Drainage Services Department

Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O

Monthly EM&A Report

(August 2023)

Prepared by

SGS Hong Kong Limited

Certified by:

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Our Ref: PL-202309008

Drainage Services Department
Special Duty Division
42/F, Revenue Tower, 5 Gloucester Road,
Wan Chai, Hong Kong.

Attention: Mr. Gary CHUNG

15 September 2023

Dear Gary,

Port Shelter Sewerage, Stage3 - Sewerage Works at Po Toi O
Monthly EM&A Report for August 2023

Reference is made to your submission of the Monthly EM&A Report for August 2023 received by email on 11 September 2023 and the subsequent revision on 14 September 2023. We are pleased to inform you that we have no adverse comment on the captioned report.

Thank you for your attention. Please do not hesitate to contact the undersigned should you have any queries.

Yours faithfully,

F.C. Tsang
Independent Environmental Checker

cc. ETL – Johnathan HO

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Drainage Services Department

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Monthly EM&A Report

(Period from 1 to 31 August 2023)

Prepared by

SGS Hong Kong Limited

Drainage Services Department

Issue and Revision Record

Revision	Description	Prepared by	Checked by	Approved by	Date
01	Submission	Various	Johnathan Ho 	Grace Fung 	Sep 2023

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TABLE OF CONTENT

1. EXECUTIVE SUMMARY

1.1 The proposed sewerage works in Po Toi O (hereafter as "the Project") is an environmental enhancement project that aims to improve environmental hygiene of the Po Toi O area. The Environmental Impact Assessment (EIA) Report for the Project (Register No: AEIAR-206/2017) was approved on 27 January 2017. The Environmental Permit (EP) (Permit No.: EP-516/2016) was issued on 27 January 2017 and is the current permit for the Project.

1.2 Société Générale de Surveillance (SGS) Hong Kong Limited has been appointed by Drainage Services Department (DSD) under service contract no. SD 3/2022 as the Environmental Team (ET) to undertake the EM&A programme during construction phase of the Project in accordance with the approved EM&A Manual for the Project.

1.3 This is the 30th monthly Environmental Monitoring & Audit (EM&A) Report prepared by SGS for the Project. This report summarized the monitoring results and audits findings of the EM&A programme under the EP and the EM&A Manual of the Project during the reporting period of 1 August 2023 to 31 August 2023.

Key Construction Works During the Reporting Period

1.4 The main works undertaken during the reporting period are as follows:

- Major activities in the reporting month:

a) Construction of village sewer;

b) Slope works;

c) Construction of ELS for Po Toi O Sewage Treatment Plant;

Summary of Exceedances, Investigation and Follow-up

1.5 There was no action or limit level exceedance record of construction noise and air quality was recorded in the reporting month.

Complaint Handling, Prosecution and Public Engagement

1.6 No complaints, notification of summons and successful prosecution was received in the reporting period. No public engagement activity was conducted in the reporting month.

1.7 No notification of summons and successful prosecution was received in the reporting period. No public engagement activity was conducted in the reporting month.

1.8 No air quality, noise and water complaints was received in the reporting month.

Reporting Change of EM&A Programme

1.9 No reporting change of the EM&A programme in this reporting month.

Future Key Issues

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

-Major activities in the upcoming month:

- Construction of village sewer;
- Slope works;
- Construction of ELS for Po Toi O Sewage Treatment Plant

2. INTRODUCTION

Project Information

2.1 Société Générale de Surveillance (SGS) Hong Kong Limited has been appointed by Drainage Services Department (DSD) as the Environmental Team (ET) to undertake the EM&A programme during construction phase of the Project in accordance to the approved EM&A Manual for the proposed sewerage works in Po Toi O (hereafter as "The Project"), an environmental enhancement project that aims to improve environmental hygiene of the Po Toi O area.

Project Background

2.2 Po Toi O is located in the southern part of Sai Kung District, next to Clear Water Bay. There is a small settlement called Po Toi O village around the bay. There is currently no public sewerage system for the village. Sewage and wastewater generated by local residents and local restaurants are treated by septic tanks/ soakaway system (STS).

2.3 Sewage works at Po Toi O comprise sewage collection, treatment and disposal facilities at Po Toi O under Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O.

2.4 The Project in Po Toi O mainly comprises of the following items:

a. Provision of village sewerage to the unsewered areas of Po Toi O. The works involve construction of about 800m of gravity sewers and 400m of rising mains;

b. Construction of a local sewage treatment plant (STP) with Average Dry Weather Flow (ADWF) of about 139m3/day; and

c. Construction of a submarine outfall of about 385m in length.

2.5 The Project consists of the following works, which are classified as Designated Projects under Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO):

a. Item Q.1 – A sewage treatment plant and portion of sewer alignments in a conservation area;

b. Item C.12 (a) (v) and (vii) – A dredging operation which is less than 500m from the nearest boundary of an existing fish culture zone and coastal protection area; and

c. Item F.6 – A submarine sewage outfall.

2.6 The Environmental Impact Assessment (EIA) Report "Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O" (Register No: AEIAR-206/2017) was approved on 27 January 2017. An Environmental Permit (EP) (Permit No.: EP-516/2016) was issued on 27 January 2017 and is the current permit for the Project. The EM&A programme of the Project shall be implemented in accordance with the requirements and procedures set out in the EM&A Manual and the Environmental Permit (EP) of the Project (Permit No.: EP-516/2016).

2.7 The air quality and noise baseline monitoring works were conducted from 23 December 2020 to 5 January 2021 and the water quality baseline monitoring work was conducted from 17 December 2020 to 12 January 2021. A Baseline Monitoring Report had been submitted to EPD on 10 March 2021.

Scope of Report

2.8 This is the 30th EM&A Report prepared by SGS for the Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O. This report summarized the monitoring results and audits findings of the EM&A programme under the EP of the Project and in accordance with the EM&A Manual during the reporting period of 1 August 2023 to 31 August 2023.

Project Organisation

2.9 The project organization structure is shown in **Appendix A**. The key personnel contact names and numbers are summarized in **Table 2-1**.

Table 2-1 Contact information of key personnel

Position	Party	Name	Telephone
Project Proponent	Drainage Services Department (DSD)	Mr. Gary Chung	2594 7227
Senior Resident Engineer (SRE)	Binnies Hong Kong Limited (Binnies)	Mr. Eugene Chan	6392 3809
Independent Environmental Checker (IEC)	Acuity Sustainability Consulting Limited (ASC)	Dr. F.C. Tsang	2698 8060
Environmental Team (ET)	Société Générale de Surveillance (SGS) Hong Kong Limited	Mr. Johnathan Ho	9236 5528
Environmental Officer	China Geo-engineering Corporation (CGC)	Mr. Terry Yuen	6175 5320

Construction Programme and Activities

2.10 The main works undertaken in the reporting period are as follows:

Major activities in the reporting month:

1. Construction of village sewer;

2. Slope works;

3. Construction of ELS for Po Toi O Sewage Treatment Plant;

The Construction Programme is shown in **Appendix B**. The general layout plan of the Project is shown in **Figure 2-1**.

3. AIR QUALITY

Monitoring Requirements

3.1 In accordance with the EM&A Manual, impact air quality monitoring shall be carried out throughout the construction period at all approved air quality monitoring locations (AMSs). 24- hours total suspended particles (TSP) monitoring shall be conducted at least once every 6 days. Meanwhile, 1-hour TSP monitoring shall be conducted at least 3 times every 6 days when the highest dust impact takes place. The Action and Limit levels for 1-hour and 24-hours TSP level are provided in **Table 3-1** and **Table 3-2.**

Table 3-1 Action and Limit Levels for 1-hour-TSP

Parameter	Air Quality Monitoring Station (AMSs)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
1-hr TSP ($\mu g/m^3$)	AMS1N	319	500$\mu g/m^3$
	AMS2N1	279	
	AMS3N	303	
	AMS4N	278	

Table 3-2 Action and Limit Levels for 24-hour-TSP

Parameter	Air Quality Monitoring Station (AMSs)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
24-hr TSP ($\mu g/m^3$)	AMS1N	153	260$\mu g/m^3$
	AMS2N1	179	
	AMS3N	158	
	AMS4N	144	

Monitoring Equipment

3.2 The 24-hour TSP air quality monitoring was performed using High Volume Air Samplers (HVS) at each of the designated monitoring stations. The HVS are calibrated by a HVS calibrator. Meanwhile 1-hour TSP air quality monitoring was performed using portable TSP monitors. The equipment used for air quality monitoring are given in **Table 3-3**.

Table 3-3 Equipment Used for Air Quality Monitoring

Air Quality Monitoring	Brand and Model of Equipment	Serial Number
24-hour TSP*	Graseby GMW High Volume Sampler	1180
		1174
		9795
		2483
	Tisch TE-5025A High Volume Sampler Calibrator	4128
1-hour TSP	Sibata LD-3B Portable TSP Monitors	014746
		155331
		597340
		597227

3.3 Meteorological information (such as the humidity, rainfall, air pressure and temperature etc.) were collected from Hong Kong Observatory (HKO)'s Weather Stations.

3.4 According to the approved EM&A Manual, wind data monitoring equipment shall be provided and setup for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

a. The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.

b. The wind data should be captured by a data logger. The data shall be downloaded for

analysis at least once a month.

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

d. Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.5 It is noted that after liaison with the Po Toi O resident's representative on 22 December 2020, the resident's representative has rejected the access to the space and power supply for ET to install the wind data monitoring stations. Therefore, ET had proposed the alternative method for wind data collection according to section 3.4.7 of EM&A Manual.

3.6 The alternative method for wind data collection was adopt the wind data information collected from the HKO's Waglan Island weather station as the representative wind data. Although there are other closer weather stations, Waglan Island Station was selected as it is the nearest weather station that measures wind data information mentioned above.

3.7 The meteorological data from HKO's Weather Station is given in **Appendix C**.

Monitoring Parameters, Frequency and Duration

3.8 The parameters, duration and frequency for air quality impact monitoring is given in Table 3-4. Monitoring stations AMS1N, AMS2N1, AMS3N and AMS4N were set up in accordance to the requirements for placement of equipment, as set out in section 3.5.3 of the EM&A manual of the Project. Locations of the alternative AMSs are given in **Figure 3-1.**

Table 3-4 Monitoring Parameters for Air Quality Monitoring

Identification no.	Location	Type of monitoring	Parameters	Frequency
AMS1N*	Footpath above House No. 28 Po Toi O Chuen Road	TSP	1-hr TSP 24-hr TSP	1-hour TSP: At least 3 times for 1- hour with every 6 days 24-hour TSP: Once every 6 days
AMS2N1*	Open space Approx. 15 m from Hung Shing Temple			
AMS3N*	Vacant land near Temporary Structure (House) Rocky Shore			
AMS4N*	Resting shelter near Seacrest Villas			

Notes:

*- Due to a number of limitations identified at the air quality monitoring stations in the Approved EM&A Manual for the Project, the monitoring location AMS1 – AMS4 were replaced by alternative monitoring location AMS1N – AMS4N, which were approved by ER and IEC.

Monitoring Methodology for 24-hour TSP Monitoring

3.9 The HVS was installed in the vicinity of the air quality monitoring stations. The following criteria were considered in the installation of the HVS:

a. A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.

b. The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.

c. A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler.

d. A minimum of 2 meters separation from any supporting structure, measured horizontally.

e. No furnace or incinerator flues nearby.

f. Airflow around the sampler was unrestricted.

g. Permission was obtained to set up the samplers and access to the monitoring stations.

h. A secured supply of electricity was obtained to operate the samplers.

i. The sampler was located more than 20 meters from any dripline.

j. Any wire fence and gate, required to protect the sampler, did not obstruct the monitoring process.

k. Flow control accuracy was kept within ±2.5% deviation over 24-hour sampling period.

3.10 The following procedures to be followed for the preparation of filter papers of the HVS:

a. Glass fibre filters, G810 were labelled and sufficient filters that were clean and without pinholes were selected.

b. All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ±3 °C; the relative humidity (RH) was < 50% and not variable by more than ±5%. A convenient working RH was 40%.

c. All filter papers were prepared and analysed by a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.

3.11 The following procedures are followed throughout air quality monitoring works:

a. The power supply was checked to ensure the HVS works properly.

b. The filter holder and the area surrounding the filter were cleaned.

c. The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.

d. The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.

e. The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.

f. Then the shelter lid was closed and was secured with the aluminum strip.

g. The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.

h. A new flow rate record sheet was set into the flow recorder.

i. On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around 1.1 m3 /min and complied with the range specified in the updated EM&A Manual (i.e., 0.6-1.7 m3 /min).

j. The programmable digital timer was set for a sampling period of 24 hrs, and the starting time, weather condition and the filter number were recorded.

k. The initial elapsed time was recorded.

l. At the end of sampling, on site temperature and atmospheric pressure readings were taken and the final flow rate of the HVS was checked and recorded.

m. The final elapsed time was recorded.

n. The sampled filter was removed carefully and folded in half-length so that only surfaces with collected particulate matter were in contact.

o. It was then placed in a clean plastic envelope and sealed.

p. All monitoring information was recorded on a standard data sheet.

3.12 The following procedures are followed for the maintenance and calibration of HVS:

a. The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.

b. 5-point calibration of the HVS was conducted using TE-5025A Calibration Kit prior to the commencement of monitoring. Bi-monthly 5-point calibration of the HVS will be carried out

during impact monitoring. The details for HVS calibration against the TE-5025A Calibration Kit is given in **Appendix D**.

Monitoring Methodology for 24-hour TSP Monitoring by Direct Reading Dust Meters

3.13 Since power supply for HVS for 24-hour TSP monitoring at alternative monitoring locations (i.e., AMS1N to AMS4N) were rejected, the use of direct reading dust meters is adopted to measure both 1-hour and 24-hour average TSP levels for the reporting month.

3.14 In accordance to Condition 3.1 of the Project's EP and Section 3.3 of the Project's EM&A Manual, the proposal for alternative monitoring equipment (i.e., direct reading dust meter) for TSP monitoring was approved by IEC and ER.

3.15 The measuring procedures of the direct reading dust meters are given in Section 3.5.10.

3.16 24 consecutive 1-hour TSP concentration measurement results is adopted for the evaluation of 24-hour TSP concentration. Results are manually logged daily, during daily maintenance of the dust meter. Calculation of the value of 24-hour TSP concentration is given by the average of 24 calculated 1-hour TSP concentration, where the calculated 1-hr TSP concentration is given by the product of the direct reading and the K-factor based on the correlation results between the direct reading meter and HVS. Details for the correlation methodology and correlation record are given in **Appendix D and Appendix E**.

3.17 HVS for 24-hr TSP monitoring will be adopted once secured supply of electricity becomes available for any agreed TSP monitoring locations.

Monitoring Methodology for 1-Hour TSP Monitoring

3.18 The measuring procedures of the direct reading dust meters were in accordance with the Manufacturer's Instruction Manual as follows:

a. Turn the power on.

b. Close the air collecting opening cover.

c. Push the "TIME SETTING" switch to [BG].

d. Push "START/STOP" switch to perform background measurement for 6 seconds.

e. Turn the knob at SENSI ADJ position to insert the light scattering plate.

f. Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.

g. Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.

h. Pull out the knob and return it to MEASURE position.

i. Push the "TIME SETTING" switch the time set in the display to 3 hours.

j. Lower down the air collection opening cover.

k. Push "START/STOP" switch to start measurement.

3.19 The following procedures are followed for the maintenance and calibration of direct reading dust meters:

a. The 1-hour TSP meter was calibrated at 1-year intervals against with high volume sampler.

b. Calibration certificates of the Laser Dust Monitors are provided in **Appendix D**. 1-hour validation checking of the TSP meter against HVS is carried out yearly at the air quality monitoring locations.

Monitoring Results and Observations

3.20 The schedule for environmental monitoring in the reporting period is provided in **Appendix F**.

3.21 The air quality monitoring results for 1-hour and 24-hour air quality monitoring are summarized in **Table 3-6** and **Table 3-7**. Air quality monitoring data and graphical presentation of the data are provided in **Appendix G**.

Table 3-6 1-hour Air Quality Monitoring Results in the Reporting Period

Parameter	Monitoring Station	Average (μg/m³)	Range (μg/m³)
1-hr TSP in μg/m³	AMS1N	53.1	27 – 84
	AMS2N1	62.9	30 – 113
	AMS3N	47.1	28 – 72
	AMS4N	48.7	29 – 73

Table 3-7 24-hour Air Quality Monitoring Results in the Reporting Period

Parameter	Monitoring Station	Average (μg/m³)	Range (μg/m³)
24-hr TSP in μg/m³	AMS1N	44.0	28 – 65
	AMS2N1	53.4	28 – 80
	AMS3N	41.6	25 – 60

	AMS4N	43.8	26 – 63

3.22 No Action or Limit Level exceedances of air quality were recorded in the reporting month. No air quality complaints between 0700 – 1900 hours on normal weekdays (i.e., Mondays to Saturdays) were received in the reporting month.

Other Influencing Factors of the Monitoring Results

3.23 Major emission sources during air quality monitoring in the reporting period were mainly vehicle emission from Po Toi O Chuen Road and nearby residents' activities.

3.24 The event and action plan for air quality monitoring are given in **Appendix H**.

4. NOISE

Monitoring Requirements

4.1 In accordance with the EM&A Manual, noise impact monitoring was conducted during daytime construction work on normal weekdays (0700-1900 hours between Monday to Saturday), 1 set of 30-min measurement shall be carried out at approved noise monitoring stations (NMSs) every week based on the measurement procedures under EPD's" Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites". The Action and Limit levels for construction noise monitoring is provided in **Table 4-1**.

Table 4-1 Action and Limit Levels for Construction Noise

NMSs ID	Noise Sensitive Receivers	Descriptions	Action Level	Limit Level
NMS1N	PTO_N1	Footpath Above House No. 28 Po Toi O Chuen Road	When one documented complaint is received from any one of the noise sensitive receivers	75 dB(A)*
NMS2N1	PTO_N2	Open Space Approx. 15 m from Hung Shing Temple		
NMS3N	PTO_N3	Vacant Land Near Temporary Structure (House) Rocky Shore		
NMS4N	PTO_N4	Resting Shelter Near Seacrest Villas		

Monitoring Equipment

4.2 Noise monitoring was completed using sound level meters at each NMSs. The sound levels meters deployed comply with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to calibrate the sound level meters at a given sound pressure level. The equipment used for noise impact monitoring is given in **Table 4-2**.

Table 4-2 Noise Monitoring Equipment

Equipment	Brand and Model	Serial No. /Equipment ID
Integrated Sound Level Meter	Rion NL-52	00264520

Acoustic Calibrator	NC-73	10196943
Acoustic Calibrator	GA607	038641
Anemometer	AZ Instrument – AZ 8908	1064869

Monitoring Locations

4.3 Due to the limitation posed by the approved monitoring stations set out by the EM&A manual, alternative monitoring stations NMS1N, NMS2N1, NMS3N and NMS4N were proposed in accordance to Section 4.5.3 of the EM&A Manual of the Project and approved from the ER and the IEC. The locations of the NMSs are given in **Figure 3-1**, and the details of the monitoring stations are illustrated in **Table 4-3**.

Table 4-3 Description of Proposed Noise Monitoring Locations

NMSs ID	Location	Type of measurement	Type of Monitoring	Duration
NMS1N*	Footpath above House No. 28 Po Toi O Chuen Road	Free-Field	Noise	30 mins
NMS2N1*	Open space approximately 15 m from Hung Shing Temple			30 mins
NMS3N*	Vacant land near Temporary Structure (House) Rocky Shore			30 mins
NMS4N*	Resting shelter near Seacrest Villas			30 mins

Notes:

*For Free-field measurement, a correction of +3dB(A) should be made to the measured results.

* Due to the limitation posed by the approved monitoring stations set out by the EM&A manual, four alternative representative Noise Quality Monitoring Stations (NMSs) are proposed. The alternative monitoring Locations were approved by ER and IEC.

Monitoring Parameters and Frequency

4.4 The monitoring parameters, frequency and duration of impact noise monitoring are summarized in **Table 4-4**.

Table 4-4 Parameters for Noise Impact Monitoring

Parameter and Duration	Frequency
30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays. L_{eq}, L_{10} and L_{90} would be recorded	At least once per week

Monitoring Methodology

4.5 The measuring procedures of the sound level meter were in accordance with the Manufacturer's Instruction Manual as follows:

a. Free-field measurement was made for the noise monitoring stations.
b. The sound level meter was set on a tripod at a height of 1.2 m above the ground.
c. The battery condition was checked to ensure the correct functioning of the meter.
d. Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
   i. frequency weighting: A
   ii. Time weighting: Fast
   iii. Time measurement: Leq(30-minutes) during non-restricted hours i.e., 07:00 – 1900 on normal weekdays; Leq(5-minutes) during restricted hours i.e., 19:00 23:00 and 23:00 – 07:00 of normal weekdays, whole day of Sundays and Public Holidays
e. Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator at a specified sound pressure level at a specified frequency. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
f. During the monitoring period, the Leq, L10 and L90 were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
g. Noise measurement was paused during periods of high intrusive noise (e.g., dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
h. Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind with gusts exceeding 10m/s.

