

Our ref: 19-10-2023

19-10-2023

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 September 2023 (Version 1.2)**

We refer to the Environment Permit (EP) No. EP-337/2009 for the captioned project.

Pursuant to Condition 3.3 of the EP-337/2009, please find enclosed four hard copies and one electronic copy of Monthly EM&A Report for September 2023 (Version 1.2), 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 9382 4204 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 September 2023 (Version 1.2)

Date: 17 October 2023  
Your ref:  
Our ref: PL-202310022

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

**Attn.: Ms. Mavis Law, SRE**

Dear Ms. Law,

**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 (September 2023)**

Reference is made to the Monthly EM&A Report (September 2023) (Version 1.2) issued by the Environmental Team on 17 October 2023.

Please be informed that we have no adverse comment on the captioned submission. We hereby verify the Monthly EM&A Report (September 2023) 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. Albert Tse      | 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**

September 2023

(Version 1.2)

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

(Environmental Team Leader)

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## EXECUTIVE SUMMARY

1. This is the 32<sup>st</sup> Monthly Environmental Monitoring & Audit (EM&A) report which summarises the findings of the EM&A Programme during the reporting period from 1 to 30 September 2023.

### **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 complaint | Description of complaint | Recommendations / Action taken | Close-out date / Status |
|---|-------------------|--------------------------|--------------------------------|-------------------------|
| No complaint was received in the reporting month. | NA                | NA                       | NA                             | NA                      |



**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 undertaken during the reporting month included:
- Erect falsework and working platform for Decking of Elevated Walkway LW-02
  - RC Construction for Decking of Elevated Walkway LW-02
  - RC Construction of LW02 Lift and Staircase
  - RTBM dismantle
  - Road and Drain Construction works for Road L16, Commercial Street and Road D1
  - Construction works for DCS
  - Modification works for Rising Main chamber WOC1 and AVC2

- Road and drain construction works at Olympic Avenue
- RC construction for Subway KS10 Lift and Staircase
- Renovation works for existing subways KS9, KS32 and KS10
- Construction of Retaining Wall Type 1 for S14
- Construction of Pile Cap for S14
- Construction of Underpinning of S14
- Construction works for SMH404 and SMH505

**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      |
|--|-----------------------|
| Erect falsework and working platform for Decking of Elevated Walkway LW-02   | Noise and Air Quality |
| RC Construction for Decking of Elevated Walkway LW-02                        | Noise and Air Quality |
| RC construction of LW02 lift and staircase                                   | Noise and Air Quality |
| RTBM dismantle   | Noise and Air Quality |
| Road and drain construction works of Road L16, Commercial Street and Road D1 | Noise and Air Quality |
| Construction works for DCS   | Noise and Air Quality |
| Modification works for Rising Main chamber WOC1 and AVC2                     | Noise and Air Quality |
| Renovation works for Subway KS10 Lift and Staircase                          | Noise and Air Quality |
| Renovation works for existing Subways KS9, KS32 and KS10                     | Noise and Air Quality |
| Construction of Retaining Wall Type 1 for S14                                | Noise and Air Quality |
| Construction of Pile Cap for S14   | Noise and Air Quality |
| Demolition of bearing wall of S14  | Noise and Air Quality |
| Construction works for SMH404 and SMH505                                     | 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. | E-mail   |
|---|--|-----------------|-----------------------------|-----------|--|
| Civil Engineering and Development Department (CEDD) | Project Proponent  | Mr. Dennis Fung | Permit Holder               | 3842 7087 | <a href="mailto:dycfung@cedd.gov.hk">dycfung@cedd.gov.hk</a>             |
| AECOM Asia Co. Ltd. (AECOM)                         | Supervisor (act as Engineers' Representative (ER) listed in EM&A Manual) | Mr. Vincent Lee | Supervisor's Delegate       | 2798 0771 | <a href="mailto:sre2@ktd-stage5.com">sre2@ktd-stage5.com</a>             |
| Acuity Sustainability Consulting Limited (Acuity)   | Independent Environmental Checker (IEC)                                  | Mr. Kevin Li    | IEC                         | 9779 2247 | <a href="mailto:kevin.li@aurecongroup.com">kevin.li@aurecongroup.com</a> |
| Ka Shing Management Consultant Limited (Ka Shing)   | Environmental Team (ET)  | Mr. Pang Chan   | ET Leader                   | 6082 2973 | <a href="mailto:stage5b@ka-shing.net">stage5b@ka-shing.net</a>           |
| Build King – STEC Joint Venture (BK-STEAC)          | Contractor   | Mr. Rex Lau     | Contractor's Representative | 6282 5154 | <a href="mailto:rex.lau@buildking.hk">rex.lau@buildking.hk</a>           |

## **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*

|   |  |
|---|--|
| Erect falsework and working platform for Decking of Elevated Walkway LW-02    | Road and Drain Construction works at Olympic Avenue      |
| RC Construction for Decking of Elevated Walkway LW-02                         | RC construction for Subway KS10 Lift and Staircase       |
| RTBM dismantle  | Renovation works for existing subways KS9, KS32 and KS10 |
| Road and Drain Construction works for Road L16, Commercial Street and Road D1 | Construction of Retaining Wall Type 1 for S14            |
| Construction works for DCS  | Construction of Pile Cap for S14                         |
| Modification works for Rising Main chamber WOC1 and AVC2                      | Construction of Underpinning of S14                      |
| Construction works for SMH404 and SMH505                                      |  |

### **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 2.3            | Updated Management Organization of Main Construction Companies   | 4 July 2022     |
| 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 3.3            | Monthly EM&A Report (Aug 2023)                                   | 18 Sep 2023     |

## 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              | 2        | 2 months             |
| HVS Calibrator        | TISCH TE-5025A                                   | 1        | 1 year               |
| 1-hour TSP Dust Meter | TSI Model AM510 SidePak Personal Aerosol Monitor | 1        | 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 quality 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 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,<br>$\mu\text{g}/\text{m}^3$ | Limit Level,<br>$\mu\text{g}/\text{m}^3$ |
|---------------------|------------------------|---|--|
| 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,<br>$\mu\text{g}/\text{m}^3$ | Limit Level,<br>$\mu\text{g}/\text{m}^3$ |
|--------------------|------------------------|---|--|
| 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 designated 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 Quality 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)                         | 30  | 10 – 46                         | 175                                    | 260                                   |
| AM3                            | 53  | 29 – 80                         | 172                                    | 260                                   |

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

| Air Quality 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)                         | 36  | 20 – 52                         | 302                                    | 500                                   |
| AM3                            | 50  | 28 – 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 (Class 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              | 1        | 1 year               |
| Sound Level Calibrator | RION NC74              | 1        | 1 year               |
| Air Flowmeter          | 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 by HOKLAS accredited laboratory or equivalent.

### **Action and Limit Levels**

3.18 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 ^ |
|--|--------------------------|-------------------------------|---|---------------|
| 0700 – 1900 hrs<br>on normal<br>weekdays | M4(A)                    | 69.5                          | When one documented<br>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**

3.19 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 ^ |
|--------------------------|---|---|--|---------------|
| M4(A)                    | 70.9  | 70.3 – 71.6                               | When one documented<br>complaint is received | 75<br>dB(A)   |
| M5(A)                    | 73.7  | 73.2 – 73.9                               |  |               |

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.

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

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

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

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

3.24 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 Quality Monitoring Station            | ASR No. in EIA report | Predicted Cumulative Maximum 24-hour average TSP concentration |  | Measured 24-hr average TSP in Reporting Month (Sep 2023) $\mu\text{g}/\text{m}^3$ |
|---|-----------------------|--|--|---|
|   |                       | 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   | 10 – 46   |
| AM3 - Sky Tower                           | A40 <sup>^</sup>      | 106 <sup>^</sup>   | 138 <sup>^</sup>   | 29 – 80   |

Note:

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

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

| Air Quality Monitoring Station            | ASR No. in EIA report | Predicted Cumulative Maximum 1-hour average TSP concentration |  | Measured 1-hr average TSP in Reporting Month (Sep 2023) $\mu\text{g}/\text{m}^3$ |
|---|-----------------------|---|--|--|
|   |                       | 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 – 52  |
| AM3 - Sky Tower                           | A40 <sup>^</sup>      | 217 <sup>^</sup>  | 247 <sup>^</sup>   | 28 – 82  |

Note:

<sup>^</sup> Prediction results are given in the Table 3.13 of the EIA Report (EIAO 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<br>L <sub>Aeq, 30min</sub> , dB(A) | Measured Noise Level in Reporting Month (Sep 2023)<br>L <sub>Aeq, 30min</sub> , dB(A) |
|--------------------------|-----------------------|---|---|
| M4(A) – Le Billionnaire  | NA                    | NA  | 70.3 – 71.6   |
| M5(A) – Prince Ritz      | NA                    | NA  | 73.2 – 73.9   |

- 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. Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.
- 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. Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.
- 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 7, 14, 21 and 28 September 2023 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 |
|-----------------|------------------|---------------------------|-------------------------|
| 7 Sep 2023      | NA               | NA                        | NA                      |
| 14 Sep 2023     | NA               | NA                        | NA                      |
| 21 Sep 2023     | NA               | NA                        | NA                      |
| 28 Sep 2023     | NA               | 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 7, 14, 21 and 28 September 2023 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   |
|-----------------|---|--|---------------------------|
| 7 Sep 2023      |  <p>Observation:<br/>Construction waste shall be removed timely.</p>                           |  <p>Action Taken:<br/>Construction waste has been removed.</p> | Closed out on 14 Sep 2023 |
| 14 Sep 2023     |  <p>Observation:<br/>The vehicles should be restricted to maximum speed of 10 km per hour.</p> |  <p>Action Taken:<br/>Label has been displayed.</p>            | Closed out on 21 Sep 2023 |
| 21 Sep 2023     | NA  | NA   | NA                        |

| Inspection Date | Key Observations  | Recommendations / Actions  | Close-out Date / Status  |
|-----------------|---|--|--------------------------|
| 28 Sep 2023     |  <p>Observation:<br/>Construction waste shall be removed timely.</p> |  <p>Action taken:<br/>Construction waste has been removed.</p> | Closed out on 5 Oct 2023 |

### **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 Form  | 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                | WT00037618-2021   | 29 Mar 2021 | 31 Mar 2026 |

| Environmental Licenses, Notifications and Permits | Ref. No.        | Valid Form  | Valid Till  |
|---|-----------------|-------------|-------------|
| WPCO  | WT00037370-2021 |             |             |
|   | WT00038562-2021 | 15 Jul 2021 | 31 Jul 2026 |
| Construction Noise Permit                         | GW-RE0624-23    | 20 Jun 2023 | 19 Dec 2023 |

### **Implementation Status of Environmental Mitigation Measures**

6.7 The Contractor has implemented environmental mitigation measures 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 |
|---|-------------------|--------------------------|--------------------------------|-------------------------|
| No complaint was received in the reporting month. | NA                | NA                       | NA                             | NA                      |

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 the reporting month. | NA            | NA                   | NA           | NA                      |

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 are 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      |
|--|-----------------------|
| Erect falsework and working platform for Decking of Elevated Walkway LW-02   | Noise and Air Quality |
| RC Construction for Decking of Elevated Walkway LW-02                        | Noise and Air Quality |
| RC Construction of LW02 Lift and Staircase                                   | Noise and Air Quality |
| RTBM dismantle   | Noise and Air Quality |
| Road and drain construction works of Road L16, Commercial Street and Road D1 | Noise and Air Quality |
| Construction of DCS  | Noise and Air Quality |
| Modification works for Rising Main chamber WOC1 and AVC2                     | Noise and Air Quality |
| Renovation works for Subway KS10 Lift and Staircase                          | Noise and Air Quality |
| Renovation works for existing Subways KS9, KS32 and KS10                     | Noise and Air Quality |
| Construction of Retaining Wall Type 1 for S14                                | Noise and Air Quality |
| Construction of Pile Cap for S14   | Noise and Air Quality |
| Demolition of bearing wall of S14  | Noise and Air Quality |
| Construction works for SMH404 and SMH505                                     | 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 Report.

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.

**Figure**

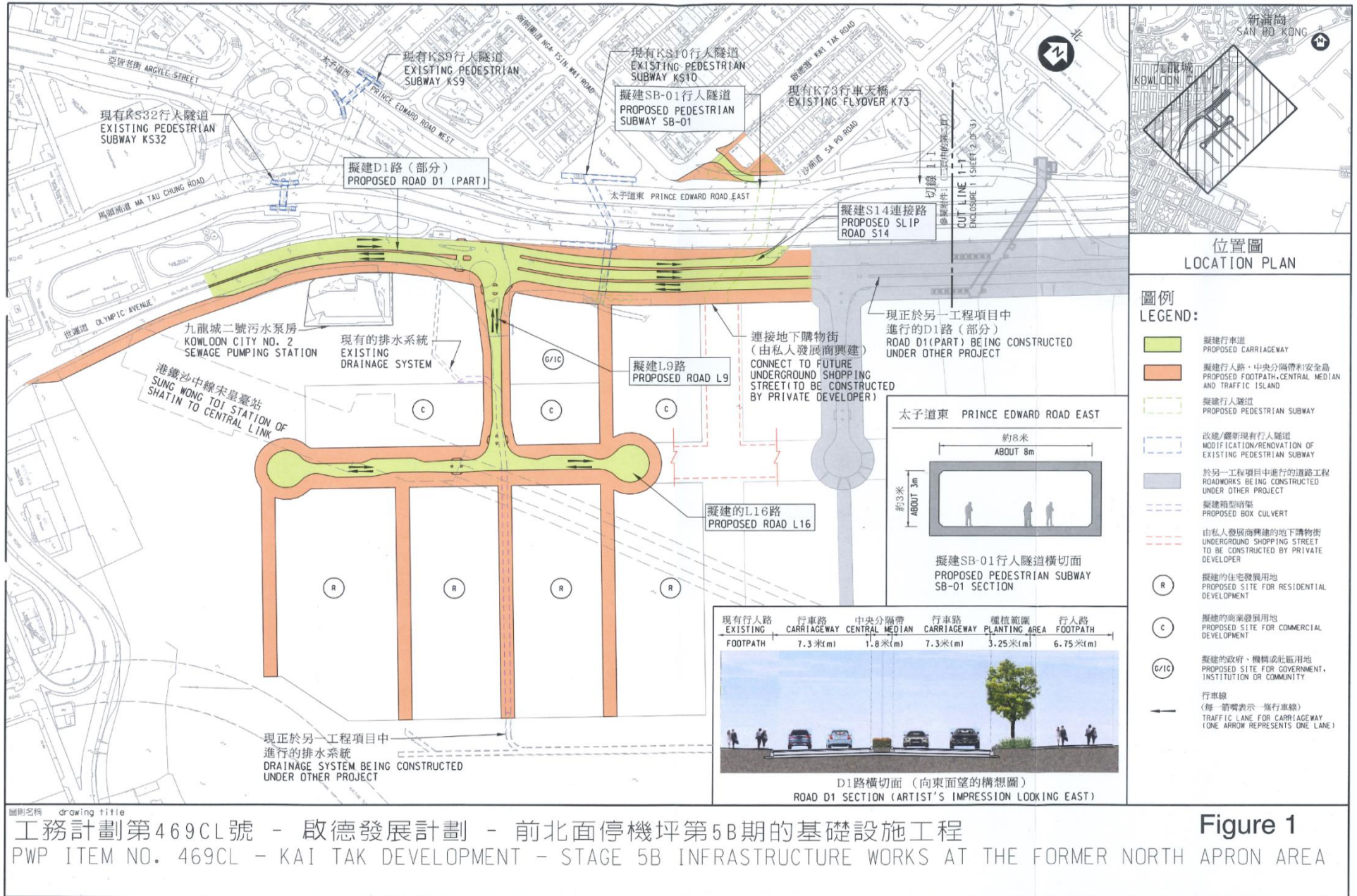


Figure 1 – Proposed works of Contract No. ED/2018/05

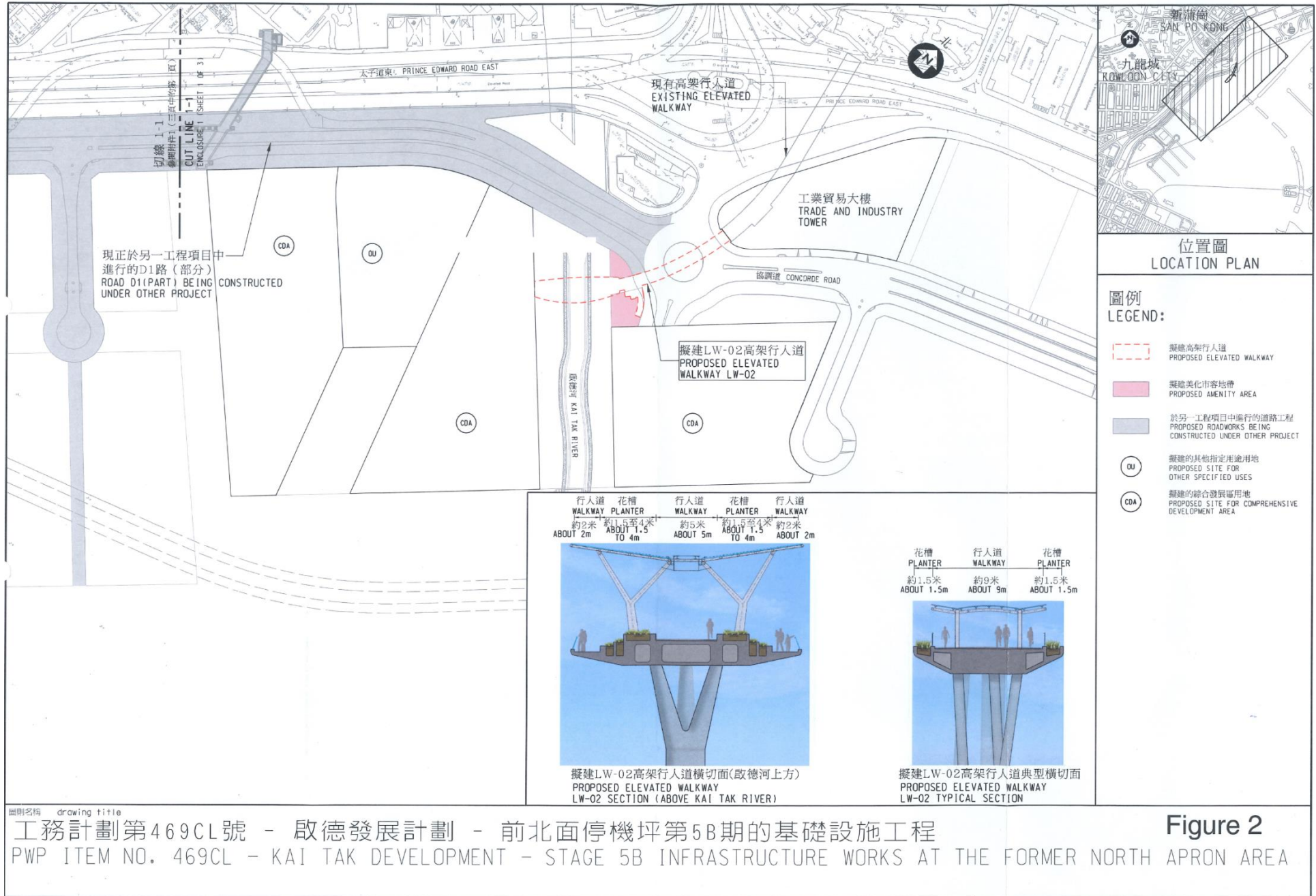
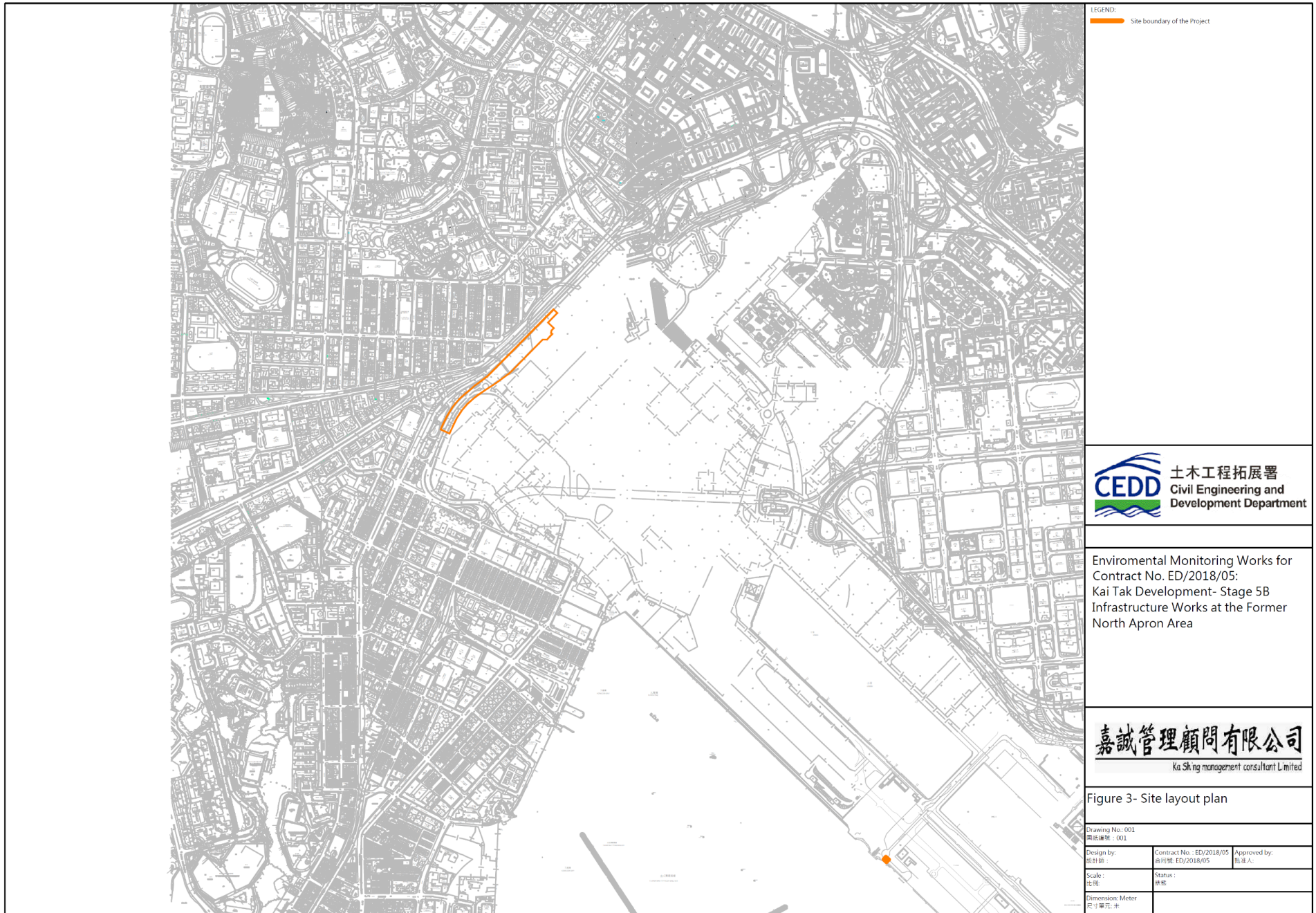


