

Ref.: HYDHZMBEEM00_0_8634L.22

12 January 2022

By Fax (3748 8900) and By Post

AECOM Asia Co. Ltd.
The PRE's Office
550 Cheung Tung Road, Lantau, Hong Kong

Attention: Mr. Jason Yu

Dear Sir,

**Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities, and
Tuen Mun-Chek Lap Kok Link – Investigation**

**Contract No. HY/2019/01
HZMB HKBCF – Phase 2 and Other Works
Monthly EM&A Report for December 2021**

Reference is made to the Environmental Team's submission of Monthly EM&A Report for December 2021 certified by the ET Leader (ET's ref.: "MCL/ED/0014/2022/C" dated 12 January 2022) and provided to us via e-mail on 12 January 2022.

We are pleased to inform you that we have no further comments on the captioned submission. We write to verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-353/2009/K (the EP).

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,
For and on behalf of
Ramboll Hong Kong Limited



Brian Tam
Independent Environmental Checker
HZMB HKBCF

c.c.	HyD	Attn.: Mr. Patrick Ng	(By Fax: 3188 6614)
	HyD	Attn.: Mr. Alan Ip	(By Fax: 3188 6614)
	Fugro	Attn.: Mr. Calvin Leung	(By Fax: 2450 6138)
	CHEC	Attn.: Mr. Johnason Ko	(By Fax: 2887 3104)

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FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre

5 Lok Yi Street, Tai Lam

Tuen Mun, NT

Hong Kong

Date 12 January 2022

Our Ref. MCL/ED/0014/2022/C

Ramboll Hong Kong Limited
21/F, BEA Harbour View Centre,
56 Gloucester Road,
Wan Chai, Hong Kong

BY EMAIL

Attn.: Mr. Brian Tam, Independent Environmental Checker

Dear Sir,

**EP Condition 5.4 – Monthly EM&A Report for
Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and
Other Works (Contract No. HY/2019/01)**

Pursuant to Condition 5.4 of the Environmental Permit (EP-353/2009K) for the captioned project, we hereby submit the certified Monthly EM&A Report for December 2021 for your verification.

Thank you for your attention, should there be any comments or queries, please contact our Mr. Cyrus Lai at 3565-4442 or the undersigned at 3565-4441.

Yours faithfully,
for and on behalf of
FUGRO TECHNICAL SERVICES LIMITED

Calvin Leung
Environmental Team Leader

c.c. AECOM Attn: Mr. Jason Yu, Mr. Gordon Kok
 Ramboll Attn: Mr. Y. H. Hui, Mr. K. C. Chan
 CHEC Attn: Mr. Marko Chan, Mr. Matthew Wu



Monthly EM&A Report (December 2021)

0002/20/ED/0432 01 |

Contact No. HY/2019/01 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

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Client	China Harbour Engineering Co., Ltd. - Contract No. HY/2019/01
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Initials	Name	Role	Signature
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CY	Cyrus C.Y. Lai	Senior Environmental Consultant	
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EXECUTIVE SUMMARY

This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works" (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). Contract No. HY/2019/01 was awarded to China Harbour Engineering Co. Limited and Fugro Technical Services Limited (FTS) was appointed as the Environmental Team (ET) by the Contractor.

Contract No. HY/2019/01 is part of the "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities" (HZMB HKBCF) Project which is a "Designated Project" under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The current Environmental Permit (EP) for HKBCF, namely No. EP-353/2009/K, was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Commencement of the Contract took place on 4 December 2019 and the construction site preparation works commenced in early February 2020.

Fugro Technical Services Limited (FTS) has been appointed by the Contractor to implement the Environmental Monitoring & Audit (EM&A) programme for the Contract in accordance with the Updated EM&A Manual for HKBCF (Version 1.0) and is providing environmental team services for the Contract.

This is the 23rd Monthly EM&A Report for the Contract which summaries findings of the EM&A programme during the reporting period from 1 December 2021 to 31 December 2021.

Environmental Monitoring and Audit Progress

The monthly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality, noise and the post-construction dolphin monitoring works for the Contract are covered by Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works". The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 as part of EM&A programme if the impact air quality monitoring work is no longer covered by Contract No. HY/2011/03 respectively. However, this is subject to ENPO's final decision on which ET should carry out the monitoring work at these stations.

Breaches of Action and Limit Levels

No Action and Limit Level exceedance was recorded for air quality monitoring in the reporting month. Also, no Action and Limit Level exceedance was recorded for construction noise monitoring in the reporting month.

Complaint Log

No complaints were received in the reporting period.

Notifications of any Summons and Successful Prosecutions

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

Reporting Change

There were no reporting changes during the reporting month.

Future Key Issues

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

- Excavation at Vehicle Clearance Plaza (VCP) (land-based);
- Road & Drain works at South Public Transport Interchanges (SPTI), North Public Transport Interchanges (NPTI) and Vehicle Clearance Plaza (VCP) (land-based);
- Covered Walkway at South Public Transport Interchanges (SPTI) and North Public Transport Interchanges (NPTI) (land-based);
- Public Toilet at North Public Transport Interchanges (NPTI) (land-based);
- Kiosks Construction at Vehicle Clearance Plaza (VCP) (land-based);
- Landscape Works at G1 and G5 (land-based);
- Conceal Conduits Works at Vehicle Clearance Plaza (VCP) (land-based);
- E&M Works at South Public Transport Interchanges (SPTI) (land-based);
- Irrigation System at G1 and G5 (land-based).

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1. INTRODUCTION

1.1 Background

- 1.1.1 Fugro Technical Services Limited was commissioned by China Harbour Engineering Co. Limited (also referred to as “the Contractor”) to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for Contract No. HY/2019/01 “Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works”.
- 1.1.2 Contract No. HY/2019/01 is part of the “Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities” (HZMB HKBCF) Project which is a “Designated Project” under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The current Environmental Permit (EP) for HKBCF, namely No. EP-353/2009/K, was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. The general layout of the Project area is shown in **Figure 1**. Commencement of the Contract took place on 4 December 2019 and the construction site preparation works commenced in early February 2020.
- 1.1.3 This is the 23rd Monthly EM&A report to document the findings of site inspection activities and EM&A programme carried out by the Contractor of Contract No. HY/2019/01 from 1 December 2021 to 31 December 2021 (reporting period) and is submitted to fulfil Condition 5.4 of the EP.

1.2 Project Description

- 1.2.1 The works to be executed under Contract No. HY/2019/01 include the following major items:
- Landscaping and establishment works;
 - Irrigation system and associated drainage pumping system and facilities;
 - Erection and installation in the Passenger Clearance Building;
 - Public transport interchange (PTI) public toilet, satellite refuse collection point (RCP) and observation guard booths;
 - PTI cross boundary shuttle (CBS) / cross boundary coach (CBC) lanes and covered walkway;
 - Vehicle clearance plazas (VCP) vehicle kiosks and associate automatic vehicle clearance supporting system (AVCSS).

1.3 Project Organization

1.3.1 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
Engineer or Engineer's Representative (AECOM Asia Co. Ltd.)	Senior Resident Engineer	Mr. Jason Yu	3748 8903
	Resident Engineer	Mr. Winston Wong	3748 8918
	Resident Engineer	Mr. Gordon Kok	3748 8967
Environmental Project Office / Independent Environmental Checker (Ramboll Hong Kong Limited)	Environmental Project Office Leader	Mr. Y. H. Hui	3465 2888
	Independent Environmental Checker (IEC)	Mr. Brian Tam	9700 6767
	Environmental Site Supervisor	Mr. K. C. Chan	3465 2882
Contractor (China Harbour Engineering Co. Ltd)	Environmental Manager	Mr. Marko Chan	9427 2879
	Environmental Officer	Mr. Matthew Wu	6076 2675
Environmental Team (Fugro Technical Services Limited)	Environmental Team Leader (ETL)	Mr. Calvin Leung	3565 4441

1.4 Construction Programme and Activities

1.4.1 The site layout plan of the Contract is shown in **Figure 1**.

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

1.5 Works undertaken during the month

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

- Excavation at VCP (land-based);
- Road & Drain works at SPTI, NPTI and VCP (land-based);
- Covered Walkway at SPTI and NPTI (land-based);
- Public Toilet at NPTI (land-based);
- Kiosks Construction at VCP (land-based);
- Landscape Works at G1 and G5 (land-based);
- Conceal Conduits Works at VCP (land-based);
- E&M Works at SPTI (land-based);
- Irrigation System at G1 and G5 (land-based).

1.6 Status of Environmental Licences, Notification and Permits

1.6.1 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
Environmental Permit	EP-353/2009/K	11-Apr-16	Not Applicable
Notification pursuant to Air Pollution (Construction Dust) Regulation	451380	28-Nov-19	Not Applicable
Billing Account for Disposal of C&D waste	A/C No. 7036097	18-Dec-19	Not Applicable
Chemical Waste Producer Registration	5296-951-C1186-32	6-Feb-20	Not Applicable
Construction Noise Permit	GW-RS0401-21	13-Jun-21	12-Dec-21
Construction Noise Permit	GW-RS0955-21	13-Dec-21	11-Jun-22
Water Discharge License	WT00035721-2020	8-Jun-21	30-Apr 25

2. AIR QUALITY

2.1 Monitoring Requirement

2.1.1 In accordance with the Contract Specific 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. Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days.

2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) deployed at the designated monitoring stations. The HVS shall meet all the requirements of the EM&A Manual.

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

2.2.3 The model of the air quality monitoring equipment used is summarized in **Table 2.1**.

Table 2.1 Air Quality Monitoring Equipment

Item	Location	Brand	Model	Equipment	Serial No.
1	AMS2	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-01
			TE-300-310X	-Mass Flow Controller	3002
			TE-5005X	-Blower Motor Assembly	4607
			TE-5007X	-Mechanical Timer	5596
			TE-5009X	-Continuous Flow Recorder	5752
2	AMS3C	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-02
			TE-300-310X	-Mass Flow Controller	3000
			TE-5005X	-Blower Motor Assembly	4610
			TE-5007X	-Mechanical Timer	5597
			TE-5009X	-Continuous Flow Recorder	5756
3	AMS7C	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-03
			TE-300-310X	-Mass Flow Controller	2037
			TE-5005X	-Blower Motor Assembly	3477
			TE-5007X	-Mechanical Timer	2697
			TE-5009X	-Continuous Flow Recorder	4371
4		Tisch	TE-5025A	HVS Sampler Calibrator	438320/2456
5		Sibata	Model LD-5R	Sibata Portable TSP Monitors	892186
6			Model LD-5R		892187
7			Model LD-5R		892189

2.3 Monitoring Methodology for HVS

2.3.1 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.

2.3.2 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.

2.3.3 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.

2.3.4 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.

2.3.5 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.

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

2.3.7 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 $\pm 3^\circ\text{C}$; the relative humidity (RH) should be $< 50\%$ and not vary by more than $\pm 5\%$. A convenient working RH is 40%.

2.4 Maintenance and Calibration for HVS

- 2.4.1 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.
- 2.4.2 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 D**.

2.5 Monitoring Methodology for Direct Reading Dust Meter

- 2.5.1 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

2.6 Maintenance and Calibration for Direct Reading Dust Meter

2.6.1 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 D**.

2.7 Monitoring Locations

2.7.1 In accordance with the Contract Specific EM&A Manual, four air quality monitoring locations, namely AMS2, AMS3C, AMS6 and AMS7B were set up at the proposed locations. AMS2, AMS3C and AMS7B are covered by Contract No. HY/2019/01 "Hong Kong-Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works"

2.7.2 AMS6 is covered by Contract No. HY/2011/03 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road (HZMB HKLR) – Section between Scenic Hill and HKBCF". The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 as part of EM&A programme if this air quality monitoring station is no longer covered by Contract No. HY/2011/03.

2.7.3 Due to the existing air quality monitoring location AMS7B would be hand over back to Airport Authority for their construction works. A new alternative air quality monitoring location is still under processing. Air quality monitoring location AMS7B was temporary suspended, effective from 10 December 2020.

2.7.4 According to the email date 11 August 2021, EPD have no comment on the Proposal for Relocation of Monitoring Location AMS 7B, the monitoring location AMS 7B are proposed to be relocated by alternative monitoring location AMS 7C for air quality monitoring. The monitoring location AMS 7C has resumed air quality monitoring on 5 October 2021.

2.7.5 The most updated locations of air quality monitoring are summarized in **Table 2.2** and they are shown in **Figure 2**.

Table 2.2 Air Quality Monitoring Location

Monitoring Station	Location
AMS2	Tung Chung Development Pier
AMS3C	Ying Tung Estate Market Rooftop
AMS6	Dragonair / CNAC (Group) Building (HKIA)
AMS7C	East Sea Rescue Berth – Airport Fire Contingent Third Runway Site Office

Remarks: The ET of this Contract should conduct impact air quality monitoring at station AMS6 listed in the table as part of EM&A programme according to latest notification from ENPO when the monitoring station is no longer covered by another ET of the HZMB project.

2.8 Monitoring Results

- 2.8.1 The schedule of air quality monitoring in reporting month is provided in **Appendix E**.
- 2.8.2 No Action / Limit Level exceedance was recorded for 1-hr and 24-hr TSP at AMS2, AMS3C and AMS7C.
- 2.8.3 The monitoring results for AMS6 are reported in the monthly EM&A Reports prepared for Contract No. HY/2011/03.
- 2.8.4 The weather conditions during the monitoring are provided in **Appendix K**.
- 2.8.5 The monitoring data of 1-hr TSP and 24-hr TSP are summarized in **Table 2.3**. Detailed monitoring data are presented in **Appendix F**.

Table 2.3 Summary of Air Quality Monitoring Results

Monitoring Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
1-hour TSP				
AMS2	54	36-68	374	500
AMS3C	89	65-125	368	
AMS7C	60	40-84	370	
24-hour TSP				
AMS2	66	32-100	176	260
AMS3C	55	36-69	167	
AMS7C	55	34-87	183	

- 2.8.6 The Event and Action Plan for air quality is given in **Appendix H**.
- 2.8.7 The wind data obtained from the on-site wind station during the reporting period is provided in **Appendix G**.

3. NOISE

3.1 Monitoring Requirement

3.1.1 In accordance with the Contract Specific EM&A Manuals, L_{eq} (30min) monitoring is conducted for at least once a week during the construction phase between 0700 and 1900 on normal weekdays at the designated monitoring locations.

3.2 Monitoring Equipment

3.2.1 The sound level meter used in noise monitoring shall comply with the International Electrotechnical Commission Publication (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum issued under the Noise Control Ordinance (NCO).

3.2.2 Sound level calibrator shall be used for the on-site calibration of the meter. This calibrator complies with the IEC Publication 942 (1988) Class 1 and ANSI S1.40 - 1984. Noise measurements were only accepted to be valid if the calibration levels from before and after the measurement agree to within 1.0 dB(A).

3.2.3 Measurements shall be recorded to the nearest 0.1dB(A). Sound level meters are programmed to measure A-weighted equivalent continuous sound pressure level at 30-minute intervals between 0700 and 1900 on normal weekdays at least once a week when construction activities are underway.

3.2.4 The model of the noise monitoring equipment used is summarized in **Table 3.1**.

Table 3.1 Construction Noise Monitoring Equipment

Item	Brand	Model	Equipment	Serial No.
1	Casella	CEL-63X Series	Integrating Sound Level Meter	1488302
2	Casella	CEL-63X Series	Integrating Sound Level Meter	1488303
3	Casella	CEL-120/1	Calibrator	5230758
4	Casella	CEL-120/1	Calibrator	5230950
5	Smart Sensor	AR816	Wind Speed Anemometer	H0423689

3.3 Monitoring Parameters and Frequency

3.3.1 The parameters and frequencies of impact noise monitoring is summarized in **Table 3.2**.

Table 3.2 Monitoring Parameters and Frequencies of Noise Monitoring

Parameter	Frequency
L_{eq} (30min) L_{10} and L_{90} will be recorded for reference	At each station at 0700-1900 hours on normal weekdays at a frequency of once a week

3.4 Monitoring Methodology

3.4.1 Noise measurement should be conducted as the following procedures:

- Free field measurements was made at monitoring location M-N3. A correction of +3 dB(A) shall be made to the free field measurements.
- The battery condition should be checked to ensure good functioning of the meter.
- 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: continuous 5 minutes interval
- Prior to and after noise measurement, the meter shall be calibrated using the calibrator for 94.0 dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB(A), the measurement will be considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
- 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.
- Noise measurement should be paused during periods of high intrusive noise if possible and observation shall be recorded when intrusive noise is not avoided.
- At the end of the monitoring period, the L_{eq} , L_{10} and L_{90} should be recorded. In addition, site conditions and noise sources should also be recorded on a standard record sheet.

3.5 Maintenance and Calibration

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

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

3.6 Monitoring Locations

- 3.6.1 In accordance with the Contract Specific EM&A Manual, two noise monitoring locations, namely NMS2 and NMS3C are covered under Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works.
- 3.6.2 Due to rejection from Ho Yu College (NMS3) for setting up a noise monitoring station at their school, an alternative location at site boundary of the site office area at Works Area WA2 (NMS3B) is proposed. Impact noise monitoring has been relocated from NMS3B to Ying Tung Estate Market Rooftop (NMS3C) on 20 August 2018 under Contract No. HY/2013/04. The same baseline and Action and Limit levels for noise, as derived from the baseline monitoring data recorded at Ho Yu College, are adopted for this alternative noise monitoring location.
- 3.6.3 The most updated locations are summarized in **Table 3.3** and the locations of the noise monitoring stations shown in **Figure 3**.

Table 3.3 Construction Noise Monitoring Location

Monitoring Station	Location
NMS2	Seaview Crescent
NMS3C	Ying Tung Estate Refuse Collection Point

Remark: The Limit Levels for schools will be applied for this alternative monitoring location at NMS3C.

3.7 Monitoring Results

- 3.7.1 The schedule of noise monitoring in reporting month is provided in **Appendix E**.
- 3.7.2 No raining and wind with speed over 5 m/s was observed during noise monitoring according to the onsite observation. The weather conditions during the monitoring month are provided in **Appendix K**.
- 3.7.3 The noise monitoring data are summarized in **Table 3.4**. Detailed monitoring data are presented in **Appendix F**.

Table 3.4 Summary of Construction Noise Monitoring Results

Time Period	Noise Monitoring Stations	L_{eq} (30min) dB(A) (Range)	Action Level	Limit Level dB(A)
0700-1900 hrs on normal weekdays	NMS2	59-65	When one documented complaint is received	75
	NMS3C	62-70		70/65

Remark:

NMS2: Façade Measurement

NMS3C: Free-field measurement (+3 dB(A) correction has been applied), reduction to 65dB(A) during school examination periods will be applied.

- 3.7.4 School calendar of Ho Yu College was checked against noise monitoring days at NMS3C.
- 3.7.5 No Action / Limit Level exceedance of location NMS2 and NMS3C were recorded for construction noise in the reporting month.
- 3.7.6 During the monitoring month, at NMS3C, road traffic along the Ying Tung Road and non-project related construction activities at the nearby construction site was observed.
- 3.7.7 The Action and Limit Levels for noise impact monitoring have been set and are presented in **Appendix C**.
- 3.7.8 The Event and Action Plan for noise is given in **Appendix H**.

4. ECOLOGY MONITORING

4.1 Monitoring Requirements

- 4.1.1 All marine-based construction activities for the HKBCF project were completed in January 2019. No marine-based construction activities will be undertaken under this Contract. However, the ET of this Contract or another ET of the HZMB is required to conduct post-construction dolphin monitoring in accordance with Section 10.7 of the updated EM&A Manual.
- 4.1.2 The CV of the proposed dolphin specialist for this Contract has been submitted to IEC for review prior to submission to AFCD for approval.
- 4.1.3 According to the Proposal on Post-construction Dolphin Monitoring (PCDM) prepared by Contract No. HY/2013/04 which has been verified by ENPO and approved by EPD on 8 March 2019 (EPD ref. () in Ax(5) to E771/E1/100) , the completion date of the PCDM is in February 2021. Therefore, the reporting of Chinese White Dolphins monitoring works under this contract was completed on 1 March 2021.

