



CONTRACT NO: HY/2020/08

FLYOVER FROM KWAI TSING INTERCHANGE
UPRAMP TO KWAI CHUNG ROAD
UNDER ENVIRONMENTAL PERMIT NO. EP-541/2017/A

MONTHLY ENVIRONMENTAL MONITORING & AUDIT REPORT

SEPTEMBER 2021

CLIENTS:

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DATE:

15 October 2021



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Date: 15th October 2021

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Dear Sirs,

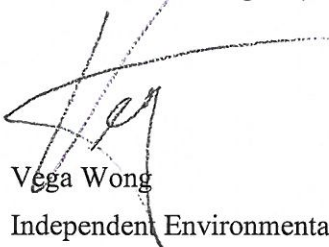
Contract No. HY/2020/08
Flyover From Kwai Tsing Interchange Upramp to Kwai Chung Road
Independent Environmental Checker

Monthly Environmental Monitoring and Audit Report for September 2021

We refer to the Contract No. HY/2020/08 Flyover From Kwai Tsing Interchange Upramp to Kwai Chung Road under Environmental Permit No. EP-541/2017/A Monthly Environmental Monitoring and Audit Report certified by the Environmental Team. We hereby verified the Monthly Environmental Monitoring and Audit Report for September 2021 in accordance with the Condition 3.4 of EP-541/2017/A.

Should you have any query, please feel free to contact the undersigned at 2877 3122 (vegawong@nt.com.hk).

Yours Sincerely,
For and on behalf of
Nature & Technologies (HK) Limited



Vega Wong
Independent Environmental Checker

c.c.

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EXECUTIVE SUMMARY

- i. This is the Environmental Monitoring and Audit (EM&A) Monthly Report – [September 2021](#) of Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road under Environmental Permit no. EP-541/2017/A (Hereafter as “the Project”). The construction works of the Project was commenced on 20 September 2021. This is the [1st](#) EM&A report presenting the environmental monitoring findings and information recorded during the period of [20 September 2021 to 30 September 2021](#). The cut-off date of reporting is at the end of each reporting month.

- ii. In the reporting month, the principal work activities conducted are as follow:
 - [General site clearance](#)
 - [Tree felling works](#)
 - [Excavation of inspection pits for ground investigation and existing utilities](#)
 - [Ground investigation \(predrill\) works prior to piling works](#)
 - [Implementation of TTA](#)

Air Quality Monitoring

- iii. 1-hour and 24-hour Total Suspended Particulates (TSP) monitoring was conducted at two monitoring station. 24-hour TSP shall be sampled at least once in every 6 days, while sampling for 1-hour TSP shall be at least 3 times in every 6 day in the reporting month.
- iv. [No action or limit level exceedance was recorded in this reporting period.](#)

Noise Monitoring

- v. Noise monitoring was conducted at one noise monitoring station once per week in the reporting month.
- vi. [No action or limit level exceedance was recorded in this reporting period.](#)

Site Inspections and Audit

- vii. The [Environmental Team \(ET\)](#) conducted [weekly site inspections on 20 and 28 September 2021](#) and [biweekly landscape inspection on 28 September 2021](#). IEC attended the joint site inspection on [20 September 2021](#). No non-compliance was found during the site inspection while reminders on environmental measures were recommended.

Complaints, Notifications of Summons and Successful Prosecutions

- viii. [No](#) environmental complaint, notification of summons and successful prosecution regarding the construction works was recorded in the reporting period.



Reporting Changes

- ix. There are no particular reporting changes.

Future Key Issues

- x. In coming reporting 3 months, the scheduled construction activities and the recommended mitigation measures are listed as follows:

Key Construction Works	Recommended Mitigation Measures
<ul style="list-style-type: none">• Tree transplant & preservation works• Excavation of inspection pits for ground investigation and existing utilities• Ground investigation (predrill) works prior to piling works• Implementation of TTA• Temporary road diversion at Container Port Road South• Diversion of existing drainage & watermain works• Demolition of existing Public Works Regional Laboratory• Piling works for Foot Bridge & Bridge H	<ul style="list-style-type: none">• Implement proper dust mitigation measures on dusty surface and stockpiles• Implement proper measures to prevent excavated material, silt or debris being deposited or washed into existing drainage systems and waterbodies• Implement proper noise mitigation measures to prevent potential noise nuisances to nearby sensitive receivers• Provision of protection to ensure no runoff out of site area or direct discharge into public drainage system

1 Introduction

1.1 Scope of the Report

1.1.1. Lam Environmental Services Limited (LES) has been appointed to work as the Environmental Team (ET) under Environmental Permit (EP) no. EP-541/2017/A to implement the Environmental Monitoring and Audit (EM&A) programme as stipulated in the EM&A Manual of the approved Environmental Impact Assessment (EIA) Report for Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road (Register No.: AEIAR-190/2015).

1.1.2. In accordance with Clause 3.4 stated in EP-541/2017/A, 3 hard copies and 3 electronic copies of Monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of each reporting month.

1.1.3. According to Section 10.3.1 of the Project EM&A Manual, the Monthly EM&A Report should be submitted within 10 working days of the end of each reporting month, with the first report due in the month after construction commences.

1.2 Structure of the Report

Section 1 **Introduction** – details the scope and structure of the report.

Section 2 **Project Background** – summarizes background and scope of the project, site description, project organization and contact details of key personnel during the reporting period.

Section 3 **Status of Regulatory Compliance** – summarizes the status of valid Environmental Permits / Licenses during the reporting period.

Section 4 **Monitoring Requirements** – summarizes all monitoring parameters, monitoring methodology and equipment, monitoring locations, monitoring frequency, criteria and respective event and action plan and monitoring programmes.

Section 5 **Monitoring Results** – summarizes the monitoring results obtained in the reporting period.

Section 6 **Compliance Audit** – summarizes the auditing of monitoring results, all exceedances environmental parameters.

Section 7 **Environmental Site Audit** – summarizes the findings of weekly site



inspections undertaken within the reporting period, with a review of any relevant follow-up actions within the reporting period.

Section 8 ***Complaints, Notification of summons and Prosecution*** – summarizes the cumulative statistics on complaints, notification of summons and prosecution

Section 9 ***Conclusion***

2 Project Background

2.1 Background

- 2.1.1. In order to cater the future traffic growth and prevent traffic congestion in the future during peak traffic flow hour at Tsuen Wan Road (TWR) near Kwai Tsing Interchange (KT I/C), an additional southbound lane (a separate viaduct) is introduced on TWR and connected to the existing lane on the west side of Kwai Chung Road (KCR). Widening of existing carriageway is also proposed to improve the road section to cope with the future traffic growth.
- 2.1.2. Based on the current design, the remaining capacity available on the two segregated KCR carriageways will be utilised for this proposed flyover. Location and layout of the proposed road works is shown in [Figure 1.1](#).
- 2.1.3. The Project consists of a designated project under Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) which is Item A.8 – *A road or railway bridge more than 100m in length between abutments*.
- 2.1.4. The major components of the Project under Environmental Permit (EP) (EP No. EP-541/2017/A) comprises: (i) an additional southbound lane from the west side of elevated Tsuen Wan Road to at-graded Kwai Chung Road; (ii) a widened section on the east side of elevated Tsuen Wan Road connecting Kwai Tsing Interchange upramp; (iii) modification of Kwai Chung Road; (iv) provision of noise mitigation measures; (v) demolition and re-provision of the existing footbridge NF303; and (vi) ancillary works including other associated road works, utilities diversion, street furniture and traffic aids, public lighting, drainage, landscaping, electrical and mechanical works.

2.2 Project Organization and Contact Personnel

- 2.2.1 Highways Department is the overall project controllers for the Project. For the construction phase of the Project, Project Engineer / Supervisor, Contractor(s), Environmental Team and Independent Environmental Checker are appointed to manage and control environmental issues.
- 2.2.2 The project organization and lines of communication with respect to environmental protection works are shown in [Figure 2.1](#). Key personnel and contact particulars are summarized in **Table 2.1**:

Table 2.1 Contact Details of Key Personnel

Party	Role	Post	Name	Contact No.	Contact Fax
Highways Department (HyD)	Project Proponent	Chief Engineer	Ms. Doris Yau	3903 6888	3188 3418
WSP (Asia) Limited	Supervisor's Representative	Resident Engineer	Mr. Eric Hon	2320 2012	2320 2166
Peako Engineering Co. Limited	Contractor	Site Agent	Mr. TS Lam	2398 8001	2398 8301
		Deputy Site Agent	Mr. SH Shea		
		Deputy Construction Manager / Environmental Officer	Mr. CY Wong		
Nature & Technologies (HK) Limited	Independent Environmental Checker (IEC)	Independent Environmental Checker (IEC)	Mr. Vega Wong	2877 3122	2511 0922
Lam Environmental Services Limited	Environmental Team (ET)	Environmental Team Leader (ETL)	Mr. Raymond Dai	2882 3939	2882 3331

2.3 Construction Activities

2.3.1 In the reporting month, the principal work activities conducted are as follow.

- General site clearance
- Tree felling works
- Excavation of inspection pits for ground investigation and existing utilities
- Ground investigation (predrill) works prior to piling works
- Implementation of TTA

2.3.2 In coming reporting 3 months, the scheduled construction activities are listed as follows:

- Tree transplant & preservation works
- Excavation of inspection pits for ground investigation and existing utilities
- Ground investigation (predrill) works prior to piling works
- Implementation of TTA
- Temporary road diversion at Container Port Road South
- Diversion of existing drainage & watermain works



- Demolition of existing Public Works Regional Laboratory
- Piling works for Foot Bridge & Bridge H

3 Status of Regulatory Compliance

3.1 Status of Environmental Licensing and Permitting under the Project

3.1.1. A summary of the current status on licences and/or permits on environmental protection pertinent to the Project is shown in **Table 3.1**.

Table 3.1 Summary of the current status on licences and/or permits on environmental protection pertinent to the Project

Permits and/or Licences	Permit. No. / Account No.	Valid From	Expiry Date	Status
Notification pursuant to Air Pollution Control (Construction Dust) Regulation	Acknowledged by EPD on 21 June 2021.			
Environmental Permit	EP-541/2017/A	19 Nov 2020	N/A	Valid
Billing Account for Disposal of Construction Waste	7040908	14 July 2021	End of the Project	Valid
Registration as a Chemical Waste Producer	8834-326-P3431-01	08 July 2021	N/A	Valid
Water Pollution Ordinance Licence	Under liaison with EPD Regional Office			
Construction Noise Permit	N/A			

3.1.2. Implementation status of the recommended mitigation measures during this report month is presented in [Appendix 3.1](#).

3.2 Status of Submission under the EP-541/2017/A

3.2.1. A summary of the current status on submission under EP-541/2017/A is shown in **Table 3.2**.

Table 3.2 Summary of submission status under EP-541/2017/A

EP Condition	Submission	Date of First Submission	Date of Latest Submission
Condition 1.12	Notification of Commencement Date of Works	27 July 2021	26 August 2021
Condition 2.3	Submission of Management Organization of Main Construction Companies	2 July 2021	2 July 2021
Condition 2.4	Submission of Landscape Plan	26 July 2021	26 July 2021
Condition 2.5	Submission of Traffic Noise Mitigation Plan	26 July 2021	20 August 2021
Condition 3.3	Submission of Baseline Monitoring Report	6 September 2021	6 September 2021

4 Monitoring Requirements

4.2 Noise Monitoring

NOISE MONITORING STATIONS

4.1.1. The noise monitoring stations for the Project are listed and shown in **Table 4.1** and **Figure 4.1**. **Appendix 4.1** shows the established Action/Limit Levels for environmental monitoring.

Table 4.1 Noise Monitoring Station

Monitoring Station ID	Noise Sensitive Receivers	Measurement Type	Monitoring Location
NMC01	Lai King Catholic Secondary School	Free-Field	Roof Floor
NMC02	Fung King House	Free-Field	Roof Floor
NMC03	HKEAA-Lai King Assessment Centre	Free-Field	Ground Floor

NOISE MONITORING PARAMETERS, FREQUENCY AND DURATION

4.1.2. For daytime construction work on normal weekdays (0700-1900 Monday to Saturday), one set of 30-min measurement shall be carried out at each NMS every week. Measurement procedures shall be referred to the Noise Control Ordinance-TM. Construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq, 30min}$ shall be used as the monitoring parameter. As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

MONITORING EQUIPMENT

4.1.3. Noise monitoring was performed using sound level meter at the designated monitoring locations. The sound level meters shall comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator shall be deployed to check the sound level meters at a known sound pressure level. Brand and model of the equipment is given in **Table 4.2**.

Table 4.2 Noise Monitoring Equipment

Equipment	Brand and Model	Series Number
Integrated Sound Level Meter	LxT1	0004797
Acoustic Calibrator	HLES-02	2019612870

4.1.4. The calibration certificates of the noise monitoring equipment are attached in **Appendix 4.2**.

SAMPLING PROCEDURE AND MONITORING EQUIPMENT

4.1.5. Monitoring Procedure

(a) The monitoring station shall normally be at a point 1m from the exterior of the sensitive

receiver's building façade and be at a position 1.2m above the ground.

- (b) Façade measurements were made at the monitoring locations. For free-field measurement, a correction factor of +3 dB (A) would be applied.
- (c) The battery condition was checked to ensure the correct functioning of the meter.
- (d) Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
- (e) Frequency weighting: A, Time weighting: Fast, Measurement time set: continuous 5 mins
- (f) Prior and after to the noise measurement, the meter was checked using the acoustic calibrator for 94dB (A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than ± 1 dB (A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.

4.1.6. Maintenance and Calibration

- (a) The microphone head of the sound level meter was cleaned with soft cloth at regular intervals.
- (b) The sound level meter and calibrator were calibrated at yearly intervals.

CONSTRUCTION NOISE LEVEL

- 4.1.1. The construction noise level refers the corrected noise level based on the calculated difference between SPL of the Measured Noise Level and the SPL of the Baseline Noise Level. In the event of the Baseline Noise Level exceeds the Measured Noise Level, no correction would be applied and the Construction Noise Level would be indicated as below baseline noise level (<BL).

EVENT AND ACTION PLAN

- 4.1.7. Noise Standards for Daytime Construction Activities are specified under EIAO-TM. The Action and Limit levels for construction noise are defined in **Table 4.3** and [Appendix 4.1](#). Should non-compliance of the criteria occurs, action in accordance with the Event and Action Plan in [Appendix 6.1](#) shall be carried out.

Table 4.3 Action and Limit Level for Noise Monitoring

Monitoring Station	Action Level	Limit Level (dB(A))		
		0700-1900 hrs on normal weekdays	0700-2300 hrs on holidays (including Sundays); and 1900-2300 hrs on all days ²	2300-0700 hrs of all days
NMC01	When one documented complaint is received	65 / 70 ¹	60 / 65 / 70 ³	45 / 50 / 55 ³
NMC02		75		45 / 50 / 55 ³
NMC03		65 / 70 ¹		45 / 50 / 55 ³

Remark 1: Limit level of NMC01 and NMC03 reduce to 65 dB (A) during examination periods if any.

Remark 2: Construction noise during restricted hours is under the control of Noise Control Ordinance Limit Level to be selected based on Area Sensitivity Rating.

Remark 3: Limit Level for restricted hour monitoring shall act as reference level only. Investigation would be conducted on CNP compliance if exceedance recorded during restricted hour noise monitoring period.

4.2 Air Monitoring

AIR QUALITY MONITORING STATIONS

4.2.1. The air monitoring stations for the Project are listed and shown in **Table 4.4** and **Figure 4.2**. **Appendix 4.1** shows the established Action/Limit Levels for environmental monitoring.

Table 4.4 Air Quality Monitoring Station

Monitoring Station	Air Sensitive Receivers	Monitoring Location
AMC01	Lai King Catholic Secondary School	Roof Floor
AMC02	Fung King House	Roof Floor
AMC03A ¹	Ming King House	Roof Floor

Remark 1: Due to limited location access, lack of power supply and land availability problem for setting up air quality monitoring stations at HKEAA-Lai King Assessment Centre (AMC03) under EM&A manual, alternative monitoring location at Ming King House was proposed in accordance with Section 2.5.3 of the EM&A manual and proposal for alternative monitoring location was submitted to EPD for approval.

AIR MONITORING PARAMETERS, FREQUENCY AND DURATION

4.2.2. One-hour and 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality.

4.2.3. 24-hour TSP shall be sampled at least once in every 6 days, while sampling for 1-hour TSP shall be at least 3 times in every 6 days when the highest dust impact takes place.

SAMPLING PROCEDURE AND MONITORING EQUIPMENT

4.2.4. 24-hour TSP Measuring Installation (HVS)

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
- (b) No furnace or incinerator flues were nearby.
- (c) Airflow around the sampler was unrestricted
- (d) 0.6 - 1.7 m³ per minute adjustable flow range
- (e) Equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operation;
- (f) Installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- (g) Equipped with a shelter to protect the filter and sampler;
- (h) Capable of operating continuously for a 24-hour period.

4.2.5. 24-hour Measuring Procedures

- (a) The power supply was checked to ensure the HVS works properly.
- (b) The filter holder and the area surrounding the filter were cleaned.
- (c) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- (d) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.

- (e) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
- (f) Then the shelter lid was closed and was secured with the aluminum strip.
- (g) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- (h) A new flowrate record sheet was set into the flow recorder.
- (i) The flow rate of the HVS was checked and adjusted at around 1.2 m³ /min. The range specified in the EM&A Manual was between 0.6-1.7 m³ /min.
- (j) The programmable timer was set for a sampling period of 24 hrs + 1 hr, and the starting time, weather condition and the filter number were recorded.
- (k) The initial elapsed time was recorded.
- (l) At the end of sampling, the sampled filter was removed carefully and folded in half-length so that only surfaces with collected particulate matter were in contact.
- (m) It was then placed in a clean plastic envelope and sealed.
- (n) All monitoring information was recorded on a standard data sheet.
- (o) Filters were sent to laboratory for further testing.