Figure 2

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



LEGEND:  
— Site boundary of the Project

**CEDD** 土木工程拓展署  
 Civil Engineering and Development Department

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

**嘉誠管理顧問有限公司**  
 Ka Shing management consultant L limited

Figure 3- Site layout plan

|                               |   |                      |
|-------------------------------|---|----------------------|
| Drawing No.: 001<br>圖則編號: 001 |   |                      |
| Design by:<br>設計師:            | Contract No.: ED/2018/05<br>合約號: ED/2018/05 | Approved by:<br>批准人: |
| Scale:<br>比例:                 | Status:<br>狀態:                              |                      |
| Dimension: Meter<br>尺寸單位: 米   |   |                      |

Figure 3 – D1 Road Site Layout Plan

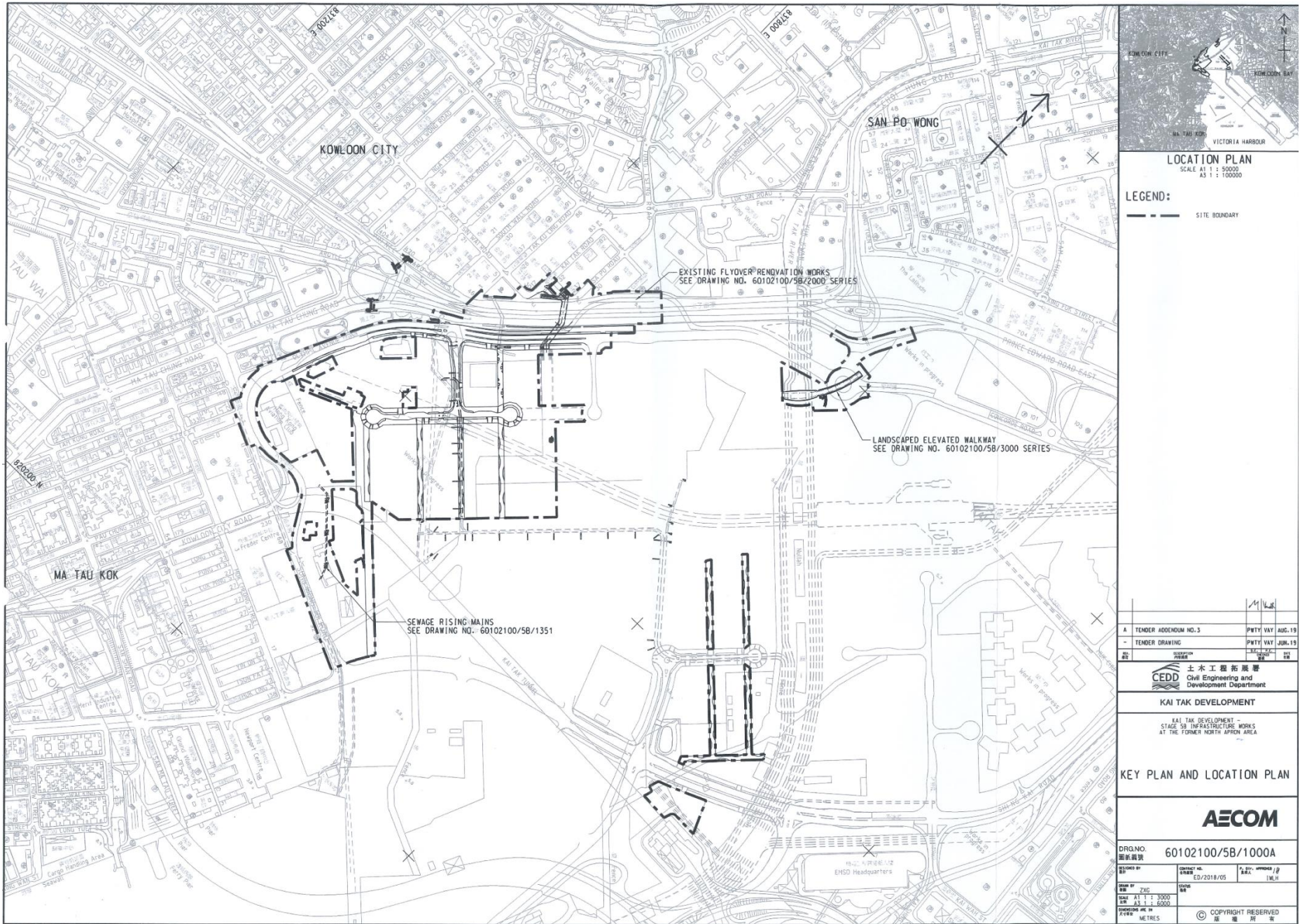


Figure 4 – Site Layout Plan

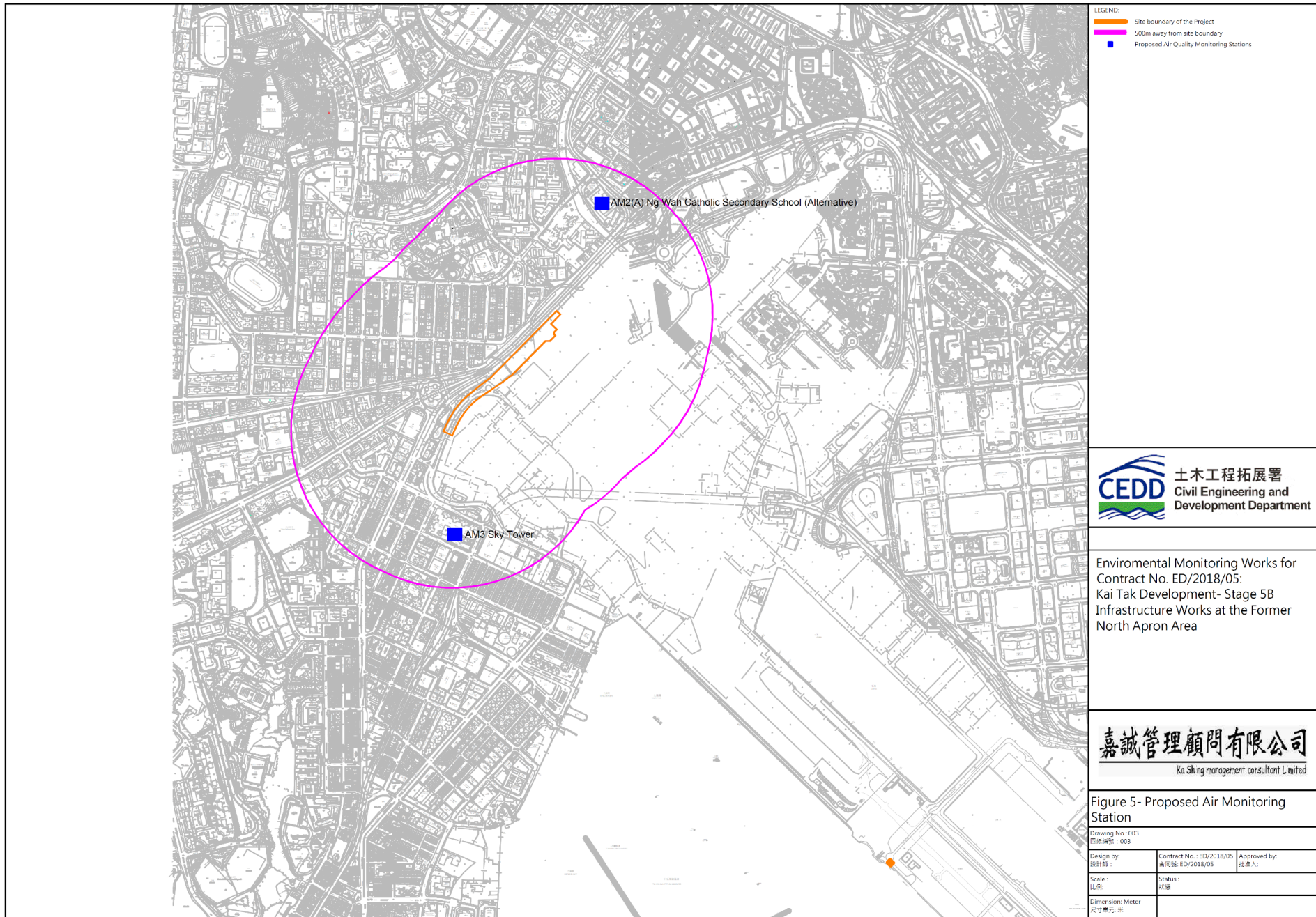


Figure 5 – Air Quality Monitoring Stations

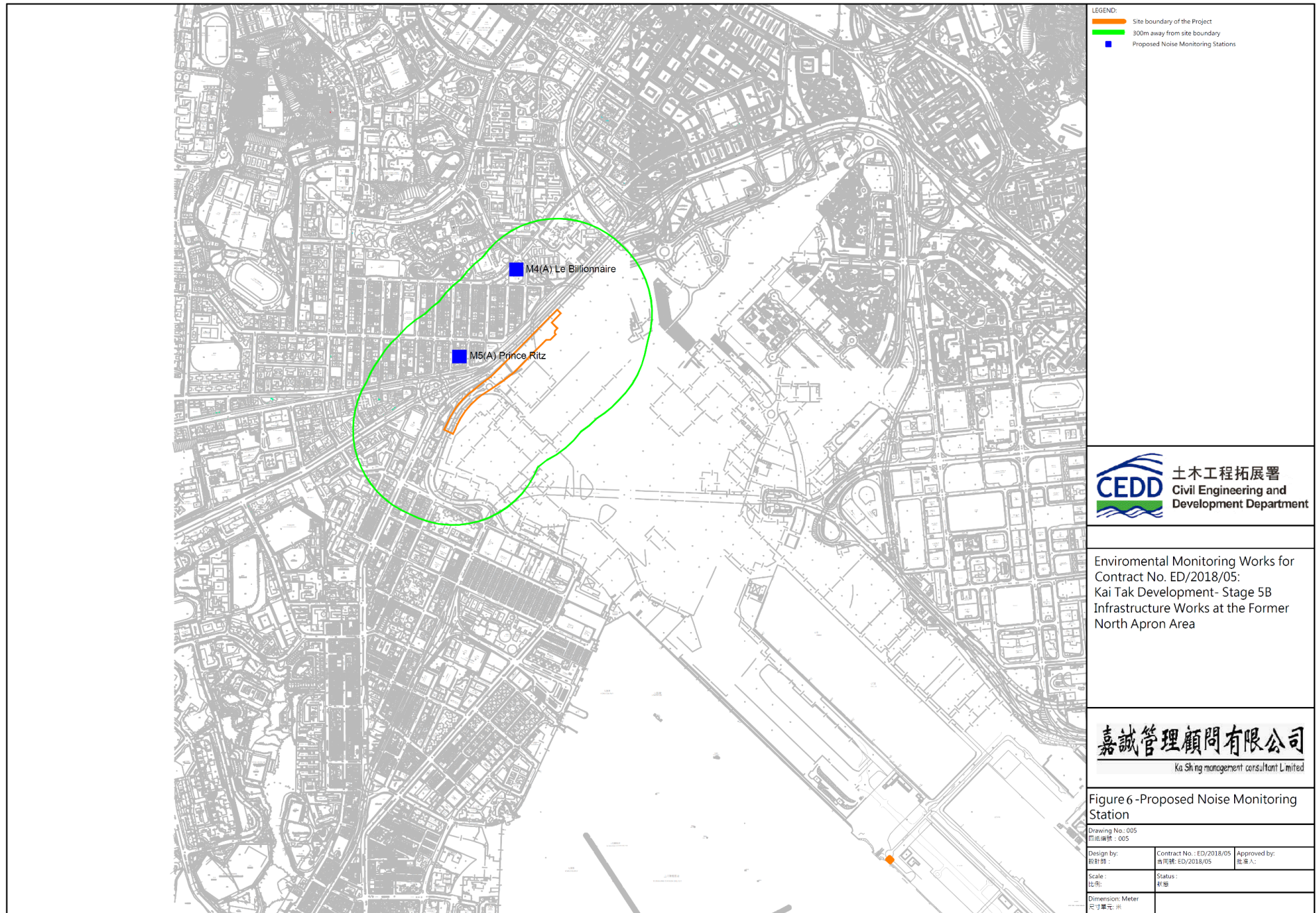


Figure 6 – Noise Monitoring Stations



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



# Appendix B – Construction Programme

























**Appendix C – Environmental monitoring schedules**

Contract No. EDO 2/2020 Environmental Monitoring at Kai Tak Development – Stage 5B infrastructure works at the former north apron area  
 Environmental Monitoring and Weekly Site Inspection Schedule for September 2023

September 2023

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

**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



Contract No. EDO 2/2020 Environmental Monitoring at Kai Tak Development – Stage 5B infrastructure works at the former north apron area

Tentative Environmental Monitoring and Weekly Site Inspection Schedule for October 2023

October 2023

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

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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Tisch Environmental  
145 S. Miami Ave  
Cleveland, OH 44102  
513-487-5000  
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

### 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

### 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"

### 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-01-2023042001      Date of calibration : 19/06/2023

Model no : Sky Tower      Sampler : TE-5170X  
Serial Number : 4687

**Calibration Data**

Ambient barometric pressure, Pa = 755.3 ( mmHg )      Ambient temperature, Ta = 306.05 ( deg K )

**Calibration Orifice**

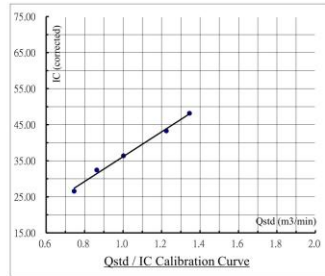
Model = TE-5025A      Qstd Slope, m = 2.01424  
Serial No. = 0006      Qstd Intercept, b = 0.02085  
Calibration Due Date: 17/05/2024      Qstd Corr. coeff., r = 0.99999

**Calibration Curve**

| Plate No. | H <sub>2</sub> O ( in ) | Qstd ( m <sup>3</sup> / min ) | I ( chart ) | IC ( corrected ) |
|-----------|-------------------------|-------------------------------|-------------|------------------|
| 18        | 7.70                    | 1.345                         | 49.0        | 48.20            |
| 13        | 6.40                    | 1.225                         | 44.0        | 43.28            |
| 10        | 4.30                    | 1.002                         | 37.0        | 36.40            |
| 7         | 3.20                    | 0.863                         | 33.0        | 32.46            |
| 5         | 2.40                    | 0.746                         | 27.0        | 26.56            |

**Subsequent calculation of sampler flow**

| Method           | Calibration equation   | Slope, m | Intercept, b | Corr. coeff., r |
|------------------|--|----------|--------------|-----------------|
| Dickson recorder | $Qstd = 1 / m [ ( I ) ( \text{Sqrt} ( ( Pa / 760 ) ( 298 / Ta ) ) ) - b ]$ | 34.421   | 1.7135       | 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 : Ben Poon      19/06/2023      Checked by : Tommy Wong      19/06/2023  
Name : ( Ben Poon )      Name : ( Tommy Wong )

Form No. INS-HVS-CAL-01 16-01-2020

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

Calibration curve ref. No. : ATSPC-01-2023042004      Date of calibration : 19/06/2023

Model no : Ng Wah Catholic Secondary School      Sampler : TE-5170X  
Serial Number : 4360

**Calibration Data**

Ambient barometric pressure, Pa = 755.3 ( mmHg )      Ambient temperature, Ta = 306.05 ( deg K )

**Calibration Orifice**

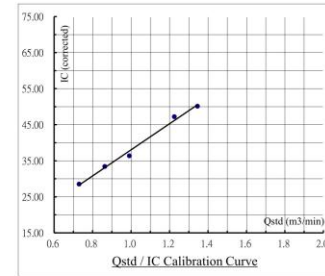
Model = TE-5025A      Qstd Slope, m = 2.01424  
Serial No. = 0006      Qstd Intercept, b = 0.02085  
Calibration Due Date: 17/05/2024      Qstd Corr. coeff., r = 0.99999

**Calibration Curve**

| Plate No. | H <sub>2</sub> O ( in ) | Qstd ( m <sup>3</sup> / min ) | I ( chart ) | IC ( corrected ) |
|-----------|-------------------------|-------------------------------|-------------|------------------|
| 18        | 7.70                    | 1.345                         | 51.0        | 50.17            |
| 13        | 6.40                    | 1.225                         | 48.0        | 47.22            |
| 10        | 4.20                    | 0.991                         | 37.0        | 36.40            |
| 7         | 3.20                    | 0.863                         | 34.0        | 33.45            |
| 5         | 2.30                    | 0.730                         | 29.0        | 28.53            |

**Subsequent calculation of sampler flow**

| Method           | Calibration equation   | Slope, m | Intercept, b | Corr. coeff., r |
|------------------|--|----------|--------------|-----------------|
| Dickson recorder | $Qstd = 1 / m [ ( I ) ( \text{Sqrt} ( ( Pa / 760 ) ( 298 / Ta ) ) ) - b ]$ | 36.197   | 1.8426       | 0.9954          |



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 : Ben Poon      19/06/2023      Checked by : Tommy Wong      19/06/2023  
Name : ( Ben Poon )      Name : ( Tommy Wong )

Form No. INS-HVS-CAL-01 16-01-2020

## Calibration Certificate of HVS

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

Calibration curve ref. No. : ATSPC-01-2023042004      Date of calibration : 17/08/2023

Model no : Ng Wah Catholic Secondary School      Sampler : TE-5170X  
Serial Number : 4360

**Calibration Data**

Ambient barometric pressure, Pa = 753.8 (mmHg)      Ambient temperature, Ta = 307.15 (deg K)

**Calibration Orifice**

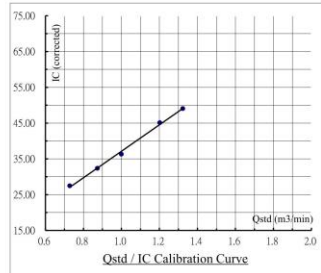
Model = TE-5025A      Qstd Slope, m = 2.01424  
Serial No. = 0006      Qstd Intercept, b = 0.02085  
Calibration Due Date: 17/05/2024      Qstd Corr. coeff., r = 0.99999

**Calibration Curve**

| Plate No. | H <sub>2</sub> O (in) | Qstd (m <sup>3</sup> /min) | I (chart) | IC (corrected) |
|-----------|-----------------------|----------------------------|-----------|----------------|
| 18        | 7.50                  | 1.323                      | 50.0      | 49.05          |
| 13        | 6.20                  | 1.202                      | 46.0      | 45.13          |
| 10        | 4.30                  | 1.000                      | 37.0      | 36.30          |
| 7         | 3.30                  | 0.874                      | 33.0      | 32.37          |
| 5         | 2.30                  | 0.728                      | 28.0      | 27.47          |

**Subsequent calculation of sampler flow**

| Method           | Calibration equation                                 | Slope, m | Intercept, b | Corr. coeff., r |
|------------------|--|----------|--------------|-----------------|
| Dickson recorder | $Qstd = 1/m [ I ( ( Pa / 760 ) ( 298 / Ta ) ) - b ]$ | 36.998   | 0.1267       | 0.9982          |



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 : Ben Poon      17/08/2023      Checked by : Tommy Wong      17/08/2023  
Name : ( Ben Poon )      Name : ( Tommy Wong )

Form No. INS-HVS-CAL-01 16-01-2020

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

Calibration curve ref. No. : ATSPC-01-2023042001      Date of calibration : 17/08/2023

Model no : Sky Tower      Sampler : TE-5170X  
Serial Number : 4687

**Calibration Data**

Ambient barometric pressure, Pa = 753.8 (mmHg)      Ambient temperature, Ta = 307.15 (deg K)

