	225	07/12/2021	23:00	1.3	67.5	08/12/2021	23:00	1.3	247.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
09/12/2021	0:00	0.9	112.5	10/12/2021	0:00	1.8	90	11/12/2021	0:00	0.9	292.5	12/12/2021	0:00	1.3	247.5
09/12/2021	1:00	1.8	247.5	10/12/2021	1:00	0.9	112.5	11/12/2021	1:00	0.9	292.5	12/12/2021	1:00	1.3	292.5
09/12/2021	2:00	1.8	90	10/12/2021	2:00	1.8	67.5	11/12/2021	2:00	1.3	292.5	12/12/2021	2:00	0.9	157.5
09/12/2021	3:00	0.9	112.5	10/12/2021	3:00	1.3	112.5	11/12/2021	3:00	0.9	225	12/12/2021	3:00	0.9	247.5
09/12/2021	4:00	1.8	67.5	10/12/2021	4:00	0.4	112.5	11/12/2021	4:00	0.9	247.5	12/12/2021	4:00	1.3	225
09/12/2021	5:00	1.3	112.5	10/12/2021	5:00	1.3	90	11/12/2021	5:00	0.9	270	12/12/2021	5:00	1.3	45
09/12/2021	6:00	0.4	112.5	10/12/2021	6:00	1.8	90	11/12/2021	6:00	0.9	112.5	12/12/2021	6:00	1.8	337.5
09/12/2021	7:00	1.3	90	10/12/2021	7:00	1.3	112.5	11/12/2021	7:00	0.9	22.5	12/12/2021	7:00	1.3	247.5
09/12/2021	8:00	1.8	90	10/12/2021	8:00	1.8	225	11/12/2021	8:00	0.9	202.5	12/12/2021	8:00	1.3	247.5
09/12/2021	9:00	1.3	112.5	10/12/2021	9:00	1.3	135	11/12/2021	9:00	0.9	45	12/12/2021	9:00	1.3	247.5
09/12/2021	10:00	1.8	225	10/12/2021	10:00	1.8	90	11/12/2021	10:00	0.4	67.5	12/12/2021	10:00	1.3	225
09/12/2021	11:00	1.3	135	10/12/2021	11:00	1.3	270	11/12/2021	11:00	0.9	45	12/12/2021	11:00	1.3	270
09/12/2021	12:00	1.3	112.5	10/12/2021	12:00	1.3	90	11/12/2021	12:00	0.4	337.5	12/12/2021	12:00	1.3	247.5
09/12/2021	13:00	1.3	135	10/12/2021	13:00	1.3	45	11/12/2021	13:00	0.9	315	12/12/2021	13:00	1.3	292.5
09/12/2021	14:00	1.8	67.5	10/12/2021	14:00	1.3	45	11/12/2021	14:00	0.4	112.5	12/12/2021	14:00	1.3	112.5
09/12/2021	15:00	0.9	45	10/12/2021	15:00	1.8	45	11/12/2021	15:00	0.4	90	12/12/2021	15:00	1.3	112.5
09/12/2021	16:00	0.9	45	10/12/2021	16:00	1.8	45	11/12/2021	16:00	0.4	135	12/12/2021	16:00	0.9	157.5
09/12/2021	17:00	1.8	90	10/12/2021	17:00	1.3	270	11/12/2021	17:00	0.4	67.5	12/12/2021	17:00	0.9	135
09/12/2021	18:00	1.8	67.5	10/12/2021	18:00	1.3	90	11/12/2021	18:00	0.9	112.5	12/12/2021	18:00	0.9	90
09/12/2021	19:00	1.3	67.5	10/12/2021	19:00	1.3	45	11/12/2021	19:00	0.9	112.5	12/12/2021	19:00	1.3	112.5
09/12/2021	20:00	1.3	90	10/12/2021	20:00	1.3	45	11/12/2021	20:00	1.3	135	12/12/2021	20:00	1.3	112.5
09/12/2021	21:00	0.9	67.5	10/12/2021	21:00	1.8	45	11/12/2021	21:00	1.3	90	12/12/2021	21:00	0.9	112.5
09/12/2021	22:00	0.9	67.5	10/12/2021	22:00	1.8	45	11/12/2021	22:00	1.3	112.5	12/12/2021	22:00	0.9	90
09/12/2021	23:00	0.9	90	10/12/2021	23:00	1.3	270	11/12/2021	23:00	1.3	112.5	12/12/2021	23:00	1.3	112.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
13/12/2021	0:00	1.8	90	14/12/2021	0:00	0.9	90	15/12/2021	0:00	0.9	90	16/12/2021	0:00	0.9	45
13/12/2021	1:00	1.3	337.5	14/12/2021	1:00	0.9	112.5	15/12/2021	1:00	0.9	90	16/12/2021	1:00	0.4	225
13/12/2021	2:00	1.8	135	14/12/2021	2:00	0.9	112.5	15/12/2021	2:00	0.9	90	16/12/2021	2:00	0.4	292.5
13/12/2021	3:00	1.8	67.5	14/12/2021	3:00	0.9	112.5	15/12/2021	3:00	0.4	112.5	16/12/2021	3:00	0.4	180
13/12/2021	4:00	1.3	135	14/12/2021	4:00	0.9	112.5	15/12/2021	4:00	0.4	112.5	16/12/2021	4:00	0.4	157.5
13/12/2021	5:00	0.9	292.5	14/12/2021	5:00	1.3	112.5	15/12/2021	5:00	0.9	112.5	16/12/2021	5:00	0.4	135
13/12/2021	6:00	0.9	247.5	14/12/2021	6:00	0.9	135	15/12/2021	6:00	0.9	112.5	16/12/2021	6:00	0.4	135
13/12/2021	7:00	0.9	45	14/12/2021	7:00	0.4	112.5	15/12/2021	7:00	0.4	90	16/12/2021	7:00	1.3	135
13/12/2021	8:00	0.9	247.5	14/12/2021	8:00	0.9	135	15/12/2021	8:00	0.9	90	16/12/2021	8:00	0.4	135
13/12/2021	9:00	1.3	337.5	14/12/2021	9:00	0.9	135	15/12/2021	9:00	1.8	112.5	16/12/2021	9:00	0.9	247.5
13/12/2021	10:00	0.9	45	14/12/2021	10:00	0.4	135	15/12/2021	10:00	1.8	112.5	16/12/2021	10:00	0.9	202.5
13/12/2021	11:00	1.8	90	14/12/2021	11:00	0.9	135	15/12/2021	11:00	2.2	112.5	16/12/2021	11:00	0.9	45
13/12/2021	12:00	1.3	337.5	14/12/2021	12:00	0.9	247.5	15/12/2021	12:00	1.8	90	16/12/2021	12:00	0.4	90
13/12/2021	13:00	1.8	135	14/12/2021	13:00	1.3	247.5	15/12/2021	13:00	0.9	67.5	16/12/2021	13:00	0.4	112.5
13/12/2021	14:00	1.8	67.5	14/12/2021	14:00	0.9	247.5	15/12/2021	14:00	0.9	157.5	16/12/2021	14:00	0.9	112.5
13/12/2021	15:00	0.9	112.5	14/12/2021	15:00	0.9	112.5	15/12/2021	15:00	0.9	22.5	16/12/2021	15:00	0.9	112.5
13/12/2021	16:00	1.8	90	14/12/2021	16:00	0.9	90	15/12/2021	16:00	1.3	135	16/12/2021	16:00	0.9	112.5
13/12/2021	17:00	1.3	112.5	14/12/2021	17:00	0.9	90	15/12/2021	17:00	1.3	90	16/12/2021	17:00	0.9	157.5
13/12/2021	18:00	0.4	135	14/12/2021	18:00	1.8	112.5	15/12/2021	18:00	1.8	247.5	16/12/2021	18:00	0.9	157.5
13/12/2021	19:00	1.3	135	14/12/2021	19:00	1.8	112.5	15/12/2021	19:00	1.3	22.5	16/12/2021	19:00	0.9	180
13/12/2021	20:00	1.3	112.5	14/12/2021	20:00	1.3	112.5	15/12/2021	20:00	0.9	90	16/12/2021	20:00	0.4	180
13/12/2021	21:00	1.8	90	14/12/2021	21:00	1.3	90	15/12/2021	21:00	1.3	22.5	16/12/2021	21:00	0.9	247.5
13/12/2021	22:00	0.9	112.5	14/12/2021	22:00	0.4	112.5	15/12/2021	22:00	0.9	315	16/12/2021	22:00	0.4	247.5
13/12/2021	23:00	0.9	67.5	14/12/2021	23:00	0.9	112.5	15/12/2021	23:00	0.9	90	16/12/2021	23:00	0.4	67.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
17/12/2021	0:00	0.9	112.5	18/12/2021	0:00	0.4	112.5	19/12/2021	0:00	1.3	247.5	20/12/2021	0:00	0.9	112.5
17/12/2021	1:00	0.4	112.5	18/12/2021	1:00	0.4	112.5	19/12/2021	1:00	0.9	247.5	20/12/2021	1:00	0.9	157.5
17/12/2021	2:00	0.9	112.5	18/12/2021	2:00	0.4	112.5	19/12/2021	2:00	1.3	247.5	20/12/2021	2:00	0.9	135
17/12/2021	3:00	0.9	90	18/12/2021	3:00	0.4	90	19/12/2021	3:00	1.3	157.5	20/12/2021	3:00	1.3	135
17/12/2021	4:00	0.9	112.5	18/12/2021	4:00	1.3	22.5	19/12/2021	4:00	1.3	180	20/12/2021	4:00	0.9	112.5
17/12/2021	5:00	0.9	112.5	18/12/2021	5:00	1.3	22.5	19/12/2021	5:00	0.9	225	20/12/2021	5:00	0.9	112.5
17/12/2021	6:00	1.3	112.5	18/12/2021	6:00	1.8	270	19/12/2021	6:00	0.9	225	20/12/2021	6:00	0.9	112.5
17/12/2021	7:00	1.3	135	18/12/2021	7:00	1.8	135	19/12/2021	7:00	1.3	225	20/12/2021	7:00	0.9	112.5
17/12/2021	8:00	0.9	112.5	18/12/2021	8:00	1.8	22.5	19/12/2021	8:00	0.9	202.5	20/12/2021	8:00	0.4	112.5
17/12/2021	9:00	1.3	90	18/12/2021	9:00	0.9	292.5	19/12/2021	9:00	0.4	180	20/12/2021	9:00	0.4	112.5
17/12/2021	10:00	0.9	112.5	18/12/2021	10:00	0.9	90	19/12/2021	10:00	0.4	247.5	20/12/2021	10:00	0.9	112.5
17/12/2021	11:00	1.3	112.5	18/12/2021	11:00	1.8	22.5	19/12/2021	11:00	0.4	247.5	20/12/2021	11:00	0.9	112.5
17/12/2021	12:00	0.9	112.5	18/12/2021	12:00	0.4	112.5	19/12/2021	12:00	0.9	112.5	20/12/2021	12:00	0.9	22.5
17/12/2021	13:00	0.9	112.5	18/12/2021	13:00	1.3	112.5	19/12/2021	13:00	0.9	90	20/12/2021	13:00	0.4	67.5
17/12/2021	14:00	1.3	112.5	18/12/2021	14:00	1.8	112.5	19/12/2021	14:00	0.9	247.5	20/12/2021	14:00	1.3	337.5
17/12/2021	15:00	1.3	135	18/12/2021	15:00	2.2	135	19/12/2021	15:00	1.3	247.5	20/12/2021	15:00	1.8	22.5
17/12/2021	16:00	0.9	112.5	18/12/2021	16:00	1.3	157.5	19/12/2021	16:00	1.3	157.5	20/12/2021	16:00	0.9	112.5
17/12/2021	17:00	0.9	112.5	18/12/2021	17:00	1.8	112.5	19/12/2021	17:00	1.8	135	20/12/2021	17:00	1.3	135
17/12/2021	18:00	0.9	112.5	18/12/2021	18:00	1.3	135	19/12/2021	18:00	1.3	135	20/12/2021	18:00	0.9	112.5
17/12/2021	19:00	0.4	112.5	18/12/2021	19:00	1.8	112.5	19/12/2021	19:00	1.3	135	20/12/2021	19:00	1.3	112.5
17/12/2021	20:00	0.4	112.5	18/12/2021	20:00	1.3	90	19/12/2021	20:00	0.9	112.5	20/12/2021	20:00	1.3	112.5
17/12/2021	21:00	0.4	112.5	18/12/2021	21:00	1.3	90	19/12/2021	21:00	0.9	90	20/12/2021	21:00	1.8	112.5
17/12/2021	22:00	0.9	112.5	18/12/2021	22:00	1.3	112.5	19/12/2021	22:00	0.9	247.5	20/12/2021	22:00	1.3	90
17/12/2021	23:00	0.9	112.5	18/12/2021	23:00	0.4	112.5	19/12/2021	23:00	1.3	247.5	20/12/2021	23:00	0.9	112.5



Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
21/12/2021	0:00	0.4	90	22/12/2021	0:00	1.3	112.5	23/12/2021	0:00	0.9	112.5	24/12/2021	0:00	0.4	112.5
21/12/2021	1:00	0.4	112.5	22/12/2021	1:00	1.3	135	23/12/2021	1:00	0.9	112.5	24/12/2021	1:00	0.4	112.5
21/12/2021	2:00	0.4	112.5	22/12/2021	2:00	0.9	157.5	23/12/2021	2:00	0.9	270	24/12/2021	2:00	0.4	135
21/12/2021	3:00	0.9	112.5	22/12/2021	3:00	0.9	135	23/12/2021	3:00	1.3	270	24/12/2021	3:00	0.9	112.5
21/12/2021	4:00	0.9	112.5	22/12/2021	4:00	0.9	135	23/12/2021	4:00	0.9	135	24/12/2021	4:00	0.9	67.5
21/12/2021	5:00	0.9	90	22/12/2021	5:00	0.9	90	23/12/2021	5:00	0.9	112.5	24/12/2021	5:00	0.9	112.5
21/12/2021	6:00	1.3	112.5	22/12/2021	6:00	1.3	90	23/12/2021	6:00	1.3	112.5	24/12/2021	6:00	0.9	112.5
21/12/2021	7:00	0.9	135	22/12/2021	7:00	0.9	135	23/12/2021	7:00	1.8	90	24/12/2021	7:00	0.9	90
21/12/2021	8:00	0.9	135	22/12/2021	8:00	1.8	247.5	23/12/2021	8:00	1.8	112.5	24/12/2021	8:00	0.9	90
21/12/2021	9:00	1.3	157.5	22/12/2021	9:00	1.3	247.5	23/12/2021	9:00	1.3	112.5	24/12/2021	9:00	1.3	67.5
21/12/2021	10:00	0.4	90	22/12/2021	10:00	1.3	112.5	23/12/2021	10:00	1.3	135	24/12/2021	10:00	1.3	112.5
21/12/2021	11:00	0.4	112.5	22/12/2021	11:00	0.4	135	23/12/2021	11:00	0.9	112.5	24/12/2021	11:00	1.3	90
21/12/2021	12:00	0.9	270	22/12/2021	12:00	0.4	225	23/12/2021	12:00	0.4	315	24/12/2021	12:00	0.4	112.5
21/12/2021	13:00	0.9	225	22/12/2021	13:00	0.9	225	23/12/2021	13:00	0.4	270	24/12/2021	13:00	0.4	112.5
21/12/2021	14:00	0.9	45	22/12/2021	14:00	0.4	225	23/12/2021	14:00	0.9	112.5	24/12/2021	14:00	0.4	135
21/12/2021	15:00	0.4	112.5	22/12/2021	15:00	0.9	247.5	23/12/2021	15:00	0.9	292.5	24/12/2021	15:00	0.4	135
21/12/2021	16:00	0.4	90	22/12/2021	16:00	0.9	247.5	23/12/2021	16:00	1.8	22.5	24/12/2021	16:00	0.4	112.5
21/12/2021	17:00	0.9	112.5	22/12/2021	17:00	0.9	67.5	23/12/2021	17:00	1.3	90	24/12/2021	17:00	0.4	135
21/12/2021	18:00	0.9	90	22/12/2021	18:00	1.3	180	23/12/2021	18:00	0.4	315	24/12/2021	18:00	0.9	135
21/12/2021	19:00	0.9	112.5	22/12/2021	19:00	0.9	135	23/12/2021	19:00	0.4	270	24/12/2021	19:00	0.4	112.5
21/12/2021	20:00	0.9	90	22/12/2021	20:00	0.9	112.5	23/12/2021	20:00	0.4	292.5	24/12/2021	20:00	0.4	135
21/12/2021	21:00	0.9	112.5	22/12/2021	21:00	0.4	135	23/12/2021	21:00	0.4	247.5	24/12/2021	21:00	0.9	112.5
21/12/2021	22:00	0.9	270	22/12/2021	22:00	0.4	225	23/12/2021	22:00	0.4	225	24/12/2021	22:00	0.9	112.5
21/12/2021	23:00	0.9	225	22/12/2021	23:00	0.9	225	23/12/2021	23:00	0.4	90	24/12/2021	23:00	0.4	135

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
25/12/2021	0:00	0.9	112.5	26/12/2021	0:00	1.3	67.5	27/12/2021	0:00	0.4	112.5	28/12/2021	0:00	0.9	247.5
25/12/2021	1:00	1.3	112.5	26/12/2021	1:00	1.8	45	27/12/2021	1:00	0.4	112.5	28/12/2021	1:00	0.9	225
25/12/2021	2:00	1.3	112.5	26/12/2021	2:00	1.3	112.5	27/12/2021	2:00	0.4	112.5	28/12/2021	2:00	0.9	247.5
25/12/2021	3:00	1.3	112.5	26/12/2021	3:00	1.3	112.5	27/12/2021	3:00	0.9	135	28/12/2021	3:00	0.9	225
25/12/2021	4:00	1.3	112.5	26/12/2021	4:00	1.3	135	27/12/2021	4:00	0.9	135	28/12/2021	4:00	0.9	247.5
25/12/2021	5:00	1.3	112.5	26/12/2021	5:00	1.3	112.5	27/12/2021	5:00	1.3	112.5	28/12/2021	5:00	0.9	270
25/12/2021	6:00	1.3	112.5	26/12/2021	6:00	2.2	112.5	27/12/2021	6:00	0.9	112.5	28/12/2021	6:00	0.9	270
25/12/2021	7:00	0.9	112.5	26/12/2021	7:00	1.8	45	27/12/2021	7:00	0.9	112.5	28/12/2021	7:00	0.9	270
25/12/2021	8:00	0.9	112.5	26/12/2021	8:00	2.2	90	27/12/2021	8:00	1.8	112.5	28/12/2021	8:00	0.9	247.5
25/12/2021	9:00	1.3	90	26/12/2021	9:00	2.2	90	27/12/2021	9:00	1.8	112.5	28/12/2021	9:00	0.9	225
25/12/2021	10:00	0.4	112.5	26/12/2021	10:00	1.3	67.5	27/12/2021	10:00	0.4	112.5	28/12/2021	10:00	0.9	247.5
25/12/2021	11:00	1.3	112.5	26/12/2021	11:00	1.8	45	27/12/2021	11:00	0.4	112.5	28/12/2021	11:00	0.4	225
25/12/2021	12:00	0.9	112.5	26/12/2021	12:00	1.3	112.5	27/12/2021	12:00	0.4	315	28/12/2021	12:00	0.9	225
25/12/2021	13:00	1.3	90	26/12/2021	13:00	0.9	112.5	27/12/2021	13:00	0.4	22.5	28/12/2021	13:00	0.9	225
25/12/2021	14:00	1.3	90	26/12/2021	14:00	0.4	112.5	27/12/2021	14:00	0.4	90	28/12/2021	14:00	0.4	225
25/12/2021	15:00	1.3	90	26/12/2021	15:00	0.4	112.5	27/12/2021	15:00	0.9	67.5	28/12/2021	15:00	0.4	247.5
25/12/2021	16:00	1.3	112.5	26/12/2021	16:00	0.9	112.5	27/12/2021	16:00	1.3	247.5	28/12/2021	16:00	1.8	270
25/12/2021	17:00	1.3	135	26/12/2021	17:00	1.3	112.5	27/12/2021	17:00	1.8	90	28/12/2021	17:00	0.4	247.5
25/12/2021	18:00	1.8	112.5	26/12/2021	18:00	1.3	112.5	27/12/2021	18:00	1.8	112.5	28/12/2021	18:00	0.4	247.5
25/12/2021	19:00	1.3	112.5	26/12/2021	19:00	0.9	90	27/12/2021	19:00	1.3	90	28/12/2021	19:00	0.9	247.5
25/12/2021	20:00	0.9	112.5	26/12/2021	20:00	0.9	112.5	27/12/2021	20:00	1.3	112.5	28/12/2021	20:00	0.4	225
25/12/2021	21:00	0.9	135	26/12/2021	21:00	1.8	135	27/12/2021	21:00	1.3	112.5	28/12/2021	21:00	0.9	112.5
25/12/2021	22:00	1.8	112.5	26/12/2021	22:00	1.3	90	27/12/2021	22:00	1.3	247.5	28/12/2021	22:00	0.4	135
25/12/2021	23:00	1.3	90	26/12/2021	23:00	1.8	90	27/12/2021	23:00	1.3	247.5	28/12/2021	23:00	0.9	45

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
29/12/2021	0:00	1.3	45	30/12/2021	0:00	0.9	112.5	31/12/2021	0:00	0.9	90				
29/12/2021	1:00	1.3	45	30/12/2021	1:00	0.4	90	31/12/2021	1:00	0.4	67.5				
29/12/2021	2:00	1.3	45	30/12/2021	2:00	0.9	90	31/12/2021	2:00	0.4	45				
29/12/2021	3:00	1.3	45	30/12/2021	3:00	1.3	90	31/12/2021	3:00	0.4	112.5				
29/12/2021	4:00	0.9	45	30/12/2021	4:00	1.8	90	31/12/2021	4:00	0.4	180				
29/12/2021	5:00	0.9	22.5	30/12/2021	5:00	1.3	135	31/12/2021	5:00	0.4	270				
29/12/2021	6:00	0.9	247.5	30/12/2021	6:00	0.9	67.5	31/12/2021	6:00	0.4	45				
29/12/2021	7:00	1.3	22.5	30/12/2021	7:00	0.9	45	31/12/2021	7:00	0.9	45				
29/12/2021	8:00	0.9	22.5	30/12/2021	8:00	0.4	67.5	31/12/2021	8:00	0.9	90				
29/12/2021	9:00	0.9	225	30/12/2021	9:00	0.9	112.5	31/12/2021	9:00	0.4	45				
29/12/2021	10:00	1.3	45	30/12/2021	10:00	0.4	135	31/12/2021	10:00	0.4	135				
29/12/2021	11:00	1.3	45	30/12/2021	11:00	0.4	90	31/12/2021	11:00	0.9	247.5				
29/12/2021	12:00	0.4	225	30/12/2021	12:00	0.4	112.5	31/12/2021	12:00	1.3	90				
29/12/2021	13:00	0.4	270	30/12/2021	13:00	0.4	90	31/12/2021	13:00	1.3	112.5				
29/12/2021	14:00	0.4	247.5	30/12/2021	14:00	0.4	67.5	31/12/2021	14:00	1.3	112.5				
29/12/2021	15:00	0.4	247.5	30/12/2021	15:00	0.4	90	31/12/2021	15:00	1.3	112.5				
29/12/2021	16:00	0.9	180	30/12/2021	16:00	0.4	90	31/12/2021	16:00	1.3	112.5				
29/12/2021	17:00	0.9	157.5	30/12/2021	17:00	0.4	135	31/12/2021	17:00	2.2	112.5				
29/12/2021	18:00	0.4	112.5	30/12/2021	18:00	0.9	135	31/12/2021	18:00	1.8	112.5				
29/12/2021	19:00	0.4	135	30/12/2021	19:00	0.9	135	31/12/2021	19:00	1.8	112.5				
29/12/2021	20:00	1.3	135	30/12/2021	20:00	1.3	112.5	31/12/2021	20:00	1.8	112.5				
29/12/2021	21:00	1.3	67.5	30/12/2021	21:00	1.3	112.5	31/12/2021	21:00	0.9	67.5				
29/12/2021	22:00	1.3	45	30/12/2021	22:00	0.4	112.5	31/12/2021	22:00	1.3	90				
29/12/2021	23:00	0.9	247.5	30/12/2021	23:00	0.4	112.5	31/12/2021	23:00	1.3	112.5				

**Appendix G – 24-hr TSP monitoring results and graphical presentation**

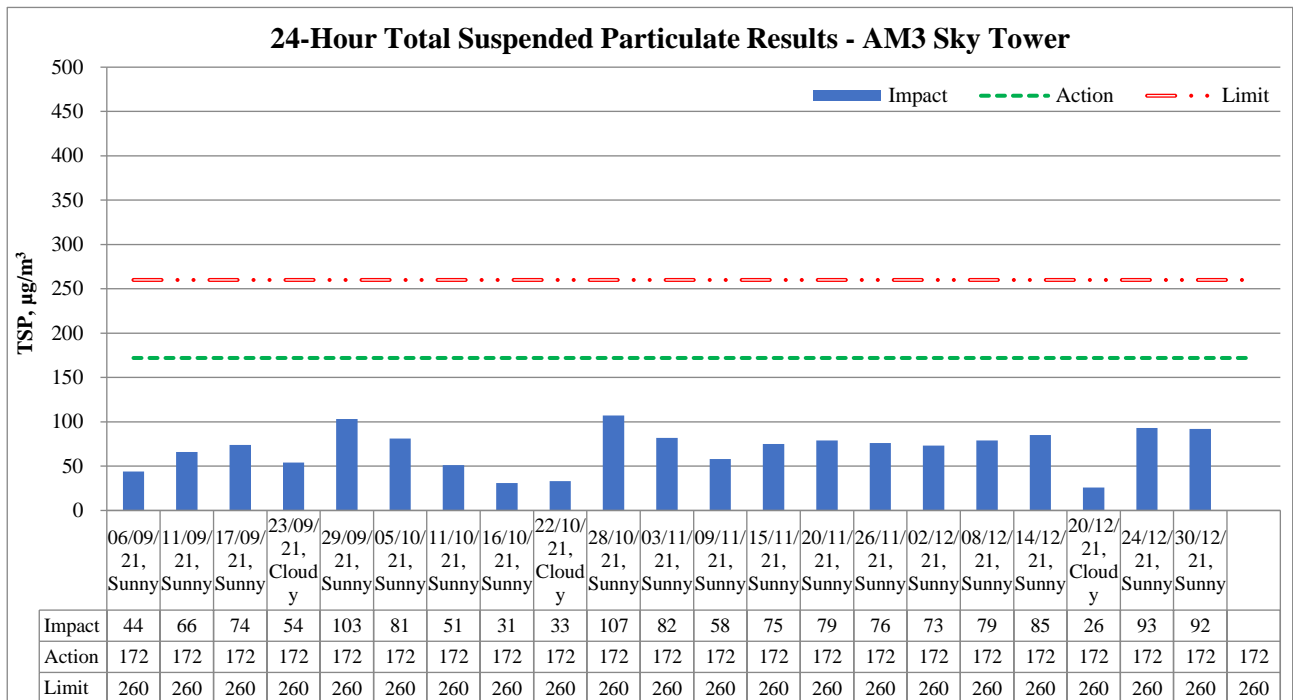
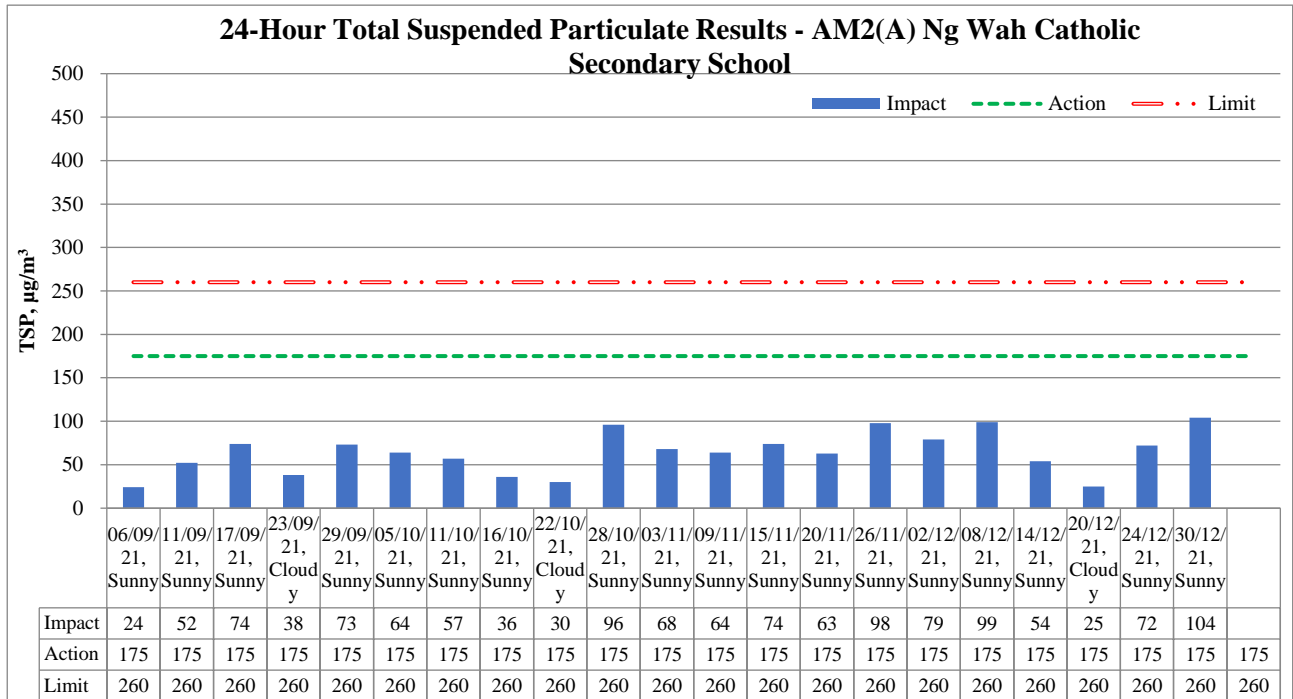
Location: AM2(A) – Ng Wah Catholic Secondary School

