Vol. 1 of 5

EP-457/2013/D

Central Kowloon Route

Central Tunnel

Contract No. HY/2018/08

December 2023

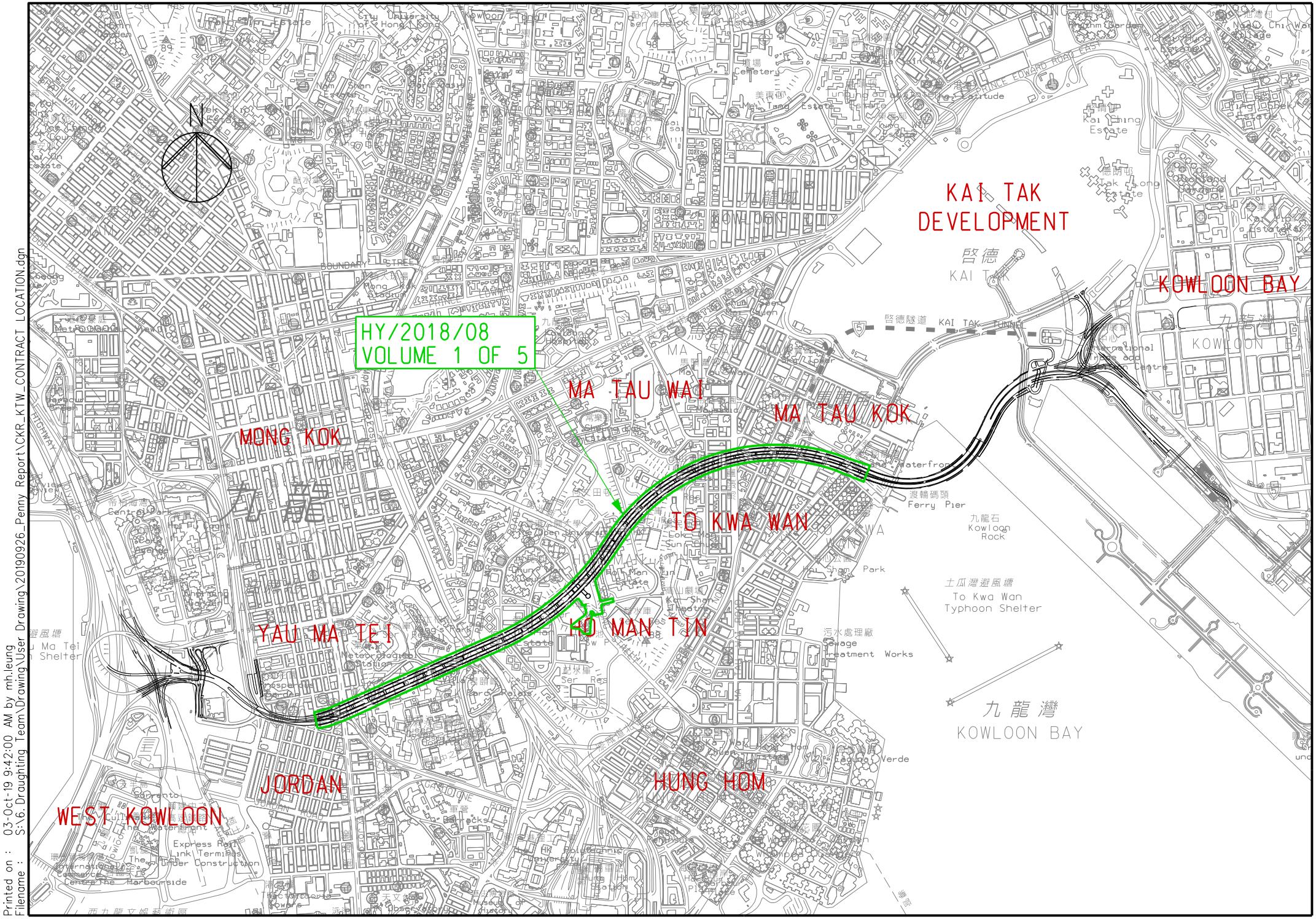


Figure 1 - Site Layout Plan of the Contract

Monthly EM&A Report No. 52 (December 2023)

0097/19/ED/0880 02 | 10 January 2024
Verified
Bouygues Travaux Publics – Contract No. HY/2018/08

路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

ERM

Environmental Permit No. EP-457/2013/D

Central Kowloon Route

Independent Environmental Checker Verification

Works Contract:	**Central Tunnel (HY/2018/08)**

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	Monthly EM&A Report No.52
Date of Report:	10 January 2024
Date received by IEC:	10 January 2024

Reference EP Condition

Environmental Permit Condition: 3.4

Submission of Monthly EM&A Report of the Project

3.4 Four hard copies and one electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of each reporting month throughout the entire construction period. The EM&A Reports shall include a summary of all non-compliance. The submissions shall be certified by the ET Leader and verified by the IEC as complying with the requirements as set out in the EM&A Manual before submission to the Director. Additional copies of the submission shall be provided to the Director upon request by the Director.

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-457/2013/D.

Ms Mandy To Date: 10 January 2024

Independent Environmental Checker

Our ref: 0436942_IEC Verification Cert_CT_Monthly EM&A Rpt No.52_20240110.docx

Document Control

Document Information

Project Title	Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel
Document Title	Monthly EM&A Report No. 52 (December 2023)
Fugro Project No.	0097/19
Fugro Document No.	0097/19/ED/0880
Issue Number	02
Issue Status	Verified

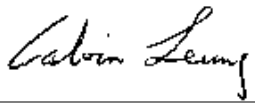
Client Information

Client	Bouygues Travaux Publics – Contract No. HY/2018/08
Client Address	Bouygues Travaux Publics, 3/F, Island Place Tower, 510 King's Road, North Point, Hong Kong
Client Contact	Mr. KAM Hing Lam, Alan
Client Document No.	Consultancy Agreement No. CA0001

Revision History

Issue	Date	Status	Comments on Content	Prepared By	Review and certified By
02	10 January 2024	Verified	No adverse comment from IEC	EC	CL
01	8 January 2024	Amended	IEC's comment released	EC	CL

Environmental Team

Initials	Name	Role	Signature
EC	**Eric T. Chan**	**Assistant Environmental Consultant**	
CL	**Calvin M.P. Leung**	**Environmental Team Leader**	

EXECUTIVE SUMMARY

I. Introduction

This is the 52nd Monthly EM&A Report prepared by Fugro Technical Services Limited for the Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel. The Contract No. HY/2018/08 commenced on 19 September 2019. This report summarized the monitoring results and audits findings of the EM&A programme under the issued EP (EP No.: EP-457/2013/D) and in accordance with the EM&A Manual during the reporting period from 01/12/2023 to 31/12/2023.

II. Summary of Main Works Undertaken and Key Measures Implemented

The main construction works carried out in the reporting period were as follow:

Ho Man Tin

- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Struct installation and D-wall coring;
- ELS excavation
- Site and shaft installation.

Yau Ma Tei

- Drill and break excavation;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Mucking out from tunnel;
- Site and shaft installation.

Ma Tau Kok

- Drill and break excavation;
- TBM pilot tunnel enlargement;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Mucking out from tunnel and horizontal access;
- Site and shaft installation.

Kai Tak Barging Point

- Material storage.

Sheung Lok Street

- Concreting.

Ma Hang Chung Road

- Concreting.

III. Summary of Exceedances, Investigation and Follow-up

No Action and Limit Level exceedance was recorded for construction dust monitoring in the reporting month.

One (1) Action Level exceedance was recorded for construction noise due to the noise-related complaints received in the reporting month. No Limit Level exceedance was recorded for construction noise monitoring in the reporting month.

IV. Complaint Handling, Prosecution and Public Engagement.

All complaints received in the last reporting month were finalized.

One (1) water quality-related complaint (i.e. 4th December 2023) and one (1) noise-related complaint (i.e. 30th December 2023) was received in the reporting month.

The complaint cases in November and December 2023 are summarized in **Table I**.

Table I Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From	Nature of Complaint	Status
EC180_CKRCT20231124_746	24th November 2023	The Contractor Hotline	Construction dust	Investigation report was finalized on 27th December 2023.
EC181_CKRCT20231204_755	4th December 2023	1823	Blocked gullies	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.
EC182_CKRCT20231230_758	30th December 2023	The Contractor Hotline	Construction noise at night	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.

No notification of summons and prosecutions were received in the reporting period.

No public engagement activities were conducted in the reporting period.

V. Reporting Change

There were no reporting changes during the reporting month.

VI. Future Key Issues

The main works will be anticipated in the next reporting period are as follow:

Ho Man Tin

- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Removal of D-wall;
- ELS excavation;
- CLP Room demolition and slope reinstatement;
- Tower crane and foundation dismantling work.

Yau Ma Tei

- Drill and break excavation;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Mucking out from tunnel;
- Site and shaft installation.

Ma Tau Kok

- Drill and break excavation;
- TBM pilot tunnel enlargement;
- Underbreak scaling and smoothing works;
- Invert, lining and OVHD construction;
- Mucking out from tunnel and horizontal access;
- Site and shaft installation.

Kai Tak Barging Point

- Material Storage.

Sheung Lok Street

- Concreting.

Ma Hang Chung Road

- Concreting.

The recommended mitigation measures corresponding to the main works in the next reporting period are listed as follow:

- Good relationship shall be maintained with the nearby sensitive receivers/ stakeholders which may be affected by the construction works such as providing better/ more detail information of the work nature and inform in advance of the works to the nearby residents;
- Any excavated, stockpile of dusty material or load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting;
- All construction plants / machineries should be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission;
- All C&D materials generated should be transported and stored at temporary storage area. Suitable materials should be sorted for reuse on-site;
- Every vehicle shall be cleaned thorough at the designated wheel washing area onsite;
- Wastewater generated from drilling shall be properly collected for reuse or treated by wastewater treatment facilities before discharge;
- Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance;
- Erecting temporary noise barrier for noisy Powered Mechanical Equipment (PME) and deployment of Quality Powered Mechanical Equipment (QPME) as many as practicable;

- Conditions in the Environmental Permit and License should be followed;
- All recommended mitigation measures specified in the approved EIA Report and EM&A Manual shall be implemented;
- All vehicles should be cleaned before leaving the construction site to ensure no muddy deposited by them on roads.

The following EP submissions were submitted during the reporting month:

Table II Status of Required Submission under Environmental Permit

EP Condition	Submission	Submission Date
3.4	Monthly EM&A Report (November 2023)	14 December 2023

Contents

EXECUTIVE SUMMARY		**iii**
1.	**INTRODUCTION**	**1**
1.1	Background	1
1.2	Project Organization	2
1.3	Construction Programme and Activities	2
1.4	Works undertaken during the month	2
1.5	Status of Environmental Licences, Notification and Permits	2
2.	**ENVIRONMENTAL MONITORING REQUIREMENTS**	**4**
2.1	Construction Dust and Noise Monitoring Location	4
2.2	Construction Dust Monitoring	5
2.3	Construction Noise Monitoring	7
2.4	Construction Dust and Noise Monitoring Schedule	8
2.5	The Action and Limit Levels	8
2.6	Landscape and Visual	8
3.	**ENVIRONMENTAL MONITORING RESULTS**	**9**
3.1	Construction Dust Monitoring	9
3.2	Construction Noise Monitoring	9
3.3	Waste Management	10
3.4	Landscape and Visual	10
4.	**ENVIRONMENTAL SITE INSPECTION AND AUDIT**	**11**
5.	**ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE**	**12**
5.1	Complaint Handling, Prosecution and Public Engagement	12
5.2	Summary of Environmental Non-Compliance	12
5.3	Summary of Monitoring Exceedance	12
6.	**IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURE**	**13**
7.	**FUTURE KEY ISSUES**	**14**
8.	**CONCLUSION AND RECOMMENDATIONS**	**16**

Tables

Table I – Environmental Complaints Log ii
Table II – Status of Required Submission under Environmental Permit iii
Table 1.1 – Contact Information of Key Personnel 2
Table 1.2 – Environmental Licenses, Notification and Permits Summary 2
Table 2.1 – Construction Dust and Noise Monitoring Location 3
Table 2.2 – Construction Dust Monitoring Equipment 3
Table 2.3 – Construction Noise Monitoring Parameters, Frequency and Duration 6
Table 2.4 – Construction Noise Monitoring Equipment 6
Table 3.1 – Summary of 1-hour TSP Monitoring Results in the Reporting Period 8
Table 3.2 – Summary of 24-hour TSP Monitoring Results in the Reporting Period 8
Table 3.3 – Summary of Construction Noise Monitoring Results in the Reporting Period 8
Table 4.1 – Observations and Recommendation of Site Inspection in the Reporting Period 10
Table 5.1 – Environmental Complaints Log 12
Table 6.1 – Status of Required Submission under Environmental Permit 14

Figures

Figure 1 The Site Layout Plan of the Contract

Figure 2.1 The Location of the Construction Dust and Noise Monitoring Stations (Ho Man Tin)

Figure 2.2 The Location of the Construction Dust and Noise Monitoring Stations (Ma Tau Kok)

Figure 2.3 The Location of the Construction Dust and Noise Monitoring Stations (Yau Ma Tei)

Appendices

Appendix A	Construction Programme
Appendix B	Project Organization Chart
Appendix C	Calibration Certificate for Construction Dust Monitoring Equipment
Appendix D	Calibration Certificate for Construction Noise Monitoring Equipment
Appendix E	Environmental Monitoring Schedule
Appendix F	Action and Limit Levels for Construction Dust and Noise Monitoring
Appendix G	Construction Dust Monitoring Results and Meteorological Observations
Appendix H	Construction Noise Monitoring Results
Appendix I	Event and Action Plan
Appendix J	Implementation Status of Environment Mitigation Measures (Construction Phase)
Appendix K	Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions
Appendix L	Waste Flow Table

1 INTRODUCTION

1.1 Background

1.1.1 In order to meet the traffic demand and relieve traffic congestion on the existing east-west roads across Central Kowloon, Central Kowloon Route (CKR) (hereinafter referred to as "the Project") is proposed which is a 4.7 km long dual 3-lane trunk road in Central Kowloon linking Yau Ma Tei Interchange in West Kowloon with the road network on Kai Tak Development and Kowloon Bay in East Kowloon.

1.1.2 The Central Kowloon Route – Design and Construction Environmental Impact Assessment Report (Register No.: AEIAR-171/2013) was approved with conditions by the Environmental Protection Department (EPD) on 11 July 2013. An Environmental Permit (EP-457/2013) was issued on 9 August 2013. A variations of EP (VEP-594/2021) was applied on 26 May 2021 and the latest EP (EP-457/2013/D) was issued by EPD on 15 June 2021.

1.1.3 Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel (hereinafter referred to as "the Contract"), is one of the contracts of CKR which included the construction of the central tunnel, cut-and-cover tunnels at Yau Ma Tei and Ma Tau Kok and construction of piles and diaphragm walls for Ho Man Tin ventilation building.

1.1.4 Fugro Technical Services Limited (FTS) was appointed by Bouygues Travaux Publics (BTP) as the Environmental Team (ET) under the Contract no. HY/2018/08) to execute the environmental monitoring and audit (EM&A) programme under the issued EP (EP No.: EP-457/2013/D) and in accordance with the EM&A Manual.

1.1.5 This is the 52nd Monthly EM&A Report prepared by FTS for the Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel. The Contract No. HY/2018/08 commenced on 19 September 2019. This report summarized the monitoring results and audits findings of the EM&A programme under the issued EP (EP No.: EP-457/2013/D) and in accordance with the EM&A Manual during the reporting period from 1/12/2023 to 31/12/2023.

1.2 Project Organization

1.2.1 The Project Organization structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1**.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone
Highways Department (HyD)	E13/CKR	Mr. Joe Lam	2762 3380
Arup-Mott MacDonald Joint Venture (AMMJV)	Senior Resident Engineer	Mr. Ben Poon	3619 5967
ERM-Hong Kong, Limited (ERM)	Independent Environmental Checker (IEC)	Ms. Mandy To	2271 3000
Bouygues Travaux Publics (BTP)	Environmental Manager	Mr. Simon Wong	9281 4346
Fugro Technical Services Limited	ET Leader	Mr. Calvin Leung	3565 4441

1.3 Construction Programme and Activities

1.3.1 The construction phase of this Contract under the EP commenced in October 2019. The site layout plan of the Contract is shown in **Figure 1**.

1.3.2 The construction programme of this Contract is shown in **Appendix A**.

1.4 Works undertaken during the month

1.4.1 The main construction works carried out in the reporting period were as follow:

Ho Man Tin

- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Struct installation and D-wall coring;
- ELS excavation;
- Site and shaft installation.

Yau Ma Tei

- Drill and break excavation;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Mucking out from tunnel;
- Site and shaft installation.

Ma Tau Kok

- Drill and break excavation;
- TBM pilot tunnel enlargement;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction
- Mucking out from tunnel and horizontal access;
- Site and shaft installation.

Kai Tak Barging Point

- Material storage.

Sheung Lok Street

- Concreting.

Ma Hang Chung Road

- Concreting.

1.5 Status of Environmental Licences, Notification and Permits

1.5.1 A summary of the relevant permits, licenses and/or notifications on environmental protection for this Contract is presented in **Table 1.2**.