4.2.6. 1-hour Measuring Procedures

- (a) Check the calibration period of portable direct reading dust meter prior to monitoring (The direct reading dust meter was calibrated at 2-years interval and checked with High Volume Sampler (HVS) yearly, details refer to Section 2.5.4)
- (b) Record the site condition near / around the monitoring stations.
- (c) Install the portable direct reading dust meter to the monitoring location.
- (d) Slide the power switch to turn the power on.
- (e) Check of portable direct reading dust meter to ensure the equipment operation in normal condition.
- (f) Select the period of measurement to 60mins.
- (g) Check and set the correct time.
- (h) Select the appropriate unit display for the equipment.
- (i) Slide the power switch to turn the power off when the monitoring period ended (3 times 1 hour TSP monitoring per day).
- (j) Uninstall the portable direct reading dust meter
- (k) Collected the sampled data for analysis.

Remark: Procedures (c) to (h) may be different subject to the brands and models of portable direct reading dust.

LABORATORY MEASUREMENT / ANALYSIS

- 4.2.7. A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited or other internationally accredited laboratory.

- 4.2.8. Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.
- 4.2.9. After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.
- 4.2.10. Maintenance and Calibration
- (a) The direct reading dust meter was calibrated at 2-years interval and checked with High Volume Sampler (HVS) yearly to determine the accuracy and validity of the results measured.
 - (b) Checking of direct reading dust meter will be carried out in order to determine the conversion factor between the direct reading dust meter and the standard equipment, HVS. The comparison check is to be considered valid based on correlation coefficient checked by HOKLAS laboratory
- 4.2.11. High Volume Sampler (HVS – Model TE-5170) completed with the appropriate sampling inlets were installed for the 24-hour TSP sampling. 1-hour TSP air quality monitoring was performed by using portable direct reading dust meters at each designated monitoring station, which was verified by IEC and approved by the Engineer's Representative (ER) on 16 July 2021 and 22 July 2021, respectively according to Section 2.2.2 and 2.3.6 of the Project EM&A Manual. The brand and model of the equipment are given in **Table 4.5**.

Table 4.5 Air Quality Monitoring Equipment

Equipment	Brand and model	Series Number
Portable direct reading dust meter	Met One Aerocet 831	R14332 R22586 W15449 Y23154
High Volume Sampler	TE-5170	HVS004 HVS014 HVS015
Wind Anemometer	YiGu	YGY-FSXY1

- 4.2.12. The calibration certificates of the air quality monitoring equipment are attached in [Appendix 4.2](#).

WIND DATA

- 4.2.13. Wind data monitoring equipment was set up at roof floor (about 15/F) of Fung King House for logging wind speed and wind direction such that the wind sensors were clear of obstructions or turbulence caused by building. The wind data monitoring equipment was re-calibrated at least

once every six months and the wind directions were divided into 16 sections of 22.5 degrees each. The wind data obtained from the on-site wind station during the reporting period is provided in [Appendix 4.3](#).

EVENT AND ACTION PLAN

4.2.14. The Action and Limit levels for construction air quality are defined in **Table 4.6** and [Appendix 4.1](#). Should non-compliance of the air quality criteria occur, action in accordance with the Event and Action Plan in [Appendix 6.1](#) shall be carried out.

Table 4.6 Action and Limit Level for Air Quality Monitoring

Parameter	Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
24-hour TSP Level	AMC01	144.8	260.0
	AMC02	144.3	260.0
	AMC03A	144.3	260.0
1-hour TSP Level	AMC01	256.2	500.0
	AMC02	256.7	500.0
	AMC03A	259.3	500.0

5 Monitoring Results

- 5.0.1 The environmental monitoring will be implemented based on the division of works areas of each designed projects. Overall layout showing work areas and monitoring stations is shown in [Figure 2.1](#) and [Figure 4.1 – 4.2](#) respectively.
- 5.0.2 The environment monitoring schedules for reporting month and coming month are presented in [Appendix 5.1](#).

5.1 Noise Monitoring Results

- 5.1.1 Noise monitoring results measured in this reporting period are reviewed and summarized. Details of noise monitoring results and graphical presentation can be referred in [Appendix 5.2](#).
- 5.1.2 [No action or limit level exceedance was recorded in this reporting month.](#)

5.2 Air Monitoring Results

- 5.2.1 Air quality monitoring results measured in this reporting period are reviewed and summarized. Details of air monitoring results and graphical presentation can be referred in [Appendix 5.3](#).
- 5.2.2 [No action or limit level exceedance was recorded in this reporting month.](#)

5.3 Waste Management

- 1.1.1 The quantities of waste for disposal in the Reporting Period are summarized in **Table 5.1** and **Table 5.2**. The Monthly Summary Waste Flow Table is shown in [Appendix 5.4](#). Whenever possible, materials were reused on-site as far as practicable.

Table 5.1 Summary of Quantities of Inert C&D Materials

Waste Type	Quantity (this month)	Quantity (Project commencement to the end of last month)	Cumulative Quantity-to-Date
Hard Rock and Large Broken Concrete (Inert) (in '000m ³)	0	0	0
Reused in this Contract (Inert) (in '000m ³)	0	0	0

Waste Type	Quantity (this month)	Quantity (Project commencement to the end of last month)	Cumulative Quantity-to-Date
Reused in other Projects (Inert) (in '000m ³)	0	0	0
Disposal as Public Fill (Inert) (in '000m ³)	0	0	0

Table 5.2 Summary of Quantities of C&D Wastes

Waste Type	Quantity (this month)	Quantity (Project commencement to the end of last month)	Cumulative Quantity-to-Date
Metals (in '000kg)	0	0	0
Paper / Cardboard Packing (in '000kg)	0	0	0
Plastics (in '000kg)	0	0	0
Chemical Wastes (in '000kg)	0	0	0
General Refuses (in '000m ³)	0.02	0.025	0.045

6 Compliance Audit

6.1.1 The Event Action Plan for construction noise, air quality and water quality are presented in [Appendix 6.1](#).

6.1.2 The summary of exceedance is presented in [Appendix 6.2](#).

6.2 Noise Monitoring

6.2.1 No action or limit level exceedance was recorded in this reporting period.

6.3 Air Quality Monitoring

6.3.1 No action or limit level exceedance was recorded in this reporting period.

6.4 Review of the Reasons for and the Implications of Non-compliance

6.4.1 No environmental non-compliance was recorded in the reporting month.

6.5 Summary of action taken in the event of and follow-up on non-compliance

6.5.1 There was no particular action taken since no non-compliance was recorded in the reporting period.

7 Environmental Site Audit

- 7.0.1. Within this reporting month, weekly environmental site audits were conducted on [20 and 28 September 2021](#). Biweekly landscape site audits were conducted on [28 September 2021](#). IEC attended the joint site inspection on [20 September 2021](#).
- 7.0.2. No non-compliance was found during the site inspection while reminders on environmental measures were recommended. Results and findings of these inspections in this reporting month are listed below in **Table 7.1**.

Table 7.1 Summary of Environmental Inspections

Item	Date	Reminder(s)/ Observation(s)	Action taken by Contractor	Outcome
20210920_1	20 Sep 2021	Environmental permit shall be properly displayed at the site entrance.	As observed on 28 Sep 2021 , the environmental permit has been displayed at site entrance.	Closed
20210920_2	20 Sep 2021	Stockpiles shall be properly covered with tarpaulin to avoid dust impact.	As observed on 28 Sep 2021 , the concerned stockpiles have been cleared.	Closed
20210928_1	28 Sep 2021	Dusty stockpiles shall be covered with tarpaulin or sprayed with water to suppress dust impact.	As observed on 07 Oct 2021 , the concerned stockpiles have been covered with tarpaulin.	Closed

8. Complaints, Notification of Summons and Prosecution

- 8.0.1. No environmental complaint, notification of summons and successful prosecution regarding construction works was recorded in the reporting period.
- 8.0.2. The details of cumulative complaint log and updated summary of complaints are presented in [Appendix 8.1](#).
- 8.0.3. Cumulative statistic on complaints and successful prosecutions are summarized in **Table 8.1** and **Table 8.2** respectively.

Table 8.1 Cumulative Statistics on Complaints

Reporting Period	No. of Complaints
September 2021	0
Project commencement to the end of last reporting month	-
Total	0

Table 8.2 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions this month (Offence Date)	Cumulative No. Project-to-Date
Air	-	0	0
Noise	-	0	0
Water	-	0	0
Waste	-	0	0
Total	-	0	0

9. Conclusion

- 9.0.1. The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alterations to the programme proposed were made in response to changing circumstances.
- 9.0.2. Mitigation measures according to the environmental mitigation implementation schedule and the EIA were generally implemented by the Contractor. Hence, the EM&A programme was considered effective and shall be maintained.
- 9.0.3. The scheduled construction activities and the recommended mitigation measures for the coming 3 months are listed in **Table 9.1**. The construction programmes of the Project are provided in [Appendix 9.1](#).

Table 9.1 Construction Activities and Recommended Mitigation Measures in Coming Reporting 3 Months

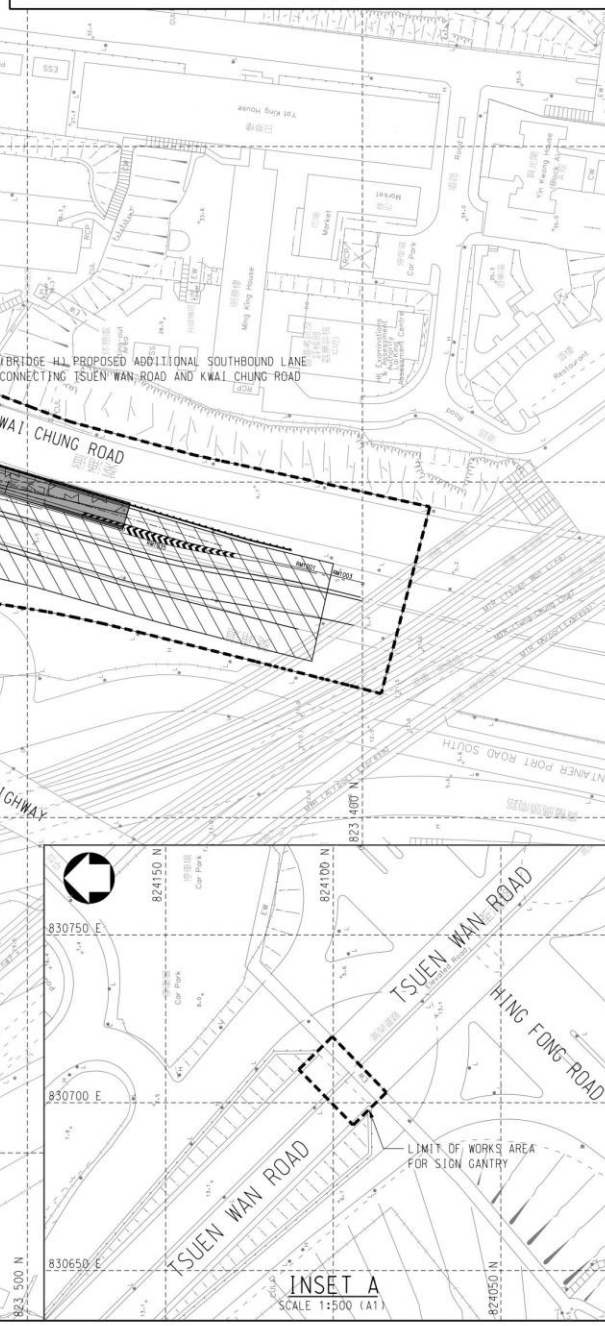
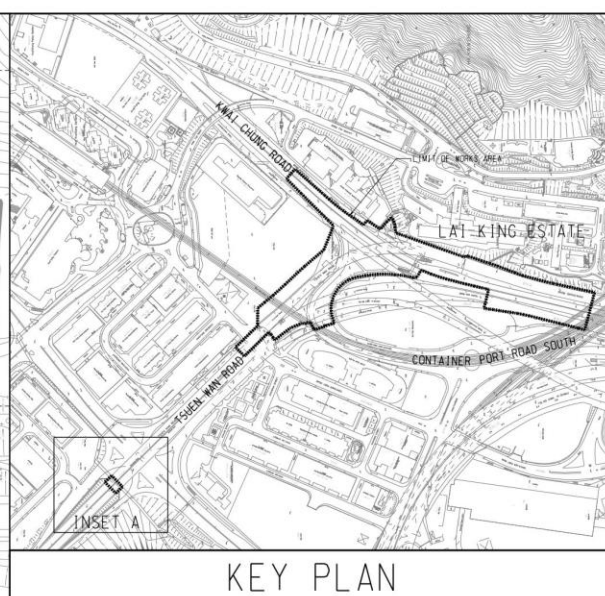
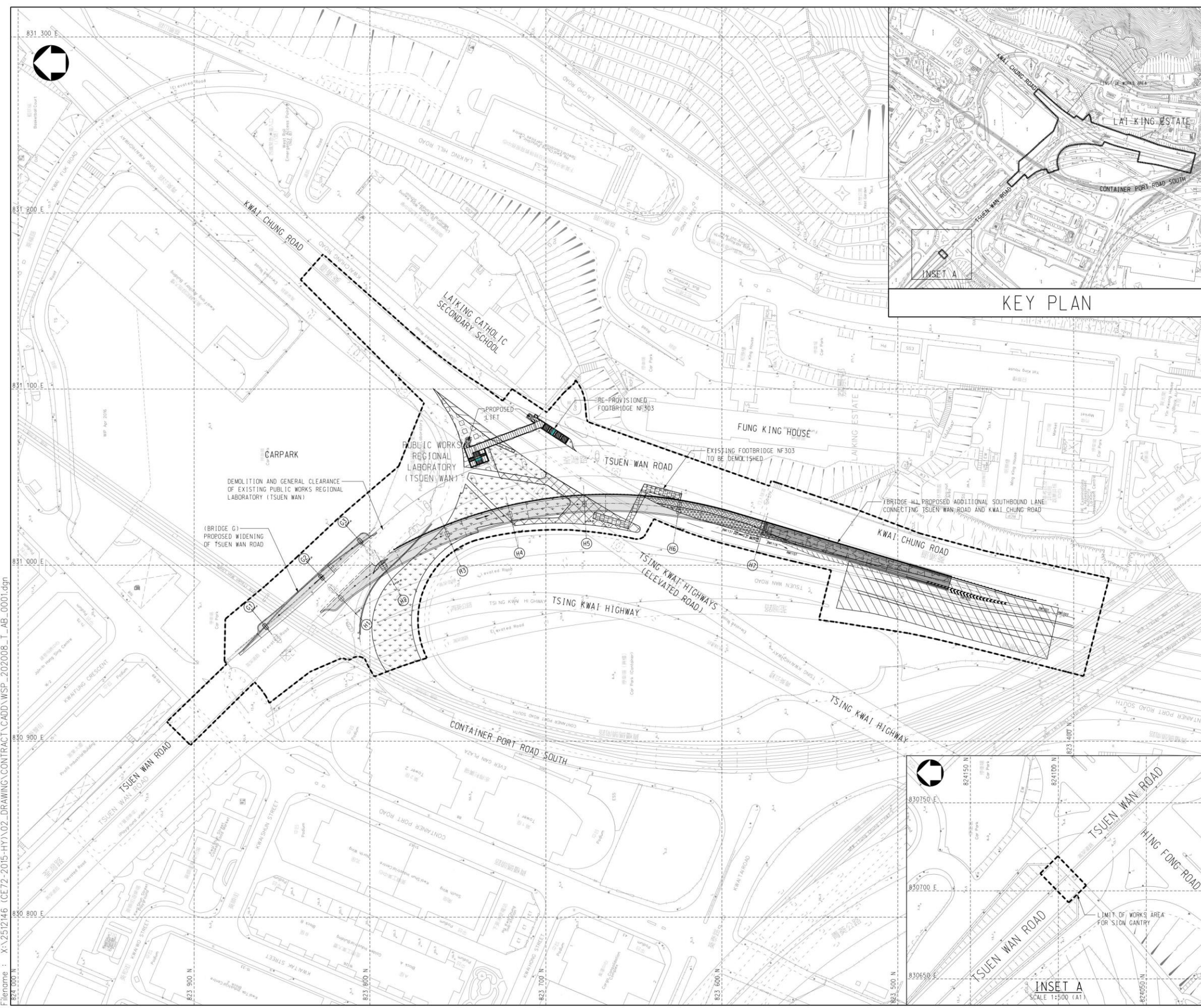
Key Construction Works	Recommended Mitigation Measures
<ul style="list-style-type: none"> • Tree transplant & preservation works • Excavation of inspection pits for ground investigation and existing utilities • Ground investigation (predrill) works prior to piling works • Implementation of TTA • Temporary road diversion at Container Port Road South • Diversion of existing drainage & watermain works • Demolition of existing Public Works Regional Laboratory • Piling works for Foot Bridge & Bridge H 	<ul style="list-style-type: none"> • Implement proper dust mitigation measures on dusty surface and stockpiles • Implement proper measures to prevent excavated material, silt or debris being deposited or washed into existing drainage systems and waterbodies • Implement proper noise mitigation measures to prevent potential noise nuisances to nearby sensitive receivers • Provision of protection to ensure no runoff out of site area or direct discharge into public drainage system



Figure 1.1

Project Layout

Date : 4/5/2021
 Filename : X:\252146 (CE72-2015-HY)\02_DRAWING\CONTRACT\CADD\WSP_202008_T_AB_0001.dgn



- NOTES :
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE APPROXIMATE VALUES AND IN METRES ABOVE HONG KONG PRINCIPAL DATUM.
 3. SECTIONS OF THE EXISTING CARRIAGEWAYS AND FOOTPATHS WITHIN THE LIMIT OF WORKS AREA MAY BE TEMPORARILY CLOSED IN PHASES AS AND WHEN REQUIRED.