4.6 The following procedures are followed for the maintenance and calibration of sound level meters:

a. The microphone head of the sound level meter was cleaned with soft cloth at regular
b. intervals.
c. The meter and calibrator were sent to the supplier or HOKLAS laboratory to check
d. and calibrate at yearly intervals.
e. Calibration certificates of the sound level meters, and acoustic calibrators are provided in **Appendix I.**

Monitoring Results and Observations

4.7 The schedule for environmental monitoring in the reporting period is provided in **Appendix F**.

4.8 The monitoring results for construction noise are summarized in **Table 4-5**. The noise monitoring data graphical presentation of the data is provided in **Appendix J**.

Table 4-5 Summary of Construction Noise Monitoring Results in the Reporting Period

NMSs ID	Construction Noise Level, dB(A)*, Leq (30 min)	Baseline Level, dB(A)	Limit Level, db(A)
NMS1N	64.3 dB(A)	62.7 dB(A)	75
NMS2N1	61.6 dB(A)	61.8 dB(A)	75
NMS3N	58.9 dB(A)	64.6 dB(A)	75
NMS4N	53.7 dB(A)	58.1 dB(A)	75

Note:

*- A correction of +3 dB(A) was made to the free field measurements. Leq (30min) was measured at 0700-1900 hours on normal weekdays.

4.9 No Action or Limit Level exceedance of construction noise was recorded in the reporting month.

4.10 No noise complaints from between 0700 – 1900 hours on normal weekdays was received in the reporting month.

4.11 The event and action plan are provided in **Appendix H**.

Other Influencing Factors of the Monitoring Results

4.12 Major noise sources during noise monitoring in the reporting period were mainly road traffic noise.

5. WATER QUALITY

Monitoring Requirements

5.1 With the recommendations of the Project's EIA report, water quality impact monitoring shall be carried out carried out 3 days per week, at mid-flood and mid-ebb tides (within ± 1.75 hour of the predicted time required) at all the approved Water Quality Monitoring Stations (WQMSs) during whole cofferdam installation/extraction work and during dredging works. The interval between two sets of monitoring shall not be less than 36 hours.

5.2 Replicate in-situ measurements of Suspended Solids (SS) and in-situ water quality data (temperature, pH, turbidity, water depth, salinity, dissolved oxygen and percentage of saturation) shall be collected.

5.3 Other relevant data should also be recorded, including monitoring location/position, time, tidal stages, weather conditions and any special observation or works that may affect the monitoring results in the vicinity.

5.4 To ensure sufficient data for robust analysis, duplicate in-situ data shall be collected. In case the difference in the duplicate in-situ measurement results is larger than 25%, the third set of in-situ measurement shall be carried out for result confirmation purpose.

5.5 Water samples shall be extracted at 1m below surface, 1m above seabed and the mid-depth level at where the water depth is at least 6m. However, if the water depth is less than 3m, water samples shall only be collected at the mid-depth level. For stations with depth less than 6m, the mid-depth sample can be omitted.

5.6 In addition, duplicated water samples for suspended solid analysis shall be collected at all the above stations and delivered to the HOKLAS accredited laboratory for analysis. Results for suspended solids shall be received back from the laboratory within 24-hour of the receipt of the samples.

5.7 Water quality impact monitoring shall also be conducted at the same frequency as monitoring throughout the whole cofferdam installation/extraction work and during dredging work. In case of exceedance of Action/Limit Level recorded, the frequency of water quality monitoring shall be increased as per the Event and Action Plan.

5.8 The water quality impact monitoring schedule shall be issued to IEC at least one month prior to the commencement of Impact Monitoring.

Monitoring Parameters and Frequency

5.9 The monitoring parameters, monitoring periods and frequencies of the water quality monitoring are summarized in **Table 5-1**.

Table 5-1 Parameters of Water Quality Monitoring

Parameters	Duration	Frequency
Temperature (Oc)	During Construction Phase: Throughout Installation And Extraction Of Cofferdam; And During Dredging	3 Days Per Week (The Interval Between Two Sets of Monitoring Shall Not Be Less Than 36 Hours.)
Ph (Ph Unit)		
Turbidity (Ntu)		
Water Depth (M)		
Salinity (Ppt)		
Do (Mg/L And % Of Saturation)		
SS (Mg/L)		

Monitoring Locations

5.10 According to section 5.2.6 of the EM&A manual of the project, 6 water quality monitoring stations (WMSs) are proposed at the Po Toi O FCZs, major amphioxus habitats and rocky shores where coral thrives. With reference to the tidal characteristics of Po Toi O Bay, 3 control stations are proposed where fresh marine water is not affected by the cofferdam installation/ extraction works, and 2 impact stations are proposed near the cofferdam under different tidal periods. All water quality monitoring stations show as **Figure 5-1** and **Table 5-2**.

Table 5-2 Summary of Water Quality Impact Monitoring Stations

Station	Monitoring period	Description	Easting	Northing
*WMS1N	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848416	845209
*WMS2N	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848505	815375
WMS3	Mid-Ebb, Mid-Flood	Rocky Shore with Corals	848644	815391
WMS4	Mid-Ebb, Mid-Flood	Rocky Shore with Corals	848774	815602
WMS5	Mid-Ebb, Mid-Flood	Rocky Shore with Corals	848578	815591
WMS6	Mid-Ebb, Mid-Flood	Major Amphioxus Habitat	848639	815523
I1	Mid-Flood	Impact monitoring Station	848643	815692
I2	Mid-Ebb	Impact monitoring Station	848722	815910
C1	Mid-Flood	Control station	848904	816052
C2	Mid-Ebb	Control station	848529	815373
C3	Mid-Ebb	Control station	848243	815710
WMS1	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848387	815201
WMS2	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848479	815378

Notes:

**WMS1N, WMS2N are new proposed alterative monitoring location. As previous EIA proposed monitoring location WMS1, WMS2 are situated in fish barges within the Fish Culture Zone (FCZ), and accesses to WMS1 and WMS2 were subsequently denied by the tenants of the fish barges. The relocation of WMS1 and WMS2 were approved by IEC and the ER of the Project.*

Results and Observations

5.11 According to submission of construction works schedule and location plan under the EP of Project, the proposed period of commencement construction work with cofferdam installation / extraction work and during dredging works is October 2023.

5.12 Marine construction was not commenced within the reporting month; hence no water quality monitoring was conducted.

5.13 Refer to Sections 5.2.10 and 5.2.11 of approved EM&A Manual, construction phase site inspection for water quality mitigation measures and check the contractor's work practice on water pollution prevention during construction phase has been conducted during weekly site audit.

5.14 During the weekly site audit of this reporting month, no non-conformance water pollution was identified / observed in the commencement works area.

6. WASTE MANAGEMENT

6.1 As advised by the Contractor, 96 m^3 of inert C&D material was generated in the reporting month. For C&D wastes, 0 m^3 of general refuse was disposed of at NENT landfill, 0 kg waste were collected by recycling contractors, and 0 kg of chemical wastes was collected by licensed Contractors in the reporting period.

6.2 The actual amounts of different types of waste generated by the activities of the Project in the reporting period are shown in **Table 6-3**, the detailed monthly summary of waste flow is detailed in **Appendix K**.

Table 6-3 Summary of Waste Flow Table

Waste Type	Quantity	Disposal/ Reuse Locations
Inert C&D Waste Disposed as Public Fill	96 m^3	Tseung Kwan O Area 137 Fill Bank (TKO137FB).
C&D Wastes Disposed as General Refuse	0 m^3	North East New Territories (NENT)
Recycle Materials	0 kg	Recycling Facilities
General Refuse	0 kg	North East New Territories (NENT)
Chemical Waste	0 kg	Licensed Contractors

6.3 During regular site auditing, the mitigation measures proposed in the Implementation Schedule of the Environmental Mitigation Measures (EMIS) in the approved EIA report of the Project has been effectively implemented in the commenced works area. No adverse waste impact was observed from the construction works in reporting month.

7. ENVIRONMENTAL SITE INSPECTION AND AUDIT

Site Inspection

7.1 Site inspections were carried out by ET on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. Key observations were recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary.

7.2 In the reporting period, 5 site inspections were carried out on 3, 10, 17, 23 and 29 August 2023. No noncompliance was recorded during the site inspection. Details of observations recorded during the site inspections are presented in **Table 7-1**.

Table 7-1 Observations and Recommendations in the Reporting Month

Date	Parameters	Observations and Recommendations	Action was taken by the contractor
3 August 2023	Water Quality	**Reminder** **Reminder 1**: The Contractor is reminded to maintain the catch pit at a regular basis to ensure seepage is stored properly and prevent direct discharge.	**Follow up Reminder** **Item 1:** The contractor has filled cement to the periphery of the U-channel to avoid discharge. **(Item Closed)**
10 August 2023	Water Quality	**Observation** **Observation 1**: The Contractor was informed to store and treat runoff after rainfall events with appropriate water treatment facilities before discharging at the discharge point.	**Follow up Observation** **Item 1:** The Contractor has installed a pipe to collect rainwater separately to avoid mixing with debris when passing through the works area. **(Item Closed)**
17 August 2023	Water Quality/Waste Management	**Observation** **Observation 1**: The Contractor was informed to store and treat runoff after rainfall events with appropriate water treatment facilities before discharging at the discharge point. **(Repeated)**	**Follow up Observation** **Item 1:** The Contractor has installed a pipe to collect rainwater separately to avoid mixing with debris when passing through the works area. **(Item Closed)**

Date	Parameters	Observations and Recommendations	Action was taken by the contractor
		Observation 2: According to the approved EP condition 2.13 – Silt Curtain & Cofferdam Deployment Plan (Issue 7) – Section 2.5, the contractor was reminded to update the Visual Inspection checklist for silt curtain on a weekly basis. **Reminder** **Reminder 1**: Environmental Permit is found missing at the workstation. The Contractor is reminded to ensure the Environmental Permit is affixed at every workstation of the site.	**Item 2**: The visual inspection checklist for silt curtain has been updated. **(Item Closed)** **Follow Up Reminder** **Item 1**: The environmental permit has been affixed at the workstations. **(Item Closed)**
23 August 2023		**Observation** **Observation 1**: The Contractor was informed to store and treat runoff after rainfall events with appropriate water treatment facilities before discharging at the discharge point. **(Repeated)** **Reminder** **Reminder 1**: Environmental Permit is found missing at the workstation. The Contractor is reminded to ensure the Environmental Permit is affixed at every workstation of the site. **(Repeated)**	**Follow up Observation** **Item 1**: The Contractor has installed a pipe to collect rainwater separately to avoid mixing with debris when passing through the works area. **(Item Closed)** **Follow Up Reminder** **Item 1**: The environmental permit has been affixed at the workstations. **(Item Closed)**
29 August 2023	N/A	No particular findings during inspection	N/A

No adverse observation was identified in the reporting period.	Noise Impact
No adverse observation was identified in the reporting period.	Ecology
No adverse observation was identified in the reporting period.	Fisheries
No adverse observation was identified in the reporting period.	Built Heritage

Date	Parameters	Observations and Recommendations	Action was taken by the contractor
No adverse observation was identified in the reporting period.		Landscape and Visual Impact	
No adverse observation was identified in the reporting period.		Miscellaneous	

Status of Environmental Licenses, Notification and Permits

7.3 The environmental licenses and permits for the Project and valid in the reporting period are summarized in **Table 7-3**.

Table 7-3 Status of Environmental License, Notification and Permit

License/ Notification/ Permit	Reference No.	Valid Period	
		From	To
Environmental Permit	EP-516/2016	27 January 2017	End of Project
Construction Dust Notification Under APCO	458613	3 August 2020	N/A
Wastewater Discharge License	WT00038707-2021	3 November 2021	31 August 2026
Chemical Waste Producer Registration	5213-820-C3510-18	23 September 2020	N/A
Billing Account for Disposal of Construction Waste	WFG22785	17 August 2020	N/A

Implementation Status on Environmental Protection Requirements

7.4 The Implementation Schedule of the Environmental Mitigation Measures (EMIS) of the reporting period is summarized in **Appendix L**. The implementation of the key mitigation measures during the reporting period is presented in **Appendix M**.

Summary of Complaints, Notification of Summons, Successful Prosecutions and Public Engagement Activities

7.5 No complaints, notification of summons and successful prosecution was received in the reporting

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

7.6 Statistics on complaints, notifications of summons, successful prosecutions and public engagement activities are summarized in **Appendix N**.

8. FUTURE KEY ISSUES

CONSTRUCTION PROGRAMME FOR THE UPCOMING REPORTING MONTH

8.1 Major activities in the upcoming month:

a. Construction of village sewer;

b. Slope works.

c. Construction of ELS for Po Toi O Sewage Treatment Plant

Reinstatement Works Key Issues for the Upcoming Reporting Month

8.2 Potential environmental impacts due to the construction activities, including air quality, noise, water quality, waste, landscape and visual, will be monitored or reviewed. The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement. The recommended environmental mitigation measures shall be implemented on site and regular inspections as required will be carried out to ensure that the environmental conditions are acceptable.

8.3 The anticipated impact of major work activities within the site and the recommended mitigation measures are shown in **Appendix M**.

Monitoring Schedule for the Coming Month

8.4 The tentative schedule for environmental monitoring in September 2023 is provided in **Appendix F**.

9. CONCLUSION

General

9.1 This Report Summarized the Monitoring Results and Audits Findings of the EM&A Programme Under the EP of The Project and In Accordance with the EM&A Manual During the Reporting Period of 1 August 2023 to 31 August 2023.

Environmental Impact Monitoring

9.2 No Action or Limit Level exceedance of construction air quality, noise was recorded in the reporting month. No air quality complaints and noise complaints were received in the reporting month.

Environmental Site Inspections

9.3 The environmental site inspections were carried out in the reporting month. Recommendations on remedial actions were given to the contractors for the deficiencies identified during the site inspection. The contractor had been follow-up the recommendations on the remedial action accordingly.

Complaint Log

9.4 There was no complaint received in relation to the environmental impact during the reporting period.

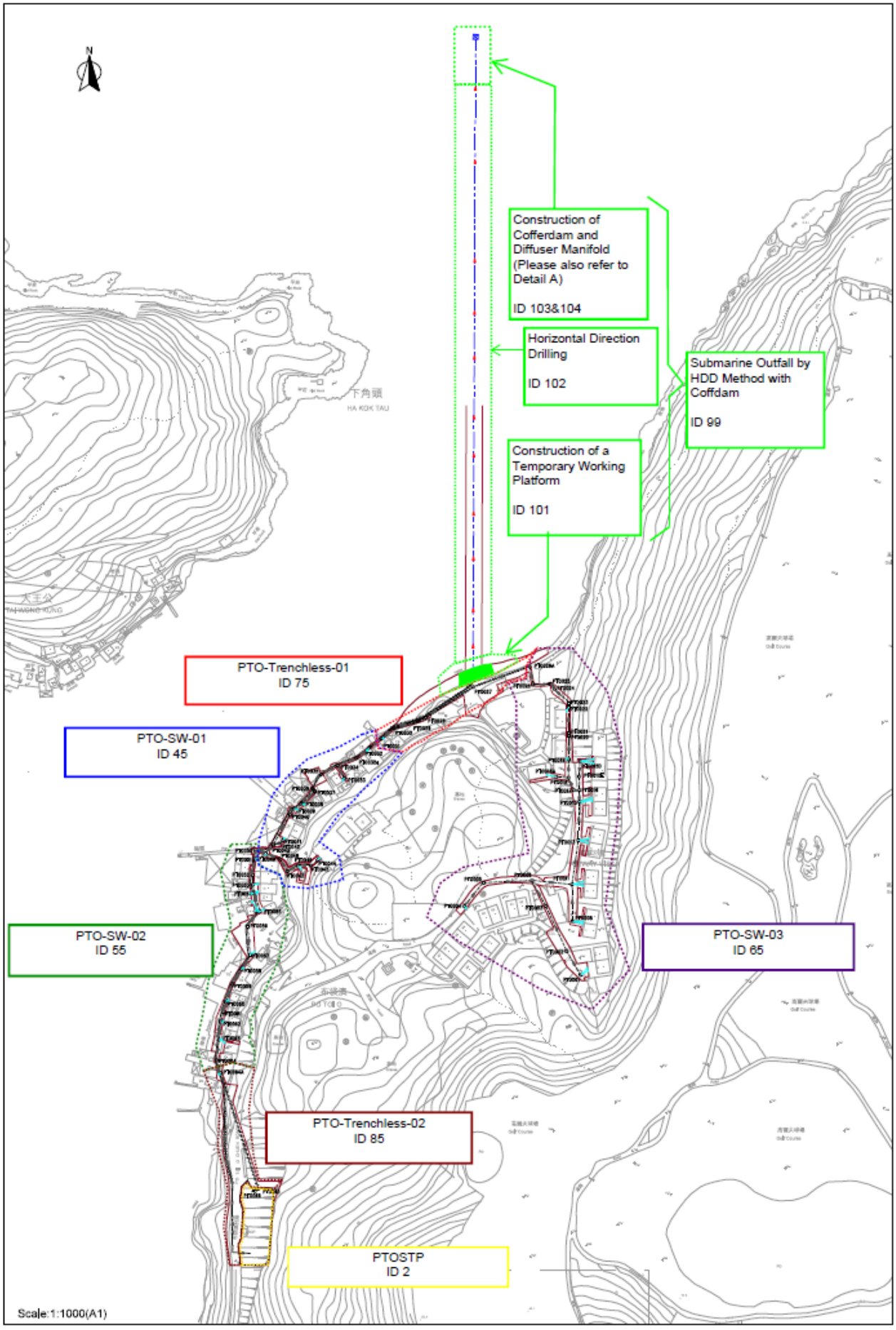
Reporting Changes

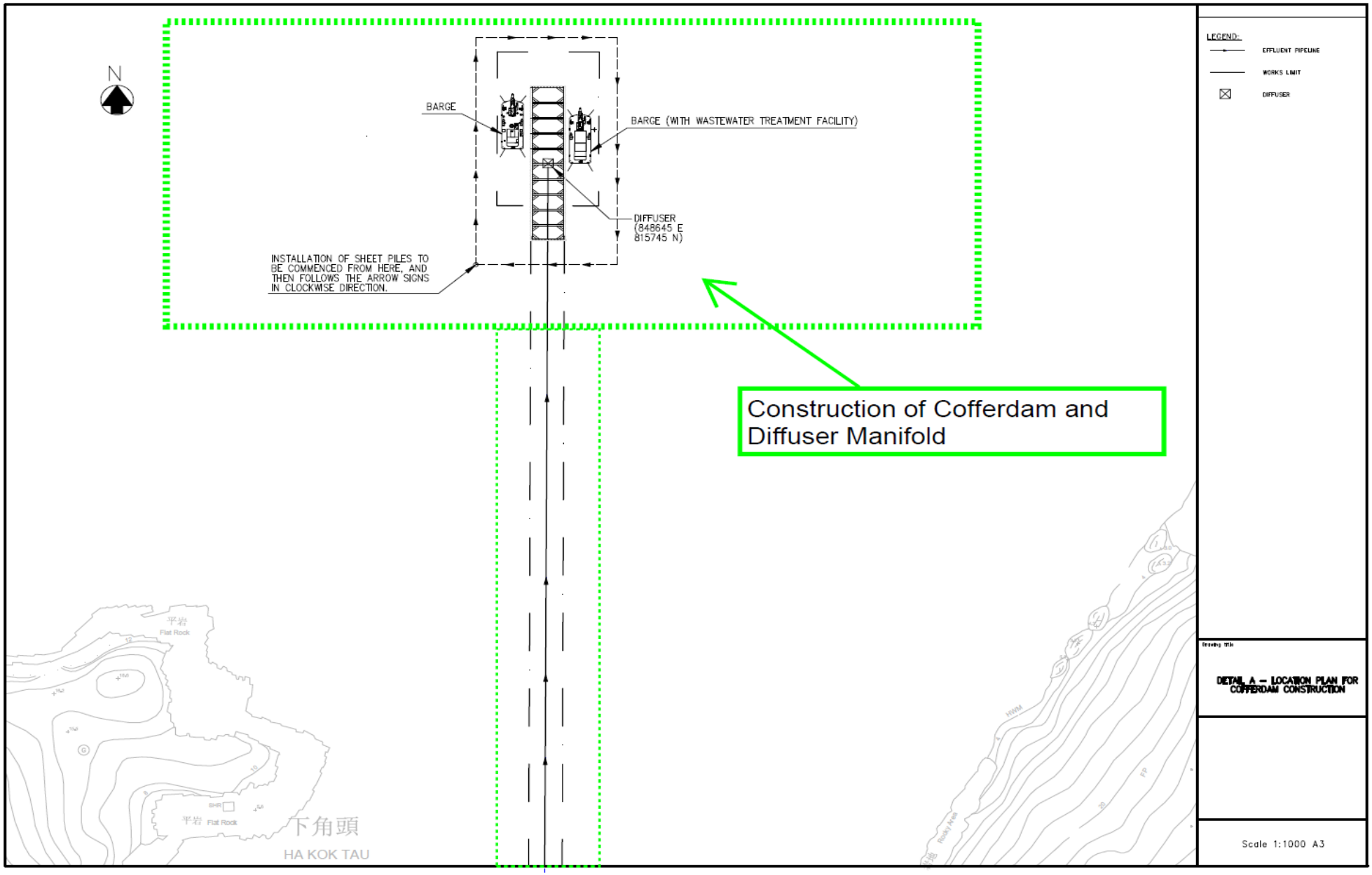
9.5 No report changes in this reporting period.