4.2 Monitoring Locations and Methodology

- 4.2.1 In accordance with the requirements of the updated EM&A manual, the dolphin monitoring programme have adopted the standard line-transect method (Buckland et al. 2001) to survey the pre-set and fixed transect lines defined by AFCD in the Northeast Lantau (NEL) and Northwest Lantau (NWL) survey areas. The layout map of the transect lines provided by AFCD is presented in **Figure 4**.

5. SITE INSPECTION AND AUDIT

5.1 Site Inspection

- 5.1.1 Site audits were carried out by ET on weekly basis to monitor the implementation of proper environmental management practices and mitigation measures in the Project site.
- 5.1.2 In the reporting month, five site inspections were carried out on 1, 8, 16, 22 and 29 December 2021.
- 5.1.3 To monitor and audit the implementation of landscape and visual mitigation measures, two Bi-weekly landscape and visual site audits were carried out on 6 and 20 December 2021 by a Registered Landscape Architect.
- 5.1.4 No outstanding issues were reported during the reporting month. Details of observations recorded during the site inspections are summarized in **Appendix M**.

5.2 Advice on the Solid and Liquid Waste Management Status

- 5.2.1 The Contractor registered as a chemical waste producer for the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.
- 5.2.2 The monthly summary of waste flow table is detailed in **Appendix I**.
- 5.2.3 If off-site disposal is required, the excavated marine mud from the land-based works shall be disposed of at the designated disposal sites within Hong Kong as allocated by the Marine Fill Committee or other locations as agreed by the Director. The Contractor shall ensure no spilling and overflowing of materials during loading / unloading / transportation is allowed.
- 5.2.4 The Contractor was reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packing, Labelling and Storage of Chemical Waste.

6. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

6.1 Environmental Exceedance

- 6.1.1 No Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS2, AMS3C and AMS7C in the reporting period.
- 6.1.2 No Action and Limit Level exceedance was recorded for construction noise monitoring at station NMS2 and NMS3C in the reporting period.
- 6.1.3 Summary of Action and Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

6.2 Complaints, Notification of Summons and Prosecution

- 6.2.1 No environmental complaint, notification of summons and successful prosecution were received in the reporting month.
- 6.2.2 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Appendix L**.

7. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURE

7.1 Implementation Status

The Contractor had implemented environmental mitigation measures and requirements as stated in the EIA Reports, the EP and EM&A Manuals. The implementation status of the environmental mitigation measures during the reporting period is summarized in **Appendix J**.

8. FUTURE KEY ISSUES

8.1 Construction Programme for the Next Month

- Excavation at VCP (land-based);
- Road & Drain works at SPTI, NPTI and VCP (land-based);
- Covered Walkway at SPTI and NPTI (land-based);
- Public Toilet at NPTI (land-based);
- Kiosks Construction at VCP (land-based);
- Landscape Works at G1 and G5 (land-based);
- Conceal Conduits Works at VCP (land-based);
- E&M Works at SPTI (land-based);
- Irrigation System at G1 and G5 (land-based).

8.2 Key Issues for the Coming Month

8.2.1 Potential environmental impacts arising from the above construction activities are mainly associated with construction dust, construction noise, waste management and landscape and visual impact issues.

8.3 Monitoring Schedules for the Next Month

8.3.1 The tentative schedule for environmental monitoring in the coming month is provided in **Appendix E**.

9. CONCLUSION AND RECOMMENDATION

9.1 Conclusions

- 9.1.1 1-hour TSP and 24-hour TSP impact monitoring at AMS2, AMS3C and AMS7C were carried out in the reporting month, no Action / Limit Level exceedance was recorded during the period.
- 9.1.2 Summary of Action and Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.
- 9.1.3 Construction noise monitoring were carried out in the reporting month, no Action / Limit Level exceedance was recorded during the period.
- 9.1.4 Five environmental site inspections were carried out in the reporting month. Recommendations on mitigation measures for air quality impact and chemical and waste management were given to the Contractor for remediating the deficiencies identified during the site inspections.
- 9.1.5 Two Bi-weekly Landscape and Visual Site audits were carried out by a Registered Landscape Architect in the reporting month.
- 9.1.6 Referring to the Contractor's information, no environmental complaint, notification of summons and successful prosecution was received in the reporting month.

9.2 Comment and Recommendations

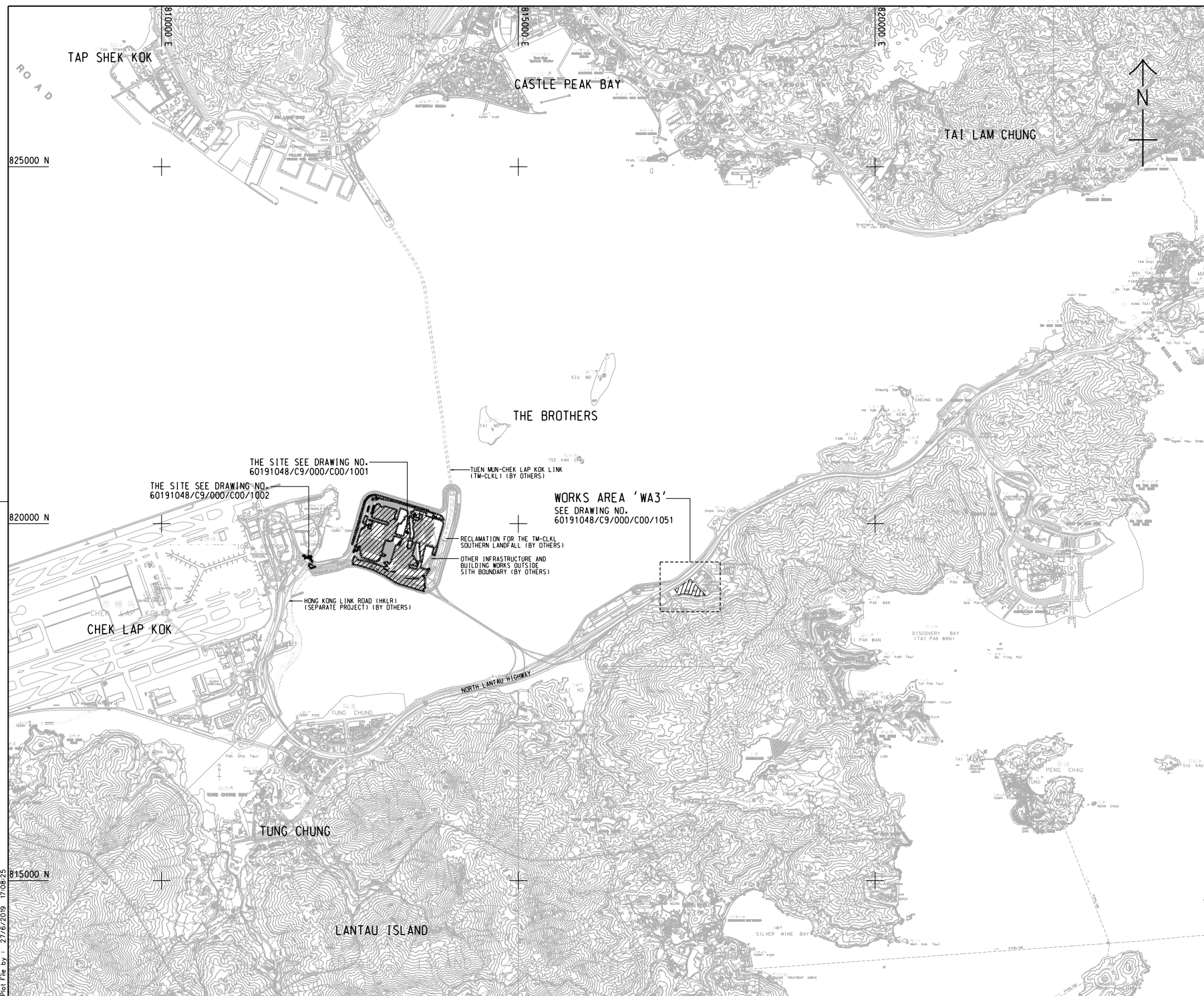
- 9.2.1 The recommended environmental mitigation measures, as proposed in the EIA reports and EM&A Manuals shall be effectively implemented to minimize the potential environmental impacts from the Project. The EM&A programme would effectively monitor the environmental impacts generated from the construction activities and ensure the proper implementation of mitigation measures.
- 9.2.2 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:
- Air Quality Impact
- Cement material should be stored and covered properly.
- Construction Noise Impact
- No specific observation was identified in the reporting month.
- Water Quality Impact
- Stagnant water should be removed.
- Chemical and Waste Management
- Waste generated at the site should be cleared and collected.
 - Contractor is reminded to clear the chemical with the absorbent pad.
- 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



- NOTES:**
- COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
 - DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.

LEGEND:

-  SITE BOUNDARY
-  WORKS AREA

THE SITE SEE DRAWING NO. 60191048/C9/000/C00/1001

THE SITE SEE DRAWING NO. 60191048/C9/000/C00/1002

WORKS AREA 'WA3'
SEE DRAWING NO. 60191048/C9/000/C00/1051

TUEN MUN-CHEK LAP KOK LINK (TM-CKLK) (BY OTHERS)

RECLAMATION FOR THE TM-CKLK SOUTHERN LANDFALL (BY OTHERS)

OTHER INFRASTRUCTURE AND BUILDING WORKS OUTSIDE SITE BOUNDARY (BY OTHERS)

HONG KONG LINK ROAD (HKLR) (SEPARATE PROJECT) (BY OTHERS)

REV. NO.	DESCRIPTION	BY	DATE
-	TENDER DRAWING	TTHK	JUL 19

香港高速公路局
HIGHWAYS DEPARTMENT
 主要工程管理處 (傳真與函)
 Major Works Project Management Office (Special Duties)

香港-珠海-澳門大橋
HONG KONG-ZHUHAI-MACAO BRIDGE
 HONG KONG BOUNDARY CROSSING FACILITIES
 - PHASE 2 AND OTHER WORKS

SITE LOCATION PLAN

AECOM +
 Rogers Stirk Harbour + Partners
 BURO HAPPOLD ATKINS ADI +

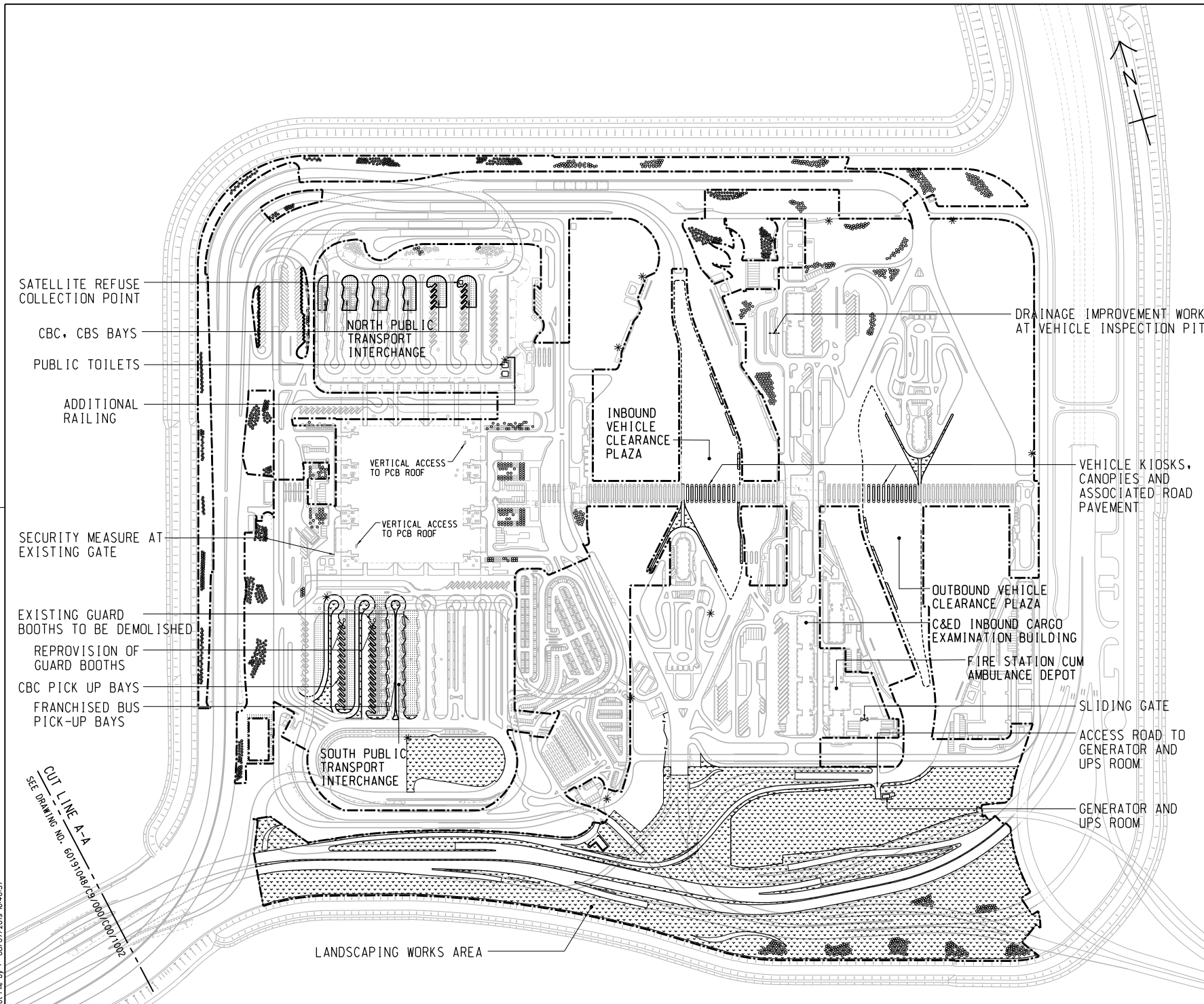
Aedas

DRG. NO. 60191048/C9/000/C00/1000
 圖紙編號

DESIGNED BY TTHK	CONTRACT NO. HY/2019/01	APPROVED BY SC1
DRAWN BY JC	STATUS REV	
SCALE A1 1 : 25000	UNIT METRES	

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REMARKS:

- IN SPT1:
 - DEMOLISH 2 NOS. EXISTING GUARD BOOTHS AND RE-PROVISION TO REVISED LOCATIONS AS SHOWN
 - CONSTRUCT COVERED WALKWAYS FOR THE NEW FB AND CBC PICK UP BAYS
 - MODIFY EXISTING DUCTING AND POLES FOR ELV SYSTEM, ROAD LIGHTING AND PILLAR BOXES, AND THE ASSOCIATED CABLING WORKS
 - RELOCATE AND REINSTATE 3 NOS. OF EXISTING BUS OPERATOR OFFICES AND FOOD TRUCK
 - REPLACEMENT OF DRAWPIT COVERS
- IN NPT1:
 - CONSTRUCT COVERED WALKWAYS FOR THE NEW CBC, CBS PICK UP BAYS AND PUBLIC TOILETS
 - PROVIDE AUTOMATIC IRRIGATION SYSTEM AT SLOPES
 - MODIFY EXISTING COVERED WALKWAY AND PROVISION OF LIGHTING
 - REPLACEMENT OF DRAWPIT COVERS
- LANDSCAPING WORKS AREA:
 - CONSTRUCT IRRIGATION SYSTEM WITH 13 NOS. OF NEW WATER POINT AND THE AUTOMATIC IRRIGATION SYSTEM AND PROVIDE MAINTENANCE WORKS
 - LANDSCAPE SOFTWORK, ESTABLISHMENT AND MAINTENANCE WORKS
 - CONSTRUCT RIVER WASHED STONE SWATHE AND MAINTENANCE WORKS
 - PROTECT EXISTING PLANTING AND HARD STRUCTURES
- PASSENGER CLEARANCE BUILDING
 - VERTICAL ACCESS
 - IMPROVEMENT WORKS FOR WATER FEATURE
 - MINOR REMAINING WORKS
 - PROVISION OF NEW CENTRAL AVSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVSS
- VEHICLE KIOSKS AT INBOUND & OUTBOUND VCP
 - PROVISION OF AVSS AT NEW KIOSKS TO SERVE 24 NOS. VEHICULAR LANES
 - REPLACEMENT OF BARRIER GATE WITH SKIRTING AT 72 NOS. EXISTING KIOSK
- C&E INBOUND CARGO EXAMINATION BUILDING
 - PROVISION OF NEW CENTRAL AVSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVSS

ABBREVIATION:

SPT1 - SOUTH PUBLIC TRANSPORT INTERCHANGE
 NPT1 - NORTH PUBLIC TRANSPORT INTERCHANGE
 VCP - VEHICLE CLEARANCE PLAZA
 PCB - PASSENGER CLEARANCE BUILDING
 FB - FRANCHISED BUS
 CBC - CROSS BOUNDARY COACH
 CBS - CROSS BOUNDARY SHUTTLE
 ELV - EXTRA LOW VOLTAGE
 AVSS - AUTOMATIC VEHICLE CLEARANCE SUPPORT SYSTEM

NOTE:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C9/000/C00/1002

LEGEND:

- SITE BOUNDARY
- AMENITY AREA
- FOOTPATH
- COVERED WALKWAY
- SECURITY FENCE
- TREE PLANTING
- IRRIGATION POINT

NO.	DESCRIPTION	DATE
-	TENDER DRAWING	TTHK 06/2019

GENERAL ARRANGEMENT

SHEET 1 OF 2

AECOM + **Aedas**
 Rogers Stirk Harbour + Partners
 BURO HAPPOLD ATKINS ADI +

DRGNO 60191048/C9/000/C00/1001
 圖紙編號

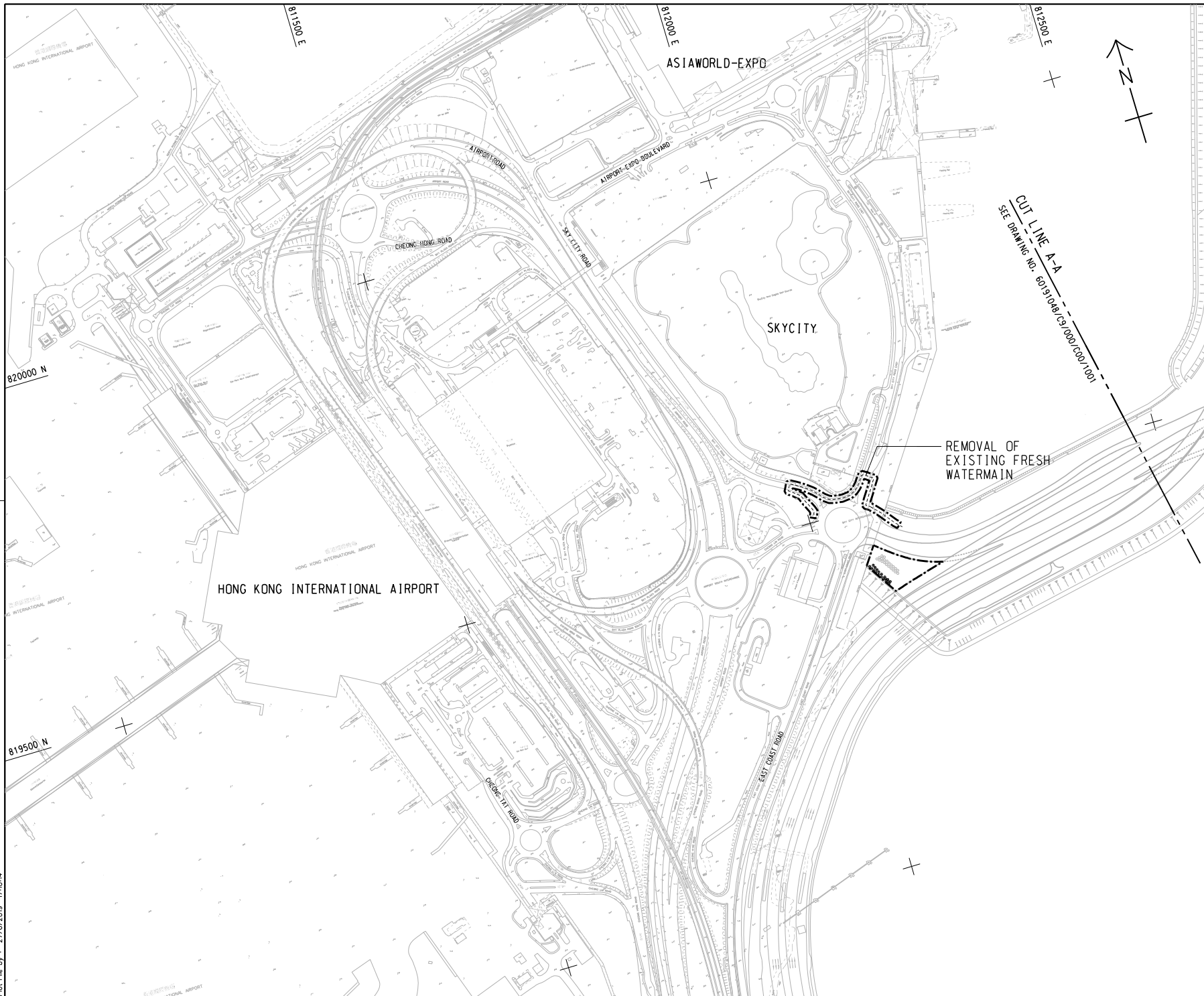
DESIGNED BY TTHK CONTRACT NO. HY/2019/01 P. Dir. APPROVED
 CHECKED BY JC STATUS
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 DIMENSIONS ARE IN METRES

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CUT LINE A-A
 SEE DRAWING NO. 60191048/C9/000/C00/1002

LANDSCAPING WORKS AREA



NOTE:
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C9/000/C00/1001.