Start Date	Weather	Air Temp. (°C)	Atmospheric Pressure (hPa)	Filter weight (g)		Particulate weight (g)	Elapse Time		Sampling Time (min)	Flow Rate (cfm)		Av. Flow (m <sup>3</sup> /min)	Total vol. (m <sup>3</sup> )	Conc. (µg/m <sup>3</sup> )
				Initial	Final		Initial	Final		Initial	Final			
2/12/2021	Sunny	22.3	1021.8	15.3602	15.5202	0.1600	6337.1	6361.1	1440	50	50	1.41	2033	79
8/12/2021	Sunny	21.8	1022.3	15.3784	15.5808	0.2024	6361.91	6385.92	1441	50	50	1.41	2036	99
14/12/2021	Sunny	18.0	1018.6	15.4902	15.6016	0.1114	6386.65	6410.66	1441	50	50	1.42	2046	54
20/12/2021	Cloudy	19.6	1017.6	17.8311	17.8817	0.0506	6410.92	6434.92	1440	50	50	1.42	2039	25
24/12/2021	Sunny	24.0	1017.2	15.2038	15.3503	0.1465	6436.17	6460.18	1441	50	50	1.40	2024	72
30/12/2021	Sunny	16.0	1024.6	15.5423	15.7562	0.2139	6461.26	6485.26	1440	50	50	1.43	2059	104
													Maximum	104
													Minimum	25
													Average	72
													Action Level	175
													Limit Level	260

Location: AM3 – Sky Tower

Start Date	Weather	Air Temp. (°C)	Atmospheric Pressure (hPa)	Filter weight (g)		Particulate weight (g)	Elapse Time		Sampling Time (min)	Flow Rate (cfm)		Av. Flow (m <sup>3</sup> /min)	Total vol. (m <sup>3</sup> )	Conc. (µg/m <sup>3</sup> )
				Initial	Final		Initial	Final		Initial	Final			
2/12/2021	Sunny	22.3	1021.8	14.9987	15.1613	0.1626	3805.07	3829.09	1441	54	54	1.54	2219	73
8/12/2021	Sunny	21.8	1022.3	18.3744	18.5243	0.1499	3830.24	3854.26	1441	46	46	1.31	1888	79
14/12/2021	Sunny	18.0	1018.6	18.3034	18.4651	0.1617	3855.09	3879.11	1441	46	46	1.32	1897	85
20/12/2021	Cloudy	19.6	1017.6	14.9824	15.0357	0.0533	3880.52	3904.55	1442	50	50	1.43	2058	26
24/12/2021	Sunny	24.0	1017.2	17.5981	17.7878	0.1897	3905.81	3929.83	1441	50	50	1.42	2042	93
30/12/2021	Sunny	16.0	1024.6	15.4292	15.6127	0.1835	3930.19	3954.21	1441	48	48	1.38	1993	92
													Maximum	93
													Minimum	26
													Average	75
													Action Level	172
													Limit Level	260

**24-hour average TSP**



Major Construction Activities	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Construction of box culvert	✓	✓	✓	
Bored pile works for landscape elevated walkway	✓	✓	✓	✓
Demolition of existing structure and cottage	✓			
Construction of project signboard	✓			
Pre-drilling works and trial pit excavation	✓	✓	✓	
Drainage works	✓			
Temporary road diversion at Sa Po Road		✓	✓	
Demolition of existing structure at SB-01		✓		
Pre-drilling work for S14 and KS10		✓		
Drainage works for Pedestrian Street No.1 & No.2		✓	✓	
Drainage works for Crowd Dispersal Route		✓	✓	
Instrumentation installation at SB-01			✓	✓
Pre-drilling work for S14			✓	✓
Removal existing piles at Road D1			✓	✓
Rising main construction			✓	✓
Trial pit excavation				✓
Advance works for traffic diversion at Sa Po Road				✓
Drainage works for Pedestrian Street No.1, No.2 & No.3				✓
Construction of Crowd Dispersal Route				✓

Factors might affect the monitoring results	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

**Appendix H – 1-hr TSP monitoring results and graphical presentation**



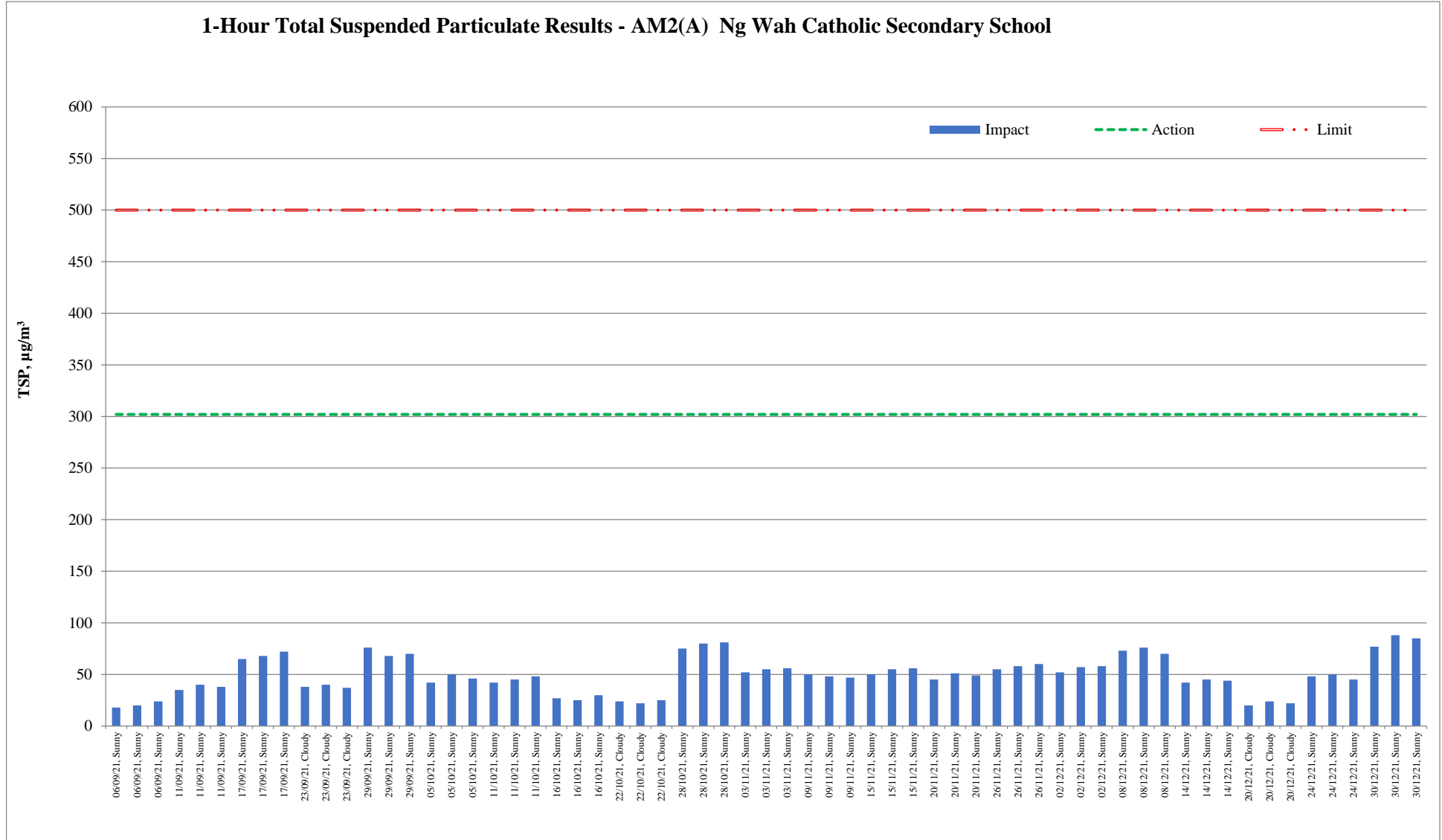
Location:  
**AM2(A) –  
 Ng Wah Catholic  
 Secondary School**

Date	Measurement Period			1-hr TSP concentration, $\mu\text{g}/\text{m}^3$	Weather
		-			
03/12/2021	13:00	-	14:00	52	Sunny
	14:00	-	15:00	57	
	15:00	-	16:00	58	
08/12/2021	09:00	-	10:00	73	Sunny
	10:00	-	11:00	76	
	11:00	-	12:00	70	
14/12/2021	13:00	-	14:00	42	Sunny
	14:00	-	15:00	45	
	15:00	-	16:00	44	
20/12/2021	09:00	-	10:00	20	Cloudy
	10:00	-	11:00	24	
	11:00	-	12:00	22	
24/12/2021	13:00	-	14:00	48	Sunny
	14:00	-	15:00	50	
	15:00	-	16:00	45	
30/12/2021	09:00	-	10:00	77	Sunny
	10:00	-	11:00	88	
	11:00	-	12:00	85	
Maximum				88	
Minimum				20	
Average				54	
Action Level				302	
Limit Level				500	

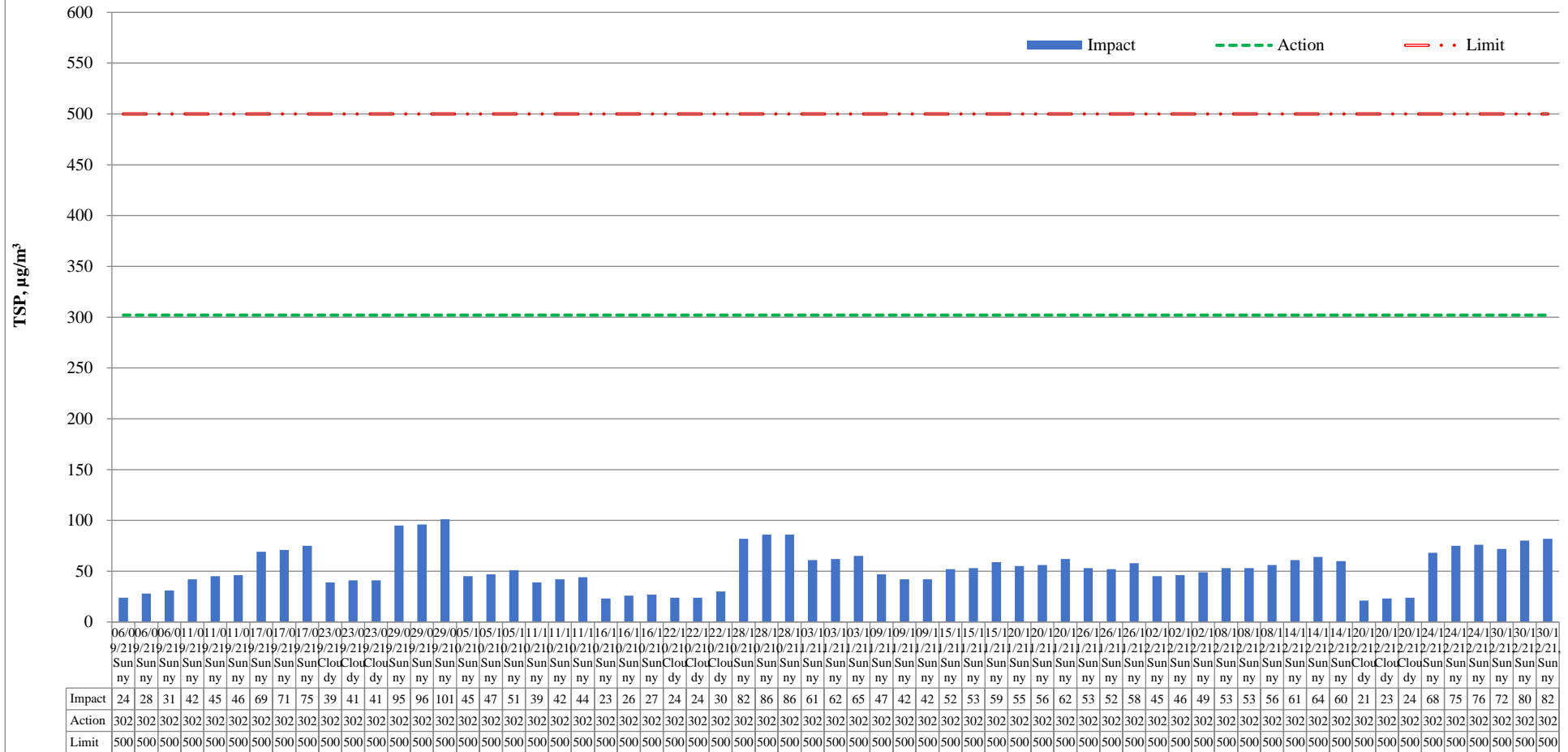
Location:  
**AM3 -  
 Sky Tower**

Date	Measurement Period			1-hr TSP concentration, $\mu\text{g}/\text{m}^3$	Weather
03/12/2021	09:00	-	10:00	45	Sunny
	10:00	-	11:00	46	
	11:00	-	12:00	49	
08/12/2021	13:00	-	14:00	53	Sunny
	14:00	-	15:00	53	
	15:00	-	16:00	56	
14/12/2021	09:00	-	10:00	61	Sunny
	10:00	-	11:00	64	
	11:00	-	12:00	60	
20/12/2021	13:00	-	14:00	21	Cloudy
	14:00	-	15:00	23	
	15:00	-	16:00	24	
24/12/2021	13:00	-	14:00	68	Sunny
	14:00	-	15:00	75	
	15:00	-	16:00	76	
30/12/2021	09:00	-	10:00	72	Sunny
	10:00	-	11:00	80	
	11:00	-	12:00	82	
Maximum				82	
Minimum				21	
Average				56	
Action Level				301	
Limit Level				500	