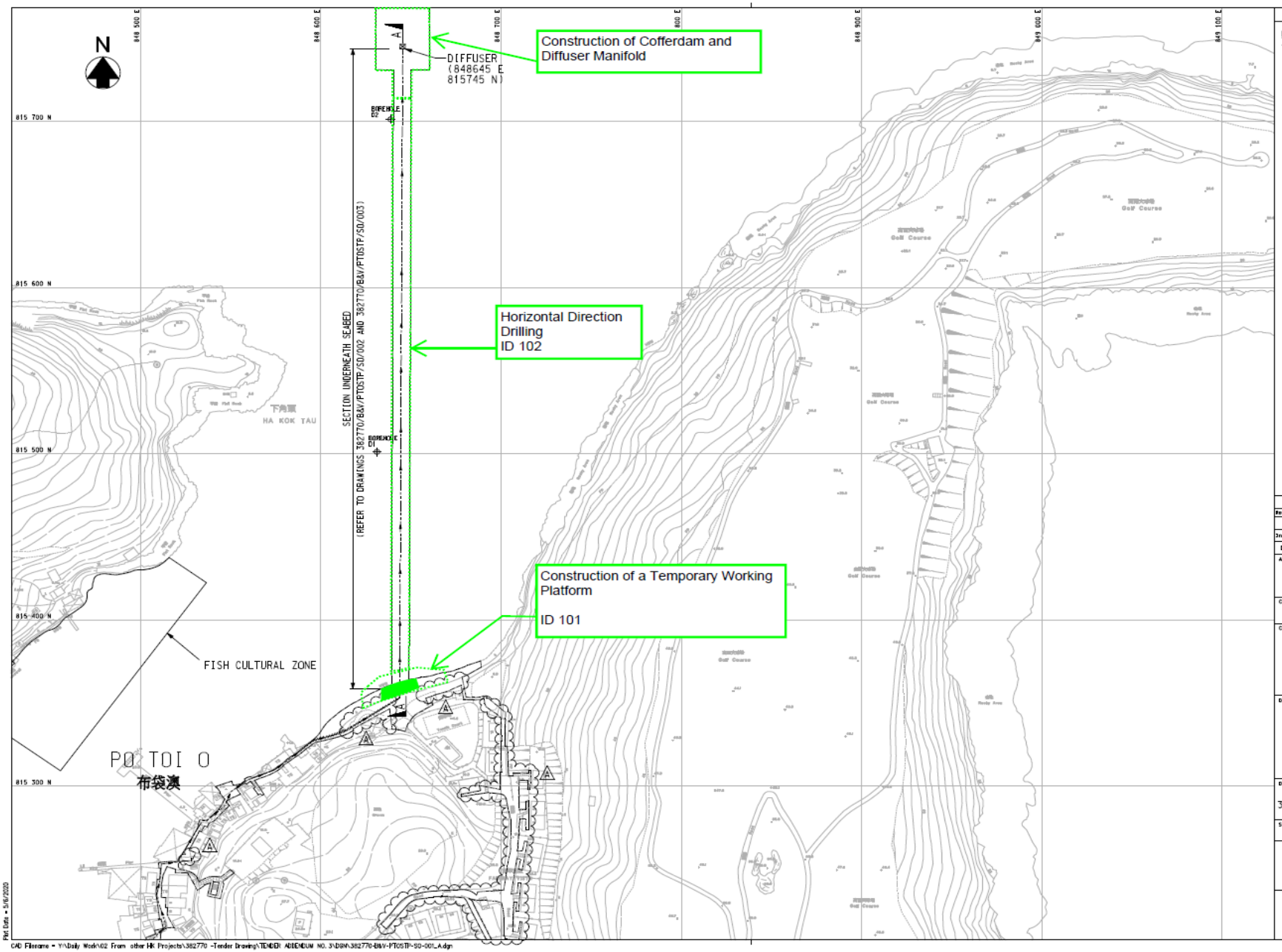
Notifications of Summons and Successful Prosecutions

9.6 There was no notification of summons and successful prosecution was received in the reporting period.

FIGURE 2-1 – LAYOUT PLAN OF THE CAPTIONED PROJECT


Construction of Cofferdam and Diffuser Manifold (Please also refer to Detail A)
ID 103&104
Horizontal Direction Drilling
ID 102
Submarine Outfall by HDD Method with Coffdam
ID 99
Construction of a Temporary Working Platform
ID 101
PTO-Trenchless-01
ID 75
PTO-SW-01
ID 45
PTO-SW-02
ID 55
PTO-SW-03
ID 65
PTO-Trenchless-02
ID 85
PTOSTP
ID 2
Scale:1:1000(A1)


N
BARGE
BARGE (WITH WASTEWATER TREATMENT FACILITY)
DIFFUSER
(848645 E
815745 N)
INSTALLATION OF SHEET PILES TO BE COMMENCED FROM HERE, AND THEN FOLLOWS THE ARROW SIGNS IN CLOCKWISE DIRECTION.
Construction of Cofferdam and Diffuser Manifold
LEGEND:
EFFLUENT PIPELINE
WORKS LIMIT
DIFFUSER
DETAIL A – LOCATION PLAN FOR COFFERDAM CONSTRUCTION
Scale 1:1000 A3
平岩
Flat Rock
下角頭
HA KOK TAU
HWM



NOTE:
1. FOR GENERAL NOTES, REFER TO 382770/B&V/GN/000.

LEGEND:
- EFFLUENT PIPELINE
- FINAL EFFLUENT PIPELINE BY TRENCHLESS METHOD
- WORKS LIMIT

Revision	Date	Description	Initial
A	05/20	TENDER ADDENDUM NO.3	HN

	Designed	Checked	Drawn	Checked
Initial	WC	WL	SZ	CC
Date	03/20	03/20	03/20	03/20

Approved

Contract no.: DC/2019/09

Contract title: PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

Drawing title: PO TOI O – PROPOSED SUBMARINE OUTFALL LAYOUT PLAN

Drawing no.: 382770/B&V/PTOSTP/SD/001 Revision: A

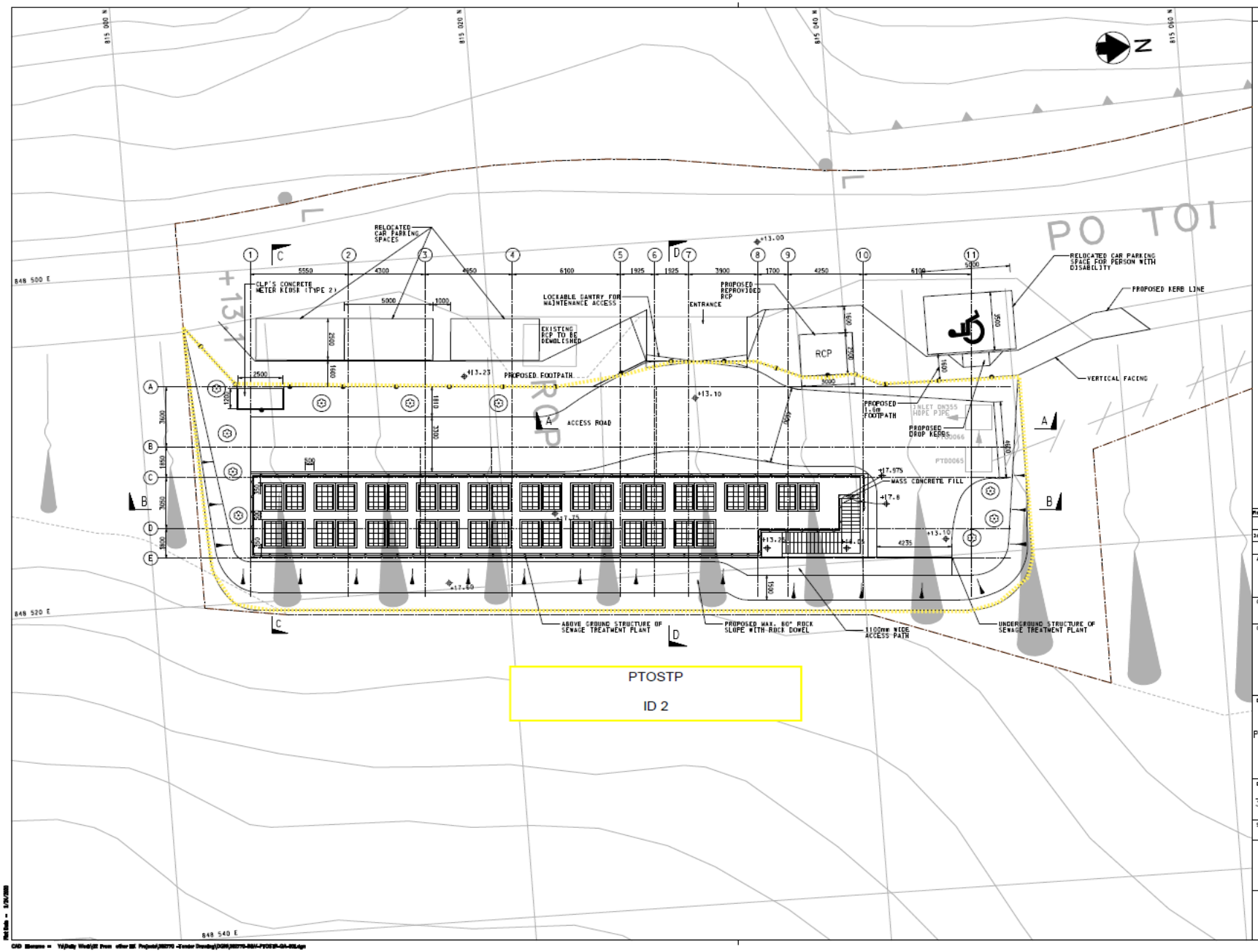
Scale: A1 1 : 1000, A3 1 : 2000

香港特別行政區政府渠務署
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

BLACK & VEATCH HONG KONG LIMITED 萬邦工程顧問有限公司

Plot Date = 5/6/2020

CAD Filename = Y:\Daily Work\02 From other HK Projects\382770 -Tender Drawing\TENDER ADDENDUM NO. 3\DGN\382770-B&V-PTOSTP-SD-001_A.dgn



PTOSTP

ID 2

NOTES:

1. FOR OTHER NOTES AND LEGEND, REFER TO DRAWING NO. 382770/B&V/GN/000.
2. ALL LEVELS ARE IN METERS ABOVE PRINCIPAL DATUM (mPD).
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

LEGEND:

- PROPOSED 2m HEIGHT FENCE WALL
- PROPOSED TREE
- PROPOSED CUT SLOPE
- BOUNDARY FENCE (REFER TO ARCHITECTURAL DRAWINGS FOR THE TYPES AND DETAILS)
- WORKS LIMIT
- STAINLESS STEEL RAILINGS

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	WC	WL	SZ		CC
Date	03/20	03/20	03/20		03/20

Approved

Contract no.

DC/2019/09

Contract title

PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

Drawing title

GENERAL ARRAGEMENT OF PO TOI O SEWAGE TREATMENT PLANT - GENERAL LAYOUT

Drawing no.	Revision
382770/B&V/PTOSTP/GA/001	-

Scale

A1 1 : 100
A3 1 : 200

香港特別行政區政府渠務署
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

BLACK & VEATCH HONG KONG LIMITED

FIGURE 3–1 PROPOSED AIR QUALITY AND NOISE MONITORING STATIONS LOCATIONS

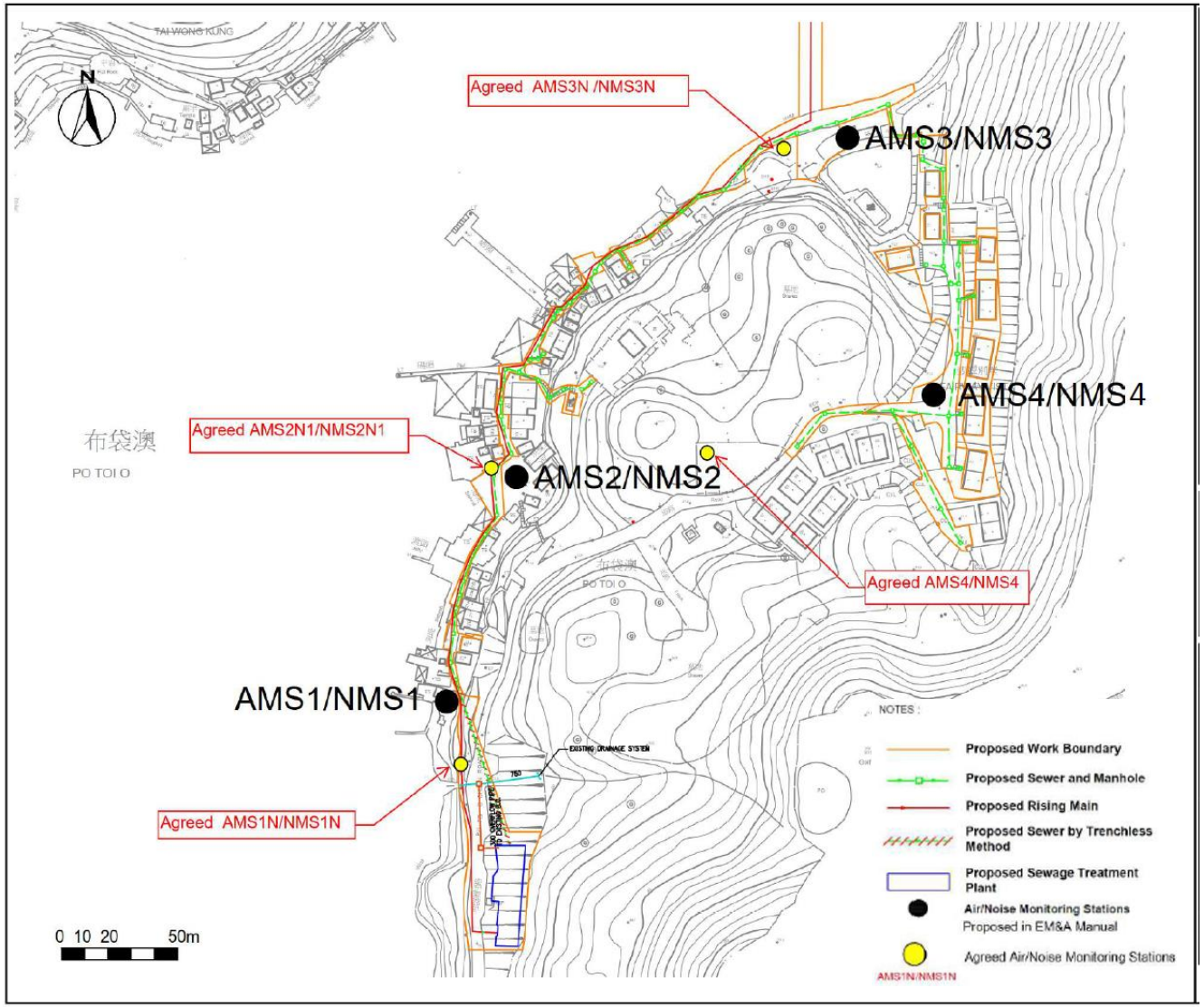
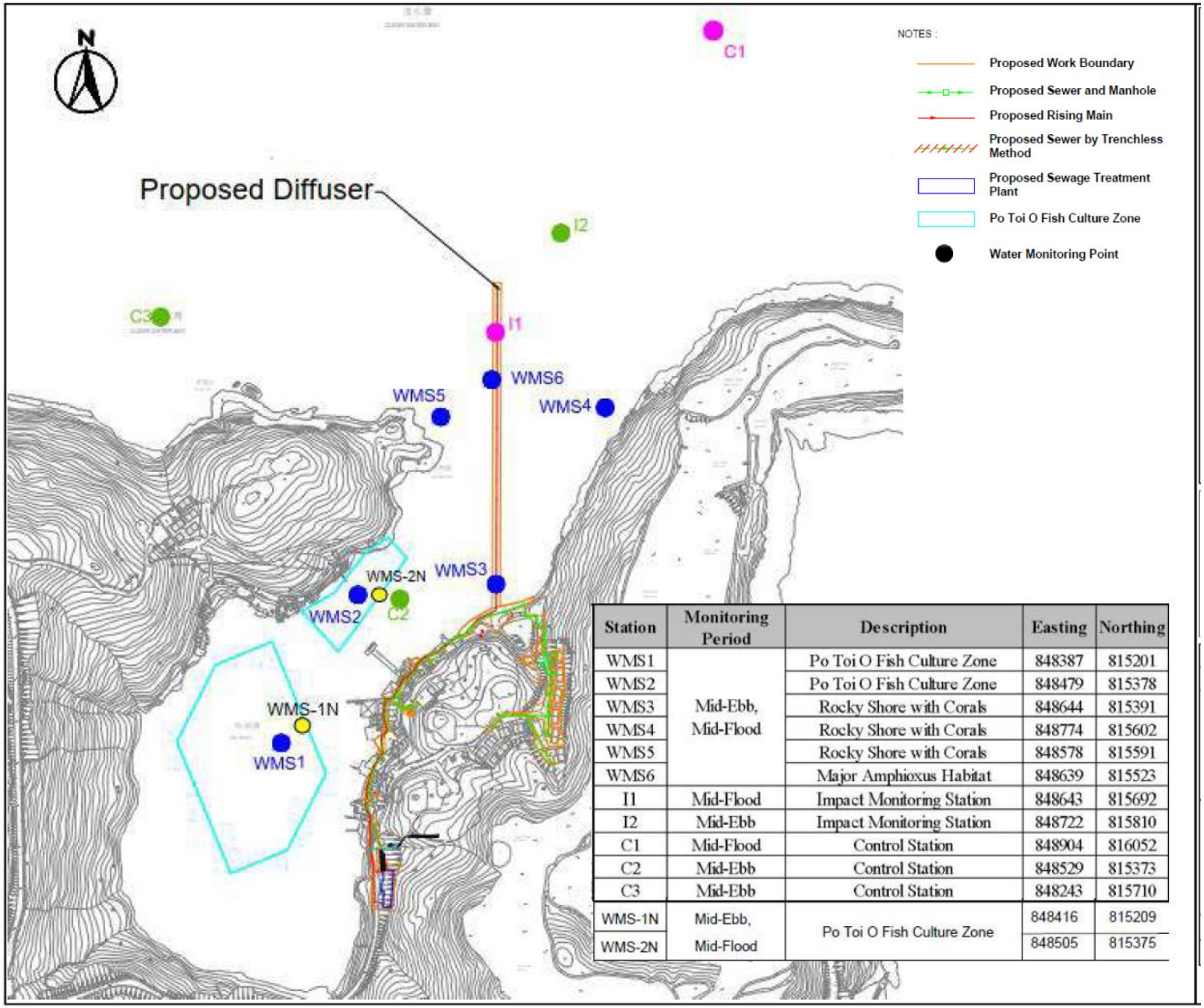
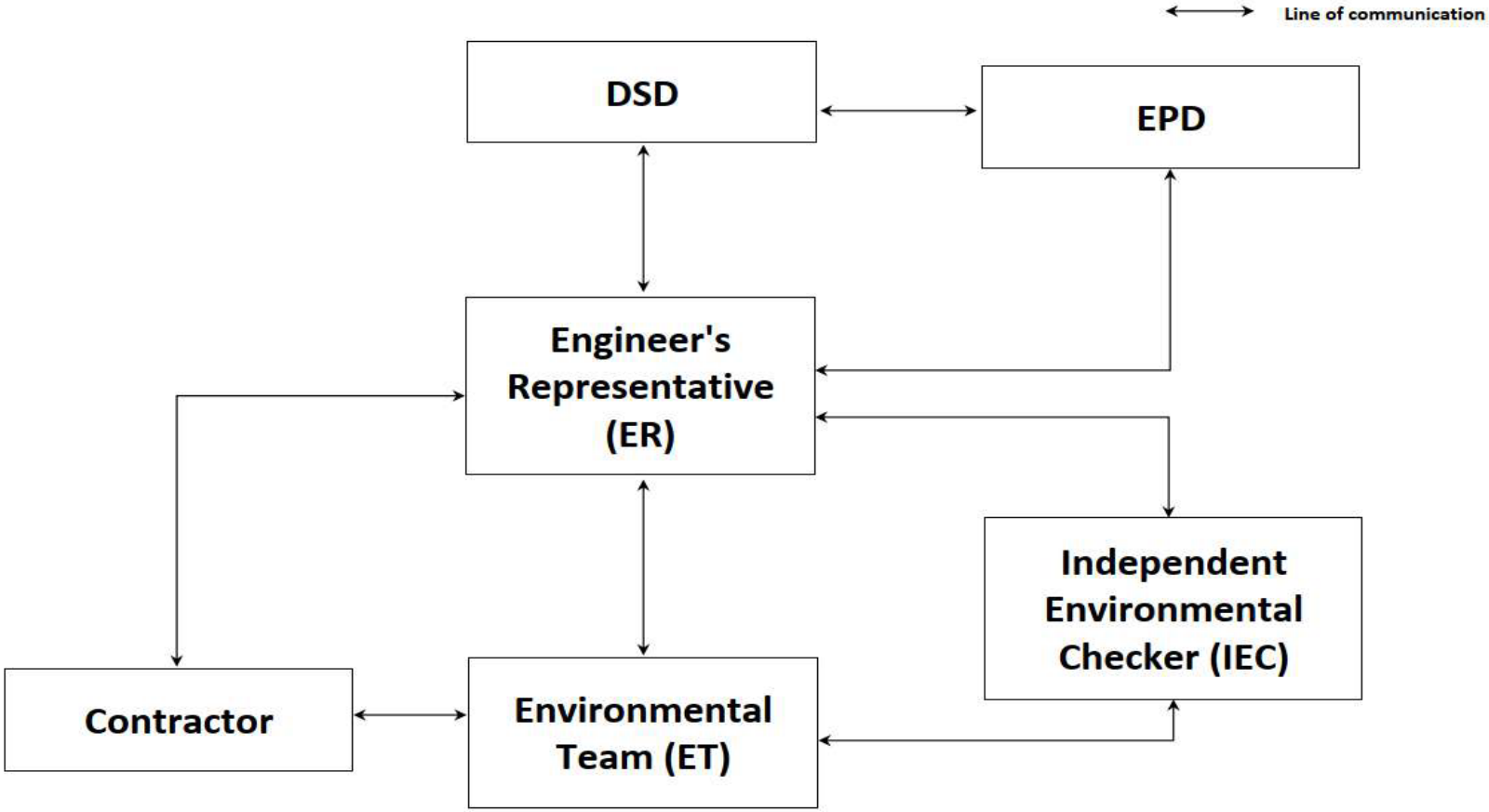