Table 1.2 Environmental Licenses, Notification and Permits Summary

Permit/ Notification/ License	Reference No	Valid From	Valid Till
Form NB	448930, 448970, 448971	Mid-Sep 2019	NA
Billing Account for Disposal of C&D waste	Account no. 7034790	06 Aug 2019	NA
Chemical Waste Producer Registration (Ho Man Tin Construction site)	5111-236-B2557-02	25 Sep 2019	NA
Chemical Waste Producer Registration (Yau Ma Tei Construction site)	5213-225-B2557-05	19 Apr 2021	NA
Chemical Waste Producer Registration (Ma Tau Kok Construction site)	5213-247-B2557-06	19 Apr 2021	NA
Construction Noise Permit			
Construction Noise Permit (Ho Man Tin Construction site)	GW-RE1416-23	14 Nov 2023	13 Jan 2024
Construction Noise Permit (Yau Ma Tei Construction site)	GW-RE1281-23	13 Oct 2023	12 Jan 2024
Construction Noise Permit (Yau Ma Tei Construction site)	GW-RE1183-23	23 Sep 2023	22 Dec 2023
Construction Noise Permit (Yau Ma Tei Construction site)[1]	GW-RE1606-23	23 Dec 2023	22 Mar 2024
Construction Noise Permit (Ma Tau Kok Construction site)	GW-RE1336-23	04 Nov 2023	03 Feb 2024
Construction Noise Permit (Ma Tau Kok Construction site)	GW-RE1271-23	18 Oct 2023	17 Dec 2023
Construction Noise Permit (Ma Tau Kok Construction site)[2]	GW-RE1547-23	18 Dec 2023	17 Feb 2024
Construction Noise Permit (Kai Tak Barging Point)	GW-RE0547-23	01 Jun 2023	30 Nov 2023
Construction Noise Permit (Kai Tak Barging Point)[3]	GW-RE1526-23	01 Dec 2023	29 Apr 2024
Construction Noise Permit (Sheung Lok Street)	GW-RE1422-23	14 Nov 2023	13 Mar 2024
Water Discharge License			
Water Discharge License	WT00034873-2019 (Ho Man Tin Construction site)	22 Nov 2019	30 Nov 2024
	WT00035436-2019 (Portion 18)	02 Apr 2020	30 Apr 2025
	WT00037723-2021 (Yau Ma Tei Construction site)	07 Apr 2021	30 Apr 2026
	WT00037883-2021 (Ma Tau Kok Construction site)	30 Apr 2021	30 Apr 2026
	WT00042304-2022 (Sheung Lok Street)	13 Oct 2022	31 Oct 2027
	WT10001427-20233 (Ma Hang Chung Road)	4 Dec 2023	31 Dec 2028

Notes:

[1] GW-RE1183-23 was superseded by GW-RE1606-23 since 23 December 2023.

[2] GW-RE1271-23 was superseded by GW-RE1547-23 since 18 December 2023.

[3] GW-RE0547-23 was superseded by GW-RE1526-23 since 1 December 2023.

2 ENVIRONMENTAL MONITORING REQUIREMENTS

2.1 Construction Dust and Noise Monitoring Locations

2.1.1 Three construction dust monitoring locations and five construction noise monitoring locations pertinent to the Project have been identified based on the approved EM&A Manual for the Project. The locations of the construction dust and noise monitoring stations are summarized in **Table 2.1** as displayed in **Figures 2.1 - 2.3**.

Table 2.1 Construction Dust and Noise Monitoring Locations

Dust Monitoring Station ID	Noise Monitoring Station ID	Monitoring Location
M-A3	M-N3	SKH Tsoi Kung Po Secondary School
/	E-N12a	19 Hing Yan Street
E-A14a	E-N21a	Block B of Merit Industrial Centre
W-A6	/	Man Cheong building
/	W-N18	Hydan Place
/	W-N25A	Prosperous Garden Block 1

Notes:

1. The dust and noise monitoring stations proposed in the EM&A Manual for M-A6/ M-N6 (i.e. Ko Fai House, Kwun Fai Court) was not available for impact dust and noise monitoring, therefore impact monitoring was conducted at M-A3/ M-N3 as an alternative which was agreed by the ER, IEC and EPD;
2. The noise monitoring station proposed in the EM&A Manual for E-N12 (i.e. Grand Waterfront Tower 3) was not available for impact dust and noise monitoring, therefore impact monitoring was conducted at E-N12a as an alternative which was agreed by the ER, IEC and EPD;
3. The dust and noise monitoring stations proposed in the EM&A Manual for E-A14 (i.e. Wyler Gardens) and E-N21 (i.e Hang Chien Court Block J) was not available for impact dust and noise monitoring, therefore impact monitoring was conducted at E-A14a/ E-N21a as an alternative which was agreed by the ER, IEC and EPD;
4. The dust monitoring stations proposed in the EM&A Manual for W-A5 (i.e. The Coronation) was not available for impact dust monitoring, therefore impact monitoring was conducted at W-A6 as an alternative which was agreed by the ER, IEC and EPD.

2.1.2 The construction dust and noise monitoring locations at M-A3 and M-N3 are covered by Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel whereas the construction dust and noise monitoring locations at E-A14a, E-N12a and E-N21a are now covered by Contract No. HY/2014/07 Central Kowloon Route – Kai Tak West. The monitoring results at E-A14a, E-N12a and E-N21a in the reporting month are presented in the monthly EM&A Report prepared by Contract No. HY/2014/07.

2.1.3 The construction dust and noise monitoring locations at W-A6, W-N18 and W-N25A are now covered by Contract No. HY/2014/08 Central Kowloon Route –Yau Ma Tei East. The monitoring results at W-A6, W-N18 and W-N25A in the reporting month are presented in the monthly EM&A Report prepared by Contract No. HY/2014/08.

2.2 Construction Dust Monitoring

Monitoring Requirement

2.2.1 In accordance with the approved EM&A Manual, 1-hour and 24-hour Total Suspended Particulates (TSP) levels should be measured at the designated air quality monitoring stations to indicate the impacts of construction dust on air quality. Regular Impact 24-hour TSP monitoring should be carried out for at least once every 6 days, and 1-hour TSP monitoring should be done at least 3 times every 6 days when the highest dust impact occurs.

Monitoring Equipment

2.2.2 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) deployed at the designated monitoring station. The HVS shall meet all the requirements of the EM&A Manual.

2.2.3 A portable direct reading dust meter was used to carry out the 1-hour TSP monitoring.

2.2.4 The model of the dust monitoring equipment used is summarized in **Table 2.2**.

Table 2.2 Construction Dust Monitoring Equipment

Equipment	Brand	Model	Serial No.
High Volume Sampler (24-hour TSP)	Tisch	TE-5170	4388
Calibrator	Tisch	TE-5025A	2456
Portable direct reading dust meter (1-hour TSP)	Sibata	LD-5R	882147

Monitoring Methodology for HVS

2.2.5 The following guidelines were adopted during the installation of HVS:

- Sufficient support is provided to secure the samplers against gusty wind.
- No two samplers are placed less than 2 meters apart.
- The distance between the sampler and an obstacle, such as buildings, is at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samples.
- A minimum of 2 meters separation from any supporting structure, measured horizontally is required.
- No furnaces or incineration flues are nearby.
- Airflow around the samplers is unrestricted.
- The samplers are more than 20 meters from the drip line.
- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
- Permission must be obtained to set up the samplers and to obtain access to the monitoring stations.
- A secured supply of electricity is needed to operate the samplers.

2.2.6 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler shall be properly set. The power supply should be checked to ensure the proper functioning of the sampler. The sampler is recommended to be operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.

2.2.7 The filter holding frame should be removed by loosening the four nuts and placing carefully a weighted and conditioned filter at the centre with the stamped number upwards on a supporting screen.

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

2.2.9 A programmed timer should be used to control the duration of operation. Information should be recorded on the record sheet, which included the starting time, the weather condition and the filter number.

2.2.10 After sampling process is finished, the filter should be removed and sent to the laboratory for weighting. The elapsed time should also be recorded.

2.2.11 All filters should be equilibrated in a conditioning environment for 24 hours before weighting. The conditioning environment temperature should be between 25°C and 30°C and not vary by more than ±3°C; the relative humidity (RH) should be <50% and not vary by more than ±5%. A convenient working RH is 40%.

Maintenance and Calibration for HVS

2.2.12 The high volume motors and their accessories should be properly maintained, including routine motor brushes replacement and electrical wiring checking, to ensure that the equipment and a continuous power supply were in good working condition.

2.2.13 Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at fortnightly intervals. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration certificate for the HVS is provided in **Appendix C**.

Monitoring Methodology for Direct Reading Dust Meter

2.2.14 Portable Laser Particle Photometer Monitors should be operated in accordance with the Manufacturer's instruction Manual as below:

a) Pulling up the air sampling inlet cover
b) Changing the Mode 0 to BG
c) Pressing Start/Stop switch
d) Turning the knob to SENSI.ADJ and press it
e) Pressing Start/Stop switch again
f) Returning the knob to the position MEASURE slowly
g) Pressing the timer set switch to set measuring time
h) Removing the cap and start the measurement

Maintenance and Calibration for Direct Reading Dust Meter

2.2.15 ET shall submit sufficient information to the IEC to prove that the instrument is capable of achieving comparable results to the HVS. The instrument should also be calibrated regularly, and the 1-hour sampling shall be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method. The calibration certificate for the direct reading dust meter is provided in **Appendix C**.

2.3 Construction Noise Monitoring

Monitoring Requirement

2.3.1 In accordance with the EM&A Manual, impact noise monitoring should be conducted at the designated noise monitoring stations for at least once a week during the construction phase of the Project. The parameters, frequency and duration of impact noise monitoring is summarized in **Table 2.3**.

Table 2.3 Construction Noise Monitoring Parameters, Frequency and Duration

Parameter	Duration	Frequency
A-weighted equivalent continuous sound pressure level (Leq). L10 and L90 were also recorded	30 minutes	At least once per week

Monitoring Equipment

2.3.2 Noise monitoring was performed using sound level meter at the designated monitoring station. The sound level meters deployed comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to check the sound level meters at a known sound pressure level.

2.3.3 The model of the noise monitoring equipment used is summarized in **Table 2.4**.

Table 2.4 Construction Noise Monitoring Equipment

Equipment	Brand	Model	Serial No.
Acoustic Calibrator	Casella	CEL-120/1	2092809
Sound Level Meter	Casella	CEL-63X	4181568

Monitoring Methodology

2.3.4 Noise measurement should be conducted as the following procedures:

a) Free field measurements were made at monitoring location M-N3. A correction of +3 dB(A) shall be made to the free field measurements.
b) The battery condition should be checked to ensure good functioning of the meter.
c) Parameters such as frequency weighting, the time weighting and the measurement time should set as follow:

(i) Frequency weighting: A
(ii) Time weighting: Fast

(iii) Measurement time: 30 minutes

d) Prior to and after noise measurement, the meter shall be calibrated using the calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB, the measurement will be considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
e) The wind speed at the monitoring station shall be checked with the portable wind meter. Noise monitoring should be cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.
f) Noise measurement should be paused during periods of high intrusive noise if possible and observation shall be recorded when intrusive noise is not avoided.
g) At the end of the monitoring period, the Leq, L10 and L90 should be recorded. In addition, site conditions and noise sources should also be recorded on a standard record sheet.

Maintenance and Calibration

2.3.5 Maintenance and calibration procedures should also be carried out, including:

a) The microphone head of the sound level meter and calibrator should be cleaned with a soft cloth at quarterly intervals.

b) The sound level meter and calibrator should be calibrated annually by a HOKLAS laboratory or the manufacturer.

The calibration certificates for noise monitoring equipment are provided in **Appendix D**.

2.4 Construction Dust and Noise Monitoring Schedule

2.4.1 The environmental monitoring schedule for the reporting period is provided in **Appendix E**.

2.5 The Action and Limit Levels

2.5.1 The Action and Limit Levels for construction dust and noise monitoring are provided in **Appendix F**.

2.6 Landscape and Visual

2.6.1 As per the EM&A Manual, the landscape and visual mitigation measures shall be implemented and site inspections should be undertaken once every two weeks during the construction period. A summary of the implementation status is presented in **Section 4**.

3 ENVIRONMENTAL MONITORING RESULTS

3.1 Construction Dust Monitoring

3.1.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 3.1** and **Table 3.2** respectively. Detailed construction dust monitoring results and daily extract of meteorological observations are presented in **Appendix G**.

3.1.2 The monitoring results at E-A14a and W-A6 are reported in the monthly EM&A Reports prepared by Contract No. HY/2014/07 and Contract No. HY/2014/08 respectively.

Table 3.1 Summary of 1-hour TSP Monitoring Results in the Reporting Period

Station ID	Average (µg/m³)	Range (µg/m³)	Action Level (µg/m³)	Limit Level (µg/m³)
M-A3	51	47 - 75	333	500

Table 3.2 Summary of 24-hour TSP Monitoring Results in the Reporting Period

Station ID	Average (µg/m³)	Range (µg/m³)	Action Level (µg/m³)	Limit Level (µg/m³)
M-A3	51	52 - 116	153	260

3.1.3 No Action and Limit Level exceedance was recorded for 1-hour TSP monitoring and 24-hour TSP monitoring at the monitoring location in the reporting month.

3.1.4 Major dust sources during the monitoring included nearby traffic emission.

3.1.5 The Event and Action Plan for the construction dust monitoring is given in **Appendix I**.

3.2 Construction Noise Monitoring

3.2.1 The monitoring results for noise are summarized in **Table 3.3** and the monitoring data is given in **Appendix H**.

3.2.2 The monitoring results at E-N12a, E-N21a, W-N18 and W-N25A are reported in the monthly EM&A Reports prepared by Contract No. HY/2014/07 and Contract No. HY/2014/08 respectively.

Table 3.3 Summary of Construction Noise Monitoring Results in the Reporting Period

Station ID	Date	[1]Measured Noise Level, dB(A), Leq (30 mins)	[2]Corrected Noise Level, dB(A), Leq (30 mins)	Action Level	Limit Level dB(A), Leq (30 mins)
M-N3	05 Dec 2023	68.9	N/A	When one documented complaint is received	For Schools: 70dB(A) during normal teaching period and 65 dB(A) during examination periods
	11 Dec 2023	69.4	N/A		
	21 Dec 2023	69.0	N/A		
	27 Dec 2023	69.1	N/A		

Notes:

1. Free field noise levels were adjusted with a correlation of +3 dB(A);
2. Corrected Noise Level =10* log (10^ (Measured Noise Level/10) – 10^ (Baseline Noise Level/10)), where the Baseline Noise Level = 67.7 dB(A).

3.2.3 No Limit Level exceedance was recorded for construction noise monitoring at the monitoring location in the reporting month.

3.2.4 One (1) Action Level exceedance was recorded for construction noise due to the noise-related complaints received in the reporting month.

3.2.5 Major noise sources during the monitoring included nearby traffic noise.

3.2.6 The Event and Action Plan for the construction noise monitoring is given in **Appendix I.**

3.3 Waste Management

3.3.1 Auditing of waste management practices during regular site inspections confirmed that the waste generated during construction were properly, stored, handled and disposed of in general. The Contractor was responsible for the implementation of any mitigation measures to reduce waste or redress issues arising from the waste materials.

3.3.2 The implemented environmental mitigation measures for the waste management in the reporting period are summarized in **Appendix J**. The summary of observations and recommendations made for waste management during the site inspections are presented in **Table 4.1.**

3.3.3 Monthly summary of waste flow table is detailed in **Appendix L**.

3.4 Landscape and Visual

3.4.1 Bi-weekly inspections of the implementation of landscape and visual mitigation measures were conducted on 5 and 19 December 2023. The implementation the landscape and visual mitigation measures in the reporting period are summarized in **Appendix J**. The summary of observations and recommendations made for landscape and visual mitigation measures during the site inspections are presented in **Table 4.1**.

3.4.2 The Event and Action Plan for landscape and visual during construction phase is given in **Appendix I**.

4 ENVIRONMENTAL SITE INSPECTION AND AUDIT

4.1.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. A summary of the mitigation measures implementation status is provided in **Appendix J**.

4.1.2 In the reporting month, five site inspections were carried out on 5 (with IEC), 12, 19 and 27 December 2023. Details of observations recorded during the site inspections are presented in **Table 4.1**.

Table 4.1 Observations and Recommendation of Site Inspection in the Reporting Period

Environmental Aspect	Date	Observations and Recommendations	Follow-up Actions
Air Quality	Nil	Nil	Nil
	Nil	Nil	Nil
Noise	Nil	Nil	Nil
Water Quality	Nil	Nil	Nil
Waste Management	Nil	Nil	Nil
Landscape and Visual	Nil	Nil	Nil
Permit/ Licenses	Nil	Nil	Nil

5 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

5.1 Complaint Handling, Prosecution and Public Engagement

5.1.1 All complaints received in the last reporting month were finalized.

5.1.2 One (1) water quality-related complaint (i.e. 4th December 2023) and one (1) noise-related complaint (i.e. 30th December 2023) was received in the reporting month.

5.1.3 The complaint cases in November and December 2023 are summarized in **Table 5.1**.

Table 5.1 Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From	Nature of Complaint	Status
EC180_CKRCT20231124_746	24th November 2023	The Contractor Hotline	Construction dust	Investigation report was finalized on 27th December 2023.
EC181_CKRCT20231204_755	4th December 2023	1823	Blocked gullies	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.
EC182_CKRCT20231230_758	30th December 2023	The Contractor Hotline	Construction noise at night	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.

5.1.4 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Appendix K**.

5.1.5 No public engagement activities were conducted in the reporting period.

5.2 Summary of Environmental Non-Compliance

5.2.1 No environmental non-compliance was recorded in the reporting period

5.3 Summary of Monitoring Exceedance

5.3.1 One (1) Action Level exceedance was recorded for construction noise due to the noise-related complaints received in the reporting month. No Limit Level exceedance was recorded for construction noise monitoring in the reporting month.