LEGEND :

----- LIMIT OF WORK SITE

ISSUE FOR TENDER	EW	01/21
Rev Description	By	Date
Consultant		
Project title		
CONTRACT NO. HY/2020/08		
FLYOVER FROM KWAI TSING INTERCHANGE UP-RAMP TO KWAI CHUNG ROAD		
Figure 1.1		
Project Layout		
Scale	1:1000 (A1)	Status
		CONTRACT
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Figure 2.1

Project Organization Chart



Project Organization Chart

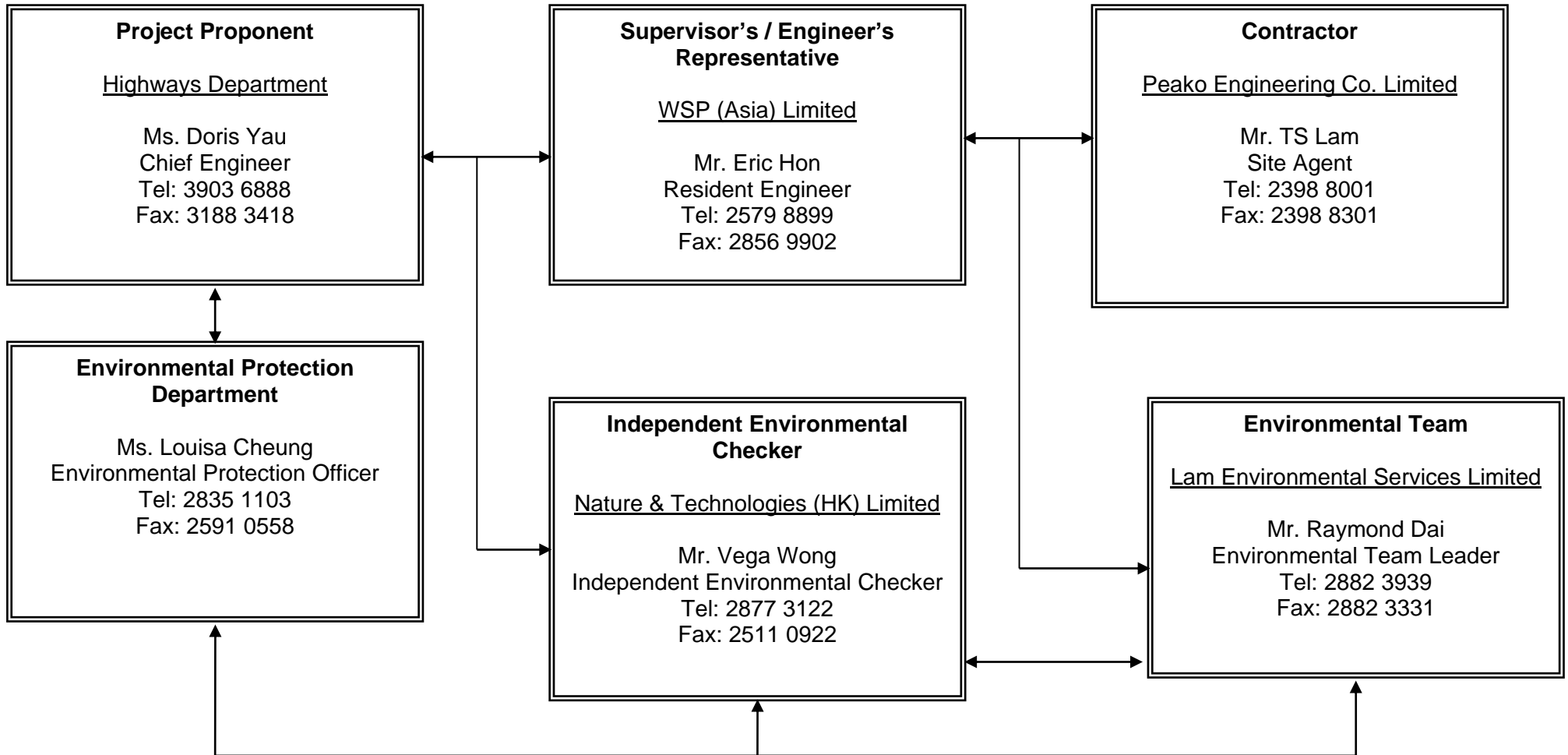
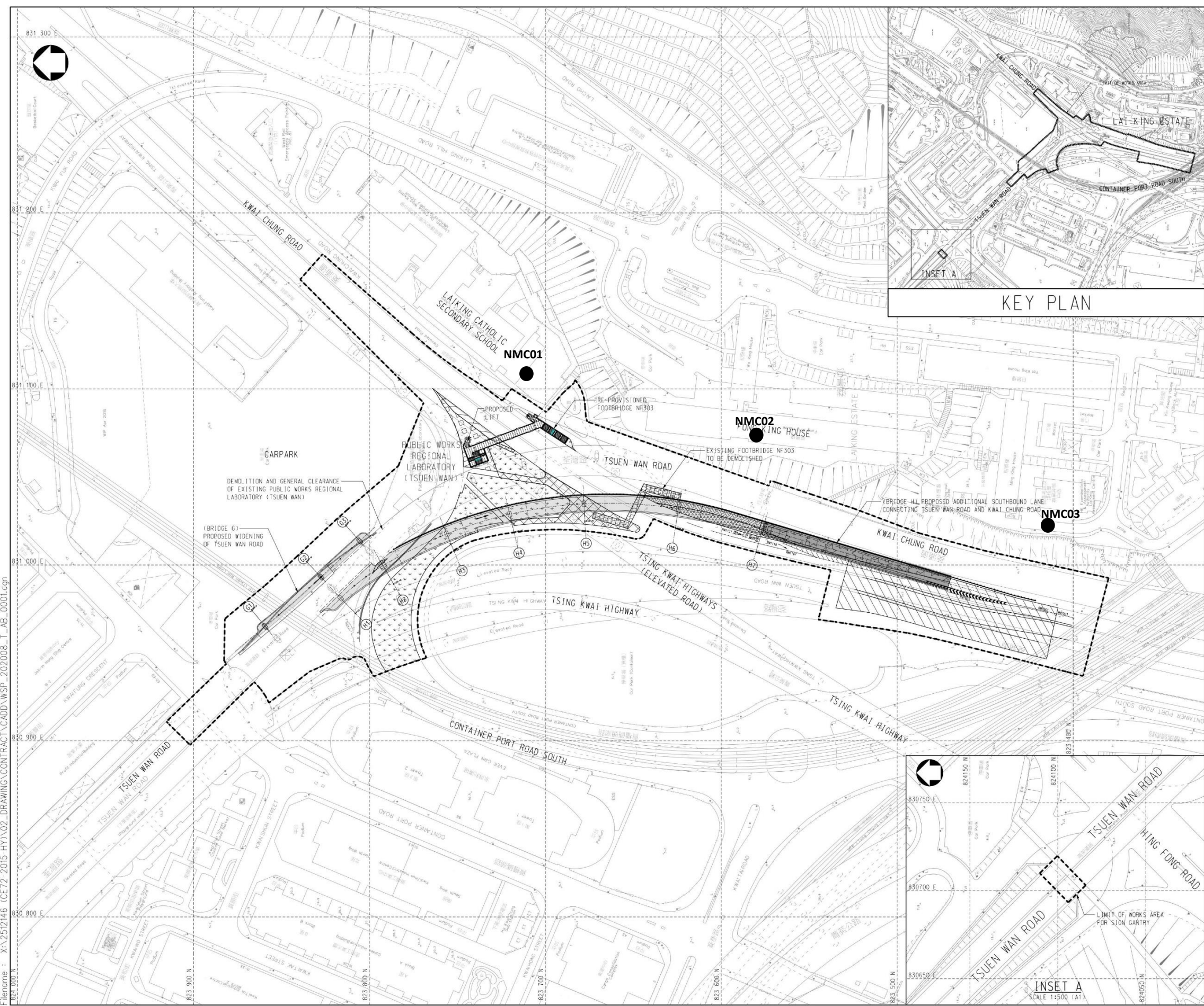


Figure 2.1

Figure 4.1

Location of Noise Monitoring Stations

Date : 4/5/2021
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- NOTES :
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE APPROXIMATE VALUES AND IN METRES ABOVE HONG KONG PRINCIPAL DATUM.
 3. SECTIONS OF THE EXISTING CARRIAGEWAYS AND FOOTPATHS WITHIN THE LIMIT OF WORKS AREA MAY BE TEMPORARILY CLOSED IN PHASES AS AND WHEN REQUIRED.

LEGEND :

--- LIMIT OF WORK SITE

● Noise Monitoring Locations

Rev	Issue for Tender	EW	01/21
Description	By	Date	

Consultant



Project title
 CONTRACT NO. HY/2020/08
 FLYOVER FROM KWAI TSING INTERCHANGE
 UP-RAMP TO KWAI CHUNG ROAD

Figure 4.1
Location of Noise Monitoring Stations

Scale 1:1000 (A1) Status CONTRACT
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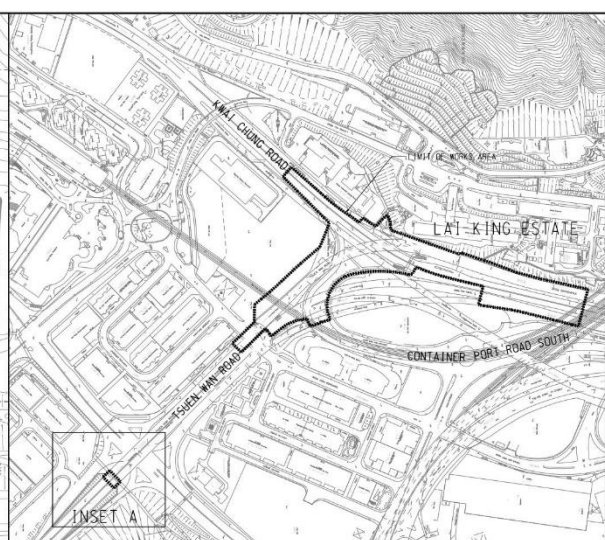
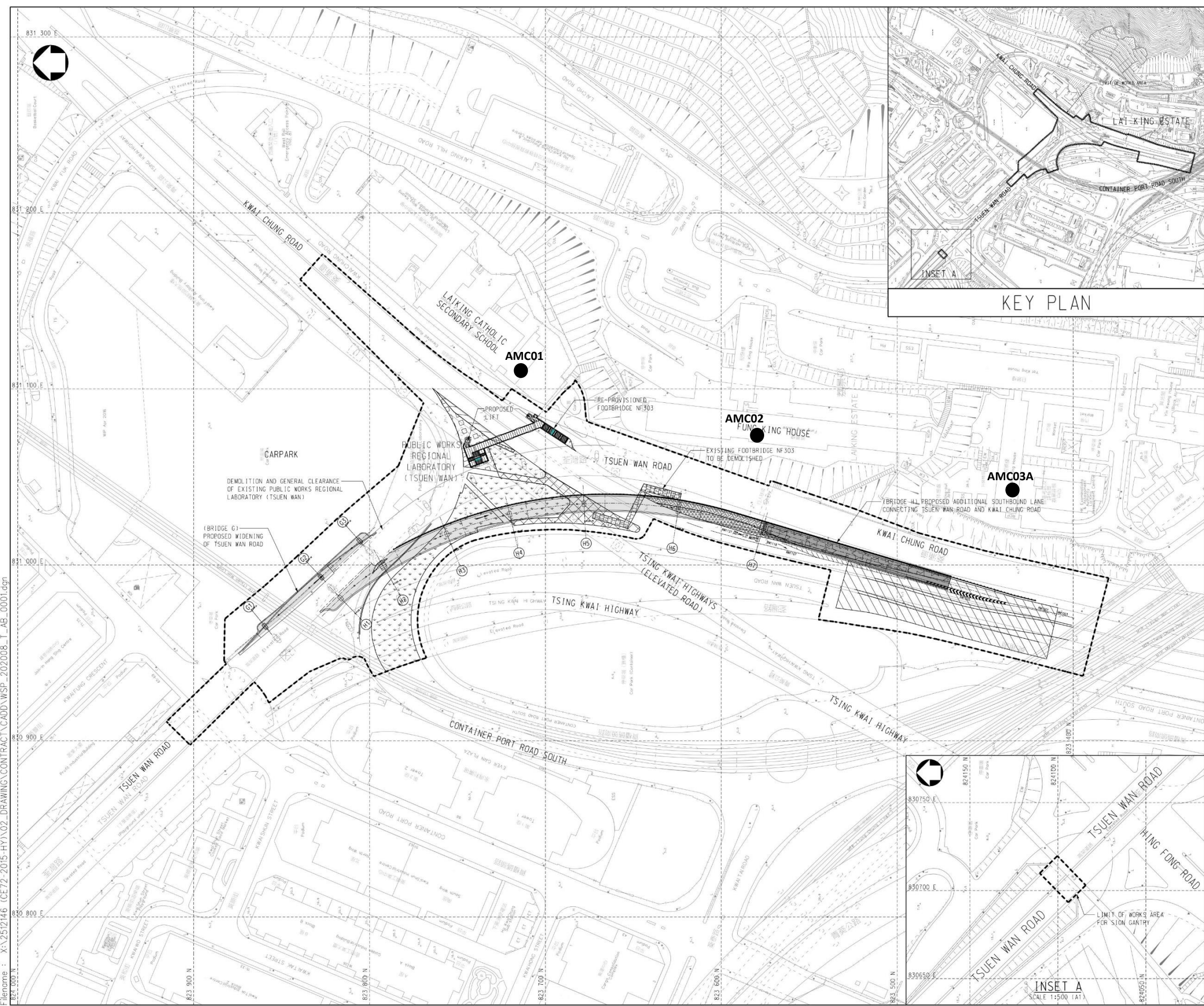


路政署
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 工程師
 WORKS DIVISION

Figure 4.2

Location of Air Quality Monitoring Stations

Date : 4/5/2021
 Filename : X:\252146 (CE72-2015-HY1)\02_DRAWING\CONTRACT\CADD\WSP_202008_T_AB_0001.dgn



KEY PLAN

- NOTES :
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE APPROXIMATE VALUES AND IN METRES ABOVE HONG KONG PRINCIPAL DATUM.
 3. SECTIONS OF THE EXISTING CARRIAGEWAYS AND FOOTPATHS WITHIN THE LIMIT OF WORKS AREA MAY BE TEMPORARILY CLOSED IN PHASES AS AND WHEN REQUIRED.

- LEGEND :
- LIMIT OF WORK SITE
 - Air Monitoring Locations

Rev	Description	EW	01/21
-	ISSUE FOR TENDER	EW	01/21

Consultant


Project title
 CONTRACT NO. HY/2020/08
 FLYOVER FROM KWAI TSING INTERCHANGE
 UP-RAMP TO KWAI CHUNG ROAD

Figure 4.2
Location of Air Quality Monitoring Stations

Scale	1:1000 (A1)	Status	CONTRACT
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 WORKS DIVISION



Appendix 3.1

Environmental Mitigation Implementation Schedule

Environmental Mitigation Implementation Schedule

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
Air Quality Monitoring							
S3.5.8	Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:						
	<ul style="list-style-type: none"> Every temporary access road shall be paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical. 	To minimize the dust impact	Contractor and Subcontractors	All works sites	Construction Phase	Air Pollution Control (Construction Dust) Regulation	^
	<ul style="list-style-type: none"> Any stockpile of dusty materials shall be covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides, or sprayed with water or a dust suppression chemical. 						^
	<ul style="list-style-type: none"> All dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation 						N/A
	<ul style="list-style-type: none"> Vehicles used for transporting dusty materials should be covered with tarpaulin. 						N/A
	<ul style="list-style-type: none"> Vehicle wheel washing facilities should be provided at each construction site exit. 						N/A
	<ul style="list-style-type: none"> Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting. 						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures ?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	<ul style="list-style-type: none"> The speed of vehicles on unpaved road within the site should be controlled to about 10 km/hr. 						N/A
	<ul style="list-style-type: none"> Routing of vehicles and positioning of construction plants should be arranged at maximum possible distances from the sensitive receivers. 						^
	<ul style="list-style-type: none"> Every stock of more than 20 bags of cement and dry pulverized fuel ash (PFA) shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. 						N/A
	<ul style="list-style-type: none"> Loading, unloading, transfer, handling or storage of large amount of cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with the an effective fabric filter or equivalent air pollution control system. 						N/A
	<ul style="list-style-type: none"> Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. 						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures ?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
Noise Monitoring							
S4.8.1	<ul style="list-style-type: none"> Selection and optimisation of construction programmes, avoidance of parallel operation of noisy PME, and/or reduction in the proportion of usage of PME during noise sensitive periods such as school examination period; 	To reduce potential construction noise impact	Contractor	All works sites	Construction Phase	EIAO-TM, NCO	N/A
	<ul style="list-style-type: none"> Use of "quiet" PME and working methods; 						N/A
	<ul style="list-style-type: none"> Use of temporary at-source noise mitigation measures such as noise barriers, acoustic fabric, noise enclosures, noise jacket and mufflers; and 						N/A
	<ul style="list-style-type: none"> Use of good site practice to limit noise emission from construction site. 						N/A
S4.8.2	Selection and Programming of Construction Processes						
	<ul style="list-style-type: none"> The timing and sequencing of the various construction activities shall be carefully arranged according to the actual site work situation, in order to limit the amount of concurrent activities and where applicable, to avoid parallel operation of noisy PME in order to minimize the total noise generated during construction periods. 	To reduce potential construction noise impact	Contractor	All works sites	Construction Phase	EIAO-TM, NCO	^
	<ul style="list-style-type: none"> Limiting the quantity of PME to be operated concurrently and also their proportion of usage were recommended in the Project and incorporated in this assessment. 						N/A
<ul style="list-style-type: none"> In the case during school examination when more stringent construction noise criteria should be imposed, the potentially most disruptive construction activities should be avoided, and arranged to be conducted during school holidays as far as practicable. 	N/A						