REV. NO.	DESCRIPTION	DATE
1	TENDER DRAWING	JUL 19

香港路政處
 HIGHWAYS DEPARTMENT
 主要工程管理處 (傳真專組)
 Major Works Project Management Office (Special Duties)

HONG KONG-ZHUHAI-MACAO BRIDGE
 HONG KONG BOUNDARY CROSSING FACILITIES
 - PHASE 2 AND OTHER WORKS

GENERAL ARRANGEMENT
 SHEET 2 OF 2

Rogers Stirk Harbour + Partners
 BURO HAPPOLD ATKINS ADI

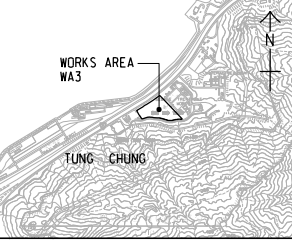
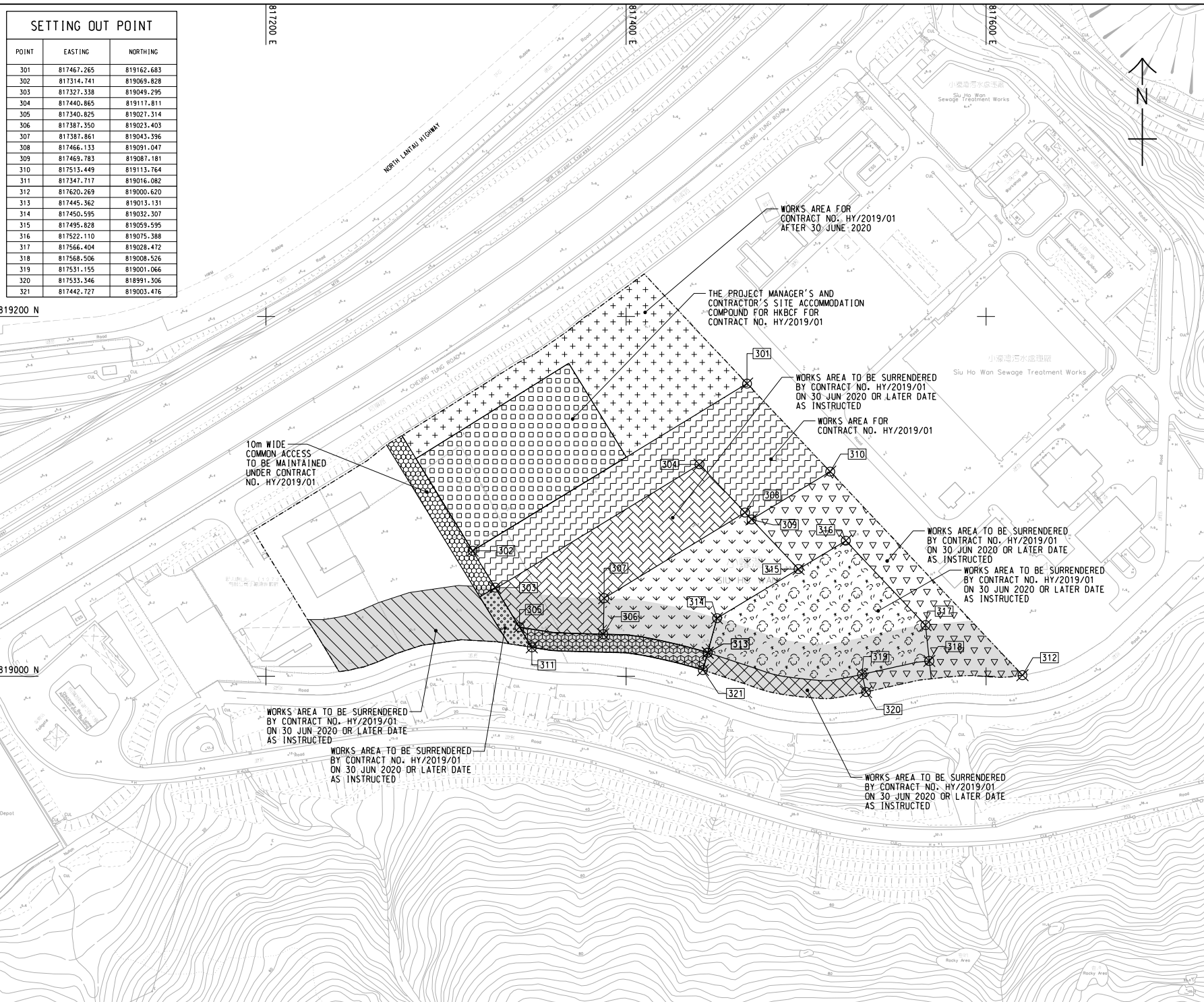
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 圖紙編號

DESIGNED BY 設計	THK	CONTRACT NO. 合約編號	HY/2019/01	FOR APPROVAL 審核	SC1
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SCALE 比例	A1 1 : 2500	DRAWING UNIT IN METRES			

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SETTING OUT POINT		
POINT	EASTING	NORTHING
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302	817314.741	819069.828
303	817327.338	819049.295
304	817440.865	819117.811
305	817340.825	819027.314
306	817387.350	819023.403
307	817387.861	819043.396
308	817466.133	819091.047
309	817469.783	819087.181
310	817513.449	819113.764
311	817347.717	819016.082
312	817620.269	819000.620
313	817445.362	819013.131
314	817450.595	819032.307
315	817495.828	819059.595
316	817522.110	819075.388
317	817566.404	819028.472
318	817568.506	819008.526
319	817531.155	819001.066
320	817533.346	818991.306
321	817442.727	819003.476



LOCATION PLAN
SCALE 1 : 25000

NOTES:
 1. COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
 2. DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.

LEGEND:

	WORKS AREA BOUNDARY
	PORTION 3.1
	PORTION 3.2
	PORTION 3.3
	PORTION 3.4
	PORTION 3.5
	PORTION 3.6
	PORTION 3.7
	PORTION 3.8
	PORTION 3.9
	PORTION 3.10
	PORTION 3.11
	PORTION 3.12
	NON-BUILDING AREA 8200m ² (WHOLE)

TENDER DRAWING	TTHK/000	JUL 19
REV. NO.	DESCRIPTION	DATE

HIGHWAYS DEPARTMENT
 道路工程處
 Major Works Project Management Office (Special Duties)
 主要工程管理處 (專責業務)

HONG KONG-ZHUIHAI-MACAO BRIDGE
 HONG KONG BOUNDARY CROSSING FACILITIES
 - PHASE 2 AND OTHER WORKS

WORKS AREA WA3

AECOM +
 Rogers Stirk Harbour + Partners
 BURO HAPPOLD ATKINS ADI +
Aedas

DRGNO. 60191048/C9/000/C00/1051
 圖紙編號

DESIGNED BY TTHK	CONTRACT NO. HY/2019/01	P. Dir. APPROVED SCL
DRAWN BY JC	STATUS REV	

SCALE 1 : 1000
 圖紙比例尺
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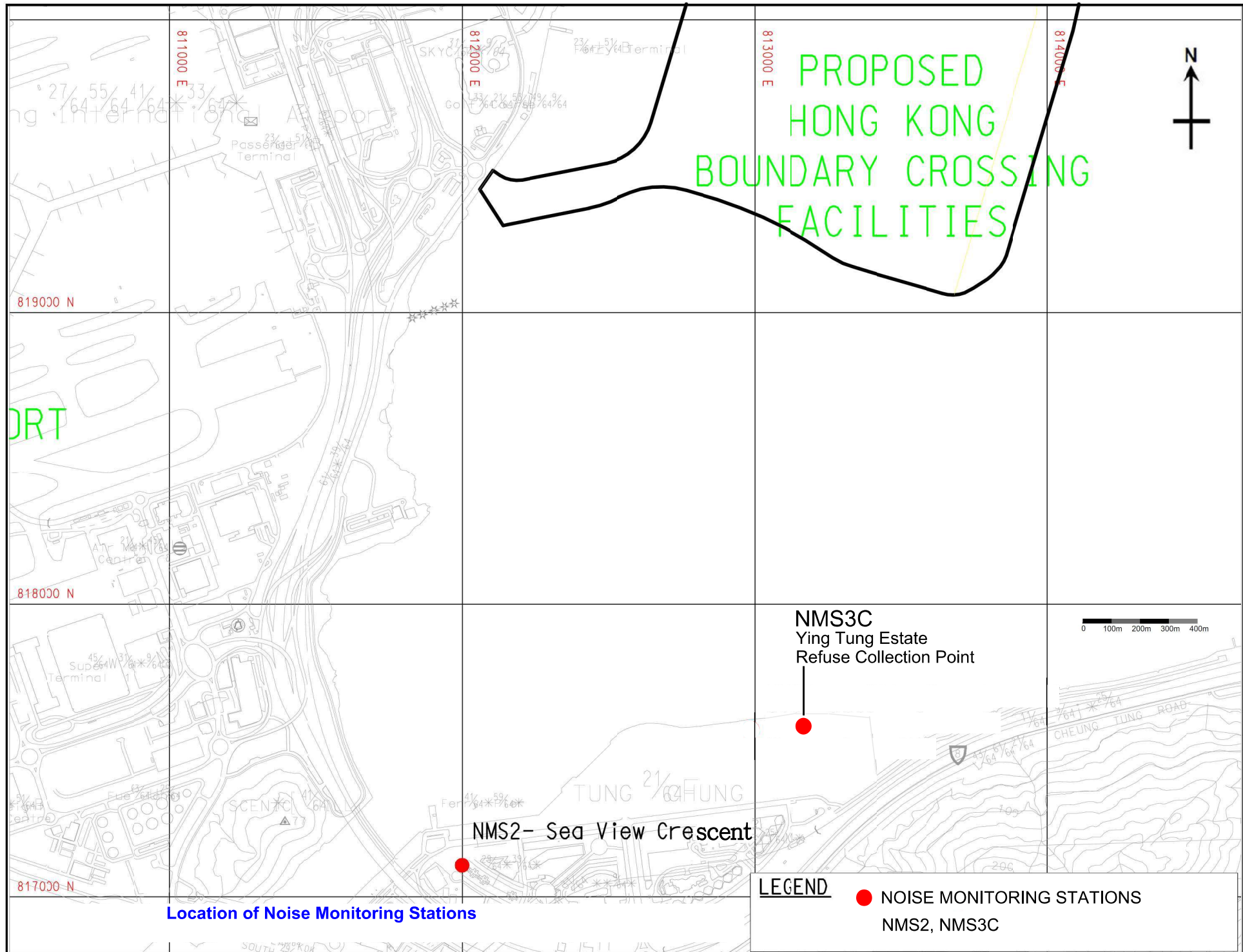
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Figure 2

The Location of the Air Quality Monitoring Station

Figure 3

The Location of the Noise Monitoring Station



PROPOSED
HONG KONG
BOUNDARY CROSSING
FACILITIES

NMS3C
Ying Tung Estate
Refuse Collection Point

NMS2- Sea View Crescent

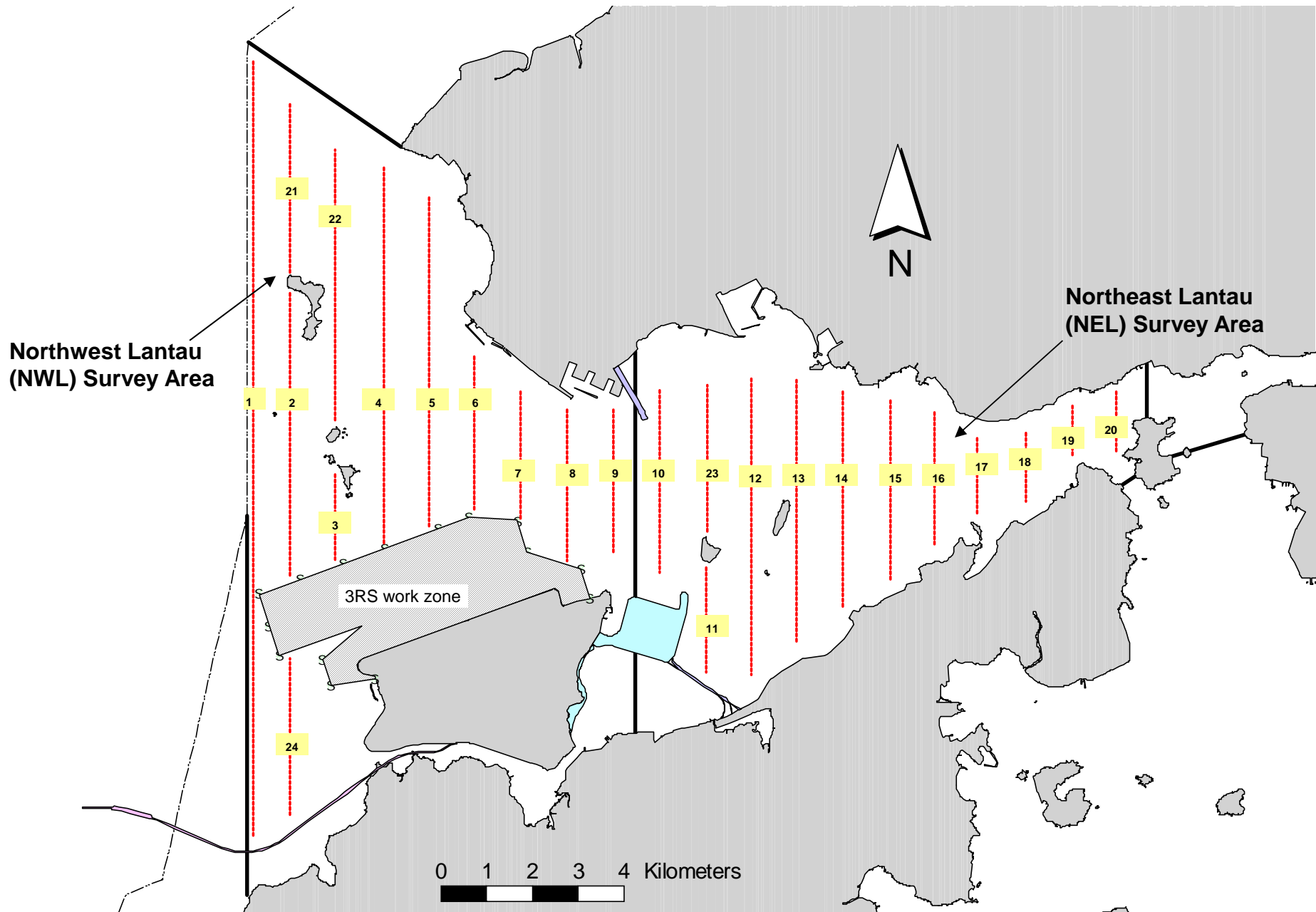
Location of Noise Monitoring Stations

LEGEND

- NOISE MONITORING STATIONS
- NMS2, NMS3C

Figure 4

Post-Construction Dolphin Monitoring Line Transect
Layout Map



Transect Line Layout in Northwest and Northeast Lantau Survey Areas

Appendix A

Construction Programme

Activity ID	Activity Name	Remaining Duration	Start	Finish	2021					2022				
					Dec	Jan	Feb	Mar	Apr	Dec	Jan	Feb	Mar	Apr
Revised Works Programme for HKZMB Phase 2 and Other Works (HY/2019/01)														
CONTRACT DATES														
Starting Date														
A0090	Completion Date (730 +19 days)	0		13-Jan-22*						◆ Completion Date (730 +19 days)				
Sectional Completion														
A0310	Section 5: Remaining Works (730 +19 days) P.8 - P.12	0		13-Jan-22*						◆ Section 5: Remaining Works (730 +19 days) P.8 - P.12				
A0320	Section 6: Establishment Works (1095 + 19 days)	0		07-Dec-22*										
SUBMISSIONS														
A0460	Acceptance of TTA	1	01-Jan-20 A	03-Jan-22										
CONTRACTOR'S DESIGN														
A7980	Acceptance of the Design for Pump House	5	16-Aug-20 A	07-Jan-22										
BUILDING INFORMATION MODELING														
A7580	Completion of BIM 3D Model	28	17-Feb-20 A	30-Jan-22										
A7590	As-built BIM Model	41	08-Jan-21 A	12-Feb-22										
REFINEMENT WORKS AT HKP (4A)														
Installation of Sliding Gate at Building No. 041 (4A.J)														
A6710	Installation of Security Fence and Sliding Gate (Fire Station cum Ambulance Depot 041)	22	06-Dec-21 A	27-Jan-22										
A6720	T&C	3	28-Jan-22	31-Jan-22										
Painting for Volleyball Court														
A8850	Pavement rectification	24	03-Jan-22*	29-Jan-22										
A8860	Painting for Volleyball Ground, Part 2	6	31-Jan-22*	09-Feb-22										
SECTION 3: NPTI - PUBLIC TOILET, COVERED WALKWAY & PAVEMENT (6)														
Additional and Modification to Existing Covered Walkway, Area 1 - 6 (6.E)														
A6980	Installation of aluminum honey comb panels to the existing covered walkways	6	29-Dec-20 A	08-Jan-22										
A6990	T&C	6	07-Jul-21 A	08-Jan-22										
Additional & Modification of Covered Walkway adjacent to Building 003, Area 7 (6.C)														
A7010	T&C	6	16-Aug-21 A	08-Jan-22										
Public Toilet Type 1, Building 003 (6.B)														
A3390	TPIDC Authority Inspection & Approval	12	30-Aug-21 A	15-Jan-22										
A6100	ASD Approval, WWO Part V submission & Approval	12	30-Aug-21 A	15-Jan-22										
SECTION 5: REMAINING WORKS														
External Works at Plaza														
A1540B	Pavement Works (Roadbase and Base Course) at Outbound North	12	10-May-21 A	15-Jan-22										
A1540C	Pavement Works (Roadbase and Base Course) at Inbound South	11	08-Jun-21 A	14-Jan-22										
A8770	Pavement Works (Wearing Course) at Outbound	22	08-Nov-21 A	27-Jan-22										
A8780	Pavement Works (Wearing Course) at Inbound	24	08-Nov-21 A	29-Jan-22										
A8790	Road Marking & Signs	73	03-Jan-22	31-Mar-22										
Inbound: 11 No. of Private Car Kiosks between 027/028														
Builder Works (5.A)														
A1080C	ABWF Works at 4th Group Kiosks (3 nos.)	9	27-Jul-21 A	12-Jan-22										
A1080D	ABWF Works at Kiosks at Inbound VCP (miscellaneous external railing, cladding etc.)	58	17-Aug-21 A	14-Mar-22										
A1180A	MJ, Fall Arrest System, Maintenance Access	25	01-Sep-21 A	31-Jan-22										
A4480	Removal of all hoarding after OPT	12	14-Mar-22*	26-Mar-22										
A8800	Removal of TTA	4	28-Mar-22	31-Mar-22										
E&M Works														
A1120-46.2	8.1.2.2-Termination & Installation Test of all ODB (027/028)	37	29-Jan-22	16-Mar-22										