# 1-hour average TSP



### 1-Hour Total Suspended Particulate Results - AM3(A) Sky Tower



Major Construction Activities	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Construction of box culvert	✓	✓	✓	
Bored pile works for landscape elevated walkway	✓	✓	✓	✓
Demolition of existing structure and cottage	✓			
Construction of project signboard	✓			
Pre-drilling works and trial pit excavation	✓	✓	✓	
Drainage works	✓			
Temporary road diversion at Sa Po Road		✓	✓	
Demolition of existing structure at SB-01		✓		
Pre-drilling work for S14 and KS10		✓		
Drainage works for Pedestrian Street No.1 & No.2		✓	✓	
Drainage works for Crowd Dispersal Route		✓	✓	
Instrumentation installation at SB-01			✓	✓
Pre-drilling work for S14			✓	✓
Removal existing piles at Road D1			✓	✓
Rising main construction			✓	✓
Trial pit excavation				✓
Advance works for traffic diversion at Sa Po Road				✓
Drainage works for Pedestrian Street No.1, No.2 & No.3				✓
Construction of Crowd Dispersal Route				✓

Factors might affect the monitoring results	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

**Appendix I – Event and Action Plan for air quality**

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Action Level being exceeded by one sampling	<ol style="list-style-type: none"> <li>1. Identify source and investigate the causes of exceedance;</li> <li>2. Inform Contractor, IEC and Supervisor /ER;</li> <li>3. Repeat measurement to confirm finding.</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>
Action Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> <li>1. Identify source and investigate the causes of exceedance;</li> <li>2. Inform Contractor, IEC and Supervisor /ER;</li> <li>3. Increase monitoring frequency to daily;</li> <li>4. Discuss with IEC and Contractor on remedial actions required;</li> <li>5. Assess the effectiveness of Contractor's remedial actions;</li> <li>6. If exceedance continues, arrange meeting with IEC and Supervisor /ER;</li> <li>7. 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 Supervisor /ER on the effectiveness of the proposed remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance 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 implementation of remedial measures;</li> <li>5. Conduct meeting with ET and IEC if exceedance continues.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and IEC on proper remedial actions;</li> <li>2. Submit proposals for remedial actions to Supervisor /ER and IEC within three working day of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>
Limit Level being exceeded by one sampling	<ol style="list-style-type: none"> <li>1. Identify source and investigate the causes of exceedance;</li> <li>2. Inform Contractor, IEC, Supervisor /ER, and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Assess effectiveness of</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 possible remedial measures with ET and Contractor;</li> <li>4. Advise the Supervisor /ER</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance 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</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Discuss with ET and IEC on proper remedial actions;</li> <li>3. Submit proposal for remedial actions to Supervisor /ER and IEC</li> </ol>

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
	Contractor's remedial actions and keep EPD, IEC and Supervisor /ER informed of the results.	on the effectiveness of the proposed remedial measures.	4. Supervise implementation of remedial measures; 5. Conduct meeting with ET and IEC if exceedance continues.	within three working days of notification; 4. Implement the agreed proposals.
Limit Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> <li>1. Notify IEC, Supervisor /ER, Contractor and EPD;</li> <li>2. Repeat measurement to confirm findings;</li> <li>3. Carry out analysis of Contractor's working procedures to identify source and investigate the causes of exceedance;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Arrange meeting with IEC, Supervisor /ER and Contractor to discuss the remedial action to be taken;</li> <li>6. Assess effectiveness of Contractor's remedial actions and keep EPD, IEC and Supervisor /ER informed of the results;</li> <li>7. If exceedance stop, 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 Supervisor /ER, 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 Supervisor /ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance 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 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. Discuss with ET and IEC on proper remedial actions;</li> <li>3. Submit proposal for remedial actions to Supervisor /ER and IEC within three working days of notification;</li> <li>4. Implement the agreed proposals;</li> <li>5. Submit further remedial actions if problem still not under control;</li> <li>6. Stop the relevant portion of works as instructed by the Supervisor /ER until the exceedance is abated.</li> </ol>



# **Appendix J – Calibration certificates, catalogue of noise monitoring equipment**

# Catalogue of Sound Level Meter

## Specifications

		NL-52	NL-42
Applicable standards		IEC 61672-1: 2002 Class 1 ANSI S1.4-1983 Type 1 ANSI S1.4A-1985 Type 1 ANSI S1.43-1997 Type 1 JIS C 1509-1: 2005 Class 1	IEC 61672-1: 2002 Class 2 ANSI S1.4-1983 Type 2 ANSI S1.4A-1985 Type 2 ANSI S1.43-1997 Type 2 JIS C 1509-1: 2005 Class 2
Measurement functions		Simultaneous measurement of the following items, with selected time weighting and frequency weighting WEEE Directives, Chinese RoHS (export model for China only)	
Processing (main ch)		Instantaneous sound pressure level: $L_p$ Equivalent continuous sound pressure level: $L_{eq}$ Sound exposure level: $L_E$ Maximum sound pressure level: $L_{max}$ Minimum sound pressure level: $L_{min}$ Percentage sound levels: $L_N$ (0.1 to 99.9%, 0.1-increment steps, max. 5 values)	
Processing (sub ch)		Instantaneous sound pressure level: $L_p$	
Additional processing		In addition to main processing items, one of the following can be selected for simultaneous processing: C-weighted equivalent continuous sound level: $L_{Ceq}$ C-weighted peak sound level: $L_{Cpeak}$ Z-weighted peak sound level: $L_{Zpeak}$ 1-time-weighted equivalent continuous sound level: $L_{A1eq}^{*2}$ Maximum 1-time-weighted equivalent continuous sound level: $L_{A1max}^{*2}$ The power average of the maximum level of each 5 second interval: $L_{A1a5}$ The frequency weighting for the additional processing synchronizes with the frequency weighting of the sub-channel, so when the sub-channel has A-weighting, $L_{A1a5}$ can be selected. When C-weighting (Z-weighting) is selected, the additional processing $L_{Ceq}$ and $L_{Cpeak}$ ( $L_{Zpeak}$ ) are selectable.	
Measuring time		10 s, 1, 5, 10, 15, 30 m, 1, 8, 24 h, and manual (maximum 24 h)	
Microphone	Type	UC-59	UC-52
	Sensitivity level	-27 dB	-33 dB
Measurement range		A-weighting: 25 dB to 138 dB C-weighting: 33 dB to 138 dB Z-weighting: 38 dB to 138 dB C-weighting peak sound level: 55 dB to 141 dB Z-weighting peak sound level: 60 dB to 141 dB	
Inherent noise	A-weighting	17 dB or less	19 dB or less
	C-weighting	25 dB or less	27 dB or less
	Z-weighting	30 dB or less	32 dB or less
Frequency range		20 Hz to 20 kHz	20 Hz to 8 kHz
Frequency weighting		A, C, and Z	
Time weighting		F (Fast) and S (Slow)	
Level range		Single range (Linearity range: 113 dB) Bar graph display range max: Max. 110 dB (20 to 130 dB) Switching of bar graph display: Set the upper/lower limit in 10 dB increments.	
RMS detection circuit		Digital processing method	
Sampling cycle		20.8 $\mu$ s ( $L_p$ , $L_{eq}$ , $L_E$ , $L_{max}$ , $L_{min}$ , $L_{peak}$ : sampling frequency: 48 kHz) 100 ms ( $L_N$ )	
Calibration		Measurement Law: electrical calibration performed according to IEC and JIS standards, using internally generated signals; acoustic calibration performed with the NC-74.	
Correction functions		Windscreen correction: Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed. Diffuse sound field correction: Correction of frequency characteristics in order to comply with standards (ANSI S1.4) in diffuse sound field.	
Delay time		The meter can be set to start measuring a specified time (OFF, 1, 3, 5 or 10 s) after the start button has been pressed or when a user-set trigger is exceeded.	
Back erase function		When the PAUSE key is pressed to pause measurement, the preceding (user selectable) 0, 1, 3 or 5 s data are excluded from processing.	
Display		Backlit semitransparent color TFT LCD display WQVGA (400 x 240 dots) * LCD with touch panel (Capacitive Touch Panel) Numerical display update frequency: 1 s Bar graph update frequency: 100 ms	
Store	Manual	Data for measurement results are stored manually in single address increments.	
	Number of data	Internal memory: max. 1000 sets SD Card: depends on the capacity of the SD Card*1	
	Auto*2	Instantaneous values ( $L_p$ mode) and processed values ( $L_{eq}$ mode) are stored continuously and automatically at preset intervals.	
		$L_p$ sampling cycle	100 ms, 200 ms, 1 s, $L_{eq}$ 1 s
	$L_{eq}$ sampling cycle	10 s, 1, 5, 10, 15, 30 ms, 1, 8, 24 h	
	Measurement Time	Max. 1000 h (depends on the capacity of the SD Card)*1	

\* Windows is a trademark of Microsoft Corporation.  
\* Specifications subject to change without notice.

Distributed by:

This product is environment-friendly. It does not include toxic chemicals on our policy.  
 This product is certified as an International Protection rating of IP54 (dust protected and resistant to splashing water).  
This leaflet is printed with environmentally friendly vegetable-based ink on recycled paper.

1011-4 212 P.D

Data recall	Allows viewing of stored data
Setup memory	Up to five setup configurations can be saved in internal memory, for later recall Start up via file settings previously stored on SD card possible
Waveform recording*3	
File format	Uncompressed waveform WAVE file
Sampling frequency	Select 48 kHz, 24 kHz or 12 kHz
Data length	Select 24 bit or 16 bit
Outputs	
DC output	Output DC signals using a frequency weighting characteristic selected by processing
Output voltage	2.5 V, 25 mV / dB at bar graph display full scale
AC output	Output AC signals using a frequency weighting characteristic selected by processing or by A, C, Z-weighting.
Output voltage	1 V (rms values) at bar graph display full scale
Comparator output*2	Turns on when the open-collector output exceeds the set value (max. applied voltage 24 V, max. current 60 mA, allowable dissipation 300 mW).
USB*5	Allows USB to be connected to a computer and recognized as a removable disk Allows USB to be controlled via communication commands
RS-232C communication	Allows for RS-232C communication via use of a dedicated cable
Data continuous output*2	
Type of data	Instantaneous value: $L_p$ Processed value: $L_{eq}$ , $L_{max}$ , $L_{min}$ , $L_{peak}$
Output interval	100 ms
Print out	Printing of measurement results on dedicated printer DPU-414
Power requirements	Four IEC R6 (size AA) batteries (alkaline or rechargeable batteries) or external power supply
Battery life (23 °C)	Alkaline battery LR6 (AA): 26 h (NI-MH secondary battery: 25 h) At the maximum: * Depends on the setting
AC adapter	NC-98C (NC-34 for previous models cannot be used)
External power voltage	5 to 7 V (rated voltage: 6 V)
Current consumption	Approximately 90 mA (normal operation, rated voltage)
Ambient conditions	Temperature: -10 to +50 °C Humidity: 10 to 90% RH (non-condensing)
Dustproof / water-resistant performance*4	IP code: IP54 (except for microphone) See precautions regarding waterproofing
Dimensions, weight	Approx. 250 (H) x 76 (W) x 33 mm (D), approx. 400 g (with batteries)
Supplied accessories	Storage case x 1, Windscreen WS-10 x 1, Windscreen fall prevention rubber x 1, Hand strap x 1, LR6 (AA) alkaline batteries x 4, SD card 512 MB x 1 (NX-42EX preinstalled model only)

## Options

Product name	Product number
Extended function program (Inst.on 512 MB SD card)	NX-42EX
Waveform recording program*2 (Inst.on 2 GB SD card)	NX-42WR
Octave, 1/3 octave real-time analysis program*2 (Inst.on 512 MB SD card)	NX-42RT
FFT analysis program*2 (Inst.on 512 MB SD card)	NX-42FT
Data management software for environmental measurement	AS-60
Data management software for environmental measurement (Includes the octave and 1/3 octave data management software)	AS-60RT
Data management software for environmental measurement (Includes the vibration level data management software)	AS-60VM
Waveform analysis software	CAT-WAVE
SD Card 512 MB	SD-512M
SD Card 2 GB	SD-2G
AC adapter (100 V to 240 V)	NC-98C
Battery pack	BP-21
Microphone extension cables	EC-04 (from 2 m)
BNC-Pin output code	CC-24
Comparator output cable	CC-42C
Printer	DPU-414
Printer cable	CC-42P
RS 232C serial I/O cable	CC-42R
USB cable	—
Sound calibrator	NC-74
All-weather windscreen	WS-15
Windscreen mounting adaptor	WS-15006
Rain-protection windscreen	WS-16
Sound level meter tripod	ST-80
All-weather windscreen tripod	ST-81

\*1 Use Rion fully guaranteed products. \*2 NX-42EX required (sold separately). \*3 NX-42WR required (sold separately).  
\*4 Protection against harmful dust and water splashing from any direction.