**Calibration Orifice**

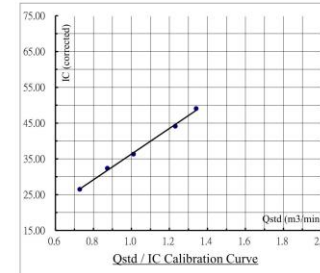
Model = TE-5025A      Qstd Slope, m = 2.01424  
Serial No. = 0006      Qstd Intercept, b = 0.02085  
Calibration Due Date: 17/05/2024      Qstd Corr. coeff., r = 0.99999

**Calibration Curve**

| Plate No. | H <sub>2</sub> O (in) | Qstd (m <sup>3</sup> /min) | I (chart) | IC (corrected) |
|-----------|-----------------------|----------------------------|-----------|----------------|
| 18        | 7.70                  | 1.341                      | 50.0      | 49.05          |
| 13        | 6.50                  | 1.231                      | 45.0      | 44.14          |
| 10        | 4.40                  | 1.011                      | 37.0      | 36.30          |
| 7         | 3.30                  | 0.874                      | 33.0      | 32.37          |
| 5         | 2.30                  | 0.728                      | 27.0      | 26.49          |

**Subsequent calculation of sampler flow**

| Method           | Calibration equation                                 | Slope, m | Intercept, b | Corr. coeff., r |
|------------------|--|----------|--------------|-----------------|
| Dickson recorder | $Qstd = 1/m [ I ( ( Pa / 760 ) ( 298 / Ta ) ) - b ]$ | 35.877   | 0.4659       | 0.9985          |



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 : Ben Poon      17/08/2023      Checked by : Tommy Wong      17/08/2023  
Name : ( Ben Poon )      Name : ( Tommy Wong )

Form No. INS-HVS-CAL-01 16-01-2020



# Calibration Certificate of HVS used for performance check of Dust Meter

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

Calibration curve ref. No. : ATSPC-01-2022061301 Date of calibration : 19/06/2023

Model no : GS2310 Serial number : 10346

### Calibration Data

Ambient barometric pressure, Pa = 755.3 ( mmHg ) Ambient temperature, Ta = 305.25 ( deg K )

### Calibration Orifice

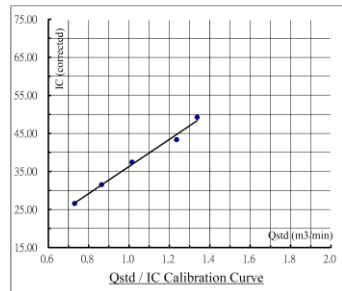
Model = TE-5025A Qstd Slope, m = 2.01424  
 Serial No. = 0006 Qstd Intercept, b = 0.02085  
 Calibration Due Date: 17/05/2024 Qstd Corr. coeff., r = 0.99999

### Calibration Curve

| Plate No. | H <sub>2</sub> O ( in ) | Qstd ( m <sup>3</sup> / min ) | I ( chart ) | IC ( corrected ) |
|-----------|-------------------------|-------------------------------|-------------|------------------|
| 18        | 7.60                    | 1.338                         | 50.0        | 49.25            |
| 13        | 6.50                    | 1.236                         | 44.0        | 43.34            |
| 10        | 4.40                    | 1.015                         | 38.0        | 37.43            |
| 7         | 3.20                    | 0.864                         | 32.0        | 31.52            |
| 5         | 2.30                    | 0.731                         | 27.0        | 26.60            |

### Subsequent calculation of sampler flow

| Method           | Calibration equation   | Slope, m | Intercept, b | Corr. coeff., r |
|------------------|--|----------|--------------|-----------------|
| Dickson recorder | $Qstd = 1/m [ I ( \text{Sqrt} ( ( Pa / 760 ) ( 298 / Ta ) ) ) - b ]$ | 35.675   | 0.6397       | 0.9953          |



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 : Ben Poon 19/06/2023 Checked by : Tommy Wong 19/06/2023

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

Form No. DNS-HVS-CAL.dtl 10/01/2020

# Orifice Transfer Standard Certification Worksheet TE-5025A

AAS- TSPC-01, Cal: 17 May 2023



RECALIBRATION  
DUE DATE:  
May 17, 2024

## Certificate of Calibration

| Calibration Certification Information |                        |                 |  |
|---------------------------------------|------------------------|-----------------|--|
| Cal. Date: May 17, 2023               | Rootsmeter S/N: 438320 | Ta: 297 °K      |  |
| Operator: Jim Tisch                   |                        | Pa: 745.0 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          | 1.4270      | 3.2        | 2.00        |
| 2   | 3              | 4               | 1          | 1.0000      | 6.4        | 4.00        |
| 3   | 5              | 6               | 1          | 0.8940      | 7.9        | 5.00        |
| 4   | 7              | 8               | 1          | 0.8490      | 8.8        | 5.50        |
| 5   | 9              | 10              | 1          | 0.6990      | 12.8       | 8.00        |

| Data Tabulation |               |  |           |             |  |  |
|-----------------|---------------|--|-----------|-------------|--|--|
| Vstd (m3)       | Qstd (x-axis) | $\sqrt{\Delta H ( \frac{Pa}{Pstd} ) ( \frac{Tstd}{Ta} )}$ (y-axis) | Va        | Qa (x-axis) | $\sqrt{\Delta H ( Ta / Pa )}$ (y-axis) |  |
| 0.9793          | 0.6863        | 1.4025   | 0.9957    | 0.6978      | 0.8929                                 |  |
| 0.9751          | 0.9751        | 1.9835   | 0.9914    | 0.9914      | 1.2628                                 |  |
| 0.9731          | 1.0885        | 2.2176   | 0.9894    | 1.1067      | 1.4119                                 |  |
| 0.9719          | 1.1448        | 2.3258   | 0.9882    | 1.1639      | 1.4808                                 |  |
| 0.9666          | 1.3829        | 2.8051   | 0.9828    | 1.4060      | 1.7859                                 |  |
| <b>QSTD</b>     |               | m= 2.01424   | <b>QA</b> |             | m= 1.26128                             |  |
|                 |               | b= 0.02085   |           |             | b= 0.01328                             |  |
|                 |               | r= 0.99999   |           |             | r= 0.99999                             |  |

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

| 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.  
145 South Miami Avenue  
Village of Cleves, OH 45002

[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 AMS10 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

#### Sensitivity

Sensor Type 90° light scattering, 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 using 10-second time-constant  
 Temperature Coefficient Approximately +0.0005 mg/m<sup>3</sup> per °C (for variations from temperature at which instrument was last zeroed)

#### Flow Rate

Range User-adjustable, 0.7 to 1.8 liters/min (L/min)

#### Temperature Range

Operating Range 32 to 120°F (0 to 50°C)  
 Storage Range -4 to 140°F (-20 to 60°C)

#### Operational Humidity

0 to 95% RH, non-condensing

#### Time Constant (LCD display)

Range User-adjustable, 1 to 60 seconds

#### Data Logging

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

#### User-Select Calibration Factors

Factory Setting 1.0 (non-adjustable)  
 User-defined Settings 3, with user-defined labels  
 Range 0.1 to 10.0, user-adjustable

#### Physical

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

#### Power Supply/Charger (P/N 2613210)

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, 4.8 V (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

|                        |                          |               |          |
|------------------------|--------------------------|---------------|----------|
| Environment Conditions |                          | Model         | AM510    |
| Temperature            | 74.14 (23.4) °F (°C)     | Serial Number | 11208032 |
| Relative Humidity      | 47.6 %RH                 |               |          |
| Barometric Pressure    | 28.96 (980.7) inHg (hPa) |               |          |

As Left       In Tolerance  
 As Found       Out of Tolerance

System ID: DTH01-02

| CONCENTRATION |          |          |                 |   |          |          |                 | Unit: mg/m <sup>3</sup> |
|---------------|----------|----------|-----------------|---|----------|----------|-----------------|-------------------------|
| #             | STANDARD | MEASURED | ALLOWABLE RANGE | # | STANDARD | MEASURED | ALLOWABLE RANGE |                         |
| 1             | 1.205    | 1.108    | 1.084-1.326     | 3 | 0.041    | * 0.059  | 0.029-0.053     |                         |
| 2             | 0.150    | 0.156    | 0.128-0.172     | 4 | 11.824   | 10.777   | 10.642-13.006   |                         |

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           | E010539   | 12-05-22  | 06-30-24 | Photometer           | E003433   | 03-21-23  | 09-30-23 |
| Microbalance         | M001324   | 01-09-23  | 01-31-25 | Pressure             | E003511   | 10-25-22  | 10-31-23 |
| Flowmeter            | E002471   | 05-22-23  | 05-31-24 | DC Voltage           | E003315   | 01-09-23  | 01-31-24 |

August 8, 2023  
 Date

Verified: JEAN LEWIS

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

Performance Check ref. No. AS0220602-1 Report Issue Date 02/06/2023  
 Date of performance check 02/06/2023

**Objective:**

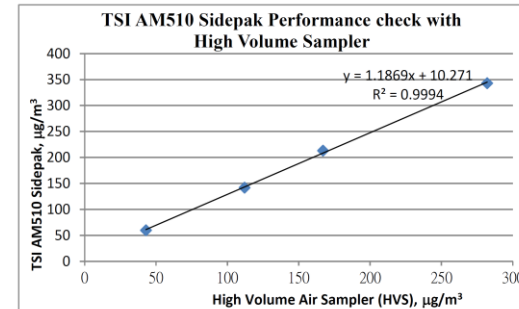
A dust meter and a Total Suspended Particulate High Volume Air Sampler (HVS) were placed together to measure the Total Suspended Particulate (TSP) concentrations simultaneously to check the performance.

**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             | 60                                    | 142 | 213 | 343 |
| High Volume Air Sampler (HVS) | 43                                    | 112 | 167 | 282 |



Tested by: POON Tsz Wing # \_\_\_\_\_      Checked by: Wong Yin Tong  
 Name: ( Poon Tsz Wing )      Name: ( Wong Yin Tong )

Form No. ENV CAL SAMPLER CCI d012/12/2003

# 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  
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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

**Calibration Certificate No.: CC0402302**

**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 | 6152CEU   | AZ170710012 | AAST-WS-02              |

**Certificate Information**

|                          |                                       |                        |                        |
|--------------------------|---------------------------------------|------------------------|------------------------|
| Date of Receipt:         | 8 February 2023                       | Calibration Condition: | 24.5°C, 54%RH, 1010hPa |
| Date of Calibration:     | 20 February 2023                      | Adjustment:            | N/A                    |
| Due Date of Calibration: | N/A                                   | Appearance:            | Good                   |
| Calibration Procedure:   | JJF 1183-2007, JJF 1076-2001, SOP-116 | 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 | 9 November 2024 |
| Humidity sensor                 | KPPRHT-A-1 | KCI I-1095, KCI P-1095 | 9 November 2024 |
| Hot Wire Anemometer             | 9535       | T95351316004           | 11 August 2024  |

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 shows 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: 20 February 2023

CF-BEG-03

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

CC0402302  
 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) | Uncertainty (°C) |
|------------------------|--------------|------------|------------------|
| 15.0                   | 15           | 0          | 2                |
| 20.0                   | 21           | 1          | 2                |
| 25.0                   | 26           | 1          | 2                |
| 30.0                   | 30           | 0          | 2                |

**Relative Humidity**

| Reference reading (%RH) | Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|-------------------------|---------------|-------------|-------------------|
| 40.0                    | 44            | 4           | 2                 |
| 50.0                    | 54            | 4           | 2                 |
| 70.0                    | 69            | -1          | 2                 |

**Wind Speed**

| Reference reading (m/s) | Measured reading (m/s) | Error (%) | Uncertainty (%) |
|-------------------------|------------------------|-----------|-----------------|
| 0.0                     | 0.0                    | N/A       | 3.6             |
| 2.0                     | 2.0                    | 0.0       | 3.6             |
| 5.0                     | 4.8                    | -4.0      | 3.6             |
| 8.0                     | 7.6                    | -5.0      | 3.6             |

**Wind Direction**

| Reference reading | Measured reading | Error | Uncertainty |
|-------------------|------------------|-------|-------------|
| 0°                | 0°               | 0°    | 5°          |
| 45°               | 45°              | 0°    | 5°          |
| 90°               | 90°              | 0°    | 5°          |
| 135°              | 135°             | 0°    | 5°          |
| 180°              | 180°             | 0°    | 5°          |
| 225°              | 225°             | 0°    | 5°          |
| 270°              | 270°             | 0°    | 5°          |
| 315°              | 315°             | 0°    | 5°          |

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

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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 (%) |
|-----------|-------------------------------------|-------------------------------------|---------------------|----------------------------|
| 1/9/2023  | 25                                  | 28.7                                | 98.9                | 81                         |
| 2/9/2023  | 25.2                                | 27.2                                | 80.4                | 92                         |
| 3/9/2023  | 27                                  | 33.7                                | 0.1                 | 76                         |
| 4/9/2023  | 27.3                                | 32.6                                | Trace               | 73                         |
| 5/9/2023  | 27.7                                | 31                                  | 0.4                 | 73                         |
| 6/9/2023  | 27.8                                | 32.1                                | 0                   | 72                         |
| 7/9/2023  | 25.5                                | 29.7                                | 215.7               | 89                         |
| 8/9/2023  | 25                                  | 26.3                                | 425                 | 94                         |
| 9/9/2023  | 25.5                                | 26.6                                | 9.8                 | 92                         |
| 10/9/2023 | 24.8                                | 26.5                                | 67.4                | 93                         |
| 11/9/2023 | 25.6                                | 28.2                                | 20.5                | 93                         |
| 12/9/2023 | 26                                  | 29.4                                | 0.9                 | 89                         |
| 13/9/2023 | 26.8                                | 30.4                                | 2.5                 | 88                         |
| 14/9/2023 | 25.6                                | 28.2                                | 103.5               | 92                         |
| 15/9/2023 | 25.2                                | 30.6                                | 28.5                | 89                         |
| 16/9/2023 | 25.4                                | 28.8                                | 4.3                 | 89                         |
| 17/9/2023 | 26.8                                | 31.7                                | 0                   | 85                         |
| 18/9/2023 | 27.4                                | 32.7                                | 0                   | 80                         |
| 19/9/2023 | 27.3                                | 33.5                                | 0                   | 79                         |
| 20/9/2023 | 27.5                                | 32.9                                | 0                   | 76                         |
| 21/9/2023 | 27.6                                | 33.6                                | 0                   | 77                         |
| 22/9/2023 | 28.4                                | 34.4                                | Trace               | 75                         |
| 23/9/2023 | 28.3                                | 33.7                                | 0                   | 74                         |
| 24/9/2023 | 28.5                                | 33.1                                | 0                   | 75                         |
| 25/9/2023 | 27.9                                | 33.1                                | 1.5                 | 76                         |
| 26/9/2023 | 28.3                                | 33.4                                | 0                   | 75                         |
| 27/9/2023 | 28.6                                | 33.9                                | Trace               | 72                         |
| 28/9/2023 | 28.7                                | 33.6                                | 0                   | 71                         |
| 29/9/2023 | 26.7                                | 33.7                                | 7.7                 | 78                         |
| 30/9/2023 | 28.2                                | 33.6                                | 0                   | 75                         |

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

NOTE2: Trace means rainfall less than 0.12 mm

<https://www.hko.gov.hk/en/cis/dailyExtract.htm?y=2023&m=09>

## Kai Tak Runway Park Information

| Date      | Absolute Daily Min Temperature (°C) | Absolute Daily Max Temperature (°C) |
|-----------|-------------------------------------|-------------------------------------|
| 1/9/2023  | 25.1                                | 28.8                                |
| 2/9/2023  | 25.6                                | 27.3                                |
| 3/9/2023  | 26.8                                | 32.2                                |
| 4/9/2023  | 27.5                                | 34.7                                |
| 5/9/2023  | 28.0                                | 31.0                                |
| 6/9/2023  | 27.6                                | 33.3                                |
| 7/9/2023  | 25.4                                | 28.5                                |
| 8/9/2023  | 24.7                                | 26.5                                |
| 9/9/2023  | 25.6                                | 26.8                                |
| 10/9/2023 | 24.6                                | 27.2                                |
| 11/9/2023 | 25.7                                | 28.0                                |
| 12/9/2023 | 25.9                                | 30.2                                |
| 13/9/2023 | 26.5                                | 31.1                                |
| 14/9/2023 | 24.9                                | 28.8                                |
| 15/9/2023 | 24.6                                | 30.8                                |
| 16/9/2023 | 25.6                                | 30.1                                |
| 17/9/2023 | 26.7                                | 31.1                                |
| 18/9/2023 | 27.0                                | 31.1                                |
| 19/9/2023 | 27.3                                | 31.5                                |
| 20/9/2023 | 27.5                                | 32.9                                |
| 21/9/2023 | 27.8                                | 34.0                                |
| 22/9/2023 | 28.2                                | 32.1                                |
| 23/9/2023 | 28.1                                | 32.4                                |
| 24/9/2023 | 28.3                                | 31.8                                |
| 25/9/2023 | 28.1                                | 32.0                                |
| 26/9/2023 | 28.3                                | 32.1                                |
| 27/9/2023 | 28.5                                | 32.8                                |
| 28/9/2023 | 28.7                                | 32.5                                |
| 29/9/2023 | 26.6                                | 32.4                                |
| 30/9/2023 | 28.0                                | 32.9                                |