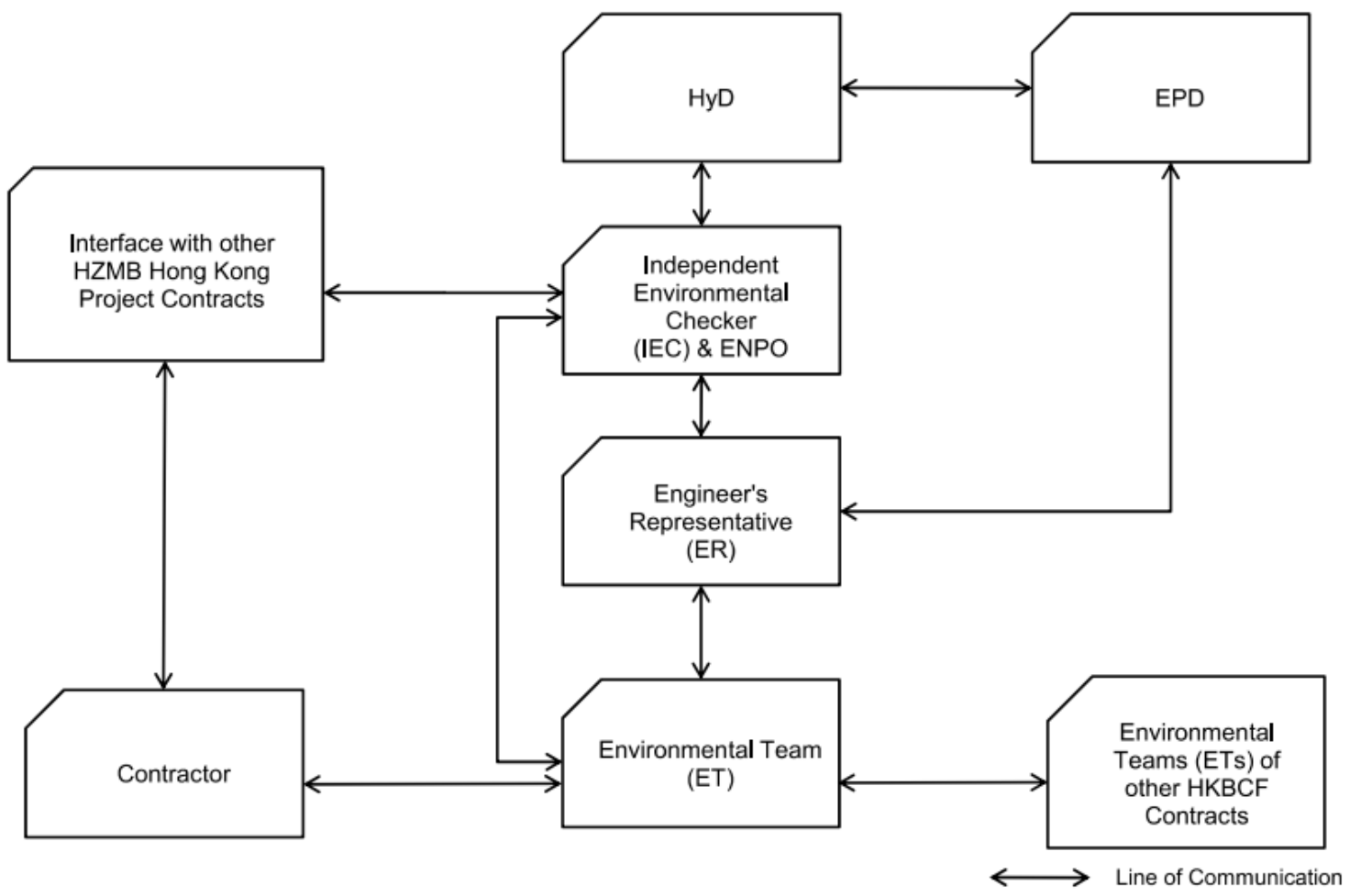
	Baseline		Critical
	Actual Work		Baseline Milestone
	Remaining Work		Milestone

UPDATED WORKS PROGRAMME FOR PHASE 2 AND OTHER WORKS, HKZMB

Date	Revision	Checked	Approved
09-Nov-21	Revised Works Programme for Phase 2	ZJ	
06-Jan-22	Revised Works Programme for Phase 2	ZJ	

Appendix B

Project Organization Chart



Appendix C

Action and Limit Levels

Action / Limit Levels for Air Quality

Parameters	Action Level	Limit Level
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	¹ For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action level = $(\text{baseline level} * 1.3 + \text{Limit level})/2$; For baseline level $> 200 \mu\text{g}/\text{m}^3$ Action level = Limit level	260 $\mu\text{g}/\text{m}^3$
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	² For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = $(\text{baseline level} * 1.3 + \text{Limit level})/2$; For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit level	500 $\mu\text{g}/\text{m}^3$

Notes:

1. The Action Level for 24-hour TSP Level:

a) AMS 2 = $(71.1 * 1.3 + 260) / 2 = 176 \mu\text{g}/\text{m}^3$; b) AMS 3C = $(56.9 * 1.3 + 260) / 2 = 167 \mu\text{g}/\text{m}^3$;
 c) AMS 6 = $(66.4 * 1.3 + 260) / 2 = 173 \mu\text{g}/\text{m}^3$; d) AMS 7B = $(82.3 * 1.3 + 260) / 2 = 183 \mu\text{g}/\text{m}^3$;

2. The Action Level for 1-hour TSP Level:

a) AMS 2 = $(191.5 * 1.3 + 500) / 2 = 374 \mu\text{g}/\text{m}^3$; b) AMS 3C = $(18.2 * 1.3 + 500) / 2 = 368 \mu\text{g}/\text{m}^3$;
 c) AMS 6 = $(169.2 * 1.3 + 500) / 2 = 360 \mu\text{g}/\text{m}^3$; d) AMS 7B = $(184.2 * 1.3 + 500) / 2 = 370 \mu\text{g}/\text{m}^3$;

Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 - 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) *

Note : If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

Appendix D

Calibration Certificate of Monitoring Equipment



Certificate of Calibration

Calibration Certification Information			
Cal. Date: June 4, 2021	Rootsometer S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 750.3	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	1.4450	3.2	2.00
2	3	4	1	1.0220	6.4	4.00
3	5	6	1	0.9070	8.0	5.00
4	7	8	1	0.8650	8.8	5.50
5	9	10	1	0.7130	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9964	0.6896	1.4147	0.9957	0.6891	0.8853
0.9922	0.9708	2.0007	0.9915	0.9701	1.2519
0.9900	1.0915	2.2368	0.9893	1.0908	1.3997
0.9890	1.1433	2.3460	0.9883	1.1425	1.4680
0.9836	1.3795	2.8294	0.9829	1.3786	1.7705
QSTD	m=	2.04731	QA	m=	1.28199
	b=	0.00573		b=	0.00358
	r=	0.99996		r=	0.99996

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

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsometer 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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 13-Sep-21	
Location : AMS2				Next Calibration Date: 12-Dec-21	
Brand:	Tisch		Technician: Ting Chan		
Model:	TE-5170	S/N:	HVS-01		

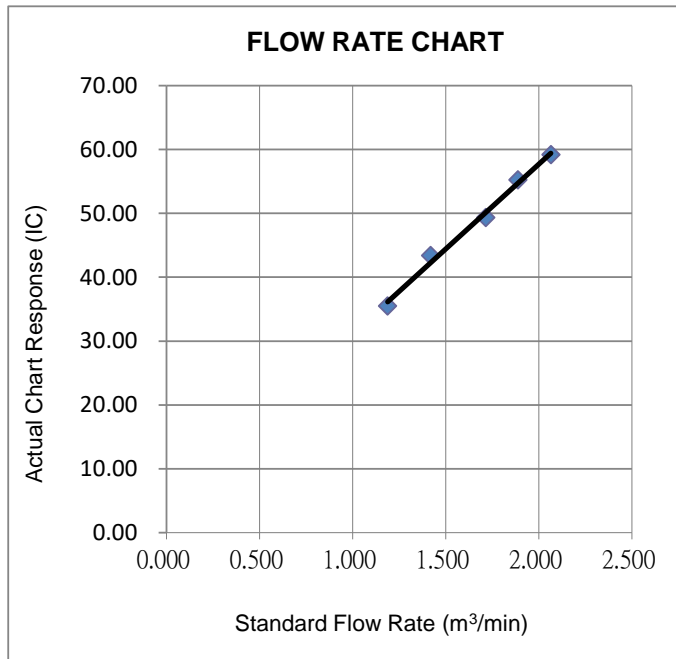
CONDITIONS					
Sea Level Pressure (hPa):	1006.7	Corrected Pressure (mm Hg):	755		
Temperature (°C):	30.9	Temperature (K):	304		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.04731		
Model:	TE-5025A	Qstd Intercept:	0.00573		
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22		
S/N:	2456				

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	11.00	-7.40	18.400	2.065	60.00	59.21	Slope = 26.5492 Intercept = 4.6122 Corr. coeff.: 0.9963
13	8.60	-6.80	15.400	1.889	56.00	55.26	
10	7.30	-5.40	12.700	1.715	50.00	49.34	
7	4.60	-4.10	8.700	1.419	44.00	43.42	
5	2.80	-3.30	6.100	1.188	36.00	35.52	

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



Wan Ka Ho
 Project Consultant

Report Date: 13/9/2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 9-Dec-21	
Location : AMS2				Next Calibration Date: 8-Mar-22	
Brand:	Tisch		Technician: Ting Chan		
Model:	TE-5170	S/N:	HVS-01		

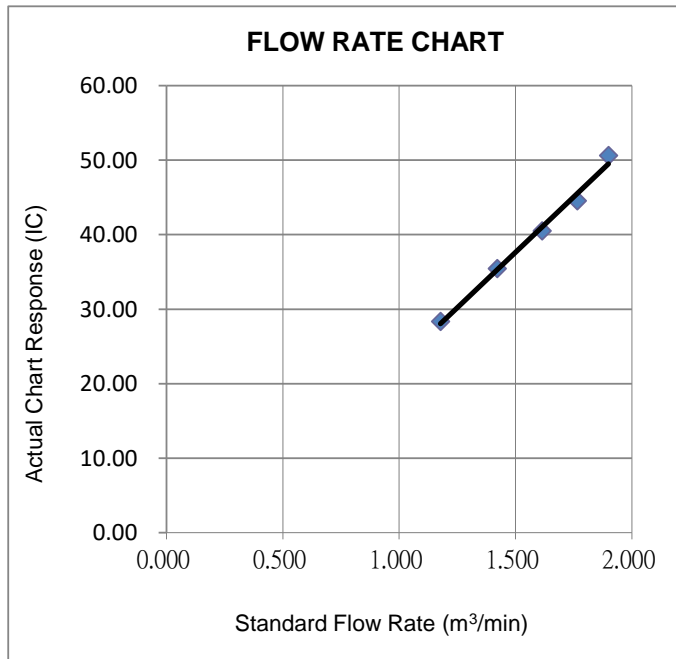
CONDITIONS					
Sea Level Pressure (hPa):	1022.3	Corrected Pressure (mm Hg):	767		
Temperature (°C):	20.2	Temperature (K):	293		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.04731		
Model:	TE-5025A	Qstd Intercept:	0.00573		
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22		
S/N:	2456				

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.80	-8.00	14.800	1.900	50.00	50.62	Slope = 29.7591 Intercept = -7.0140 Corr. coeff.: 0.9954
13	6.00	-6.80	12.800	1.766	44.00	44.54	
10	4.90	-5.80	10.700	1.615	40.00	40.50	
7	3.70	-4.60	8.300	1.422	35.00	35.43	
5	1.90	-3.80	5.700	1.178	28.00	28.35	

Calculations:
 $Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$
 Qstd = standard flow rate
 IC = corrected chart response
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pa = actual pressure during calibration (mm Hg)
 Tstd = 298 deg K
 Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)] - b)$
 m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



Wan Ka Ho
 Project Consultant

Report Date: 10/12/2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 13-Sep-21	
Location : AMS3C				Next Calibration Date: 12-Dec-21	
Brand:	Tisch		Technician: Ting Chan		
Model:	TE-5170	S/N:	HVS-02		

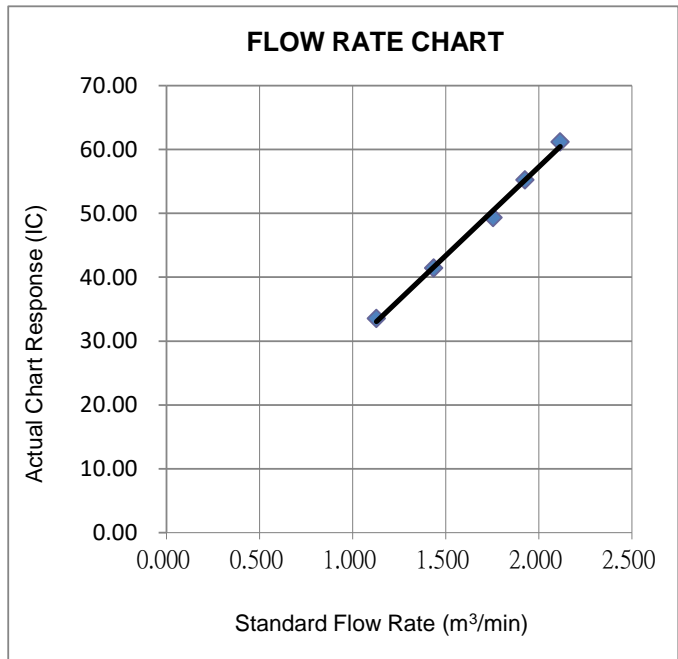
CONDITIONS					
Sea Level Pressure (hPa):	1006.7	Corrected Pressure (mm Hg):	755		
Temperature (°C):	30.9	Temperature (K):	304		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.04731		
Model:	TE-5025A	Qstd Intercept:	0.00573		
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22		
S/N:	2456				

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	11.00	-8.30	19.300	2.115	62.00	61.18	Slope = 27.7723 Intercept = 1.7337 Corr. coeff.: 0.9978
13	8.80	-7.20	16.000	1.925	56.00	55.26	
10	7.10	-6.20	13.300	1.755	50.00	49.34	
7	4.60	-4.30	8.900	1.435	42.00	41.45	
5	2.40	-3.10	5.500	1.128	34.00	33.55	

Calculations:
 $Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))]-b$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$
 Qstd = standard flow rate
 IC = corrected chart response
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pa = actual pressure during calibration (mm Hg)
 Tstd = 298 deg K
 Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$
 m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



Wan Ka Ho
 Project Consultant

Report Date: 13/9/2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 9-Dec-21	
Location : AMS3C				Next Calibration Date: 8-Mar-22	
Brand:	Tisch		Technician: Ting Chan		
Model:	TE-5170	S/N:	HVS-02		

CONDITIONS

Sea Level Pressure (hPa):	1022.3	Corrected Pressure (mm Hg):	767
Temperature (°C):	20.2	Temperature (K):	293

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.04731
Model:	TE-5025A	Qstd Intercept:	0.00573
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22
S/N:	2456		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
							Slope =	Intercept =
18	6.20	-8.00	14.200	1.861	50.00	50.62	37.4548	Corr. coeff.: 0.9947
13	5.80	-6.50	12.300	1.731	46.00	46.57	-18.1567	
10	4.50	-5.60	10.100	1.569	42.00	42.52		
7	3.60	-4.00	7.600	1.360	32.00	32.40		
5	2.20	-3.20	5.400	1.146	24.00	24.30		

Calculations:

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

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

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

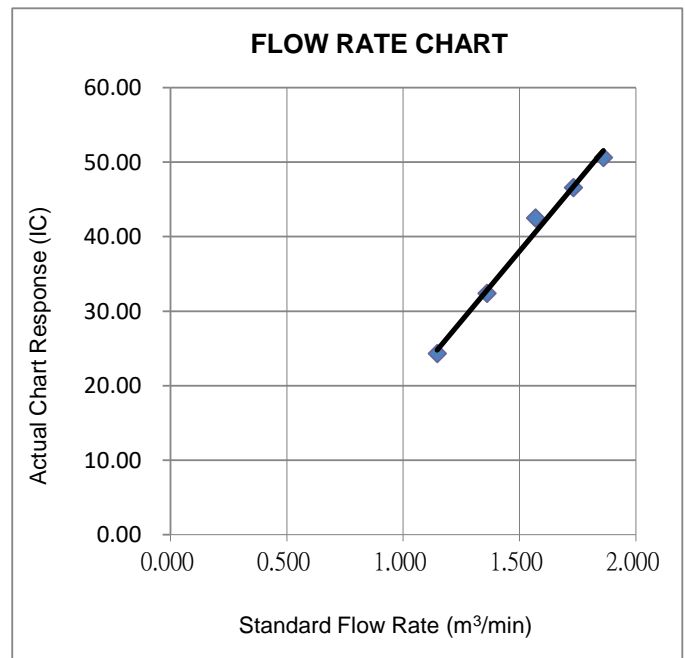
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Wan Ka Ho
Project Consultant

Report Date: **13/9/2021**

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge			Date of Calibration: 5-Oct-21
Location : AMS7C			Next Calibration Date: 4-Jan-22
Brand:	Tisch		Technician: Ting Chan
Model:	TE-5170	S/N: HVS-03	

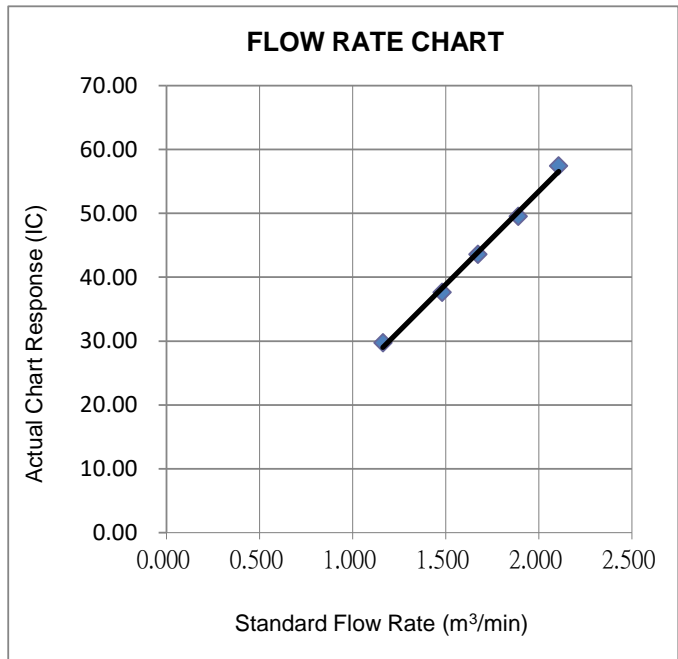
CONDITIONS			
Sea Level Pressure (hPa):	1011.4	Corrected Pressure (mm Hg):	759
Temperature (°C):	30.1	Temperature (K):	303

CALIBRATION ORIFICE			
Make:	Tisch	Qstd Slope:	2.04731
Model:	TE-5025A	Qstd Intercept:	0.00573
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22
S/N:	2456		

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	10.80	-8.20	19.000	2.106	58.00	57.46	Slope = 29.1849 Intercept = -4.9340 Corr. coeff.: 0.9974
13	8.60	-6.70	15.300	1.890	50.00	49.53	
10	7.00	-5.00	12.000	1.673	44.00	43.59	
7	5.20	-4.20	9.400	1.481	38.00	37.64	
5	2.60	-3.20	5.800	1.163	30.00	29.72	