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures ?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
S4.8.3 – 4.8.5	Use of “Quiet” Alternative Plant and Working Methods						
	<ul style="list-style-type: none"> The use of particular plant with equipment noise levels quieter than those specified in the GW-TM can result in reduction of noise levels generated by the plant. The level of noise reduction achieved is dependent on the Contractor’s chosen methods of working. It is possible for the Contractor to achieve noise reductions from the adopted working methodologies by specifying maximum limits of sound power level for specific plant. 	To reduce potential construction noise impact	Contractor	All works sites	Construction Phase	EIAO-TM, NCO	N/A
S4.8.6 – S4.8.9	Temporary Noise Barrier						
	<ul style="list-style-type: none"> Use of Temporary Noise Barrier/ Acoustic Fabric for breaker, mini-robot mounted; excavator/loader, wheeled/tracked; lorry; lorry with crane/grab; mobile crane; poker vibratory, hand-held (electric); road roller; hand-held chain saw; concrete pump, lorry mounted; asphalt paver; air compressor. The minimum surface density of the movable noise barrier is 10kg/m2. 	To reduce potential construction noise impact	Contractor	All works sites	Construction Phase	EIAO-TM, NCO	N/A
	<ul style="list-style-type: none"> A not less than 8m high movable barrier with skid footing and a small cantilevered upper portion to be located within a few metres of the grab and chisel piling plants. 						N/A
<ul style="list-style-type: none"> When temporary noise barriers are not practicable or noise reduction achieved is insufficient, noise jacket/muffler can be applied to cover the noisy part of the engine or at the engine exhaust of particular mobile plants respectively. 	N/A						

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures ?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
S4.8.10	Good Site Practice:						
	<ul style="list-style-type: none"> • Use of well-maintained and regularly-serviced plant during the works; 	To reduce potential construction noise impact	Contractor	All works sites	Construction Phase	EIAO-TM, NCO	^
	<ul style="list-style-type: none"> • Plant operating on intermittent basis should be turned off or throttled down when not in active use; 						^
	<ul style="list-style-type: none"> • Plant that is known to emit noise strongly in one direction should be orientated to face away from the NSRs; 						^
	<ul style="list-style-type: none"> • Silencers, mufflers and enclosures for plant should be used where possible and maintained adequately throughout the works; 						N/A
	<ul style="list-style-type: none"> • Where possible fixed plants should be sited away from NSRs; and 						^
<ul style="list-style-type: none"> • Stockpiles of excavated materials and other structures such as site buildings should be used effectively to screen noise from the works. 	N/A						

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
Water Quality Control							
S5.9.2 S4.8.2	In accordance with ProPECC PN 1/94, construction phase mitigation measures with good management practices should include the following:						
	<ul style="list-style-type: none"> At the establishment of works site, perimeter drains to direct off-site water around the Site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided to divert the stormwater to silt removal facilities. The design of the temporary onsite drainage system will be undertaken by the Contractor prior to the commencement of construction; 	To control water quality impact from construction site runoff	Contractor and Sub-contractors	All work sites	Construction Phase	Water Pollution Control Ordinance, ProPECC PN 1/94	N/A
	<ul style="list-style-type: none"> Dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the run-off discharge into an appropriate watercourse, through a silt/sediment trap. Silt/sediment traps should also be incorporated in the permanent drainage channels to enhance deposition rates; 						N/A
	<ul style="list-style-type: none"> The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt / sand traps should be 5 minutes under maximum flow conditions. A sedimentation basin would be required when necessary. The detailed design of the silt / sand traps should be undertaken by the Contractor prior to the commencement of construction; 						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	<ul style="list-style-type: none"> The construction works should be programmed to minimise surface excavation works during rainy seasons (April to September), as possible. All exposed earth areas should be completed and vegetated as soon as possible after the earthworks have been completed. 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; 						^
	<ul style="list-style-type: none"> The overall slope of works sites should be kept to a minimum to reduce the erosive potential of surface water flows, and all trafficked areas and access roads should be protected by coarse stone ballast. An additional advantage accruing from the use of crushed stone is the positive traction gained during the prolonged periods of inclement weather and the reduction of surface sheet flows; 						N/A
	<ul style="list-style-type: none"> All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure their proper and efficient operation at all times particularly following rainstorms. Deposited silts and grits should be removed regularly and disposed of by spreading evenly over stable, vegetated areas; 						N/A
	<ul style="list-style-type: none"> Measures should be taken to minimise the ingress of site drainage into excavations. If the excavation of trenches in wet season is inevitable, they should be dug and backfilled in short sections wherever practicable. The water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; 						N/A
	<ul style="list-style-type: none"> All open stockpiles of construction materials (for example, aggregates, sand and fill material) should be covered with tarpaulin or similar fabric during rainstorms. Measures 						^

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system;						
	<ul style="list-style-type: none"> 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; 						N/A
	<ul style="list-style-type: none"> Precautions to be taken at any time of the year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted and during or after rainstorms, are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface run-off during storm events; 						^
	<ul style="list-style-type: none"> All vehicles and plant should be cleaned before leaving the Site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities / bay should be provided at the exit of the Site where practicable. 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-washing bay to public roads should be paved with sufficient backfall toward the wheelwashing bay to prevent vehicle tracking of soil and silty water to public roads and drains; 						N/A
	<ul style="list-style-type: none"> Oil interceptors should be provided in the drainage system downstream of any oil / fuel pollution sources. Oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water 						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	<p>drainage system after accidental spillage. A bypass should be provided for oil interceptors to prevent flushing during heavy rain;</p> <ul style="list-style-type: none"> The construction solid waste, debris and rubbish onsite should be collected, handled and disposed of properly to avoid causing any water quality impacts; and All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds with adequate storage capacity to prevent spilled fuel oils. 						
							^
							^
S5.9.5	Control of effluent discharge						
	<ul style="list-style-type: none"> A discharge licence for discharge of effluent from the construction site under the WPCO shall be applied to the EPD for. The discharge quality must meet the requirements specified in the discharge licence. 	To control the effluent discharge from the Site	Contractor and Sub-contractors	All work sites	Construction Phase	Water Pollution Control Ordinance	N/A
	<ul style="list-style-type: none"> All the run-off and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the Technical Memorandum. Minimum distances of 100m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. 						N/A
	<ul style="list-style-type: none"> No new effluent discharges in nearby typhoon shelters should be allowed. 						N/A
	<ul style="list-style-type: none"> The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., would minimize water consumption and reduce the effluent discharge volume. 						N/A
S5.9.6	Sewage from Workforce						

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	<ul style="list-style-type: none"> Portable chemical toilets and sewage holding tanks are recommended for the handling of the construction sewage generated by the workforce. 	To control Sewage generated from onsite construction	Contractor and Sub-workers	All work sites	Construction Phase	Water Pollution Control Ordinance and Waste Disposal Ordinance	^
	<ul style="list-style-type: none"> A licensed Contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance. 						^
S5.9.7 – S5.9.8	Accidental Spillage of Chemicals						
	<ul style="list-style-type: none"> The Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. 	To control accidental spillage of chemicals	Contractor and Sub-contractors	All work sites	Construction Phase	EIAO-TM, Water Pollution Control Ordinance and Waste Disposal (Chemical Waste) (General) Regulation	^
	<ul style="list-style-type: none"> Any maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. 						^
	<ul style="list-style-type: none"> Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges. 						^
S5.9.9	Provision of surface runoff collection system						
	<ul style="list-style-type: none"> All surface runoff on the road shall be direct to the system. 	To control road surface runoff	Contractor and Sub-contractors	Along Road Alignment	Design and Construction Phases	Water Pollution Control Ordinance	N/A
	<ul style="list-style-type: none"> The capacity of the system should be properly designed to cater for all surface water. 						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
Waste Management							
S6.6.3	Waste Management Plan (WMP) should be prepared and submitted for approval by the Engineer prior to any construction activities. During the construction period the WMP should be used as a working document to detail the on-going management procedures and to record waste arising from construction works and import of fill throughout the Contract. The WMP shall be subject to audit under the requirements of the Environmental Monitoring and Audit (EM&A) Procedures set out in the EM&A Manual accompanying this EIA Report.	Preparation and approval of WMP	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	^
S6.6.4 and S6.6.5	<p>The WMP shall be developed and implemented according to a best-practice philosophy of waste management. There are various waste management options, which can be categorised in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in a longterm context. The hierarchy is as follows:</p> <ul style="list-style-type: none"> • Avoidance and minimisation, i.e. avoiding or not generating waste through changing or improving practices and design; • Reuse of materials, thus avoiding disposal (generally with only limited reprocessing); • Recovery and recycling, thus avoiding disposal (although reprocessing may be required); • Treatment and disposal, according to relevant laws, guidelines and good practice; and • The suitability (or otherwise) of material for reuse on site shall be detailed in the WMP. If, for any reason, the recommendations cannot be implemented, full justification should be given in the WMP for approval by the Engineer. 	To minimise waste generation	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	^

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
S6.6.6	To facilitate adoption of the best-practice philosophy, training shall be provided to all personnel working on site. The training shall promote the concept of general site cleanliness and clearly explain the appropriate waste management procedures defined in the WMP.	To encourage all workers to reduce, reuse and recycle wastes.	Contractor	All works sites	Construction Phase	EIAO-TM	^
S6.6.7	a. During construction, the WMP should be kept up-to-date on a monthly basis with records of the actual quantities of wastes generated, recycled and disposed of off-site.	To keep trace of waste generation, minimisation, reuse and disposal	Contractor	All works sites	Construction Phase	ETWB TC(W) No. 19/2005	^
	b. Quantities shall be determined by weighing each load or other methods agreed to by the Engineer's Representative. Waste shall only be disposed of at licensed sites and the WMP should include procedures to ensure that illegal disposal of wastes does not occur.						^
	c. Only waste haulers authorised to collect the specific category of waste concerned should be employed and a trip ticket system shall be implemented for offsite disposal of inert C&D material and C&D waste at public fill reception facilities and landfills.						^
	d. Appropriate measures should be employed to minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers.						^
S6.6.8	The WMP shall include plans indicating specific areas designated for the storage of particular types of waste, reusable and recyclable materials as well as areas and management proposals for any stockpiling areas. Generally, waste storage areas should be well maintained and cleaned regularly.	Work site(s):- a. Arrange and manage to facilitate the proper management of wastes and materials. b. Design to avoid	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	^

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
		cross contamination of materials and pollution of the surrounding environment.					
S6.6.9	The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.	To maximise reuse of inert C&D Materials	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	N/A
S6.6.10 and S6.6.11	a. Inert C&D materials should be segregated on site into different waste and material types. Where materials cannot be reused on site, opportunities for recycling materials off-site shall be explored.	To maximise reuse and facilitate recycling by segregating inert C&D Materials	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	^
	b. Potential opportunities for recycling and reuse of inert C&D materials from the Project include:						
	<ul style="list-style-type: none"> Milling wastes arising from regrading of the existing pavement could be recycled on site and reused as either road-base in the new carriageways or fill for new embankments; 						N/A
	<ul style="list-style-type: none"> Existing marginal roadside barriers comprise pre-cast units, it may be possible to re-use these following widening works; and 						N/A
	<ul style="list-style-type: none"> Existing bridge parapets comprise aluminium post and railings, these have a recyclable value and could be sold on for reconditioning or reused for scrap metal. 						N/A
S6.6.12	Any stockpile should be sited away from existing watercourses and suitably covered.	To prevent wind erosion and impacts on air and	Contractor	All works sites	Design and Construction Phases	ETWB TC(W) No. 19/2005	N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
		water quality					
S6.6.13	C&D waste which cannot be reused or recycled should be segregated and stored in different containers or skips from the inert C&D material and should be disposed of to landfill.	To facilitate disposal of C&D waste	Contractor	All works sites	Construction Phase	ETWB TC(W) No. 19/2005	^
S6.6.14	Workers should, when necessary, wear appropriate personal protective equipment (PPE) when handling contaminated sediments. Adequate washing and cleaning facilities should also be provided on site.	To minimise the exposure to contaminated materials	Contractor	All works sites when necessary	Construction Phase	Practice Guide, Guidance Note, Guidance Manual	N/A
S6.6.15 and S6.6.16	a. The marine sediment should be excavated, transported and processed properly.	To minimise any potential adverse impacts arising from the handling, treatment and reuse of the marine sediment	Contractor	All works sites	Design and Construction Phases	Practice Guide, Guidance Note, Guidance Manual	N/A
	b. Stockpiling of contaminated sediments should be avoided as far as possible.						N/A
	c. If temporary stockpiling of contaminated sediments is necessary, the excavated sediment should be covered by tarpaulin and the area should be placed within earth bunds or sand bags to prevent leachate from entering the ground, nearby drains and surrounding water bodies. The stockpiling areas should be completely paved or covered by linings in order to avoid contamination to underlying soil or groundwater. Separate and clearly defined areas should be provided for stockpiling of contaminated and uncontaminated materials.						N/A
	d. Leachate, if any, should be collected and discharged according to the WPCO.						N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
	e. The approved Sediment Assessment Plan and Sediment Assessment Report with Remediation Plan shall be incorporated to the WMP.						N/A
S6.6.17	Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of chemical Wastes as follows. Containers used for the storage of chemical wastes should:						
	<ul style="list-style-type: none"> Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; 	To reduce environmental impacts in packaging, handling and storage of chemical wastes	Contractor	All works sites	Construction Phase	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	^
<ul style="list-style-type: none"> Have a capacity of less than 450L unless the specifications have been approved by the EPD; and 	^						
<ul style="list-style-type: none"> Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations. 	^						
S6.6.18	The storage area for chemical wastes should:						
	<ul style="list-style-type: none"> Be clearly labelled and used solely for the storage of chemical waste; 	To reduce environmental impacts by managing storage area for chemical wastes	Contractor	All works sites	Construction Phase	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	^
	<ul style="list-style-type: none"> Be enclosed on at least 3 sides; 						^
	<ul style="list-style-type: none"> Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; 						^
	<ul style="list-style-type: none"> Have adequate ventilation ; 						^
	<ul style="list-style-type: none"> Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and 						^
	<ul style="list-style-type: none"> Be arranged so that incompatible materials are adequately separated. 						^

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
S6.6.19	The Contractor shall register with EPD as a Chemical Waste Producer. Waste oils and other chemical wastes as defined in the Waste Disposal (Chemical Waste) (General) Regulation will require disposal by appropriate means and could require pre-notification to EPD prior to disposal. Appropriate means include disposal:						
	<ul style="list-style-type: none"> • Be via a licensed waste collector; and • Be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers 	To reduce environmental impacts in disposing chemical wastes.	Contractor	All works sites	Design and Construction Phases	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	^
S6.6.20 and S6.6.21	a. General refuse generated on-site should be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimise odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law.	To reduce environmental impacts in handling general refuse.	Contractor	All works sites	Construction Phase	Waste Disposal Ordinance (Cap 354)	^
	b. General refuse is generated largely by food service activities on site, so reusable rather than disposable dishware should be used if feasible. Aluminum cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible. Therefore separate, labelled bins for their deposit should be provided if feasible.						^
S6.6.22	Office waste can be reduced through recycling of paper if volumes are large enough to warrant collection. Opportunities for participation in a local collection scheme should be investigated.	To reduce office waste	Contractor	All works sites	Construction Phase	Waste Disposal Ordinance (Cap 354)	^

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
Landscape and Visual							
S7.9.6	Mitigation Planting: <ul style="list-style-type: none"> Replanting of disturbed vegetation should be undertaken at the earliest possible stage of the construction phase of the project and this should use the recommended transplant trees identified in the Tree Removal Recommendation. 	To avoid potential damage to these identified transplant trees	Contractor	Identified locations for tree planting	Construction Phase	Follow the relevant guidelines in the ETWB TC(W) 10/2013; ETWB TC(W)2/2004; ETWB TC(W)29/2004 ; ETWB TC(W)7/2002; Tree Planting and Maintenance in HK, HKSAR 1991 Relevant sections of the latest version of General Specifications for	N/A

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve	Status
						Civil Engineering Works, HKSAR	
S7.9.6	Development Site and Temporary Works Area						
	<ul style="list-style-type: none"> The construction area and Contractor's temporary works area should be minimized to avoid impacts on adjacent landscape 	To minimize potential impacts on adjacent landscape and VSRs	Contractor	The project area where appropriate	Construction Phase	N/A	^
	<ul style="list-style-type: none"> The landscape of these works areas will be restored following the completion of the construction phase 	To minimize potential impacts on the landscape	Contractor	The project area where appropriate	Construction Phase		N/A
	<ul style="list-style-type: none"> Construction site controls shall be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities are minimized including the storage of materials 	To minimize potential visual impacts on identified VSRs	Contractor	The project area where appropriate	Construction Phase		^
	<ul style="list-style-type: none"> The location and appearance of site accommodation and the careful design of site lighting to prevent light spillage 	To minimize potential impacts on identified VSRs	Contractor	The project area where appropriate	Construction Phase		N/A
	<ul style="list-style-type: none"> Screen hoarding may be a practicable for this project due to the viewing distances is short in a lot of site situation 	To minimize potential impacts on identified VSRs	Contractor	The project area where appropriate	Construction Phase		N/A

Remarks:

- ^ Implemented
- * To be followed-up by Contractor
- # Not Implemented
- N/A Not Applicable



Appendix 4.1

Action and Limit Level



Action and Limit Levels

Air Quality Monitoring

Monitoring Station	1-hour TSP Level in $\mu\text{g}/\text{m}^3$		24-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	Action Level	Limit Level	Action Level	Limit Level
AMC01	256.2	500	144.8	260
AMC02	256.7	500	144.3	260
AMC03A	259.3	500	144.3	260

Noise Monitoring

Monitoring Station	Action Level	Limit Level (dB(A))		
		0700-1900 hrs on normal weekdays	0700-2300 hrs on holidays (including Sundays); and 1900-2300 hrs on all days ²	2300-0700 hrs of all days
NMC01	When one documented complaint is received	65 / 70 ¹	60 / 65 / 70 ³	45 / 50 / 55 ³
NMC02		75		45 / 50 / 55 ³
NMC03		65 / 70 ¹		45 / 50 / 55 ³

Remark 1: Limit level of NMC01 and NMC03 reduce to 65 dB (A) during examination periods if any.