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=2023-09-01&chart\\_type=DG\\_TEMP](https://i-lens.hk/hkweather/history_chart.php?date=2023-09-01&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 |
|----------|-------|------------------|----------------|----------|-------|------------------|----------------|----------|-------|------------------|----------------|----------|-------|------------------|----------------|
| 1/9/2023 | 0:00  | 4                | 90             | 2/9/2023 | 0:00  | 7.7              | 135            | 3/9/2023 | 0:00  | 1.8              | 112.5          | 4/9/2023 | 0:00  | 1.3              | 270            |
| 1/9/2023 | 1:00  | 4.5              | 90             | 2/9/2023 | 1:00  | 6.8              | 270            | 3/9/2023 | 1:00  | 1.8              | 90             | 4/9/2023 | 1:00  | 0.9              | 270            |
| 1/9/2023 | 2:00  | 5.8              | 90             | 2/9/2023 | 2:00  | 6.4              | 270            | 3/9/2023 | 2:00  | 1.8              | 112.5          | 4/9/2023 | 2:00  | 1.3              | 247.5          |
| 1/9/2023 | 3:00  | 5.8              | 90             | 2/9/2023 | 3:00  | 6.5              | 270            | 3/9/2023 | 3:00  | 1.3              | 112.5          | 4/9/2023 | 3:00  | 1.8              | 270            |
| 1/9/2023 | 4:00  | 5.8              | 90             | 2/9/2023 | 4:00  | 5.8              | 247.5          | 3/9/2023 | 4:00  | 1.3              | 112.5          | 4/9/2023 | 4:00  | 2.2              | 270            |
| 1/9/2023 | 5:00  | 5.8              | 247.5          | 2/9/2023 | 5:00  | 5.8              | 247.5          | 3/9/2023 | 5:00  | 1.3              | 112.5          | 4/9/2023 | 5:00  | 1.3              | 247.5          |
| 1/9/2023 | 6:00  | 5.8              | 270            | 2/9/2023 | 6:00  | 5.8              | 247.5          | 3/9/2023 | 6:00  | 1.8              | 90             | 4/9/2023 | 6:00  | 0.9              | 247.5          |
| 1/9/2023 | 7:00  | 6.3              | 270            | 2/9/2023 | 7:00  | 5.8              | 90             | 3/9/2023 | 7:00  | 1.3              | 90             | 4/9/2023 | 7:00  | 0.4              | 247.5          |
| 1/9/2023 | 8:00  | 6.4              | 270            | 2/9/2023 | 8:00  | 5.8              | 90             | 3/9/2023 | 8:00  | 0.9              | 112.5          | 4/9/2023 | 8:00  | 0.4              | 247.5          |
| 1/9/2023 | 9:00  | 6.4              | 270            | 2/9/2023 | 9:00  | 4.5              | 247.5          | 3/9/2023 | 9:00  | 0.9              | 112.5          | 4/9/2023 | 9:00  | 0.9              | 247.5          |
| 1/9/2023 | 10:00 | 6.4              | 270            | 2/9/2023 | 10:00 | 4.4              | 247.5          | 3/9/2023 | 10:00 | 1.3              | 112.5          | 4/9/2023 | 10:00 | 0.9              | 247.5          |
| 1/9/2023 | 11:00 | 6.4              | 270            | 2/9/2023 | 11:00 | 4.4              | 247.5          | 3/9/2023 | 11:00 | 1.3              | 90             | 4/9/2023 | 11:00 | 0.9              | 247.5          |
| 1/9/2023 | 12:00 | 6.4              | 270            | 2/9/2023 | 12:00 | 3.6              | 247.5          | 3/9/2023 | 12:00 | 1.3              | 90             | 4/9/2023 | 12:00 | 0.9              | 247.5          |
| 1/9/2023 | 13:00 | 5.8              | 90             | 2/9/2023 | 13:00 | 4.4              | 247.5          | 3/9/2023 | 13:00 | 1.3              | 67.5           | 4/9/2023 | 13:00 | 1.3              | 247.5          |
| 1/9/2023 | 14:00 | 3.1              | 90             | 2/9/2023 | 14:00 | 5.7              | 247.5          | 3/9/2023 | 14:00 | 1.8              | 45             | 4/9/2023 | 14:00 | 1.3              | 247.5          |
| 1/9/2023 | 15:00 | 4                | 90             | 2/9/2023 | 15:00 | 4.1              | 247.5          | 3/9/2023 | 15:00 | 1.8              | 90             | 4/9/2023 | 15:00 | 1.3              | 247.5          |
| 1/9/2023 | 16:00 | 5.8              | 247.5          | 2/9/2023 | 16:00 | 3.6              | 247.5          | 3/9/2023 | 16:00 | 2.2              | 67.5           | 4/9/2023 | 16:00 | 1.3              | 247.5          |
| 1/9/2023 | 17:00 | 6.6              | 247.5          | 2/9/2023 | 17:00 | 3.6              | 90             | 3/9/2023 | 17:00 | 2.7              | 90             | 4/9/2023 | 17:00 | 1.3              | 247.5          |
| 1/9/2023 | 18:00 | 7.1              | 270            | 2/9/2023 | 18:00 | 3.6              | 90             | 3/9/2023 | 18:00 | 2.2              | 157.5          | 4/9/2023 | 18:00 | 1.3              | 247.5          |
| 1/9/2023 | 19:00 | 7.3              | 247.5          | 2/9/2023 | 19:00 | 3.6              | 90             | 3/9/2023 | 19:00 | 2.2              | 90             | 4/9/2023 | 19:00 | 1.8              | 135            |
| 1/9/2023 | 20:00 | 7.3              | 270            | 2/9/2023 | 20:00 | 3.6              | 90             | 3/9/2023 | 20:00 | 2.7              | 90             | 4/9/2023 | 20:00 | 0.9              | 112.5          |
| 1/9/2023 | 21:00 | 8                | 270            | 2/9/2023 | 21:00 | 3.6              | 90             | 3/9/2023 | 21:00 | 1.3              | 112.5          | 4/9/2023 | 21:00 | 0.4              | 247.5          |
| 1/9/2023 | 22:00 | 8                | 90             | 2/9/2023 | 22:00 | 2.8              | 90             | 3/9/2023 | 22:00 | 1.3              | 90             | 4/9/2023 | 22:00 | 0.4              | 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 |
|----------|-------|------------------|----------------|----------|-------|------------------|----------------|----------|-------|------------------|----------------|----------|-------|------------------|----------------|
| 1/9/2023 | 23:00 | 8                | 90             | 2/9/2023 | 23:00 | 2.8              | 90             | 3/9/2023 | 23:00 | 0.4              | 90             | 4/9/2023 | 23:00 | 0.9              | 90             |
| 5/9/2023 | 0:00  | 0.4              | 90             | 6/9/2023 | 0:00  | 1.3              | 90             | 7/9/2023 | 0:00  | 1.3              | 67.5           | 8/9/2023 | 0:00  | 0.4              | 112.5          |
| 5/9/2023 | 1:00  | 0.9              | 270            | 6/9/2023 | 1:00  | 1.3              | 225            | 7/9/2023 | 1:00  | 1.3              | 292.5          | 8/9/2023 | 1:00  | 0.4              | 225            |
| 5/9/2023 | 2:00  | 0.4              | 135            | 6/9/2023 | 2:00  | 1.3              | 112.5          | 7/9/2023 | 2:00  | 1.8              | 112.5          | 8/9/2023 | 2:00  | 0.4              | 112.5          |
| 5/9/2023 | 3:00  | 0.4              | 135            | 6/9/2023 | 3:00  | 1.3              | 270            | 7/9/2023 | 3:00  | 1.8              | 135            | 8/9/2023 | 3:00  | 0.4              | 225            |
| 5/9/2023 | 4:00  | 0.4              | 112.5          | 6/9/2023 | 4:00  | 0.9              | 270            | 7/9/2023 | 4:00  | 1.3              | 112.5          | 8/9/2023 | 4:00  | 0.4              | 225            |
| 5/9/2023 | 5:00  | 0.4              | 247.5          | 6/9/2023 | 5:00  | 0.4              | 22.5           | 7/9/2023 | 5:00  | 0.9              | 135            | 8/9/2023 | 5:00  | 0.4              | 225            |
| 5/9/2023 | 6:00  | 0.9              | 202.5          | 6/9/2023 | 6:00  | 0.9              | 202.5          | 7/9/2023 | 6:00  | 0.9              | 112.5          | 8/9/2023 | 6:00  | 0.4              | 112.5          |
| 5/9/2023 | 7:00  | 0.4              | 112.5          | 6/9/2023 | 7:00  | 0.4              | 270            | 7/9/2023 | 7:00  | 0.4              | 90             | 8/9/2023 | 7:00  | 0.4              | 135            |
| 5/9/2023 | 8:00  | 0.4              | 135            | 6/9/2023 | 8:00  | 0.4              | 247.5          | 7/9/2023 | 8:00  | 0.9              | 135            | 8/9/2023 | 8:00  | 0.4              | 112.5          |
| 5/9/2023 | 9:00  | 0.4              | 112.5          | 6/9/2023 | 9:00  | 0.8              | 135            | 7/9/2023 | 9:00  | 1.3              | 90             | 8/9/2023 | 9:00  | 0.4              | 90             |
| 5/9/2023 | 10:00 | 0.9              | 22.5           | 6/9/2023 | 10:00 | 0.4              | 112.5          | 7/9/2023 | 10:00 | 1.8              | 135            | 8/9/2023 | 10:00 | 0.9              | 90             |
| 5/9/2023 | 11:00 | 1.3              | 337.5          | 6/9/2023 | 11:00 | 0.4              | 112.5          | 7/9/2023 | 11:00 | 0.9              | 90             | 8/9/2023 | 11:00 | 1.3              | 135            |
| 5/9/2023 | 12:00 | 1.8              | 270            | 6/9/2023 | 12:00 | 0.9              | 225            | 7/9/2023 | 12:00 | 0.9              | 112.5          | 8/9/2023 | 12:00 | 1.3              | 90             |
| 5/9/2023 | 13:00 | 1.3              | 112.5          | 6/9/2023 | 13:00 | 0.9              | 247.5          | 7/9/2023 | 13:00 | 0.9              | 292.5          | 8/9/2023 | 13:00 | 1.8              | 135            |
| 5/9/2023 | 14:00 | 1.3              | 112.5          | 6/9/2023 | 14:00 | 1.8              | 247.5          | 7/9/2023 | 14:00 | 0.9              | 112.5          | 8/9/2023 | 14:00 | 1.3              | 90             |
| 5/9/2023 | 15:00 | 1.8              | 90             | 6/9/2023 | 15:00 | 0.9              | 225            | 7/9/2023 | 15:00 | 0.4              | 90             | 8/9/2023 | 15:00 | 0.9              | 67.5           |
| 5/9/2023 | 16:00 | 1.3              | 90             | 6/9/2023 | 16:00 | 1.8              | 247.5          | 7/9/2023 | 16:00 | 0.9              | 135            | 8/9/2023 | 16:00 | 1.3              | 112.5          |
| 5/9/2023 | 17:00 | 0.9              | 112.5          | 6/9/2023 | 17:00 | 1.8              | 270            | 7/9/2023 | 17:00 | 1.3              | 90             | 8/9/2023 | 17:00 | 0.9              | 112.5          |
| 5/9/2023 | 18:00 | 0.9              | 112.5          | 6/9/2023 | 18:00 | 0.9              | 112.5          | 7/9/2023 | 18:00 | 1.8              | 135            | 8/9/2023 | 18:00 | 0.4              | 112.5          |
| 5/9/2023 | 19:00 | 0.9              | 112.5          | 6/9/2023 | 19:00 | 0.9              | 337.5          | 7/9/2023 | 19:00 | 0.9              | 90             | 8/9/2023 | 19:00 | 1.3              | 112.5          |
| 5/9/2023 | 20:00 | 0.4              | 112.5          | 6/9/2023 | 20:00 | 0.4              | 22.5           | 7/9/2023 | 20:00 | 0.9              | 112.5          | 8/9/2023 | 20:00 | 0.4              | 112.5          |
| 5/9/2023 | 21:00 | 0.4              | 112.5          | 6/9/2023 | 21:00 | 0.9              | 315            | 7/9/2023 | 21:00 | 0.9              | 292.5          | 8/9/2023 | 21:00 | 0.9              | 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 |
|----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 5/9/2023 | 22:00 | 1.8              | 90             | 6/9/2023  | 22:00 | 0.9              | 315            | 7/9/2023  | 22:00 | 0.9              | 112.5          | 8/9/2023  | 22:00 | 0.9              | 135            |
| 5/9/2023 | 23:00 | 0.4              | 45             | 6/9/2023  | 23:00 | 1.3              | 315            | 7/9/2023  | 23:00 | 0.9              | 112.5          | 8/9/2023  | 23:00 | 1.3              | 135            |
| 9/9/2023 | 0:00  | 1.8              | 112.5          | 10/9/2023 | 0:00  | 0.9              | 22.5           | 11/9/2023 | 0:00  | 1.3              | 22.5           | 12/9/2023 | 0:00  | 2.2              | 135            |
| 9/9/2023 | 1:00  | 0.9              | 157.5          | 10/9/2023 | 1:00  | 0.9              | 22.5           | 11/9/2023 | 1:00  | 0.9              | 22.5           | 12/9/2023 | 1:00  | 1.3              | 180            |
| 9/9/2023 | 2:00  | 1.3              | 112.5          | 10/9/2023 | 2:00  | 0.9              | 22.5           | 11/9/2023 | 2:00  | 0.9              | 45             | 12/9/2023 | 2:00  | 1.3              | 112.5          |
| 9/9/2023 | 3:00  | 1.3              | 67.5           | 10/9/2023 | 3:00  | 0.9              | 22.5           | 11/9/2023 | 3:00  | 0.9              | 45             | 12/9/2023 | 3:00  | 0.9              | 112.5          |
| 9/9/2023 | 4:00  | 1.8              | 0              | 10/9/2023 | 4:00  | 0.9              | 112.5          | 11/9/2023 | 4:00  | 0.9              | 67.5           | 12/9/2023 | 4:00  | 1.8              | 135            |
| 9/9/2023 | 5:00  | 1.8              | 45             | 10/9/2023 | 5:00  | 0.9              | 45             | 11/9/2023 | 5:00  | 0.9              | 112.5          | 12/9/2023 | 5:00  | 1.8              | 135            |
| 9/9/2023 | 6:00  | 1.8              | 45             | 10/9/2023 | 6:00  | 0.9              | 135            | 11/9/2023 | 6:00  | 0.9              | 112.5          | 12/9/2023 | 6:00  | 1.8              | 112.5          |
| 9/9/2023 | 7:00  | 1.3              | 112.5          | 10/9/2023 | 7:00  | 1.3              | 180            | 11/9/2023 | 7:00  | 0.9              | 225            | 12/9/2023 | 7:00  | 0.9              | 202.5          |
| 9/9/2023 | 8:00  | 1.3              | 22.5           | 10/9/2023 | 8:00  | 1.3              | 112.5          | 11/9/2023 | 8:00  | 0.9              | 225            | 12/9/2023 | 8:00  | 1.3              | 202.5          |
| 9/9/2023 | 9:00  | 1.3              | 45             | 10/9/2023 | 9:00  | 0.9              | 112.5          | 11/9/2023 | 9:00  | 1.3              | 157.5          | 12/9/2023 | 9:00  | 0.4              | 225            |
| 9/9/2023 | 10:00 | 1.8              | 90             | 10/9/2023 | 10:00 | 0.9              | 135            | 11/9/2023 | 10:00 | 0.9              | 112.5          | 12/9/2023 | 10:00 | 0.9              | 112.5          |
| 9/9/2023 | 11:00 | 1.3              | 112.5          | 10/9/2023 | 11:00 | 0.9              | 135            | 11/9/2023 | 11:00 | 0.4              | 180            | 12/9/2023 | 11:00 | 0.9              | 135            |
| 9/9/2023 | 12:00 | 1.8              | 112.5          | 10/9/2023 | 12:00 | 0.9              | 112.5          | 11/9/2023 | 12:00 | 1.3              | 112.5          | 12/9/2023 | 12:00 | 0.9              | 112.5          |
| 9/9/2023 | 13:00 | 1.3              | 22.5           | 10/9/2023 | 13:00 | 0.9              | 135            | 11/9/2023 | 13:00 | 0.9              | 90             | 12/9/2023 | 13:00 | 0.4              | 135            |
| 9/9/2023 | 14:00 | 1.3              | 90             | 10/9/2023 | 14:00 | 1.3              | 135            | 11/9/2023 | 14:00 | 0.9              | 135            | 12/9/2023 | 14:00 | 1.3              | 180            |
| 9/9/2023 | 15:00 | 1.8              | 90             | 10/9/2023 | 15:00 | 1.8              | 135            | 11/9/2023 | 15:00 | 0.9              | 112.5          | 12/9/2023 | 15:00 | 1.3              | 112.5          |
| 9/9/2023 | 16:00 | 1.8              | 90             | 10/9/2023 | 16:00 | 0.9              | 90             | 11/9/2023 | 16:00 | 0.9              | 135            | 12/9/2023 | 16:00 | 0.9              | 112.5          |
| 9/9/2023 | 17:00 | 0.9              | 90             | 10/9/2023 | 17:00 | 1.8              | 270            | 11/9/2023 | 17:00 | 0.4              | 135            | 12/9/2023 | 17:00 | 1.8              | 135            |
| 9/9/2023 | 18:00 | 1.3              | 112.5          | 10/9/2023 | 18:00 | 0.9              | 45             | 11/9/2023 | 18:00 | 0.9              | 135            | 12/9/2023 | 18:00 | 1.8              | 135            |
| 9/9/2023 | 19:00 | 0.9              | 22.5           | 10/9/2023 | 19:00 | 1.3              | 225            | 11/9/2023 | 19:00 | 0.4              | 157.5          | 12/9/2023 | 19:00 | 1.8              | 112.5          |
| 9/9/2023 | 20:00 | 1.3              | 22.5           | 10/9/2023 | 20:00 | 1.3              | 270            | 11/9/2023 | 20:00 | 0.4              | 157.5          | 12/9/2023 | 20:00 | 1.8              | 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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 9/9/2023  | 21:00 | 1.3              | 22.5           | 10/9/2023 | 21:00 | 1.3              | 135            | 11/9/2023 | 21:00 | 0.9              | 157.5          | 12/9/2023 | 21:00 | 1.3              | 135            |
| 9/9/2023  | 22:00 | 0.4              | 22.5           | 10/9/2023 | 22:00 | 1.3              | 90             | 11/9/2023 | 22:00 | 0.4              | 157.5          | 12/9/2023 | 22:00 | 1.8              | 135            |
| 9/9/2023  | 23:00 | 0.4              | 22.5           | 10/9/2023 | 23:00 | 1.3              | 45             | 11/9/2023 | 23:00 | 0.4              | 157.5          | 12/9/2023 | 23:00 | 0.9              | 90             |
| 13/9/2023 | 0:00  | 1.3              | 45             | 14/9/2023 | 0:00  | 0.4              | 135            | 15/9/2023 | 0:00  | 0.9              | 112.5          | 16/9/2023 | 0:00  | 0.9              | 315            |
| 13/9/2023 | 1:00  | 1.8              | 67.5           | 14/9/2023 | 1:00  | 0.4              | 135            | 15/9/2023 | 1:00  | 1.3              | 67.5           | 16/9/2023 | 1:00  | 1.3              | 247.5          |
| 13/9/2023 | 2:00  | 2.7              | 112.5          | 14/9/2023 | 2:00  | 0.4              | 135            | 15/9/2023 | 2:00  | 0.4              | 45             | 16/9/2023 | 2:00  | 1.3              | 225            |
| 13/9/2023 | 3:00  | 0.9              | 202.5          | 14/9/2023 | 3:00  | 0.4              | 135            | 15/9/2023 | 3:00  | 1.3              | 112.5          | 16/9/2023 | 3:00  | 1.3              | 157.5          |
| 13/9/2023 | 4:00  | 0.9              | 45             | 14/9/2023 | 4:00  | 0.4              | 112.5          | 15/9/2023 | 4:00  | 0.9              | 45             | 16/9/2023 | 4:00  | 0.9              | 202.5          |
| 13/9/2023 | 5:00  | 2.7              | 135            | 14/9/2023 | 5:00  | 0.9              | 135            | 15/9/2023 | 5:00  | 1.3              | 90             | 16/9/2023 | 5:00  | 0.4              | 202.5          |
| 13/9/2023 | 6:00  | 1.3              | 202.5          | 14/9/2023 | 6:00  | 0.9              | 112.5          | 15/9/2023 | 6:00  | 0.9              | 45             | 16/9/2023 | 6:00  | 0.4              | 112.5          |
| 13/9/2023 | 7:00  | 1.3              | 22.5           | 14/9/2023 | 7:00  | 0.4              | 135            | 15/9/2023 | 7:00  | 0.4              | 67.5           | 16/9/2023 | 7:00  | 0.9              | 112.5          |
| 13/9/2023 | 8:00  | 1.3              | 135            | 14/9/2023 | 8:00  | 0.4              | 112.5          | 15/9/2023 | 8:00  | 0.9              | 67.5           | 16/9/2023 | 8:00  | 0.4              | 112.5          |
| 13/9/2023 | 9:00  | 1.3              | 135            | 14/9/2023 | 9:00  | 0.9              | 67.5           | 15/9/2023 | 9:00  | 0.4              | 67.5           | 16/9/2023 | 9:00  | 0.9              | 112.5          |
| 13/9/2023 | 10:00 | 0.9              | 202.5          | 14/9/2023 | 10:00 | 0.4              | 157.5          | 15/9/2023 | 10:00 | 1.3              | 67.5           | 16/9/2023 | 10:00 | 1.8              | 112.5          |
| 13/9/2023 | 11:00 | 0.4              | 202.5          | 14/9/2023 | 11:00 | 0.9              | 202.5          | 15/9/2023 | 11:00 | 1.8              | 67.5           | 16/9/2023 | 11:00 | 0.1              | 135            |
| 13/9/2023 | 12:00 | 0.4              | 202.5          | 14/9/2023 | 12:00 | 1.8              | 202.5          | 15/9/2023 | 12:00 | 0.9              | 67.5           | 16/9/2023 | 12:00 | 1.8              | 337.5          |
| 13/9/2023 | 13:00 | 0.4              | 112.5          | 14/9/2023 | 13:00 | 0.1              | 202.5          | 15/9/2023 | 13:00 | 0.9              | 135            | 16/9/2023 | 13:00 | 0.4              | 135            |
| 13/9/2023 | 14:00 | 0.4              | 247.5          | 14/9/2023 | 14:00 | 1.8              | 202.5          | 15/9/2023 | 14:00 | 0.4              | 135            | 16/9/2023 | 14:00 | 0.4              | 135            |
| 13/9/2023 | 15:00 | 0.4              | 247.5          | 14/9/2023 | 15:00 | 0.4              | 202.5          | 15/9/2023 | 15:00 | 0.4              | 112.5          | 16/9/2023 | 15:00 | 0.4              | 135            |
| 13/9/2023 | 16:00 | 0.4              | 135            | 14/9/2023 | 16:00 | 0.4              | 202.5          | 15/9/2023 | 16:00 | 0.4              | 135            | 16/9/2023 | 16:00 | 0.4              | 135            |
| 13/9/2023 | 17:00 | 0.4              | 270            | 14/9/2023 | 17:00 | 0.9              | 202.5          | 15/9/2023 | 17:00 | 0.4              | 112.5          | 16/9/2023 | 17:00 | 0.4              | 112.5          |
| 13/9/2023 | 18:00 | 0.4              | 135            | 14/9/2023 | 18:00 | 0.4              | 202.5          | 15/9/2023 | 18:00 | 0.4              | 135            | 16/9/2023 | 18:00 | 0.9              | 67.5           |
| 13/9/2023 | 19:00 | 0.4              | 90             | 14/9/2023 | 19:00 | 0.9              | 202.5          | 15/9/2023 | 19:00 | 0.4              | 135            | 16/9/2023 | 19:00 | 0.9              | 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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 13/9/2023 | 20:00 | 1.3              | 67.5           | 14/9/2023 | 20:00 | 1.8              | 135            | 15/9/2023 | 20:00 | 0.9              | 90             | 16/9/2023 | 20:00 | 0.4              | 67.5           |
| 13/9/2023 | 21:00 | 1.3              | 45             | 14/9/2023 | 21:00 | 0.1              | 112.5          | 15/9/2023 | 21:00 | 1.3              | 112.5          | 16/9/2023 | 21:00 | 0.4              | 67.5           |
| 13/9/2023 | 22:00 | 1.3              | 112.5          | 14/9/2023 | 22:00 | 1.8              | 90             | 15/9/2023 | 22:00 | 1.3              | 112.5          | 16/9/2023 | 22:00 | 0.9              | 67.5           |
| 13/9/2023 | 23:00 | 1.3              | 22.5           | 14/9/2023 | 23:00 | 0.4              | 337.5          | 15/9/2023 | 23:00 | 1.3              | 112.5          | 16/9/2023 | 23:00 | 0.9              | 67.5           |