Calculations:
 $Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$
 Qstd = standard flow rate
 IC = corrected chart response
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pa = actual pressure during calibration (mm Hg)
 Tstd = 298 deg K
 Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)] - b)$
 m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



Wan Ka Ho
 Project Consultant

Report Date: 6/10/2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 9-Dec-22	
Location : AMS7C				Next Calibration Date: 8-Mar-22	
Brand:	Tisch		Technician: Ting Chan		
Model:	TE-5170	S/N:	HVS-03		

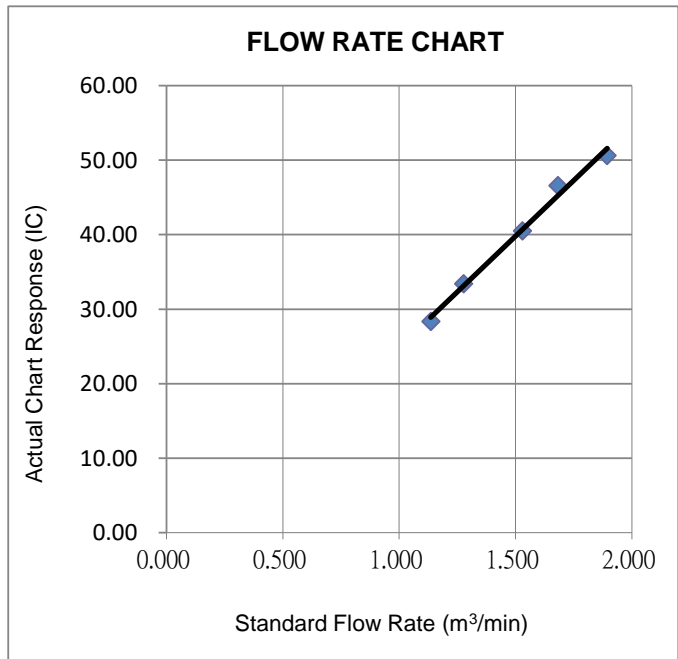
CONDITIONS					
Sea Level Pressure (hPa):	1022.3	Corrected Pressure (mm Hg):	767		
Temperature (°C):	20.2	Temperature (K):	293		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.04731		
Model:	TE-5025A	Qstd Intercept:	0.00573		
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22		
S/N:	2456				

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.80	-7.90	14.700	1.894	50.00	50.63	Slope = 29.9386 Intercept = -5.1209 Corr. coeff.: 0.9954
13	5.80	-5.80	11.600	1.682	46.00	46.58	
10	4.80	-4.80	9.600	1.530	40.00	40.51	
7	3.20	-3.50	6.700	1.277	33.00	33.42	
5	2.50	-2.80	5.300	1.136	28.00	28.35	

Calculations:
 $Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$
 Qstd = standard flow rate
 IC = corrected chart response
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pa = actual pressure during calibration (mm Hg)
 Tstd = 298 deg K
 Pstd = 760 mm Hg

For subsequent calculation of sampler flow:
 $1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)] - b)$
 m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



Wan Ka Ho
 Project Consultant

Report Date: 6/10/2020



CALIBRATION REPORT OF WIND METER

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge	Date of Calibration: 30-Jun-2021
Location: AMS3C	Next Calibration Date: 29-Dec-2021
Brand: Global Water	Technician: Ting Chan
Model: GL500-7-2	
Anemometer	
Brand: Smart Sensor	Serial No: H0423689
Model: AR816	
Procedures:	
1. Wind Still Test:	The wind speed sensor was held by hand until stabilized.
2. Wind Speed Test:	The wind meter was calibrated in-situ and compared with the Anemometer.
3. Wind Direction Test:	The wind meter was calibrated in-situ and compared with a marine compass from four directions.

Wind Still Test:

Wind Speed (m/s)
0.00

Wind Speed Test:

Global Water (m/s)	Anemometer (m/s)
0.7	0.9
2.3	2.4
3.2	3.1

Wind Direction Test:

	Marine Compass (o)
1	360
70	71
242	242
310	312

Wan Ka Ho
Project Consultant

Report Date: 1/7/2021

CALIBRATION REPORT OF WIND METER

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge Location: AMS3C Brand: Global Water Model: GL500-7-2	Date of Calibration: 28-Dec-2021 Next Calibration Date: 27-Jun-2022 Technician: Ting Chan
Anemometer	
Brand: Smart Sensor Model: AR816	Serial No: H0423689
Procedures:	
<ol style="list-style-type: none"> 1. Wind Still Test: The wind speed sensor was held by hand until stabilized. 2. Wind Speed Test: The wind meter was calibrated in-situ and compared with the Anemometer. 3. Wind Direction Test: The wind meter was calibrated in-situ and compared with a marine compass from four directions. 	

Wind Still Test:

Wind Speed (m/s)
0.00

Wind Speed Test:

Global Water (m/s)	Anemometer (m/s)
1.8	1.8
2.6	2.5
4.2	4.3

Wind Direction Test:

	Marine Compass (o)
0	0
113	112
254	254
286	285



Wan Ka Ho
Project Consultant

Report Date: 29/12/2021

Report no. : 940891CA211483

Page 1 of 1

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. : 892186

Specification Limit : NA

Next Calibration Date : 02-Jun-2022

Laboratory Information

Description : 1. Balance 2. TSP high volume air sampler

Equipment ID. / Serial no. : 1. C-065-9 2. 4350

Date of Calibration : 03-Jun-2021 Ambient Temperature : 25 ± 10 °C

Calibration Location : General Chemical Laboratory of FTS and Ma Wan A1 Site Boundary

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)
0.0569	2147	35.78
0.0675	2299	38.32
0.1122	2675	44.58

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m³) = K x [UUT reading (CPM)], where K = 0.001994
3. Correlation coefficient (r) : 0.9948

 Checked by : Cherry Date : 23-6-2021 Certified by : Leung Kwok Tai Date : 30-6-2021
 CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

**** End of Report ****

Report no. : 940891CA211924(2)A

Page 1 of 1

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. : 892187

Specification Limit : NA

Next Calibration Date : 11-Jul-2022

Laboratory Information

Description : 1. Balance 2. TSP high volume air sampler

Equipment ID. / Serial no. : 1. C-065-9 2. 4350

Date of Calibration : 12-Jul-2021 Ambient Temperature : 25 ± 10 °C

Calibration Location : General Chemical Laboratory of FTS and Ma Wan A1 Site Boundary

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)
0.0424	1512	25.20
0.0194	1041	17.35
0.0230	1090	18.17

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m³) = K x [UUT reading (CPM)], where K = 0.001398
3. Correlation coefficient (r) : 0.9987
4. This is to supersede the previous report no. 940891CA211924(2).

Checked by : C. Wong Date : 3-9-2021 Certified by : K.T. Leung Date : 6-9-2021

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

Report no. : 940891CA211924(3)A

Page 1 of 1

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. : 892189
 Specification Limit : NA
 Next Calibration Date : 11-Jul-2022

Laboratory Information

Description : 1. Balance 2. TSP high volume air sampler
 Equipment ID. / Serial no. : 1. C-065-9 2. 4350
 Date of Calibration : 12-Jul-2021 Ambient Temperature : 25 ± 10 °C
 Calibration Location : General Chemical Laboratory of FTS and Ma Wan A1 Site Boundary
 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)
0.0424	1498	24.97
0.0194	1052	17.53
0.0230	1088	18.13

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m³) = K x [UUT reading (CPM)], where K = 0.001400
3. Correlation coefficient (r) : 0.9973
4. This is to supersede the previous report no. 940891CA211924(3).

 Checked by : Cenny Date : 3-9-2021 Certified by : K.T. Leung Date : 6-9-2021

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

Leung Kwok Tai (Assistant Manager)

**** End of Report ****

Report no.: 212769CA211755(1)

Page 1 of 1

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

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.	1488302	02795	003538

Equipment ID : N-30

Next Calibration Date : 25-Jul-2022

Specification Limit : EN 61672-1: 2003 Class 1

Laboratory Information

Details of Reference Equipment -

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

Date of Calibration : 26-Jul-2021

Calibration Location : Calibration Laboratory of FTS Ambient Temperature : 20±2 °C

Method Used : By direct comparison Relative Humidity : <80% R.H.

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	1.2	2.6 to -0.6
	2000Hz	1.3	2.8 to -0.4
	1000Hz	0.0	1.1 to -1.1
	500Hz	-3.3	-1.8 to -4.6
	250Hz	-8.7	-7.2 to -10.0
	125Hz	-16.1	-14.6 to -17.6
	63Hz	-26.2	-24.7 to -27.7
	31.5Hz	-39.2	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.3	± 0.6
	104dB-114dB	-0.3	± 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. The expanded uncertainty is 0.3 dB with a coverage factor of 2 at a confidence level of 95%.
4. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast
5. The UUT does comply with EN 61672-1: 2003 Class 1 sound level meter for the above measurement.
6. 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 transportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

 Checked by : Cenny Date : 30-7-2021 Certified by : K. T. Leung Date : 30-7-2021
 CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

**** End of Report ****

Report no.: 212769CA212069

Page 1 of 1

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

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.	1488303	02849	0043415

Equipment ID : N/A

Next Calibration Date : 25-Aug-2022

Specification Limit : EN 61672-1: 2003 Class 1

Laboratory Information

Details of Reference Equipment -

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 26-Aug-2021

Calibration Location : Calibration Laboratory of FTS Ambient Temperature : 20±2 °C

Method Used : By direct comparison Relative Humidity : <80% R.H.

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weigthing frequency response	4000Hz	1.4	2.6 to -0.6
	2000Hz	1.3	2.8 to -0.4
	1000Hz	0.0	1.1 to -1.1
	500Hz	-3.4	-1.8 to -4.6
	250Hz	-8.8	-7.2 to -10.0
	125Hz	-16.2	-14.6 to -17.6
	63Hz	-26.3	-24.7 to -27.7
	31.5Hz	-39.0	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.3	± 0.6
	104dB-114dB	-0.3	± 0.6

Remarks :

- The equipment used in this calibration is traceable to recognized National Standards.
- The mean value is the average of four measurements.
- The expanded uncertainty is 0.3 dB with a coverage factor of 2 at a confidence level of 95%.
- For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast
- The UUT does comply with EN 61672-1: 2003 Class 1 sound level meter for the above measurement.
- 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 transportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

 Checked by : Cenny Date : 27-8-2021 Certified by : K.T. Leung Date : 27-8-2021
 CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

**** End of Report ****

Report no.: 212769CA211664

Page 1 of 1

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Calibrator
 Manufacturer : Casella (Model CEL-120/1)
 Serial No. : 5230758
 Equipment ID : N/A
 Next Calibration Date : 15-Jul-2022
 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 Calibration : 16-Jul-2021
 Calibration Location : Calibration Laboratory of FTS Ambient Temperature : 20±2 °C
 Method Used : By direct comparison Relative Humidity : <80% R.H.

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.2 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 expanded uncertainty is 0.3 dB with a coverage factor of 2 at a confidence level of 95%.
4. The unit under test complies with the specification limit.
5. 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 : Emily Date : 20-7-2021 Certified by : R. T. Leung Date : 20-7-2021
 CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

** End of Report **

Report no.: 212769CA211553(1)

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CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Calibrator
 Manufacturer : Casella (Model CEL-120/1)
 Serial No. : 5230950
 Equipment ID : N/A

Next Calibration Date : 05-Jul-2022

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 Calibration : 06-Jul-2021

Calibration Location : Calibration Laboratory of FTS Ambient Temperature : 20±2 °C

Method Used : By direct comparison Relative Humidity : <80% R.H.

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.4 dB	±0.4dB
114dB	-0.3 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 unit under test complies 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 : William Date : 7-7-2021 Certified by : K.T. Leung Date : 7-7-2021
 CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

** End of Report **

Report No. : 212769CA211337

Page 1 of 1

CALIBRATION CERTIFICATE OF ANEMOMETER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Anemometer

Manufacturer : Smart Sensor

Model No. : AR816

Serial No. : H0423689

Equipment ID.: WS-03

Next Calibration Date : 15-Jun-2022

Laboratory Information

Details of Reference Equipment –

Description : Reference Anemometer

Equipment ID.: R-101-4

Date of Calibration : 16-Jun-2021 Ambient Temperature : 22 °C

Calibration Location. : Calibration Laboratory of FTS

Method Used : R-C-279

Calibration Results :

Reference Reading (m/s)	UUT Reading (m/s)	Error (m/s)
1.99	2.0	0.0
4.00	4.0	0.0
6.00	5.9	-0.1
8.00	7.5	-0.5
10.01	9.0	-1.0

Remark :

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The reported readings in this calibration are an average from 10 trials.

Checked by : William Date : 22-6-2021 Certified by : K. J. Leung Date : 22-6-2021

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

Appendix E

Environmental Monitoring Schedule

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Impact Monitoring Schedule (December 2021)

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

Remarks

1. Dust Monitoring: 24-hours TSP Monitoring per 6 days, and 3 x 1-hour TSP Monitoring per 6 days
2. Noise Monitoring: Leq (30 min) between 0700 and 1900 hours
3. Dust Monitoring Location: AMS2 (Tung Chung New Development Pier), AMS3C (Ying Tung Estate Market Rooftop) and AMS7C (East Sea Rescue Berth – Airport Fire Contingent Third Runway Site Office)
4. Noise Monitoring Location: NMS2 (Seaview Crescent), NMS3C (Ying Tung Estate Refuse Collection Point)

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Impact Monitoring Schedule (January 2022)

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

Remarks

- Actual monitoring may be subjected to change due to any safety concern or adverse weather condition
- Dust Monitoring: 24-hours TSP Monitoring per 6 days, and 3 x 1-hour TSP Monitoring per 6 days
- Noise Monitoring: Leq (30 min) between 0700 and 1900 hours
- Dust Monitoring Location: AMS2 (Tung Chung New Development Pier), AMS3C (Ying Tung Estate Market Rooftop) and AMS7C (East Sea Rescue Berth – Airport Fire Contingent Third Runway Site Office)
- Noise Monitoring Location: NMS2 (Seaview Crescent), NMS3C (Ying Tung Estate Refuse Collection Point)

Appendix F

Air Quality Monitoring Results
and Construction Noise Monitoring Results

1-hour TSP Monitoring Result for Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

AMS2 - Tung Chung Development Pier

Date	Weather Condition	Start Time	1-hour TSP ($\mu\text{g}/\text{m}^3$)			Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
			1st Measurement	2nd Measurement	3rd Measurement		
2-Dec-21	Fine	13:06	65	59	54	374	500
8-Dec-21	Fine	09:08	59	62	63		
14-Dec-21	Fine	12:39	39	36	36		
20-Dec-21	Fine	12:15	42	45	44		
24-Dec-21	Fine	13:35	68	59	63		
30-Dec-21	Fine	09:11	54	62	59		
		Min	36				
		Max	68				
		Average	54				

AMS3C - Ying Tung Estate Market Rooftop

Date	Weather Condition	Start Time	1-hour TSP ($\mu\text{g}/\text{m}^3$)			Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
			1st Measurement	2nd Measurement	3rd Measurement		
2-Dec-21	Fine	13:34	91	101	98	368	500
8-Dec-21	Fine	09:27	86	91	84		
14-Dec-21	Fine	12:28	67	65	70		
20-Dec-21	Fine	12:33	79	84	89		
24-Dec-21	Fine	13:47	115	120	125		
30-Dec-21	Fine	09:19	82	82	74		
		Min	65				
		Max	125				
		Average	89				

AMS7C - East Sea Rescue Berth – Airport Fire Contingent Third Runway Site Office

Date	Weather Condition	Start Time	1-hour TSP ($\mu\text{g}/\text{m}^3$)			Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
			1st Measurement	2nd Measurement	3rd Measurement		
2-Dec-21	Fine	15:08	68	65	65	370	500
8-Dec-21	Fine	09:43	61	63	59		
14-Dec-21	Fine	13:00	46	44	40		
20-Dec-21	Fine	12:52	51	57	59		
24-Dec-21	Fine	13:10	74	84	78		
30-Dec-21	Fine	08:45	55	51	55		
		Min	40				
		Max	84				
		Average	60				

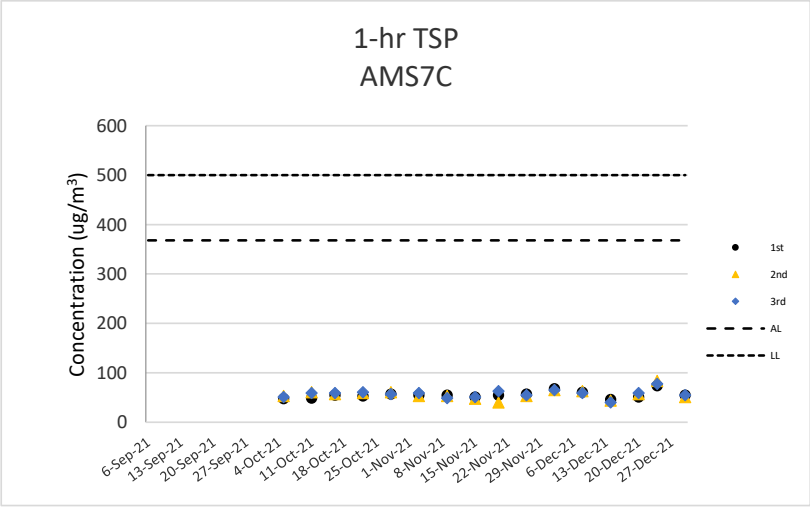
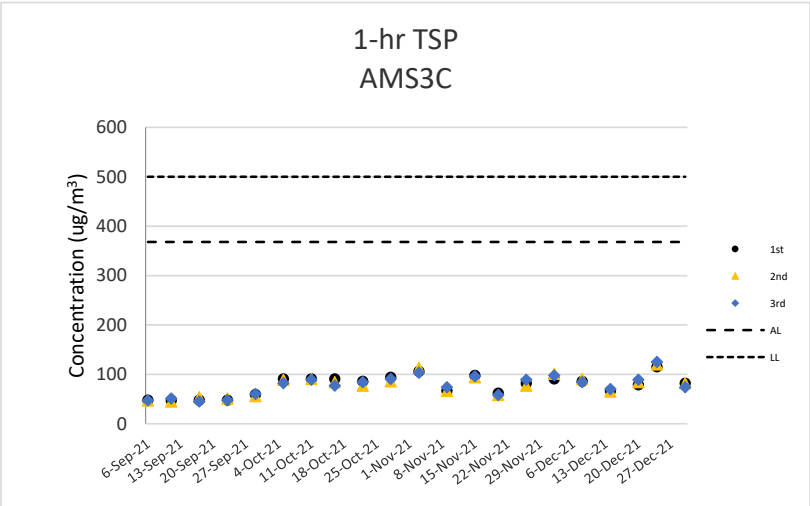
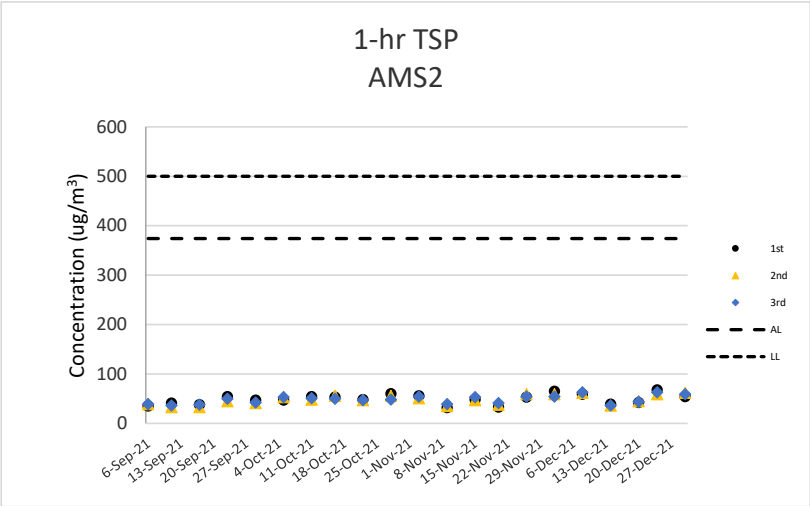
Note:

Underline: Exceedance of Action Level

Underline and Bold: Exceedance of Limit Level

1. Air quality monitoring location AMS7B was temporary suspended, effective from 10 December 2020.

2. According to the email date 11 August 2021, EPD have no comment on the Proposal for Relocation of Monitoring Location AMS 7B, the monitoring location AMS 7B are proposed to be relocated by alternative monitoring location AMS 7C for air quality monitoring.