5.3.2 No Action and Limit Level exceedance was recorded for construction dust monitoring in the reporting month.

6 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURE

6.1.1 The Contractor had implemented environmental mitigation measures and requirements as stated in the EIA Report, the EP and EM&A Manual. The implementation status of the environmental mitigation measures during the reporting period is summarized in **Appendix J**. Status of required submissions under the EP during the reporting period is summarised in **Table 6.1**.

Table 6.1 Status of Required Submission under Environmental Permit

EP Condition	Submission	Submission Date
3.4	Monthly EM&A Report (November 2023)	14 December 2023

7 FUTURE KEY ISSUES

7.1.1 The main works will be anticipated in the next reporting period are as follow:

Ho Man Tin

- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Removal of D-wall;
- ELS excavation;
- CLP Room demolition and slope reinstatement;
- Tower crane and foundation dismantling work.

Yau Ma Tei

- Drill and break excavation;
- Underbreak scaling and smoothing works;
- Invert, lining and OHVD construction;
- Mucking out from tunnel;
- Site and shaft installation.

Ma Tau Kok

- Drill and break excavation;
- TBM pilot tunnel enlargement;
- Underbreak scaling and smoothing works;
- Invert, lining and OVHD construction;
- Mucking out from tunnel and horizontal access;
- Site and shaft installation.

Kai Tak Barging Point

- Material Storage.

Sheung Lok Street

- Concreting.

Ma Hang Chung Road

- Concreting.

7.1.2 The recommended mitigation measures corresponding to the main works in the next reporting period are listed as follows:

- Good relationship shall be maintained with the nearby sensitive receivers/ stakeholders which may be affected by the construction works such as providing better/ more detail information of the work nature and inform in advance of the works to the nearby residents;

- Any excavated, stockpile of dusty material or load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting;
- All construction plants / machineries should be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission;
- All C&D materials generated should be transported and stored at temporary storage area. Suitable materials should be sorted for reuse on-site;
- Every vehicle shall be cleaned thorough at the designated wheel washing area onsite;
- Wastewater generated from drilling shall be properly collected for reuse or treated by wastewater treatment facilities before discharge;
- Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance;
- Erecting temporary noise barrier for noisy Powered Mechanical Equipment (PME) and deployment of Quality Powered Mechanical Equipment (QPME) as many as practicable;
- Conditions in the Environmental Permit and License should be followed;
- All recommended mitigation measures specified in the approved EIA Report and EM&A Manual shall be implemented.
- All vehicles should be cleaned before leaving the construction site to ensure no muddy deposited by them on roads.

7.1.3 As informed by AMMJV on 25 November 2023 by email, main works in Ho Man Tin construction site will be passed by HY/2018/08 to HY/2019/13. Monitoring works will be taken over by Environmental team of Contract No. HY/2019/13 since January 2024.

8 CONCLUSION AND RECOMMENDATIONS

8.1.1 The 52nd Monthly EM&A Report for the Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel summarized the monitoring results and audits findings of the EM&A programme under the issued EP (EP No.: EP-457/2013/D) and in accordance with the EM&A Manual during the reporting period from 01/12/2023 to 31/12/2023.

8.1.2 Construction dust (including 1-hour and 24-hour TSP) and noise monitoring were carried out in the reporting period.

8.1.3 One (1) Action Level exceedance was recorded for construction noise due to the noise-related complaints received in the reporting month. No Limit Level exceedance was recorded for construction noise monitoring in the reporting month. No Action and Limit Level exceedance was recorded for construction dust monitoring in the reporting month.

8.1.4 Weekly environmental site inspections were conducted during the reporting period. In general, the Contractor had implemented environmental mitigation measures and requirements as stated in the EIA Report, the EP and EM&A Manual.

8.1.5 All complaints received in the last reporting month were finalized.

8.1.6 One (1) water quality-related complaint (i.e. 4th December 2023) and one (1) noise-related complaint (i.e. 30th December 2023) was received in the reporting month. Both complaints are under investigation and will be reported in the subsequent reporting month.

8.1.7 No environmental related prosecutions or notification of summons were received in the reporting period.

8.1.8 No environmental non-compliance was recorded in the reporting period.

8.1.9 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:

Air Quality Impact

- No specific observation was identified in the reporting month.

Construction Noise Impact

- No specific observation was identified in the reporting month.

Water Quality Impact

- No specific observation was identified in the reporting month.

Waste Management

- No specific observation was identified in the reporting month.

Landscape and Visual Impact

- No specific observation was identified in the reporting month.

Permit/ Licenses

- No specific observation was identified in the reporting month.

Figure 1

The Site Layout Plan of the

Contract

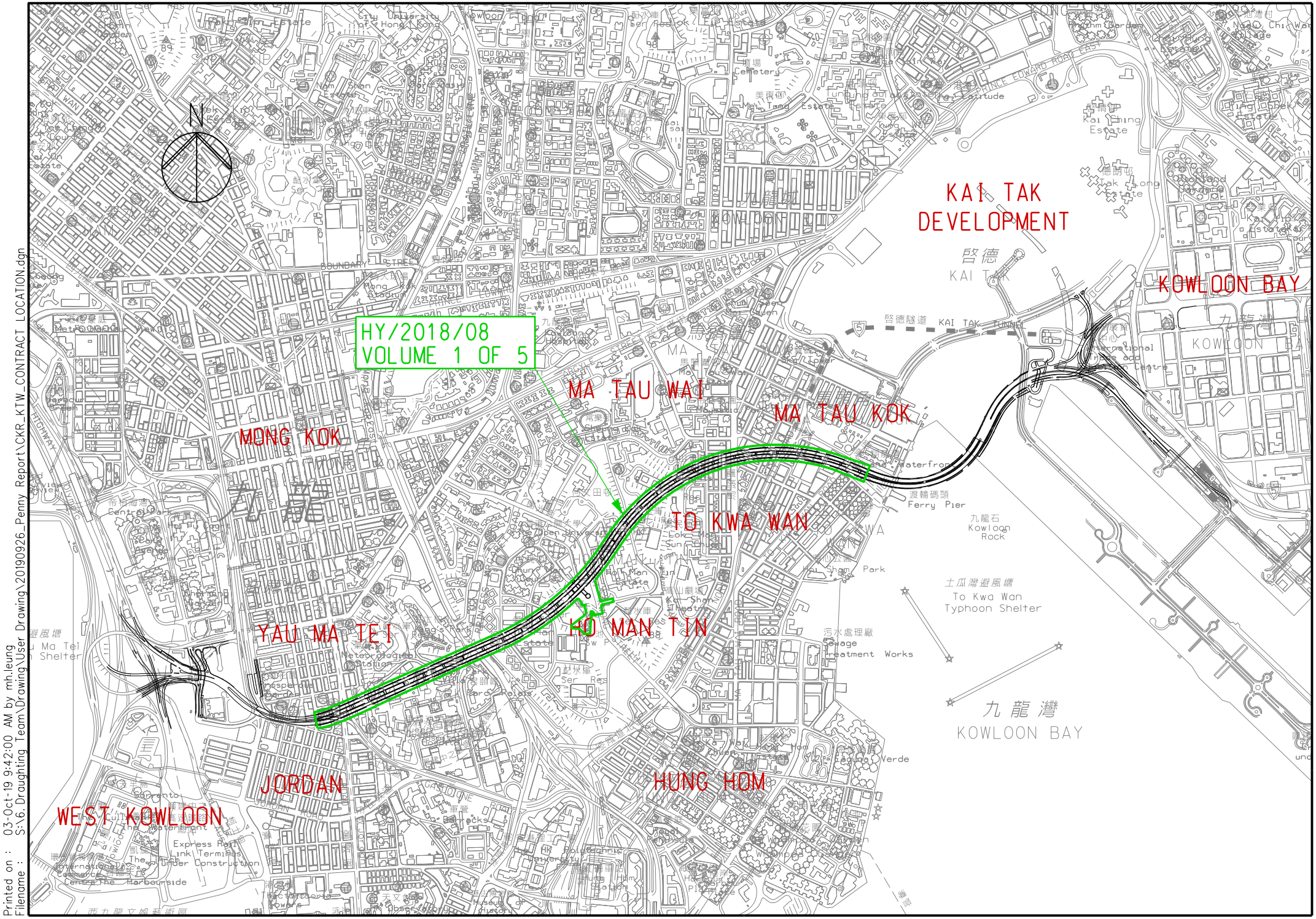
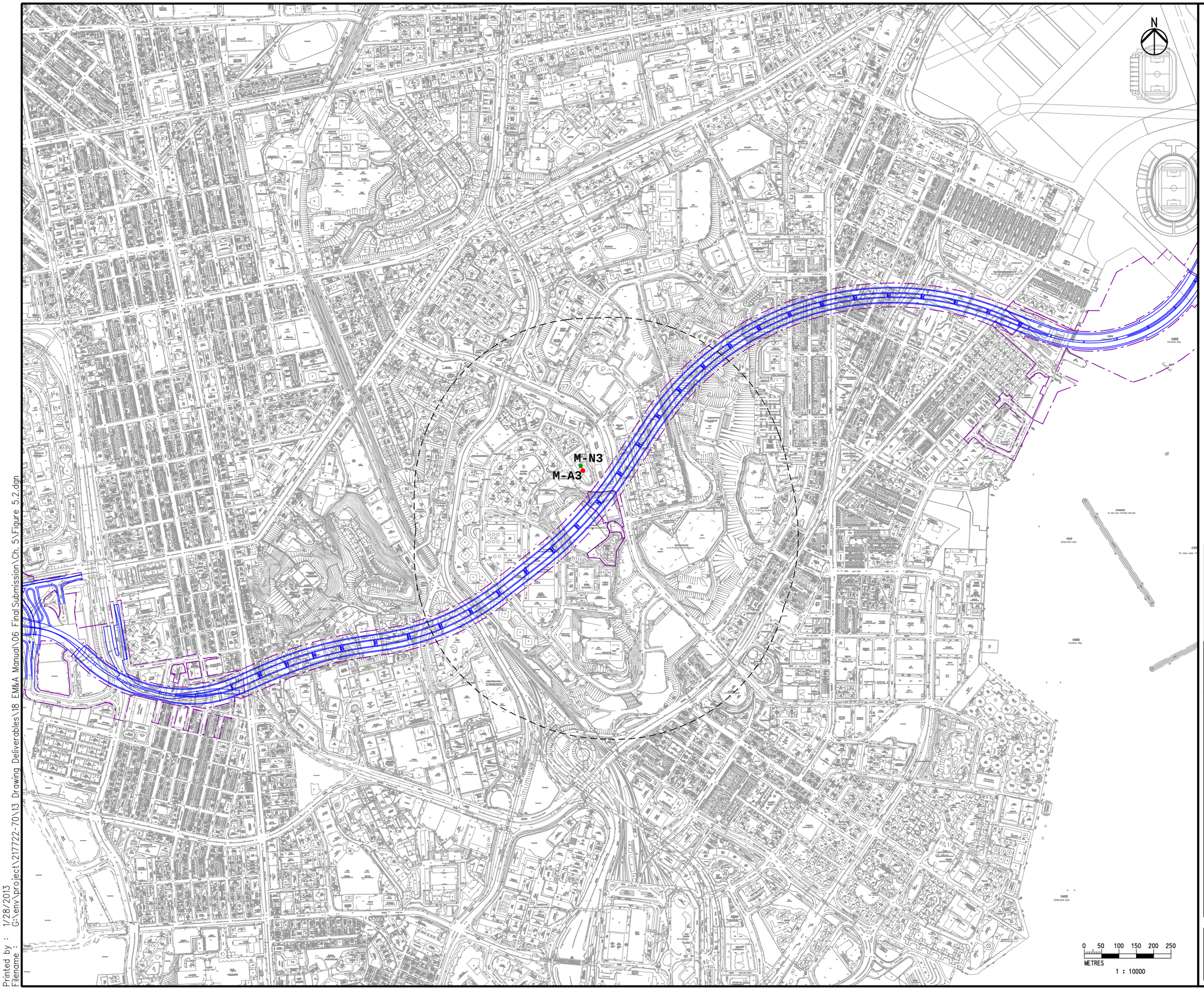


Figure 1 - Site Layout Plan of the Contract

Figure 2.1

The Location of the Construction Dust and Noise Monitoring Stations (Ho Man Tin)



Legend

- Construction Dust Monitoring Station
- CKR Alignment
- CKR Works Limit
- 500 m Study Boundary in the EIA Report
- Construction Noise Monitoring Station

Rev	Description	By	Date
E	FIFTH ISSUE	GL	01/13
D	FOURTH ISSUE	GL	12/12
C	THIRD ISSUE	GL	09/12
B	SECOND ISSUE	GL	01/12
A	FIRST ISSUE	GL	12/11

Consultant

ARUP Mott MacDonald

Project title

Agreement No. CE 43/2010 (HY)

Central Kowloon Route - Design and Construction

Drawing title

Location of Construction Dust and Noise Monitoring Stations (Central Portion)

Figure 2.1 Rev. E

Drawn	Date	Checked	Approved
GL	01/13	FC	ST

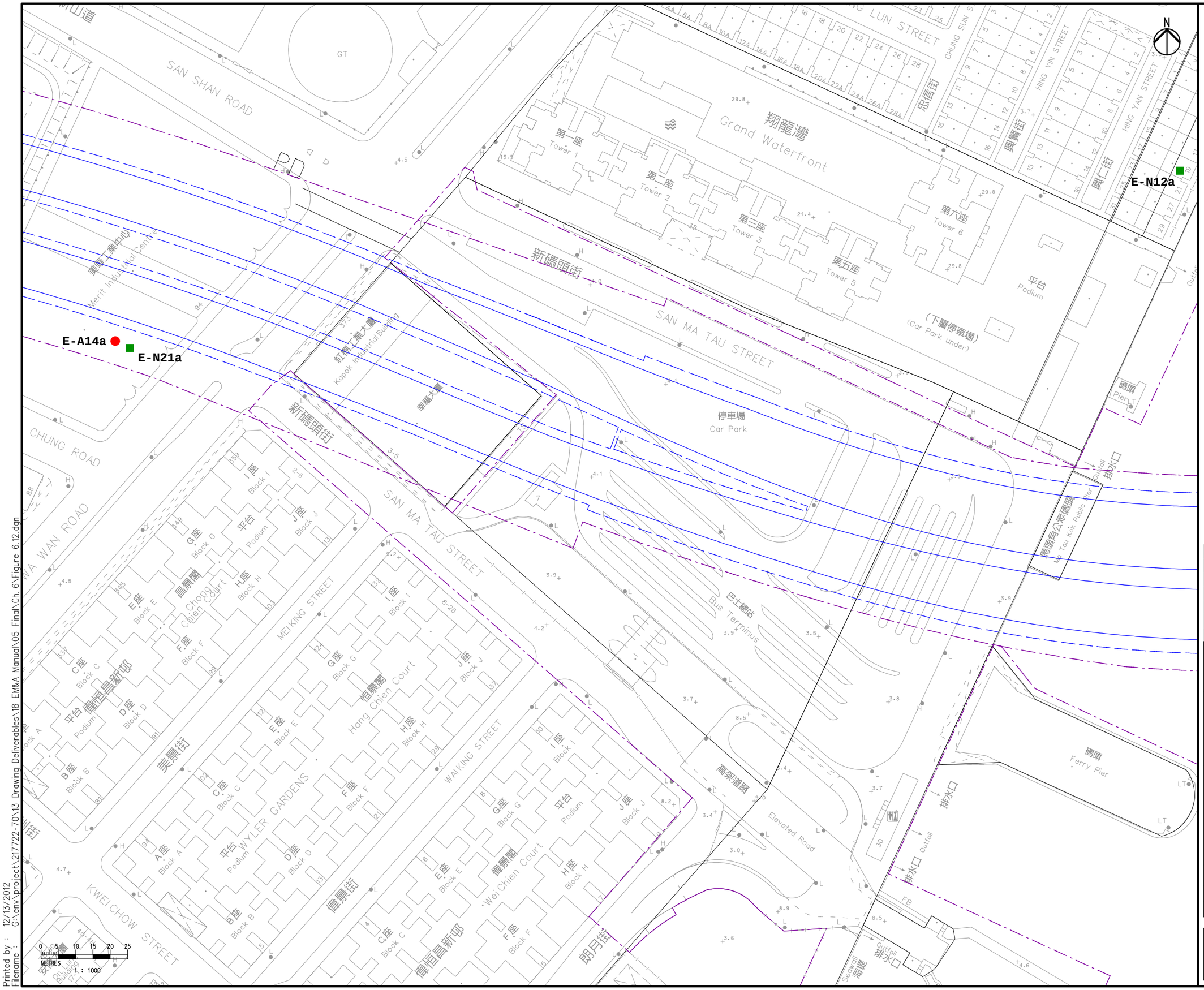
Scale 1:10000 ON A3 | Status PRELIMINARY

路政署 HIGHWAYS DEPARTMENT
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE

Printed by : 1/28/2013
Filename : G:\env\project\217722-70\13 Drawing Deliverables\18 EM&A Manual\06 Final Submission\Ch. 5\Figure 5.2.dgn

Figure 2.2

The Location of the Construction Dust and Noise Monitoring Stations (Ma Tau Kok)



Legend

- CKR Alignment
- Works Limit
- ● Construction Dust Monitoring Station
- ■ Construction Noise Monitoring Station