| 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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 17/9/2023 | 0:00  | 0.9              | 90             | 18/9/2023 | 0:00  | 0.4              | 112.5          | 19/9/2023 | 0:00  | 0.9              | 135            | 20/9/2023 | 0:00  | 0.4              | 67.5           |
| 17/9/2023 | 1:00  | 0.9              | 22.5           | 18/9/2023 | 1:00  | 1.3              | 157.5          | 19/9/2023 | 1:00  | 0.4              | 45             | 20/9/2023 | 1:00  | 0.4              | 45             |
| 17/9/2023 | 2:00  | 0.9              | 90             | 18/9/2023 | 2:00  | 1.3              | 315            | 19/9/2023 | 2:00  | 0.4              | 315            | 20/9/2023 | 2:00  | 1.3              | 112.5          |
| 17/9/2023 | 3:00  | 0.9              | 45             | 18/9/2023 | 3:00  | 0.9              | 315            | 19/9/2023 | 3:00  | 0.4              | 22.5           | 20/9/2023 | 3:00  | 0.9              | 90             |
| 17/9/2023 | 4:00  | 1.3              | 90             | 18/9/2023 | 4:00  | 1.3              | 315            | 19/9/2023 | 4:00  | 0.9              | 112.5          | 20/9/2023 | 4:00  | 1.3              | 22.5           |
| 17/9/2023 | 5:00  | 1.3              | 90             | 18/9/2023 | 5:00  | 1.3              | 315            | 19/9/2023 | 5:00  | 1.3              | 270            | 20/9/2023 | 5:00  | 1.3              | 90             |
| 17/9/2023 | 6:00  | 1.3              | 22.5           | 18/9/2023 | 6:00  | 1.8              | 315            | 19/9/2023 | 6:00  | 1.3              | 45             | 20/9/2023 | 6:00  | 1.8              | 45             |
| 17/9/2023 | 7:00  | 0.4              | 315            | 18/9/2023 | 7:00  | 1.8              | 315            | 19/9/2023 | 7:00  | 0.9              | 22.5           | 20/9/2023 | 7:00  | 1.8              | 90             |
| 17/9/2023 | 8:00  | 0.9              | 45             | 18/9/2023 | 8:00  | 0.9              | 315            | 19/9/2023 | 8:00  | 1.3              | 45             | 20/9/2023 | 8:00  | 0.9              | 90             |
| 17/9/2023 | 9:00  | 0.9              | 22.5           | 18/9/2023 | 9:00  | 1.3              | 112.5          | 19/9/2023 | 9:00  | 0.9              | 22.5           | 20/9/2023 | 9:00  | 1.3              | 112.5          |
| 17/9/2023 | 10:00 | 0.9              | 292.5          | 18/9/2023 | 10:00 | 0.9              | 112.5          | 19/9/2023 | 10:00 | 1.3              | 22.5           | 20/9/2023 | 10:00 | 0.9              | 135            |
| 17/9/2023 | 11:00 | 0.9              | 67.5           | 18/9/2023 | 11:00 | 1.3              | 112.5          | 19/9/2023 | 11:00 | 1.8              | 22.5           | 20/9/2023 | 11:00 | 0.9              | 180            |
| 17/9/2023 | 12:00 | 0.9              | 112.5          | 18/9/2023 | 12:00 | 1.3              | 112.5          | 19/9/2023 | 12:00 | 0.4              | 22.5           | 20/9/2023 | 12:00 | 0.9              | 180            |
| 17/9/2023 | 13:00 | 0.9              | 112.5          | 18/9/2023 | 13:00 | 1.8              | 112.5          | 19/9/2023 | 13:00 | 0.9              | 22.5           | 20/9/2023 | 13:00 | 0.9              | 180            |
| 17/9/2023 | 14:00 | 0.4              | 90             | 18/9/2023 | 14:00 | 0.4              | 112.5          | 19/9/2023 | 14:00 | 2.2              | 22.5           | 20/9/2023 | 14:00 | 1.3              | 180            |
| 17/9/2023 | 15:00 | 1.3              | 315            | 18/9/2023 | 15:00 | 0.9              | 112.5          | 19/9/2023 | 15:00 | 2.2              | 22.5           | 20/9/2023 | 15:00 | 0.4              | 180            |
| 17/9/2023 | 16:00 | 1.8              | 337.5          | 18/9/2023 | 16:00 | 0.4              | 112.5          | 19/9/2023 | 16:00 | 2.2              | 22.5           | 20/9/2023 | 16:00 | 0.4              | 90             |

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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 17/9/2023 | 17:00 | 1.3              | 315            | 18/9/2023 | 17:00 | 0.9              | 112.5          | 19/9/2023 | 17:00 | 2.2              | 22.5           | 20/9/2023 | 17:00 | 0.4              | 90             |
| 17/9/2023 | 18:00 | 1.3              | 67.5           | 18/9/2023 | 18:00 | 0.4              | 90             | 19/9/2023 | 18:00 | 0.4              | 22.5           | 20/9/2023 | 18:00 | 1.3              | 45             |
| 17/9/2023 | 19:00 | 1.3              | 67.5           | 18/9/2023 | 19:00 | 0.9              | 112.5          | 19/9/2023 | 19:00 | 0.4              | 67.5           | 20/9/2023 | 19:00 | 0.9              | 112.5          |
| 17/9/2023 | 20:00 | 1.3              | 337.5          | 18/9/2023 | 20:00 | 0.4              | 90             | 19/9/2023 | 20:00 | 0.9              | 67.5           | 20/9/2023 | 20:00 | 1.3              | 112.5          |
| 17/9/2023 | 21:00 | 1.3              | 135            | 18/9/2023 | 21:00 | 0.4              | 112.5          | 19/9/2023 | 21:00 | 1.3              | 67.5           | 20/9/2023 | 21:00 | 0.9              | 90             |
| 17/9/2023 | 22:00 | 1.8              | 135            | 18/9/2023 | 22:00 | 0.4              | 337.5          | 19/9/2023 | 22:00 | 0.4              | 90             | 20/9/2023 | 22:00 | 0.9              | 112.5          |
| 17/9/2023 | 23:00 | 0.4              | 112.5          | 18/9/2023 | 23:00 | 0.9              | 22.5           | 19/9/2023 | 23:00 | 0.9              | 112.5          | 20/9/2023 | 23:00 | 0.9              | 270            |
| 21/9/2023 | 0:00  | 1.3              | 112.5          | 22/9/2023 | 0:00  | 0.9              | 67.5           | 23/9/2023 | 0:00  | 1.3              | 157.5          | 24/9/2023 | 0:00  | 1.3              | 135            |
| 21/9/2023 | 1:00  | 1.3              | 135            | 22/9/2023 | 1:00  | 0.4              | 135            | 23/9/2023 | 1:00  | 1.3              | 315            | 24/9/2023 | 1:00  | 1.3              | 135            |
| 21/9/2023 | 2:00  | 1.3              | 45             | 22/9/2023 | 2:00  | 0.4              | 292.5          | 23/9/2023 | 2:00  | 1.3              | 292.5          | 24/9/2023 | 2:00  | 1.3              | 135            |
| 21/9/2023 | 3:00  | 1.8              | 337.5          | 22/9/2023 | 3:00  | 2.2              | 292.5          | 23/9/2023 | 3:00  | 1.8              | 135            | 24/9/2023 | 3:00  | 0.4              | 112.5          |
| 21/9/2023 | 4:00  | 0.9              | 247.5          | 22/9/2023 | 4:00  | 1.8              | 292.5          | 23/9/2023 | 4:00  | 1.8              | 45             | 24/9/2023 | 4:00  | 0.4              | 45             |
| 21/9/2023 | 5:00  | 0.9              | 112.5          | 22/9/2023 | 5:00  | 1.8              | 292.5          | 23/9/2023 | 5:00  | 1.3              | 202.5          | 24/9/2023 | 5:00  | 0.4              | 45             |
| 21/9/2023 | 6:00  | 0.4              | 112.5          | 22/9/2023 | 6:00  | 1.8              | 292.5          | 23/9/2023 | 6:00  | 1.3              | 135            | 24/9/2023 | 6:00  | 0.9              | 337.5          |
| 21/9/2023 | 7:00  | 0.4              | 112.5          | 22/9/2023 | 7:00  | 1.8              | 292.5          | 23/9/2023 | 7:00  | 1.3              | 112.5          | 24/9/2023 | 7:00  | 0.9              | 112.5          |
| 21/9/2023 | 8:00  | 0.9              | 135            | 22/9/2023 | 8:00  | 1.8              | 112.5          | 23/9/2023 | 8:00  | 1.3              | 45             | 24/9/2023 | 8:00  | 0.9              | 112.5          |
| 21/9/2023 | 9:00  | 0.4              | 112.5          | 22/9/2023 | 9:00  | 1.3              | 157.5          | 23/9/2023 | 9:00  | 2.2              | 135            | 24/9/2023 | 9:00  | 0.4              | 112.5          |
| 21/9/2023 | 10:00 | 0.9              | 90             | 22/9/2023 | 10:00 | 1.3              | 315            | 23/9/2023 | 10:00 | 1.3              | 45             | 24/9/2023 | 10:00 | 0.4              | 337.5          |
| 21/9/2023 | 11:00 | 1.3              | 90             | 22/9/2023 | 11:00 | 1.3              | 292.5          | 23/9/2023 | 11:00 | 0.9              | 45             | 24/9/2023 | 11:00 | 0.4              | 337.5          |
| 21/9/2023 | 12:00 | 1.3              | 112.5          | 22/9/2023 | 12:00 | 1.8              | 135            | 23/9/2023 | 12:00 | 0.9              | 112.5          | 24/9/2023 | 12:00 | 1.3              | 337.5          |
| 21/9/2023 | 13:00 | 0.4              | 90             | 22/9/2023 | 13:00 | 1.8              | 45             | 23/9/2023 | 13:00 | 2.2              | 22.5           | 24/9/2023 | 13:00 | 1.3              | 337.5          |
| 21/9/2023 | 14:00 | 0.9              | 135            | 22/9/2023 | 14:00 | 1.3              | 202.5          | 23/9/2023 | 14:00 | 2.2              | 22.5           | 24/9/2023 | 14:00 | 1.3              | 337.5          |
| 21/9/2023 | 15:00 | 0.4              | 180            | 22/9/2023 | 15:00 | 1.3              | 135            | 23/9/2023 | 15:00 | 2.2              | 45             | 24/9/2023 | 15:00 | 1.8              | 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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 21/9/2023 | 16:00 | 0.9              | 180            | 22/9/2023 | 16:00 | 1.3              | 112.5          | 23/9/2023 | 16:00 | 2.2              | 225            | 24/9/2023 | 16:00 | 0.9              | 247.5          |
| 21/9/2023 | 17:00 | 2.2              | 180            | 22/9/2023 | 17:00 | 1.3              | 45             | 23/9/2023 | 17:00 | 2.2              | 90             | 24/9/2023 | 17:00 | 0.9              | 112.5          |
| 21/9/2023 | 18:00 | 2.2              | 180            | 22/9/2023 | 18:00 | 2.2              | 135            | 23/9/2023 | 18:00 | 2.2              | 90             | 24/9/2023 | 18:00 | 0.4              | 112.5          |
| 21/9/2023 | 19:00 | 1.3              | 22.5           | 22/9/2023 | 19:00 | 0.4              | 67.5           | 23/9/2023 | 19:00 | 2.2              | 112.5          | 24/9/2023 | 19:00 | 0.4              | 112.5          |
| 21/9/2023 | 20:00 | 0.9              | 22.5           | 22/9/2023 | 20:00 | 0.4              | 67.5           | 23/9/2023 | 20:00 | 2.2              | 112.5          | 24/9/2023 | 20:00 | 0.9              | 135            |
| 21/9/2023 | 21:00 | 0.9              | 45             | 22/9/2023 | 21:00 | 0.9              | 90             | 23/9/2023 | 21:00 | 2.2              | 135            | 24/9/2023 | 21:00 | 0.4              | 112.5          |
| 21/9/2023 | 22:00 | 0.9              | 45             | 22/9/2023 | 22:00 | 0.9              | 90             | 23/9/2023 | 22:00 | 0.9              | 135            | 24/9/2023 | 22:00 | 0.9              | 90             |
| 21/9/2023 | 23:00 | 0.9              | 67.5           | 22/9/2023 | 23:00 | 0.4              | 90             | 23/9/2023 | 23:00 | 0.9              | 112.5          | 24/9/2023 | 23:00 | 0.9              | 112.5          |
| 25/9/2023 | 0:00  | 1.8              | 135            | 26/9/2023 | 0:00  | 0.9              | 90             | 27/9/2023 | 0:00  | 0.9              | 90             | 28/9/2023 | 0:00  | 0.4              | 135            |
| 25/9/2023 | 1:00  | 1.3              | 135            | 26/9/2023 | 1:00  | 0.9              | 22.5           | 27/9/2023 | 1:00  | 0.9              | 90             | 28/9/2023 | 1:00  | 0.9              | 135            |
| 25/9/2023 | 2:00  | 1.8              | 135            | 26/9/2023 | 2:00  | 0.9              | 90             | 27/9/2023 | 2:00  | 0.9              | 90             | 28/9/2023 | 2:00  | 1.3              | 135            |
| 25/9/2023 | 3:00  | 0.4              | 112.5          | 26/9/2023 | 3:00  | 0.9              | 45             | 27/9/2023 | 3:00  | 0.9              | 135            | 28/9/2023 | 3:00  | 1.3              | 157.5          |
| 25/9/2023 | 4:00  | 0.4              | 45             | 26/9/2023 | 4:00  | 1.3              | 90             | 27/9/2023 | 4:00  | 0.9              | 112.5          | 28/9/2023 | 4:00  | 0.9              | 135            |
| 25/9/2023 | 5:00  | 0.4              | 45             | 26/9/2023 | 5:00  | 1.3              | 90             | 27/9/2023 | 5:00  | 1.3              | 135            | 28/9/2023 | 5:00  | 1.3              | 112.5          |
| 25/9/2023 | 6:00  | 0.9              | 337.5          | 26/9/2023 | 6:00  | 1.3              | 22.5           | 27/9/2023 | 6:00  | 0.4              | 112.5          | 28/9/2023 | 6:00  | 0.4              | 270            |
| 25/9/2023 | 7:00  | 1.8              | 247.5          | 26/9/2023 | 7:00  | 0.9              | 22.5           | 27/9/2023 | 7:00  | 0.4              | 135            | 28/9/2023 | 7:00  | 0.9              | 270            |
| 25/9/2023 | 8:00  | 1.8              | 67.5           | 26/9/2023 | 8:00  | 0.9              | 22.5           | 27/9/2023 | 8:00  | 0.4              | 112.5          | 28/9/2023 | 8:00  | 0.9              | 270            |
| 25/9/2023 | 9:00  | 1.8              | 67.5           | 26/9/2023 | 9:00  | 0.9              | 22.5           | 27/9/2023 | 9:00  | 0.4              | 135            | 28/9/2023 | 9:00  | 1.3              | 270            |
| 25/9/2023 | 10:00 | 0.9              | 67.5           | 26/9/2023 | 10:00 | 1.3              | 22.5           | 27/9/2023 | 10:00 | 0.4              | 135            | 28/9/2023 | 10:00 | 0.4              | 270            |
| 25/9/2023 | 11:00 | 0.9              | 67.5           | 26/9/2023 | 11:00 | 0.9              | 22.5           | 27/9/2023 | 11:00 | 0.9              | 90             | 28/9/2023 | 11:00 | 0.4              | 90             |
| 25/9/2023 | 12:00 | 0.9              | 67.5           | 26/9/2023 | 12:00 | 0.9              | 22.5           | 27/9/2023 | 12:00 | 1.3              | 112.5          | 28/9/2023 | 12:00 | 0.4              | 90             |
| 25/9/2023 | 13:00 | 0.9              | 292.5          | 26/9/2023 | 13:00 | 0.9              | 22.5           | 27/9/2023 | 13:00 | 0.9              | 112.5          | 28/9/2023 | 13:00 | 0.4              | 90             |
| 25/9/2023 | 14:00 | 0.9              | 22.5           | 26/9/2023 | 14:00 | 0.9              | 22.5           | 27/9/2023 | 14:00 | 1.3              | 112.5          | 28/9/2023 | 14:00 | 0.4              | 90             |

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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|
| 25/9/2023 | 15:00 | 0.9              | 315            | 26/9/2023 | 15:00 | 0.9              | 90             | 27/9/2023 | 15:00 | 1.3              | 135            | 28/9/2023 | 15:00 | 0.4              | 90             |
| 25/9/2023 | 16:00 | 0.9              | 337.5          | 26/9/2023 | 16:00 | 0.9              | 90             | 27/9/2023 | 16:00 | 0.9              | 112.5          | 28/9/2023 | 16:00 | 0.4              | 90             |
| 25/9/2023 | 17:00 | 0.9              | 315            | 26/9/2023 | 17:00 | 0.9              | 90             | 27/9/2023 | 17:00 | 0.9              | 112.5          | 28/9/2023 | 17:00 | 0.4              | 90             |
| 25/9/2023 | 18:00 | 1.3              | 67.5           | 26/9/2023 | 18:00 | 1.3              | 90             | 27/9/2023 | 18:00 | 1.3              | 67.5           | 28/9/2023 | 18:00 | 0.9              | 90             |
| 25/9/2023 | 19:00 | 1.3              | 67.5           | 26/9/2023 | 19:00 | 0.9              | 90             | 27/9/2023 | 19:00 | 0.9              | 270            | 28/9/2023 | 19:00 | 0.9              | 45             |
| 25/9/2023 | 20:00 | 1.3              | 337.5          | 26/9/2023 | 20:00 | 0.9              | 90             | 27/9/2023 | 20:00 | 0.9              | 270            | 28/9/2023 | 20:00 | 0.9              | 67.5           |
| 25/9/2023 | 21:00 | 1.3              | 135            | 26/9/2023 | 21:00 | 1.3              | 90             | 27/9/2023 | 21:00 | 1.3              | 270            | 28/9/2023 | 21:00 | 0.9              | 67.5           |
| 25/9/2023 | 22:00 | 1.3              | 180            | 26/9/2023 | 22:00 | 0.4              | 90             | 27/9/2023 | 22:00 | 1.8              | 270            | 28/9/2023 | 22:00 | 0.9              | 67.5           |
| 25/9/2023 | 23:00 | 0.9              | 180            | 26/9/2023 | 23:00 | 0.9              | 90             | 27/9/2023 | 23:00 | 2.2              | 270            | 28/9/2023 | 23:00 | 0.9              | 67.5           |
| 29/9/2023 | 0:00  | 0.4              | 67.5           | 30/9/2023 | 0:00  | 0.4              | 135            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 1:00  | 0.4              | 67.5           | 30/9/2023 | 1:00  | 1.3              | 315            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 2:00  | 0.4              | 67.5           | 30/9/2023 | 2:00  | 1.3              | 112.5          |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 3:00  | 0.4              | 67.5           | 30/9/2023 | 3:00  | 0.4              | 337.5          |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 4:00  | 0.4              | 135            | 30/9/2023 | 4:00  | 0.9              | 270            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 5:00  | 0.4              | 157.5          | 30/9/2023 | 5:00  | 0.9              | 315            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 6:00  | 0.4              | 45             | 30/9/2023 | 6:00  | 0.9              | 45             |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 7:00  | 0.4              | 90             | 30/9/2023 | 7:00  | 0.9              | 337.5          |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 8:00  | 0.4              | 90             | 30/9/2023 | 8:00  | 0.9              | 270            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 9:00  | 0.1              | 90             | 30/9/2023 | 9:00  | 0.9              | 315            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 10:00 | 0.1              | 90             | 30/9/2023 | 10:00 | 0.9              | 45             |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 11:00 | 0.1              | 90             | 30/9/2023 | 11:00 | 0.9              | 270            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 12:00 | 0.1              | 90             | 30/9/2023 | 12:00 | 0.4              | 270            |           |       |                  |                |           |       |                  |                |
| 29/9/2023 | 13:00 | 0.1              | 112.5          | 30/9/2023 | 13:00 | 0.4              | 270            |           |       |                  |                |           |       |                  |                |



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 |
|-----------|-------|------------------|----------------|-----------|-------|------------------|----------------|------|------|------------------|----------------|------|------|------------------|----------------|
| 29/9/2023 | 14:00 | 0.1              | 112.5          | 30/9/2023 | 14:00 | 0.9              | 270            |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 15:00 | 2.2              | 112.5          | 30/9/2023 | 15:00 | 0.4              | 315            |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 16:00 | 2.2              | 315            | 30/9/2023 | 16:00 | 0.9              | 135            |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 17:00 | 2.2              | 135            | 30/9/2023 | 17:00 | 0.4              | 292.5          |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 18:00 | 2.2              | 292.5          | 30/9/2023 | 18:00 | 0.4              | 135            |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 19:00 | 2.2              | 135            | 30/9/2023 | 19:00 | 0.4              | 45             |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 20:00 | 2.2              | 45             | 30/9/2023 | 20:00 | 0.9              | 45             |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 21:00 | 2.2              | 315            | 30/9/2023 | 21:00 | 0.4              | 45             |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 22:00 | 1.8              | 22.5           | 30/9/2023 | 22:00 | 0.9              | 45             |      |      |                  |                |      |      |                  |                |
| 29/9/2023 | 23:00 | 1.8              | 90             | 30/9/2023 | 23:00 | 0.4              | 45             |      |      |                  |                |      |      |                  |                |