Remark 2: Construction noise during restricted hours is under the control of Noise Control Ordinance Limit Level to be selected based on Area Sensitivity Rating.

Remark 3: Limit Level for restricted hour monitoring shall act as reference level only. Investigation would be conducted on CNP compliance if exceedance recorded during restricted hour noise monitoring period.



Appendix 4.2

Copies of Calibration Certificates



CERTIFICATE OF CALIBRATION

Certificate No.: 21CA0526 02-01 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	Microphone	Preamp
Manufacturer:	Larson Davis	PCB	PCB
Type/Model No.:	LxT1	377B02	PRMLxT1L
Serial/Equipment No.:	0004797	163704	042622
Adaptors used:	-	-	-

Item submitted by

Customer Name: Lam Environmental Services Limited.
Address of Customer: -
Request No.: -
Date of receipt: 26-May-2021

Date of test: 27-May-2021

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	23-Aug-2021	CIGISMEC
Signal generator	DS 360	61227	31-Dec-2021	CEPREI

Ambient conditions

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

Test specifications

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

Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:  Date: 28-May-2021 Company Chop: 

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



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 21CA0526 02-01 Page 2 of 2

1, Electrical Tests

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

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

2, Acoustic tests

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

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

3, Response to associated sound calibrator

N/A

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

- End -

Calibrated by:

Fung Chi Yip

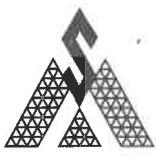
Date: 27-May-2021

Checked by:

Chan Yuk Yiu

Date: 28-May-2021

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



Test Data for Sound Level Meter

Sound level meter type:	LxT1	Serial No.	0004797	Date	27-May-2021
Microphone type:	377B02	Serial No.	163704		
Preamp type:	PRMLxT1L	Serial No.	042622	Report:	21CA0526 02-01

SELF GENERATED NOISE TEST

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

Noise level in A weighting	10.6	dB
Noise level in C weighting	14.8	dB
Noise level in Lin	22.3	dB

LINEARITY TEST

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

Reference/Expected level	Actual level		Tolerance	Deviation	
	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	99.0	99.0	0.7	0.0	0.0
104.0	104.0	104.0	0.7	0.0	0.0
109.0	109.0	109.0	0.7	0.0	0.0
114.0	114.0	114.0	0.7	0.0	0.0
115.0	115.0	115.0	0.7	0.0	0.0
116.0	116.0	116.0	0.7	0.0	0.0
117.0	117.0	117.0	0.7	0.0	0.0
118.0	118.0	118.0	0.7	0.0	0.0
119.0	119.0	119.0	0.7	0.0	0.0
120.0	120.0	120.0	0.7	0.0	0.0
89.0	89.0	89.0	0.7	0.0	0.0
84.0	84.0	84.0	0.7	0.0	0.0
79.0	79.0	79.0	0.7	0.0	0.0
74.0	73.9	73.9	0.7	-0.1	-0.1
69.0	68.9	68.9	0.7	-0.1	-0.1
64.0	63.9	63.9	0.7	-0.1	-0.1
59.0	58.9	58.9	0.7	-0.1	-0.1
54.0	53.9	53.9	0.7	-0.1	-0.1
49.0	48.9	48.9	0.7	-0.1	-0.1
44.0	43.9	43.9	0.7	-0.1	-0.1
39.0	38.9	38.9	0.7	-0.1	-0.1
34.0	33.9	33.9	0.7	-0.1	-0.1
33.0	32.9	32.9	0.7	-0.1	-0.1



Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type:	LxT1	Serial No.	0004797	Date	27-May-2021
Microphone type:	377B02	Serial No.	163704		
Preamp type:	PRMLxT1L	Serial No.	042622	Report:	21CA0526 02-01

32.0	31.9	31.9	0.7	-0.1	-0.1
31.0	30.9	30.9	0.7	-0.1	-0.1
30.0	29.9	29.9	0.7	-0.1	-0.1

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

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
20-120	94.0	94.0	0.7	0.0

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

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
20-120	30.0	29.9	0.7	-0.1
	118.0	118.0	0.7	0.0

FREQUENCY WEIGHTING TEST

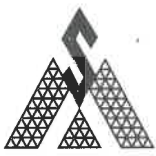
The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
				+	-	
Hz	dB	dB	dB			dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.5	1.5	1.5	-0.1
63.1	94.0	67.8	67.8	1.5	1.5	0.0
125.9	94.0	77.9	77.9	1.0	1.0	0.0
251.2	94.0	85.4	85.3	1.0	1.0	-0.1
501.2	94.0	90.8	90.7	1.0	1.0	-0.1
1995.0	94.0	95.2	95.2	1.0	1.0	0.0
3981.0	94.0	95.0	95.0	1.0	1.0	0.0
7943.0	94.0	92.9	92.9	1.5	3.0	0.0
12590.0	94.0	89.7	89.7	3.0	6.0	0.0

Frequency weighting C:

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



Test Data for Sound Level Meter

Page 3 of 5

Sound level meter type: LxT1 Serial No. 0004797 Date 27-May-2021
Microphone type: 377B02 Serial No. 163704
Preamp type: PRMLxT1L Serial No. 042622 Report: 21CA0526 02-01

1995.0	94.0	93.8	93.8	1.0	1.0	0.0
3981.0	94.0	93.2	93.2	1.0	1.0	0.0
7943.0	94.0	91.0	91.0	1.5	3.0	0.0
12590.0	94.0	87.8	87.7	3.0	6.0	-0.1

Frequency weighting Lin:

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

TIME WEIGHTING FAST TEST

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

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

TIME WEIGHTING SLOW TEST

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

Ref. level dB	Expected level dB	Actual level dB	Tolerance(dB)		Deviation dB
			+	-	
116.0	111.9	111.8	1.0	1.0	-0.1

PEAK RESPONSE TEST

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

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

Ref. level dB	Response to 10 ms dB	Response to 100 us dB	Tolerance	Deviation dB
			+/- dB	
119.0	119.0	118.7	2.0	-0.3



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: LxT1 Serial No. 0004797 Date 27-May-2021
Microphone type: 377B02 Serial No. 163704
Preamp type: PRMLxT1L Serial No. 042622 Report: 21CA0526 02-01

Negative polarities:

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
119.0	119.0	118.7	2.0	-0.3

RMS ACCURACY TEST

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

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

	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
Time weighting	dB	dB	indication(dB)	+/- dB	dB
Slow	114.0+6.6	114.0	113.9	0.5	-0.1

TIME WEIGHTING IMPULSE TEST

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

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

Single sinusoidal burst of duration 5 ms:

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

Repeated at 100 Hz

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

TIME AVERAGING TEST

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

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

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

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

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

Test frequency: 4000 Hz

Integration time: 10 sec



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: LxT1 Serial No. 0004797 Date 27-May-2021
Microphone type: 377B02 Serial No. 163704
Preamp type: PRMLxT1L Serial No. 042622 Report: 21CA0526 02-01

The integrating sound level meter set to Leq:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10	88.0	58.0	58.0	1.7	0.0

The integrating sound level meter set to SEL:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	88.0	68.0	68.0	1.7	0.0

OVERLOAD INDICATION TEST

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

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

Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	dB	dB
113.4	112.4	109.4	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

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

Rms level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	dB	dB
120.2	119.2	79.2	79.2	2.2	0.0

ACOUSTIC TEST

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

Frequency	Expected level	Actual level	Tolerance (dB)		Deviation
			+	-	
Hz	dB	Measured (dB)			dB
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	78.1	1.0	1.0	0.2
8000	92.9	91.2	1.5	3.0	-1.7

-----END-----



CERTIFICATE OF CALIBRATION

Certificate No.: 21CA0120 03

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Honglim Co., Ltd.
Type/Model No.: HLES-02
Serial/Equipment No.: 2019612870
Adaptors used: -

Item submitted by

Customer: Lam Environmental Services Limited.
Address of Customer: -
Request No.: -
Date of receipt: 20-Jan-2021

Date of test: 24-Jan-2021

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	11-May-2021	SCL
Preamplifier	B&K 2673	2743150	03-Jun-2021	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Jun-2021	CEPREI
Signal generator	DS 360	33873	19-May-2021	CEPREI
Digital multi-meter	34401A	US36087050	19-May-2021	CEPREI
Audio analyzer	8903B	GB41300350	18-May-2021	CEPREI
Universal counter	53132A	MY40003662	18-May-2021	CEPREI

Ambient conditions

Temperature: 21 ± 1 °C
Relative humidity: 55 ± 10 %
Air pressure: 1000 ± 5 hPa

Test specifications


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

Test results

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

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

Approved Signatory:


Feng Junqi

Date: 25-Jan-2021

Company Chop:



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



RECALIBRATION DUE DATE:
February 18, 2021

Certificate of Calibration

Calibration Certification Information			
Cal. Date: February 18, 2020	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 753.1	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 0005		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3790	3.2	2.00
2	3	4	1	0.9840	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8350	8.8	5.50
5	9	10	1	0.6910	12.6	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H (Ta/Pa)}$ (y-axis)
1.0001	0.7253	1.4173	0.9958	0.7221	0.8836
0.9959	1.0121	2.0044	0.9915	1.0076	1.2496
0.9939	1.1372	2.2410	0.9895	1.1322	1.3971
0.9927	1.1888	2.3504	0.9883	1.1836	1.4653
0.9876	1.4293	2.8347	0.9833	1.4230	1.7672
QSTD	m=	2.00927	QA	m=	1.25817
	b=	-0.03767		b=	-0.02348
	r=	0.99995		r=	0.99995

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

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

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



Certificate of Calibration

Calibration Certification Information			
Cal. Date: August 3, 2021	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 750.3	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 3166		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3610	3.2	2.00
2	3	4	1	0.9540	6.4	4.00
3	5	6	1	0.8460	7.9	5.00
4	7	8	1	0.8070	8.7	5.50
5	9	10	1	0.6630	12.7	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9930	0.7296	1.4123	0.9957	0.7316	0.8868
0.9888	1.0365	1.9973	0.9915	1.0393	1.2541
0.9868	1.1664	2.2330	0.9895	1.1696	1.4021
0.9857	1.2215	2.3420	0.9884	1.2248	1.4705
0.9804	1.4788	2.8246	0.9831	1.4828	1.7735
QSTD	m=	1.88375	QA	m=	1.17957
	b=	0.03970		b=	0.02493
	r=	0.99998		r=	0.99998

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

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

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



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : AMC01
 Equipment no. : HVS004

Calibration Date : 12-Aug-21
 Calibration Due Date : 12-Oct-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	302	Kelvin	Pressure, P _a
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	3166	Slope, m _c	1.88375	Intercept, b _c	0.03970
Last Calibration Date	03-Aug-21	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	03-Aug-22				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.8	1.8	3.6	0.9773	23	22.7975
2	2.5	2.5	5.0	1.1555	30	29.7359
3	3.7	3.7	7.4	1.4103	38	37.6655
4	4.1	4.1	8.2	1.4857	42	41.6302
5	5.0	5.0	10.0	1.6429	51	50.5510

By Linear Regression of Y on X

Slope, m = 39.8907 Intercept, b = -16.7512
 Correlation Coefficient* = 0.9915
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry Lau
 Date : 12-Aug-21

Checked by : James Chu
 Date : 12-Aug-21



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : AMC02
 Equipment no. : HVS015

Calibration Date : 12-Aug-21
 Calibration Due Date : 12-Oct-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	302	Kelvin	Pressure, P _a
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	3166	Slope, m _c	1.88375	Intercept, b _c	0.03970
Last Calibration Date	03-Aug-21	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	03-Aug-22				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.4	1.4	2.8	0.8594	29	28.7447
2	2.1	2.1	4.2	1.0573	34	33.7007
3	3.2	3.2	6.4	1.3101	42	41.6302
4	4.4	4.4	8.8	1.5398	48	47.5774
5	5.4	5.4	10.8	1.7081	52	51.5422

By Linear Regression of Y on X

Slope, m = 27.3494 Intercept, b = 5.2231
 Correlation Coefficient* = 0.9990
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry Lau
 Date : 12-Aug-21

Checked by : James Chu
 Date : 12-Aug-21



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : AMC03A
 Equipment no. : HVS014

Calibration Date : 12-Aug-21
 Calibration Due Date : 12-Oct-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	302	Kelvin	Pressure, P _a
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	3166	Slope, m _c	1.88375	Intercept, b _c	0.03970
Last Calibration Date	03-Aug-21	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	03-Aug-22				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.4	1.4	2.8	0.8594	34	33.7007
2	2.1	2.1	4.2	1.0573	40	39.6479
3	3.3	3.3	6.6	1.3307	47	46.5862
4	4.4	4.4	8.8	1.5398	52	51.5422
5	5.4	5.4	10.8	1.7081	60	59.4718

By Linear Regression of Y on X

Slope, m = 28.8808 Intercept, b = 8.6715
 Correlation Coefficient* = 0.9935
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry Lau
 Date : 12-Aug-21

Checked by : James Chu
 Date : 12-Aug-21



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : GCE Calibration Date : 28-Dec-20
 Equipment no. : HVS000 Calibration Due Date : 27-Feb-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	294	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	0005	Slope, m _c	2.00927	Intercept, b _c	-0.03767
Last Calibration Date	18-Feb-20	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	17-Feb-21				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.5	1.5	3.0	0.8874	35	35.2668
2	2.3	2.3	4.6	1.0943	42	42.3202
3	3.4	3.4	6.8	1.3265	49	49.3736
4	4.2	4.2	8.4	1.4722	54	54.4117
5	5.0	5.0	10.0	1.6046	55	55.4193

By Linear Regression of Y on X

Slope, m = 29.2707 Intercept, b = 9.9801
 Correlation Coefficient* = 0.9913
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Alan Ng Checked by : James Chu
 Date : 28-Dec-20 Date : 28-Dec-20



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CCC2 Calibration Date : 08-Mar-21
 Equipment no. : HVS018 Calibration Due Date : 08-May-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	293	Kelvin	Pressure, P _a
			1020 mmHg

Orifice Transfer Standard Information					
Equipment No.	3166	Slope, m _c	2.08877	Intercept, b _c	-0.02270
Last Calibration Date	17-Jul-20	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	18-Jul-21				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.9	1.9	3.8	0.9552	21	21.2483
2	2.7	2.7	5.4	1.1365	33	33.3902
3	3.7	3.7	7.4	1.3286	44	44.5203
4	4.9	4.9	9.8	1.5273	51	51.6031
5	5.6	5.6	11.2	1.6320	62	62.7331

By Linear Regression of Y on X

Slope, m = 57.4631 Intercept, b = -32.9183
 Correlation Coefficient* = 0.9919
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Alan Ng Checked by : James Chu
 Date : 08-Mar-21 Date : 08-Mar-21



Lam Environmental Services Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CCC2 Calibration Date : 06-May-21
 Equipment no. : HVS018 Calibration Due Date : 06-Jul-21

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	298	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	3166	Slope, m _c	2.08877	Intercept, b _c	-0.02270
Last Calibration Date	17-Jul-20	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	17-Jul-21				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.2	1.2	2.4	0.7532	32	32.0268
2	2.5	2.5	5.0	1.0823	42	42.0352
3	3.2	3.2	6.4	1.2230	49	49.0411
4	4.1	4.1	8.2	1.3830	52	52.0436
5	5.3	5.3	10.6	1.5709	59	59.0495

By Linear Regression of Y on X

Slope, m = 33.0242 Intercept, b = 7.1288
 Correlation Coefficient* = 0.9958
 Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Alan Ng Checked by : James Chu
 Date : 06-May-21 Date : 06-May-21



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : Metone AEROCET 831
Model Number : 831
Serial Number : R14332
Performance Check Date : 22-Mar-21

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 08-Mar-21

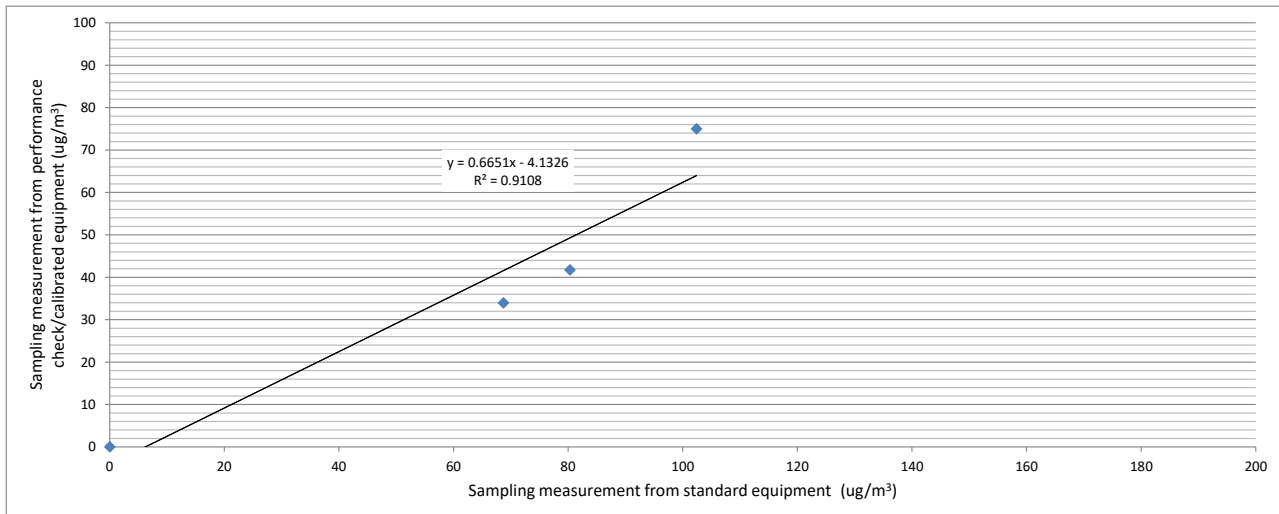
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Pressure (hPa), Mean Temp (°C), Concentration in ug/m³ (Standard equipment) (X - Axis), Concentration in ug/m³ (Performance Check / Calibrated equipment) (Y - Axis). Rows include Zero Check and trials 1, 2, 3.