### Precautions regarding waterproofing

Before use, verify that the rubber bottom cover and the battery compartment lid are firmly closed.  
To maintain the water and dust proof rating, internal packing replacement is required every two years (at cost).



**RION CO., LTD.**  
<http://www.rion.co.jp/english/>

3-20-41, Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan  
Tel: +81-42-359-7888 Fax: +81-42-359-7442

# Calibration Certificate of Sound Level Meter

AAST-SLM-10  
 Cal Cert: 2021/7/19



**中国赛宝实验室计量检测中心**  
 (工业和信息化部电子第五研究所计量检测中心)  
**CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE**

## 校准证书

### CALIBRATION CERTIFICATE

证书编号: 2HB21001383-0001  
 Certificate No. 



中国认可  
 国际互认  
 校准  
 CALIBRATION  
 CNAS L13344

委托单位: Client	Castco Testing Centre Limited	
仪器名称: Description	Sound Level Meter	
型号规格: Model/Type	NL-52	
制造商: Manufacturer	RION	
机身号: Serial No.	00976203	
管理号: Asset No.	AAST-SLM-10	
接收日期: Rec. Date	2021-07-08	校准日期: Cal. Date
签发日期: App. Date	2021-07-19	建议校准周期: Reference Cal. Period
结论: Conclusion	所校准项目合格(Passed at Calibration Items)	

校准:  
Calibrated by 

签发:  
Approved by 

核验:  
Inspected by 

印章:  
Stamp

赛宝计量检测中心  
 广州总部地址: 广州市增城区朱村街朱村大道西78号  
 客服电话: 020-87237633 传真: 020-87236189  
 投诉电话: 020-87236896  
 邮件: cal@ceprei.com  
 网址: www.ceprei-cal.com

CEPREI Calibration and Testing Centre  
 HQ Addr: No.78,Zhucon Avenue West,Zengcheng District,Guangzhou,China  
 Service Tel: 020-87237633 Fax: 020-87236189  
 Complaint Tel: 020-87236896  
 Email: cal@ceprei.com  
 Website: www.ceprei-cal.com

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 Page of

证书编号(Certificate No.): 2HB21001383-0001

## 说明

### DIRECTIONS

1. 本机构质量管理体系符合ISO/IEC 17025:2017标准的要求, 获得中国合格评定国家认可委员会 (CNAS) 认可, 认可证书号为: CNAS L13344。  
 This laboratory quality management system meets the ISO/IEC 17025:2017 and is accredited by the China National Accreditation Service for Conformity Assessment, No. CNAS L13344.
2. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):  
 \* JJG 188-2017 声级计检定规程; Sound pressure level: (20~130)dB; Frequency Weighting: (20~130)dB@(10 Hz~20kHz).  
 \* 详细内容请查看CNAS网站中注册编号为L13344的证书附件, 超出范围的内容未被认可, 其结果/结论所依据的合格评定活动不在认可范围内。(Please see the attachment of certificate No. L13344 at CNAS website for details, beyond which is not accredited, the conformity assessment activities on which the results/conclusions are based are outside the scope of accreditation.)
3. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):
 

名称 (Description)	证书号/有效期/溯源单位 (Certificate No./Due Date/Traceability to)	技术指标 (Specification)	测量范围 (Measuring Range)
正弦信号发生器	4GC20000427-0010/2021-11-04/赛宝(广州)	f: 41mHz; 失真度 Distortion: <-70dB	f: 0.001Hz~200kHz; U : 100μV~5Vrms
数字多用表	4GC20000358-0060/2021-09-09/赛宝(广州)	DCV: ±0.0035%; ACV: ±0.06%; DCI: ±0.05%; ACI: ±0.1%; R: ±0.01%; f: ±0.001%	DCV:(0~1000)V; ACV:(0.001~750)V@(3Hz~300kHz); DCI:(0~3)A; ACI:(0~3)A@(3Hz~5kHz); R:(0~100)MΩ; f:3Hz~300kHz
步进衰减器	4GC21000155-0024/2022-04-29/赛宝(广州)	43dB	(0~110) dB/10dB step @(DC~1GHz)
PULSE分析系统	GFJGJL1001210202725/2022-03-03/航空304所	频率: $f_{max}=0.001\text{kHz} \times A^{-2}$ ; 电压: $U_{max}=0.04\text{V} \times A^{-2}$	频率:0.001Hz~51.2kHz; 电压: $(1 \times 10^{-5} \sim 30)\text{V}$
标准传声器	LSs2021-13180/2022-04-24/中国计量院	$U=(0.05 \sim 0.20)\text{dB} \times (A-2)$	20Hz~20kHz
前置放大器	LSs2021-11346/2022-03-07/中国计量院	$U=(0.3\text{dB} \times (A-2))$	(10~20000) Hz
功率放大器	4GC20000457-0065/2021-11-17/赛宝(广州)	频率响应: ±1dB, 失真度: ≤0.2%	20Hz~20kHz
多功能声学校准器	4EC20000091-0005/2021-11-05/赛宝(广州)	1级	31.5Hz~16kHz
4. 校准地点(The calibration place):  
 广州市增城区朱村街朱村大道西78号9栋110室
5. 环境条件(Environmental conditions):  
 温度(Temperature): 23.4°C 相对湿度(Relative Humidity): 55.8%
6. 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度的评定与表示》评定, 由合成标准不确定度乘以包含概率约为95%时对应的包含因子k得到。  
 The extended uncertainty given in this certificate is evaluated according to JJF1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", and is calculated by multiplying the combined standard uncertainty by the coverage factor k which corresponding to the coverage probability about 95%.
7. 证书中"P"、"合格"代表"测量结果在允许范围内", "F"、"不合格"代表"测量结果不在允许范围内", "N/A"代表"不适用或技术指标暂时无法确认等"。本证书报告的结论仅供参考, 使用人员应结合实际测量的要求合理使用, 如考虑测量结果测量不确定度的影响等。  
 "P" and "Pass" in this certificate stand for "Low Limit≤the measured value ≤High Limit", "F" and "Fail" stand for "the measured value < Low Limit or the measured value > High Limit", "N/A" stands for "Not Applicable or The technical specification has not been confirmed etc".The conclusions of this certificate are for reference only. Users should use them reasonably according to the actual measurement requirements, such as considering the impact of measurement uncertainty, etc.
8. 建议校准周期是本实验室依据本证书报告的技术依据和仪器设备常规使用条件给出的建议, 供委托方参考。委托方可以根据实际使用情况自行决定样品的校准周期。

赛宝计量检测中心  
 广州总部地址: 广州市增城区朱村街朱村大道西78号  
 客服电话: 020-87237633 传真: 020-87236189  
 投诉电话: 020-87236896  
 邮件: cal@ceprei.com  
 网址: www.ceprei-cal.com

CEPREI Calibration and Testing Centre  
 HQ Addr: No.78,Zhucon Avenue West,Zengcheng District,Guangzhou,China  
 Service Tel: 020-87237633 Fax: 020-87236189  
 Complaint Tel: 020-87236896  
 Email: cal@ceprei.com  
 Website: www.ceprei-cal.com

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# Calibration Certificate of Sound Level Meter



证书编号(Certificate No.): 2HB21001383-0001

### 1 外观与工作正常性检查 (Appearance and Function Check)

无影响证书中测量结果准确度的因素和缺陷。

There are no factor and defect that affect the measurement result accuracy of the certificate.

### 2 指示声级调整 (Indication SPL Calibration)

频率(Frequency)=1000Hz

传声器型号 (Microphone Type)	传声器编号 (Microphone SN.)	放大器型号 (Preamplifier Type)	放大器编号 (Preamplifier SN.)
UC-59	15764	NH-25	76321

声校准器型号 (Calibrator Type)	标准声压级 (Reference SPL)	校准前示值 (Before Calibration)	校准后示值 (After Calibration)	U (k=2)
	(dB)	(dB)	(dB)	(dB)
4226	94.0	94.1	94.1	0.2

### 3 级线性 (Level Linearity)

#### 3.1 参考级量程 (Reference Range)

频率(Frequency): 8000Hz

起始点指示声级(Sound Level Indication of Start Point):	90.0 dB
起始点以上间隔10dB点的最大误差(Maximum Error for each 10dB above Start Point):	-0.2 dB
U (k=2)	0.6 dB
上限以下5dB间隔1dB点的最大误差(Maximum Error for each 1dB below Upper Limit 5dB):	-0.2 dB
U (k=2)	0.6 dB
起始点以下间隔10dB点的最大误差(Maximum Error for each 10dB below Start Point):	-0.2 dB
U (k=2)	0.6 dB
下限以上5dB间隔1dB点的最大误差(Maximum Error for each 1dB above Lower Limit 5dB):	-0.2 dB
U (k=2)	0.6 dB

#### 3.2 其它级量程 (Other Range)

频率(Frequency): 1000Hz

起始点指示声级(Sound Level Indication of Start Point):	90.0 dB
起始点以上间隔10dB点的最大误差(Maximum Error for each 10dB above Start Point):	-0.1 dB
U (k=2)	0.4 dB
上限以下5dB间隔1dB点的最大误差(Maximum Error for each 1dB below Upper Limit 5dB):	-0.1 dB
U (k=2)	0.4 dB
起始点以下间隔10dB点的最大误差(Maximum Error for each 10dB below Start Point):	-0.1 dB
U (k=2)	0.4 dB
下限以上5dB间隔1dB点的最大误差(Maximum Error for each 1dB above Lower Limit 5dB):	-0.1 dB
U (k=2)	0.4 dB

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证书编号(Certificate No.): 2HB21001383-0001

### 4 A计权特性(A-Weighting Characteristic)

频率 (Frequency)	实测值 (Actual)	理论值 (Theoretical value)	误差 (Error)	允许误差 (Limit)	结论 (Pass/Fail)	U (k=2)
(Hz)	(dB)	(dB)	(dB)	(dB)	(P/F)	(dB)
20	-49.2	-50.5	1.3	±2.0	P	0.5
25	-44.2	-44.7	0.5	+2.0 ~ -1.5	P	0.5
31.5	-39.4	-39.4	0.0	±1.5	P	0.5
40	-34.4	-34.6	0.2	±1.0	P	0.5
50	-30.3	-30.2	-0.1	±1.0	P	0.5
63	-26.0	-26.2	0.2	±1.0	P	0.5
80	-22.4	-22.5	0.1	±1.0	P	0.5
100	-19.1	-19.1	0.0	±1.0	P	0.5
125	-16.0	-16.1	0.1	±1.0	P	0.5
160	-13.2	-13.4	0.2	±1.0	P	0.5
200	-10.8	-10.9	0.1	±1.0	P	0.5
250	-8.6	-8.6	0.0	±1.0	P	0.5
315	-6.6	-6.6	0.0	±1.0	P	0.4
400	-4.7	-4.8	0.1	±1.0	P	0.4
500	-3.3	-3.2	-0.1	±1.0	P	0.4
630	-1.9	-1.9	0.0	±1.0	P	0.4
800	-0.8	-0.8	0.0	±1.0	P	0.4
1000(Ref.)	0.0	0.0	0.0	±0.7	P	0.4
1250	0.5	0.6	-0.1	±1.0	P	0.6
1600	0.9	1.0	-0.1	±1.0	P	0.6
2000	1.1	1.2	-0.1	±1.0	P	0.6
2500	1.0	1.3	-0.3	±1.0	P	0.6
3150	0.9	1.2	-0.3	±1.0	P	0.6
4000	1.2	1.0	0.2	±1.0	P	0.6
5000	0.3	0.5	-0.2	±1.5	P	0.6
6300	-0.3	-0.1	-0.2	+1.5 ~ -2.0	P	0.6
8000	-0.6	-1.1	0.5	+1.5 ~ -2.5	P	0.6
10000	-2.4	-2.5	0.1	+2.0 ~ -3.0	P	0.6
12500	-4.3	-4.3	0.0	+2.0 ~ -5.0	P	1.0
16000	-8.5	-6.6	-1.9	+2.5 ~ -16.0	P	1.0
20000	-18.5	-9.3	-9.2	+3.0 ~ -∞	P	1.0

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## Calibration Certificate of Sound Level Meter



证书编号(Certificate No.): 2HB21001383-0001

### 5 C计权特性(C-Weighting Characteristic)

频率 (Frequency) (Hz)	实测值 (Actual) (dB)	理论值 (Theoretical value) (dB)	误差 (Error) (dB)	允许误差 (Limit) (dB)	结论 (Pass/Fail) (P/F)	U (dB)
20	-6.6	-6.2	-0.4	±2.0	P	0.5
25	-4.5	-4.4	-0.1	+2.0 ~ -1.5	P	0.5
31.5	-2.9	-3.0	0.1	±1.5	P	0.5
40	-1.9	-2.0	0.1	±1.0	P	0.5
50	-1.3	-1.3	0.0	±1.0	P	0.5
63	-0.7	-0.8	0.1	±1.0	P	0.5
80	-0.5	-0.5	0.0	±1.0	P	0.5
100	-0.2	-0.3	0.1	±1.0	P	0.5
125	-0.1	-0.2	0.1	±1.0	P	0.5
160	-0.1	-0.1	0.0	±1.0	P	0.5
200	0.0	0.0	0.0	±1.0	P	0.5
250	0.0	0.0	0.0	±1.0	P	0.5
315	0.0	0.0	0.0	±1.0	P	0.4
400	0.1	0.0	0.1	±1.0	P	0.4
500	0.0	0.0	0.0	±1.0	P	0.4
630	0.0	0.0	0.0	±1.0	P	0.4
800	0.0	0.0	0.0	±1.0	P	0.4
1000(Ref.)	0.0	0.0	0.0	±0.7	P	0.4
1250	-0.1	0.0	-0.1	±1.0	P	0.6
1600	-0.2	-0.1	-0.1	±1.0	P	0.6
2000	-0.3	-0.2	-0.1	±1.0	P	0.6
2500	-0.6	-0.3	-0.3	±1.0	P	0.6
3150	-0.8	-0.5	-0.3	±1.0	P	0.6
4000	-0.6	-0.8	0.2	±1.0	P	0.6
5000	-1.6	-1.3	-0.3	±1.5	P	0.6
6300	-2.1	-2.0	-0.1	+1.5 ~ -2.0	P	0.6
8000	-2.5	-3.0	0.5	+1.5 ~ -2.5	P	0.6
10000	-4.3	-4.4	0.1	+2.0 ~ -3.0	P	0.6
12500	-6.3	-6.2	-0.1	+2.0 ~ -5.0	P	1.0
16000	-10.5	-8.5	-2.0	+2.5 ~ -16.0	P	1.0
20000	-20.4	-11.2	-9.2	+3.0 ~ ∞	P	1.0

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证书编号(Certificate No.): 2HB21001383-0001

### 6 自生噪声 (Autogenous noise)

计权 (Weighting)	实测值 (Actual) (dB)
A	15.3

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## 说 明 DIRECTIONS

1. 本机构质量管理体系符合ISO/IEC 17025:2017标准的要求，获得中国合格评定国家认可委员会（CNAS）认可，认可证书号为：CNAS L13344。  
This laboratory quality management system meets the ISO/IEC 17025:2017 and is accredited by the China National Accreditation Service for Conformity Assessment, No. CNAS L13344.

2. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):

▪ JJG 188-2017 声级计检定规程: Sound pressure level: (20~130)dB; Frequency Weighting: (20~130)dB@(10 Hz~20kHz).

▪ 详细内容请查看CNAS网站中注册编号为L13344的证书附件，超出范围的内容未被认可，其结果/结论所依据的合格评定活动不在认可范围内。(Please see the attachment of certificate No. L13344 at CNAS website for details, beyond which is not accredited, the conformity assessment activities on which the results/conclusions are based are outside the scope of accreditation.)

3. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):

名称 (Description)	证书号/有效期/溯源单位 (Certificate No./Due Date/Traceability to)	技术指标 (Specification)	测量范围 (Measuring Range)
数字多用表	4GC20000467-0001/2021-11-26/赛宝(广州)	DCV: $\pm 0.0035\%$ ; ACV: $\pm 0.06\%$ ; DCI: $\pm 0.05\%$ ; ACI: $\pm 0.1\%$ ; R: $\pm 0.01\%$ ; f: $\pm 0.001\%$	DCV:(0~1000)V; ACV: (0.001~750)V@(3Hz~300kHz); DCI:(0~3)A; ACI:(0~3)A@(3Hz~5kHz); R:(0~100)M $\Omega$ ; f: 3Hz~300kHz
正弦信号发生器	4GC20000427-0010/2021-11-04/赛宝(广州)	f: $\pm 1\text{mHz}$ ; 失真度 Distortion: $< -70\text{dB}$	f: 0.001Hz~200kHz; U: 100 $\mu\text{V}$ ~5Vrms
标准传声器	LSsx2021-13180/2022-04-24/中国计量院	U=(0.05~0.20)dB (k=2)	20Hz~20kHz
前置放大器	LSsx2021-13000/2022-04-19/中国计量院	U=0.3dB (k=2)	(10~50000) Hz
PULSE分析系统	4GC21000026-0375/2022-01-21/赛宝(广州)	频率: $U_{rel}=0.001\%$ , k=2; 电压: $U_{rel}=0.04\%$ , k=2	频率: 0.001Hz~51.2kHz; 电压: $(1 \times 10^{-7} \sim 30)\text{V}$
声级校准器	LSsx2021-11345/2022-03-07/中国计量院	1级	94dB, 114dB@ (1000Hz)
功率放大器	4GC20000457-0065A/2021-11-17/赛宝(广州)	频率响应: $\pm 1\text{dB}$ , 失真度: $\leq 0.2\%$	20Hz~20kHz
步进衰减器	4GC21000155-0024/2022-04-29/赛宝(广州)	$\pm 3\text{dB}$	(0~110) dB/10dB step @ (DC~1GHz)
声校准器	4GC20000502-0050/2021-12-21/赛宝(广州)	1级 First Level	31.5Hz~16kHz

4. 校准地点(The calibration place):  
广州市增城区朱村街朱村大道西78号9栋110室

5. 环境条件(Environmental conditions):  
温度(Temperature): 23.9°C 相对湿度(Relative Humidity): 55.8%

6. 本证书中给出的扩展不确定度依据JJF 1059.1-2012《测量不确定度的评定与表示》评定，由合成标准不确定度乘以包含概率约为95%时对应的包含因子k得到。  
The extended uncertainty given in this certificate is evaluated according to JJF 1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", and is calculated by multiplying the combined standard uncertainty by the coverage factor k which corresponding to the coverage probability about 95%.

7. 证书中"P"、"合格"代表"测量结果在允许范围内"，"F"、"不合格"代表"测量结果不在允许范围内"，"N/A"代表"不适用或技术指标暂时无法确认等"。本证书报告的结论仅供参考，使用人员应结合实际测量的要求合理使用，如考虑测量结果测量不确定度的影响等。  
"P" and "Pass" in this certificate stand for "Low Limit $\leq$ the measured value  $\leq$ High Limit", "F" and "Fail" stand for "the measured value  $<$  Low Limit or the measured value  $>$  High Limit", "N/A" stands for "Not Applicable or The technical specification has not been confirmed etc". The conclusions of this certificate are for reference only. Users should use them reasonably according to the actual measurement requirements, such as considering the impact of measurement uncertainty, etc.

Sound Calibrator NC-75



Compact and lightweight sound calibrator allows highly reliable and accurate measurement anywhere

# Sound Calibrator NC-75

Patent pending



- Integrated newly developed reference microphone enables feedback control that completely eliminates the need for atmospheric pressure and coupler volume correction, resulting in highly accurate and reliable calibration.
- Effective coupler sound insulation (30 dB or higher\*) permits calibration also in relatively noisy environments.  
\*A-weighted sound level insulation performance measured with pink noise
- Each product comes standard with a JCSS Calibration Certificate, demonstrating high quality.

- Conforming with IEC 60942: 2017 class 1 and JIS C 1515: 2020
- Supports calibration of RION sound level meters compliant with IEC 61672-1: 2013, JIS C 1509-1: 2017 and JIS C 1516: 2014.
- Supports calibration of RION microphones and microphones of other manufacturers meeting the size specifications of IEC 61094-4.
- Supports 1-inch, 1/2-inch, and 1/4-inch microphones (1/4 inch with optional adapter)

JCSS Calibration Certificate

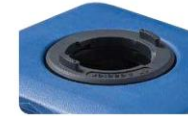


JCSS Calibration Results



How to use the adapter

- **1-inch microphones**  
To use the sound calibrator with 1-inch diameter microphones, remove the 1/2-inch microphone adapter.
- **1/2-inch microphones**  
To use the sound calibrator with 1/2-inch diameter microphones, the supplied 1/2-inch microphone adapter must be in place.  
Make sure the 1/2-inch adapter is locked.
- **1/4-inch microphones**  
To use the sound calibrator with 1/4-inch diameter microphones, use the supplied 1/2-inch microphone adapter together with the optional 1/4-inch adapter.



Usage example

Specifications (under standard ambient conditions\*)

Applicable standards	IEC 60942: 2017 class 1, ANSI/ASA S1.40-2006 class 1, JIS C 1515: 2020 class 1, CE marking, WEEE directive, Chinese RoHS
Supported microphones	Microphones made by RION and microphones made by other manufacturers that meet the IEC 61094-4 size specifications 1-inch microphones 1/2-inch microphones (with supplied adapter) 1/4-inch microphones (with optional adapter)
Nominal sound pressure level	94 dB
Sound pressure level tolerance	Max. ±0.20 dB
Nominal frequency	1 000 Hz
Frequency tolerance	Max. ±0.1%
THD + noise	Max. 1.0 % (22.4 Hz to 22.4 kHz)
Dimensions and weight	Approx. 42 mm (H) x 77 mm (W) x 70 mm (D), approx. 200 g
Power supply	IEC LR6 (size AA) alkaline battery x 2 IEC LR6 (size AA) nickel-hydrate rechargeable battery ("eneloop pro" supported) x 2
Battery life	50 hours or more (using two alkaline batteries, continuous use) 50 hours or more (using two nickel-hydrate rechargeable batteries (eneloop pro), continuous use)
Supplied accessories	Soft case x 1, 1/2-inch microphone adapter x 1, IEC LR6 (size AA) alkaline battery x 2, hand strap x 1, JCSS Calibration Certificate x 1
* RION standard ambient conditions: static pressure 101.325 kPa, ambient temperature 23 °C, relative humidity 50 %	
Optional accessories	1/4-inch microphone adapter NC-75-S11

Strap



Securely carry the unit with the supplied hand strap

Soft case



Calibration can be performed with the calibrator inserted in the soft case

PISTONPHONE NC-72A



Specifications (under standard ambient conditions*)	
Applicable standards	IEC 60942: 2017 class L5/M, class 1/M, JIS C 1515: 2020 class L5/M, class 1/M
Nominal sound pressure level	114 dB, Sound pressure level tolerance ±0.10 dB



RION CO., LTD. is recognized by the JCSS which uses ISO/IEC 17025 as an accreditation standard and bases its accreditation scheme on ISO/IEC 17011. JCSS is operated by the accreditation body (IA Japan) which is a signatory to the Asia Pacific Accreditation Cooperation (APAC), as well as the International Laboratory Accreditation Cooperation (ILAC). The Quality Assurance Section of RION CO., LTD. is an international MHA compliant JCSS operator with the accreditation number JCSS 0197.

\* Windows is a trademark of Microsoft Corporation. \* Specifications subject to change without notice.

Distributed by:



3-20-41, Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan  
Tel: +81-42-359-7888 Fax: +81-42-359-7442

This product is environment-friendly. It does not include toxic chemicals on our policy. This leaflet is printed with environmentally friendly UV ink.

1709-B 2003/PD

## Calibration Certificate of Sound Calibrator



中国赛宝实验室计量检测中心  
(工业和信息化部电子第五研究所计量检测中心)  
CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE

# 校准证书

## CALIBRATION CERTIFICATE

证书编号: 2HB21001749-0002  
Certificate No.



委托单位: Castco Testing Centre Limited  
Client

仪器名称: Sound Level Calibrator  
Description

型号规格: NC-75  
Model/Type

制造商: RION  
Manufacturer

机身号: 34280310  
Serial No.

管理号: AAST-SLC-07  
Asset No.

接收日期: 2021-08-05 校准日期: 2021-08-17  
Rec. Date Cal. Date

签发日期: 2021-08-18 建议校准周期: 12个月(12 months)  
App. Date Reference Cal. Period

结论: 所校准项目合格(Passed at Calibration Items)  
Conclusion

校准: 赵文钰  
Calibrated by

核验: 张毅  
Inspected by

签发: 郑木力  
Approved by

印章:  
Stamp

赛宝计量检测中心  
广州总部地址: 广州市增城区朱村街朱村大道西78号  
客服电话: 020-87237633 传真: 020-87236189  
投诉电话: 020-87236896  
邮件: cal@ceprei.com  
网址: www.ceprei-cal.com

CEPREI Calibration and Testing Centre  
HQ Addr: No.78,Zhuacun Avenue West,Zengcheng District,Guangzhou,China  
Service Tel: 020-87237633 Fax: 020-87236189  
Complaint Tel: 020-87236896  
Email: cal@ceprei.com  
Website: www.ceprei-cal.com

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证书编号(Certificate No.): 2HB21001749-0002

## 说明

### DIRECTIONS

1. 本机构质量管理体系符合ISO/IEC 17025:2017标准的要求, 获得中国合格评定国家认可委员会 (CNAS) 认可, 认可证书号为: CNAS L13344.  
This laboratory quality management system meets the ISO/IEC 17025:2017 and is accredited by the China National Accreditation Service for Conformity Assessment, No. CNAS L13344.
2. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):  
\* JJG 176-2005 声校准器检定规程: Sound Pressure Level: 94dB、104dB、114dB、124dB(63Hz~8kHz); 94dB、104dB、114dB、(31.5Hz~16kHz); Frequency: 31.5Hz~16kHz; Harmonic Distortion: 0~10%, (20Hz~20 kHz).  
\* 详细内容请查看CNAS网站中注册编号为L13344的证书附件, 超出范围的内容未被认可, 其结果/结论所依据的合格评定活动不在认可范围内。(Please see the attachment of certificate No. L13344 at CNAS website for details, beyond which is not accredited, the conformity assessment activities on which the results/conclusions are based are outside the scope of accreditation.)
3. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):  

名称 (Description)	证书号/有效期/溯源单位 (Certificate No./Due Date/Traceability to)	技术指标 (Specification)	测量范围 (Measuring Range)
标准传声器	LS6x2021-13180/2022-04-24/中国计量院	$U=0.05-0.20\text{dB} (k=2)$	10Hz~20kHz
PULSE分析系统	4GC21000026-0375/2022-01-21/赛宝(广州)	频率: $U_{rel}=0.001\%,k=2$ ;电压: $U_{rel}=0.04\%,k=2$	频率:0.001Hz~51.2kHz; 电压:( $1 \times 10^{-3}$ ~30)V
前置放大器	LSx2021-13000/2022-04-19/中国计量院	$U=0.3\text{dB} (k=2)$	(10~50000) Hz
4. 校准地点(The calibration place):  
广州市增城区朱村街朱村大道西78号9栋110室
5. 环境条件(Environmental conditions):  
温度(Temperature): 22.9°C 相对湿度(Relative Humidity): 59.5%
6. 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度的评定与表示》评定, 由合成标准不确定度乘以包含概率约为95%时对应的包含因子k得到。  
The extended uncertainty given in this certificate is evaluated according to JJF1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", and is calculated by multiplying the combined standard uncertainty by the coverage factor k which corresponding to the coverage probability about 95%.
7. 证书中"P"、"合格"代表"测量结果在允许范围内", "F"、"不合格"代表"测量结果不在允许范围内", "N/A"代表"不适用或技术指标暂时无法确认等"。本证书报告的结论仅供参考, 使用人员应结合实际测量的要求合理使用, 如考虑测量结果测量不确定度的影响等。  
"P" and "Pass" in this certificate stand for "Low Limit≤the measured value ≤High Limit", "F" and "Fail" stand for "the measured value < Low Limit or the measured value > High Limit", "N/A" stands for "Not Applicable or The technical specification has not been confirmed etc".The conclusions of this certificate are for reference only. Users should use them reasonably according to the actual measurement requirements, such as considering the impact of measurement uncertainty, etc.
8. 建议校准周期是实验室依据本证书报告的技术依据和仪器设备常规使用条件给出的建议, 供委托方参考。委托方可以根据实际使用情况自行决定样品的校准周期。  
The reference calibration period is based on the reference documents and normal operating conditions of the calibrated instrument. It is only for reference. The client may decide the calibration period of the instrument according to the actual use.