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

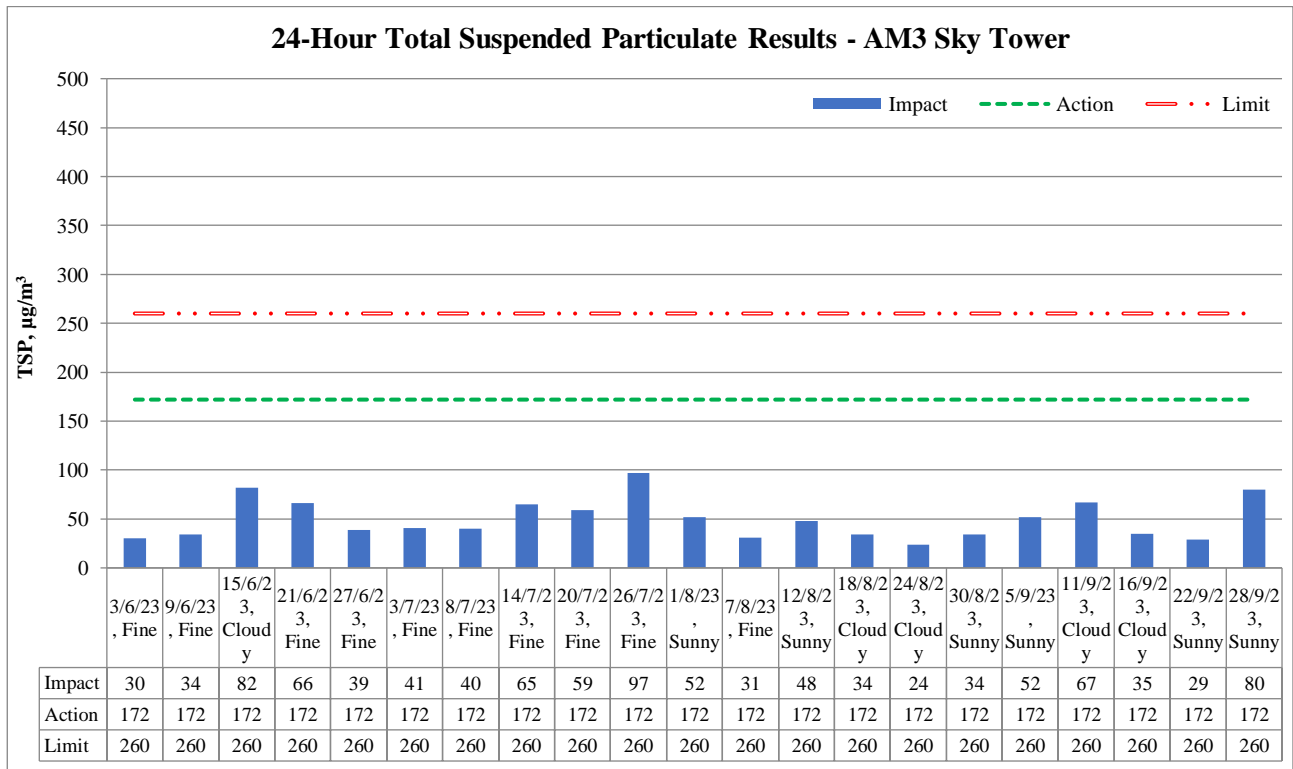
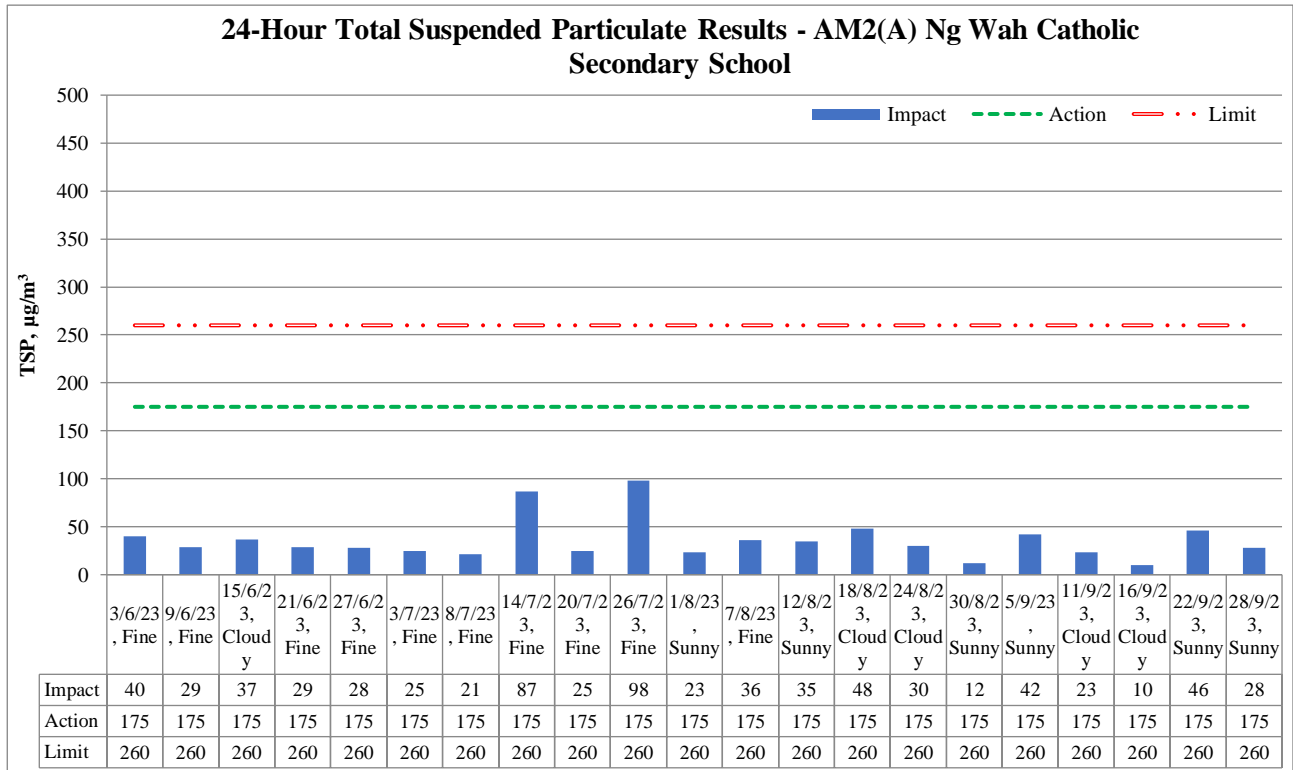
Location: AM2(A) – Ng Wah Catholic Secondary School

| 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 |                                |                              |                            |
| 05/09/2023 | Sunny   | 31.0           | 1003.6                     | 15.4842           | 15.5649 | 0.0807                 | 2023/9/5<br>13:00  | 2023/9/6<br>13:00  | 1440                | 50              | 50    | 1.33                           | 1913                         | 42                         |
| 11/09/2023 | Cloudy  | 28.0           | 1007.3                     | 18.2659           | 18.3117 | 0.0458                 | 2023/9/11<br>9:10  | 2023/9/12<br>9:10  | 1440                | 52              | 52    | 1.39                           | 2003                         | 23                         |
| 16/09/2023 | Cloudy  | 30.1           | 1011.1                     | 15.1309           | 15.1513 | 0.0204                 | 2023/9/16<br>13:10 | 2023/9/17<br>13:10 | 1440                | 52              | 52    | 1.39                           | 2000                         | 10                         |
| 22/09/2023 | Sunny   | 32.8           | 1010.4                     | 18.2925           | 18.3803 | 0.0878                 | 2023/9/22<br>9:05  | 2023/9/23<br>9:05  | 1440                | 50              | 50    | 1.33                           | 1913                         | 46                         |
| 28/09/2023 | Sunny   | 32.5           | 1011.6                     | 18.5317           | 18.5852 | 0.0535                 | 2023/9/28<br>9:20  | 2023/9/29<br>9:20  | 1440                | 50              | 50    | 1.33                           | 1915                         | 28                         |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       | Maximum                        | 46                           |                            |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       | Minimum                        | 10                           |                            |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       | Average                        | 30                           |                            |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       | 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 |                                |                              |                            |
| 05/09/2023 | Sunny   | 31.0           | 1003.6                     | 18.4638           | 18.5581 | 0.0943                 | 2023/9/5<br>9:24   | 2023/9/6<br>9:24   | 1440                | 46              | 46    | 1.25                           | 1800                         | 52                         |
| 11/09/2023 | Cloudy  | 28             | 1007.3                     | 18.2045           | 18.3262 | 0.1217                 | 2023/9/11<br>13:24 | 2023/9/12<br>13:24 | 1440                | 46              | 46    | 1.26                           | 1813                         | 67                         |
| 16/09/2023 | Cloudy  | 30.1           | 1011.1                     | 18.2286           | 18.2911 | 0.0625                 | 2023/9/16<br>9:25  | 2023/9/17<br>9:25  | 1440                | 46              | 46    | 1.26                           | 1810                         | 35                         |
| 22/09/2023 | Sunny   | 32.8           | 1010.4                     | 14.9973           | 15.0487 | 0.0514                 | 2023/9/22<br>13:26 | 2023/9/23<br>13:26 | 1440                | 46              | 46    | 1.25                           | 1801                         | 29                         |
| 28/09/2023 | Sunny   | 32.5           | 1011.6                     | 18.6444           | 18.7894 | 0.1450                 | 2023/9/28<br>13:31 | 2023/9/29<br>13:31 | 1440                | 46              | 46    | 1.25                           | 1803                         | 80                         |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       |                                | Maximum                      | 80                         |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       |                                | Minimum                      | 29                         |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       |                                | Average                      | 53                         |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       |                                | Action Level                 | 172                        |
|            |         |                |                            |                   |         |                        |                    |                    |                     |                 |       |                                | Limit Level                  | 260                        |

**24-hour average TSP**



| Major Construction Activities   | Reporting Period |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| Construction works for DCS  | ✓                | ✓        | ✓        | ✓        |
| Construction works for SB-01 tunnel   | ✓                | ✓        | ✓        |          |
| Construction of Underpinning of S14   |                  | ✓        | ✓        | ✓        |
| Construction of Retaining Wall Type 1 for S14                                     | ✓                | ✓        | ✓        | ✓        |
| Construction of Pile Cap for S14  |                  |          |          | ✓        |
| Construction works for SMH404 and SMH505  |                  |          |          | ✓        |
| Modification works for Rising Main chamber WOC1 and AVC2                          |                  |          |          | ✓        |
| ELS modification and Backfilling works for Retrieving Shaft at Sa Po Road         | ✓                | ✓        | ✓        |          |
| Pre-bored socket H-pile construction works for Slip Road S14                      | ✓                |          |          |          |
| GI and Grouting works for Slip Road S14   |                  | ✓        | ✓        |          |
| Erection of falseworks and working platform for decking of Elevated Walkway LW-02 | ✓                | ✓        | ✓        | ✓        |
| RTBM dismantle  |                  |          |          | ✓        |
| RC construction for decking of Elevated Walkway LW-02                             | ✓                | ✓        | ✓        | ✓        |
| RC construction for Subway KS10 Lift and Staircase                                | ✓                | ✓        | ✓        | ✓        |
| RC construction works for lift and staircase of LW-02                             | ✓                | ✓        | ✓        | ✓        |
| Renovation works for existing subways KS9, KS32 and KS10                          | ✓                | ✓        | ✓        | ✓        |
| Road and drain construction works for Road L16                                    | ✓                | ✓        | ✓        |          |
| Road and Drain Construction works for Road L16, Commercial Street and Road D1     |                  |          |          | ✓        |
| Road and drain construction works for Olympic Avenue                              | ✓                | ✓        | ✓        | ✓        |
| Assembly of RTBM at launching shaft for SB-01                                     | ✓                |          |          |          |

| Factors might affect the monitoring results   | Reporting Period |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| 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**

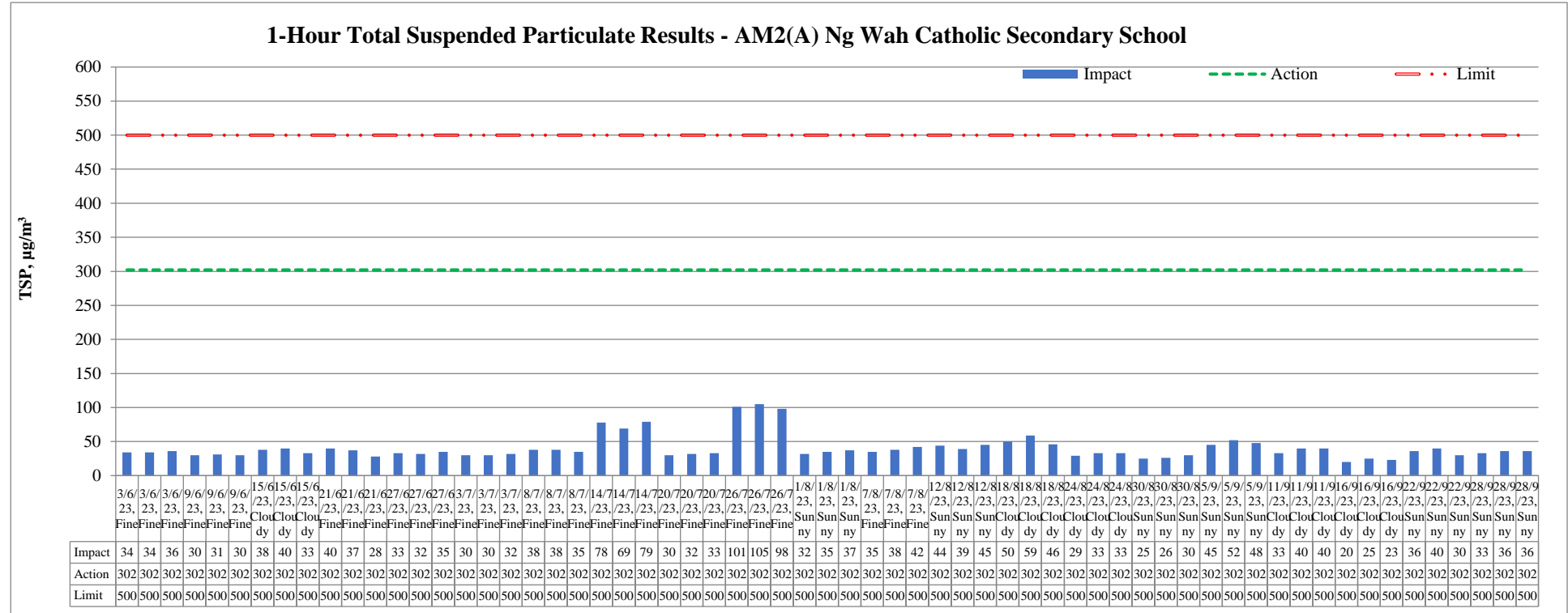
| Date         | Measurement Period |   |       | 1-hr TSP concentration,<br>$\mu\text{g}/\text{m}^3$ | Weather |
|--------------|--------------------|---|-------|---|---------|
|              |                    | - |       |   |         |
| 05/09/2023   | 13:00              | - | 14:00 | 45  | Sunny   |
|              | 14:00              | - | 15:00 | 52  |         |
|              | 15:00              | - | 16:00 | 48  |         |
| 11/09/2023   | 9:00               | - | 10:00 | 33  | Cloudy  |
|              | 10:00              | - | 11:00 | 40  |         |
|              | 11:00              | - | 12:00 | 40  |         |
| 16/09/2023   | 13:00              | - | 14:00 | 20  | Cloudy  |
|              | 14:00              | - | 15:00 | 25  |         |
|              | 15:00              | - | 16:00 | 23  |         |
| 22/09/2023   | 9:00               | - | 10:00 | 36  | Sunny   |
|              | 10:00              | - | 11:00 | 40  |         |
|              | 11:00              | - | 12:00 | 30  |         |
| 28/09/2023   | 9:00               | - | 10:00 | 33  | Sunny   |
|              | 10:00              | - | 11:00 | 36  |         |
|              | 11:00              | - | 12:00 | 36  |         |
| Maximum      |                    |   |       | 52  |         |
| Minimum      |                    |   |       | 20  |         |
| Average      |                    |   |       | 36  |         |
| Action Level |                    |   |       | 302   |         |
| Limit Level  |                    |   |       | 500   |         |



Location:  
**AM3 -  
 Sky Tower**

| Date         | Measurement Period |   |       | 1-hr TSP concentration,<br>μg/m <sup>3</sup> | Weather |
|--------------|--------------------|---|-------|--|---------|
| 05/09/2023   | 9:00               | - | 10:00 | 46   | Sunny   |
|              | 10:00              | - | 11:00 | 48   |         |
|              | 11:00              | - | 12:00 | 48   |         |
| 11/09/2023   | 13:00              | - | 14:00 | 59   | Cloudy  |
|              | 14:00              | - | 15:00 | 60   |         |
|              | 15:00              | - | 16:00 | 58   |         |
| 16/09/2023   | 9:00               | - | 10:00 | 28   | Cloudy  |
|              | 10:00              | - | 11:00 | 30   |         |
|              | 11:00              | - | 12:00 | 31   |         |
| 22/09/2023   | 13:00              | - | 14:00 | 28   | Sunny   |
|              | 14:00              | - | 15:00 | 32   |         |
|              | 15:00              | - | 16:00 | 35   |         |
| 28/09/2023   | 13:00              | - | 14:00 | 80   | Sunny   |
|              | 14:00              | - | 15:00 | 82   |         |
|              | 15:00              | - | 16:00 | 81   |         |
| Maximum      |                    |   |       | 82   |         |
| Minimum      |                    |   |       | 28   |         |
| Average      |                    |   |       | 50   |         |
| Action Level |                    |   |       | 301  |         |
| Limit Level  |                    |   |       | 500  |         |

# 1-hour average TSP





| Major Construction Activities   | Reporting Period |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| Construction works for DCS  | ✓                | ✓        | ✓        | ✓        |
| Construction works for SB-01 tunnel   | ✓                | ✓        | ✓        |          |
| Construction of Underpinning of S14   |                  | ✓        | ✓        | ✓        |
| Construction of Retaining Wall Type 1 for S14                                     | ✓                | ✓        | ✓        | ✓        |
| Construction of Pile Cap for S14  |                  |          |          | ✓        |
| Construction works for SMH404 and SMH505  |                  |          |          | ✓        |
| Modification works for Rising Main chamber WOC1 and AVC2                          |                  |          |          | ✓        |
| ELS modification and Backfilling works for Retrieving Shaft at Sa Po Road         | ✓                | ✓        | ✓        |          |
| Pre-bored socket H-pile construction works for Slip Road S14                      | ✓                |          |          |          |
| GI and Grouting works for Slip Road S14   |                  | ✓        | ✓        |          |
| Erection of falseworks and working platform for decking of Elevated Walkway LW-02 | ✓                | ✓        | ✓        | ✓        |
| RTBM dismantle  |                  |          |          | ✓        |
| RC construction for decking of Elevated Walkway LW-02                             | ✓                | ✓        | ✓        | ✓        |
| RC construction for Subway KS10 Lift and Staircase                                | ✓                | ✓        | ✓        | ✓        |
| RC construction works for lift and staircase of LW-02                             | ✓                | ✓        | ✓        | ✓        |
| Renovation works for existing subways KS9, KS32 and KS10                          | ✓                | ✓        | ✓        | ✓        |
| Road and drain construction works for Road L16                                    | ✓                | ✓        | ✓        |          |
| Road and Drain Construction works for Road L16, Commercial Street and Road D1     |                  |          |          | ✓        |
| Road and drain construction works for Olympic Avenue                              | ✓                | ✓        | ✓        | ✓        |
| Assembly of RTBM at launching shaft for SB-01                                     | ✓                |          |          |          |

| Factors might affect the monitoring results   | Reporting Period |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| 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>  |

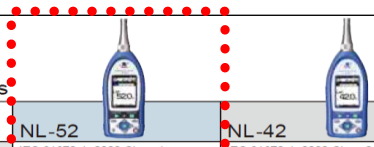
| Event  | Action   |  |   |  |
|--|--|--|---|--|
|  | ET   | IEC  | Supervisor / ER   | Contractor   |
|  | Contractor's remedial actions and keep EPD, IEC and Supervisor /ER informed of the results.  | on the effectiveness of the proposed remedial measures.  | 4. Supervise implementation of remedial measures;<br>5. Conduct meeting with ET and IEC if exceedance continues.  | within three working days of notification;<br>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<br>ANSI S1.4-1983 Type 1<br>ANSI S1.4A-1985 Type 1<br>ANSI S1.43-1997 Type 1<br>JIS C 1509-1: 2005 Class 1   | IEC 61672-1: 2002 Class 2<br>ANSI S1.4-1983 Type 2<br>ANSI S1.4A-1985 Type 2<br>ANSI S1.43-1997 Type 2<br>JIS C 1509-1: 2005 Class 2                                   |  |
| Measurement functions          | Simultaneous measurement of the following items, with selected time weighting and frequency weighting  |  |  |
| Processing (main ch)           | Instantaneous sound pressure level: $L_p$<br>Equivalent continuous sound pressure level: $L_{eq}$<br>Sound exposure level: $L_E$<br>Maximum sound pressure level: $L_{max}$<br>Minimum sound pressure level: $L_{min}$<br>Percentile 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:<br>C-weighted equivalent continuous sound level: $L_{Ceq}$<br>C-weighted peak sound level: $L_{Cpeak}$<br>Z-weighted peak sound level: $L_{Zpeak}$<br>1-time-weighted equivalent continuous sound level: $L_{A,eq}^{\#2}$<br>Maximum 1-time-weighted equivalent continuous sound level: $L_{A,max}^{\#2}$<br>The power average of the maximum level of each 5 second interval: $L_{A,max}$<br>The frequency weighting for the additional processing synchronizes with the frequency weighting of the sub-channel, so when the sub-channel has A-weighting, $L_{A,max}$ can be selected.<br>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<br>Sensitivity level: -27 dB   | Type: UC-52<br>Sensitivity level: -33 dB   |  |
| Measurement range              | A-weighting: 25 dB to 138 dB<br>C-weighting: 33 dB to 138 dB<br>Z-weighting: 38 dB to 138 dB<br>C-weighting peak sound level: 55 dB to 141 dB<br>Z-weighting peak sound level: 60 dB to 141 dB   |  |  |
| Inherent noise                 | A-weighting: 17 dB or less<br>C-weighting: 25 dB or less<br>Z-weighting: 30 dB or less   | 19 dB or less<br>27 dB or less<br>32 dB or less  |  |
| Frequency range                | 20 Hz to 20 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)<br>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:<br>Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed.<br>Diffuse sound field correction:<br>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)<br>* LCD with touch panel (Capacitive Touch Panel)<br>Numerical display update frequency: 1 s<br>Bar graph update frequency: 100 ms   |  |  |
| Store                          | Manual   | Data for measurement results are stored manually in single address increments.<br>Internal memory: max. 1000 sets<br>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 to an International Protection rating of IP54 (dust protected and resistant to splashing water).  
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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<br>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*1                                     | Allows USB to be connected to a computer and recognized as a removable disk<br>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: $L_p$<br>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<br>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<br>Humidity: 10 to 90% RH (non-condensing)  |
| Dustproof / water-resistant performance*4 | IP code: IP54 (except for microphone)<br>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 adapter  | WS-1500          |
| 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