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.4000
Correlation Coefficient : 0.9544
Validity of Performance Check / Calibration Record : 22/3/2022



Operator: Alan Ng

Date: 22-Mar-21

Checked by: James Chu

Date: 23-Mar-21



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : MET ONE INSTRUMENTS
Model Number : BT-645
Serial Number : R22586
Performance Check Date : 10-May-21

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 06-May-21

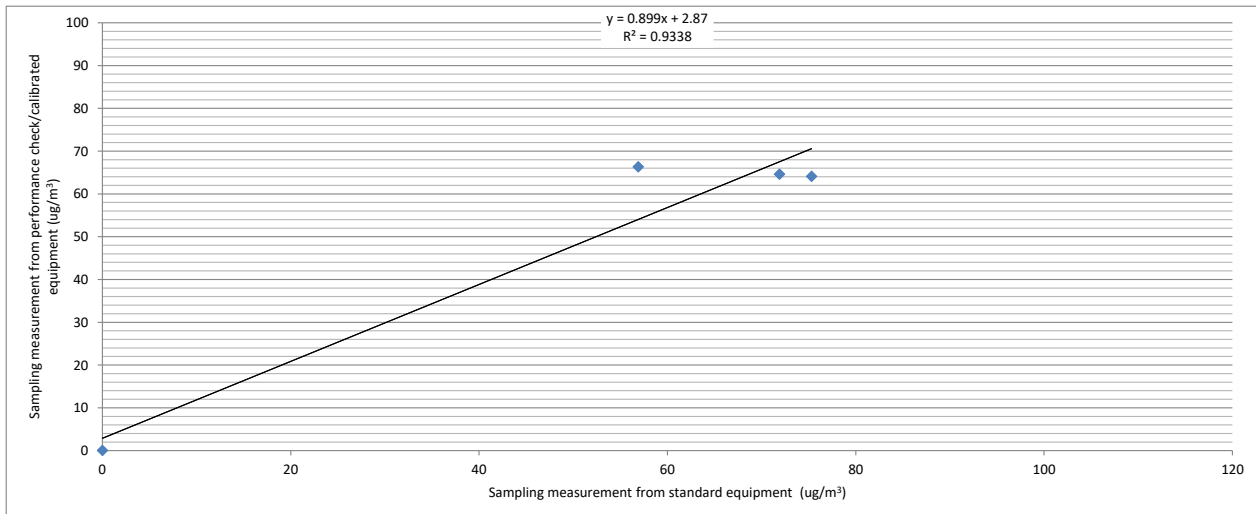
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Temp (°C), Mean Pressure (hPa), Concentration in ug/m³ (Standard equipment), Concentration in ug/m³ (Performance Check / Calibrated equipment). Rows include Zero Check and three trials.

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.1000
Correlation Coefficient : 0.9663
Validity of Performance Check / Calibration Record : 10/5/2022



Operator: Henry Lau

Date: 10/05/2021

Checked by: James Chu

Date: 11/05/2021



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : Metone AEROCET 831
Model Number : 831
Serial Number : W15449
Performance Check Date : 18-Jun-21

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 06-May-21

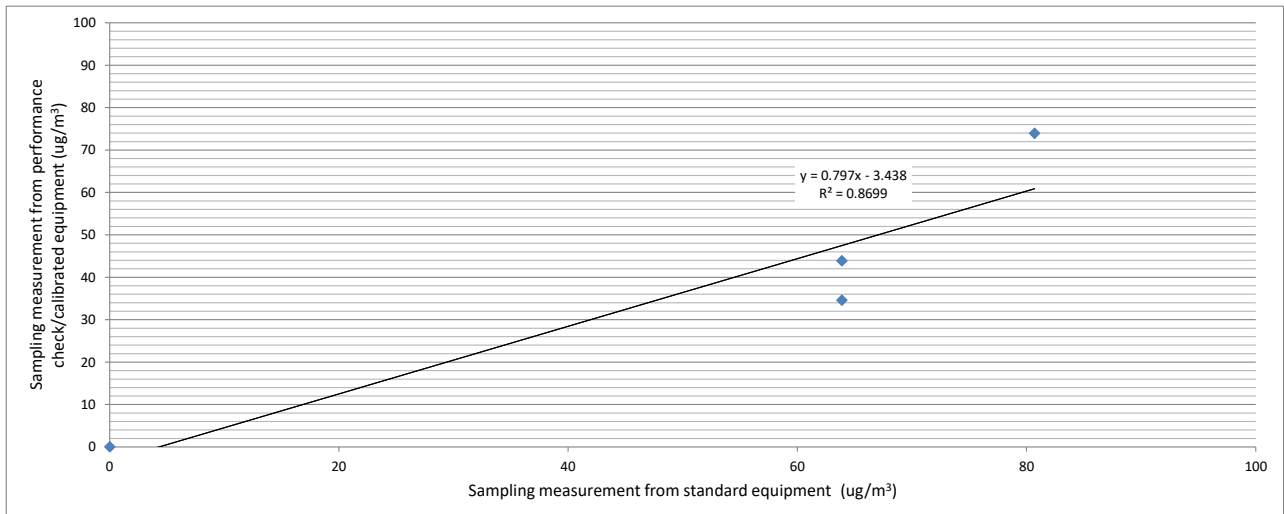
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Pressure (hPa), Mean Temp (°C), Concentration in ug/m³ (Standard equipment) (X - Axis), Concentration in ug/m³ (Performance Check / Calibrated equipment) (Y - Axis). Rows include Zero Check and three trials.

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.1000
Correlation Coefficient : 0.9327
Validity of Performance Check / Calibration Record : 18/6/2022



Operator: Alan Ng Date: 18-Jun-21
Checked by: James Chu Date: 19-Jun-21



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulare Monitor
 Manufacturer : Metone AEROCET 831
 Model Number : 831
 Serial Number : Y23154
 Performance Check Date : 29-Dec-20

Standard Equipment

Type : High Volume Sampler
 Manufacturer : TISCH
 Model Number : TE-5170
 Equipment Number : HVS000
 Last Calibration Date : 28-Dec-20

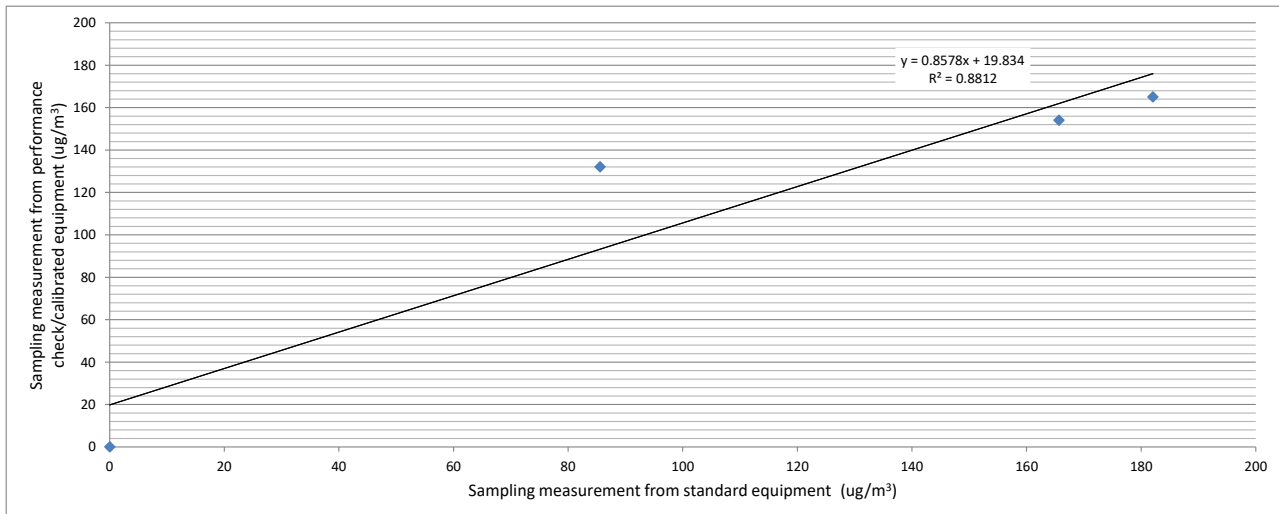
Portable Dust Meter Performance Check Results

Trial no. in 1-hr period	Time	Mean Pressure (hPa)	Mean Temp (°C)	Concentration in ug/m ³ (Standard equipment) (X - Axis)	Concentration in ug/m ³ (Performance Check / Calibrated equipment) (Y - Axis)
Zero Check	28/12/2020 08:00	0	0	0	0
1	29/12/2020 08:04	1015	21	182	165
2	29/12/2020 09:05	1015	21	166	154
3	29/12/2020 10:06	1015	21	86	132

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.1000
 Correlation Coefficient : 0.9387
 Validity of Performance Check / Calibration Record : 29/12/2021



Operator: Henry Lau

Date: 29-Dec-20

Checked by: James Chu

Date: 30-Dec-20

出厂检验报告

产品名称：在线式风速风向仪

产品型号：YGY-FSXY1

武汉辰云科技有限公司

2021年9月7日

1. 检验类别

一、在线式风速风向仪

检验项目	检测要求	检测结果
外观检查	1. 要求成品外观无破损，各部件完整，无掉漆，无凹陷变形； 2. 采集仪内部无目视可见灰尘杂物油污，布局整洁美观； 3. 芯线，航插完整，保护皮无破损，无油污；	
结构检查	1. 内部电路板固定牢固可靠，无挤压，无晃动； 2. 检查防尘防水措施是否到位，密封是否严密，端子与外壳缝隙不宜过大，以不透光为原则；	

二、风速风向传感器示值校准结果

实际风速 (m/s)	指示风速 (m/s)
0.5	启动
1	0.9
5	4.8
10	9.9
15	15.1
20	20.1
25	25.2
30	28.7

实际风向 (°)	指示风向 (°)
45	44
90	91
135	136
200	201
235	237
275	276
315	314
359	0

2. 备注 NOTE

数据采集仪数据显示风速、风向值正常，通过 RJ45 通讯与电脑连接，
仪器软件数据显示正常。

3. 检验结论：

各项检测和实验结果表明：
_____在线式风速风向仪_____仪器全部测试通过，系统硬件测试符合工厂
(武汉易谷科技有限公司检验标准) 测试标准。符合技术文件的要求，检
验合格，准予出厂。

4. 校准的环境条件：

环境条件： 温度：26.3，相对湿度：62.8%RH，大气压力：1010.8hpa

测试员： 李元华
检验员： 吴肖



测试日期：2021年9月7日



Appendix 4.3

Wind Data

**Wind Speed and Wind Direction**

Date	Time	Wind Speed (m/s)	Wind Direction (degree)
23-Sep-21	12:00	1.1	204(SSW)
	13:00	0.0	121(ESE)
	14:00	0.9	171(S)
	15:00	0.9	178(S)
	16:00	0.9	142(SE)
	17:00	1.5	204(SSW)
	18:00	0.5	80(E)
	19:00	0.0	213(SSW)
	20:00	0.0	192(SSW)
	21:00	1.1	169(S)
	22:00	0.5	35(NE)
	23:00	0.9	58(ENE)
24-Sep-21	0:00	0.5	280(W)
	1:00	0.0	233(SW)
	2:00	0.0	156(SSE)
	3:00	0.7	159(SSE)
	4:00	0.0	182(S)
	5:00	0.0	156(SSE)
	6:00	0.0	114(ESE)
	7:00	1.1	55(NE)
	8:00	0.9	225(SW)
	9:00	1.3	141(SE)
	10:00	0.5	46(NE)
	11:00	1.5	196(SSW)
	12:00	1.5	201(SSW)
	13:00	2.3	81(E)
	14:00	1.3	131(SE)
	15:00	0.9	177(S)
	16:00	0.7	142(SE)
	17:00	1.1	236(SW)
	18:00	1.1	69(ENE)
	19:00	1.3	331(NNW)
20:00	0.7	224(SW)	
21:00	0.7	206(SSW)	
22:00	1.3	154(SSE)	
23:00	1.5	144(SE)	



Wind Speed and Wind Direction

Date	Time	Wind Speed (m/s)	Wind Direction (degree)
25-Sep-21	0:00	1.9	225(SW)
	1:00	0.9	172(S)
	2:00	1.1	234(SW)
	3:00	0.7	124(SE)
	4:00	1.3	250(WSW)
	5:00	0.0	161(SSE)
	6:00	0.0	273(W)
	7:00	0.9	159(SSE)
	8:00	1.1	229(SW)
	9:00	1.7	173(S)
	10:00	1.5	151(SSE)
	11:00	1.5	322(NW)
	12:00	1.5	213(SSW)
	13:00	2.7	163(SSE)
	14:00	0.7	128(SE)
	15:00	0.9	116(ESE)
	16:00	2.5	204(SSW)
	17:00	0.9	214(SW)
	18:00	0.0	22(NNE)
	19:00	0.9	246(WSW)
	20:00	1.5	274(W)
	21:00	1.1	111(ESE)
	22:00	0.9	261(W)
23:00	1.1	254(WSW)	
26-Sep-21	0:00	1.9	198(SSW)
	1:00	1.1	335(NNW)
	2:00	0.0	287(WNW)
	3:00	0.5	185(S)
	4:00	1.1	167(SSE)
	5:00	0.7	193(SSW)
	6:00	0.7	115(ESE)
	7:00	0.5	304(NW)
	8:00	1.1	66(ENE)
	9:00	0.9	177(S)
	10:00	1.1	114(ESE)
	11:00	1.5	216(SW)
	12:00	0.0	183(S)
	13:00	0.5	81(E)
	14:00	0.7	162(SSE)
	15:00	0.7	152(SSE)
	16:00	0.0	89(E)
	17:00	1.3	81(E)
	18:00	0.7	83(E)
	19:00	0.7	164(SSE)
	20:00	0.5	92(E)
	21:00	0.5	221(SW)
	22:00	0.0	286(WNW)
23:00	0.0	236(SW)	



Wind Speed and Wind Direction

Date	Time	Wind Speed (m/s)	Wind Direction (degree)
27-Sep-21	0:00	0.7	129(SE)
	1:00	0.9	216(SW)
	2:00	0.9	22(NNE)
	3:00	0.0	184(S)
	4:00	0.0	180(S)
	5:00	0.0	70(ENE)
	6:00	0.0	322(NW)
	7:00	0.0	151(SSE)
	8:00	0.7	158(SSE)
	9:00	0.9	136(SE)
	10:00	0.5	52(NE)
	11:00	1.3	196(SSW)
	12:00	1.1	263(W)
	13:00	0.5	168(SSE)
	14:00	0.0	188(S)
	15:00	1.5	62(ENE)
	16:00	0.7	91(E)
	17:00	1.1	71(ENE)
	18:00	1.3	222(SW)
	19:00	0.7	70(ENE)
	20:00	1.7	302(WNW)
	21:00	0.5	105(ESE)
	22:00	0.7	10(N)
23:00	0.7	138(SE)	
28-Sep-21	0:00	0.9	152(SSE)
	1:00	1.3	222(SW)
	2:00	0.0	246(WSW)
	3:00	0.9	123(ESE)
	4:00	0.9	204(SSW)
	5:00	0.5	165(SSE)
	6:00	0.7	226(SW)
	7:00	0.7	274(W)
	8:00	0.9	252(WSW)
	9:00	0.0	101(E)
	10:00	1.1	308(NW)
	11:00	1.7	115(ESE)
	12:00	NIL	NIL
	13:00	NIL	NIL
	14:00	NIL	NIL
	15:00	NIL	NIL
	16:00	1.5	219(SW)
	17:00	1.3	212(SSW)
	18:00	1.7	264(W)
	19:00	0.9	155(SSE)
	20:00	1.5	125(SE)
	21:00	1.5	314(NW)
	22:00	2.1	11(N)
23:00	1.1	271(W)	



Wind Speed and Wind Direction

Date	Time	Wind Speed (m/s)	Wind Direction (degree)
29-Sep-21	0:00	0.9	80(E)
	1:00	0.9	23(NNE)
	2:00	0.7	112(ESE)
	3:00	0.9	30(NNE)
	4:00	0.9	47(NE)
	5:00	0.7	131(SE)
	6:00	0.0	125(SE)
	7:00	0.0	99(E)
	8:00	0.5	323(NW)
	9:00	0.7	178(S)
	10:00	2.1	180(S)
	11:00	1.1	271(W)
	12:00	1.3	67(ENE)
	13:00	1.1	290(WNW)
	14:00	1.9	133(SE)
	15:00	1.7	248(WSW)
	16:00	1.1	231(SW)
	17:00	1.1	62(ENE)
	18:00	0.9	154(SSE)
	19:00	1.1	106(ESE)
	20:00	1.1	310(NW)
	21:00	1.1	196(SSW)
	22:00	1.1	67(ENE)
23:00	1.1	125(SE)	
30-Sep-21	0:00	0.9	69(ENE)
	1:00	1.7	132(SE)
	2:00	0.9	190(S)
	3:00	1.7	228(SW)
	4:00	1.1	60(ENE)
	5:00	0.7	101(E)
	6:00	0.5	321(NW)
	7:00	0.5	233(SW)
	8:00	1.3	159(SSE)
	9:00	0.9	164(SSE)
	10:00	1.3	184(S)
	11:00	0.9	323(NW)
	12:00	1.3	226(SW)
	13:00	1.3	143(SE)
	14:00	1.5	233(SW)
	15:00	1.7	256(WSW)
	16:00	0.9	235(SW)
	17:00	1.5	67(ENE)
	18:00	1.3	131(SE)
	19:00	1.7	111(ESE)
	20:00	1.3	144(SE)
	21:00	1.3	345(NNW)
	22:00	1.1	106(ESE)
23:00	1.3	197(SSW)	