**24-hour TSP Monitoring Result for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works**

AMS2 - Tung Chung Development Pier

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 (ug/m ³)	Limit Level (ug/m ³)	
				Initial	Final			Initial	Final						
2-Dec-21	Fine	287.8	766.4	2.7518	2.9023	0.1505	24	1.37	1.33	1.35	1943.2	77	176	260	
8-Dec-21	Fine	293.3	766.8	2.7325	2.8788	0.1463	24	1.35	1.33	1.34	1933.0	76			
14-Dec-21	Fine	293.7	764.0	2.7184	2.9472	0.2288	24	1.59	1.58	1.59	2284.7	100			
20-Dec-21	Fine	290.4	763.3	2.7037	2.7778	0.0741	24	1.60	1.58	1.59	2289.7	32			
24-Dec-21	Fine	293.1	763.0	2.7468	2.8230	0.0762	24	1.59	1.58	1.59	2285.0	33			
30-Dec-21	Fine	291.3	768.5	2.7656	2.9466	0.1810	24	1.60	1.58	1.59	2291.6	79			
												Min	32		
												Max	100		
												Average	66		

AMS3C - Ying Tung Estate Market Rooftop

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 (ug/m ³)	Limit Level (ug/m ³)	
				Initial	Final			Initial	Final						
2-Dec-21	Fine	287.8	766.4	2.7305	2.8685	0.1380	24	1.41	1.38	1.39	2006.9	69	167	260	
8-Dec-21	Fine	293.3	766.8	2.7287	2.8488	0.1201	24	1.47	1.45	1.46	2101.5	57			
14-Dec-21	Fine	293.7	764.0	2.6737	2.7793	0.1056	24	1.56	1.55	1.56	2243.6	47			
20-Dec-21	Fine	290.4	763.3	2.6609	2.7427	0.0818	24	1.57	1.55	1.56	2247.6	36			
24-Dec-21	Fine	293.1	763.0	2.7513	2.9063	0.1550	24	1.67	1.66	1.67	2398.5	65			
30-Dec-21	Fine	291.3	768.5	2.7806	2.9000	0.1194	24	1.57	1.55	1.56	2249.1	53			
												Min	36		
												Max	69		
												Average	55		

AMS7C - East Sea Rescue Berth – Airport Fire Contingent Third Runway Site Office

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 (ug/m ³)	Limit Level (ug/m ³)	
				Initial	Final			Initial	Final						
2-Dec-21	Fine	287.8	766.4	2.7082	2.7995	0.0913	24	1.57	1.54	1.55	2238.7	41	183	260	
8-Dec-21	Fine	293.3	766.8	2.7245	2.8554	0.1309	24	1.56	1.54	1.55	2229.5	59			
14-Dec-21	Fine	293.7	764.0	2.6687	2.7503	0.0816	24	1.66	1.64	1.65	2373.3	34			
20-Dec-21	Fine	290.4	763.3	2.6704	2.7892	0.1188	24	1.53	1.51	1.52	2184.9	54			
24-Dec-21	Fine	293.1	763.0	2.7310	2.8586	0.1276	24	1.66	1.64	1.65	2373.6	54			
30-Dec-21	Fine	291.3	768.5	2.7116	2.9027	0.1911	24	1.53	1.51	1.52	2186.8	87			
												Min	34		
												Max	87		
												Average	55		

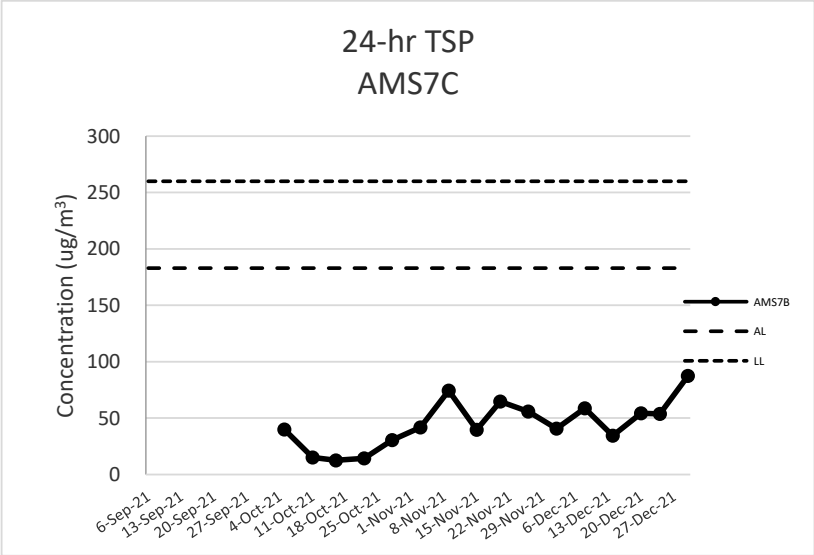
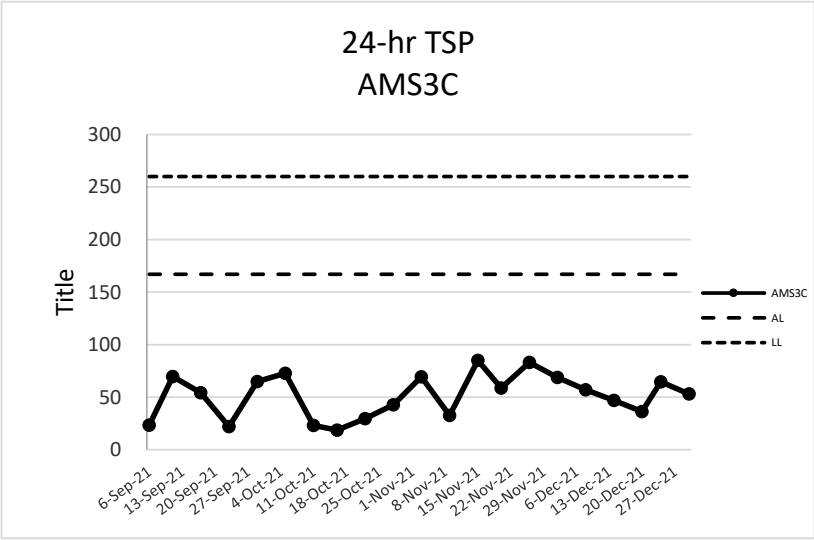
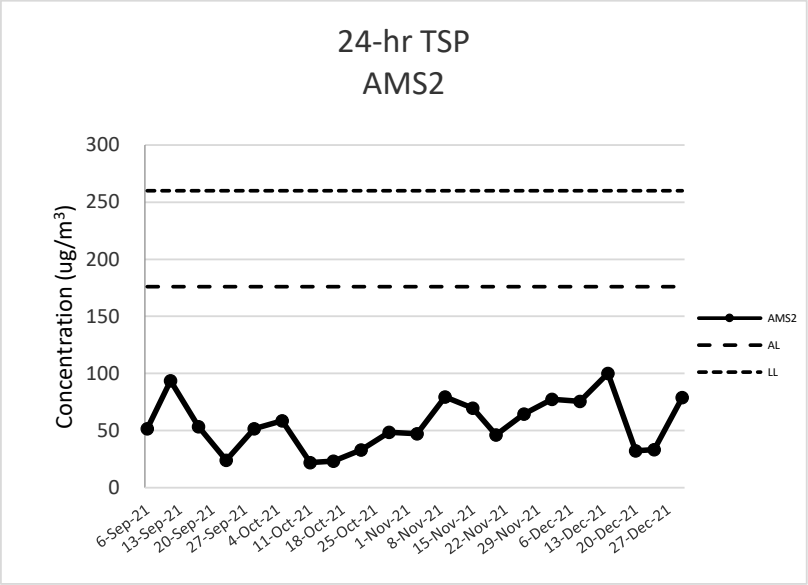
Note:

Underline: Exceedance of Action Level

Underline and Bold: Exceedance of Limit Level

1. Air quality monitoring location AMS7B was temporary suspended, effective from 10 December 2020.

2. According to the email date 11 August 2021, EPD have no comment on the Proposal for Relocation of Monitoring Location AMS 7B, the monitoring location AMS 7B are proposed to be relocated by alternative monitoring location AMS 7C for air quality monitoring.



**Noise Impact Monitoring Result for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works**

NMS2 - Seaview Crescent

Date	Start Time	L _{eq} 30min dB(A)	L ₁₀ dB(A)	L ₉₀ dB(A)	Wind Speed (m/s)	Weather	Limit Level dB(A)
2-Dec-21	14:23	61	62	58	0.7	Fine	75
8-Dec-21	10:06	64	66	61	0.9	Fine	75
14-Dec-21	11:02	59	60	55	0.2	Fine	75
20-Dec-21	12:48	65	62	71	0.3	Fine	75
30-Dec-21	10:11	62	63	59	0.7	Fine	75
	Max	65					
	Min	59					

NMS3C - Ying Tung Estate Refuse Collection Point

Date	Start Time	L _{eq} 30min dB(A)	L ₁₀ dB(A)	L ₉₀ dB(A)	Wind Speed (m/s)	Weather	Limit Level dB(A)	Corrected Noise Level*
2-Dec-21	13:31	70	73	67	0.9	Fine	70	
8-Dec-21	11:07	69	72	68	0.7	Fine	70	
14-Dec-21	11:55	63	66	56	0.4	Fine	70	
20-Dec-21	13:33	62	61	66	0.6	Fine	70	
30-Dec-21	09:23	66	69	64	1.2	Fine	70	
	Max	70						
	Min	62						

Note:

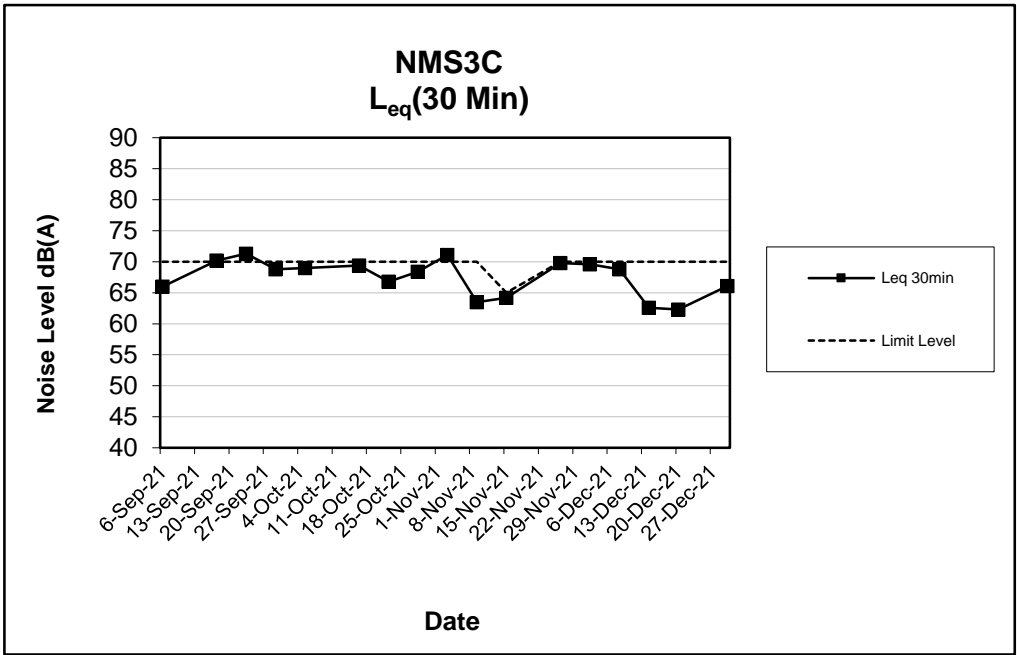
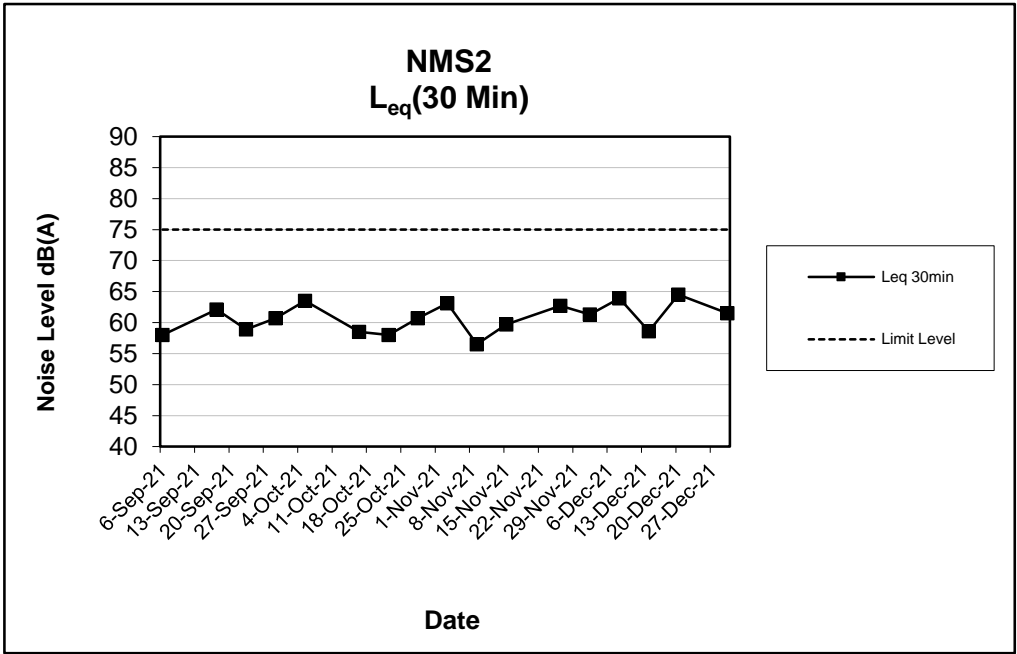
NMS2: Façade Measurement

NMS3C: Free-field measurement (+3dB(A) correction has been applied), reduction to 65dB(A) during school examination periods will be applied.

No raining or wind with speed over 5 m/s was observed during noise monitoring according to the onsite observation.

*Corrected Noise Level = $\text{LOG}(10^{(\text{Impact Noise Level} / 10)} - 10^{(\text{Baseline Noise Level} / 10)}) \times 10$

Baseline Noise Level = 66.3 dB(A)



Appendix G

Wind Data

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
01/12/2021 00:00	0.0	SWW
01/12/2021 01:00	0.0	SW
01/12/2021 02:00	0.1	N
01/12/2021 03:00	0.0	NEN
01/12/2021 04:00	0.0	SWS
01/12/2021 05:00	0.0	NWN
01/12/2021 06:00	0.0	NWN
01/12/2021 07:00	0.0	N
01/12/2021 08:00	0.0	NEE
01/12/2021 09:00	0.0	SES
01/12/2021 10:00	0.5	N
01/12/2021 11:00	0.1	SEE
01/12/2021 12:00	0.0	E
01/12/2021 13:00	0.6	E
01/12/2021 14:00	0.3	NE
01/12/2021 15:00	0.8	NE
01/12/2021 16:00	0.3	N
01/12/2021 17:00	0.9	SEE
01/12/2021 18:00	0.1	SEE
01/12/2021 19:00	0.0	SWS
01/12/2021 20:00	0.1	SE
01/12/2021 21:00	0.0	SES
01/12/2021 22:00	0.6	N
01/12/2021 23:00	1.2	E
02/12/2021 00:00	1.0	NEN
02/12/2021 01:00	2.2	N
02/12/2021 02:00	2.0	N
02/12/2021 03:00	1.5	N
02/12/2021 04:00	3.4	N
02/12/2021 05:00	0.4	N
02/12/2021 06:00	0.1	S
02/12/2021 07:00	0.1	SWW
02/12/2021 08:00	1.6	NEN
02/12/2021 09:00	0.1	N
02/12/2021 10:00	0.1	E
02/12/2021 11:00	0.2	NEE
02/12/2021 12:00	0.9	N
02/12/2021 13:00	0.3	NEE
02/12/2021 14:00	0.0	NE
02/12/2021 15:00	0.0	E

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
02/12/2021 16:00	0.8	N
02/12/2021 17:00	0.0	NE
02/12/2021 18:00	0.4	N
02/12/2021 19:00	4.6	NE
02/12/2021 20:00	2.2	SWS
02/12/2021 21:00	0.1	NWN
02/12/2021 22:00	1.2	N
02/12/2021 23:00	2.1	NEN
03/12/2021 00:00	1.5	N
03/12/2021 01:00	0.0	SWS
03/12/2021 02:00	0.0	SW
03/12/2021 03:00	0.0	SWW
03/12/2021 04:00	0.3	NEN
03/12/2021 05:00	0.0	SW
03/12/2021 06:00	0.4	N
03/12/2021 07:00	0.2	SE
03/12/2021 08:00	0.0	SE
03/12/2021 09:00	0.0	W
03/12/2021 10:00	0.4	SW
03/12/2021 11:00	0.7	E
03/12/2021 12:00	0.0	E
03/12/2021 13:00	0.8	E
03/12/2021 14:00	0.3	E
03/12/2021 15:00	0.2	NEN
03/12/2021 16:00	0.1	NE
03/12/2021 17:00	0.1	NE
03/12/2021 18:00	0.0	NE
03/12/2021 19:00	1.4	NEN
03/12/2021 20:00	0.8	N
03/12/2021 21:00	1.0	NEN
03/12/2021 22:00	0.0	N
03/12/2021 23:00	0.0	N
04/12/2021 00:00	0.0	N
04/12/2021 01:00	0.4	N
04/12/2021 02:00	0.9	NE
04/12/2021 03:00	0.0	NW
04/12/2021 04:00	0.0	SES
04/12/2021 05:00	0.0	E
04/12/2021 06:00	0.0	NEE
04/12/2021 07:00	0.0	SEE
04/12/2021 08:00	0.0	NE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
04/12/2021 09:00	0.0	SWW
04/12/2021 10:00	0.1	NEN
04/12/2021 11:00	1.3	NE
04/12/2021 12:00	1.3	NE
04/12/2021 13:00	1.0	NEE
04/12/2021 14:00	1.4	NE
04/12/2021 15:00	0.1	N
04/12/2021 16:00	0.0	NEN
04/12/2021 17:00	0.9	NE
04/12/2021 18:00	1.2	NE
04/12/2021 19:00	1.7	NEN
04/12/2021 20:00	0.6	NEN
04/12/2021 21:00	0.0	NEN
04/12/2021 22:00	0.1	NEN
04/12/2021 23:00	0.9	NEN
05/12/2021 00:00	0.0	SW
05/12/2021 01:00	0.0	S
05/12/2021 02:00	0.0	SWW
05/12/2021 03:00	0.0	S
05/12/2021 04:00	0.0	SWW
05/12/2021 05:00	0.0	SWS
05/12/2021 06:00	0.0	S
05/12/2021 07:00	0.1	S
05/12/2021 08:00	0.0	S
05/12/2021 09:00	0.0	W
05/12/2021 10:00	0.6	N
05/12/2021 11:00	0.0	NEE
05/12/2021 12:00	0.1	E
05/12/2021 13:00	0.0	NE
05/12/2021 14:00	0.3	SE
05/12/2021 15:00	1.3	SEE
05/12/2021 16:00	1.5	SEE
05/12/2021 17:00	0.2	NEE
05/12/2021 18:00	0.2	NE
05/12/2021 19:00	0.6	NE
05/12/2021 20:00	0.0	N
05/12/2021 21:00	0.0	N
05/12/2021 22:00	0.0	S
05/12/2021 23:00	0.7	N
06/12/2021 00:00	0.0	W
06/12/2021 01:00	0.0	N