Rev	Description	By	Date
D	FOUTH ISSUE	GL	12/12
C	THIRD ISSUE	GL	09/12
B	SECOND ISSUE	GL	06/12
A	FIRST ISSUE	GL	02/12

Consultant: ARUP / Mott MacDonald

Project title: Agreement No. CE 43/2010 (HY)
Central Kowloon Route - Design and Construction

Drawing title: Location of Construction Dust and Noise Monitoring Stations (East Portion)

Figure 2.2 Rev. D

Drawn	Date	Checked	Approved
GL	12/12	FC	ST

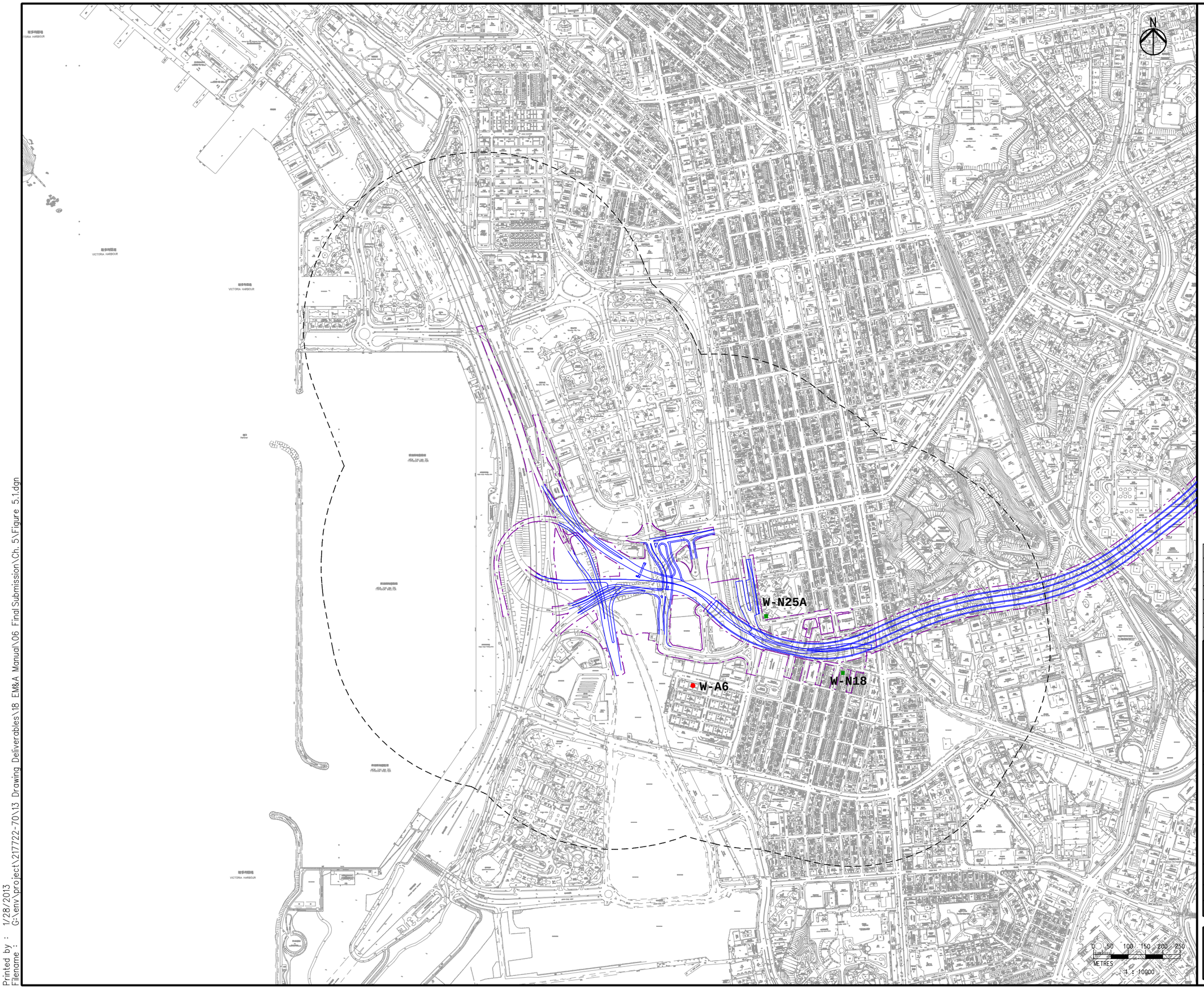
Scale: 1:1000 ON A3
Status: PRELIMINARY

路政署 HIGHWAYS DEPARTMENT
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE

Printed by : 12/13/2012
Filename : G:\env\project\217722-70\13 Drawing Deliverables\18 EM&A Manual\05 Final\Ch. 6\Figure 6.12.dgn

Figure 2.3

The Location of the Construction Dust and Noise Monitoring Stations (Yau Ma Tei)



Legend

- Construction Dust Monitoring Station
- CKR Alignment
- CKR Works Limit
- 500m Study Boundary in the EIA Report
- Construction Noise Monitoring Station

Rev	Description	By	Date
E	FIFTH ISSUE	GL	01/13
D	FOURTH ISSUE	GL	12/12
C	THIRD ISSUE	GL	09/12
B	SECOND ISSUE	GL	01/12
A	FIRST ISSUE	GL	12/11

Consultant

ARUP Mott MacDonald

Project title

Agreement No. CE 43/2010 (HY)

Central Kowloon Route - Design and Construction

Drawing title

Location of Construction Dust and Noise Monitoring Stations (West Portion)

Figure 2.3 Rev. E

Drawn	Date	Checked	Approved
GL	01/13	FC	ST

Scale 1:10000 ON A3 Status PRELIMINARY

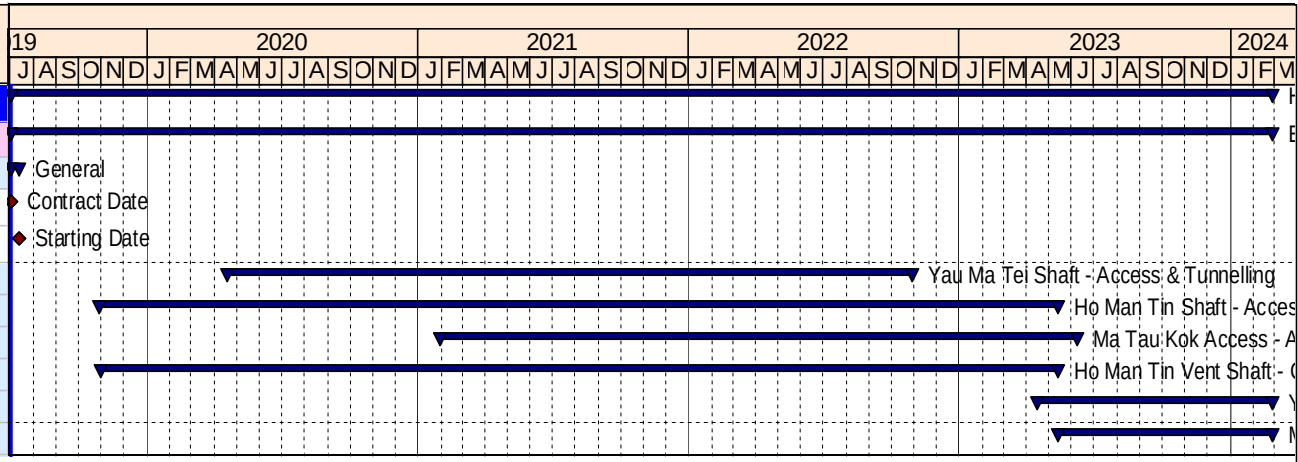
路政署 HIGHWAYS DEPARTMENT
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE

Printed by : 1/28/2013
Filename : G:\env\project\217722-70\13 Drawing Deliverables\18 EM&A Manual\06 Final Submission\Ch. 5\Figure 5.1.dgn

Appendix A

Construction Programme

#	Activity Name	Orig Dur	Start	Finish
1	**HY/2018/08 Central Kowloon Route**	1379	03-Jul-19	26-Feb-24
2	**Executive Summary**	1379	03-Jul-19	26-Feb-24
3	**General**	9	03-Jul-19	12-Jul-19
4	Contract Date	0	03-Jul-19	
5	Starting Date	0	12-Jul-19	
6	**Yau Ma Tei Shaft - Access & Tunnelling**	749	18-Apr-20	28-Oct-22
7	**Ho Man Tin Shaft - Access & Tunnelling**	1046	28-Oct-19	12-May-23
8	**Ma Tau Kok Access - Access & Tunnelling**	693	31-Jan-21	08-Jun-23
9	**Ho Man Tin Vent Shaft - Civil works**	1044	30-Oct-19	12-May-23
10	**Yau Ma Tei Shaft - Civil works**	258	16-Apr-23	26-Feb-24
11	**Ma Tau Kok Shaft - Civil works**	236	13-May-23	26-Feb-24



Summary

Milestone

HY/2018/08 Central Kowloon Route Central Tunnel

Executive Summary

BOUYGUES TRAVAUX PUBLICS

Date	Revision	Checked	Approved
16-Jul-19	00V0	CLa	WYu
20-Aug-19	00V1	CLa	WYu

Major Construction Activities (Dec 2023)

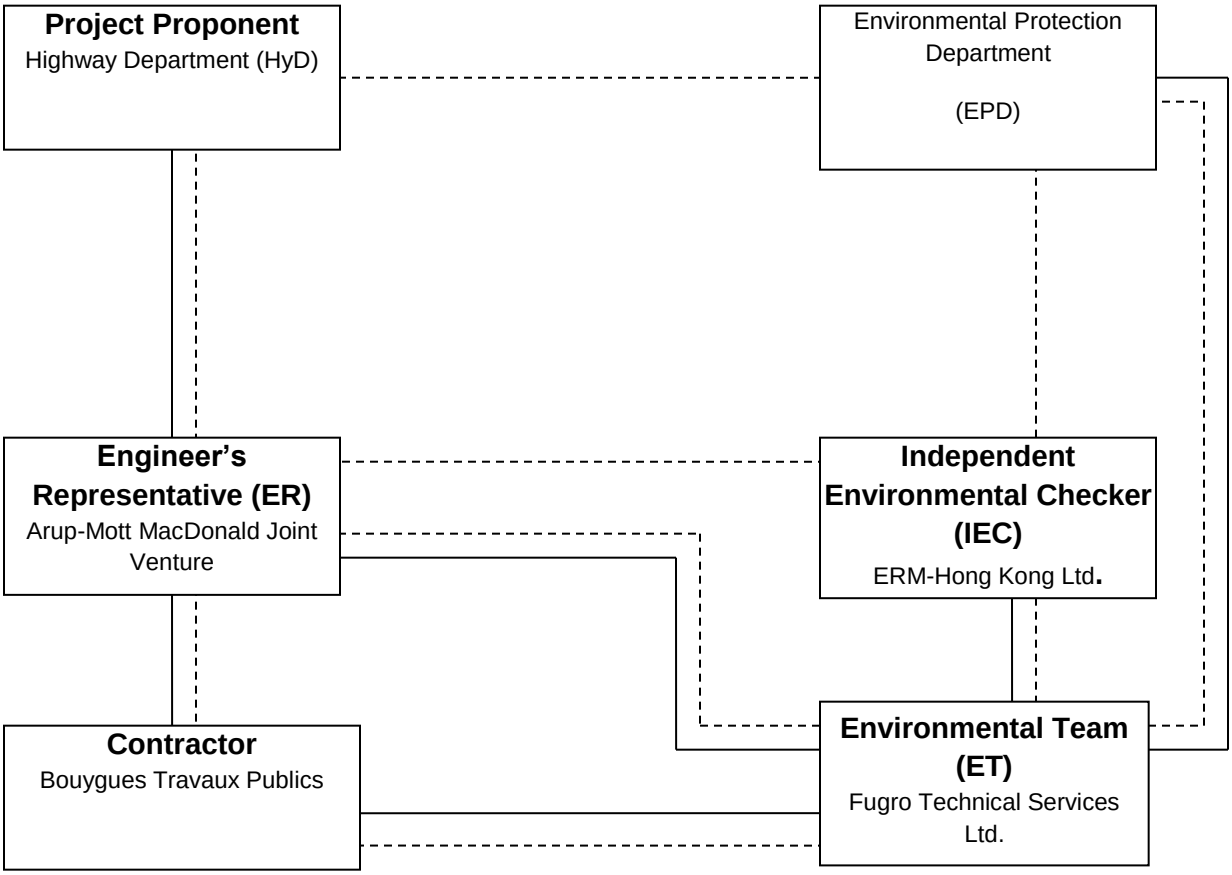
Item	Major Construction Activates	Location
1	Underbreak scaling and smoothing works	HMT
2	Invert, lining and OHVD construction	
3	Struct installation and D-wall coring	
4	ELS excavation	
5	Site and shaft installation	
6	Drill and break excavation	YMT
7	Underbreak scaling and smoothing works	
8	Invert, lining and OHVD construction	
9	Mucking out from tunnel	
10	Site and shaft installation	
11	Drill and break excavation	MTK
12	TBM pilot tunnel enlargement	
13	Underbreak scaling and smoothing works	
14	Invert, lining and OHVD construction	
15	Mucking out from tunnel and horizontal access	
16	Site and shaft installation	
17	Material Storage	KTBF
18	Concreting	SLS
19	Concreting	MHC

Major Construction Activities (Jan 2024)

Item	Major Construction Activates	Location
1	Underbreak scaling and smoothing works	HMT
2	Invert, lining and OHVD construction	
3	Removal of D-wall	
4	ELS excavation	
5	CLP Room demolition and slope reinstatement	
6	Tower crane and foundation dismantling work	
7	Drill and break excavation	YMT
8	Underbreak scaling and smoothing works	
9	Invert, lining and OHVD construction	
10	Mucking out from tunnel	
11	Site and shaft installation	
12	Drill and break excavation	MTK
13	TBM pilot tunnel enlargement	
14	Underbreak scaling and smoothing works	
15	Invert, lining and OHVD construction	
16	Mucking out from tunnel and horizontal access	
17	Site and shaft installation	
18	Material Storage	KTBF
19	Concreting	SLS
20	Concreting	MHC

Appendix B

Project Organization Chart


Project Proponent
Highway Department (HyD)
Environmental Protection Department
(EPD)
Engineer's Representative (ER)
Arup-Mott MacDonald Joint Venture
Independent Environmental Checker (IEC)
ERM-Hong Kong Ltd.
Contractor
Bouygues Travaux Publics
Environmental Team (ET)
Fugro Technical Services Ltd.
Legend:
Line of Reporting
Line of Communication

Appendix C

Calibration Certificate for

Construction Dust Monitoring

Equipment

FUGRO TECHNICAL SERVICES LIMITED
Room 723 - 726, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent, Kwai Fong,
Hong Kong.
Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : M-A3
Date of Calibration: 23-Sep-23
Location : S.K.H Tsoi Kung Po Secondary School
Next Calibration Date: 22-Dec-23
Make: Tisch
Technician: Eve Ma
Model: TE-5170 S/N: 4388

CONDITIONS

Sea Level Pressure (hPa):	1012	Corrected Pressure (mm Hg):	759
Temperature (℃):	30	Temperature (K):	303

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.08482
Model:	TE-5025A	Qstd Intercept:	-0.02977
Calibration Date:	1-Jun-23	Expiry Date:	1-Jun-24
S/N:	2456		

CALIBRATIONS

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	7.90	-4.20	12.100	1.667	60.00	59.45	Slope =	28.9784
13	6.80	-3.00	9.800	1.502	55.00	54.49	Intercept =	11.2062
10	5.60	-1.80	7.400	1.307	50.00	49.54	Corr. coeff.=	0.9955
7	3.40	-0.40	3.800	0.941	40.00	39.63		
5	3.16	-0.50	3.660	0.923	37.00	36.66		

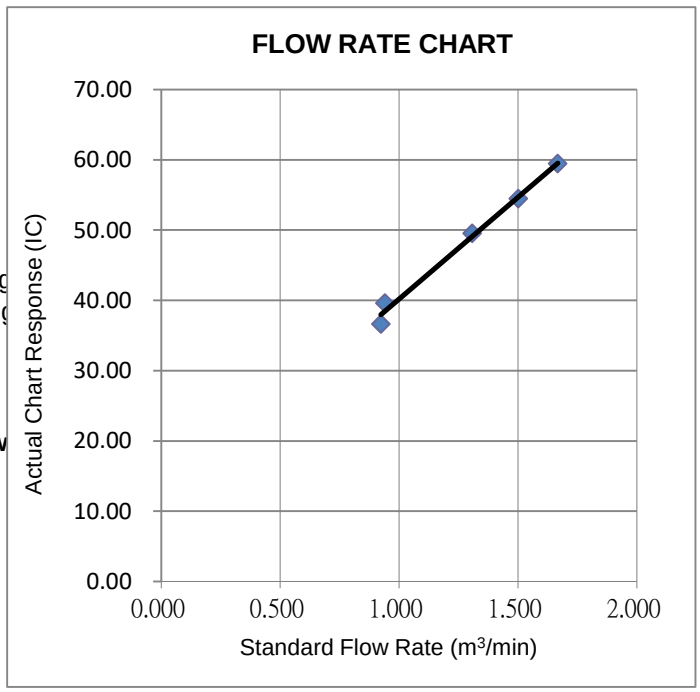
Calculations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg
Pa = actual pressure during calibration (mm Hg
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Model:	Tisch TE-5170	Date of Calibration:	23-Dec-23
Serial No.:	4388	Next Calibration Date:	22-Mar-24
		Technician:	Eve Ma