TAI WONG KUNG
N
Agreed AMS3N /NMS3N
AMS3/NMS3
AMS4/NMS4
布袋澳
PO TOI O
Agreed AMS2N1/NMS2N1
AMS2/NMS2
Agreed AMS4/NMS4
AMS1/NMS1
Agreed AMS1N/NMS1N
NOTES :
Proposed Work Boundary
Proposed Sewer and Manhole
Proposed Rising Main
Proposed Sewer by Trenchless Method
Proposed Sewage Treatment Plant
Air/Noise Monitoring Stations Proposed in EM&A Manual
Agreed Air/Noise Monitoring Stations
AMS1N/NMS1N
0 10 20 50m

FIGURE 5–1 LOCATIONS OF WATER QUALITY IMPACT MONITORING STATIONS



Station	Monitoring Period	Description	Easting	Northing
WMS1	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848387	815201
WMS2		Po Toi O Fish Culture Zone	848479	815378
WMS3		Rocky Shore with Corals	848644	815391
WMS4		Rocky Shore with Corals	848774	815602
WMS5		Rocky Shore with Corals	848578	815591
WMS6		Major Amphioxus Habitat	848639	815523
I1	Mid-Flood	Impact Monitoring Station	848643	815692
I2	Mid-Ebb	Impact Monitoring Station	848722	815810
C1	Mid-Flood	Control Station	848904	816052
C2	Mid-Ebb	Control Station	848529	815373
C3	Mid-Ebb	Control Station	848243	815710
WMS-1N	Mid-Ebb, Mid-Flood	Po Toi O Fish Culture Zone	848416	815209
WMS-2N			848505	815375

APPENDIX A – PROJECT ORGANIZATION CHART

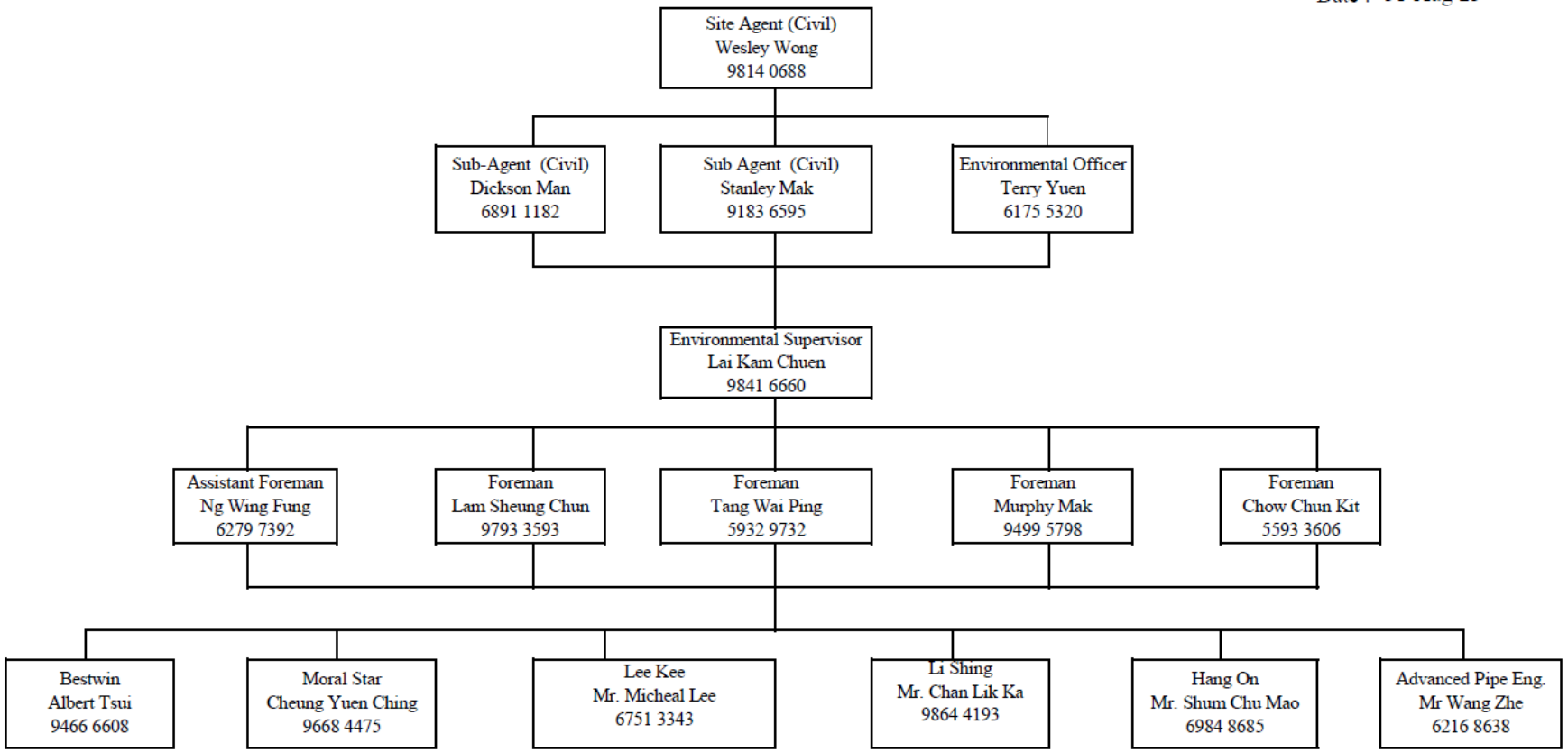

Line of communication
DSD
EPD
Engineer's Representative (ER)
Independent Environmental Checker (IEC)
Contractor
Environmental Team (ET)

Contract No. : DC/2019/09

Provision of Village Sewerage in Sai Kung

Environmental Organization Chart

Revision : Rev. 37
Date : 31-Aug-23



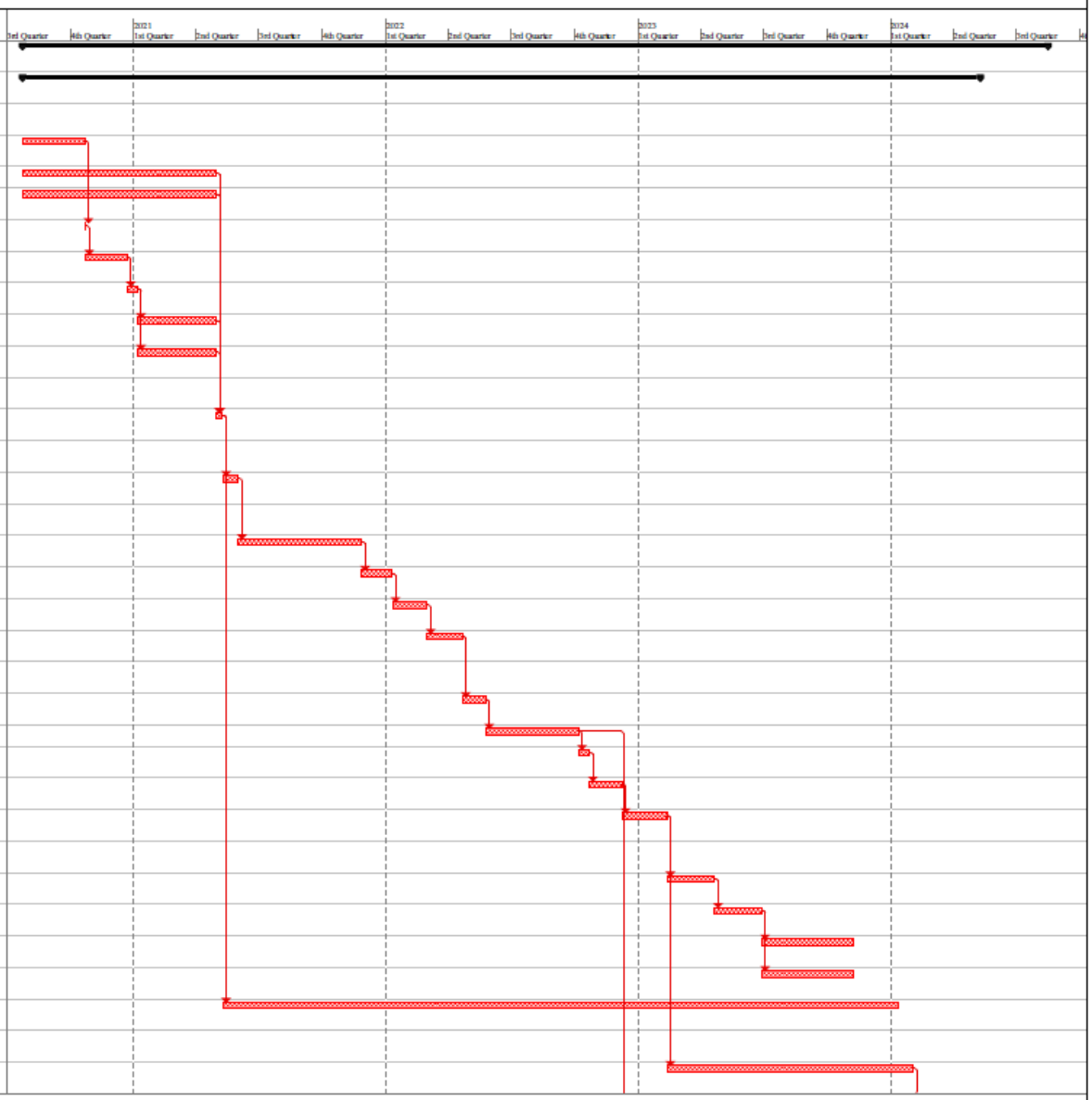
APPENDIX B – CONSTRUCTION PROGRAMME

Project: Provision of Village Sewerage in Sai Kung

Drainage Services Department of HKSAR
Provision of Village Sewerage in Sai Kung
Contract No: DC/2019/09

Date: June 2023

ID	Task Name	Duration	Starting Date	Percentage of Completion	Completion Date
1	**Section 2 - Village Sewerage Works at Po Toi O and PTOSTP**	**1209 days**	**Fri 24/7/20**	**0%**	**Thu 15/8/24**
2	**Po Toi O Sewage Treatment Plant (PTOSTP)**	**1128 days**	**Fri 24/7/20**	**0%**	**Thu 9/5/24**
3					
4	Liaise with the village representative works to ensure the possession of construction site	75 days	Fri 24/7/20	0%	Wed 21/10/20
5	Preparation works (i.e. TMLG meetings; Application for traffic advise for suspension of existing parking slot; Re-provision of existing RCP, etc.)	231 days	Fri 24/7/20	0%	Thu 29/4/21
6	Environmental submissions	231 days	Fri 24/7/20	0%	Thu 29/4/21
7	Possession of site (Access Date: 22nd October 2020)	1 day	Thu 22/10/20	0%	Thu 22/10/20
8	Installation of site hoardings at PTOSTP	50 days	Fri 23/10/20	0%	Mon 21/12/20
9	Mobilization of plant and equipment	10 days	Tue 22/12/20	0%	Tue 5/1/21
10	Site clearance	95 days	Wed 6/1/21	0%	Thu 29/4/21
11	Initial survey, UU detection and permit-to-dig	95 days	Wed 6/1/21	0%	Thu 29/4/21
12					
13	Preparation for geotechnical submissions	7 days	Fri 30/4/21	0%	Sat 8/5/21
14					
15	Liaison with PTO VR	18 days	Mon 10/5/21	0%	Mon 31/5/21
16					
17	Slope cutting (Total 2850 m3 solid materials to be removed, i.e. about 4275 m3 loosen materials. 23.8m3 loosen materials to be removed per day, i.e. 4 trips of dumping per day)(Installation of silt curtain at the outlet of the box culvert)	148 days	Tue 1/6/21	0%	Thu 25/11/21
18	Installation of rock dowl (Include drilling, rebar installation and grouting, etc.)	35 days	Fri 26/11/21	0%	Sat 8/1/22
19	Construction of anchorages for flexible barrier	40 days	Mon 10/1/22	0%	Mon 28/2/22
20	Installation of flexible barriers	40 days	Tue 1/3/22	0%	Wed 20/4/22
21					
22	Installation of shuriphi	28 days	Thu 21/4/22	0%	Tue 24/5/22
23	Excavation from +13.25 Mpd to -1.20 Mpd (Total 2150 m3 solid materials to be removed, i.e. about 3225m3 loosen materials. 23.8m3 loosen materials to be removed per day, i.e. 4 trips of dumping per	110 days	Wed 25/5/22	0%	Wed 5/10/22
24	Plate load test	14 days	Thu 6/10/22	0%	Fri 21/10/22
25	Construction of raft footing	40 days	Sat 22/10/22	0%	Wed 7/12/22
26	Construction of basement (below +13.25 mPD)	50 days	Thu 8/12/22	0%	Fri 10/3/23
27					
28	Construction of R.C. walls at 1st Floor	55 days	Sat 11/2/23	0%	Thu 20/4/23
29	Construction of rooftop (below + 17.75 mPD)	55 days	Fri 21/4/23	0%	Tue 27/6/23
30	External Finishes	110 days	Wed 28/6/23	0%	Tue 7/11/23
31	Internal Finishes (Incl. installation of Door & Window etc)	110 days	Wed 28/6/23	0%	Tue 7/11/23
32	Landscape works & other associated works	797 days	Mon 10/5/21	0%	Fri 12/1/24
33					
34	E&M works	292 days	Sat 11/2/23	0%	Fri 2/2/24

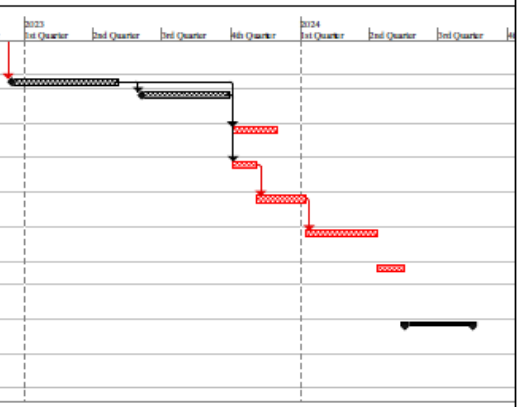


Project:DC/2019/09

Task
Project Guide: Critical Task
Split
Milestone
Summary
Project Summary
Project Guide: Critical Task
Split
Progress
Milestone
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Progress
Summary

ID	Task Name	Duration	Starting Date	Percentage of Completion	Completion Date
35	T&C (Stage 1) + T&C (Stage 2)	223 days	Tue 9/5/23	0%	Fri 2/2/24
36	T&C (Stage 3)	75 days	Sat 3/2/24	0%	Thu 9/5/24
37					
38					
39	**Construction of PTO Village Sewerage**	**1173 days**	**Fri 24/7/20**	**0%**	**Thu 4/7/24**
40	Liaise with the village representatives	90 days	Fri 24/7/20	0%	Mon 9/11/20
41	Initial survey and photo-taking	90 days	Wed 26/8/20	0%	Fri 1/1/12/20
42	UU Detection and application for permit-to-dig	90 days	Mon 21/9/20	0%	Sat 9/1/21
43					
44	Trial pit excavation (Action Date of PTO-B1-01: 22nd Oct 2020)	90 days	Thu 22/10/20	0%	Mon 8/2/21
45					
46	Producing Layout plans showing the location of terminal manholes, timber box and alignment of sewers and other associated preparation works	83 days	Tue 17/11/20	0%	Sat 27/2/21
47					
48	Liaison with PTO VR	77 days	Mon 1/3/21	0%	Mon 31/5/21
49					
50	**PTO-SW-01 (Open Trench, 18 nos. manholes (170m), and rising main(CH2+53.81 - CH4+36.66)**	**316 days**	**Tue 1/6/21**	**0%**	**Thu 23/6/22**
57	**Landscape works for PTO-SW-01**	**316 days**	**Tue 1/6/21**	**0%**	**Thu 23/6/22**
59					
60	**PTO-SW-02 (Open Trench, 16nos. Manhole(145m), and a Section of Rising Main)**	**263 days**	**Fri 24/6/22**	**0%**	**Sat 13/5/23**
67	**Landscape works for PTO-SW-02**	**263 days**	**Fri 24/6/22**	**0%**	**Sat 13/5/23**
69					
70	**PTO-SW-03 (Open Trench, 25 nos., Length: 360m)**	**390 days**	**Fri 24/6/22**	**0%**	**Sat 14/10/23**
77	**Landscape works for PTO-SW-03**	**390 days**	**Fri 24/6/22**	**0%**	**Sat 14/10/23**
79					
80	**PTO-Trenchless-01 (Trenchless, (Length: 75m) and related Rising Main)**	**237 days**	**Fri 24/6/22**	**0%**	**Wed 12/4/23**
87	**Landscape works for PTO-Trenchless-01**	**237 days**	**Fri 24/6/22**	**0%**	**Wed 12/4/23**
89					
90	**PTO-Trenchless-02 (Trenchless, (Length: 100m) and related Rising Main)**	**289 days**	**Thu 13/4/23**	**0%**	**Tue 2/4/24**
97	**Landscape works for PTO-Trenchless-02**	**289 days**	**Thu 13/4/23**	**0%**	**Tue 2/4/24**
99					
100	**Testing of PTO Village Sewerage**	**75 days**	**Wed 3/4/24**	**0%**	**Thu 4/7/24**
102					
103					
104	**Submarine Outfall by HDD Method with Cofferdam**	**492 days**	**Thu 15/12/22**	**0%**	**Thu 15/8/24**

ID	Task Name	Duration	Starting Date	Percentage of Completion	Completion Date
105					
106	Construction of temporary working platform	111 days	Thu 15/12/22	0%	Fri 5/5/23
107	Preparation of MDN	99 days	Mon 5/6/23	0%	Fri 29/9/23
108	Construction of Cofferdam	50 days	Tue 3/10/23	0%	Thu 30/11/23
109	Pilot Drilling of HDD	26 days	Wed 4/10/23	0%	Fri 3/11/23
110	Enlargement of HDD and Pipe Installation	52 days	Sat 4/11/23	0%	Sat 6/1/24
111	Construction of diffuser manifold	74 days	Mon 8/1/24	0%	Wed 10/4/24
112	Removal of cofferdam at both the manifold and the entry pit (including removal of silt curtain after removal of cofferdam)	30 days	Thu 11/4/24	0%	Fri 17/5/24
113					
114	**Testing of Submarine Outfall**	**75 days**	**Sat 18/5/24**	**0%**	**Thu 15/8/24**
116					
117	**Completion of Section 2**	0 days	Thu 15/8/24	0%	Thu 15/8/24