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
06/12/2021 02:00	0.0	SES
06/12/2021 03:00	0.0	SWS
06/12/2021 04:00	0.0	SWW
06/12/2021 05:00	0.0	SW
06/12/2021 06:00	0.0	SW
06/12/2021 07:00	0.0	S
06/12/2021 08:00	0.0	SW
06/12/2021 09:00	0.0	SWW
06/12/2021 10:00	0.0	SWW
06/12/2021 11:00	0.0	SWS
06/12/2021 12:00	0.0	SWW
06/12/2021 13:00	0.0	SE
06/12/2021 14:00	0.0	NEE
06/12/2021 15:00	0.0	SE
06/12/2021 16:00	0.0	N
06/12/2021 17:00	0.4	E
06/12/2021 18:00	2.2	NE
06/12/2021 19:00	0.0	SEE
06/12/2021 20:00	0.4	NE
06/12/2021 21:00	0.8	SE
06/12/2021 22:00	0.1	E
06/12/2021 23:00	0.0	SEE
07/12/2021 00:00	0.0	SEE
07/12/2021 01:00	0.8	SE
07/12/2021 02:00	0.2	SWW
07/12/2021 03:00	1.2	SEE
07/12/2021 04:00	0.0	SEE
07/12/2021 05:00	0.4	E
07/12/2021 06:00	0.0	SEE
07/12/2021 07:00	0.0	SEE
07/12/2021 08:00	0.0	S
07/12/2021 09:00	0.0	NE
07/12/2021 10:00	0.0	NEE
07/12/2021 11:00	1.1	SES
07/12/2021 12:00	2.3	NEN
07/12/2021 13:00	0.4	NEE
07/12/2021 14:00	0.8	E
07/12/2021 15:00	0.1	E
07/12/2021 16:00	1.7	E
07/12/2021 17:00	0.6	NEN
07/12/2021 18:00	0.8	NE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
07/12/2021 19:00	0.4	NEE
07/12/2021 20:00	0.1	NEE
07/12/2021 21:00	0.3	N
07/12/2021 22:00	0.0	S
07/12/2021 23:00	0.0	SES
08/12/2021 00:00	0.0	NEN
08/12/2021 01:00	0.0	SW
08/12/2021 02:00	0.0	NEN
08/12/2021 03:00	0.0	N
08/12/2021 04:00	0.0	SW
08/12/2021 05:00	0.0	SWS
08/12/2021 06:00	0.0	SWS
08/12/2021 07:00	0.0	SWS
08/12/2021 08:00	0.0	SW
08/12/2021 09:00	0.0	SW
08/12/2021 10:00	0.0	SWS
08/12/2021 11:00	0.0	S
08/12/2021 12:00	0.0	SWS
08/12/2021 13:00	0.0	SWS
08/12/2021 14:00	0.0	SWW
08/12/2021 15:00	0.0	SWW
08/12/2021 16:00	0.0	SWS
08/12/2021 17:00	0.0	SWW
08/12/2021 18:00	0.0	SWS
08/12/2021 19:00	0.0	SWS
08/12/2021 20:00	0.0	SWS
08/12/2021 21:00	0.0	SES
08/12/2021 22:00	0.0	SES
08/12/2021 23:00	0.0	SEE
09/12/2021 00:00	0.0	NEE
09/12/2021 01:00	0.0	SEE
09/12/2021 02:00	0.0	NEE
09/12/2021 03:00	0.0	SES
09/12/2021 04:00	0.0	N
09/12/2021 05:00	0.1	E
09/12/2021 06:00	0.6	SEE
09/12/2021 07:00	0.0	NEE
09/12/2021 08:00	0.2	SEE
09/12/2021 09:00	0.0	N
09/12/2021 10:00	0.0	NEE
09/12/2021 11:00	0.0	NE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
09/12/2021 12:00	0.0	NEE
09/12/2021 13:00	0.2	NE
09/12/2021 14:00	0.3	SEE
09/12/2021 15:00	0.0	E
09/12/2021 16:00	0.0	N
09/12/2021 17:00	0.0	N
09/12/2021 18:00	0.0	NEN
09/12/2021 19:00	0.0	SE
09/12/2021 20:00	0.1	NE
09/12/2021 21:00	0.6	W
09/12/2021 22:00	0.1	SE
09/12/2021 23:00	0.0	SW
10/12/2021 00:00	0.1	N
10/12/2021 01:00	0.0	N
10/12/2021 02:00	0.0	SWW
10/12/2021 03:00	0.0	S
10/12/2021 04:00	0.0	SWW
10/12/2021 05:00	0.0	S
10/12/2021 06:00	0.0	SES
10/12/2021 07:00	0.0	SES
10/12/2021 08:00	0.0	SES
10/12/2021 09:00	0.0	S
10/12/2021 10:00	0.0	N
10/12/2021 11:00	0.0	NWW
10/12/2021 12:00	0.0	NW
10/12/2021 13:00	0.0	N
10/12/2021 14:00	0.0	NEN
10/12/2021 15:00	0.0	NWW
10/12/2021 16:00	0.0	W
10/12/2021 17:00	0.0	N
10/12/2021 18:00	0.9	NEN
10/12/2021 19:00	0.0	W
10/12/2021 20:00	0.0	S
10/12/2021 21:00	0.0	SW
10/12/2021 22:00	0.0	N
10/12/2021 23:00	0.0	SEE
11/12/2021 00:00	0.0	NE
11/12/2021 01:00	0.0	E
11/12/2021 02:00	0.0	SEE
11/12/2021 03:00	0.0	SWW
11/12/2021 04:00	0.0	NEE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
11/12/2021 05:00	0.0	SWW
11/12/2021 06:00	0.0	NEE
11/12/2021 07:00	0.0	S
11/12/2021 08:00	0.0	E
11/12/2021 09:00	0.0	NE
11/12/2021 10:00	0.0	NE
11/12/2021 11:00	0.1	NE
11/12/2021 12:00	0.2	NE
11/12/2021 13:00	0.1	SE
11/12/2021 14:00	0.7	NEN
11/12/2021 15:00	0.5	NEE
11/12/2021 16:00	0.0	S
11/12/2021 17:00	0.2	NEN
11/12/2021 18:00	1.9	NE
11/12/2021 19:00	0.8	SEE
11/12/2021 20:00	1.0	N
11/12/2021 21:00	0.0	SEE
11/12/2021 22:00	0.0	N
11/12/2021 23:00	0.1	NEN
12/12/2021 00:00	0.0	W
12/12/2021 01:00	0.4	SES
12/12/2021 02:00	0.0	SEE
12/12/2021 03:00	0.0	SW
12/12/2021 04:00	0.0	SWS
12/12/2021 05:00	0.0	NE
12/12/2021 06:00	0.4	NE
12/12/2021 07:00	0.2	NEN
12/12/2021 08:00	0.0	N
12/12/2021 09:00	0.1	NE
12/12/2021 10:00	0.1	NEN
12/12/2021 11:00	0.0	NWW
12/12/2021 12:00	1.5	N
12/12/2021 13:00	0.4	N
12/12/2021 14:00	0.0	E
12/12/2021 15:00	0.1	SW
12/12/2021 16:00	0.5	SE
12/12/2021 17:00	0.0	E
12/12/2021 18:00	0.0	E
12/12/2021 19:00	1.3	N
12/12/2021 20:00	0.0	N
12/12/2021 21:00	0.0	SES

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
12/12/2021 22:00	0.0	N
12/12/2021 23:00	0.1	N
13/12/2021 00:00	0.0	NWN
13/12/2021 01:00	0.6	SW
13/12/2021 02:00	0.3	SW
13/12/2021 03:00	0.0	N
13/12/2021 04:00	0.0	SE
13/12/2021 05:00	0.0	S
13/12/2021 06:00	0.0	N
13/12/2021 07:00	0.0	N
13/12/2021 08:00	0.7	N
13/12/2021 09:00	0.1	S
13/12/2021 10:00	0.0	SWS
13/12/2021 11:00	0.1	NEN
13/12/2021 12:00	0.2	NEE
13/12/2021 13:00	0.4	SWS
13/12/2021 14:00	0.0	NE
13/12/2021 15:00	0.1	NEN
13/12/2021 16:00	0.1	SWW
13/12/2021 17:00	0.0	NWW
13/12/2021 18:00	0.0	E
13/12/2021 19:00	0.1	NEN
13/12/2021 20:00	3.4	SES
13/12/2021 21:00	0.3	NEE
13/12/2021 22:00	1.4	SEE
13/12/2021 23:00	0.4	SE
14/12/2021 00:00	0.0	SES
14/12/2021 01:00	0.0	SES
14/12/2021 02:00	0.0	N
14/12/2021 03:00	0.2	E
14/12/2021 04:00	0.0	NEN
14/12/2021 05:00	0.0	NE
14/12/2021 06:00	0.2	SES
14/12/2021 07:00	0.1	NE
14/12/2021 08:00	0.2	SEE
14/12/2021 09:00	0.0	NEE
14/12/2021 10:00	0.0	SES
14/12/2021 11:00	0.2	E
14/12/2021 12:00	0.0	E
14/12/2021 13:00	0.2	SEE
14/12/2021 14:00	0.0	N

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
14/12/2021 15:00	0.1	N
14/12/2021 16:00	0.0	N
14/12/2021 17:00	0.0	NEE
14/12/2021 18:00	0.0	NEE
14/12/2021 19:00	0.0	SE
14/12/2021 20:00	0.0	SWS
14/12/2021 21:00	0.0	SWW
14/12/2021 22:00	0.0	SW
14/12/2021 23:00	0.0	SW
15/12/2021 00:00	0.0	SWW
15/12/2021 01:00	0.0	SWS
15/12/2021 02:00	0.1	SWS
15/12/2021 03:00	0.8	S
15/12/2021 04:00	0.0	S
15/12/2021 05:00	0.0	SES
15/12/2021 06:00	2.7	SES
15/12/2021 07:00	0.0	S
15/12/2021 08:00	0.0	NE
15/12/2021 09:00	0.0	SES
15/12/2021 10:00	0.3	E
15/12/2021 11:00	0.0	NEE
15/12/2021 12:00	0.3	NEN
15/12/2021 13:00	0.4	NEE
15/12/2021 14:00	0.1	NEN
15/12/2021 15:00	0.1	SEE
15/12/2021 16:00	2.5	NEE
15/12/2021 17:00	4.3	NE
15/12/2021 18:00	2.3	NEE
15/12/2021 19:00	1.2	SEE
15/12/2021 20:00	0.4	SE
15/12/2021 21:00	3.4	NE
15/12/2021 22:00	2.5	SE
15/12/2021 23:00	3.0	SE
16/12/2021 00:00	1.3	NEE
16/12/2021 01:00	0.7	NEE
16/12/2021 02:00	1.5	NE
16/12/2021 03:00	5.1	NE
16/12/2021 04:00	2.0	SE
16/12/2021 05:00	2.1	NEE
16/12/2021 06:00	0.7	NEE
16/12/2021 07:00	0.0	SEE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
16/12/2021 08:00	3.7	NEN
16/12/2021 09:00	0.4	SE
16/12/2021 10:00	2.1	SE
16/12/2021 11:00	0.3	SEE
16/12/2021 12:00	0.0	S
16/12/2021 13:00	1.4	NE
16/12/2021 14:00	0.1	NEE
16/12/2021 15:00	1.3	E
16/12/2021 16:00	0.1	E
16/12/2021 17:00	0.2	E
16/12/2021 18:00	0.0	NEN
16/12/2021 19:00	0.8	SEE
16/12/2021 20:00	0.0	SES
16/12/2021 21:00	0.4	NEN
16/12/2021 22:00	1.5	NEE
16/12/2021 23:00	1.6	NE
17/12/2021 00:00	0.1	SE
17/12/2021 01:00	0.3	NEE
17/12/2021 02:00	0.1	SEE
17/12/2021 03:00	0.6	NE
17/12/2021 04:00	1.9	SEE
17/12/2021 05:00	3.6	E
17/12/2021 06:00	1.2	SE
17/12/2021 07:00	0.7	E
17/12/2021 08:00	0.0	NE
17/12/2021 09:00	0.1	NE
17/12/2021 10:00	0.0	NE
17/12/2021 11:00	0.6	NE
17/12/2021 12:00	1.4	NE
17/12/2021 13:00	0.0	NEE
17/12/2021 14:00	0.5	SES
17/12/2021 15:00	0.8	SEE
17/12/2021 16:00	0.2	N
17/12/2021 17:00	0.1	NE
17/12/2021 18:00	1.1	NE
17/12/2021 19:00	2.8	NE
17/12/2021 20:00	4.1	NEN
17/12/2021 21:00	1.8	NEE
17/12/2021 22:00	0.3	SE
17/12/2021 23:00	0.2	NEE
18/12/2021 00:00	2.1	NEN

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
18/12/2021 01:00	1.7	NEE
18/12/2021 02:00	2.5	NEE
18/12/2021 03:00	1.6	E
18/12/2021 04:00	1.2	SE
18/12/2021 05:00	0.0	SEE
18/12/2021 06:00	4.2	SEE
18/12/2021 07:00	2.9	E
18/12/2021 08:00	1.1	SES
18/12/2021 09:00	1.5	NEE
18/12/2021 10:00	0.3	SWW
18/12/2021 11:00	2.0	NEE
18/12/2021 12:00	0.6	E
18/12/2021 13:00	1.4	SE
18/12/2021 14:00	2.9	NEE
18/12/2021 15:00	0.7	SE
18/12/2021 16:00	2.1	SES
18/12/2021 17:00	1.8	E
18/12/2021 18:00	0.8	SW
18/12/2021 19:00	3.5	SE
18/12/2021 20:00	1.1	NEE
18/12/2021 21:00	0.6	NEE
18/12/2021 22:00	2.7	SE
18/12/2021 23:00	1.0	SE
19/12/2021 00:00	3.0	E
19/12/2021 01:00	2.1	E
19/12/2021 02:00	0.3	NE
19/12/2021 03:00	0.0	SWW
19/12/2021 04:00	0.0	SEE
19/12/2021 05:00	2.4	NEE
19/12/2021 06:00	0.9	SEE
19/12/2021 07:00	0.0	E
19/12/2021 08:00	0.9	NEN
19/12/2021 09:00	0.0	E
19/12/2021 10:00	0.3	NEE
19/12/2021 11:00	0.1	SE
19/12/2021 12:00	0.1	NEE
19/12/2021 13:00	0.6	NEN
19/12/2021 14:00	0.0	NE
19/12/2021 15:00	0.2	N
19/12/2021 16:00	0.2	E
19/12/2021 17:00	0.0	SEE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
19/12/2021 18:00	0.1	SE
19/12/2021 19:00	0.7	NE
19/12/2021 20:00	0.0	E
19/12/2021 21:00	0.0	N
19/12/2021 22:00	0.0	NEN
19/12/2021 23:00	0.4	NE
20/12/2021 00:00	0.5	NEN
20/12/2021 01:00	0.0	NEN
20/12/2021 02:00	0.4	SWS
20/12/2021 03:00	0.0	NE
20/12/2021 04:00	0.0	NEE
20/12/2021 05:00	0.0	N
20/12/2021 06:00	0.0	E
20/12/2021 07:00	0.0	S
20/12/2021 08:00	0.1	S
20/12/2021 09:00	0.0	SEE
20/12/2021 10:00	0.1	NE
20/12/2021 11:00	0.0	NE
20/12/2021 12:00	0.0	SES
20/12/2021 13:00	0.1	S
20/12/2021 14:00	0.4	SE
20/12/2021 15:00	0.0	NE
20/12/2021 16:00	0.0	NE
20/12/2021 17:00	0.0	S
20/12/2021 18:00	0.0	SE
20/12/2021 19:00	1.4	SWW
20/12/2021 20:00	0.0	SWS
20/12/2021 21:00	0.0	SW
20/12/2021 22:00	0.0	S
20/12/2021 23:00	0.0	E
21/12/2021 00:00	0.4	NE
21/12/2021 01:00	0.1	E
21/12/2021 02:00	0.0	SWS
21/12/2021 03:00	0.0	NE
21/12/2021 04:00	0.6	E
21/12/2021 05:00	0.5	SEE
21/12/2021 06:00	0.1	W
21/12/2021 07:00	0.2	NE
21/12/2021 08:00	0.1	N
21/12/2021 09:00	0.4	SEE
21/12/2021 10:00	0.0	NE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
21/12/2021 11:00	0.2	SWS
21/12/2021 12:00	0.0	SEE
21/12/2021 13:00	0.0	SEE
21/12/2021 14:00	0.0	SEE
21/12/2021 15:00	0.4	E
21/12/2021 16:00	0.3	E
21/12/2021 17:00	1.5	SE
21/12/2021 18:00	0.1	NEE
21/12/2021 19:00	1.0	NW
21/12/2021 20:00	0.8	NWW
21/12/2021 21:00	1.2	SW
21/12/2021 22:00	2.2	W
21/12/2021 23:00	0.1	SW
22/12/2021 00:00	0.0	NE
22/12/2021 01:00	0.0	SEE
22/12/2021 02:00	0.3	SWS
22/12/2021 03:00	0.6	NWW
22/12/2021 04:00	0.4	NW
22/12/2021 05:00	0.2	N
22/12/2021 06:00	0.1	NW
22/12/2021 07:00	0.0	E
22/12/2021 08:00	0.1	NEE
22/12/2021 09:00	0.0	NE
22/12/2021 10:00	1.2	NEE
22/12/2021 11:00	0.1	SW
22/12/2021 12:00	0.1	N
22/12/2021 13:00	0.1	SE
22/12/2021 14:00	0.0	SE
22/12/2021 15:00	0.0	NEE
22/12/2021 16:00	0.0	SE
22/12/2021 17:00	0.1	NW
22/12/2021 18:00	0.0	NEE
22/12/2021 19:00	0.1	N
22/12/2021 20:00	0.0	NW
22/12/2021 21:00	0.0	NWW
22/12/2021 22:00	0.0	NWW
22/12/2021 23:00	0.0	NEN
23/12/2021 00:00	0.1	N
23/12/2021 01:00	0.0	N
23/12/2021 02:00	0.2	NWW
23/12/2021 03:00	0.1	NEE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
23/12/2021 04:00	0.0	S
23/12/2021 05:00	0.2	N
23/12/2021 06:00	0.1	N
23/12/2021 07:00	0.1	N
23/12/2021 08:00	0.1	N
23/12/2021 09:00	0.1	W
23/12/2021 10:00	0.0	SE
23/12/2021 11:00	0.0	N
23/12/2021 12:00	0.1	SES
23/12/2021 13:00	0.1	SW
23/12/2021 14:00	0.1	W
23/12/2021 15:00	0.0	NE
23/12/2021 16:00	0.4	SWS
23/12/2021 17:00	0.0	NWW
23/12/2021 18:00	0.0	N
23/12/2021 19:00	0.0	W
23/12/2021 20:00	0.0	E
23/12/2021 21:00	0.0	S
23/12/2021 22:00	0.0	SES
23/12/2021 23:00	0.0	NWN
24/12/2021 00:00	0.0	NW
24/12/2021 01:00	0.0	SE
24/12/2021 02:00	0.0	SW
24/12/2021 03:00	1.3	NE
24/12/2021 04:00	0.0	SW
24/12/2021 05:00	0.0	NE
24/12/2021 06:00	0.0	N
24/12/2021 07:00	0.2	SW
24/12/2021 08:00	0.0	SW
24/12/2021 09:00	0.0	SWW
24/12/2021 10:00	0.0	SW
24/12/2021 11:00	0.0	SWW
24/12/2021 12:00	0.0	SW
24/12/2021 13:00	0.0	SW
24/12/2021 14:00	0.0	SW
24/12/2021 15:00	0.0	SWW
24/12/2021 16:00	0.0	SWW
24/12/2021 17:00	0.0	SW
24/12/2021 18:00	0.0	SWW
24/12/2021 19:00	0.0	SW
24/12/2021 20:00	0.0	SW