证书编号(Certificate No.): 2HB23001488-0003

**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<br>(Microphone Type) | 传声器编号<br>(Microphone SN.) | 放大器型号<br>(Preamplifier Type) | 放大器编号<br>(Preamplifier SN.) | 声校准器型号<br>(Calibrator Type) | 标准声压级<br>(Reference SPL)<br>(dB) | 校准前示值<br>(Before Calibration)<br>(dB) | 校准后示值<br>(After Calibration)<br>(dB) | U<br>(k=2)<br>(dB) |
|----------------------------|---------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------------|---------------------------------------|--------------------------------------|--------------------|
| /                          | /                         | /                            | /                           | 4226                        | 94.0                             | 93.8                                  | 93.8                                 | 0.2                |

**3 级线性 (Level Linearity)**

**3.1 参考级量程 (Reference Range)**

频率(Frequency): 8000Hz

| 标准声级<br>(Standard)<br>(dB) | 指示声级<br>(Indication)<br>(dB) | 误差<br>(Error)<br>(dB) | 允许误差<br>(Limit)<br>(dB) | 结论<br>(Pass/Fail)<br>(P/F) | U<br>(k=2)<br>(dB) |
|----------------------------|------------------------------|-----------------------|-------------------------|----------------------------|--------------------|
| 130.0                      | 129.8                        | -0.2                  | ±0.8                    | P                          | 0.3                |
| 129.0                      | 128.8                        | -0.2                  | ±0.8                    | P                          | 0.3                |
| 128.0                      | 127.8                        | -0.2                  | ±0.8                    | P                          | 0.3                |
| 127.0                      | 126.8                        | -0.2                  | ±0.8                    | P                          | 0.3                |
| 126.0                      | 125.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 125.0                      | 124.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 120.0                      | 119.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 110.0                      | 110.0                        | 0.0                   | ±0.8                    | P                          | 0.3                |
| 100.0                      | 100.0                        | 0.0                   | ±0.8                    | P                          | 0.3                |
| 90.0                       | 90.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 80.0                       | 79.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 70.0                       | 69.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 60.0                       | 60.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 50.0                       | 49.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 40.0                       | 39.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 35.0                       | 34.8                         | -0.2                  | ±0.8                    | P                          | 0.3                |
| 34.0                       | 33.8                         | -0.2                  | ±0.8                    | P                          | 0.3                |
| 33.0                       | 32.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 32.0                       | 31.8                         | -0.2                  | ±0.8                    | P                          | 0.3                |
| 31.0                       | 30.8                         | -0.2                  | ±0.8                    | P                          | 0.3                |
| 30.0                       | 29.8                         | -0.2                  | ±0.8                    | P                          | 0.3                |

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证书编号(Certificate No.): 2HB23001488-0003

**3.2 其它级量程 (Other Range)**

频率(Frequency): 1000Hz

| 标准声级<br>(Standard)<br>(dB) | 指示声级<br>(Indication)<br>(dB) | 误差<br>(Error)<br>(dB) | 允许误差<br>(Limit)<br>(dB) | 结论<br>(Pass/Fail)<br>(P/F) | U<br>(k=2)<br>(dB) |
|----------------------------|------------------------------|-----------------------|-------------------------|----------------------------|--------------------|
| 130.0                      | 129.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 129.0                      | 128.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 128.0                      | 127.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 127.0                      | 126.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 126.0                      | 125.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 125.0                      | 124.9                        | -0.1                  | ±0.8                    | P                          | 0.3                |
| 120.0                      | 120.0                        | 0.0                   | ±0.8                    | P                          | 0.3                |
| 110.0                      | 110.0                        | 0.0                   | ±0.8                    | P                          | 0.3                |
| 100.0                      | 100.0                        | 0.0                   | ±0.8                    | P                          | 0.3                |
| 90.0                       | 90.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 80.0                       | 80.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 70.0                       | 70.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 60.0                       | 60.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 50.0                       | 50.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 40.0                       | 40.0                         | 0.0                   | ±0.8                    | P                          | 0.3                |
| 35.0                       | 34.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 34.0                       | 33.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 33.0                       | 32.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 32.0                       | 31.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 31.0                       | 30.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |
| 30.0                       | 29.9                         | -0.1                  | ±0.8                    | P                          | 0.3                |

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# Calibration Certificate of Sound Level Meter



证书编号(Certificate No.): 2HB23001488-0003

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

| 频率<br>(Frequency)<br>(Hz) | 实测值<br>(Actual)<br>(dB) | 理论值<br>(Theoretical value)<br>(dB) | 误差<br>(Error)<br>(dB) | 允许误差<br>(Limit)<br>(dB) | 结论<br>(Pass/Fail)<br>(P/F) | U<br>(k=2)<br>(dB) |
|---------------------------|-------------------------|------------------------------------|-----------------------|-------------------------|----------------------------|--------------------|
| 20                        | -6.6                    | -6.2                               | -0.4                  | ±2.0                    | P                          | 0.5                |
| 25                        | -4.7                    | -4.4                               | -0.3                  | +2.0 ~ -1.5             | P                          | 0.5                |
| 31.5                      | -3.0                    | -3.0                               | 0.0                   | ±1.5                    | P                          | 0.5                |
| 40                        | -2.0                    | -2.0                               | 0.0                   | ±1.0                    | P                          | 0.5                |
| 50                        | -1.3                    | -1.3                               | 0.0                   | ±1.0                    | P                          | 0.5                |
| 63                        | -0.8                    | -0.8                               | 0.0                   | ±1.0                    | P                          | 0.5                |
| 80                        | -0.4                    | -0.5                               | 0.1                   | ±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                       | 0.0                     | -0.1                               | 0.1                   | ±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                       | 0.0                     | 0.0                                | 0.0                   | ±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                      | -0.5                    | -0.3                               | -0.2                  | ±1.0                    | P                          | 0.6                |
| 3150                      | -0.8                    | -0.5                               | -0.3                  | ±1.0                    | P                          | 0.6                |
| 4000                      | -1.1                    | -0.8                               | -0.3                  | ±1.0                    | P                          | 0.6                |
| 5000                      | -1.5                    | -1.3                               | -0.2                  | ±1.5                    | P                          | 0.6                |
| 6300                      | -2.1                    | -2.0                               | -0.1                  | +1.5 ~ -2.0             | P                          | 0.6                |
| 8000                      | -3.0                    | -3.0                               | 0.0                   | +1.5 ~ -2.5             | P                          | 0.6                |
| 10000                     | -4.3                    | -4.4                               | 0.1                   | +2.0 ~ -3.0             | P                          | 0.6                |
| 12500                     | -6.2                    | -6.2                               | 0.0                   | +2.0 ~ -5.0             | P                          | 1.0                |
| 16000                     | -10.4                   | -8.5                               | -1.9                  | +2.5 ~ -16.0            | P                          | 1.0                |
| 20000                     | -20.3                   | -11.2                              | -9.1                  | +3.0 ~ -∞               | P                          | 1.0                |

## Catalogue of Sound Calibrator

For microphone calibration **NC-74**

### How to use

Carefully insert the microphone all the way into the coupler of the NC-74. Then simply turn the power on to apply a constant sound pressure level to the diaphragm of the microphone.

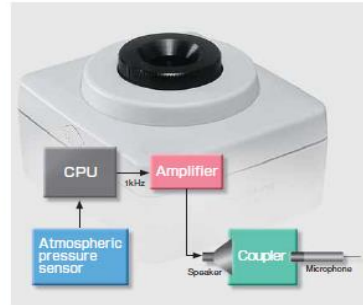


Usage example (NL series)

The performance of the NC-74 is suitable for calibration of high-precision sound level meters. The unit is compact, lightweight, and easy to use. Two IEC LR6 (size AA) alkaline batteries will power the unit for more than 30 hours of continuous use at room temperature.

### Atmospheric pressure compensation principle

The NC-74 incorporates a sensor that detects atmospheric pressure. Based on the information provided by the sensor, the CPU controls the signal amplitude. This allows the unit to always provide the correct output for achieving constant sound pressure level, regardless of fluctuations in atmospheric pressure.



### Using the 1/2-inch adapter

To allow calibration of sound level meter microphones with 1 inch diameter, the 1/2-inch microphone adapter can be removed. 1/2-inch microphones are calibrated with the adapter in place.



### Specifications

|                                |  |
|--------------------------------|--|
| Applicable standards           | IEC 60942:2003 Class 1<br>JIS C 1615:2004 Class 1  |
| Suitable microphones           | 1-inch microphones<br>IEC 61094-1 Type LS1P<br>UC-27<br>UC-28<br>UC-34   |
|                                | 1/2-inch microphones<br>IEC 61094-1 Type LS2aP<br>UC-69<br>UC-67<br>UC-63A<br>UC-62<br>UC-26<br>UC-30<br>UC-31<br>UC-33P |
| Nominal sound pressure level   | 94 dB  |
| Sound pressure level tolerance | ±0.3 dB  |
| Nominal frequency              | 1 kHz  |
| Frequency tolerance            | ±1.0 % or less   |
| Power requirements             | IEC LR6 (size AA) alkaline battery × 2   |
| Dimensions, mass               | Approx. 49 (H) × 80 (W) × 74 (D) mm<br>Approx. 200 g (including batteries)   |
| Supplied accessories           | Class 1<br>IEC LR6 (size AA) alkaline battery × 2<br>1/2-inch microphone adapter NC-74-002 × 1                           |



\* Specification subject to change without notice.

**RION CO., LTD.**

3-20-41, Higashinomachi, Kokubunji, Tokyo 185-8533, Japan  
Tel: +81-42-359-7888 Fax: +81-42-359-7442  
<http://www.rion.co.jp/english/>

Distributed by:

Printed in Japan 0510-1 0807.P.MP

## Calibration Certificate of Sound Calibrator

AAST-SLC-06 Cal 5 Sep 2023



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: 2HB23001715-0001  
Certificate No.



委托单位: Castco Testing Centre Limited  
Client  
仪器名称: Sound Level Calibrator  
Description  
型号规格: NC-74  
Model/Type  
制造商: RION  
Manufacturer  
机身号: 34678556  
Serial No.  
管理号: AAST-SLC-06  
Asset No.  
接收日期: 2023-08-23  
Rec. Date  
校准日期: 2023-09-05  
Cal. Date  
签发日期: 2023-09-05  
App. Date  
建议校准周期: 12个月(12 months)  
Reference Cal. Period  
结论: 所校准项目符合技术要求(The calibrated items meet the technical requirements)  
Conclusion

校准: 赵文钰 赵文钰  
Calibrated by

检验: 钟颖 钟颖  
Inspected by

签发: 郑木力 郑木力  
Approved by

印章: Stamp



扫一扫查真伪

赛宝计量检测中心  
总部地址: 广州市增城区朱村街朱村大道西78号  
实验室地址: 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,Zhucun Avenue West,Zengcheng District,Guangzhou,China  
Add. of the Lab: No.78,Zhucun 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 Calibrator

证书编号(Certificate No.): 2HB23001715-0001

## 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. 本机构出具的数据均可溯源到国际单位制 (SI) 单位和社会公用计量标准。  
The data issued by this laboratory is traceable to International system of Units (SI) and national primary standards.
3. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):  
\* JJG 176-2022 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: 0.1%~10%, (20Hz~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.)
4. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):  

| 名称<br>(Description)           | 证书号/有效期/溯源单位<br>(Certificate No./Due Date/Traceability to) | 技术指标<br>(Specification)   | 测量范围<br>(Measuring Range)   |
|-------------------------------|--|---|---|
| 前置放大器(2239843)<br>304所        | GFJGJL1001230304185/2024-03-22/航空                          | 频率响应: $\pm 0.1\text{dB}$  | (10~50000) Hz   |
| 数字多用表(MY4505167<br>4)<br>514所 | GFJGJL1004230400378/2024-04-02/航天                          | DCV: $\pm 8 \times 10^{-6}$ ; DCI: $\pm 2 \times 10^{-5}$ ; ACV: $\pm 0.02\%$ ; ACI: $\pm 0.03\%$ ; R: $\pm 1 \times 10^{-5}$ ; f: $\pm 0.01\%$ | DCV: 10nV~1000V; DCI: 1pA~1A; ACV: (10nV~700V) @ (1Hz~2MHz); ACI: (100pA~1A) @ (10Hz~100kHz); R: 10 $\mu\Omega$ ~1G $\Omega$ ; F: 1Hz~10MHz |
| PULSE分析系统(3160-1<br>06540)    | 4GC23000528-0009/2024-08-16/赛宝(广州)                         | 频率: $U_{rel}=0.001\%$ , $k=2$ ; 电压: $U_{rel}=0.10\%$ , $k=2$  | 频率: 0.001Hz~51.2kHz, 电压: (1~10 <sup>3</sup> ~30)V   |
| 实验室标准传声器(2246<br>093)<br>304所 | GFJGJL1001230304187/2024-04-13/航空                          | LS级   | 10Hz~25kHz  |
5. 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
6. 环境条件(Environmental conditions):  
温度(Temperature): 21.2°C 相对湿度(Relative Humidity): 60%
7. 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%.
8. 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.
9. 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。

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证书编号(Certificate No.): 2HB23001715-0001

### 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 声压级 (Sound Pressure Level)

| 规定声压级<br>(Prescribed SPL) | 测量声压级<br>(Measured SPL) | 声压级差的绝对值<br>(Absolute value of SPL) | 接受限<br>(Limit) | 结论<br>(Pass/Fail) | $U$<br>( $k=2$ )<br>(dB) |
|---------------------------|-------------------------|-------------------------------------|----------------|-------------------|--------------------------|
| (dB)                      | (dB)                    | (dB)                                | (dB)           |                   | (dB)                     |
| 94                        | 93.86                   | 0.14                                | ≤0.25          | P                 | 0.10                     |

### 3 频率 (Frequency)

| 规定频率<br>(Prescribed Fre.) | 测量频率<br>(Measured Fre.) | 频率误差的绝对值<br>(Absolute value of Fre.) | 接受限<br>(Limit) | 结论<br>(Pass/Fail) | $U_{rel}$<br>( $k=2$ )<br>(%) |
|---------------------------|-------------------------|--------------------------------------|----------------|-------------------|-------------------------------|
| (Hz)                      | (Hz)                    | (%)                                  | (%)            |                   | (%)                           |
| 1000                      | 1003.7                  | 0.37                                 | ≤0.70          | P                 | 0.10                          |

### 4 总失真+噪声 (Distortion and noise)

| 规定声压级<br>(Prescribed SPL) | 规定频率<br>(Measured Fre.) | 总失真+噪声<br>(Distortion and noise) | 接受限<br>(Limit) | 结论<br>(Pass/Fail) | $U_{rel}$<br>( $k=2$ )<br>(%) |
|---------------------------|-------------------------|----------------------------------|----------------|-------------------|-------------------------------|
| (dB)                      | (Hz)                    | (%)                              | (%)            |                   | (%)                           |
| 94                        | 1000                    | 0.69                             | ≤2.50          | P                 | 5.0                           |

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# 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 -18 to 93°C (0 to 200°F)  
Operating (Probe) -10 to 60°C (14 to 140°F)  
Model TA440 -20 to 60°C (-4 to 140°F)  
Storage

### 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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UK Tel: +44 149 4 459200 Germany Tel: +49 241 523030  
France Tel: +33 491 11 87 64

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### 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) for change in instrument temperature.

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

# Calibration Certificate of Air Flow Meter



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



Calibration Certificate No.: CC0222301

### 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. |
|-----------------------|--------------|---------------|--------------|------------------------|
| Air Velocity Monitor  | TSI          | AIRFLOW TA440 | TA4401706003 | AAST-FLOW-03           |

### Certificate Information

|                          |                 |                        |                        |
|--------------------------|-----------------|------------------------|------------------------|
| Date of Receipt:         | 11 January 2023 | Calibration Condition: | 23.5°C, 58%RH, 1003hPa |
| Date of Calibration:     | 13 January 2023 | Adjustment:            | N/A                    |
| Due Date of Calibration: | N/A             | Appearance:            | Good                   |
| Calibration Procedure:   | SOP-112         | Remark:                | N/A                    |

### Reference Equipment Identification

| Equipment Description | Model | Serial No.   | Expiration Date |
|-----------------------|-------|--------------|-----------------|
| Hot Wire Anemometer   | 9535  | T95351316004 | 11 August 2024  |

### Result of Calibration

#### Air flow rate – Error of indication

| Reference reading (L/min) | Measured reading (L/min) | Error (%) | Uncertainty (%FS) | Technical Requirement | Technical Reference Doc. |
|---------------------------|--------------------------|-----------|-------------------|-----------------------|--------------------------|
| 0.5                       | 0.51                     | 2.0       | 3.6               | ± 5 %                 | JIG 956-2013             |
| 1.0                       | 0.99                     | -1.0      | 3.6               | ± 5 %                 | JIG 956-2013             |
| 2.0                       | 2.03                     | 1.5       | 3.6               | ± 5 %                 | JIG 956-2013             |
| 5.0                       | 5.07                     | 1.4       | 3.6               | ± 5 %                 | JIG 956-2013             |

CT-AFR-01

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 shows in this calibration certificate relate only to the item calibrated, and the result only applies to the calibration item as received.