APPENDIX C – METEORLOGICAL DATA

Day	Hong Kong Observatory								King's Park	Waglan Island^	
	Mean Pressure (hPa)	Air Temperature			Mean Dew Point (deg. C)	Mean Relative Humidity (%)	Mean Amount of Cloud (%)	Total Rainfall (mm)	Total Bright Sunshine (hours)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
		Absolute Daily Max (deg. C)	Mean (deg. C)	Absolute Daily Min (deg. C)							
01	1004.7	32.2	29.3	27.9	25.3	80	75	Trace	***	***	***
02	1003.7	34.6	30.4	27.9	24.1	70	52	0.0	***	***	***
03	1002.8	35.1	30.8	27.9	25.2	73	43	0.0	***	***	***
04	1004.7	33.5	30.5	28.3	26.0	77	86	2.6	***	***	***
05	1004.5	33.0	30.4	28.3	26.3	79	84	5.9	***	***	***
06	1002.4	33.0	30.3	29.2	26.1	78	71	Trace	***	***	***
07	1001.8	32.4	30.1	28.0	25.4	76	69	1.6	***	***	***
08	1003.6	33.3	30.3	28.9	25.2	74	69	0.0	***	***	***
09	1004.9	32.8	30.3	28.7	25.4	76	73	Trace	***	***	***
10	1004.7	32.1	29.2	27.5	25.7	82	86	11.1	***	***	***
11	1003.5	30.1	27.8	25.7	24.9	85	85	26.4	***	***	***
12	1003.5	32.1	29.0	26.6	24.9	79	86	0.9	***	***	***
13	1003.7	29.6	28.5	26.1	25.6	84	87	34.2	***	***	***
14	1005.2	32.2	29.4	27.0	25.9	82	88	3.6	***	***	***
15	1006.7	32.5	29.9	28.8	26.2	80	85	Trace	***	***	***
16	1006.8	34.0	30.6	28.8	26.2	78	70	0.0	***	***	***
17	1005.2	32.0	30.0	29.0	26.5	82	85	Trace	***	***	***
18	1004.0	30.6	29.2	27.2	26.6	86	88	9.3	***	***	***
19	1005.7	30.6	28.8	27.3	25.8	84	88	0.3	***	***	***
20	1007.7	31.5	29.7	28.4	26.0	80	86	0.6	***	***	***
21	1007.8	32.1	29.6	28.2	26.2	82	86	0.2	***	***	***
22	1006.1	33.0	30.0	28.0	25.8	79	88	0.3	***	***	***
23	1005.3	33.5	30.4	28.2	25.9	78	86	0.3	***	***	***
24	1006.7	31.4	29.1	27.5	26.1	85	88	5.7	***	***	***
25	1006.8	30.9	29.3	28.2	26.1	83	77	0.2	***	***	***
26	1005.2	32.8	29.7	27.9	26.4	83	88	0.0	***	***	***
27	1003.2	31.9	29.4	26.4	26.4	84	87	2.2	***	***	***
28	1002.6	33.4	29.9	28.1	26.2	81	88	0.5	***	***	***
29	1003.5	32.6	29.0	26.8	25.8	83	87	34.4	***	***	***
30	1003.9	32.0	28.9	26.7	23.3	72	83	0.0	***	***	***
31	1002.7	32.1	29.2	27.7	23.2	70	88	0.4	***	***	***
Mean/Total	1004.6	32.4	29.7	27.8	25.6	79	81	140.7	***	***	***
Climatological Normal[2]	1005.2	31.3	28.7	26.7	25.1	81	70	453.2	182.1	230	18.8

Source: https://www.hko.gov.hk/en/cis/dailyExtract.htm?y=2023&m=08

APPENDIX D – AIR QUALITY MONITORING EQUIPMENT CALIBRATION CERTIFICATES

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TEST REPORT

Internal Calibration Report of Dust Monitor

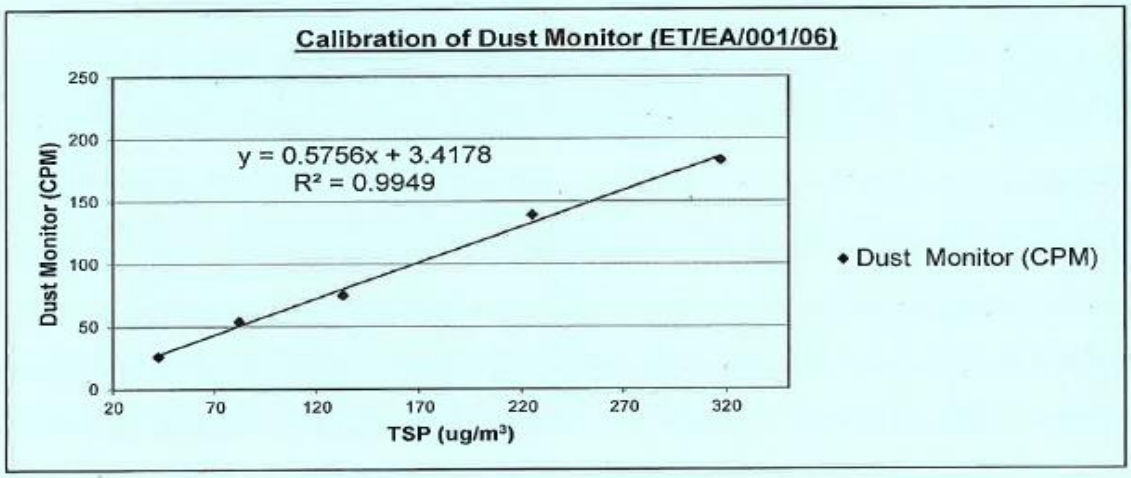
Manufacturer : SIBATA (LD-3B) Date of Calibration : 05 June 2023

Serial No. : 014746 (ET/EA/001/06) Calibration Due Date : 04 August 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	26	54	75	139	183
TSP (ug/m^3)	42	82	133	225	317
High Volume Air Sampler Serial No.: 1180	Calibration Due Date: 25 June 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after five-point calibration.

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : CHENG, Hei Man (Technician)

Checked by : Guy, Kong Ping Ki (Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

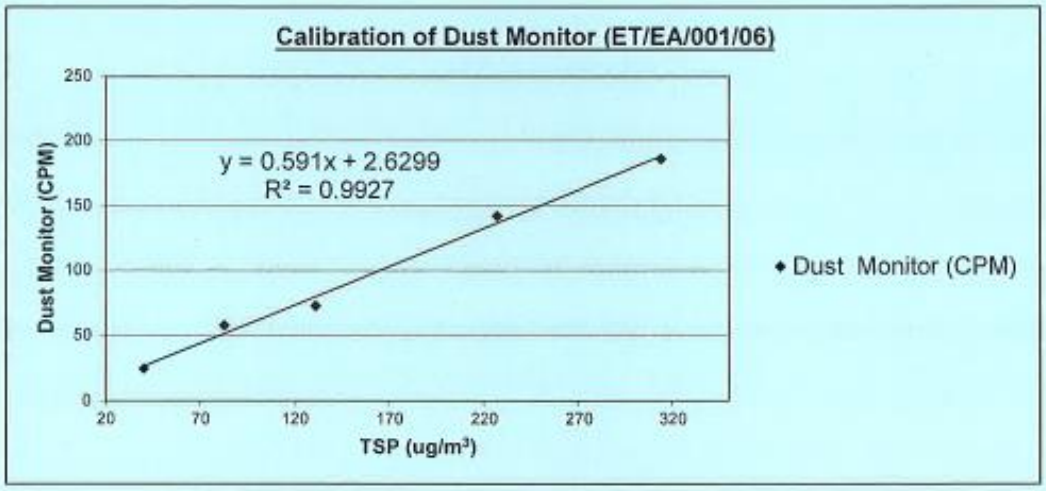
Manufacturer : SIBATA (LD-3B) Date of Calibration : 03 August 2023

Serial No. : 014746 (ET/EA/001/06) Calibration Due Date : 02 October 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	24	58	73	142	186
TSP (ug/m^3)	40	83	131	227	314
High Volume Air Sampler Serial No.: 1180	Calibration Due Date: 23 August 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after five-point calibration.

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : CHENG, Hei Man (Technician)

Checked by : Guy, Kenq Ping Ki (Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

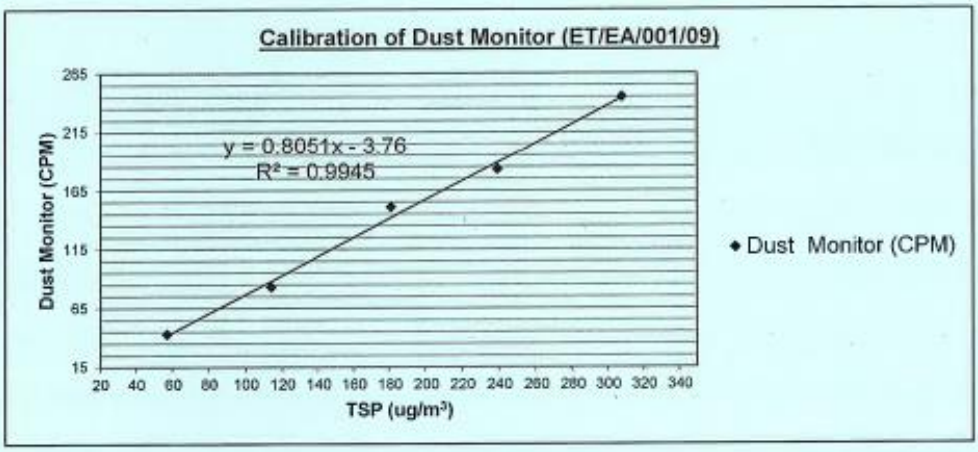
Manufacturer : SIBATA (LD-3B) Date of Calibration : 05 June 2023

Serial No. : 155331 (ET/EA/001/09) Calibration Due Date : 04 August 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	43	83	151	183	245
TSP (ug/m^3)	57	114	181	239	308
High Volume Air Sampler Serial No.: 9795	Calibration Due Date: 25 June 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : CHENG, Hei Man (Technician)

Checked by : Guy, Kong Ping Ki (Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

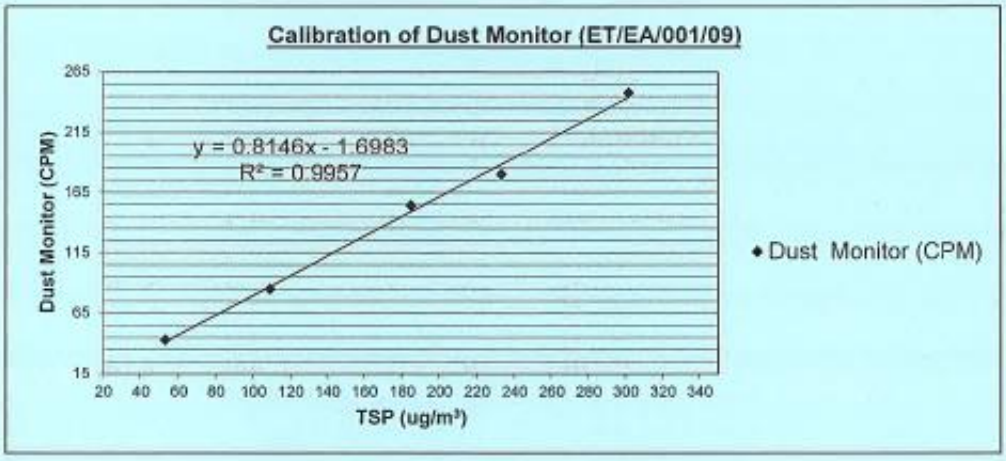
Manufacturer : SIBATA (LD-3B) Date of Calibration : 03 August 2023

Serial No. : 155331 (ET/EA/001/09) Calibration Due Date : 02 October 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	43	85	154	180	248
TSP (ug/m^3)	53	109	185	233	302
High Volume Air Sampler Serial No.: 9795	Calibration Due Date: 22 August 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : Toby
CHENG, Hei Man
(Technician)

Checked by : Guy
Guy, Kong Ping Ki
(Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

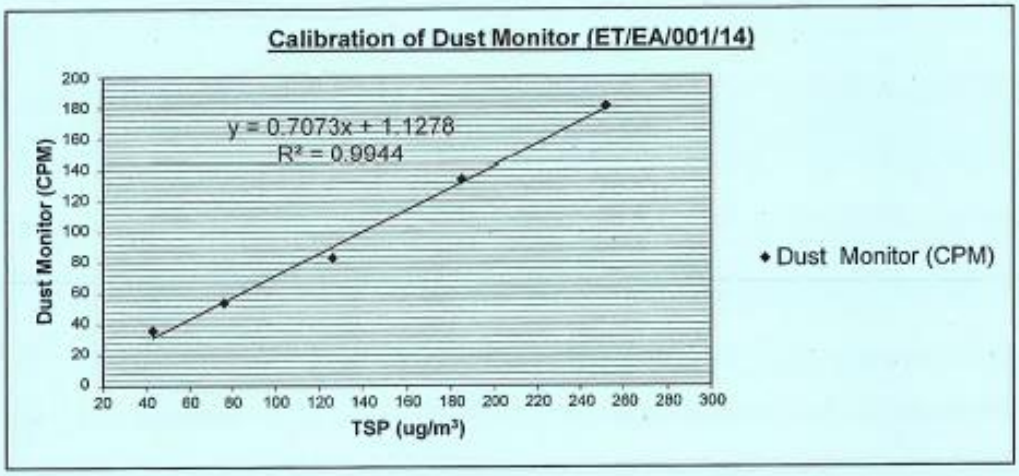
Manufacturer : SIBATA (LD-3B) Date of Calibration : 05 June 2023

Serial No. : 597340 (ET/EA/001/14) Calibration Due Date: 04 August 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	36	54	83	134	181
TSP (ug/m³)	43	76	126	185	252
High Volume Air Sampler Serial No.: 1174	Calibration Due Date: 25 June 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : CHENG, Hei Man (Technician)

Checked by : Guy, Kong Ping Ki (Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

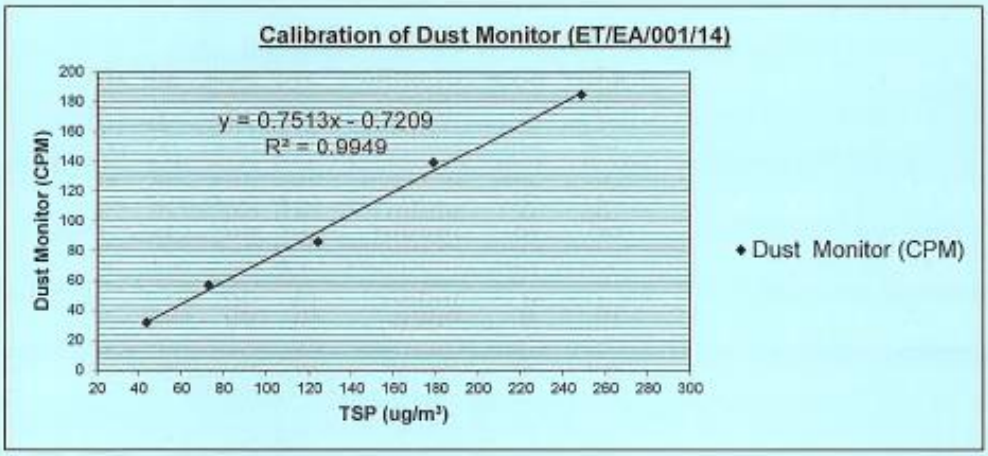
Manufacturer : SIBATA (LD-3B) Date of Calibration : 03 August 2023

Serial No. : 597340 (ET/EA/001/14) Calibration Due Date : 02 October 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	32	57	86	139	185
TSP (ug/m^3)	44	73	124	179	249
High Volume Air Sampler Serial No.: 1174	Calibration Due Date: 23 August 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : Toby
CHENG, Hei Man
(Technician)

Checked by : Guy
Guy, Kong Ping Ki
(Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

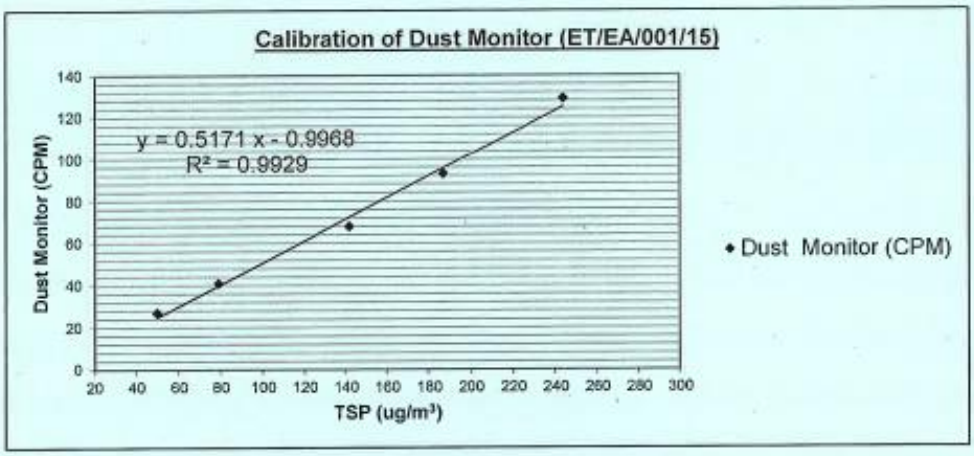
Manufacturer : SIBATA (LD-3B) Date of Calibration : 05 June 2023

Serial No. : 597227 (ET/EA/001/15) Calibration Due Date : 04 August 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	27	41	68	93	129
TSP (ug/m³)	50	79	142	187	244
High Volume Air Sampler Serial No.: 2483	Calibration Due Date: 25 June 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : CHENG, Hei Man (Technician)

Checked by : Guy, Kong Ping Ki (Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Internal Calibration Report of Dust Monitor

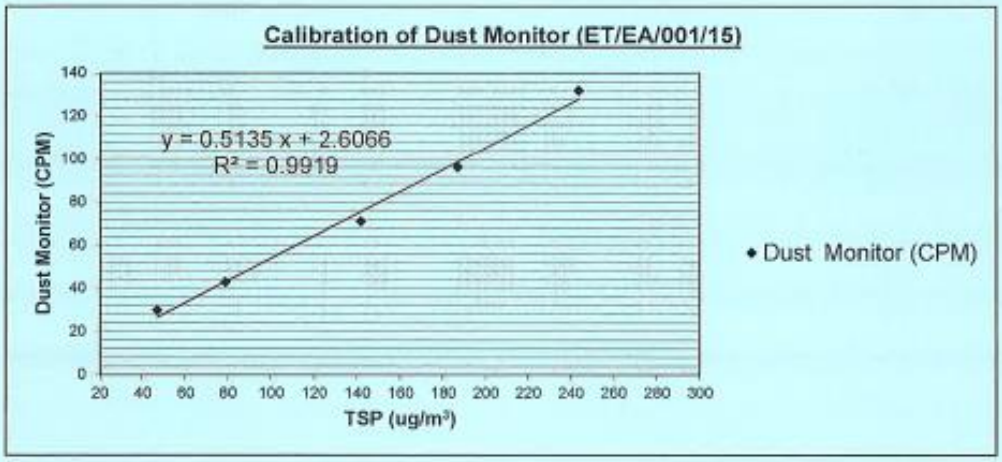
Manufacturer : SIBATA (LD-3B) Date of Calibration : 03 August 2023

Serial No. : 597227 (ET/EA/001/15) Calibration Due Date : 02 October 2023

Method : Parallel measurement (Five-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	30	43	71	96	132
TSP (ug/m³)	47	79	142	187	244
High Volume Air Sampler Serial No.: 2483	Calibration Due Date: 23 August 2023				



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a five-point calibration

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : Toby
CHENG, Hei Man
(Technician)

Checked by : Guy
Guy, Kong Ping Ki
(Laboratory Manager)

- END OF REPORT -

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW — Date of Calibration : 24 June 2023

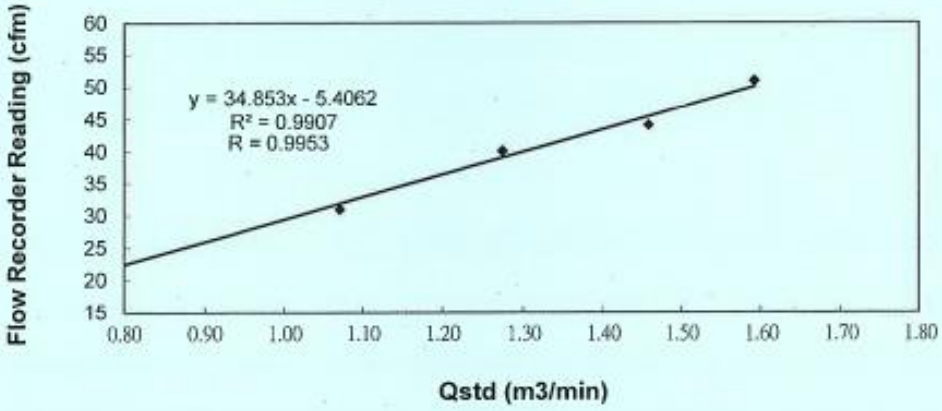
Serial No. : 1180 (ET / EA / 003 / 04) — Calibration Due Date : 23 August 2023

Method : Based on Operations Manual for the 5-point calibration using standard calibration kit manufactured by Tisch TE-5025 A

Results :

Flow recorder reading (cfm)	51	44	40	31	22
Qstd (Actual flow rate, m^3/min)	1.59	1.46	1.27	1.07	0.77
Pressure : 755.39 mm Hg		Temp. : 302 K			

Sampler 1180 Calibration Curve
Site: Tuen Mun (TM-RA2)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable* / ~~unacceptable~~ * for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

- END OF REPORT -

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW — Date of Calibration : 22 August 2023