CONDITIONS

Sea Level Pressure (hPa):	1029.90	Corrected Pressure (mm Hg):	772
Temperature (°C):	11	Temperature (K):	284

CALIBRATION ORIFICE

Model:	Tisch TE-5025A	Qstd Slope:	2.08482
Serial No.:	2456	Qstd Intercept:	-0.02977
Calibration Date:	1-Jun-23	Expiry Date:	1-Jun-24

CALIBRATIONS

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	4.60	-4.70	9.300	1.525	54.00	55.77	Slope =	22.4052
13	3.80	-3.90	7.700	1.389	51.00	52.67	Intercept =	21.0926
10	3.30	-3.40	6.700	1.296	48.00	49.57	Corr. coeff.=	0.9931
7	2.50	-2.60	5.100	1.133	44.00	45.44		
5	1.10	-1.30	2.400	0.782	38.00	39.24		

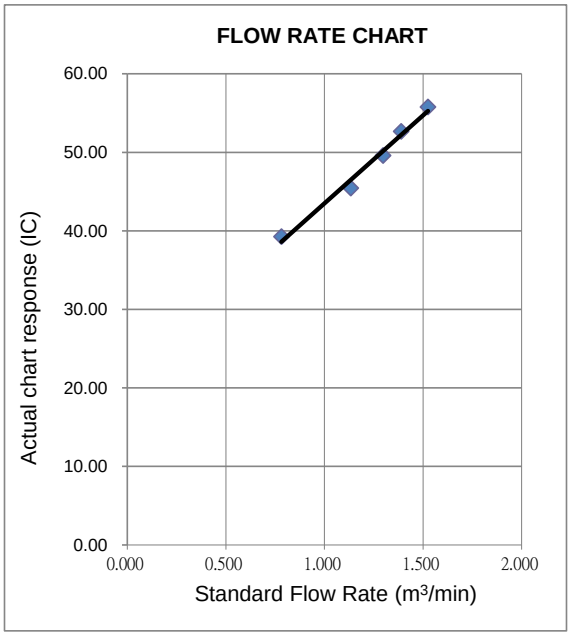
Calculations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TISCH Environmental

RECALIBRATION DUE DATE:
June 1, 2024

Certificate of Calibration

Calibration Certification Information					
Cal. Date:	June 1, 2023	**Rootsmeter S/N:** 438320	**Ta:** 295	°K	
Operator:	Jim Tisch		**Pa:** 751.8	mm Hg	
Calibration Model #:	TE-5025A	**Calibrator S/N:** **2456**			

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4360	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9080	8.0	5.00
4	7	8	1	0.8670	8.8	5.50
5	9	10	1	0.7170	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9951	0.6929	1.4137	0.9957	0.6934	0.8859
0.9908	0.9704	1.9993	0.9915	0.9711	1.2528
0.9887	1.0889	2.2353	0.9894	1.0896	1.4007
0.9876	1.1391	2.3444	0.9883	1.1399	1.4690
0.9823	1.3700	2.8275	0.9830	1.3710	1.7717
QSTD	**m=**	**2.08482**	**QA**	**m=**	**1.30548**
	b=	**-0.02977**		**b=**	**-0.01866**
	r=	**0.99997**		**r=**	**0.99997**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

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

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

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

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA230848(6)

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT -

Description : Laser Dust Monitor

Manufacturer : SIBATA

Model No. : LD-5R

Serial No. : 882147

Next Calibration Date : 8-Feb-2024

Laboratory Information

Details of Reference Equipment -

Description : Reference balance

Equipment ID. : C-065-5

Date of Calibration : 9-Feb-2023 Ambient Temperature : 24 °C

Calibration Location : Calibration Lab. of FTS

Method Used : By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.0545	1588	26.47
0.0587	1603	26.72
0.0775	1674	27.90

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x UUT reading (CPM) where K = 0.002352
3. Correlation coefficient (r) : 1.0000

Checked by : _____ Date : 26-4-2023 Certified by : K.T. Leung Date : 26-4-2023

CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

** End of Report **

Appendix D

Calibration Certificate for Construction Noise Monitoring Equipment

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 212769CA223056(1)

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.
Project : Calibration Services

Details of Unit Under Test, UUT -

Description : Sound Level Meter
Manufacturer : Casella

	Meter	Microphone	Preamplifier
Model No. :	CEL-63X	CE-251	CEL-495
Serial No. :	4181568	03133	003967

Equipment ID : N/A
Next Calibration Date : 03-Jan-2024
Specification Limit : EN 61672-1: 2003 Class 1
Next Calibration Date : 03-Jan-2024

Laboratory Information

Details of Reference Equipment -

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)
Equipment ID. : R-108-1

Date of Receipt UUT : 30-Dec-2022
Date of Calibration : 04-Jan-2023
Calibration Location : Calibration Laboratory of FTS
Method Used : By direct comparison

Ambient Temperature : 20±2 °C
Relative Humidity : <80% R.H.

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weigthing frequency response	4000Hz	1.5	2.6 to -0.6
	2000Hz	1.4	2.8 to -0.4
	1000Hz	0.2	1.1 to -1.1
	500Hz	-3.3	-1.8 to -4.6
	250Hz	-8.6	-7.2 to -10.0
	125Hz	-16.0	-14.6 to -17.6
	63Hz	-26.1	-24.7 to -27.7
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 0.6

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast
4. The UUT does comply with EN 61672-1: 2003 Class 1 sound level meter for the above measurement.
5 The values given in this Calibration Certificate only relate to unit under test and the values measured at the time of the test. Any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : _____ Date : 11-1-2023 Certified by : _____ Date : 11-1-2023

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 212769CA233154(1)

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client Supplied Information

Client : Materialab Consultants Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT -

Description	:	Sound Calibrator
Manufacturer	:	Casella (Model CEL-120/1)
Serial No.	:	2092809
Equipment ID	:	N/A

Next Calibration Date : 29-May-2024

Specification Limit : EN 60942: 2003 Class 1

Laboratory Information

Details of Calibration Equipment

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-2

Date of Receipt UUT : 17-May-2023

Date of Calibration : 30-May-2023

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

Ambient Temperature : 20±2 °C

Relative Humidity : <80% R.H.

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.1 dB	±0.4dB
114dB	-0.2 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment under test does comply with the specification limit.
4. The values given in this Calibration Certificate only relate to the unit-under-test and the values measured at the time of the test. Any uncertainties quoted will not include allowances for the environmental changes, variation and shock during transportation, or the capability of any other laboratory to repeat the measurement.

Checked by : _____ Date : 6-6-2023 Certified by : _____ Date : 8-6-2023

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

Appendix E

Environmental Monitoring Schedule

Project: **Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel**

Impact Monitoring Schedule for the Next Reporting Period (December 2023)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
					1	2
3	4	5 Dust Monitoring Noise Monitoring (08:30-12:30)	6	7	8	9
10	11 Dust Monitoring Noise Monitoring (08:30-12:30)	12	13	14	15 Dust Monitoring (12:30-17:30)	16
17	18	19	20	21 Dust Monitoring Noise Monitoring (12:30-17:30)	22	23
24	25	26	27 Dust Monitoring Noise Monitoring (12:30-17:30)	28	29	30
31						

Remarks

1. Actual monitoring may be subjected to change due to any safety concern or adverse weather condition;
2. Dust Monitoring: 24-hours TSP Monitoring per 6 days, and 3 x 1-hour TSP Monitoring per 6 days;
3. Noise Monitoring: Leq (30 min) between 0700 and 1900 hours;
4. Monitoring Location: M-A3 and M-N3: SKH Tsoi Kung Po Secondary School.

Appendix F

Action and Limit Levels for Construction Dust and Noise Monitoring

Table F-1 Action and Limit Levels for 1-hour TSP

Station ID	Location	Action Level	Limit Level
M-A3	SKH Tsoi Kung Po Secondary School	333 μg/m^3	500 μg/m^3

Table F-2 Action and Limit Levels for 24-hour TSP

Station ID	Location	Action Level	Limit Level
M-A3	SKH Tsoi Kung Po Secondary School	153 μg/m^3	260 μg/m^3

Table F-3 Action and Limit Levels for Construction Noise (0700 – 1900 hour of normal weekdays)

Station ID	Location	Action Level	Limit Level
M-N3	SKH Tsoi Kung Po Secondary School	When one documented compliant is received	For Schools: 70dB(A) during normal teaching period and 65 dB(A) during examination periods

Appendix G

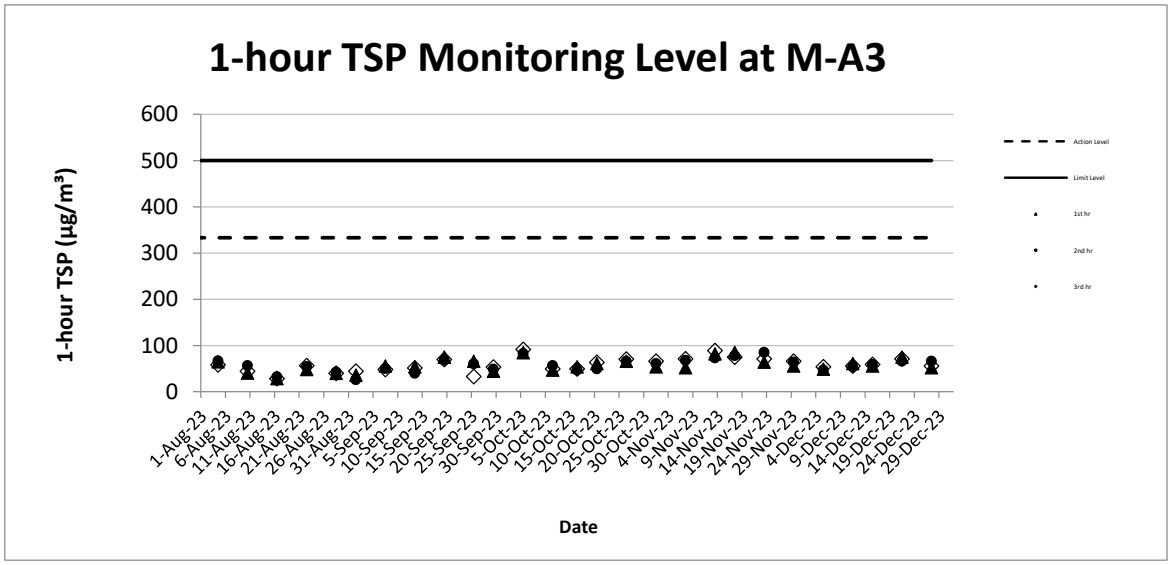
Construction Dust Monitoring Results and Meteorological Observations

1-hour TSP Monitoring Result for
Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel

M-A3 - SKH Tsoi Kung Po Secondary School

1-hour TSP (µg/m³)								
Date	Start Time	1st hr	2nd hr	3rd hr	Average	Action Level	Limit Level	Weather
5-Dec-23	10:48	49	47	54	50	333	500	Fine
11-Dec-23	9:05	61	54	56	57			Fine
15-Dec-23	8:30	56	59	59	58			Fine
21-Dec-23	8:43	75	66	71	71			Fine
27-Dec-23	13:10	52	66	56	58			Fine

Average	59
Max	75
Min	47

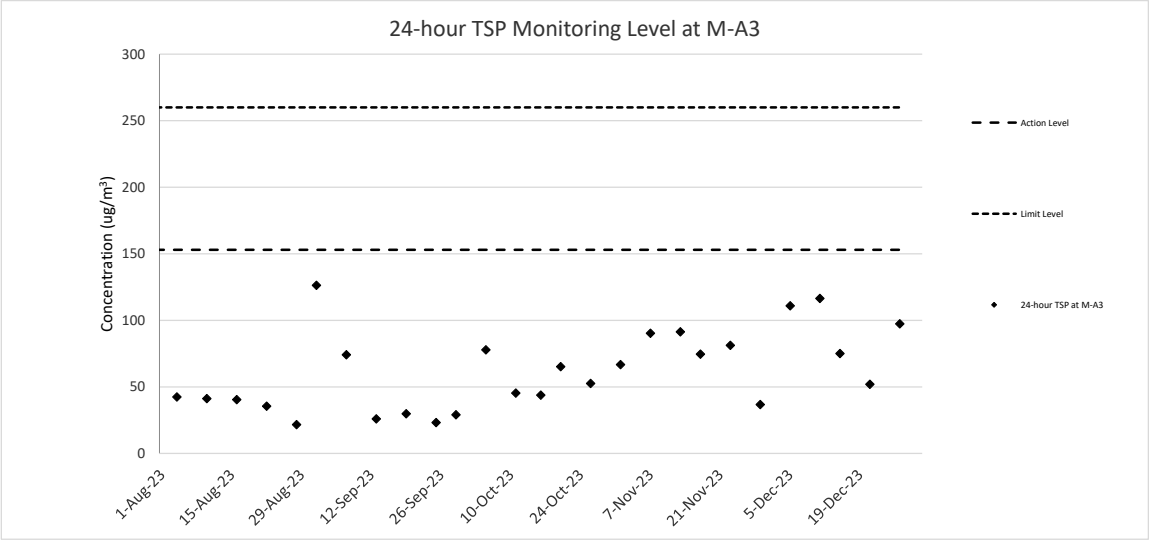


24-hour TSP Monitoring Result for
Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel

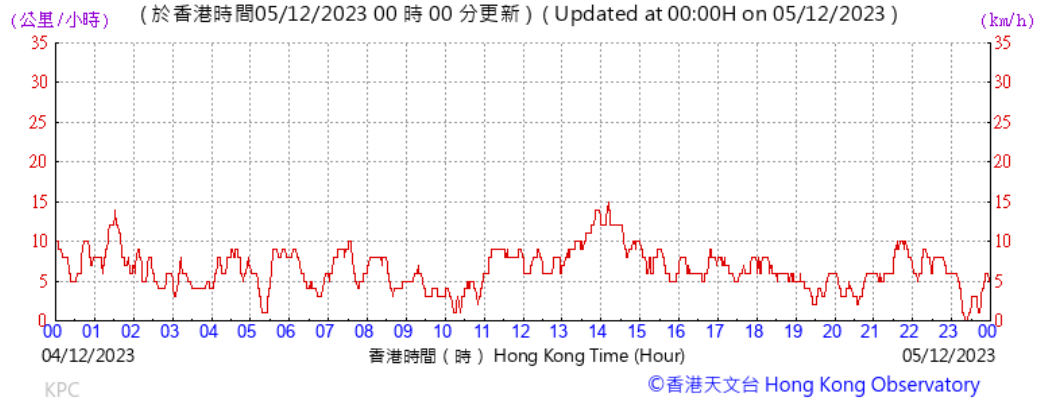
M-A3 - SKH Tsoi Kung Po Secondary School

Start Date	Weather Condition	Air Temperature (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Sampling Time (hrs)	Flow Rate (m^3/min.)		Average flow (m^3/min)	Total volume (m^3)	Conc. (ug/m^3)	Action Level	Limit Level
				Initial	Final			Initial	Final				(ug/m^3)	(ug/m^3)
5-Dec-23	Fine	294.7	761.8	2.6829	2.8464	0.1635	24	1.02	1.03	1.02	1473.5	111	153	260
11-Dec-23	Fine	297.2	761.0	2.7008	2.8804	0.1796	24	1.05	1.10	1.07	1543.0	116		
15-Dec-23	Fine	297.4	762.3	2.7371	2.8437	0.1066	24	0.98	0.99	0.99	1419.9	75		
21-Dec-23	Fine	283.9	770.4	2.6816	2.7581	0.0765	24	1.02	1.03	1.02	1473.1	52		
27-Dec-23	Fine	291.7	768.1	2.6936	2.8405	0.1469	24	1.03	1.06	1.05	1507.8	97		
											Min	52		
											Max	116		
											Average	90		

Note:
Underline: Exceedance of Action Level
Underline and Bold: Exceedance of Limit Level



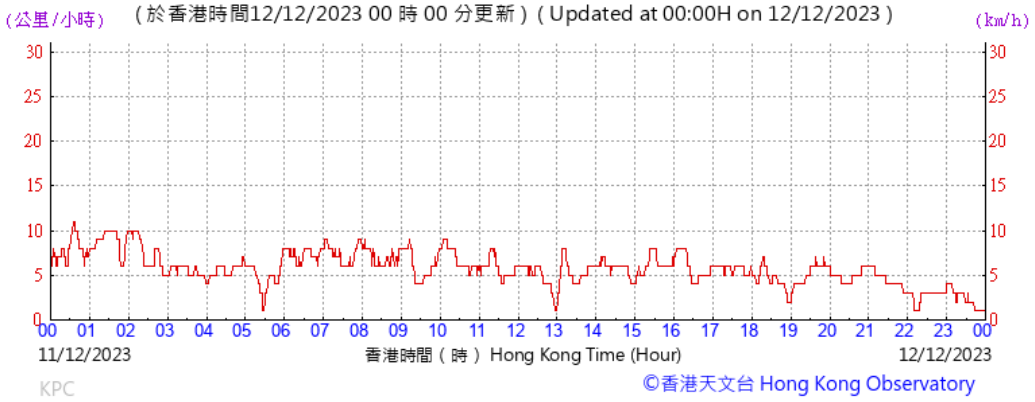
Wind Speed recorded at King's Park Meteorological Station on 5 December 2023