Appendix 5.1

Monitoring Schedule for Reporting Month and Next Reporting Month

**Contract No. HY/2020/08
Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road**

**Environmental Impact Monitoring Schedule
September 2021**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-Sep	2-Sep	3-Sep	4-Sep
5-Sep	6-Sep	7-Sep	8-Sep	9-Sep	10-Sep	11-Sep
12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	17-Sep	18-Sep
19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep	25-Sep
26-Sep	27-Sep	28-Sep	29-Sep	30-Sep		
	24hr TSP	1hr TSP & Noise			24hr TSP 1hr TSP & Noise	

**Contract No. HY/2020/08
Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road**

**Tentative Environmental Impact Monitoring Schedule
October 2021**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Oct	2-Oct
						24hr TSP
3-Oct	4-Oct	5-Oct	6-Oct	7-Oct	8-Oct	9-Oct
1hr TSP & Noise					24hr TSP	1hr TSP & Noise
10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct	16-Oct
				24hr TSP	1hr TSP & Noise	
17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	22-Oct	23-Oct
		24hr TSP	1hr TSP & Noise			
24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct
	24hr TSP	1hr TSP & Noise				24hr TSP
31-Oct						



Appendix 5.2

Noise Monitoring Results and Graphical Presentations



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: NMC-01 - R/F, Lai King Catholic Secondary School

Date	Weather	Time	Measurement Noise Level			Average Noise Level	Baseline Level	Construction Noise Level	Limit Level
			Leq	L10	L90	Leq	Leq	Leq	Leq
			Unit: dB(A), (5-min)			Unit: dB(A), (30-min)			
24 Sep 2021	Fine	14:47	69.2	69.8	68.7	67	74.5	<Baseline Level	70
		14:52	69.2	69.7	68.6				
		14:57	65.6	66.6	64.1				
		15:02	64.7	65.5	63.6				
		15:07	64.7	65.6	63.9				
		15:12	64.8	65.8	63.9				
28 Sep 2021	Fine	10:35	68.4	68.9	66.6	67	74.5	<Baseline Level	70
		10:40	67.3	68.2	66.2				
		10:45	67.2	67.9	66.3				
		10:50	67.0	68.1	65.6				
		10:55	67.5	68.4	66.4				
		11:00	67.0	67.9	66.0				



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: NMC-02 - R/F, Fung King House

Date	Weather	Time	Measurement Noise Level			Average Noise Level	Baseline Level	Construction Noise Level	Limit Level
			Leq	L10	L90	Leq	Leq	Leq	Leq
			Unit: dB(A), (5-min)			Unit: dB(A), (30-min)			
24 Sep 2021	Fine	14:02	67.5	68.4	67.5	68	67.6	44	75
		14:07	67.5	68.4	66.3				
		14:12	67.7	68.6	66.5				
		14:17	67.6	68.5	66.6				
		14:22	67.7	68.5	66.7				
		14:27	67.7	68.5	66.8				
28 Sep 2021	Fine	11:20	65.2	66.2	64.3	65	67.6	<Baseline Level	75
		11:25	65.1	65.9	64.2				
		11:30	65.2	65.9	64.4				
		11:35	64.9	65.4	64.2				
		11:40	65.3	66.1	64.5				
		11:45	65.1	65.7	64.4				



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

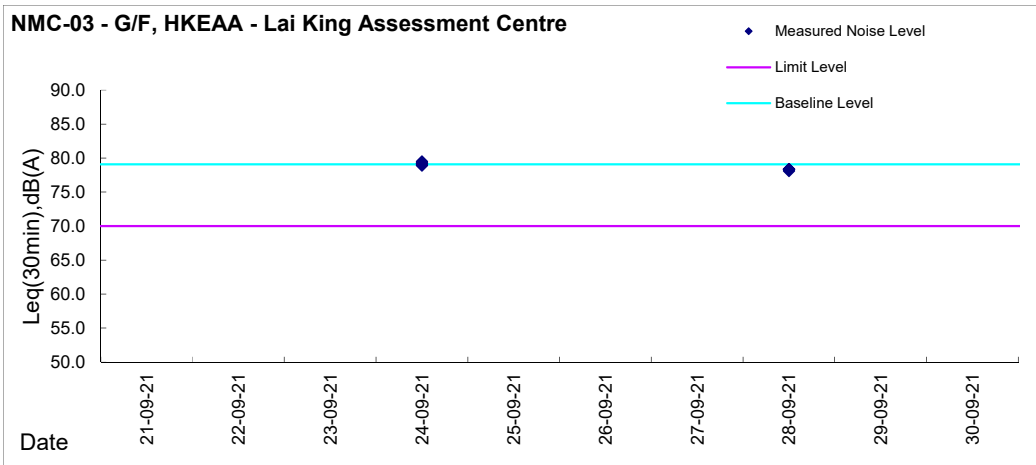
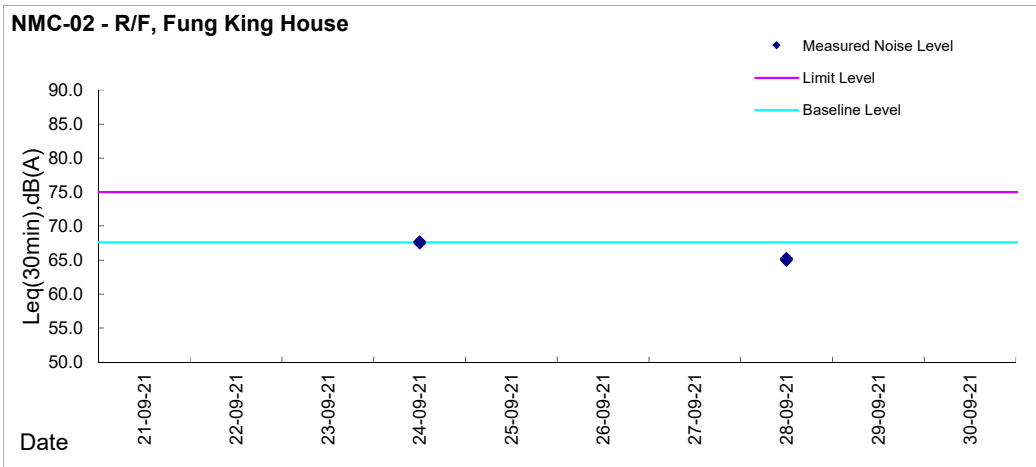
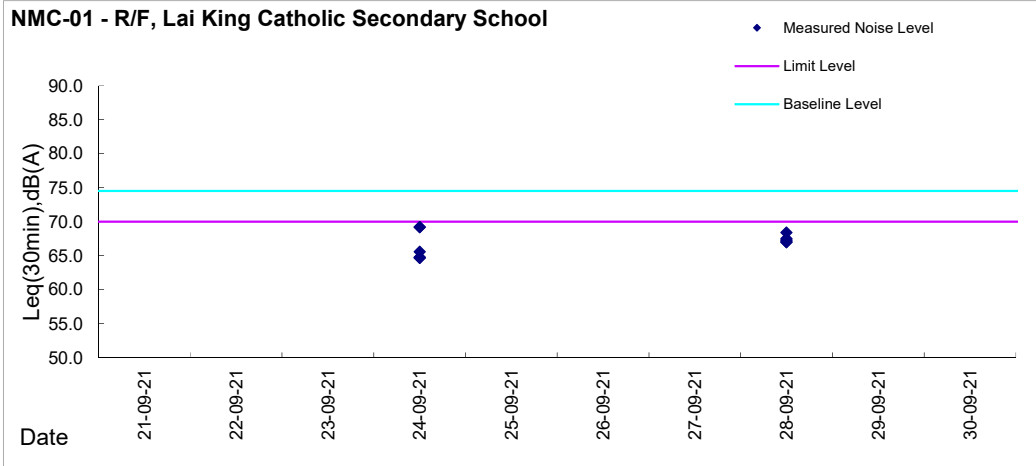
Location: NMC-03 - G/F, HKEAA - Lai King Assessment Centre

Date	Weather	Time	Measurement Noise Level			Average Noise Level	Baseline Level	Construction Noise Level	Limit Level
			Leq	L10	L90	Leq	Leq	Leq	Leq
			Unit: dB(A), (5-min)			Unit: dB(A), (30-min)			
24 Sep 2021	Fine	13:15	79.2	80.2	77.8	79	79.1	62	70
		13:20	79.3	80.4	77.8				
		13:25	79.5	80.5	78.1				
		13:30	79.0	80.1	77.6				
		13:35	78.9	79.9	77.6				
		13:40	79.2	80.5	77.7				
28 Sep 2021	Fine	13:05	78.3	79.5	76.9	78	79.1	<Baseline Level	70
		13:10	78.3	79.4	76.8				
		13:15	78.4	79.6	76.9				
		13:20	78.1	79.5	76.4				
		13:25	78.4	79.7	76.4				
		13:30	78.4	79.6	76.8				



Graphic Presentation of Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)





Appendix 5.3

Air Quality Monitoring Results and Graphical Presentations



Report on 1-hour TSP monitoring at AMC01- Lai King Catholic Secondary School

Action Level ($\mu\text{g}/\text{m}^3$) - 256.2

Limit Level ($\mu\text{g}/\text{m}^3$) - 500.0

Date	Weather Condition	Time	TSP Level ($\mu\text{g}/\text{m}^3$)
24-Sep-21	Rainy	9:47	14.6
24-Sep-21	Rainy	10:48	5.2
24-Sep-21	Rainy	13:01	4.7
28-Sep-21	Fine	9:47	61.8
28-Sep-21	Fine	10:48	51.5
28-Sep-21	Fine	13:01	41.7



Report on 1-hour TSP monitoring at AMC02 - Fung King House

Action Level ($\mu\text{g}/\text{m}^3$) -

256.7

Limit Level ($\mu\text{g}/\text{m}^3$) -

500.0

Date	Weather Condition	Time	TSP Level ($\mu\text{g}/\text{m}^3$)
24-Sep-21	Rainy	9:29	13.8
24-Sep-21	Rainy	10:30	8.2
24-Sep-21	Rainy	13:00	11.3
28-Sep-21	Fine	10:00	41.3
28-Sep-21	Fine	11:01	34.9
28-Sep-21	Fine	13:01	27.0



Report on 1-hour TSP monitoring at AMC03A - Ming King House

Action Level ($\mu\text{g}/\text{m}^3$) - 259.3

Limit Level ($\mu\text{g}/\text{m}^3$) - 500.0

Date	Weather Condition	Time	TSP Level ($\mu\text{g}/\text{m}^3$)
24-Sep-21	Rainy	9:39	68.2
24-Sep-21	Rainy	10:40	44.6
24-Sep-21	Rainy	11:41	50.4
28-Sep-21	Fine	9:50	142.5
28-Sep-21	Fine	10:51	127.8
28-Sep-21	Fine	13:01	109.0



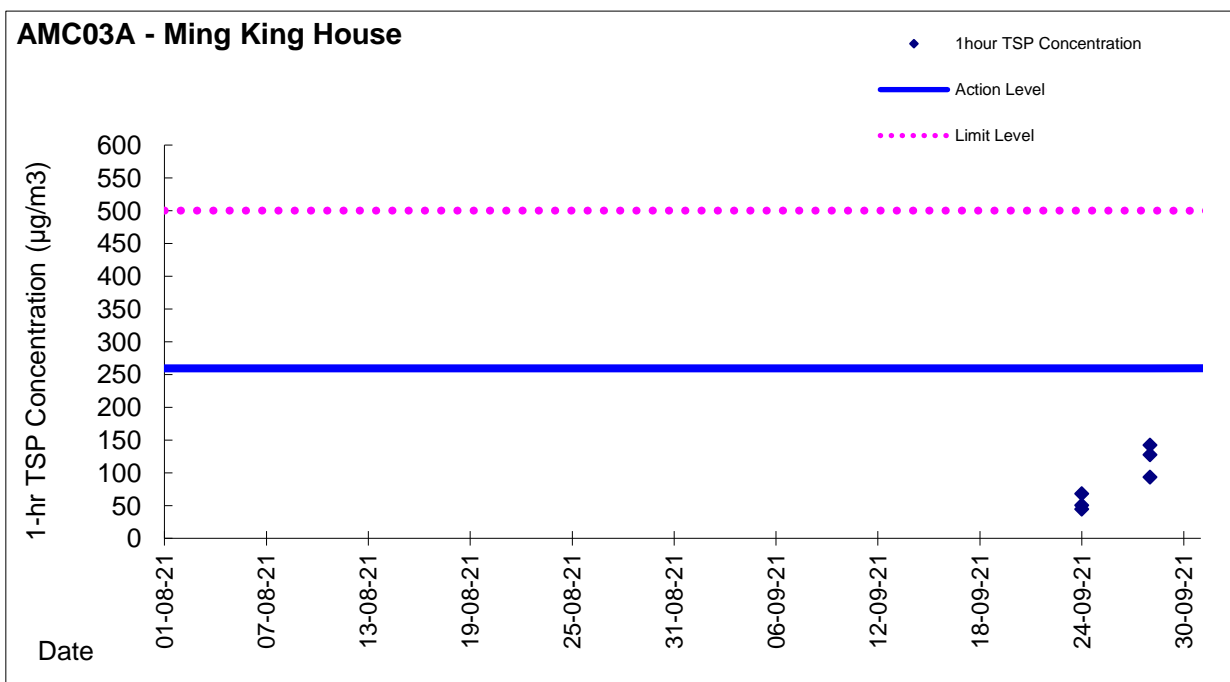
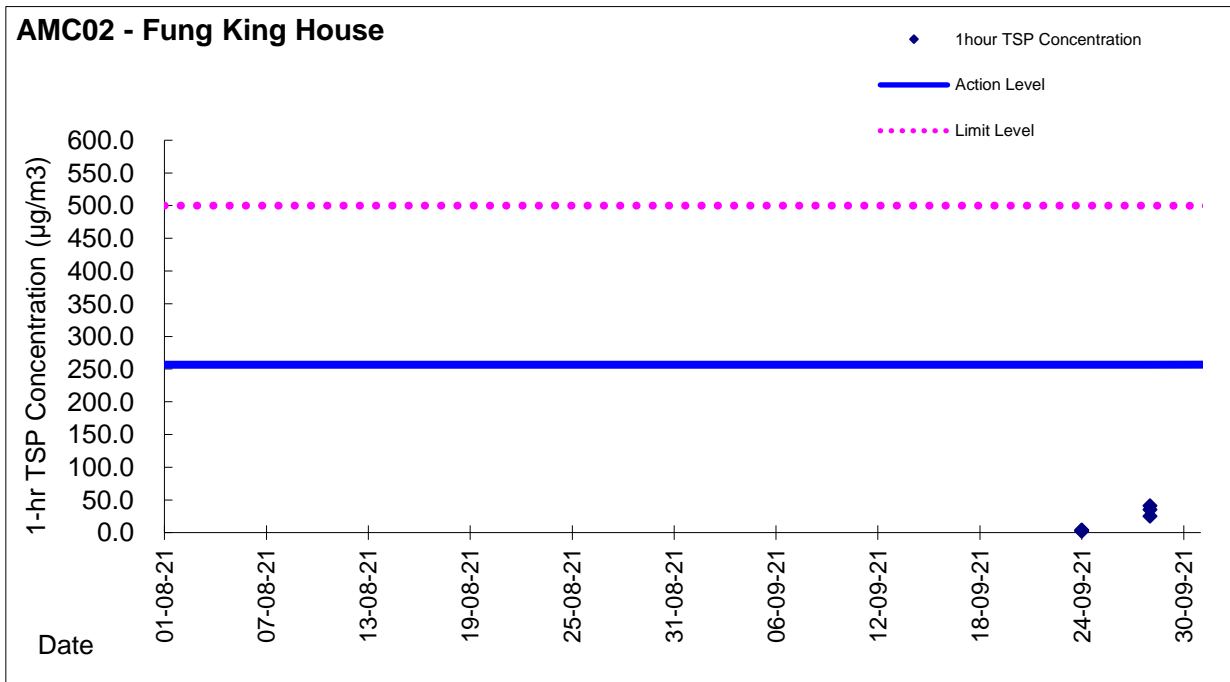
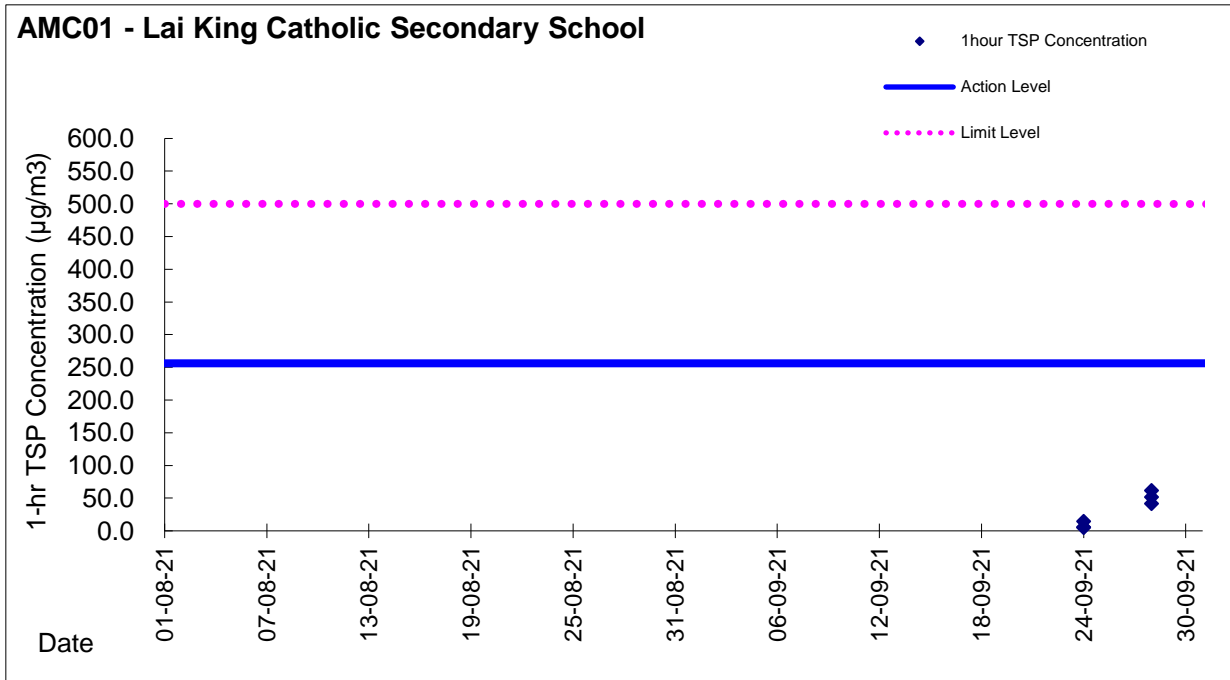
Contract No. HY/2020/08

Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road

	Date	Sampling Time	Weather Condition	Filter paper no.	Filter Weight, g		Elapse Time, hr		Sampling Time, hr	Flow Rate, m ³ /min			Total Volume, m ³	TSP Level, µg/m ³
					Initial	Final	Initial	Final		Initial, Qsi	Final, Qsf	Average		
AMC01	24-09-21	8:00	Rainy	AM1_24hr_008390	2.6762	2.6982	9477.05	9501.05	24.00	1.43	1.42	1.43	2053	10.7
	27-09-21	8:00	Fine	AM1_24hr_009524	2.6567	2.7158	9501.05	9525.05	24.00	1.42	1.42	1.42	2049	28.8
AMC02	24-09-21	8:00	Rainy	AM2_24hr_008389	2.6675	2.7158	30801.36	30825.36	24.00	1.28	1.27	1.28	1837	26.3
	27-09-21	8:00	Fine	AM2_24hr_009526	2.7829	2.9055	30825.36	30849.36	24.00	1.27	1.27	1.27	1832	66.9
AMC03a	24-09-21	8:00	Rainy	AM3a_24hr_008391	2.6567	2.6932	9425.03	9449.03	24.00	1.09	1.09	1.09	1568	23.3
	27-09-21	8:00	Fine	AM3a_24hr_009532	2.7715	2.8284	9449.03	9473.03	24.00	1.09	1.09	1.09	1563	36.4

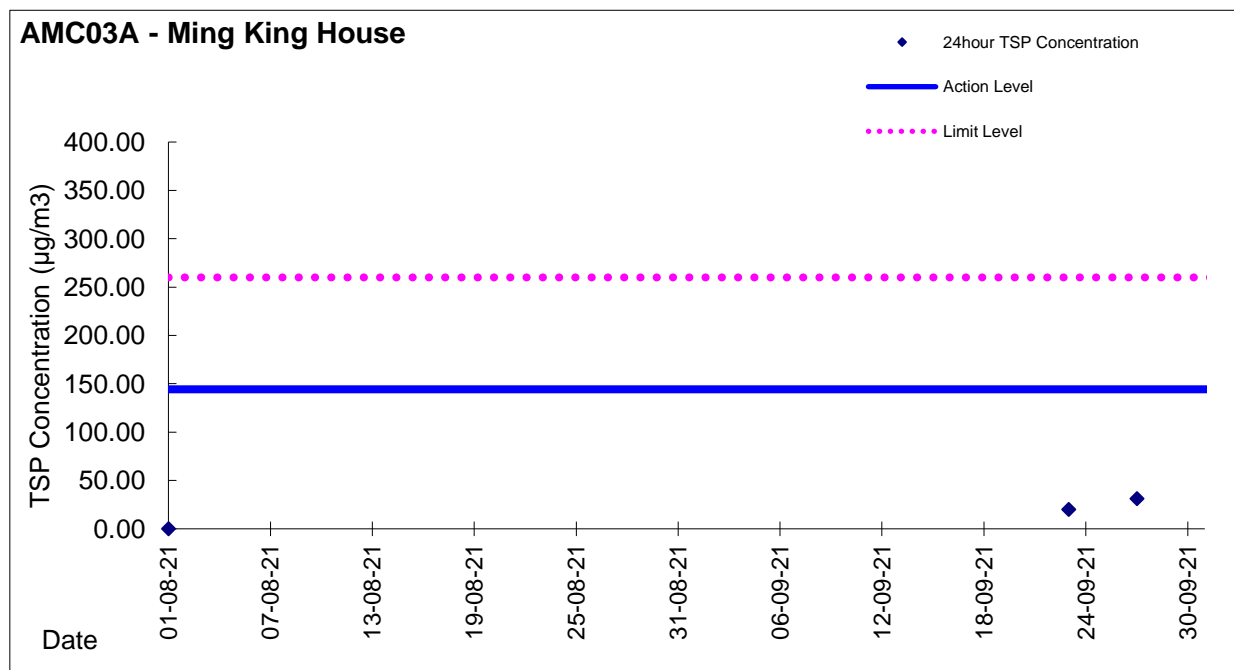
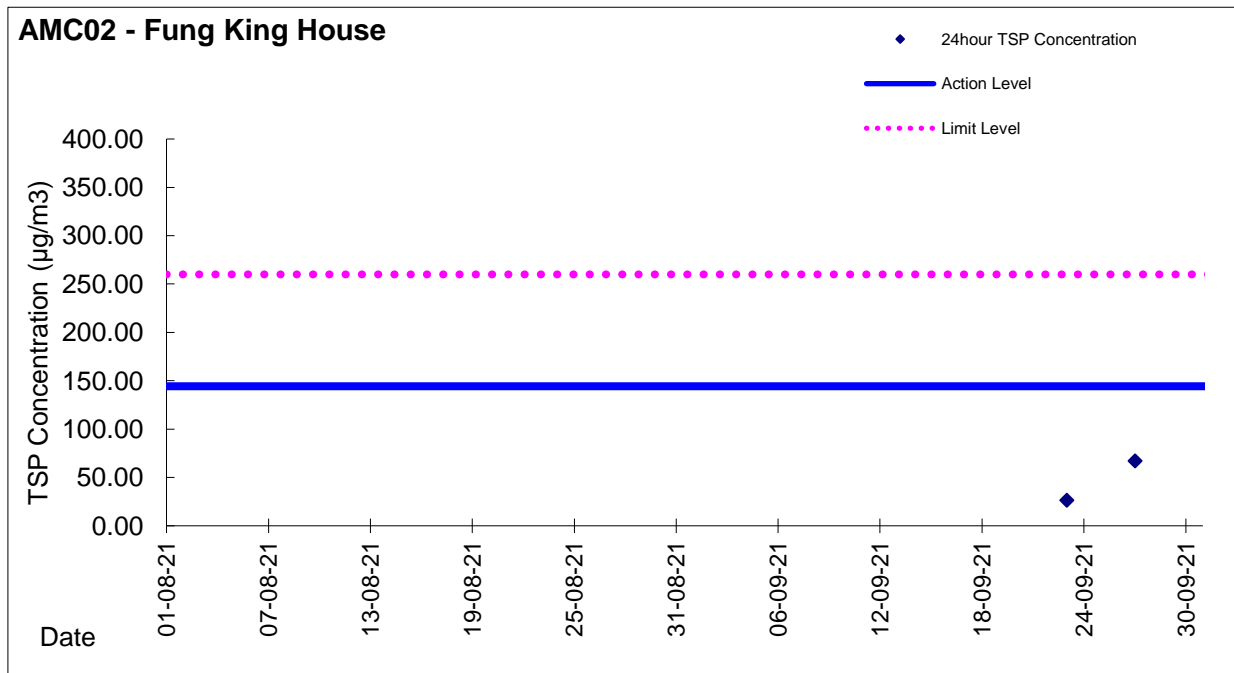
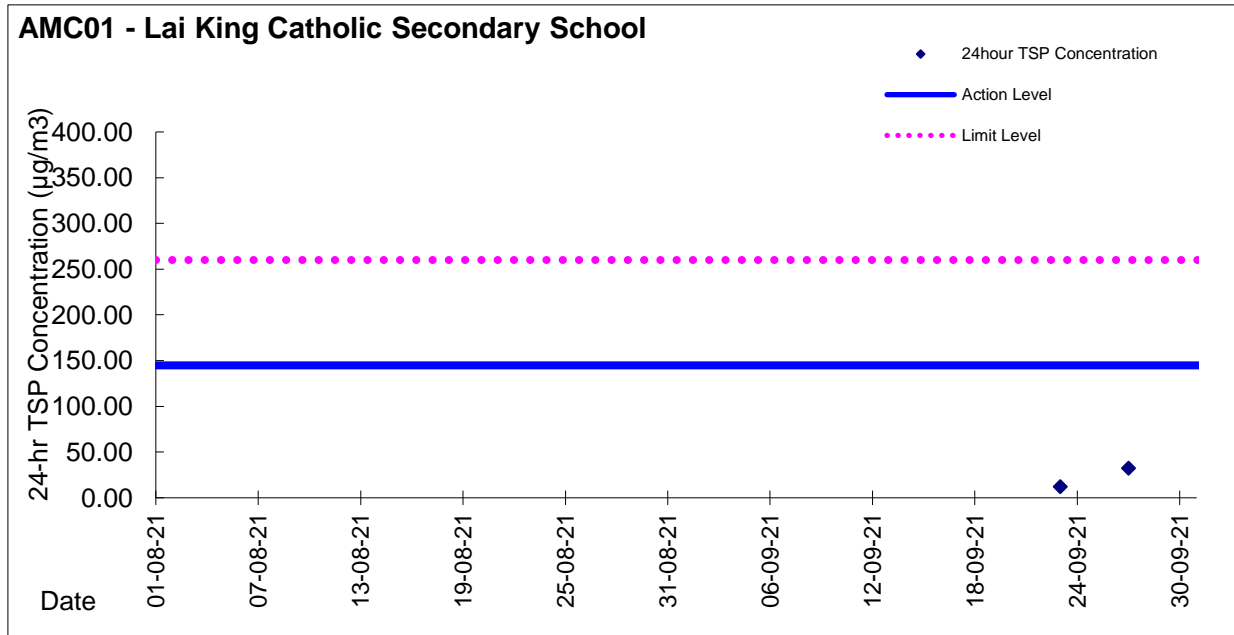


Graphic Presentation of 1-hour and 24-hour TSP Results





Graphic Presentation of 1-hour and 24-hour TSP Results





Appendix 5.4

Monthly Summary Waste Flow Table

Department: HyD
 Contract : HY/2020/08 - Flyover from Kwai Tsing Interchange Upramp to Kwai Chung Road



Monthly Summary Waste Flow Table for Year 2021

Month	Quantities of Inert C&D Materials Generated Monthly												Quantities of C&D Wastes Generated Monthly										
	Total Quantity Generated		Broken Concrete (see Note 2)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Imported Fill		Metals		Paper / Cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. general refuse		
	(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m ³)		
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	
Jan																							
Feb																							
Mar																							
Apr																							
May																							
Jun	0.006	0	0	0	0	0	0	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0	
Sub-total	0.006	0	0	0	0	0	0	0	0	0.006	0	0	0	0	0	0	0	0	0	0	0	0	
Jul	0.012	0	0	0	0	0	0	0	0	0.012	0	0	0	0	0	0	0	0	0	0	0.025	0.01	
Aug	0.016	0	0	0	0	0	0	0	0	0.016	0	0	0	0	0	0	0	0	0	0	0.025	0.015	
Sep	0.035	0	0	0	0	0	0	0	0	0.035	0	0	0	0	0	0	0	0	0	0	0.025	0.02	
Oct	0.05		0		0		0		0	0.05		0		0		0		0		0	0.02		
Nov	0.05		0		0		0		0	0.05		0		0		0		0		0	0.02		
Dec	0.05		0		0		0		0	0.05		0		0		0		0.01		0	0.02		
Total	0.219	0	0	0	0	0	0	0	0	0.219	0	0	0	0	0	0	0	0	0	0.01	0	0.145	0.045

Forecast of Total Quantities of C&D Materials to be Generated from the Contract																				
Total Quantity Generated	Broken Concrete (see Note 2)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Imported Fill		Metals		Paper / Cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. general refuse	
(in '000m ³)	(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m ³)	
2.1	0		0.53		0		1.55		0		0.1		0.3		0.05		0.05		1.03	

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the contract to be imported for use at the Site.
 - (2) Broken concrete for recycling into aggregates.
 - (3) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging material.



Appendix 6.1

Event and Action Plans

Event and Action Plan

Event and Action Plan for Construction Noise

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



Event and Action Plan for Construction Dust Monitoring

Event	Action			
	ET	IEC	ER	Contractor
Action Level				
1. Exceedance for one sample	1. Identify sources, investigate the causes of complaint and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding. 4. Increase monitoring	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods.	1. Notify the Contractor.	1. Rectify any unacceptable practices. 2. Amend working methods agreed with the ER as appropriate.
2. Exceedance for two or more consecutive samples	1. Identify sources. 2. Inform the IEC and ER. 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with the IEC, ER and Contractor on remedial action required. 7. If exceedance continues, arrange meeting with the IEC, Contractor and ER. 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures if required. 4. Advise the ER on the effectiveness of proposed remedial measures if required.	1. Notify the Contractor. 2. Ensure remedial measures properly implemented.	1. Submit proposals for remedial action to the ER within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal as appropriate.
Limit Level				
1. Exceedance for one sample	1. Identify sources, investigate causes of exceedance and proposed remedial measures. 2. Inform the IEC, ER, and Contractor. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of the Contractor's remedial action and keep the IEC and ER informed of the results.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures. 4. Advise the ER and ET on the effectiveness of the proposed remedial measures.	1. Confirm receipt of the notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal as appropriate.



Event	Action			
	ET	IEC	ER	Contractor
		5. Supervise the implementation of remedial measures.		
2. Exceedance for two or more consecutive samples	1. Notify the IEC, ER and Contractor. 2. Identify sources. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures with the ER to determine the possible mitigation to be implemented. 6. Arrange meeting with the IEC and ER to discuss the remedial action to be taken. 7. Assess the effectiveness of the Contractor's remedial action and keep the IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst the ER, ET and Contractor on the potential remedial action. 2. Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise the ER and ET accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of the notification of exceedance in writing. 2. Notify the Contractor. 3. In consultation with the IEC and ET, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what portion of works is responsible and instruct the Contractor to stop that portion of works until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the IEC and ET within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problems still not under control. 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.



Appendix 6.2

Summary of Notification of Exceedance



Summary for Notification of Exceedance

Ref No.	Date	Location	Parameters (Unit)	Measured	Action Level	Limit Level	Follow-up Action
-	-	-	-	-	-	-	-

Ref. No.	Date	Time	Location	Construction Noise Level	Parameter	Action Level	Limit Level	Follow-up action
-	-	-	-	-	-	-	-	-



Appendix 8.1

Complaint Log



Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
-	-	-	-	-	-	-



Appendix 9.1

Construction Programme

	Duration (Days)	Start	End
PRELIMINARIES			
Provision of Site Accommodation			
Project Manager 's Site Accommodation	60	06-Nov-21	04-Jan-22
Contractor 's Site Accommodation	60	06-Nov-21	04-Jan-22
Site Clearance			
Tree felling	50	16-Aug-21	04-Oct-21
Demoliton of existing PWRL compounds	21	02-Oct-21	22-Oct-21
Monitoring and Instrumentation			
Installation of monitoring instruments	14	22-Sep-21	05-Oct-21
LANDSCAPE WORKS			
Tree Transplantation			
Transplanting of existing trees	14	24-Nov-21	07-Dec-21
BRIDGE G			
Ground Investigation			
Pier G1 - Pre-drilling	6	11-Sep-21	16-Sep-21
Pier G2 - Pre-drilling	5	04-Oct-21	08-Oct-21
BRIDGE H			
Ground Investigation			
Pier H4 - Pre-drilling	4	17-Sep-21	20-Sep-21
Pier H1 - Pre-drilling	6	05-Nov-21	10-Nov-21
Pier H2 - Pre-drilling	5	11-Nov-21	15-Nov-21
Pier H3 - Pre-drilling	5	29-Sep-21	03-Oct-21
Pier H5 - Pre-drilling	4	22-Oct-21	25-Oct-21
Pier H6 - Pre-drilling	4	18-Oct-21	21-Oct-21
Pre-bored Socketed H-piles			
Pier H1 - Piles (12 nos.)	42	11-Nov-21	22-Dec-21
Pier H2 - Piles (30 nos.)	120	23-Dec-21	21-Apr-22
Pier H3 - Piles (16 nos.)	49	28-Dec-21	14-Feb-22
Pier H4 - Piles (16 nos.)	49	15-Feb-22	04-Apr-22
Pier H5 - Piles (16 nos.)	49	05-Apr-22	23-May-22
Pier H6 - Piles (15 nos.)	49	24-May-22	11-Jul-22
Utility & Road Diversion			
Demolition of existing planter	5	23-Sep-21	27-Sep-21
Drainage diversion	28	28-Sep-21	25-Oct-21
Road diversion	10	26-Oct-21	04-Nov-21
Water main diversion	28	05-Nov-21	02-Dec-21

	Duration (Days)	Start	End
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FOOTBRIDGE

Lift tower LT1 and staircase (north)

Pile cap PC1 - Pre-drilling	4	21-Sep-21	24-Sep-21
Pile cap PC5 - Pre-drilling	4	25-Sep-21	28-Sep-21
Pile cap PC1 - Piles (8 nos.)	56	05-Oct-21	29-Nov-21
Pile cap PC5 - Piles (4 nos.)	28	30-Nov-21	27-Dec-21

Lift tower LT2 and staircase (south)

Pile cap PC4 - Pre-drilling	3	09-Oct-21	11-Oct-21
Pile cap PC6 - Pre-drilling	3	12-Oct-21	14-Oct-21
Pile cap PC2 - Pre-drilling	3	15-Oct-21	17-Oct-21
Temporary footpath diversion	7	02-Oct-21	08-Oct-21
Water main diversion	35	09-Oct-21	12-Nov-21
Pile cap PC4 - Piles (4 nos.)	28	12-Oct-21	08-Nov-21
Pile cap PC6 - Piles (4 nos.)	28	13-Nov-21	10-Dec-21
Pile cap PC2 - Piles (7 nos.)	49	11-Dec-21	28-Jan-22