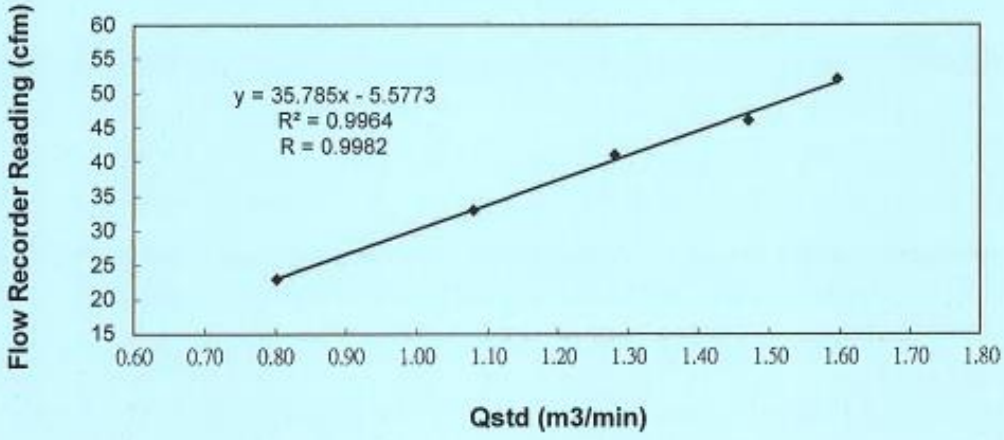
Serial No. : 1180 (ET / EA / 003 / 04) — Calibration Due Date : 21 October 2023

Method : Based on Operations Manual for the 5-point calibration using standard calibration kit manufactured by Tisch TE-5025 A

Results :

Flow recorder reading (cfm)	52	46	41	33	23
Qstd (Actual flow rate, m^3/min)	1.60	1.47	1.28	1.08	0.80
Pressure : 754.64 mm Hg		Temp. : 303 K			

Sampler 1180 Calibration Curve
Site: Tuen Mun (TM-RA2)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable* / ~~unacceptable~~ * for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

- END OF REPORT -

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW — Date of Calibration : 24 June 2023

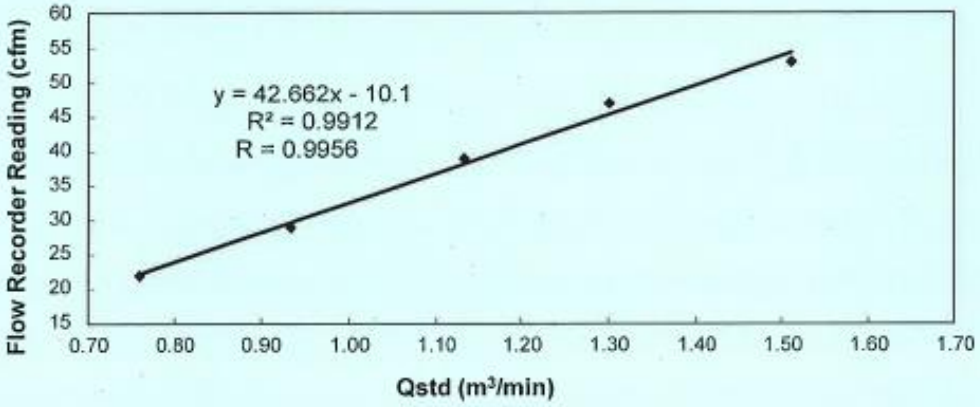
Serial No. : 1174 (ET / EA / 003 / 08) — Calibration Due Date : 23 August 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	53	47	39	29	22
Qstd (Actual flow rate, m^3/min)	1.51	1.30	1.13	0.93	0.76
Pressure : 755.39 mm Hg	Temp. : 302 K				

Sampler 1174 Calibration Curve
Site: Tuen Mun CWSF (TM1a)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration.

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable* / ~~unacceptable~~* for use.

Calibrated by : MAK, Kei Wai (Assistant Supervisor)

Checked by : LAU, Chi Leung (Environmental Team Leader)

- END OF REPORT -

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW

Date of Calibration : 22 August 2023

Serial No. : 1174 (ET / EA / 003 / 08)

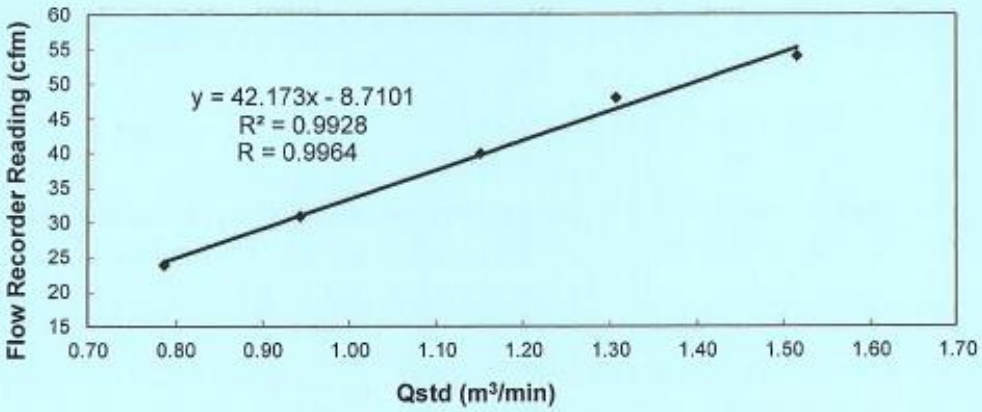
Calibration Due Date : 21 October 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	54	48	40	31	24
Qstd (Actual flow rate, m^3/min)	1.52	1.31	1.15	0.94	0.79
Pressure : 754.64 mm Hg		Temp. : 303 K			

Sampler 1174 Calibration Curve
Site: Tuen Mun CWSF (TM1a)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration.

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable* / unacceptable* for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

- END OF REPORT -

東業德勤測試顧問有限公司
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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby 105 — Date of Calibration : 23 June 2023

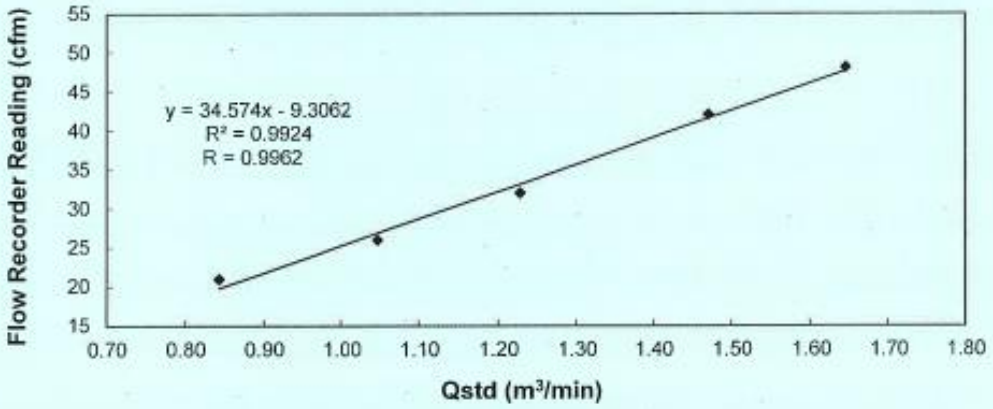
Serial No. : 9795 (ET / EA / 003 / 18) — Calibration Due Date : 22 August 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	48	42	32	26	21
Qstd (Actual flow rate, m^3/min)	1.65	1.47	1.23	1.05	0.84
Pressure : 754.94 mm Hg		Temp. : 303 K			

Sampler 9795 Calibration Curve
Site: Tseung Kwan O 137 (TKO-A1)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable*/ ~~unacceptable~~* for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

- END OF REPORT -

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby 105 — Date of Calibration : 21 August 2023

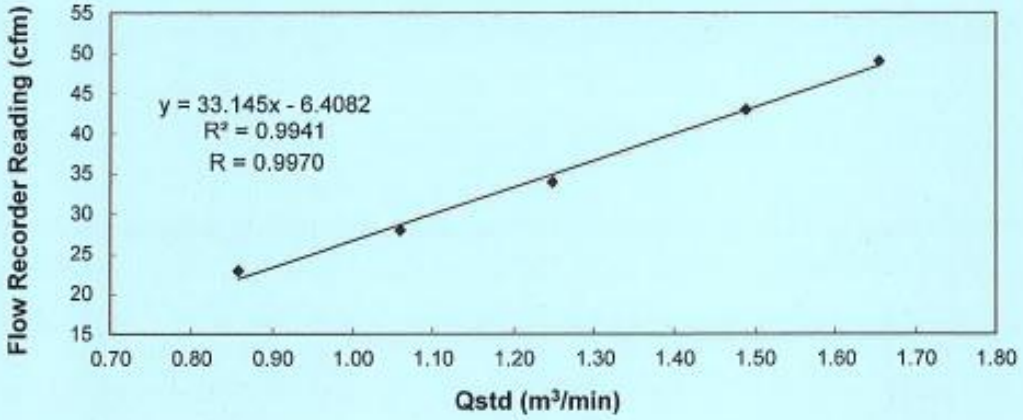
Serial No. : 9795 (ET / EA / 003 / 18) — Calibration Due Date : 20 October 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	49	43	34	28	23
Qstd (Actual flow rate, m^3/min)	1.65	1.49	1.25	1.06	0.86
Pressure : 755.91 mm Hg		Temp. : 303 K			

Sampler 9795 Calibration Curve
Site: Tseung Kwan O 137 (TKO-A1)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable*/ ~~unacceptable~~* for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW — Date of Calibration : 24 June 2023

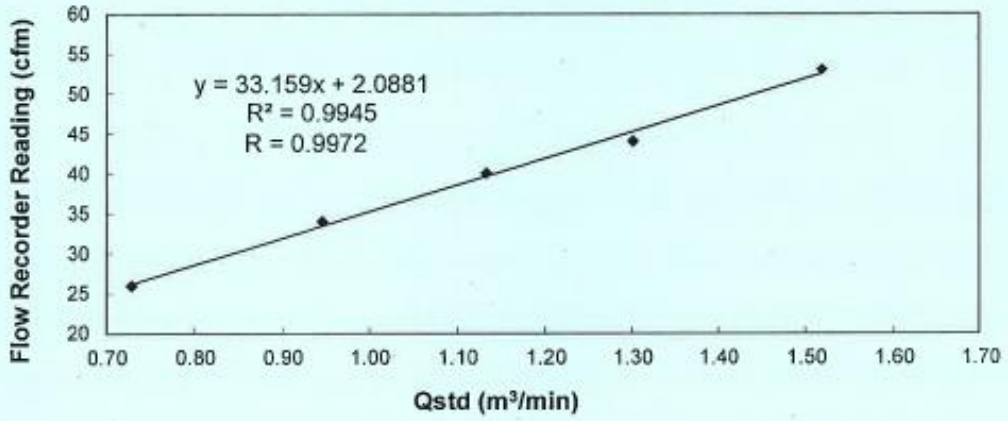
Serial No. : 2483 (ET / EA / 003 / 26) — Calibration Due Date : 23 August 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	53	44	40	34	26
Qstd (Actual flow rate, m^3/min)	1.52	1.30	1.13	0.95	0.73
Pressure : 755.39 mm Hg		Temp. : 302 K			

Sampler 2483 Calibration Curve
Site: Tuen Mun CWSF (TM2)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable*/ ~~unacceptable~~* for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

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TEST REPORT

Calibration Report of High Volume Air Sampler

Manufacturer : Graseby GMW Date of Calibration : 22 August 2023

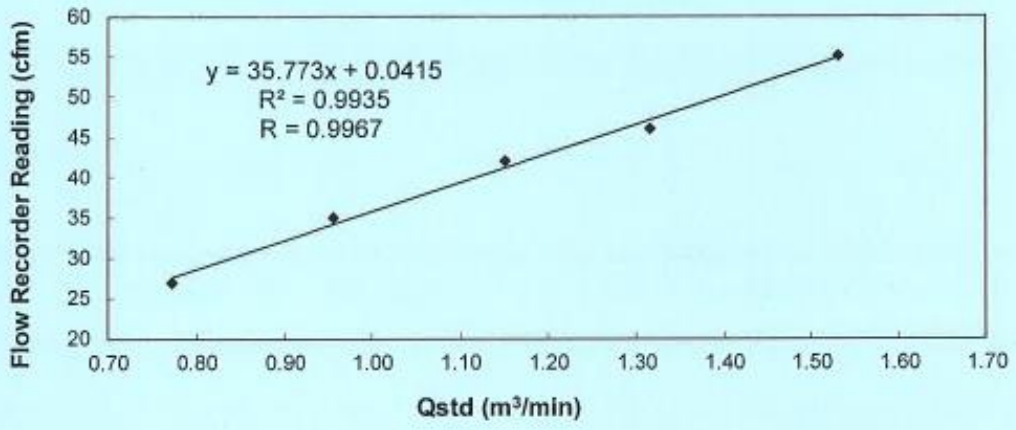
Serial No. : 2483 (ET / EA / 003 / 26) Calibration Due Date : 21 October 2023

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	55	46	42	35	27
Qstd (Actual flow rate, m^3/min)	1.53	1.32	1.15	0.96	0.77
Pressure : 754.64 mm Hg		Temp. : 303 K			

Sampler 2483 Calibration Curve
Site: Tuen Mun CWSF (TM2)



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply~~* with the specified requirements and is deemed acceptable*/ ~~unacceptable~~* for use.

Calibrated by : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAU, Chi Leung
(Environmental Team Leader)

- END OF REPORT -

TISCH Environmental

RECALIBRATION DUE DATE:
January 17, 2024

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	January 17, 2023	Rootsmeter S/N: 438320	Ta: 294	°K
Operator:	Jim Tisch		Pa: 741.4	mm Hg
Calibration Model #:	TE-5025A	Calibrator S/N: **4128**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4370	3.2	2.00
2	3	4	1	1.0170	6.4	4.00
3	5	6	1	0.9140	8.0	5.00
4	7	8	1	0.8640	8.8	5.50
5	9	10	1	0.7170	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9846	0.6852	1.4063	0.9957	0.6929	0.8905
0.9803	0.9639	1.9888	0.9914	0.9748	1.2594
0.9782	1.0702	2.2235	0.9892	1.0823	1.4081
0.9771	1.1309	2.3321	0.9881	1.1437	1.4768
0.9718	1.3553	2.8126	0.9827	1.3706	1.7811
QSTD	**m=**	**2.09676**	**QA**	**m=**	**1.31296**
	b=	**-0.03027**		**b=**	**-0.01917**
	r=	**0.99991**		**r=**	**0.99991**

Calculations

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

For subsequent flow rate calculations:

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

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

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

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

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

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APPENDIX E – METHODOLOGY FOR CORRELATION CALCULATION BETWEEN POTABLE LASER DUST METER AND HIGH-VOLUME SAMPLER

Correlation between Portable laser dusty meter and High-volume Sampler Methodology

Correlation results between the direct reading meter and High-Volume Sampler

High – Volume Sampler Calibration

The specification, a sample of calibration certificate and certificate of comparison check with High volume sampler of the proposed air quality monitoring equipment listed in Table 2.1 are attached in appendix.

The High-Volume air sampler calibration procedure based on the requirement of manufacturer is shown below.

a. Disconnect the sampler motor from the mass flow controller and connect the motor to a stable AC power source.
b. Mount the calibrator orifice and top loading adapter plate to the sampler. A sampling filter is generally not used during this procedure. Tighten the top loading adapter hold down nuts securely to ensure that no air leaks are present.
c. Allow the sampler motor to warm up to its normal operating temperature
d. (approximately 10-15 minutes).
e. Conduct a leak test by covering the hole(s) on top of the orifice and pressure tap on the orifice with your hands. Listen for a high-pitched squealing sound made by escaping air. If this sound is heard, a leak is present and the top loading adapter hold-down nuts need to be re-tightened. If the sound is lower, the leak is near one of the other gaskets in the system. Avoid running the sampler for longer than 30 seconds at a time with the orifice blocked to avoid overheating the motor. Do not perform this leak test procedure with a manometer connected to the side tap on the calibration orifice or the blower motor. Liquid from the manometer could be drawn into the system and cause motor damage
f. Connect one side of a water manometer to the pressure tap on the side of the orifice with a rubber vacuum tube. Leave the opposite side of the manometer open to the atmosphere. Note: Both valves on the manometer have to be open for the liquid to flow freely. One side of the 'U' tube goes up the other goes down; add together for the "H2O reading.
g. A manometer must be held vertically to ensure accurate readings. Tapping the backside of the continuous flow recorder will help to center the pen and provide accurate readings. When using a variable orifice, five flow rates are achieved in this step by adjusting the knob on the variable orifice to five different positions and taking five different reading.

h. Record the ambient air temperature, the ambient barometric pressure, the sampler serial number, the orifice s/n, the orifice slope and intercept with date last certified, today's date, site location and the operators initial on the attached blank calibration sheet.

i. An example of a Lead (or TSP) Sampler Calibration Data Sheet has been attached with data filled in from a typical calibration. This includes the transfer standard orifice calibration relationship which was taken from the Orifice Calibration Worksheet that accompanies the calibrator orifice.

Disconnect the sampler motor from its power source and remove the orifice and top loading adapter plate. Re-connect the sampler motor to the electronic mass flow controller.

Since this calibration is for a TSP sampler, the slope and intercept for this orifice uses standard flows rather than actual flows and is taken from the Q standard section of the Orifice Calibration Worksheet. The Q actual flows are only used when calibrating a PM-10 sampler.

The five orifice manometer readings taken during the calibration have been recorded in the column on the data worksheet titled Orifice "H2O. The five continuous flow recorder readings taken during the calibration have been recorded under the column titled I chart.

The orifice manometer readings need to be converted to the standard air flows they represent using the following equation:

$$Qstd = 1/m[Sqrt((H_20)(Pa/760)(298/Ta))-b]$$

where:
Qstd = actual flow rate as indicated by the calibrator orifice, m^3/min
H_2O = orifice manometer reading during calibration, "H_2O
Ta = ambient temperature during calibration, K (K = 273 + °C)
298 = standard temperature, a constant that never changes, K
Pa = ambient barometric pressure during calibration, mm Hg
760 = standard barometric pressure, a constant that never changes, mm Hg
m = *Qstandard slope of orifice* calibration relationship
b = *Qstandard intercept of orifice* calibration relationship.

Once these standard flow rates have been determined for each of the five run points, they are recorded in the column titled Qstd and are represented in cubic meters per minute.

The continuous flow recorder readings taken during the calibration need to be corrected to the current meteorological conditions using the following equation:

$$IC = I[Sqrt((Pa/760)(298/Ta))]$$

where:
IC = continuous flow recorder readings corrected to current Ta and Pa
I = continuous flow recorder readings during calibration
Pa = ambient barometric pressure during calibration, mm Hg.
760 = standard barometric pressure, a constant that never changes, mm Hg
Ta = ambient temperature during calibration, K (K = 273 + °C)
298 = standard temperature, a constant that never changes, K

After each of the continuous flow recorder readings have been corrected, they are recorded in the column titled IC (corrected).

Using Qstd and IC (or FLOW (corrected)) as the x and y axis respectively, a slope, intercept, and correlation coefficient can be calculated using the least squares regression method. The correlation coefficient should never be less than 0.990 after a five-point calibration. A coefficient below .990 indicates a calibration that is not linear, and the calibration should be performed again. If this occurs, it is most likely the result of an air leak during the calibration or high wind speed during the calibration procedure.

The equations for determining the slope (m) and intercept (b) are as follows:

$$m = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \quad ; \quad b = \bar{y} - m\bar{x}$$

The equation for the coefficient of correlation (r) is as follows:

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]\left[\sum y^2 - \frac{(\sum y)^2}{n}\right]}}$$

where: n = number of observations
$\sum$ = sum of

The acceptable operating flow range of a TSP sampler is 1.1 to 1.7 m3/min (39 to 60 CFM). Looking at the worksheet column Qstd(see page 38), the flow rates that are within this range can be identified along with the chart reading (I) that represents them. For instance, if you wanted to set this sampler at 1.265 m3/min (44.67 CFM) (Make sure the mass flow controller is plugged in and a filter is in place) you would turn the Flow Adjustment screw until the continuous flow recorder read 37 on the chart. By making sure that the sampler is operating at a chart reading (or manometer reading) that is within the acceptable range, it can be assumed that valid TSP data is being collected.

A calibration that has a correlation coefficient of less than .990 is not considered linear and should be re-calibrated. Therefore, if r < 0.990, return all the points or only the point with the greatest deviation and the recalculate.

The 24-hour TSP levels to be measured by direct reading methods, utilising portable Laser Particle Photometer Monitors (Sibata Model LD-3B), in place of High-Volume Sampler (HVS) if HVS experience difficulties in operation during monitoring. It is demonstrated by the previous project experiences, that 24-hour TSP monitoring results collected by direct reading method are comparable to those produced by the high-volume sampling method, to indicate short event impacts. The projects utilising the collection of 24-hour TSP levels data by direct reading methods are shown below.

Project Reference for utilising the collection of 24-hour TSP levels data by direct reading methods

Project Contract Number	Location	Status
NDO 03/2018	Road Widening and Retrofitting Noise Barriers on Tai Po Road (Sha Tin Section)	On-going

NDO 14/2018	Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas	On-going

Calculation of the value of 24-hour TSP concentration is given by the average of 24 calculated 1-hour TSP concentration, where the calculated 1-hr TSP concentration is given by the product of the direct reading and the K-factor based on the correlation results between the direct reading meter and High-Volume Sampler.