注: 1. 本证书未经本机构书面授权, 不得部分复制。(The certificate shall not be partly reproduced without written approval of the laboratory.)

2. 本次校准结果仅与被校物有关。(The results are only related to the items calibrated.)

第 3 页,共 5 页  
Page of



# Calibration Certificate of Sound Calibrator



证书编号(Certificate No.): 2HB21001749-0002

## 1 外观与工作正常性检查 (Appearance and Function Check)

无影响证书中校准结果准确度的因素和缺陷。

There are no factor and defect that affect the calibration result accuracy of the certificate.

## 2 声压级 (Sound Pressure Level)

规定声压级 (Prescribed SPL)	测量声压级 (Measured SPL)	声压级差的绝对值 (Absolute value of SPL)	允许范围 (Limit)	结论 (Pass/Fail)	$U$ ( $k=2$ )
(dB)	(dB)	(dB)	(dB)		(dB)
94	94.12	0.12	≤0.40	P	0.10

## 3 频率 (Frequency)

规定频率 (Prescribed Fre.)	测量频率 (Measured Fre.)	频率误差的绝对值 (Absolute value of Fre.)	允许范围 (Limit)	结论 (Pass/Fail)	$U_{rel}$ ( $k=2$ )
(Hz)	(Hz)	(%)	(%)		(%)
1000	1000.0	0.00	≤1.00	P	0.10

## 4 总失真 (Distortion)

规定声压级 (Prescribed SPL)	规定频率 (Measured Fre.)	总失真 (Distortion)	允许范围 (Limit)	结论 (Pass/Fail)	$U_{rel}$ ( $k=2$ )
(dB)	(Hz)	(%)	(%)		(%)
94	1000	0.15	≤3.00	P	5.0

以下空白/No data hereafter.

CEPREI

# Catalogue of Air Flow Meter (TSI TA440)

## SPECIFICATIONS

### THERMAL ANEMOMETERS MODELS TA410, TA430 AND TA440

#### Velocity

Range (TA410) 0 to 20 m/s (0 to 4,000 ft/min)  
 Range (TA430, TA440) 0 to 30 m/s (0 to 6,000 ft/min)  
 Accuracy (TA410)<sup>1,2</sup> ±5% of reading or ±0.025 m/s (±5 ft/min), whichever is greater  
 Accuracy (TA430, TA440)<sup>1,2</sup> ±3% of reading or ±0.015 m/s (±3 ft/min), whichever is greater  
 Resolution 0.01 m/s (1 ft/min)

#### Duct Size (TA430, TA440)

Dimensions 1 to 635 cm in increments of 0.1 cm (1 to 250 inches in increments of 0.1 in.)

#### Volumetric Flow Rate (TA430, TA440)

Range Actual range is a function of velocity, and duct size

#### Temperature

Range (TA410, TA430) -18 to 93°C (0 to 200°F)  
 Range (TA440) -10 to 60°C (14 to 140°F)  
 Accuracy<sup>3</sup> ±0.3°C (±0.5°F)  
 Resolution 0.1°C (0.1°F)

#### Relative Humidity (TA440 only)

Range 5 to 95% RH  
 Accuracy<sup>4</sup> ±3% RH  
 Resolution 0.1% RH

#### Wet Bulb Temperature (TA440 only)

Range 5 to 60°C (40 to 140°F)  
 Resolution 0.1°C (0.1°F)

#### Dew Point (TA440 only)

Range -15 to 49°C (5 to 120°F)  
 Resolution 0.1°C (0.1°F)

#### Instrument Temperature Range

Operating (Electronics) 5 to 45°C (40 to 113°F)  
 Model TA410, TA430 Operating (Probe) -18 to 93°C (0 to 200°F)  
 Model TA440 Operating (Probe) -10 to 60°C (14 to 140°F)  
 Storage -20 to 60°C (-4 to 140°F)

#### Data Storage Capabilities (TA430, TA440)

Range 12,700+ samples and 100 test IDs

#### Logging Interval (TA430, TA440)

1 second to 1 hour

Specifications subject to change without notice.

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Airflow Instruments, TSI Instruments Ltd.  
 Visit our website at [www.airflowinstruments.co.uk](http://www.airflowinstruments.co.uk) for more information.

UK Tel: +44 149 4 459209 Germany Tel: +49 241 523030  
 France Tel: +33 491 11 87 64

P/N 29805-08 Rev D (A4) ©2014 TSI Incorporated

#### Time Constant (TA430, TA440)

User selectable

#### External Meter Dimensions

8.4 cm x 17.8 cm x 4.4 cm (3.3 in. x 7.0 in. x 1.8 in.)

#### Meter Weight with Batteries

0.27 kg (0.6 lbs.)

#### Meter Probe Dimensions

Probe Length 101.6 cm (40 in.)  
 Probe Diameter of Tip 7.0 mm (0.28 in.)  
 Probe Diameter of Base 13.0 mm (0.51 in.)

#### Articulating Probe Dimensions

Articulating Section Length 19.7 cm (7.8 in.)  
 Diameter of Articulating Knuckle 9.5 mm (0.38 in.)

#### Power Requirements

Four AA-size batteries or AC adapter

	TA410	TA430, TA430-A	TA440, TA440-A
Velocity range 0 to 20.00 m/s (0 to 4000 ft/min)	+		
Velocity range 0 to 30.00 m/s (0 to 6000 ft/min)		+	+
Temperature	+	+	+
Flow		+	+
Humidity, wet bulb, dew point			+
Probe	Straight	Straight or -A articulated	Straight or -A articulated
Variable time constant		+	+
Manual data logging		+	+
Auto save data logging			+
Statistics		+	+
Review data		+	+
LogDat2 downloading software		+	+
Free Certificate of Calibration	+	+	+

<sup>1</sup>Temperature compensated over an air temperature range of 5 to 65°C (40 to 150°F).

<sup>2</sup>The accuracy statement begins at 30 ft/min through 4000 ft/min (0.15 m/s through 20 m/s) for the Model TA410, and 30 ft/min through 6,000 ft/min (0.15 m/s through 30 m/s) for Models TA430 and TA440.

<sup>3</sup>Accuracy with instrument case at 25°C (77°F), add uncertainty of 0.03°C (0.05°F/F) for change in instrument temperature.

<sup>4</sup>Accuracy with probe at 25°C (77°F). Add uncertainty of 0.2% RH (0.1% RH/°F) for change in probe temperature. Includes 1% hysteresis.

# Calibration Certificate of Air Flow Meter



深圳市东华计量检测技术有限公司  
 Shenzhen Donghua Metrology & Testing Technology Co., Ltd.



## 校准证书 CALIBRATION CERTIFICATE

证书编号:  
Certificate No. DH21AA002160001

委托方名称:  
Client name Castco Testing Centre Limited

委托方地址:  
Add. of Client 33, On Kui Street, Fanling, N. T.

计量器具名称:  
Name of Instrument 风速计

型号/规格:  
Type/Specification TA440

制造单位:  
Manufacturer AIRFLOW

器具编号:  
Serial No. AAST-FLOW-03/TA4401706003

接收日期:  
Date of Receipt 2021 年 02 月 23 日  
Year Month Day

校准日期:  
Date of calibration 2021 年 02 月 26 日  
Year Month Day

批准人:  
Approved by 蒋荣飞 蒋荣飞 签发日期: 2021 年 02 月 26 日  
Date of issue Year Month Day

核验员:  
Checked by 张吉庆 张吉庆

校准员:  
Calibrated by 蒋新建 蒋新建

(证书专用章)  
Stamp

该二维码非公众号



扫码查看证书信息 (真伪)

计量校准机构备案号: 粤校备2017B010

Register No: 粤校备2017B010

地址: 深圳市龙华区大浪街道同胜社区浦华科技园厂房 A1 层

Add: 1st Floor, Building A1, Puhua Science and Technology Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, Guangdong, China

电话: 0755-28161768/28162768/28166778

Tel: 0755-28161768/28162768/28166778

传真: 0755-21004376 邮编: 518109

Fax: 0755-21004376 Zip Code: 518109

网址: www.szdhl.com 电子邮箱: szdhl@163.com

http://www.szdhl.com E-mail: szdhl@163.com

# Calibration Certificate of Air Flow Meter



**深圳市东华计量检测技术有限公司**  
Shenzhen Donghua Metrology & Testing Technology Co., Ltd.

证书编号: **DH21AA002160001**  
Certificate No.

## 证书说明

Certificate Statement

- 本校准证书包含的数据和信息仅对本次校准的计量器具负责。  
The calibration certificate contains data and information applies only to the calibrated instrument.
- 本公司仅对加盖我司的“证书专用章”的完整证书负责。  
The company only Division I stamped "certificate special seal" is responsible for the full certificate.
- 未经本公司书面授权, 不得部分复印证书。  
The certificate shall not be photocopied without the written authorization of the company.
- 本次校准依据的技术文件:  
Reference Documents for the Calibration:  
JJG (建设) 0001-1992 热球式风速仪计量检定规程  
JJG (建设) 0001-1992 Metrological Verification Regulation of Hot Ball shaped Anemometer
- 本次校准所使用的主要计量标准器具:  
Major standards of measurement used in the calibration:

设备名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级 /最大允许误差 Uncertainty/Accuracy Class/ Maximum permissible Error	设备编号 Equipment No.	溯源机构/ 证书编号 Traceability to/ Certificate No.	溯源有效期 Traceability Due Date
补偿式微压计	(-2500~2500) Pa	二等	SM1926	上海市计量测试技术研究院 2018E21-20-2637951001	2022-07-28
皮托管	(0~30) m/s	-	SM326	中国计量科学研究院 RGV2019-0007	2024-01-20
机械式温湿度计	温度: (-20~80) °C; 湿度: (0~100) %RH	MPE: 温度: ±2°C, 湿度: ±(5~7) %	85926	深圳市计量质量检测研究院 205605616	2021-05-10
空盒气压表	(800~1060) hPa	$U=0.6\text{hPa}, k=2$	15033115	深圳市计量质量检测研究院 204373348	2021-08-17
标准水银温度计	(0~50)°C	$U=0.03^\circ\text{C}, k=2$	2-204	深圳市计量质量检测研究院 205502058	2022-03-09

- 校准地点: 本公司力学实验室  
Operation Location
- 环境条件: 温度 21.7 °C 相对湿度 60 % 大气压 1010.0 hPa  
Operation Environment Temperature °C RH



**深圳市东华计量检测技术有限公司**  
Shenzhen Donghua Metrology & Testing Technology Co., Ltd.

证书编号: **DH21AA002160001**  
Certificate No.

## 校准结果

Result of Calibration

- 外观及工作正常性检查: 正常
- 校准结果:

标准值 (m/s)	示值 (m/s)	示值误差 (m/s)	不确定度 ( $k=2$ ) $U_{rel}$
2.50	2.50	0.00	3%
3.00	2.99	-0.01	3%
5.00	4.98	-0.02	3%
10.00	9.98	-0.02	3%
15.00	14.96	-0.04	3%
20.00	19.96	-0.04	3%
25.00	24.95	-0.05	3%

说明 (Explanation):

- 本次测量结果的不确定度 ( $k=2$ )。  
The uncertainty of the measurement result ( $k=2$ ).
- 本次校准结果不确定度的评估和表述依据JJF1059.1的要求。  
The uncertainty of the calibration result is evaluated and expressed according to the requirement of JJF1059.1.
- 根据客户要求和所依据技术文件的规定, 建议复校时间间隔不超过12个月。  
According to customers' request and technical documents, the re-check time interval should not exceed 12 months.