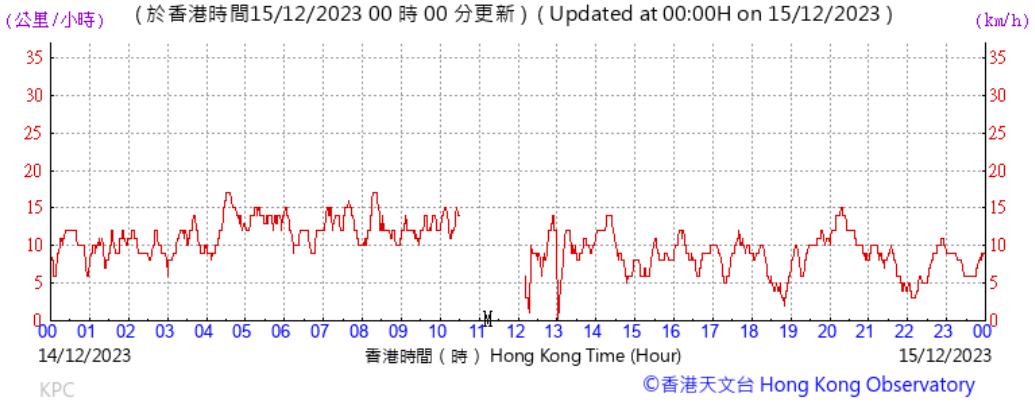
Wind Speed recorded at King's Park Meteorological Station on 6 December 2023

Wind Speed recorded at King's Park Meteorological Station on 11 December 2023

Wind Speed recorded at King's Park Meteorological Station on 12 December 2023

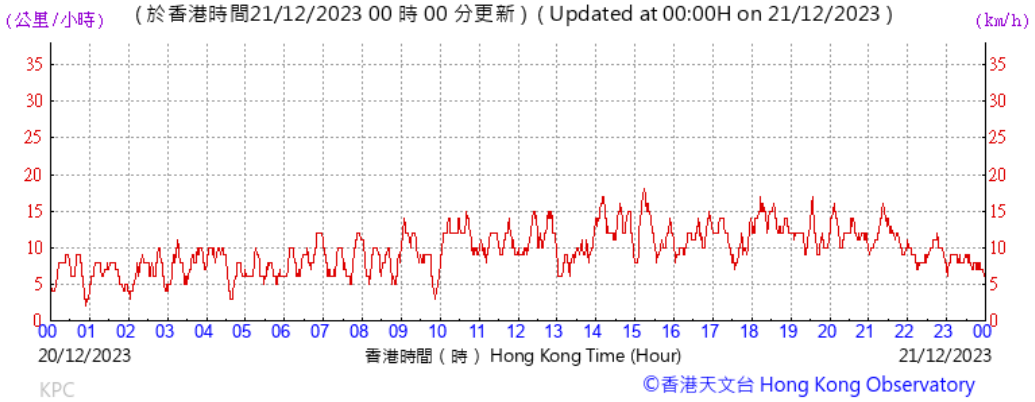


Wind Speed recorded at King's Park Meteorological Station on 15 December 2023

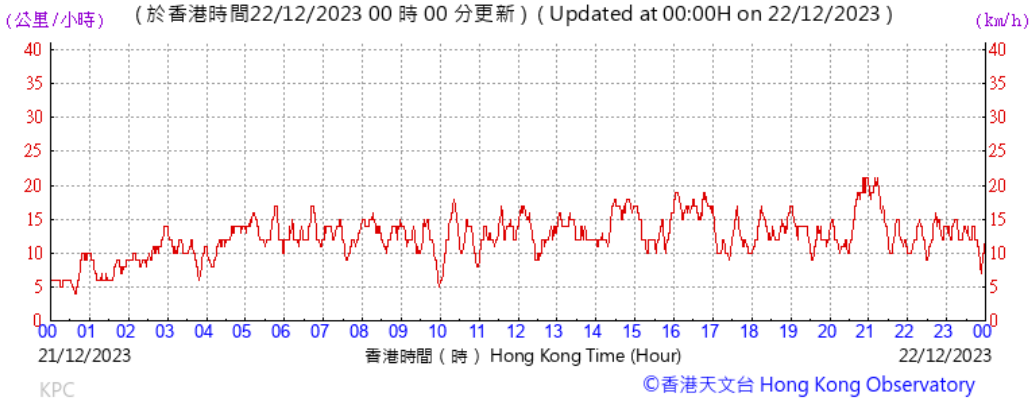


Wind Speed recorded at King's Park Meteorological Station on 16 December 2023

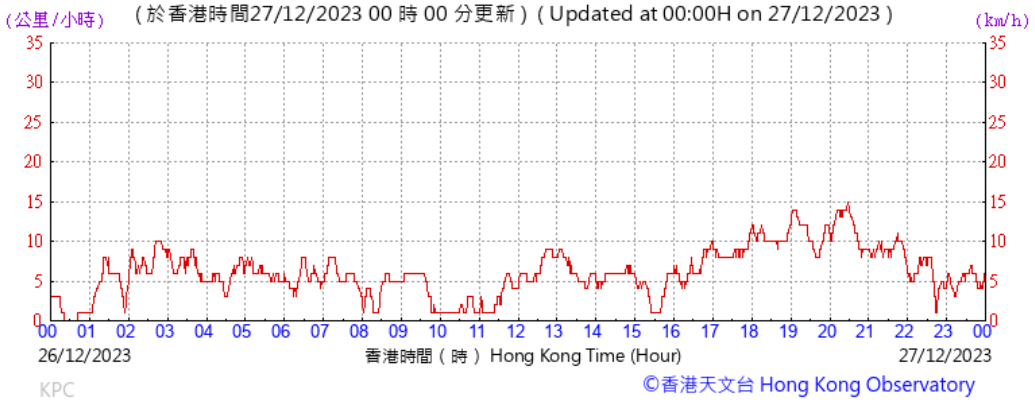
Wind Speed recorded at King's Park Meteorological Station on 21 December 2023



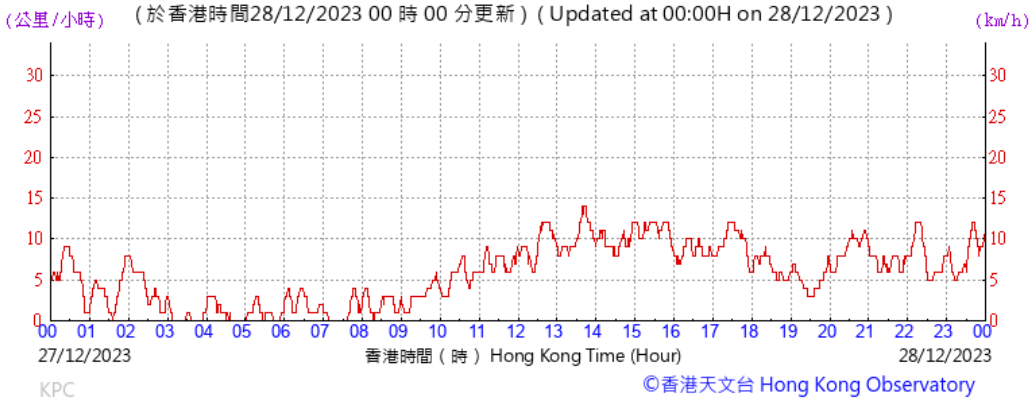
Wind Speed recorded at King's Park Meteorological Station on 22 December 2023



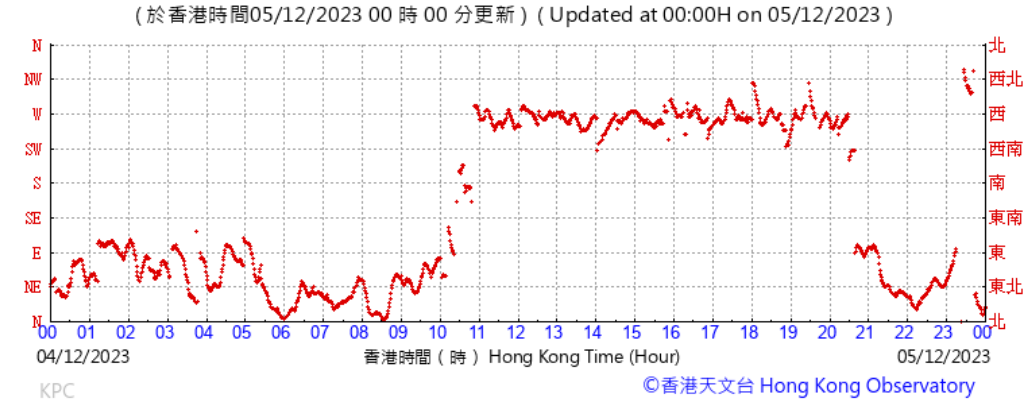
Wind Speed recorded at King's Park Meteorological Station on 27 December 2023



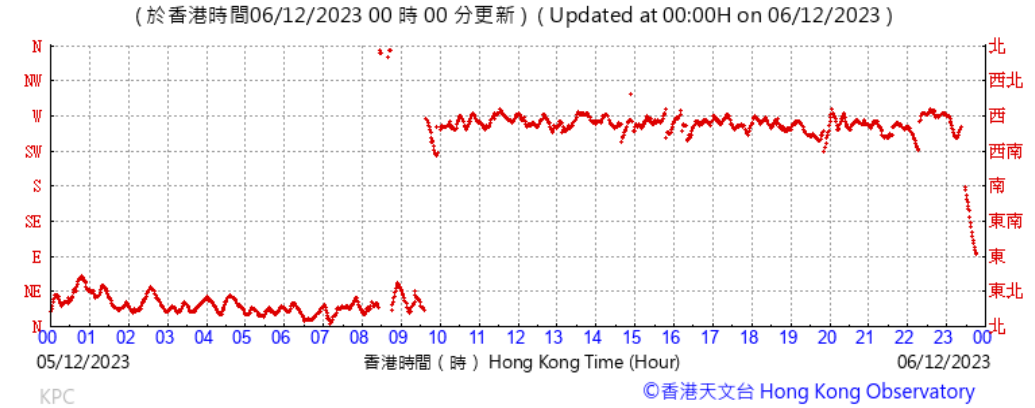
Wind Speed recorded at King's Park Meteorological Station on 28 December 2023



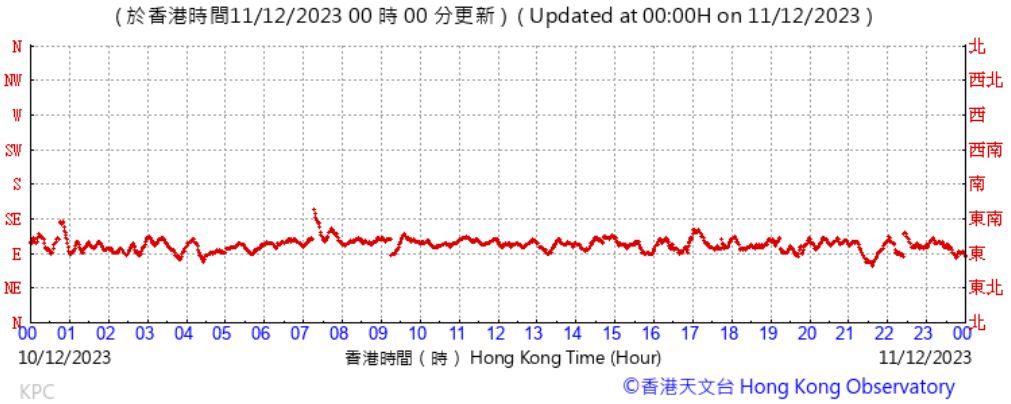
Wind Direction recorded at King's Park Meteorological Station on 5 December 2023



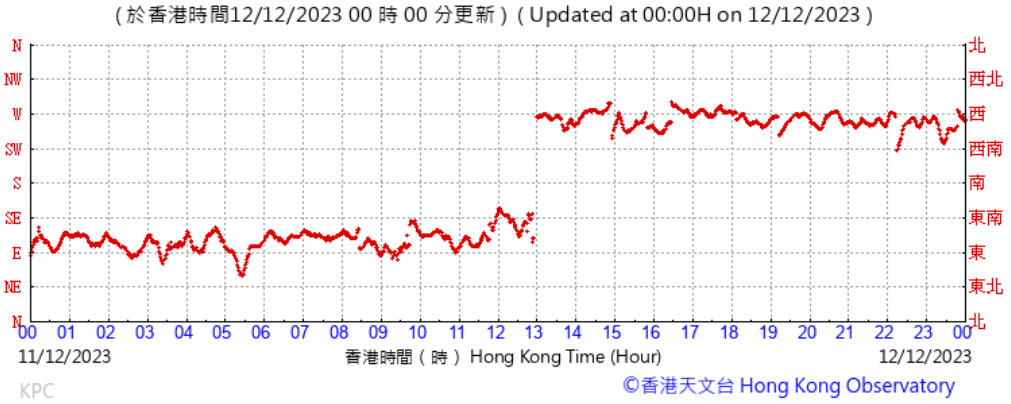
Wind Direction recorded at King's Park Meteorological Station on 6 December 2023



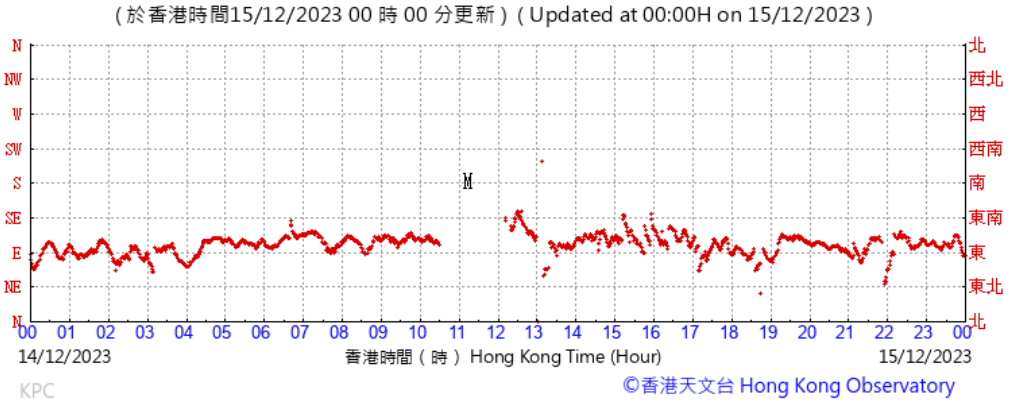
Wind Direction recorded at King's Park Meteorological Station on 11 December 2023



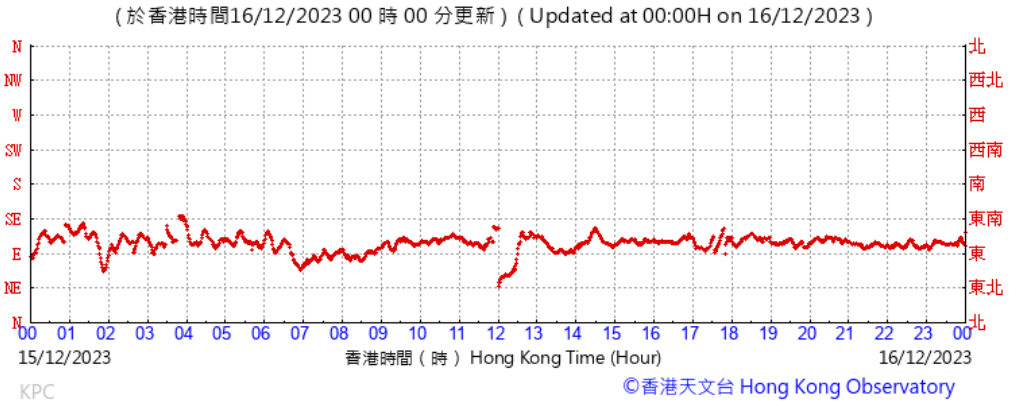
Wind Direction recorded at King's Park Meteorological Station on 12 December 2023



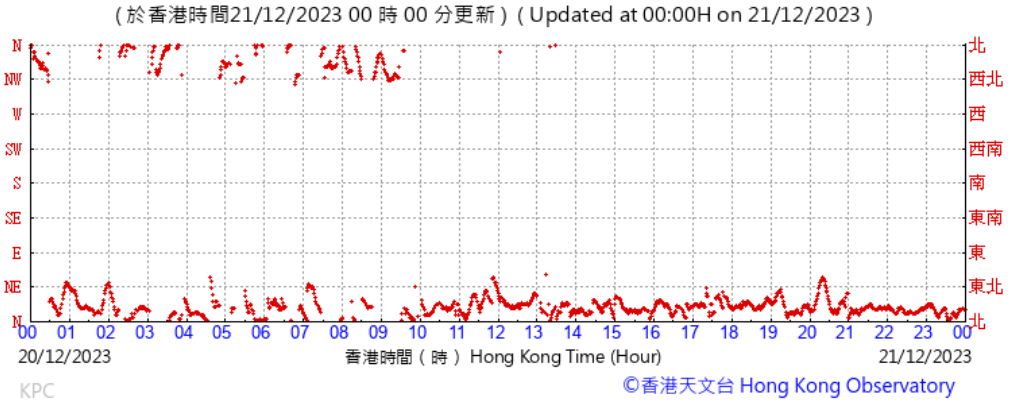
Wind Direction recorded at King's Park Meteorological Station on 15 December 2023