The correlation results between the direct reading meter and High-Volume Sampler shall be review with bimonthly internal calibration. To maintain the correlation with two sets of data (monitoring data from HVS and monitoring data from Portable Laser Particle Photometer Monitors) bimonthly internal calculated are strongly linked together two sets of data.

To protect the dust meter from being damaged and to operate without disturbances or nuisance, temporary barriers shall be erected around the monitoring equipment during the monitoring period. Temporary barriers will be placed approx. 0.5m away from the dust meter.

Maintenance/ Calibration for the High-Volume Sampler (HVS) being correlation

The HVS shall be calibrated bimonthly in accordance to the specification in the manufacturer's manual. The calibration certificates shall be available to the IEC for checking upon request. The validity and accuracy of the HVS shall also be tested against the result by the TE-5025A Calibration Kit periodically, Details of Calibration Cert and Specification for HVS – Graseby GMW and HVS- Calibration Kit TE-5025A are given in Appendix 2-1 and Appendix 2-3.

Graseby GMW is chosen as the HVS for 24-hour TSP monitoring and Tisch TE – 5025A is chosen as the HVS Calibration-Kit for HVS calibration.

APPENDIX F – AIR QUALITY AND NOISE IMPACT MONITORING SCHEDULE

2023 August Air Quality and Noise Impact Monitoring Schedule

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

2023 September Air Quality and Noise Impact Monitoring Schedule

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

Remark:
1. Monitoring on 01/09/2023 was rescheduled to 04/09/2023 due to the adverse weather condition (The Tropical Cyclone Signal No.8).
2. Monitoring on 08/09/2023 was rescheduled to 11/09/2023 due to the adverse weather condition (Black Rainstorm Warning Signal).

APPENDIX G – AIR QUALITY MONITORING RESULT

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 1-hour Monitoring Data

Monitoring Location: AMS1N

Date	Weather	1-hour TSP Monitoring			
			Start Time	Concentration ($\mu g/m^3$)	Average Concentration ($\mu g/m^3$)
4-Aug-23	Fine	1st hr	9:53	72.0	68.0
		2nd hr	10:53	65.0	
		3rd hr	11:53	67.0	
10-Aug-23	Rainy	1st hr	9:41	32.0	32.3
		2nd hr	10:41	38.0	
		3rd hr	13:12	27.0	
16-Aug-23	Fine	1st hr	9:38	36.0	42.0
		2nd hr	10:38	41.0	
		3rd hr	13:10	49.0	
22-Aug-23	Cloudy	1st hr	10:46	41.0	40.7
		2nd hr	13:46	41.0	
		3rd hr	14:46	40.0	
28-Aug-23	Fine	1st hr	9:09	84.0	82.3
		2nd hr	10:09	80.0	
		3rd hr	11:09	83.0	
				Average:	53.1
				Action Level:	319
				Limit Level:	500

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 1-hour Monitoring Data

Monitoring Location: AMS2N1

Date	Weather	1-hour TSP Monitoring			
			Start Time	Concentration ($\mu g/m^3$)	Average Concentration ($\mu g/m^3$)
4-Aug-23	Fine	1st hr	10:01	109.0	111.0
		2nd hr	11:01	113.0	
		3rd hr	12:01	111.0	
10-Aug-23	Rainy	1st hr	9:47	34.0	33.3
		2nd hr	10:47	36.0	
		3rd hr	13:09	30.0	
16-Aug-23	Fine	1st hr	9:45	40.0	41.7
		2nd hr	10:45	49.0	
		3rd hr	13:08	36.0	
22-Aug-23	Cloudy	1st hr	10:41	51.0	50.7
		2nd hr	13:41	53.0	
		3rd hr	14:41	48.0	
28-Aug-23	Fine	1st hr	9:12	76.0	78.0
		2nd hr	10:12	80.0	
		3rd hr	11:12	78.0	
				Average:	62.9
				Action Level:	279
				Limit Level:	500

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 1-hour Monitoring Data

Monitoring Location: AMS3N

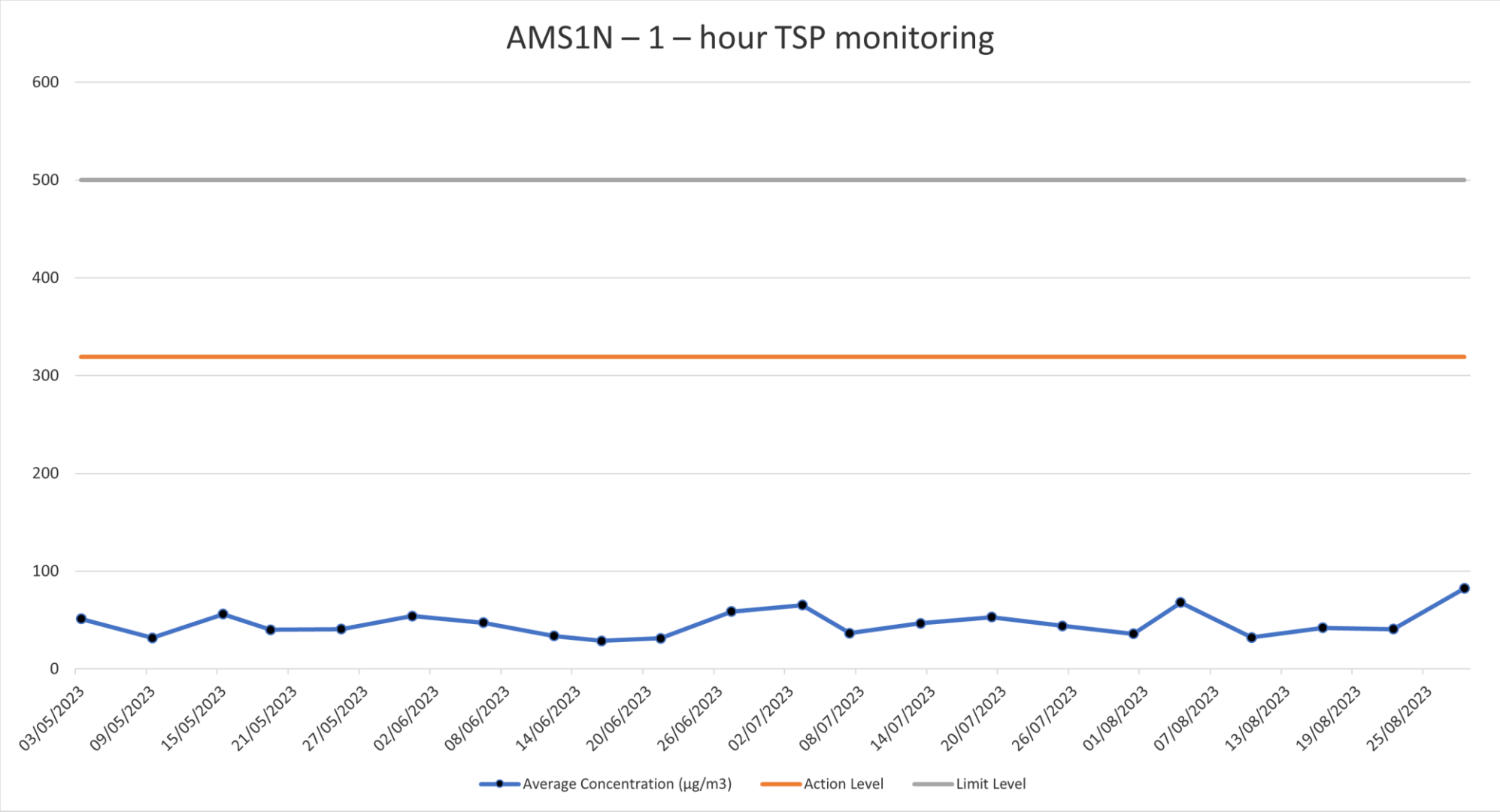
Date	Weather	1-hour TSP Monitoring			
			Start Time	Concentration (µg/m³)	Average Concentration (µg/m³)
4-Aug-23	Fine	1st hr	10:08	64.0	62.7
		2nd hr	11:08	62.0	
		3rd hr	12:08	62.0	
10-Aug-23	Rainy	1st hr	9:50	37.0	33.0
		2nd hr	10:50	34.0	
		3rd hr	13:05	28.0	
16-Aug-23	Fine	1st hr	9:49	32.0	30.0
		2nd hr	10:49	28.0	
		3rd hr	13:00	30.0	
22-Aug-23	Cloudy	1st hr	10:35	38.0	39.3
		2nd hr	13:35	38.0	
		3rd hr	14:35	42.0	
28-Aug-23	Fine	1st hr	9:21	68.0	70.7
		2nd hr	10:21	72.0	
		3rd hr	11:21	72.0	
				Average:	47.1
				Action Level:	303
				Limit Level:	500

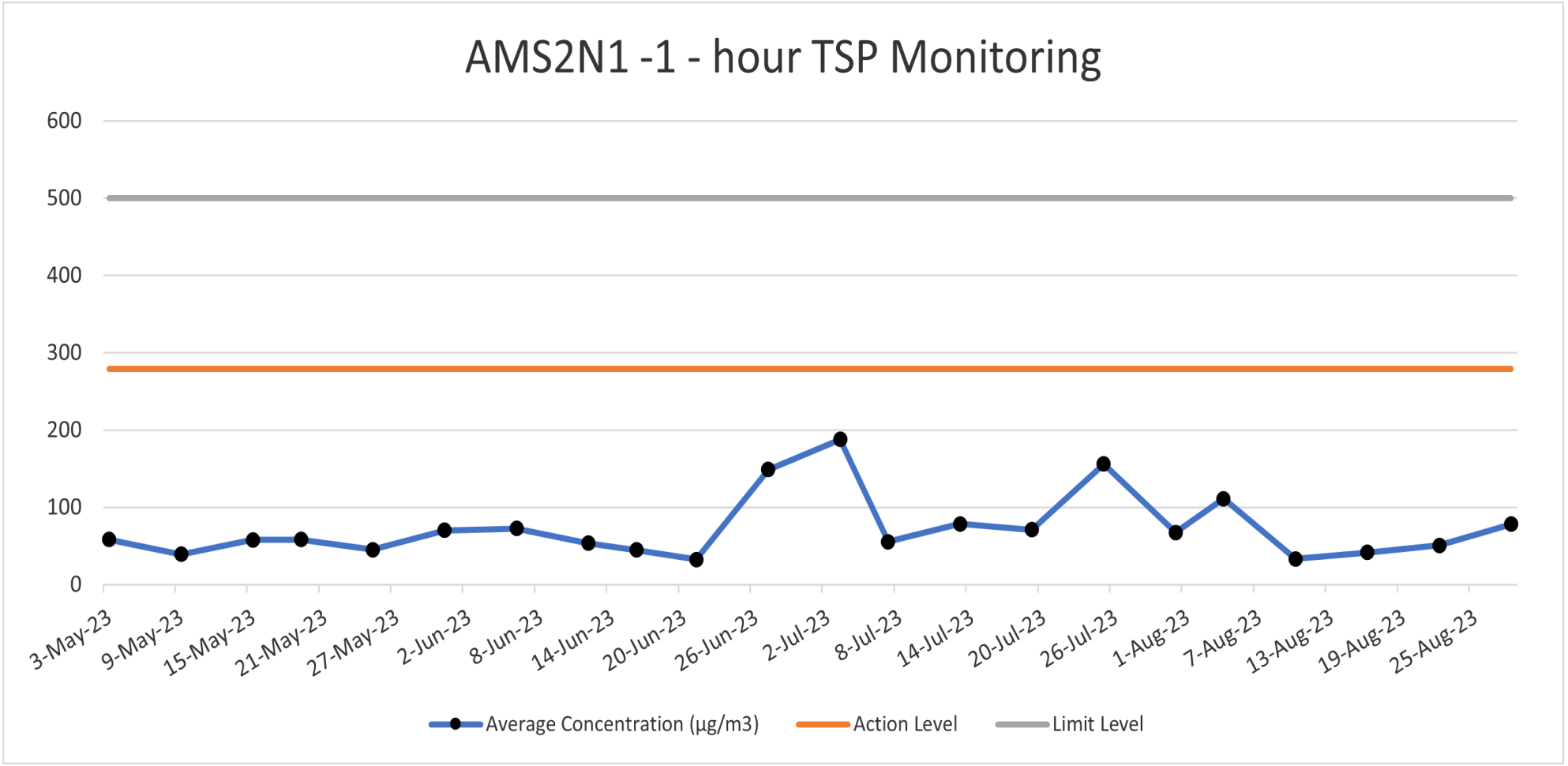
Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

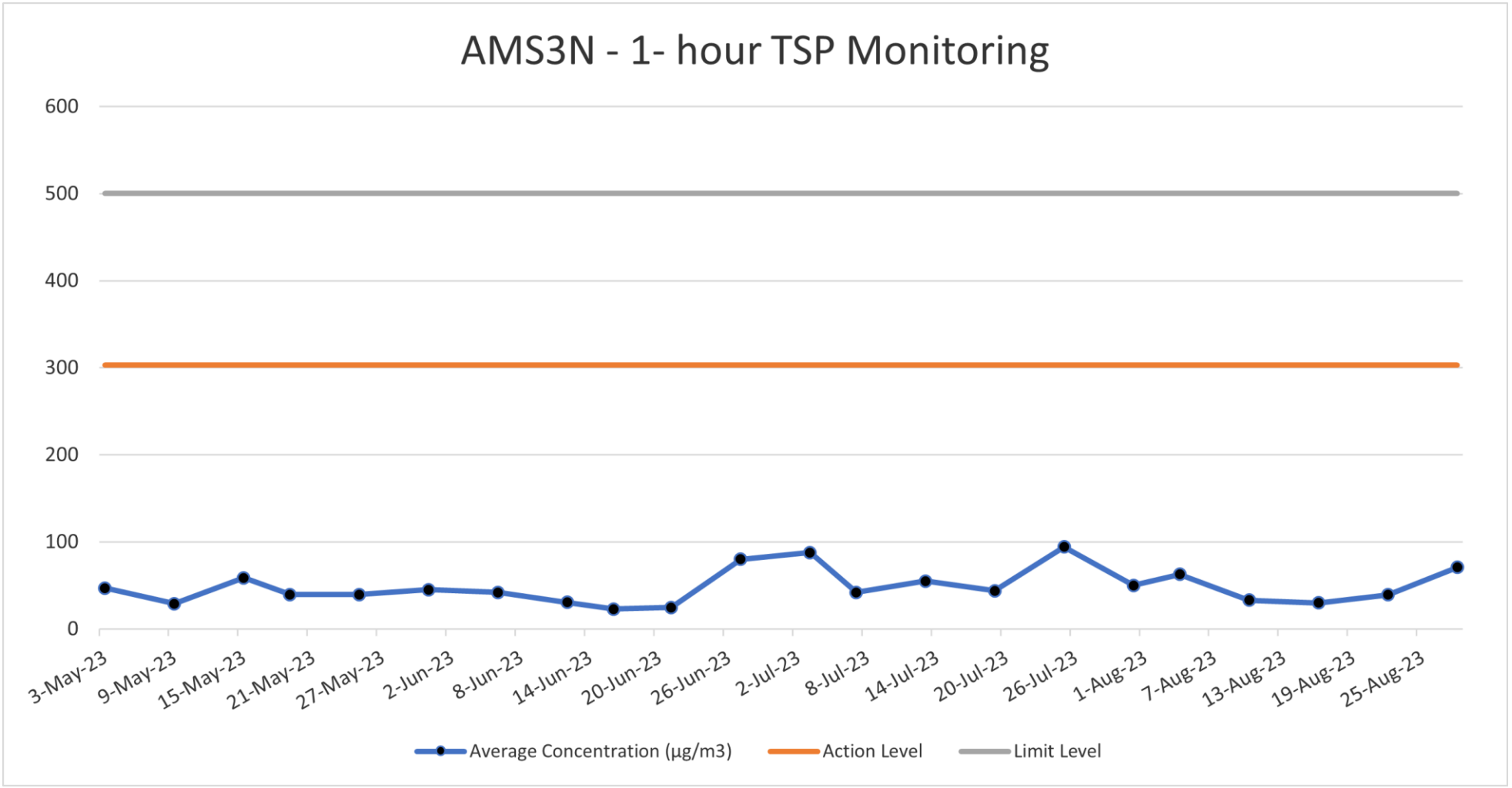
2023 August 1-hour Monitoring Data

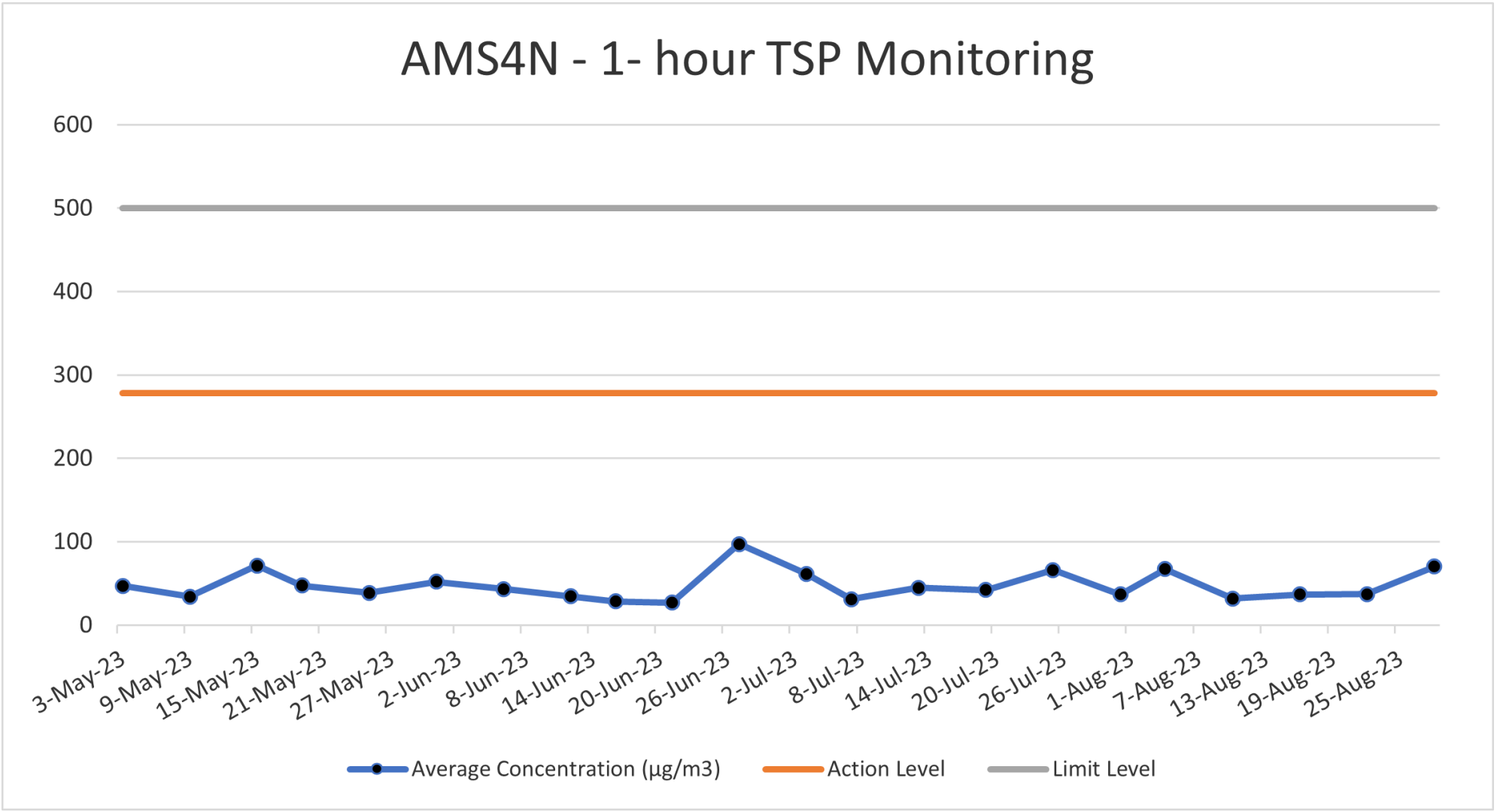
Monitoring Location: AMS4N

Date	Weather	1-hour TSP Monitoring			
			Start Time	Concentration ($\mu g/m^3$)	Average Concentration ($\mu g/m^3$)
4-Aug-23	Fine	1st hr	10:15	66.0	67.3
		2nd hr	11:15	70.0	
		3rd hr	12:15	66.0	
10-Aug-23	Rainy	1st hr	9:43	33.0	31.7
		2nd hr	10:43	33.0	
		3rd hr	13:00	29.0	
16-Aug-23	Fine	1st hr	9:42	34.0	36.7
		2nd hr	10:42	38.0	
		3rd hr	13:04	38.0	
22-Aug-23	Cloudy	1st hr	10:27	38.0	37.3
		2nd hr	13:27	34.0	
		3rd hr	14:27	40.0	
28-Aug-23	Fine	1st hr	9:04	68.0	70.3
		2nd hr	10:04	73.0	
		3rd hr	11:04	70.0	
				Average:	48.7
				Action Level:	278
				Limit Level:	500