Calibrated By:

Wing Cheng

Checked and Approved By:

Warren Yeung

Company Chop:



Certificate Issue Date: 13 January 2023

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

CT-BEG-03

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

CC0222301  
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**Appendix K – Noise monitoring results and graphical presentation**



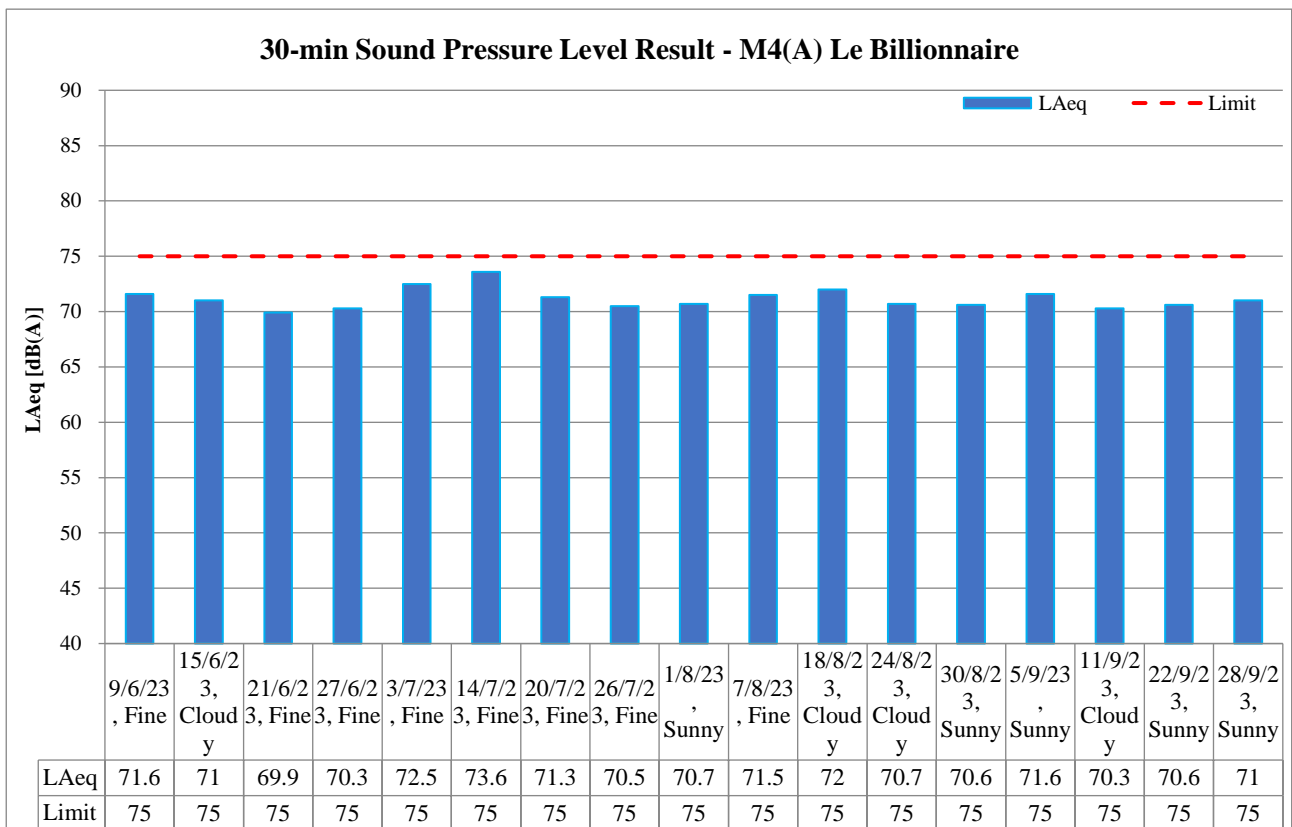
**M4(A) – Le Billionnaire**

| Date       | Temp (°C) | Wind Speed m/s | Weather | Measured Noise Level at M4(A), dB(A) |   |          |                  |                  |                  | Limit |    |
|------------|-----------|----------------|---------|--------------------------------------|---|----------|------------------|------------------|------------------|-------|----|
|            |           |                |         | Time                                 |   | Baseline | L <sub>Aeq</sub> | L <sub>A10</sub> | L <sub>A90</sub> |       |    |
| 05/09/2023 | 31.0      | 1.1            | Sunny   | 13:30                                | - | 14:00    | 69.5             | 71.6             | 72.5             | 68.6  | 75 |
| 11/09/2023 | 28.0      | 0.9            | Cloudy  | 9:20                                 | - | 9:50     | 69.5             | 70.3             | 71.9             | 69.5  | 75 |
| 22/09/2023 | 32.8      | 1.1            | Sunny   | 9:22                                 | - | 9:52     | 69.5             | 70.6             | 71.7             | 69.3  | 75 |
| 28/09/2023 | 32.5      | 1.3            | Sunny   | 9:15                                 | - | 9:45     | 69.5             | 71.0             | 72.1             | 69.2  | 75 |
|            |           |                |         |                                      |   |          |                  | Maximum          |                  | 71.6  |    |
|            |           |                |         |                                      |   |          |                  | Minimum          |                  | 70.3  |    |
|            |           |                |         |                                      |   |          |                  | Average          |                  | 70.9  |    |

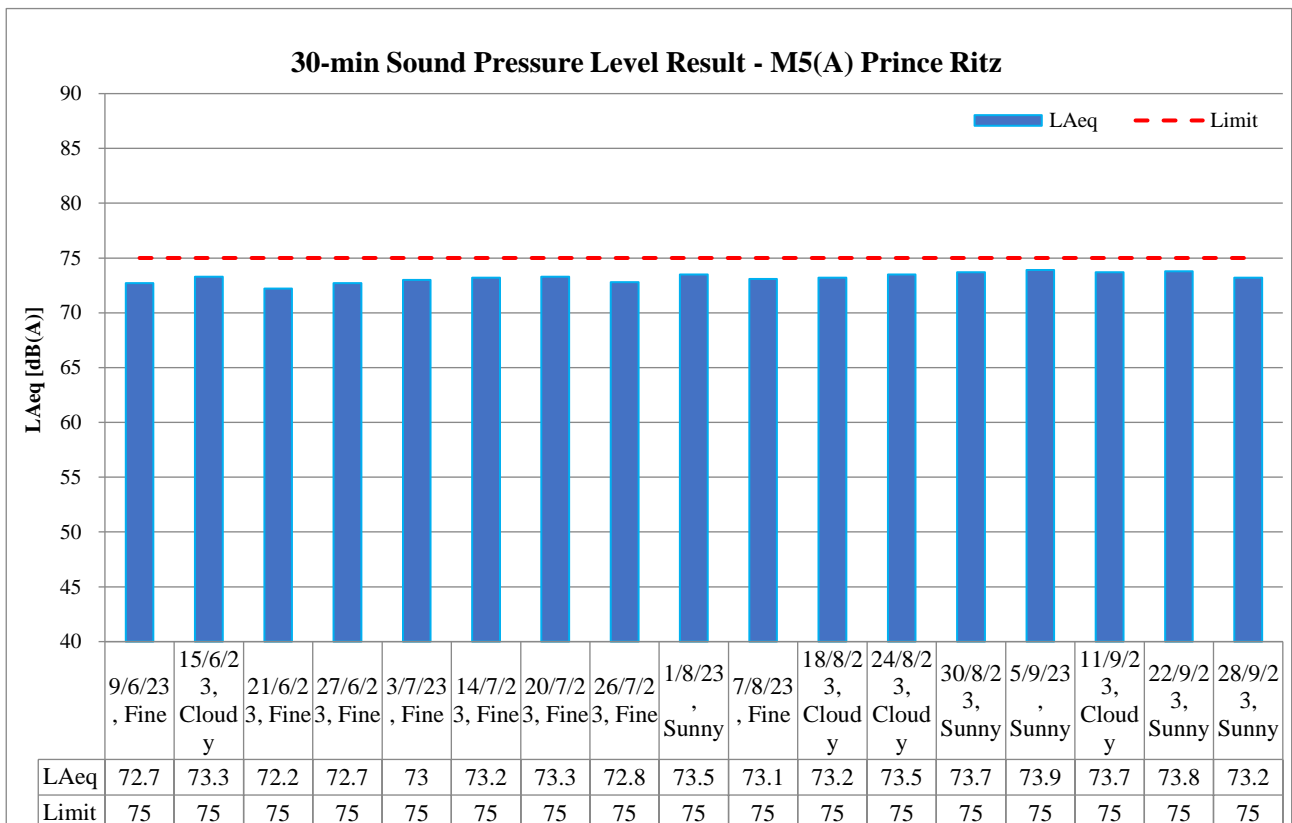
**M5(A) – Prince Ritz**

| Date       | Temp (°C) | Wind Speed m/s | Weather | Measured Noise Level at M5(A), dB(A) |   |          |                  |                  |                  | Limit |    |
|------------|-----------|----------------|---------|--------------------------------------|---|----------|------------------|------------------|------------------|-------|----|
|            |           |                |         | Time                                 |   | Baseline | L <sub>Aeq</sub> | L <sub>A10</sub> | L <sub>A90</sub> |       |    |
| 05/09/2023 | 31.0      | 0.7            | Sunny   | 14:45                                | - | 15:15    | 72.5             | 73.9             | 75.4             | 72.0  | 75 |
| 11/09/2023 | 28.0      | 0.9            | Cloudy  | 10:25                                | - | 10:55    | 72.5             | 73.7             | 74.9             | 71.8  | 75 |
| 22/09/2023 | 32.8      | 1.7            | Sunny   | 10:22                                | - | 10:52    | 72.5             | 73.8             | 75.3             | 71.9  | 75 |
| 28/09/2023 | 32.5      | 0.4            | Sunny   | 10:10                                | - | 10:40    | 72.5             | 73.2             | 74.7             | 71.1  | 75 |
|            |           |                |         |                                      |   |          |                  | Maximum          |                  | 73.9  |    |
|            |           |                |         |                                      |   |          |                  | Minimum          |                  | 73.2  |    |
|            |           |                |         |                                      |   |          |                  | Average          |                  | 73.7  |    |

**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 |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| Construction works for DCS  | ✓                | ✓        | ✓        | ✓        |
| Construction works for SB-01 tunnel   | ✓                | ✓        | ✓        |          |
| Construction of Underpinning of S14   |                  | ✓        | ✓        | ✓        |
| Construction of Retaining Wall Type 1 for S14                                     | ✓                | ✓        | ✓        | ✓        |
| Construction of Pile Cap for S14  |                  |          |          | ✓        |
| Construction works for SMH404 and SMH505  |                  |          |          | ✓        |
| Modification works for Rising Main chamber WOC1 and AVC2                          |                  |          |          | ✓        |
| ELS modification and Backfilling works for Retrieving Shaft at Sa Po Road         | ✓                | ✓        | ✓        |          |
| Pre-bored socket H-pile construction works for Slip Road S14                      | ✓                |          |          |          |
| GI and Grouting works for Slip Road S14   |                  | ✓        | ✓        |          |
| Erection of falseworks and working platform for decking of Elevated Walkway LW-02 | ✓                | ✓        | ✓        | ✓        |
| RTBM dismantle  |                  |          |          | ✓        |
| RC construction for decking of Elevated Walkway LW-02                             | ✓                | ✓        | ✓        | ✓        |
| RC construction for Subway KS10 Lift and Staircase                                | ✓                | ✓        | ✓        | ✓        |
| RC construction works for lift and staircase of LW-02                             | ✓                | ✓        | ✓        | ✓        |
| Renovation works for existing subways KS9, KS32 and KS10                          | ✓                | ✓        | ✓        | ✓        |
| Road and drain construction works for Road L16                                    | ✓                | ✓        | ✓        |          |
| Road and Drain Construction works for Road L16, Commercial Street and Road D1     |                  |          |          | ✓        |
| Road and drain construction works for Olympic Avenue                              | ✓                | ✓        | ✓        | ✓        |
| Assembly of RTBM at launching shaft for SB-01                                     | ✓                |          |          |          |

| Factors might affect the monitoring results   | Reporting Period |          |          |          |
|---|------------------|----------|----------|----------|
|   | Jun 2023         | Jul 2023 | Aug 2023 | Sep 2023 |
| 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.<br/>(The above actions should be taken within 2 working days after the exceedance is identified.)</p> |     | <p>exceedance until the exceedance is abated.<br/>(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 2023 (YEAR)**

| Month     | Actual Quantities of Inert C&D Materials Generated Monthly |                             |                          |  |                                     |                          |                          |                          | Actual Quantities of C&D Wastes Generated Monthly |                             |              |                |                            |
|-----------|--|-----------------------------|--------------------------|--|-------------------------------------|--------------------------|--------------------------|--------------------------|---|-----------------------------|--------------|----------------|----------------------------|
|           | Total Quantity Generated A + B                             | Broken Concrete Generated A | General fill Generated B | Broken Concrete Reused in the Contract | General Fill 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 '000m <sup>3</sup> ] | [in '000m <sup>3</sup> ] | [in '000kg]                                       | [in '000kg]                 | [in '000kg]  | [in '000kg]    | [in '000m <sup>3</sup> ]   |
| JAN       | 0.67   | 0.00                        | 0.67                     | 0.00                                   | 0.09                                | 0.00                     | 0.58                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| FEB       | 0.81   | 0.00                        | 0.81                     | 0.00                                   | 0.08                                | 0.00                     | 0.73                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| MAR       | 0.79   | 0.00                        | 0.79                     | 0.00                                   | 0.08                                | 0.00                     | 0.71                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| APR       | 1.18   | 0.00                        | 1.18                     | 0.00                                   | 0.09                                | 0.00                     | 1.09                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| MAY       | 1.01   | 0.00                        | 1.01                     | 0.00                                   | 0.09                                | 0.00                     | 0.92                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| JUNE      | 0.23   | 0.00                        | 0.23                     | 0.00                                   | 0.05                                | 0.00                     | 0.18                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| SUB-TOTAL | 4.69   | 0.00                        | 4.69                     | 0.00                                   | 0.48                                | 0.00                     | 4.21                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.06                       |
| JULY      | 0.30   | 0.00                        | 0.30                     | 0.00                                   | 0.06                                | 0.00                     | 0.24                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| AUG       | 0.90   | 0.00                        | 0.90                     | 0.00                                   | 0.06                                | 0.00                     | 0.84                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| SEPT      | 0.56   | 0.00                        | 0.56                     | 0.00                                   | 0.05                                | 0.00                     | 0.51                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.01                       |
| OCT       |  |                             |                          |  |                                     |                          |                          |                          |   |                             |              |                |                            |
| NOV       |  |                             |                          |  |                                     |                          |                          |                          |   |                             |              |                |                            |
| DEC       |  |                             |                          |  |                                     |                          |                          |                          |   |                             |              |                |                            |
| TOTAL     | 6.45   | 0.00                        | 6.45                     | 0.00                                   | 0.65                                | 0.00                     | 5.80                     | 0.00                     | 0.00  | 0.00                        | 0.00         | 0.00           | 0.09                       |

**Appendix O – Environmental Mitigation Implementation Schedule  
(EMIS)**

| EIA Ref              | Recommended Mitigation Measures   | Implementation                      |                                     |                          |        |
|----------------------|---|-------------------------------------|-------------------------------------|--------------------------|--------|
| Part B Water Quality |   | Not Observed                        | Yes                                 | No                       | Remark |
| S8.8                 | Exposed soil areas should be minimised to reduce the potential for increased siltation, contamination of runoff, and erosion. <del>Construction runoff related impacts associated with the above ground construction activities can be readily controlled through the use of appropriate mitigation measures which include use of sediment traps and adequate maintenance of drainage systems to prevent flooding and overflow</del>  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Construction site should be provided with adequately designed perimeter channel and pre-treatment facilities and proper maintenance. <del>The boundaries of critical areas of earthworks should be marked and surrounded by dykes or embankments for flood protection. Temporary ditches should be provided to facilitate runoff discharge into the appropriate watercourses, via a silt retention pond. Permanent drainage channels should incorporate sediment basins or traps and baffles to enhance deposition rates. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94.</del>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Construction works should be programmed to minimise surface excavation works during the rainy season (April to September). All exposed earth areas should be completed as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Sediment tanks of sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m <sup>3</sup> capacity, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. <del>The system capacity is flexible and able to handle multiple inputs from a variety of sources and particularly suited to applications where the influent is pumped.</del>   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Open stockpiles of construction materials (for examples, aggregates, sand and fill material) of more than 50 m <sup>3</sup> should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms. Particular attention should be paid to the control of silty surface runoff during storm events.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | Oil interceptors should be provided in the drainage system and regularly cleaned to prevent the release of oils and grease into the storm water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. <del>An adequately designed and located wheel washing bay should be provided at every site exit, and wash water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel wash bay to the public road should be paved with sufficient backfall toward the wheel wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.</del> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S8.8                 | <i>Drainage</i><br>On-site drainage system should be installed prior to the commencement of other construction activities. Sediment traps should be installed in order to minimise the sediment loading of the effluent prior to discharge into foul sewers. There should be no direct discharge of effluent from the site into the sea.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | All temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge should be adequately designed for the controlled release of storm flows. All sediment control measures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rain storms. The temporarily diverted drainage should be reinstated to its original condition when the construction work has finished or the temporary diversion is no longer required.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | All fuel tanks and storage areas should be provided with locks and be located on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank, to prevent spilled fuel oils from reaching the coastal waters of the Victoria Harbour WCZ  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | <i>Sewage Effluent</i><br>Construction work force sewage discharges on site are expected to be connected to the existing trunk sewer or sewage treatment facilities. The construction sewage may need to be handled by portable chemical toilets prior to the commission of the on-site sewer system. Appropriate numbers of portable toilets should be provided by a licensed contractor to serve the large number of construction workers over the construction site. The Contractor should also be responsible for waste disposal and maintenance practices.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | <i>Stormwater Discharges</i><br>Minimum distances of 100 m should be maintained between the existing or planned stormwater discharges and the existing or planned seawater intakes  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                 | <i>Debris and Litter</i><br>In order to maintain water quality in acceptable conditions with regard to aesthetic quality, contractors should be required, under conditions of contract, to ensure that site management  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |

| EIA Ref                                   | Recommended Mitigation Measures  | Implementation                      |                                     |                          |        |
|---|--|-------------------------------------|-------------------------------------|--------------------------|--------|
|   | is optimised and that disposal of any solid materials, litter or wastes to marine waters does not occur  |                                     |                                     |                          |        |
| S8.8                                      | Construction Works at or in Close Proximity of Storm Culvert or Seafront<br>The proposed works should preferably be carried out within the dry season where the flow in the drainage channel /storm culvert/ nullah is low.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | The use of less or smaller construction plants may be specified to reduce the disturbance to the bottom sediment at the drainage channel /storm culvert / nullah.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses during carrying out of the construction works.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Stockpiling of construction materials and dusty materials should be covered and located away from any water courses.   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S8.8                                      | Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nearby water receivers  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S8.8                                      | Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the waterfront, where practicable.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Mitigation measures to control site runoff from entering the nearby water environment should be implemented to minimize water quality impacts. Surface channels should be provided along the edge of the waterfront within the work sites to intercept the runoff.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Construction effluent, site run-off and sewage should be properly collected and/or treated.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Any works site inside the storm water courses should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props to prevent adverse impact on the storm water quality.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Silt curtain may be installed around the construction activities at the seafront to minimize the potential impacts due to accidental spillage of construction materials.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Proper shoring may need to be erected in order to prevent soil/mud from slipping into the storm culvert/drainage channel/sea.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S8.8                                      | Supervisory staff should be assigned to station on site to closely supervise and monitor the works   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| <b>Part C Construction Noise Impact</b>   |  | Not Observed                        | Yes                                 | No                       | Remark |
| S7.8                                      | Use of quiet PME, movable barriers for <del>Asphalt Paver, Breaker</del> , Excavator and <del>Hand-held breaker</del> and full enclosure for <del>Air Compressor, Bar Bender, Concrete Pump</del> , Generator and Water Pump   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S7.9                                      | Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. <del>Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program. Mobile plant, if any, should be sited as far away from NSRs as possible.</del>  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
|   | Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. <del>Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.</del>   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
|   | Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| <b>Part D Waste / Chemical Management</b> |  | Not Observed                        | Yes                                 | No                       | Remark |
| S5.2                                      | Prepare a Waste Management Plan, which becomes a part of the Environmental Management Plan, in accordance with the requirements stipulated in ETWB TC(W) No. 19/2005, approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
|   | Training of site personnel in site cleanliness, proper waste management and chemical waste handling procedures   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
|   | Provision of sufficient waste disposal points and regular collection for waste. Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
|   | Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. Separation of chemical wastes for special handling and appropriate treatment  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S9.5                                      | 1)Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site<br>2)Training of site personnel in proper waste management and chemical waste handling procedures<br>3)Provision of sufficient waste disposal points and regular collection for disposal<br>4)Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers<br>5)A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites) | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |

| EIA Ref                              | Recommended Mitigation Measures  | Implementation                      |                                     |                          |        |
|--------------------------------------|--|-------------------------------------|-------------------------------------|--------------------------|--------|
| S9.5                                 | Waste Reduction Measures<br>1) Sort C&D waste from demolition of the remaining structures to recover recyclable portions such as metals<br>2) Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal<br>3) Encourage collection of aluminum cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force<br>4) Any unused chemicals or those with remaining functional capacity should be recycled<br>5) Proper storage and site practices to minimize the potential for damage or contamination of construction materials   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S9.5                                 | Construction and Demolition Material<br>Mitigation measures and good site practices should be incorporated into contract document to control potential environmental impact from handling and transportation of C&D material. The mitigation measures include:<br>1) <del>Where it is unavoidable to have transient stockpiles of C&amp;D material within the Project work site pending collection for disposal, the transient stockpiles should be located away from waterfront or storm drains as far as possible</del><br>2) <del>Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric</del><br>3) <del>Skip hoist for material transport should be totally enclosed by impervious sheeting</del><br>4) Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site<br>5) The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores<br>6) <del>The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle</del><br>7) <del>All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet</del> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S9.5                                 | When delivering inert C&D material to public fill reception facilities, the material should consist entirely of inert construction waste and of size less than 250mm or other sizes as agreed with the Secretary of the Public Fill Committee. In order to monitor the disposal of the surplus C&D material at the designed public fill reception facility and to control fly tipping, a trip-ticket system as stipulated in the ETWB TCW No. 31/2004 "Trip Ticket System for Disposal of Construction   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S9.5                                 | Chemical Waste<br>After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i>  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| <b>Part E Landscape &amp; Visual</b> |  | Not Observed                        | Yes                                 | No                       | Remark |
| S13.9                                | CM1 - All existing trees should be carefully protected during construction.<br><del>CM2 - Trees unavoidably affected by the works should be transplanted where practical. Detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBC 2/2004 and 3/2006. Final locations of transplanted trees should be agreed prior to commencement of the work.</del><br>CM3 - Control of night-time lighting.<br>CM4 - Erection of decorative screen hoarding.  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| <b>Part F Air Quality</b>            |  | Not Observed                        | Yes                                 | No                       | Remark |
| S6.8                                 | <del>Stockpiling site(s) should be lined with impermeable sheeting and bunded.</del> Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S6.8                                 | Misting for the dusty material should be carried out before being loaded into the vehicle.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S6.8                                 | Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S6.8                                 | The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S6.8                                 | <del>The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways inside the site. On-site unpaved roads should be compacted and kept free of loose materials</del>   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S6.8                                 | Vehicle washing facilities should be provided at every vehicle exit point  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |        |
| S6.8                                 | The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |
| S6.8                                 | <del>Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet.</del>  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |        |

| EIA Ref | Recommended Mitigation Measures  | Implementation           |                                     |                          |  |
|---------|--|--------------------------|-------------------------------------|--------------------------|--|
| S6.8    | Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| S6.8    | Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.                             | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| S6.5    | 8 times daily watering of the work site with active dust emitting activities.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |

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



**Reporting Month: September 2023**

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

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

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