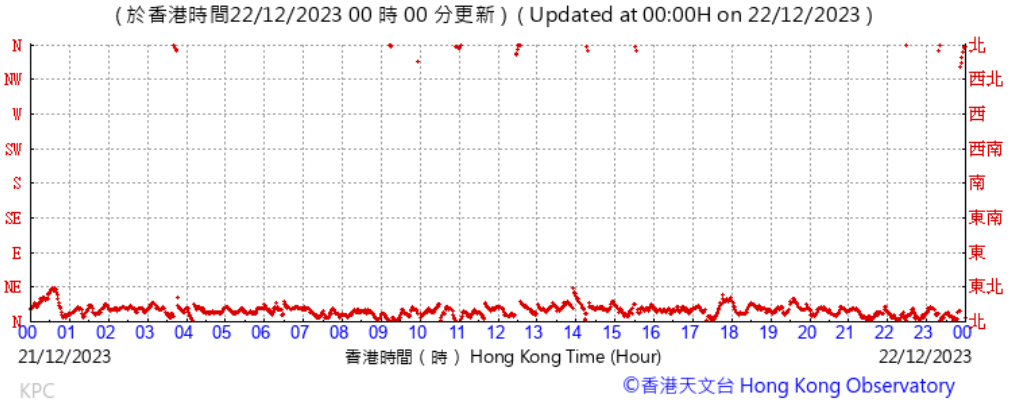
Wind Direction recorded at King's Park Meteorological Station on 16 December 2023



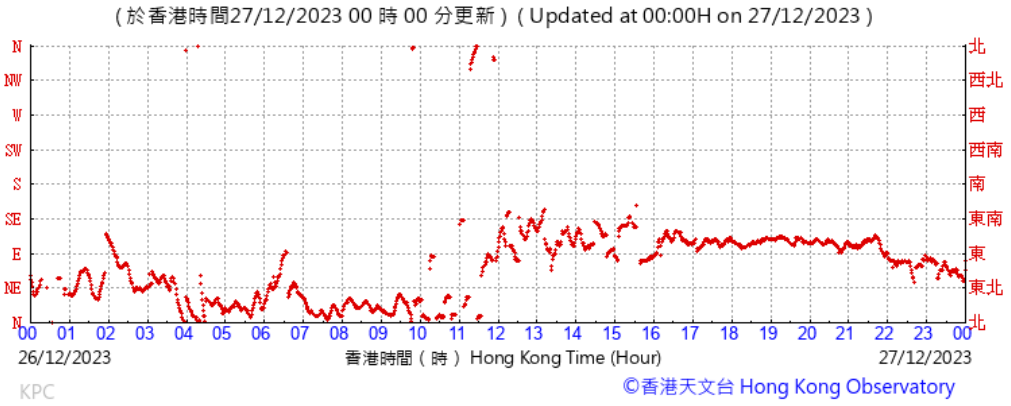
Wind Direction recorded at King's Park Meteorological Station on 21 December 2023



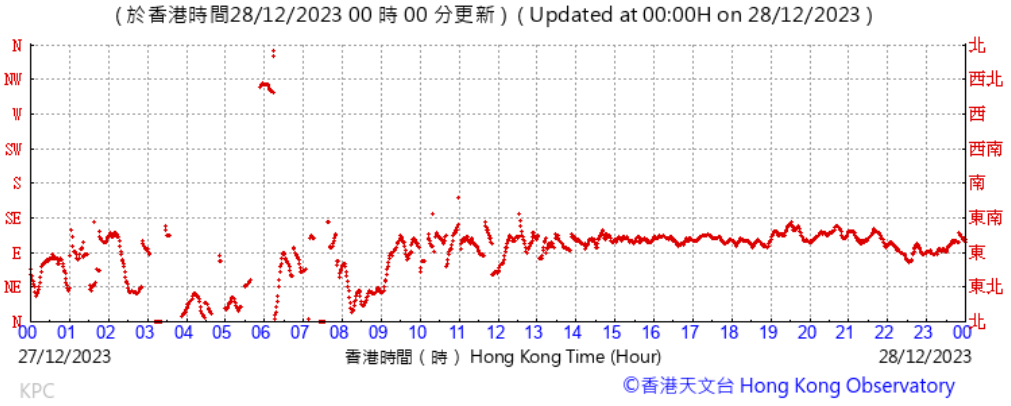
Wind Direction recorded at King's Park Meteorological Station on 22 December 2023



Wind Direction recorded at King's Park Meteorological Station on 27 December 2023



Wind Direction recorded at King's Park Meteorological Station on 28 December 2023



Appendix H

Construction Noise Monitoring

Results

Noise Impact Monitoring Result for
Contract No. HY/2018/08 Central Kowloon Route – Central Tunnel

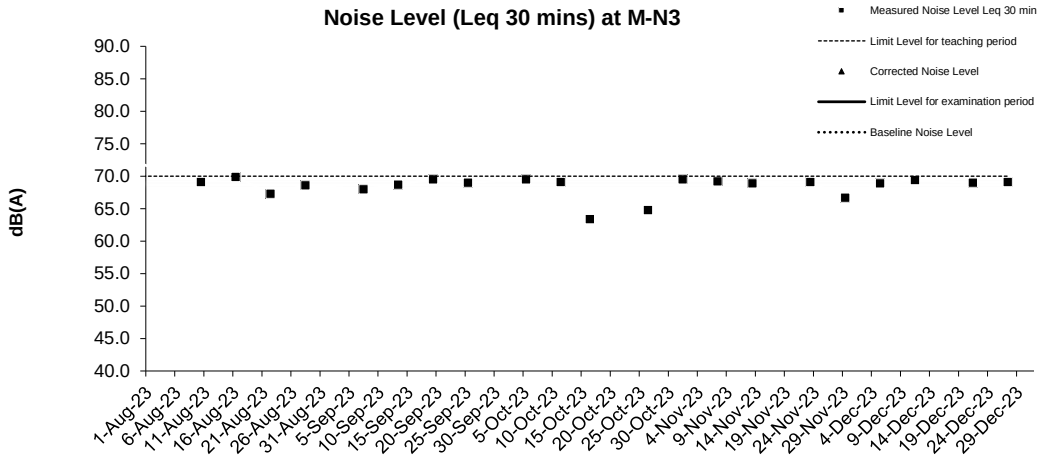
M-N3 - SKH Tsoi Kung Po Secondary School

Date	Start Time	Measured Noise Level Leq 30min dB(A) #	Corrected Noise Level* dB(A)	Limit Level^	L10 dB(A)	L90 dB(A)	Wind Speed (m/s)	Weather
5-Dec-23	8:56	68.9	N/A	70	70.5	65.0	0.5	Fine
11-Dec-23	8:51	69.4	N/A	70	71.0	64.5	0.6	Fine
21-Dec-23	8:58	69.0	N/A	70	71.0	60.0	0.8	Fine
27-Dec-23	8:56	69.1	N/A	70	71.5	64.5	0.4	Fine
	Max	69.4	N/A					
	Min	68.9	N/A					

Notes:
Free field noise levels were adjusted with a correlation of +3 dB(A).

* Corrected Noise Level = 10* log(10^(Measured Noise Level/10) – 10^(Baseline Noise Level/10)); NA refers to Not Applied as the Measured Noise Level < Limit Level.

^ The Limit Level was 70 dB(A) for the teaching period and 65 dB(A) for the examination period.



Appendix I

Event and Action Plan

Table I-1 Event and Action Plan for Construction Dust Monitoring

EVENT	Action			
	ET	IEC	ER	Contractor
Action Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify source; 2. Inform 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 IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

Table I-1 Event and Action Plan for Construction Dust Monitoring (Continued)

EVENT	Action			
	ET	IEC	ER	Contractor
Limit Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 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.	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; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Table I-2 Event and Action Plan for Construction Noise Monitoring

EVENT	Action			
	ET	IEC	ER	Contractor
Exceedance of Action Level	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Notify IEC and Contractor; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1.Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Exceedance of Limit Level	1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 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.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Table I-3 Event and Action Plan for Landscape and Visual during construction phase

EVENT	Action			
	ET	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify source(s); 2. Inform the Contractor, IEC and ER; 3. Discuss remedial actions and preventive measures with IEC, ER and Contractor; 4. Monitor remedial action(s) and preventive measures until rectification has been completed.	1. Check inspection report; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measure(s) and preventive measure(s); 4. Advise ER on effectiveness of proposed remedial measure(s) and preventive measure(s); 5. Check implementation of proposed remedial measure(s) and preventive measure(s).	1. Confirm receipt of notification of non-conformity in writing; 2. Notify the Contractor; 3. Review and agree on the remedial measure(s) and preventive measures proposed by the Contractor; 4. Check implementation of remedial measure(s) and preventive measures.	1. Identify source and investigate the non-conformity; 2. Implement remedial measure(s) and preventive measure(s); 3. Amend working methods agreed with ER as appropriate; 4. Rectify damage and undertake any necessary replacement.
Repeat Non-conformity	1. Identify source(s); 2. Inform Contractor, IEC and ER; 3. Discuss inspection frequency; 4. Discuss remedial action(s) and preventive measures with IEC, ER and Contractor; 5. Monitor remedial action(s) and preventive measure(s) until rectification has been completed; 6. If non-conformity stops, cease any additional monitoring.	1. Check inspection report; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measure(s) and preventive measure(s) 4. Advise ER on effectiveness of proposed remedial measure(s) and preventive measures; 5. Supervise implementation of proposed remedial measure(s) and preventive measure(s).	1. Notify the Contractor; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measure(s) and preventive; measure(s) to be implemented; 3. Supervise implementation of remedial measure(s) and preventive measure(s).	1. Identify source and investigate the non-conformity; 2. Implement remedial measure(s) and preventive measure(s); 3. Amend working methods agreed with ER as appropriate; 4. Rectify damage and undertake any necessary replacement. Stop relevant portion of works as determined by ER until the non-conformity is abated.

Appendix J

Implementation Status of Environment Mitigation Measures (Construction Phase)

Implement Status of Environment Mitigation Measures (Construction Phase)

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
Air Quality			
S4.3.10	D1	- The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Implemented
S4.3.10	D2	- Mitigation measures in form of regular watering under a good site practice should be adopted. Watering once per hour on exposed worksites and haul road should be conducted to achieve dust removal efficiencies of 91.7%. While the above watering frequencies are to be followed, the extent of watering may vary depending on actual site conditions but should be sufficient to maintain an equivalent intensity of no less than 1.3 L/m^2 to achieve the dust removal efficiency.	Implemented
S4.3.10	D3	- Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading;	Implemented
		- Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;	Implemented
		- A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones;	Implemented
		- The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle;	Implemented
		- Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;	Implemented
		- When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided and properly maintained as far as practicable along the site boundary with provision for public crossing;	Implemented
		- The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials;	Implemented
		- Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously;	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet	Implemented
S4.3.10	D3	- Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding;	N.O.
		- Any skip hoist for material transport should be totally enclosed by impervious sheeting;	Implemented
		- Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;	Implemented
		- Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed;	N.O.
		- Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and	N.O.
		- Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.	N.O.
Noise (Airborne)			
S5.4.1	N1	- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;	Implemented
		- Machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;	Implemented
		- Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;	Implemented
		- Silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;	N.O.
		- Mobile plant should be sited as far away from NSRs as possible and practicable;	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- Material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	N.O.
S5.4.1	N2	- Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Implemented
S5.4.1	N3	- Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered on a skid footing with 25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators and handheld breakers etc.	Implemented
S5.4.1	N4	- Use "Quiet plants".	Implemented
S5.4.1	N5	- Loading/unloading activities should be carried out inside the full enclosure of mucking out points.	N.O.
S5.4.1	N6	- Sequencing operation of construction plants where practicable.	Implemented
Water Quality			
S6.9.1.1	W1	*Construction Runoff* - At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities;	Implemented
		- The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a site/sediment trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates;	Implemented
		- 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. Sizes may vary depending upon the flow rate, but for a flow rate of 0.1 m^3/s a sedimentation basin of $30m^3$ would be required and for a flow rate of 0.5 m^3/s the basin would be 150 m^3;	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks where practicable. Exposed slope surfaces should be covered by tarpaulin or other means;	N.O.
		- The overall slope of the site should be kept to a minimum to reduce the erosive potential of surface water flows, and all traffic areas and access roads protected by coarse stone ballast;	N.O.
		- All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas;	Implemented
		- Measures should be taken to minimize the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities;	Implemented
		- Open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50m3 should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system;	Implemented
		- 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;	Implemented
S6.9.1.1	W1	- Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.	Implemented
		- All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit 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-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains;	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain;	N.O.
		- Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts;	Implemented
		- All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby;	Implemented
		- All the earth works involving should be conducted sequentially to limit the amount of construction runoff generated from exposed areas during the wet season (April to September) as far as practicable.	Implemented
S6.9.1.2	W2	*Tunnelling Works and Underground Works* - Cut-&-cover tunnelling work should be conducted sequentially to limit the amount of construction runoff generated from exposed areas during the wet season (April to September) as far as practicable;	N.O.
		- Uncontaminated discharge should pass through sedimentation tanks prior to off-site discharge;	Implemented
		- The wastewater with a high concentration of SS should be treated (e.g. by sedimentation tanks with sufficient retention time) before discharge. Oil interceptors would also be required to remove the oil, lubricants and grease from the wastewater;	Implemented
S6.9.1.2	W2	- Direct discharge of the bentonite slurry (as a result of D-wall and bored tunnelling construction) is not allowed. It should be reconditioned and reused wherever practicable. Temporary storage locations (typically a properly closed warehouse) should be provided on site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.	Implemented
S6.9.1.3	W3	*Sewage Effluent* - Portable chemical toilets and sewage holding tanks are recommended for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.	Implemented
S6.9.1.5	W4	*Groundwater from Potential Contaminated Area* - No direct discharge of groundwater from contaminated areas should be adopted;	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- A discharge license under the WPCO through the Regional Office of EPD for groundwater discharge should be applied. Prior to the excavation works within these potentially contaminated areas, the groundwater quality should be reviewed during the process of discharge license application. The compliance to the Technical Memorandum on Standards for Effluents Discharged into Drainage on Sewerage Systems, Inland and Coastal Waters (TM-DSS) and the existence of prohibited substance should be confirmed. If the review results indicated that the groundwater to be generated from the excavation works would be contaminated, the contaminated groundwater should be either properly treated in compliance with the requirements of the TM-DSS or properly recharged into the ground;	N.O.
		- If wastewater treatment is deployed, the wastewater treatment unit shall deploy suitable treatment process (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (e.g. TPH) to undetectable range. All treated effluent from wastewater treatment plant shall meet the requirements as stated in TM-DSS and should be discharged into the foul sewers;	N.O.
		- If groundwater recharging wells are deployed, recharging wells should be installed as appropriate for recharging the contaminated groundwater back into the ground. The recharging wells should be selected at places where the groundwater quality will not be affected by the recharge operation as indicated in the Section 2.3 of TM-DSS.	N.O.
S6.9.1.6	W6	*Accidental Spillage* - All the tanks, containers, storage area should be bunded and the locations should be locked as far as possible from the sensitive watercourse and stormwater drains;	Implemented
		- The Contractor should register as a chemical waste producer if chemical wastes would be generated. Storage of chemical waste arising from the construction activities should be stored with suitable labels and warnings. Disposal of chemical wastes should be conducted in compliance with the requirements as stated in the Waste disposal (Chemical Waste) (General) Regulation.	Implemented
Waste Management			
S7.4.1	WM1	*On-site sorting of C&D materials* - Geological assessment should be carried out by competent persons on site during excavation to identify materials which are not suitable to use as aggregate in structural concrete (e.g. volcanic rock, Aplite dyke rock, etc). Volcanic rock and Aplite dyke rock should be separated at the source sites as far as practicable and stored at designated stockpile areas preventing them from delivering to crushing facilities. The	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		crushing plant operator should also be reminded to set up measures to prevent unsuitable rock from ended up at concrete batching plants and be turned into concrete for structural use. Details regarding control measures at source site and crushing facilities should be submitted by the Contractors for the Engineer to review and agree. In addition, site records should also be kept for the types of rock materials excavated and the traceability of delivery will be ensured with the implementation of Trip Ticket System and enforced by site supervisory staff as stipulated under DEVB TC(W) No. 6/2010 for tracking of the correct delivery to the rock crushing facilities for processing into aggregates. Alternative disposal option for the reuse of volcanic rock and Aplite Dyke rock, etc should also be explored.	
S7.5.1	WM2	*Construction and Demolition Materials* - Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement;	Implemented
		- Carry out on-site sorting;	Implemented
		- Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate;	Implemented
		- Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible;	N.O.
		- Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and	Implemented
		- Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction.	Implemented
S7.5.1	WM3	*C&D Waste* - Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage;	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.	Implemented
S7.5.1	WM5	<u>*Land-based Sediment*</u> - All construction plant and equipment shall be designed and maintained to minimize the risk of silt, sediments, contaminants or other pollutants being released into the water column or deposited in the locations other than designated location;	Implemented
		- Requirement in the ETWB TCW No. 34/2002 shall be followed;	N.O.
		- For Type 3 special disposal treatment, sealing of contaminant with geosynthetic containment before dropping into designated mud pit would be a possible arrangement. A geosynthetic containment method is a method whereby the sediments are sealed in geosynthetic containers and, the containers would be dropped into the designated contaminated mud pit where they would be covered by further mud disposal and later by the mud pit capping at the disposal site, thereby fulfilling the requirements for fully confined mud disposal.	N.A.
S7.5.1	WM6	<u>*Chemical Waste*</u> - Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes;	Implemented
		- Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation;	Implemented
S7.5.1	WM6	- The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated; - Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.	
S7.5.1	WM6	<u>*General Refuse*</u> - General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes;	Implemented
		- 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 basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law;	Implemented
		- Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible;	Implemented
		- Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor.	N.O.
Land Contamination			
S8.10, S8.12 & Appendix 8.4	LC1	<u>*Remaining SI Works*</u> - The potential for land contamination issues at EBH1 and EBH2 will be confirmed by site investigation after site possession and utility diversion by the construction contractor. Following the completion of the remaining SI works, the Project Proponent would prepare and submit a Second Supplementary CAR/RAP to EPD to present the findings of the SI works and to recommend specific remediation measures, if required. Upon completion of the remediation works, if any, a Remediation Report (RR) would be prepared and submitted to EPD for agreement prior to commencement of the construction works.	N.O.
Hazard to Life			
S9.18	H1	- Blasting activities regarding transport and use of explosives should be supervised and audited by competent site staff to ensure full compliance with the blasting permit conditions.	N.O.
S9.6, para 4	H2	- Detonators shall not be transported in the same vehicle with other Category 1 Dangerous Goods.	N.O.
S9.6, para 8	H3	- The explosives delivery trucks should be approved by Mines Division and should meet the regulatory requirements for transport of explosives.	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
S9.10, para 7 and S9.18	H4	- Blast doors should be provided for tunnels and blast cover should be provided for shaft at HMT, and kept closed during blasting. Provision of blast doors or heavy duty blast curtains should be implemented at the shafts, adits and other suitable locations to prevent flyrock and control the air overpressure.	N.O.
S9.18	H5	- Only the required quantity of explosives for a particular blast should be transported to avoid the return.	N.O.
S9.18	H6	- Maximum instantaneous charge (MIC) should be within the MIC as specified for the given section.	N.O.
S9.18	H7	- The approved truck dedicated for transport of explosives should comply with the "Guidance Note on Requirements for Approval of an Explosives Delivery Vehicle" issued by CEDD Mines Division. The truck should be periodically inspected and properly maintained in good operation conditions. The fuel carried in the fuel tank should be minimized to reduce the duration of fire. Adequate fire-fighting equipment shall be provided, inspected and replaced periodically (e.g. fire extinguishers).	N.O.
S9.18	H8	- The driver and his assistant should be physically healthy, experienced and have good safe driving records. The driver should hold a proper driving license for the approved transport truck. Dedicated training programme and regular road safety briefing sessions / workshops should be provided to enhance their safe driving attitude and practice. Smoking should be strictly prohibited.	N.O.
S9.18	H9	- Emergency response plans in case of road accident should be prepared and implemented. The driver and his assistant should be familiar with the emergency procedures including evacuation, and proper communication / fire-fighting equipment should be provided to the driver and his assistant.	Implemented
S9.18	H10	- Close liaison and communication among Mines Division, contractors for transport of explosives, and working staff of the tunnel blasting should be established. In case of any change of work schedule leading to cancellation or variation of explosives required, relevant parties should be informed in time to avoid unused explosives at the work sites.	Implemented
S9.18	H11	- Close liaison and communication with Fire Services Department should be established to reduce the accidental detonation escalated from a fire. The contractors for transport of explosives should use the preferred transport routes as far as practicable.	Implemented
S9.18	H12	- Contingency plan should be prepared for transport of explosives under severe weather conditions such as rainstorms and thunderstorms.	Implemented
S9.18	H13	- For explosive transport, all packages of explosives on the truck should be properly stored in the truck compartment as required. Packaging of the explosives should remain intact (i.e. damage free) until they are transferred to the blasting site.	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
S9.18	H14	- Availability of a parking space should be ensured before commencement of transport of explosives. Location for loading and unloading of explosives should be as close as possible to the shaft or the adit. No hot work should be performed in the vicinity during the time of loading and unloading.	N.O.
S9.18	H15	- Good communication and coordination should be performed for safe blasting of different chainage locations on the same day.	N.O.
S9.18	H16	- Evacuation and secure refugee areas should be implemented / provided to the working staff.	N.O.
S9.18	H17	- Healthy competent licensed shotfirers and blasting engineers should be employed to conduct the blasting work.	N.O.
S9.18	H18	- Proper control measures should be enforced during explosive transport within the tunnel and charging the blast holes, such as speed limit for the truck, no hot work in the vicinity, etc.	N.O.
S9.18	H19	- Ground vibrations of the blasting operation should be monitored and MICs should be adjusted according to the actual geotechnical features to ensure blasting vibrations within the specified PPV limit.	N.O.
S9.18	H20	- For tunnel blasting near gas facilities, requirement of the "Gas Production and Supply Code of Practice - Avoiding Danger from Gas Pipes" should be respected. Close liaison and coordination with HKCG should be established to provide sufficient notice of the planned blasting activities in an appropriate format within a reasonable time period prior to blasting. Emergency response procedures should be prepared and implemented in case of gas leaks.	N.O.
S9.18	H21	- For tunnel blasting near MTRC railway tunnels, close liaison and coordination with MTRC should be established to provide sufficient notice of the planned blasting activities in an appropriate format within a reasonable time period prior to blasting. Emergency response procedures should be prepared and implemented in case of any damage to the railway facilities.	N.O.
S9.18	H22	- It is recommended to explore to minimize the use of the cartridged emulsion explosives and maximize the use of bulk emulsion explosive as far as practicable.	N.O.
S9.18	H23	- The use of bulk emulsion where the maximum instant charge (MIC) envisaged for a particular blast is above 0.5kg. This prevents the occurrence of excessive vibrations due to potential bulk emulsion dosing inaccuracy in the case of low MIC. It is recommended to explore the bulk emulsion dosing technology so as to maximize the use of bulk emulsion explosive as far as practicable.	N.O.
S9.18	H24	- It is recommended to explore to use smaller explosive charges such as 'cast boosters' or 'mini-cast booster' instead of cartridged emulsion as primers for bulk emulsion. This is option reduces the quantity of explosives required for transportation for the sections where bulk emulsion will be used.	Implemented