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
24/12/2021 21:00	0.0	SW
24/12/2021 22:00	0.0	SWW
24/12/2021 23:00	0.0	SWW
25/12/2021 00:00	0.0	SW
25/12/2021 01:00	0.0	SWW
25/12/2021 02:00	0.0	SW
25/12/2021 03:00	0.0	SW
25/12/2021 04:00	0.0	NEN
25/12/2021 05:00	0.0	NE
25/12/2021 06:00	0.0	NEN
25/12/2021 07:00	0.0	SEE
25/12/2021 08:00	0.0	N
25/12/2021 09:00	0.0	NEE
25/12/2021 10:00	0.6	NEN
25/12/2021 11:00	0.0	NE
25/12/2021 12:00	0.0	NEN
25/12/2021 13:00	0.0	N
25/12/2021 14:00	0.0	NEN
25/12/2021 15:00	0.0	N
25/12/2021 16:00	0.0	SWW
25/12/2021 17:00	0.0	NEE
25/12/2021 18:00	0.0	NEN
25/12/2021 19:00	0.0	N
25/12/2021 20:00	0.0	N
25/12/2021 21:00	0.3	N
25/12/2021 22:00	0.0	N
25/12/2021 23:00	0.2	N
26/12/2021 00:00	0.0	N
26/12/2021 01:00	0.0	NEE
26/12/2021 02:00	0.0	N
26/12/2021 03:00	0.0	SWS
26/12/2021 04:00	0.0	SW
26/12/2021 05:00	0.0	SW
26/12/2021 06:00	0.0	SW
26/12/2021 07:00	0.0	SW
26/12/2021 08:00	0.0	SW
26/12/2021 09:00	0.0	SW
26/12/2021 10:00	0.0	SW
26/12/2021 11:00	0.0	SW
26/12/2021 12:00	0.0	SW

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
26/12/2021 13:00	0.0	SW
26/12/2021 14:00	0.0	N
26/12/2021 15:00	0.0	N
26/12/2021 16:00	0.0	SWS
26/12/2021 17:00	0.0	N
26/12/2021 18:00	0.0	SES
26/12/2021 19:00	0.0	S
26/12/2021 20:00	0.0	SEE
26/12/2021 21:00	0.0	W
26/12/2021 22:00	0.0	NE
26/12/2021 23:00	0.0	NEE
27/12/2021 00:00	0.8	N
27/12/2021 01:00	0.0	N
27/12/2021 02:00	0.1	SW
27/12/2021 03:00	0.0	SEE
27/12/2021 04:00	0.0	SWS
27/12/2021 05:00	0.0	S
27/12/2021 06:00	0.4	SWW
27/12/2021 07:00	0.0	N
27/12/2021 08:00	0.0	SWS
27/12/2021 09:00	0.1	N
27/12/2021 10:00	0.0	SEE
27/12/2021 11:00	0.0	NE
27/12/2021 12:00	0.0	S
27/12/2021 13:00	0.1	N
27/12/2021 14:00	0.0	N
27/12/2021 15:00	0.1	NEN
27/12/2021 16:00	0.0	N
27/12/2021 17:00	0.9	NEE
27/12/2021 18:00	0.4	E
27/12/2021 19:00	0.0	SEE
27/12/2021 20:00	0.0	SEE
27/12/2021 21:00	0.5	NE
27/12/2021 22:00	0.8	NEN
27/12/2021 23:00	0.5	N
28/12/2021 00:00	0.7	N
28/12/2021 01:00	0.0	SWW
28/12/2021 02:00	0.0	N
28/12/2021 03:00	0.0	N
28/12/2021 04:00	0.0	NWN
28/12/2021 05:00	0.0	SW

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
28/12/2021 06:00	0.0	W
28/12/2021 07:00	0.0	S
28/12/2021 08:00	0.0	S
28/12/2021 09:00	0.0	W
28/12/2021 10:00	0.0	SWW
28/12/2021 11:00	0.0	NEN
28/12/2021 12:00	0.0	SWW
28/12/2021 13:00	0.0	NW
28/12/2021 14:00	0.0	NWN
28/12/2021 15:00	0.0	W
28/12/2021 16:00	0.0	SWW
28/12/2021 17:00	0.0	SW
28/12/2021 18:00	0.0	NEE
28/12/2021 19:00	0.0	SES
28/12/2021 20:00	0.0	NWN
28/12/2021 21:00	0.0	SWW
28/12/2021 22:00	0.0	NW
28/12/2021 23:00	0.0	NWN
29/12/2021 00:00	0.0	SE
29/12/2021 01:00	0.0	NEE
29/12/2021 02:00	0.0	S
29/12/2021 03:00	0.0	E
29/12/2021 04:00	0.0	NWW
29/12/2021 05:00	0.0	SEE
29/12/2021 06:00	0.1	NEN
29/12/2021 07:00	0.0	NE
29/12/2021 08:00	0.0	NE
29/12/2021 09:00	0.0	SE
29/12/2021 10:00	0.0	SE
29/12/2021 11:00	0.0	SE
29/12/2021 12:00	0.0	SEE
29/12/2021 13:00	0.0	E
29/12/2021 14:00	0.0	N
29/12/2021 15:00	0.0	SWS
29/12/2021 16:00	0.1	NEN
29/12/2021 17:00	2.3	SES
29/12/2021 18:00	0.5	NEE
29/12/2021 19:00	5.4	SE
29/12/2021 20:00	0.6	SEE
29/12/2021 21:00	0.4	E
29/12/2021 22:00	0.3	SE

Wind Data for
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
29/12/2021 23:00	0.7	SE
30/12/2021 00:00	0.0	SE
30/12/2021 01:00	0.0	SE
30/12/2021 02:00	0.1	SEE
30/12/2021 03:00	1.0	E
30/12/2021 04:00	0.0	SES
30/12/2021 05:00	0.0	NE
30/12/2021 06:00	0.0	SE
30/12/2021 07:00	0.0	SEE
30/12/2021 08:00	0.5	SE
30/12/2021 09:00	0.9	SE
30/12/2021 10:00	0.0	NE
30/12/2021 11:00	1.8	SES
30/12/2021 12:00	0.5	SE
30/12/2021 13:00	0.5	SE
30/12/2021 14:00	0.0	E
30/12/2021 15:00	0.0	S
30/12/2021 16:00	1.9	SEE
30/12/2021 17:00	1.7	SES
30/12/2021 18:00	2.2	NEE
30/12/2021 19:00	0.0	NEE
30/12/2021 20:00	0.2	NWW
30/12/2021 21:00	0.4	S
30/12/2021 22:00	0.0	SE
30/12/2021 23:00	4.3	E
31/12/2021 00:00	0.0	SW
31/12/2021 01:00	0.0	SW
31/12/2021 02:00	0.0	SW
31/12/2021 03:00	0.0	N
31/12/2021 04:00	0.0	SE
31/12/2021 05:00	0.4	SEE
31/12/2021 06:00	0.0	NE
31/12/2021 07:00	0.0	S
31/12/2021 08:00	0.1	NEE
31/12/2021 09:00	0.4	N
31/12/2021 10:00	0.0	N
31/12/2021 11:00	0.0	N
31/12/2021 12:00	0.2	N
31/12/2021 13:00	0.0	N
31/12/2021 14:00	0.0	SWW
31/12/2021 15:00	0.0	SWS

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
31/12/2021 16:00	0.1	NEN
31/12/2021 17:00	0.0	N
31/12/2021 18:00	0.2	N
31/12/2021 19:00	0.0	W
31/12/2021 20:00	0.0	N
31/12/2021 21:00	1.7	SES
31/12/2021 22:00	0.0	NEE
31/12/2021 23:00	0.2	N
01/01/2022 00:00	0.0	W

Appendix H

Event and Action Plan

Event / Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	ACTION LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 	<ol style="list-style-type: none"> 1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	LIMIT LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 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.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.

Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> 1. <u>Notify IEC and Contractor;</u> 2. <u>Identify source, investigate the causes of exceedance and propose remedial measures;</u> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. <u>Inform IEC, ER, EPD and Contractor;</u> 2. <u>Identify source;</u> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.

Appendix I

Waste Flow Table

Waste Flow Table for Year 2020										
Monthly Ending	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of Non-inert C&D Wastes Generated Monthly				
	Total Quantity Generated (Inert C&D)	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)
2020 Jan	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2020 Feb	720.34	Nil	720.34	Nil	Nil	Nil	0.335	Nil	Nil	2.23
2020 Mar	11344.57	Nil	10218.92	Nil	1125.65	Nil	0.669	Nil	Nil	8.05
2020 Apr	19649.37	Nil	18670.3	Nil	979.07	Nil	Nil	Nil	Nil	21.64
2020 May	26767.55	Nil	26692.04	Nil	75.51	Nil	2.42	Nil	Nil	196.64
2020 Jun	4628.13	Nil	4198.52	Nil	429.61	Nil	Nil	Nil	Nil	117.19
2020 Jul	4895.66	Nil	3398.41	Nil	1497.25	Nil	Nil	Nil	Nil	30.33
2020 Aug	4971.00	Nil	4774.49	Nil	196.51	Nil	0.418	Nil	Nil	36.91
2020 Sep	1175.26	Nil	736.1	Nil	439.16	Nil	Nil	Nil	Nil	36.16
2020 Oct	3433.83	Nil	Nil	2262.7	1171.13	Nil	Nil	Nil	Nil	32.25
2020 Nov	26481.72	Nil	Nil	24393.64	2088.08	Nil	Nil	Nil	Nil	40.09
2020 Dec	14361.90	Nil	Nil	13468.00	893.90	Nil	Nil	Nil	Nil	39.56
Total	118429.33	0	69409.12	40124.34	8895.87	0	3.842	0	0	561.05

Note:

- 1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- 2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.
- 3) Total Quantity Generated (Inert) = Hard Rock and Large Broken Concrete + Reused in the Contract + Disposed as Public Fill – Imported Fill

Waste Flow Table for Year 2021										
Monthly Ending	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of Non-inert C&D Wastes Generated Monthly				
	Total Quantity Generated (Inert C&D)	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)
2021 Jan	787.6	0	0	0	787.6	0	0	0	0	18.19
2021 Feb	254.95	0	0	0	254.95	0	0	0	0	154.94
2021 Mar	1899.61	0	0	1720.5	179.11	0	0	0	0	371.73
2021 Apr	4056.27	0	0	0	4056.27	2.13	8.17	0	0	144.08
2021 May	2738.81	0	0	0	2738.81	0.495	0	0	0	31.63
2021 Jun	1009.53	0	0	0	1009.53	0	0	0	0	90.91
2021 Jul	1384.29	0	0	0	1384.29	0	0	0	0	51.69
2021 Aug	340.46	0	0	0	340.46	5.85	0	0	0	42.99
2021 Sep	732.9	0	0	0	732.9	0	0	0	0	70.11
2021 Oct	1023.81	0	0	0	1023.81	0	0	0	0	74.68
2021 Nov	1155.56	0	0	0	1155.56	3.195	0	0	0	121.99
2021 Dec	271.67	0	0	0.00	271.67	0	0	0	0	70.97
Total	15655.46	0	0	1720.5	13934.96	11.665	8.17	0	0	1243.91

Note:

- 1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- 2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.
- 3) Total Quantity Generated (Inert) = Hard Rock and Large Broken Concrete + Reused in the Contract + Disposed as Public Fill – Imported Fill

Appendix J

Implementation Status of

Environment mitigation Measures (Construction Phase)

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
Air Quality				
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	All construction sites	Implemented
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: <ul style="list-style-type: none"> •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; •Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; •A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. •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; •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; 	All construction sites	Implemented
S5.5.6.2	A2	<ul style="list-style-type: none"> •When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; •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, •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; •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; •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; •Any skip hoist for material transport should be totally enclosed by impervious sheeting; •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. 	All construction sites	Partially Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S5.5.6.2	A2	<ul style="list-style-type: none"> • 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; • 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 • 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 	All construction sites	N/A
S5.5.6.3	A3	3) The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	All construction sites	Implemented
S5.5.6.4	A4	4) Project Manager to incorporate the controlled measures into the Particular Specification (PS) for the civil work. The PS should also draw the contractor's attention to the relevant latest Practice Notes issued by EPD.	All construction sites	Implemented
S5.5.6.4	A5	5) Implement regular dust monitoring under EM&A programme during the construction stage.	Selected representative dust monitoring station	Implemented
S5.5.7.1	A6	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant;</p> <ul style="list-style-type: none"> • Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; • All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; • Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; • The materials which may generate airborne dusty emissions should be wetted by water spray system; • All receiving hoppers should be enclosed on three sides up to 3m above unloading point; • All conveyor transfer points should be totally enclosed; • All access and route roads within the premises should be paved and wetted; and • Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body. 	Selected representative dust monitoring station	Implemented
S5.5.2.7	A7	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point:</p> <ul style="list-style-type: none"> • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; • Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points. 	All construction sites	Implemented
Construction Noise (Air borne)				
S6.4.10	N1	<p>1) Use of good site practices to limit noise emissions by considering the following:</p> <ul style="list-style-type: none"> • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • 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; • plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; 	All construction sites	Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		<ul style="list-style-type: none"> •mobile plant should be sited as far away from NSRs as possible and practicable; •material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 		
S6.4.11	N2	2) 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.	All construction sites	Implemented
S6.4.12	N3	3) Install movable noise barriers (typically density@14kg/m acoustic mat or full enclosure close to noisy plants including compressor, generators, saw.	For plant items listed in Appendix 6D of the EIA report at all construction sites	N/A
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	For plant items listed in Appendix 6D of the EIA report at all construction sites	Implemented
S6.4.14	N5	5) Sequencing operation of construction plants where practicable	All construction sites where practicable	Implemented
S5.1	N6	6) Implement a noise monitoring under EM&A programme.	Selected representative noise monitoring station	Implemented
Waste Management (Construction Noise)				
S8.3.8	WM1	<p>Construction and Demolition Material</p> <p>The following mitigation measures should be implemented in handling the waste:</p> <ul style="list-style-type: none"> •Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; •Carry out on-site sorting; •Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; •Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and •Implement an enhanced Waste Management Plan similar to E7WBTC (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. •In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation. 	All construction sites	N/A
S8.3.9- S8.3.11	WM2	<p>C&D Waste</p> <ul style="list-style-type: none"> •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. •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. 	All construction sites	Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S8.2.12- S8.3.15	WM3	<p>Chemical Waste</p> <ul style="list-style-type: none"> •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. •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. •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 chemical waste, such as the Chemical Waste Treatment Centre which also offers chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD. 	All construction sites	Implemented
S8.3.16	WM4	<p>Sewage</p> <ul style="list-style-type: none"> •Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly. 	All construction sites	Implemented
S8.3.17- S8.3.19	WM5	<p>General Refuse</p> <ul style="list-style-type: none"> •General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. •A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. •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. •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. •Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. 	All construction sites	Partially Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
Water Quality (Construction Phase)				
S9.11.1.7	W2	<p>Land Works</p> <p>General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include:</p> <ul style="list-style-type: none"> •wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; •sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; •storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; •silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; •temporary access roads should be surfaced with crushed stone or gravel; •rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; •measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; •open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; •manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; •discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; •all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit; •wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; •the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; •wastewater generated from concreting, plastering, Internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; •vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; •the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; •waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; •all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and •surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system. 	All land-based construction sites	Partially Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
Ecology (Construction Phase)				
S10.7	E4	•Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater	Seawall, reclamation area	N/A
	E9	•Dolphin vessel monitoring	North Lantau and West Lantau	N/A Completed on 1 March 2021
Landscape & Visual (Construction Phase)				
S14.3.3.3	LV2	Mitigate both Landscape and Visual Impacts G1. Grass-hydroseed bare soil surface and stock pile areas; G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. G3. Providing aesthetic architectural design on related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonic atmosphere of the HKBCF. G4. Vegetation reinstatement and upgrading to disturbed areas; G5. Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed; G6. Providing planting area around peripheral of HKBCF for tree planting screening effect; G7. Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline; and G8. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of the new coastline.	All construction site areas	G6, G8, G9 and V1 were Implemented
S14.3.3.3	LV3	Mitigate Visual Impacts V1. Minimize time for construction activities during construction period.	All construction site areas	Implemented
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	All construction sites	Implemented
S15.5 –	EM2	1) An Environmental Team needs to be employed as per the EM&A Manual.	All construction sites	Implemented

Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S15.6		2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.		

Appendix K

Weather and Meteorological Conditions during
Reporting Month

Station: Hong Kong Observatory

Date	Mean Pressure (hPa)	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
December 2021						
1	1021.5	20.1	17.3	14.8	40	0
2	1021.8	20.4	17.4	14.6	42	0
3	1021.5	21.3	18.0	14.7	35	0
4	1022.2	20.6	18.1	15.3	46	0
5	1021.2	22.2	19.1	16.7	55	0
6	1020.3	22.2	19.2	16.4	59	0
7	1020.9	22.5	19.9	17.1	65	0
8	1022.3	22.2	20.1	18.4	67	0
9	1022.3	22.9	20.2	18.7	72	0
10	1020.7	23.7	20.9	18.6	73	0
11	1020.8	24.4	21.4	20.0	74	0
12	1021.0	24.7	21.5	19.2	75	0
13	1021.6	21.5	19.4	17.4	67	0
14	1018.6	23.6	20.5	18.7	72	Trace
15	1016.1	23.0	21.5	19.9	78	0.2
16	1015.8	25.8	23.2	21.7	81	Trace
17	1018.9	23.8	21.7	18.9	69	0
18	1022.8	20.0	18.1	16.3	58	0
19	1021.8	19.7	17.9	16.0	51	0
20	1017.6	19.3	17.2	15.7	78	9.4
21	1013.5	19	17.3	16.0	88	2.4
22	1016.5	21.7	19.3	17.1	80	Trace
23	1016.8	21.9	19.9	18.7	77	0.8
24	1017.2	21.8	19.9	18.2	84	1.7
25	1021.2	21.5	19.6	17.9	75	Trace
26	1025.5	18.5	15.0	11.7	78	3.5
27	1027.1	14.6	12.0	9.9.0	81	1.3
28	1024.4	17.5	15.3	12.2	74	0.2
29	1023.2	20.6	18.4	16.6	74	0
30	1024.6	21.4	18.1	16.2	77	0
31	1025.0	19.9	18.0	17.1	78	Trace

Remark: The corresponding weather station at Hong Kong International Airport were unavailable at the time of preparation of this report.
Source: Hong Kong Observatory

Appendix L

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

Environmental Complaints Log

Reference No.	Date of Complaint Received	Received From	Received By	Nature of Complaint	Date of Investigation	Outcome	Date of Reply

Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Cumulative Statistics on Notification of Summons and Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Notification of Summons and Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Appendix M

Summary of Site Audit in the Reporting Month

Summary of Site Audit in the Reporting Month

Parameters	Date	Observations and Recommendations	Follow-up
Air Quality	1 Dec 2021	Observation: Dusty materials should be removed immediately. (SPTI)	1 Dec 2021
	8 Dec 2021	Observation: Cement materials should be covered. (NPTI)	8 Dec 2021
Noise	NA		
Water Quality	22 Dec 2021	Reminder: Stagnant water should be removed. (VCP)	NA
	29 Dec 2021	Reminder: Stagnant water should be cleared. (SPTI)	NA
Chemical and Waste Management	1 Dec 2021	Reminder: Waste generated at the site should be cleared and collected. (VCP)	NA
	16 Dec 2021	Observation: Contractor is reminded to clear the chemical with the absorbent pad. (SPTI)	16 Dec 2021
Land Contamination	NA		
Landscape and Visual Impact	NA		
Permit / Licenses	NA		
Others	NA		

Appendix N

Outstanding Issues and Deficiencies

Summary of Outstanding Issues and Deficiencies in the Reporting Month

Parameters	Outstanding Issues	Deficiencies
Air Quality	NA	Any items of deficiencies can be referred to Appendix M .
Noise	NA	
Water Quality	NA	
Chemical and Waste Management	NA	
Land Contamination	NA	
Landscape and Visual Impact	NA	
Permit / Licenses	NA	
Others	NA	