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**Appendix K – Noise monitoring results and graphical presentation**

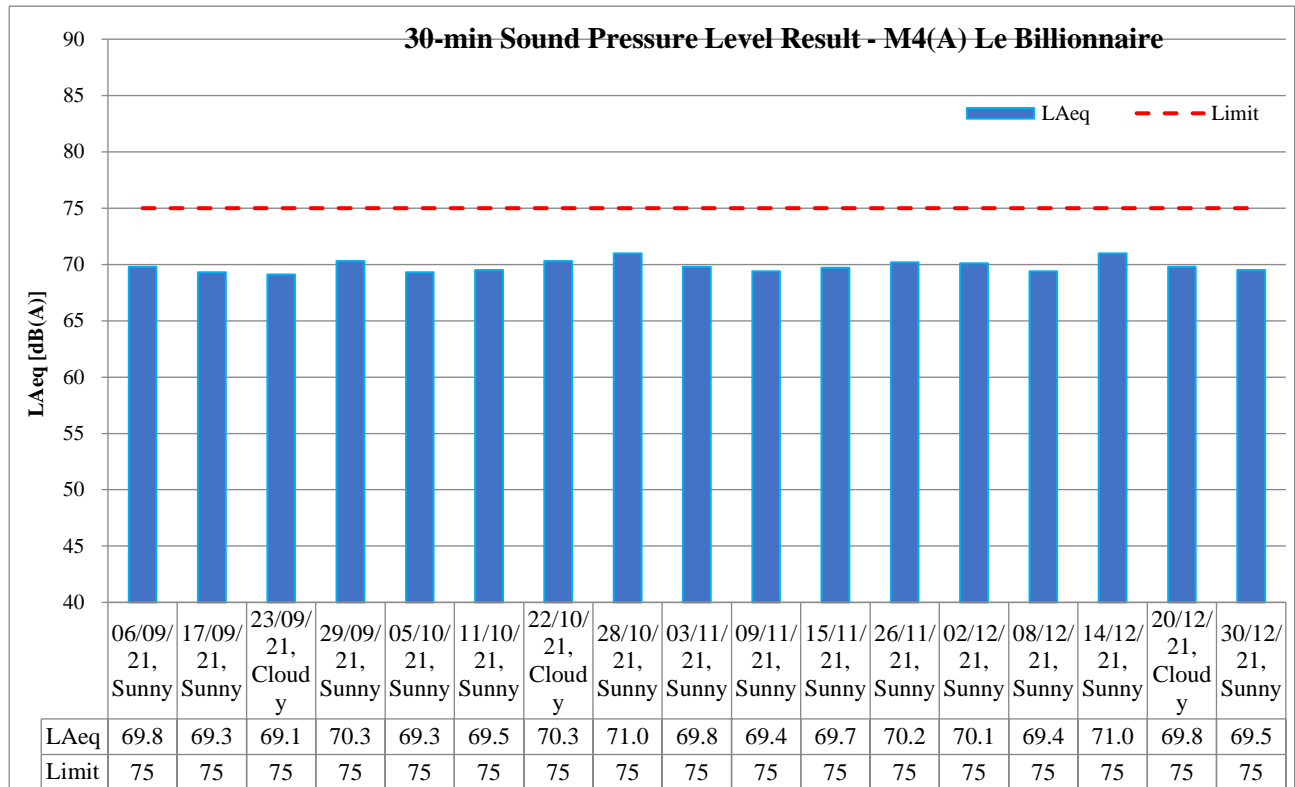
**M4(A) – Le Billionnaire**

Date	Temp (°C)	Weather	Measured Noise Level at M4(A), dB(A)							Limit
			Time		Baseline	L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>		
2/12/2021	22.3	Sunny	13:25	-	13:55	69.5	70.1	71.5	68.8	75
8/12/2021	21.8	Sunny	09:25	-	09:55	69.5	69.4	70.8	68.3	75
14/12/2021	18.0	Sunny	09:14	-	09:44	69.5	71.0	72.2	69.4	75
20/12/2021	19.6	Cloudy	13:20	-	13:50	69.5	69.8	71.4	68.1	75
30/12/2021	16.0	Sunny	09:35	-	10:05	69.5	69.5	71.1	68.6	75
							Maximum	71.0		
							Minimum	69.4		
							Average	70.0		

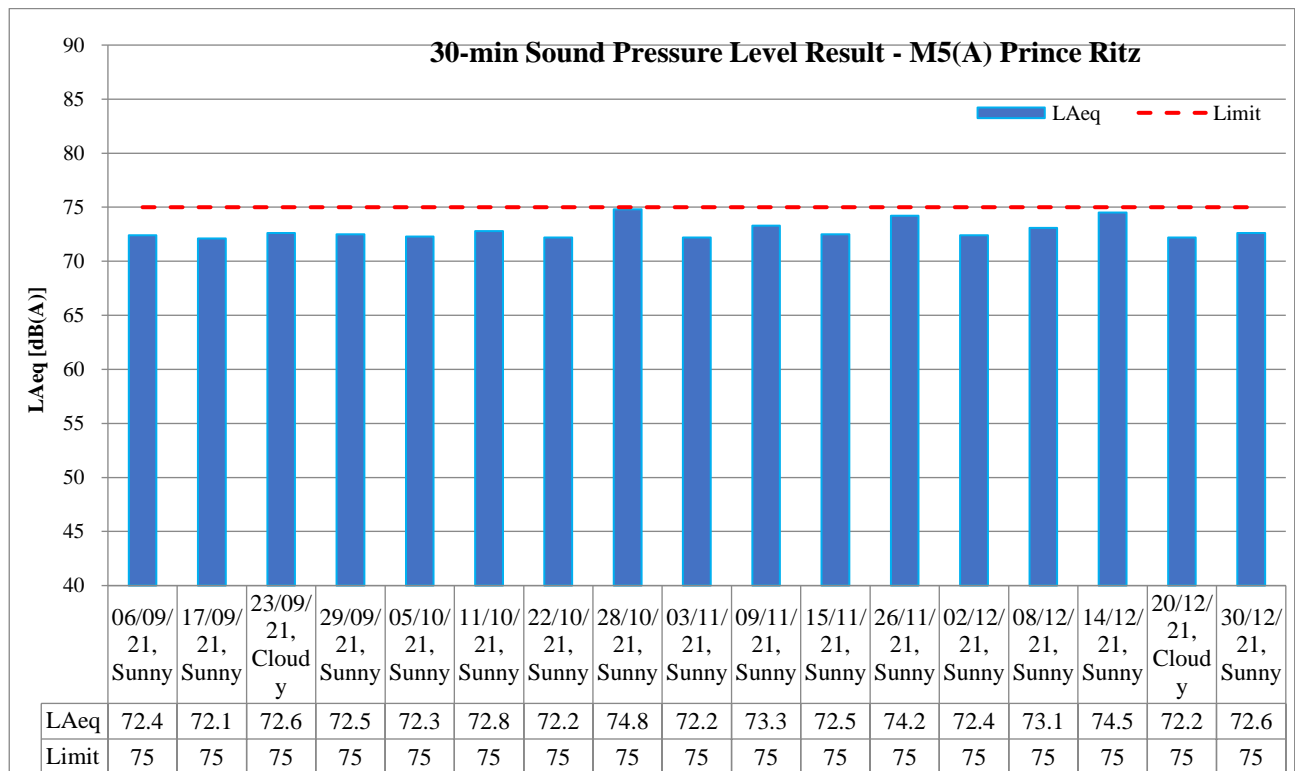
**M5(A) – Prince Ritz**

Date	Temp (°C)	Weather	Measured Noise Level at M5(A), dB(A)							Limit
			Time		Baseline	L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>		
2/12/2021	22.3	Sunny	14:30	-	15:00	72.5	72.4	73.6	70.2	75
8/12/2021	21.8	Sunny	10:35	-	11:05	72.5	73.1	74.5	71.6	75
14/12/2021	18.0	Sunny	10:44	-	11:14	72.5	74.5	76.0	72.4	75
20/12/2021	19.6	Cloudy	14:25	-	14:55	72.5	72.2	73.1	70.5	75
30/12/2021	16.0	Sunny	10:40	-	11:10	72.5	72.6	73.8	70.7	75
							Maximum	74.5		
							Minimum	72.2		
							Average	73.0		

**L<sub>Aeq</sub>, 30-min graphical results of M4(A) – Le Billionnaire**



**L<sub>Aeq</sub>, 30-min graphical results of M5(A) – Prince Ritz**



Major Construction Activities	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Construction of box culvert	✓	✓	✓	
Bored pile works for landscape elevated walkway	✓	✓	✓	✓
Demolition of existing structure and cottage	✓			
Construction of project signboard	✓			
Pre-drilling works and trial pit excavation	✓	✓	✓	
Drainage works	✓			
Temporary road diversion at Sa Po Road		✓	✓	
Demolition of existing structure at SB-01		✓		
Pre-drilling work for S14 and KS10		✓		
Drainage works for Pedestrian Street No.1 & No.2		✓	✓	
Drainage works for Crowd Dispersal Route		✓	✓	
Instrumentation installation at SB-01			✓	✓
Pre-drilling work for S14			✓	✓
Removal existing piles at Road D1			✓	✓
Rising main construction			✓	✓
Trial pit excavation				✓
Advance works for traffic diversion at Sa Po Road				✓
Drainage works for Pedestrian Street No.1, No.2 & No.3				✓
Construction of Crowd Dispersal Route				✓

Factors might affect the monitoring results	Reporting Period			
	Sept 2021	Oct 2021	Nov 2021	Dec 2021
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

**Appendix L – Event and Action Plan for noise**



Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Action Level being exceeded	<ol style="list-style-type: none"> <li>1. Notify Supervisor / ER, IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, Supervisor / ER 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> <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures submitted by the Contractor and advise the ER accordingly;</li> <li>3. Advise the Supervisor / ER on the proposed remedial measures.</li> </ol> <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<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> <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposal to IEC and Supervisor / ER;</li> <li>2. Implement noise mitigation proposals.</li> </ol> <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>
Limit Level being exceeded	<ol style="list-style-type: none"> <li>1. Inform IEC, Supervisor /ER, Contractor and EPD;</li> <li>2. Repeat measurement 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 Contract's working procedure;</li> <li>6. Discuss remedial measures required with the IEC, Contractor and Supervisor /ER;</li> <li>7. Assess effectiveness of</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss the potential remedial actions with Supervisor /ER, ET and Contractor;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the Supervisor /ER accordingly.</li> </ol> <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<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</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 Supervisor /ER within 3 working days of notification;</li> <li>3. Implement the agreed proposal;</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 Supervisor /ER until the exceedance is abated.</li> </ol> <p>(The above actions should be</p>

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
	<p>Contractor's remedial actions and keep IEC, EPD, and Supervisor /ER informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified.)</p>		<p>exceedance until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<p>taken within 2 working days after the exceedance is identified.)</p>

**Appendix M – Event and Action Plan for Landscape and Visual Impact**

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Design Check	<ol style="list-style-type: none"> <li>1. Check final design conforms to the requirements of EP and prepare report.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report.</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.</li> <li>2. Inform IEC and Supervisor /ER.</li> <li>3. Discuss remedial actions with IEC, Supervisor /ER and Contractor.</li> <li>4. Monitor remedial actions until rectification has been completed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check report.</li> <li>2. Check Contractor's working method.</li> <li>3. Discuss with ET and Contractor on possible remedial measures.</li> <li>4. Advise Supervisor /ER on effectiveness of proposed remedial measures.</li> <li>5. Check implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> <li>2. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods.</li> <li>2. Rectify damage and undertake any necessary replacement.</li> </ol>
Repeated Non-conformity	<ol style="list-style-type: none"> <li>1. Identify Source.</li> <li>2. Inform IEC and Supervisor /ER.</li> <li>3. Increase monitoring frequency.</li> <li>4. Discuss remedial actions with IEC, Supervisor /ER and Contractor.</li> <li>5. Monitor remedial actions until rectification has been completed.</li> <li>6. If non-conformity stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring report.</li> <li>2. Check Contractor's working method.</li> <li>3. Discuss with ET and Contractor on possible remedial measures.</li> <li>4. Advise Supervisor /ER on effectiveness of proposed remedial measures.</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> <li>2. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods.</li> <li>2. Rectify damage and undertake any necessary replacement.</li> </ol>

**Appendix N – Waste Flow Table**

**MONTHLY SUMMARY WASTE FLOW TABLE FOR 2021 (YEAR)**

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Borken Concrete (4)	Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Import Fill	Metals	Paper / Cardboard Packaging	Plastics (3)	Chemical Waste	Other, e.g. general refuse
	[in '000m <sup>3</sup> ]	[in '000m <sup>3</sup> ]	[in '000m <sup>3</sup> ]	[in '000m <sup>3</sup> ]	[in '000m <sup>3</sup> ]	[in '000m <sup>3</sup> ]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000m <sup>3</sup> ]
JAN	0.191597506	0.028739612	0	0	0.162857895	0	0	0	0	0	0.007013333
FEB	1.108290924	0.166243555	0	0	0.942047368	0	0	0	0	0	0.011833333
MAR	0.416297177	0.062444545	0	0	0.353852632	0	0	0	0	0	0.017520000
APR	0.020390091	0.003058512	0	0	0.017331579	0	0	0	0	0	0.002420000
MAY	0.230390073	0.034558494	0	0	0.195831579	0	0	0	0	0	0.189360000
JUNE	0.299331150	0.194899576	0	0	1.104431579	0	0	0	0	0	0.006900000
SUB-TOTAL	2.266296921	0.489944294	0	0	2.776352632	0	0	0	0	0	0.235046666
JULY	0.992681027	0.14890208	0	0	0.843778947	0	0	0	0	0	0.009193333
AUG	0.800414791	0.120062159	0	0	0.680352632	0	0	0	0	0	0.008226667
SEPT	0.192557259	0.028883574	0	0	0.163673684	0	0	0	0	0	0.007060000
OCT	0.146749213	0.022012371	0	0	0.124736842	0	0	0	0	0	0.001333333
NOV	0.095975223	0.014396276	0	0	0.081578947	0	0	0	0	0	0.003706667
DEC	0.156656333	0.023498438	0	0	0.133157895	0	0	0	0	0	0.009086667
TOTAL	4.651330767	0.847699192	0	0	4.803631579	0	0	0	0	0	0.273653333

**Appendix P – Summaries of Environmental Complaint, Warning,  
Summon and Notification of Successful Prosecution**

**Reporting Month: December 2021**

<b>Contract No.</b>	<b>Record of Complaint (Yes/No)</b>	<b>Record of Warning (Yes/No)</b>	<b>Notification of Summons and Successful Prosecutions (Yes/No)</b>
ED/2018/05	No	No	No

**Cumulative Statistics on Complaints, Notification of Summons and Successful Prosecutions up to reporting month**

<b>Contract No.</b>	<b>Record of Complaint</b>	<b>Record of Warning</b>	<b>Notification of Summons and Successful Prosecutions</b>
ED/2018/05	1	0	0



<b>Complaint Log for ED/2018/05</b>				
Complaint Ref. No.	Date of Complaint	Description of Complaint	Investigation / Recommendations / Actions	Close-Out Date / Status