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
S9.18	H25	- Instrumentation and monitoring plan should be submitted to all relevant stakeholders for agreement prior to the commencement of the tunnel blasting works. Such plan should be implemented during construction of CKR tunnels.	Implemented
S9.18	H26	- Contingency plan should be submitted to all relevant stakeholders for agreement prior to the commencement of the tunnel blasting works.	Implemented
Landscape and Visual			
S10.10.1, Table 10.11	LV3	*Good Site Management* - Large temporary stockpiles of excavated material shall be covered with unobtrusive sheeting to prevent dust and dirt spreading to adjacent landscape areas and vegetation, and to create a neat and tidy visual appearance. Construction plant and building material shall be orderly and carefully stored in order to create a neat and tidy visual appearance.	N.O.
S10.10.1, Table 10.11	LV4	*Screen Hoarding* - Decorative screen hoarding should be erected to screen the public from the construction area. It should be designed to be compatible with the existing urban context.	N.O.
S10.10.1, Table 10.11	LV5	*Lighting Control during Construction* - All lighting in the construction site shall be carefully controlled to minimize light pollution and night-time glare to nearby residencies and GIC. The contractor shall consider other security measures, which shall minimize the visual impacts.	Implemented
S10.10.1, Table 10.11	LV6	*Erosion Control* - The potential for soil erosion shall be reduced by minimizing the extent of vegetation disturbance on site and by providing a protective cover over newly exposed soil.	N.O.
S10.10.1, Table 10.11	LV7	*Tree Protection & Preservation* - Carefully protected during construction. Tree protection measures will be detailed at the Tree Removal Application stage and plans submitted to the relevant Government Department for approval in due course in accordance with ETWB TC no. 3/2006.	Implemented
S10.10.1, Table 10.11	LV8	*Tree Transplantation* - For trees unavoidably affected by the Project that have to be removed, where practical transplantation will be chosen as the top priority method of removal. If this is not possible or practical compensatory planting will be provided for trees unavoidably felled (See LV10). For trees unavoidably affected by the	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		Project works that are transplanted, transplantation must be carried out in accordance with ETWBTC 2/2004 and 3/2006.	
S10.10.1, Table 10.11	LV9	*Compensatory Planting* - All felled trees shall be compensated for by planting trees to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006. Compensatory tree planting may be incorporated into public open spaces and along roadside amenity areas affected by the construction works and therefore be part of the bigger wider planting plans. Onsite compensation planting is preferred but if necessary, additional receptor sites outside the Works Area shall be agreed separately with Government during the Tree Felling Application process.	N.O.
S10.10.1, Table 10.11	LV10	*Screen Planting* - Tall screen/buffer trees, shrubs and climbers should be planted, in so far as is possible, to soften and screen proposed structures such as roads and central strip, vertical edges and buildings and to enhance streetscape greening effect where appropriate. Indiscriminate use of trees for screening must be avoided and the principle of 'right tree for the right place' must be followed.	N.O.
S10.10.1, Table 10.11	LV11	*Green Roof* - Roof greening is recommended be established on ventilation and administration buildings to reduce exposure to untreated concrete surfaces and particularly mitigate visual impact to VSRs at high levels.	N.O.
S10.10.1, Table 10.11	LV12	*Reinstatement* - All works areas, excavated areas and disturbed areas for tunnel construction and temporary road diversion or any other proposed works shall be reinstated to former conditions or better, with reasonable landscape treatment and to the satisfaction of the relevant Government departments. (Specific mitigation for disturbance to public open space is detailed separately under LV14).	N.O.
S10.10.1, Table 10.11	LV13	*Reprovising of Public Open Space* - All areas of public open space affected by the Project will be reprovisioned either at the same location following the completion of temporary works, or at a separate site, as agreed with relevant Government departments. Open space should be re-provisioned in an enhanced manner.	N.O.
S10.10.1, Table 10.11	LV14	*Landscape enhancement* - Implement a comprehensive landscape plan to maximize the greening opportunity and create a unique landscape for the project to blend in with the surrounding, including in reprovisioned areas. In particular:	N.O.

EIA Ref	EM&A Log Ref	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status
		- landscape enhancement of re-provisioned Public Transport Interchange; - landscape deck on tunnel portals; - viaduct planters for trailer planting.	
Cultural Heritage			
S11.4.4	CH1	- The contractor should be alerted during the construction on the possibility of locating archaeological remains and as a precautionary measure, AMO shall be informed immediately in case of discovery of antiquities or supposed antiquities in the subject sites.	N.A.
S12.6.1, Table 12.2	CH5	*Tin Hau Temple (CKR-02)* - The Alert, Alarm and Action (AAA) vibration limit is recommended to be set at 3/4/5 mm/s and a condition survey shall be carried out by the project proponent prior to the construction phase to confirm this assessment; - Vibration monitoring of the structure shall be employed during the construction phase to ensure that the level is not exceeded. . The monitoring proposal should be sent to AMO for comment.	N.A.
S12.6.1, Table 12.2	CH6	*Kowloon Methodist Church (CKR-10)* - The Alert, Alarm and Action (AAA) vibration limit is recommended to be set at 5/6/7.5 mm/s; - Vibration monitoring of the structure shall be employed during the construction phase to ensure that the level is not exceeded, and as such appropriate vibration monitoring on the building should be complied with as appropriate. The monitoring proposal should be sent to AMO for comment.	N.A.
S12.6.1, Table 12.2	CH7	*Ma Tau Kok Animal Quarantine Depot (CKR-12)* - The Alert, Alarm and Action (AAA) vibration limit is recommended to be set at 5/6/7.5 mm/s; - Vibration monitoring of the structure shall be employed during the construction phase to ensure that the level is not exceeded, and as such appropriate vibration monitoring on the building should be complied with as appropriate. The monitoring proposal should be sent to AMO for comment.	N.A.
S12.6.1, Table 12.2	CH11	*Air raid precaution tunnels of the K1 Network (CKR-14)* - A condition survey for the tunnel network should be undertaken by the project proponent to determine the present condition of the air raid tunnels and to recommend protective measures to ensure that the tunnels are not damaged by the construction works. and as such appropriate vibration monitoring on the building should be complied with as appropriate. The monitoring proposal should be sent to AMO for comment.	N.A.

Remarks:

N.A. Not Applicable at this stage as no such site activities were conducted in the reporting period

N.O. Not Observed during site inspection in the reporting period.

Appendix K

Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

Table K-1 Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From	Received By	Nature of Complaint	Investigation/Mitigation Action	Status
EC180_CKRCT20231124_746	24 November 2023	The Contractor Hotline	The Contractor & Engineer	Construction dust	A complaint from Jade market was referred to the Contractor on 24 November 2023 about dust generated from the construction site. He/she requested the Contractor to take follow-up action. According to information provided by the contractor, material would be ensured to be covered properly and frequency of spraying water would be increased for dust control. Supervision is taken by Resident Site Staff (RSS) of the Project to monitor the site work activities and implementation of the dust mitigation measures is audited on-site by ET and RSS. The Contractor was suggested to maintain good relations with the nearby sensitive receivers/ stakeholders which may be affected by the construction work such as providing better/ more detailed information about the work nature and informing in advance of the	Investigation report was finalized on 27 December 2023.

Complaint Log No.	Date of Complaint	Received From	Received By	Nature of Complaint	Investigation/Mitigation Action	Status
					works to the nearby residents.	
EC181_CKRCT20230914_755	28 November, 2 December, 4 December, 5 December 2023	1823	The Contractor & Engineer	Blocked gullies	The Contractor was referred complaints from 1823 on 28 November, 2, 4 and 5 December 2023. The complainant complaint about blocked gully near the taxi stand at San Ma Tau Street.	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.
EC182_CKRCT20230914_758	30 December 2023	Contractor Hotline	The Contractor & Engineer	Construction Noise	Ultima Property Management Office reported that they received a complaint by their resident about the construction vehicle noise in the vicinity of the construction site near Ho Man Tin East Service Reservoir Playground at around 4:00 a.m. on 30 December 2023.	Under investigation and the investigation results will be reported in the subsequent Monthly EM&A Report.

Table K-2 Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions and Public Engagement Activities

Reporting Period	Complaints	Notifications of Summons and Prosecutions	Public Engagement Activities
This Month	2	0	0
Cumulative Project-to-Date	183	0	0

Table K-3 Cumulative Statistics on Monitoring Exceedance

Monitoring Parameter	Month/Year	No. of Exceedance	
		Action	Limit
1-hour TSP	No. of Exceedance This Month	0	0
	Cumulative Project-to-Date	0	0
24-hour TSP	No. of Exceedance This Month	0	0
	Cumulative Project-to-Date	0	0
Noise (LAeq (30min))	No. of Exceedance This Month	1	0
	Cumulative Project-to-Date	148	0

Appendix L

Waste Flow Table

Monthly Summary Waste Flow Table (2023)

Month	Actual Quantities of Inert C&D Materials Generated Monthly				Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity of Inert C&D Materials Generated[2 3] (A)	Reused in the Contract[3] (B)	Reused in other Projects[3] (C)	Disposed as Public Fill[3] (D)	Metals	Paper/ cardboard packaging	Plastics	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 '000m^3)	(in '000m^3)	(in '000m^3)
Total (2019)	2.284	0.0000	0.0000	2.284	0.0000	0.0000	0.0000	0.0000	0.0358
Total (2020)	130.0518	0.0000	75.3533	54.6985	49.1912	3.1500	0.0219	4.2240	0.2613
Total (2021)	571.1005	0.0000	509.5554	61.5452	0.0842	3.3920	0.0860	25.5200	0.4916
Total (2022)	472.7173	7.9374	320.6842	137.2021	0.0726	3.5310	0.1382	44.9046	0.7432
Jan	53.2818	0.0000	50.2477	3.0341	0.0033	0.1650	0.0120	0.0000	0.0688
Feb	72.6005	0.0000	65.6327	6.9677	0.0058	0.1300	0.0088	2.8160	0.0900
Mar	61.8141	0.6882	52.2268	8.8991	0.0056	0.1400	0.0098	5.2448	0.1094
Apr	30.5641	0.5191	19.4473	10.5977	0.0045	0.5000	0.0101	1.9360	0.1094
May	49.9648	0.0676	36.2894	13.6078	0.0042	0.4700	0.0070	0.7040	0.1594
Jun	50.8995	0.5987	42.9123	7.3885	0.0048	0.1600	0.0092	0.0000	0.1563
Sub-Total (2023)	319.1248	1.8736	266.7562	50.4949	0.0282	1.5650	0.0569	10.7008	0.6933
Jul	33.1173	0.0000	23.8764	9.2409	0.0107	0.0000	0.0263	0.0000	0.1865
Aug	23.7191	0.1214	15.5295	8.0682	0.0062	0.2700	0.0120	2.8160	0.2912
Sep	19.0242	0.0446	17.0439	1.9357	0.0093	0.0000	0.0168	0.0000	0.1706
Oct	26.0330	2.2207	20.6945	3.1177	0.0025	0.2600	0.0022	5.6320	0.3106
Nov	40.8191	0.0882	36.2573	4.4736	0.0069	0.8600	0.0169	0.0000	0.4663
Dec	16.3710	0.0000	12.6630	3.7081	0.0100	0.2350	0.0063	0.0000	0.4017
Total (2023)	478.2085	4.3485	392.8208	81.0391	0.0738	3.1900	0.1374	19.1488	2.5202
Total accumulated waste quantity	1654.3621	12.2859	1298.4137	336.7689	49.4218	13.2630	0.3835	93.7974	4.0521

Notes:

1. Following assumption is made for calculation:

i) 1m^3 of inert material weight 2.2 tonne;

ii) 1m^3 of non-inert material weight 1.6 tonne;

iii) 1m^3 of chemical waste weight 0.88 tonne;

2. Total Quantity of Inert C&D Materials (A) should reflect total quantities of C&D materials (including rock, broken concrete, soil, asphalt, slurry and bentonite) generated from site;

3. Disposed as Public Fill (D) = Total Quantity of Inert C&D Materials Generated (A) – Reused in the Contract (B) – Reused in other Projects (C).