AMS1N – 1 – hour TSP monitoring
600
500
400
300
200
100
0
03/05/2023
09/05/2023
15/05/2023
21/05/2023
27/05/2023
02/06/2023
08/06/2023
14/06/2023
20/06/2023
26/06/2023
02/07/2023
08/07/2023
14/07/2023
20/07/2023
26/07/2023
01/08/2023
07/08/2023
13/08/2023
19/08/2023
25/08/2023
Average Concentration (µg/m3)
Action Level
Limit Level


AMS2N1 -1 - hour TSP Monitoring
600
500
400
300
200
100
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level


AMS3N - 1- hour TSP Monitoring
600
500
400
300
200
100
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level


AMS4N - 1- hour TSP Monitoring
600
500
400
300
200
100
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 24-hour Monitoring Data

Monitoring Location: AMS1N

Hour	4-Aug-23	10-Aug-23	16-Aug-23	22-Aug-23	28-Aug-23
1	55	22	35	35	65
2	57	25	29	34	67
3	52	25	24	32	62
4	50	24	20	27	61
5	51	24	19	25	58
6	50	23	19	28	55
7	44	25	18	29	46
8	43	25	17	27	45
9	43	23	18	25	44
10	42	24	16	29	44
11	42	26	15	28	42
12	41	23	15	28	41
13	40	19	14	28	40
14	43	18	15	24	43
15	40	15	15	31	40
16	42	14	15	27	42
17	40	14	14	25	40
18	52	16	14	25	52
19	54	17	18	29	54
20	56	23	29	32	56
21	52	27	30	36	59
22	53	29	37	34	66
23	53	28	30	39	65
24	52	25	25	35	64
Average:	48	22	21	30	52
24-hr TSP ($\mu g/m^3$; with correlation(x)	59	29	28	39	65
Action Level:	153				
Limit Level:	260				

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 24-hour Monitoring Data

Monitoring Location: AMS2N1

Hour	4-Aug-23	10-Aug-23	16-Aug-23	22-Aug-23	28-Aug-23
1	57	18	20	30	45
2	56	17	19	29	44
3	57	24	20	27	44
4	57	23	17	27	45
5	54	23	15	29	42
6	52	25	15	30	42
7	53	26	16	31	40
8	41	25	17	27	40
9	42	22	15	26	39
10	42	22	13	27	40
11	40	24	13	29	40
12	39	21	14	30	39
13	38	18	14	30	38
14	38	14	14	27	38
15	37	13	15	30	37
16	35	12	14	28	35
17	35	12	14	31	35
18	34	12	15	30	34
19	38	15	16	30	38
20	42	20	18	31	42
21	44	21	21	33	46
22	48	20	19	34	48
23	48	23	23	31	48
24	50	27	26	30	47
Average:	45	20	17	29	41
24-hr TSP ($\mu g/m^3$; with correlation(x)	80	34	28	51	74
Action Level:	179				
Limit Level:	260				

Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

2023 August 24-hour Monitoring Data

Monitoring Location: AMS3N

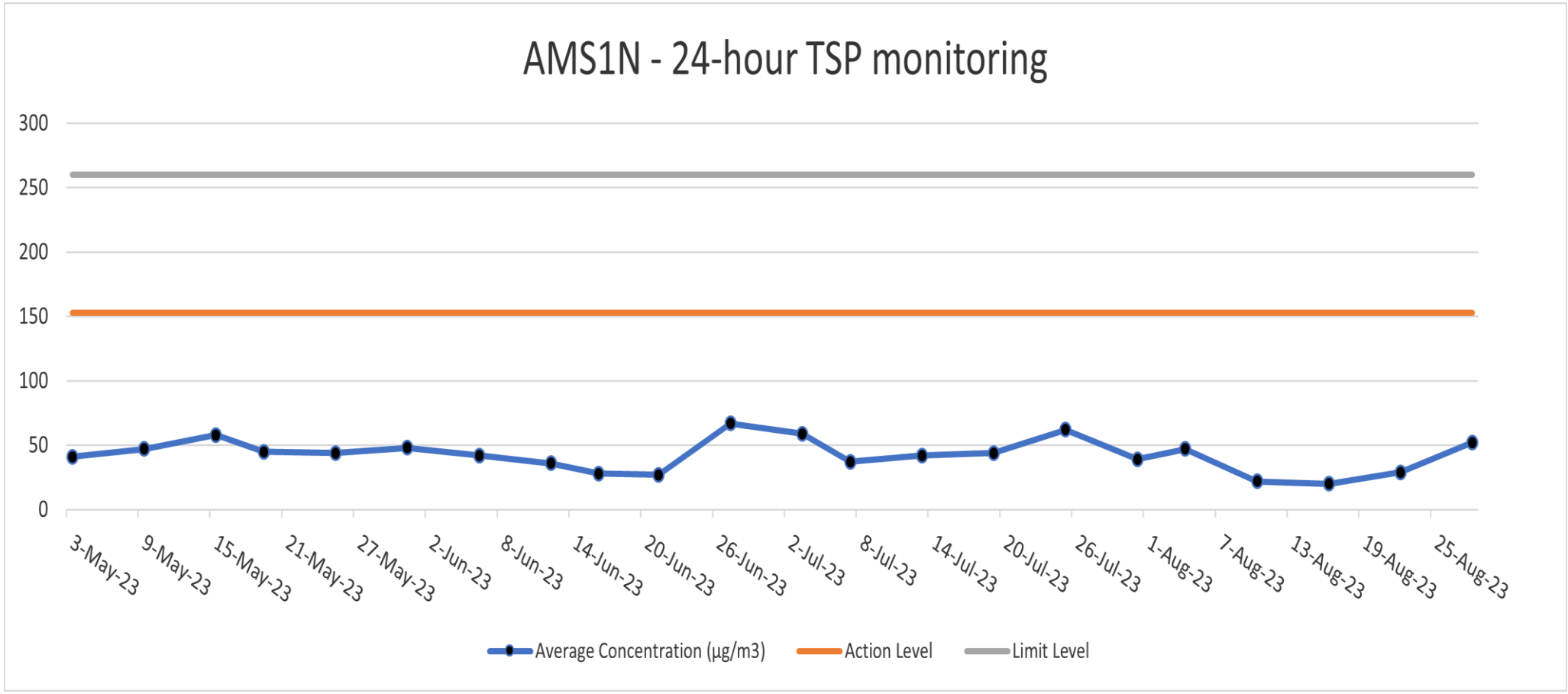
Hour	4-Aug-23	10-Aug-23	16-Aug-23	22-Aug-23	28-Aug-23
1	47	20	21	28	52
2	46	20	21	29	54
3	47	25	22	32	54
4	43	26	18	31	56
5	44	24	17	29	54
6	43	27	17	28	50
7	44	29	17	28	48
8	42	25	16	29	44
9	42	24	15	26	42
10	43	25	16	28	43
11	41	29	14	25	41
12	40	23	17	28	40
13	37	17	16	28	35
14	39	15	14	27	39
15	38	14	15	25	38
16	39	14	15	24	39
17	38	13	14	25	38
18	40	16	13	28	40
19	41	18	19	27	41
20	43	22	20	25	48
21	42	22	23	25	46
22	46	23	22	27	46
23	45	25	19	28	47
24	43	26	21	29	46
Average:	42	22	18	27	45
24-hr TSP ($\mu g/m^3$; with correlation(x)	56	30	25	37	60
Action Level:	158				
Limit Level:	260				

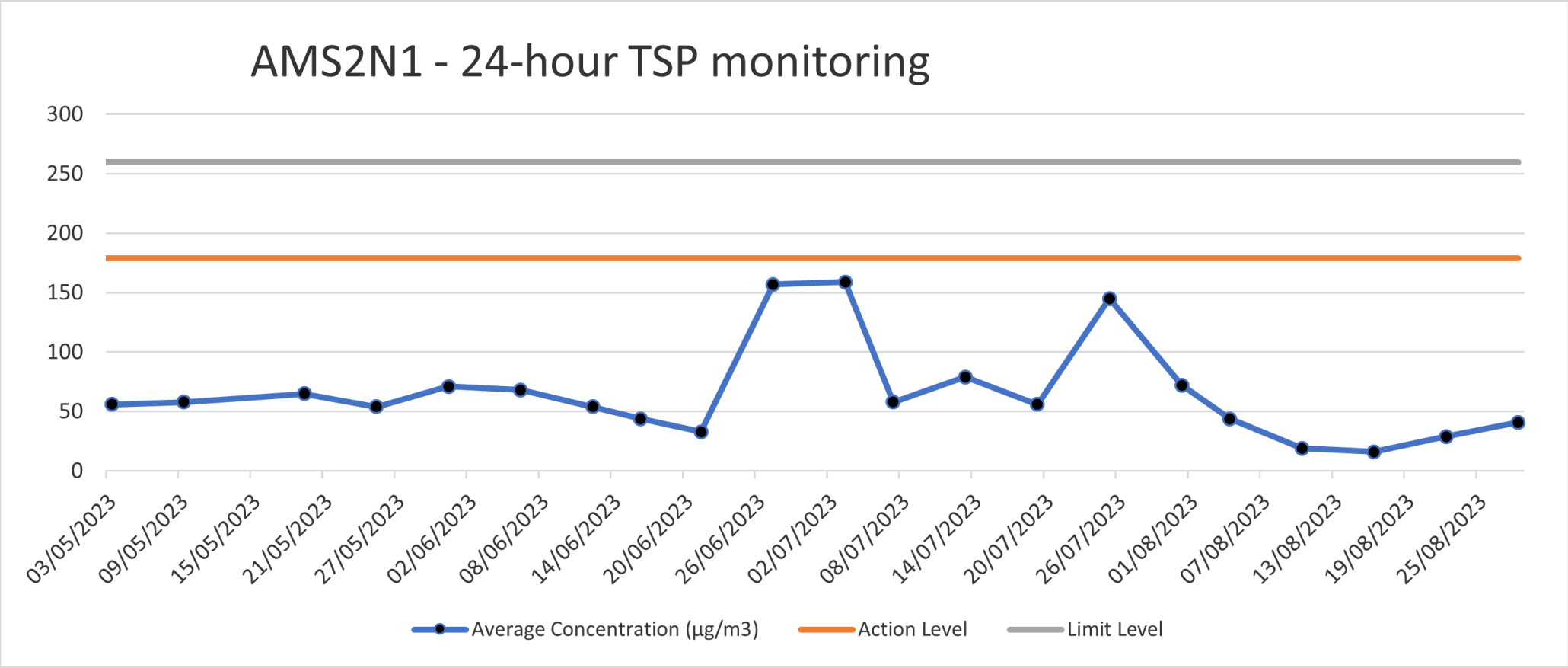
Monthly Environmental Monitoring & Audit Report for Porter Shelter Phase 3, Po Toi O Sewage Treatment Plant

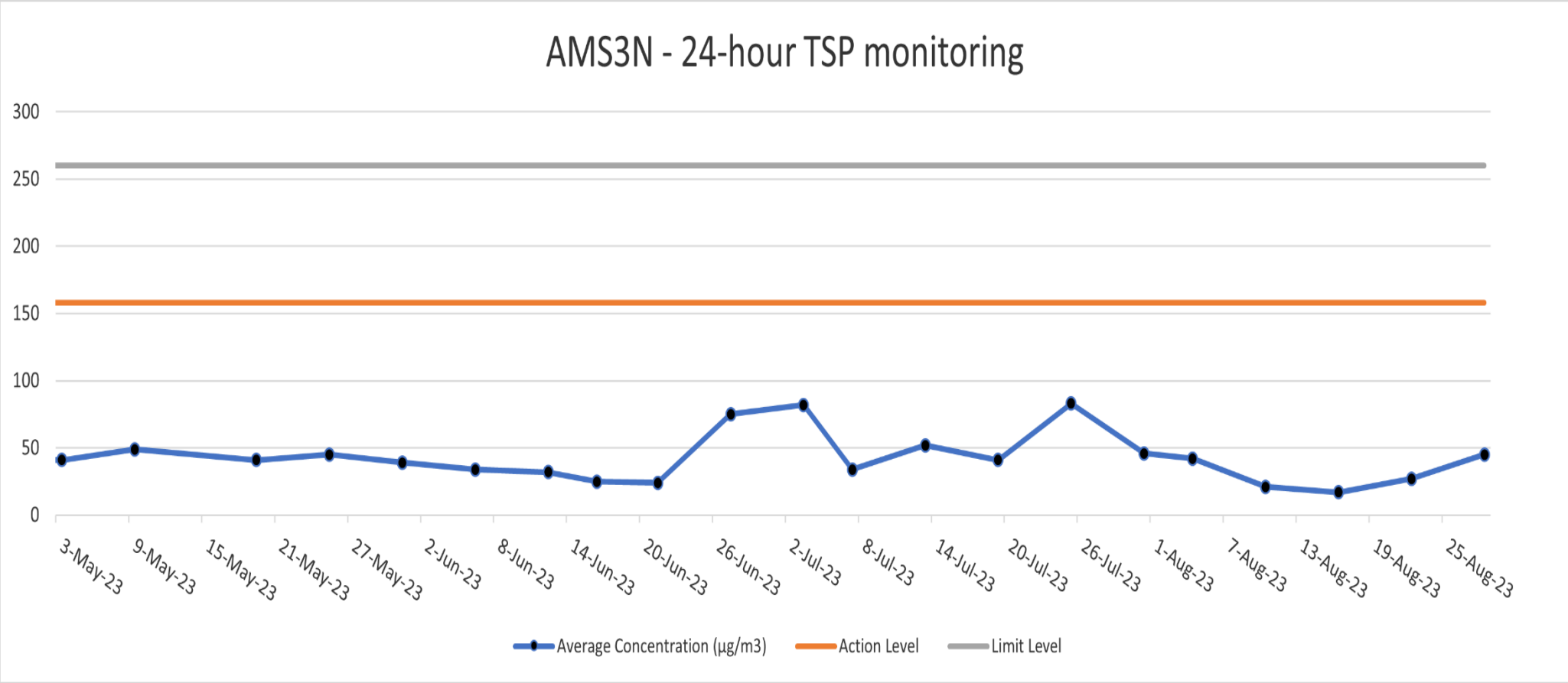
2023 August 24-hour Monitoring Data

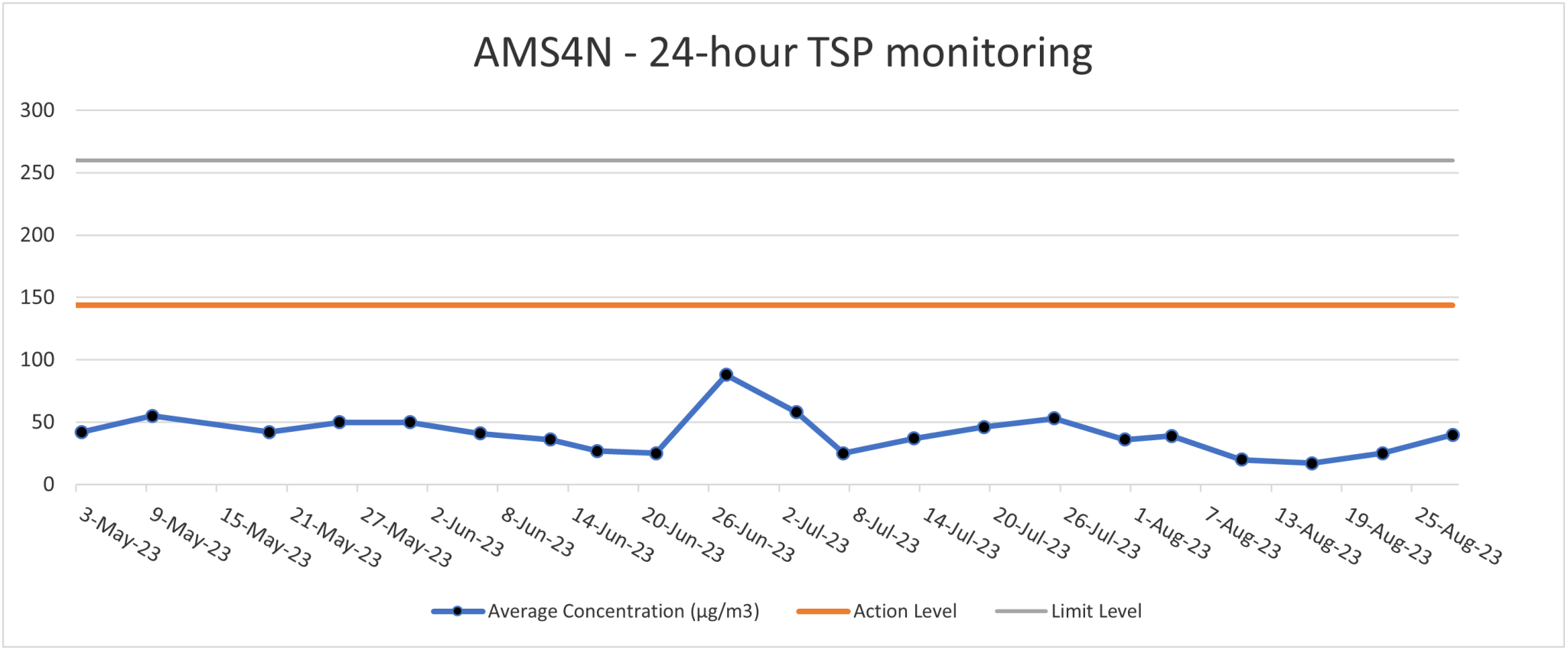
Monitoring Location: AMS4N

Hour	4-Aug-23	10-Aug-23	16-Aug-23	22-Aug-23	28-Aug-23
1	40	19	21	25	42
2	41	20	20	23	41
3	40	21	21	22	40
4	44	22	19	22	46
5	44	25	19	25	45
6	42	25	17	28	45
7	43	26	16	27	43
8	41	24	15	26	41
9	42	22	15	25	42
10	40	23	15	24	40
11	41	25	16	27	41
12	39	25	15	25	39
13	38	20	16	24	38
14	39	17	15	25	37
15	39	15	15	28	39
16	36	15	14	26	36
17	34	14	14	25	35
18	35	16	15	24	34
19	39	17	20	28	39
20	37	20	19	25	40
21	42	23	24	23	44
22	42	22	22	22	42
23	40	20	25	27	43
24	41	23	21	25	41
Average:	40	21	18	25	41
24-hr TSP ($\mu g/m^3$; with correlation(x)	61	31	26	38	63
Action Level:	144				
Limit Level:	260				


AMS1N - 24-hour TSP monitoring
300
250
200
150
100
50
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level


AMS2N1 - 24-hour TSP monitoring
300
250
200
150
100
50
0
03/05/2023
09/05/2023
15/05/2023
21/05/2023
27/05/2023
02/06/2023
08/06/2023
14/06/2023
20/06/2023
26/06/2023
02/07/2023
08/07/2023
14/07/2023
20/07/2023
26/07/2023
01/08/2023
07/08/2023
13/08/2023
19/08/2023
25/08/2023
Average Concentration (µg/m3)
Action Level
Limit Level


AMS3N - 24-hour TSP monitoring
300
250
200
150
100
50
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level


AMS4N - 24-hour TSP monitoring
300
250
200
150
100
50
0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Average Concentration (µg/m3)
Action Level
Limit Level

APPENDIX H – EVENT AND ACTION PLAN

AIR QUALITY MONITORING

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
Exceedance for one sample	1. Repeat measurement to confirm findings; 2. If exceedance is confirmed, inform the Contractor, IEC and ER; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; and 4. Increase monitoring frequency.	1. Check monitoring data submitted by the ET; 2. Check Contractor's working method; and 3. Discuss with ET, ER and Contractor on possible remedial measures 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; and 3. Amend working methods agreed with the ER as appropriate.
Exceedance for two or more consecutive samples	1. Repeat measurements to confirm findings; 2. If exceedance is confirmed, inform Contractor, IEC and ER; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Increase monitoring frequency to daily; 5. Advise the Contractor and ER on the effectiveness of the proposed remedial measures; 6. Discuss with IEC and Contractor on remedial actions required;	1. Check monitoring data submitted by the ET; 2. Check Contractor's working method; and 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC agree with the Contractor on the remedial measures to be implemented; and 3. Supervise implementation of remedial measures	1. Identify source(s) and investigate the causes of exceedance; 2. Submit proposals for remedial measures to the ER, ET and IEC within three working days of notification for agreement; 3. Implement the agreed proposals; and 4. Amend proposal as appropriate.

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
	7. If exceedance continues, arrange meeting with Contractor, IEC and ER to discuss the remedial measures to be taken; and 8. If exceedance stops, cease additional monitoring.			
LIMIT LEVEL				
Exceedance for one sample	1. Repeat measurement to confirm findings; 2. If exceedance is confirmed, inform the Contractor, IEC, EPD and ER; 3. Identify source(s), investigate the causes of exceedance and propose remedial; 4. Increase monitoring frequency to daily; and 5. Discuss with the ER, IEC and Contractor on the remedial measures and assess effectiveness.	1. Check monitoring data submitted by the ET; 2. Check Contractor's working method; 3. Discuss with the ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Review and agree on the remedial measures proposed by the Contractor; and 3. Ensure remedial measures properly implemented.	1. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to ER, ET and IEC within three working days of notification for agreement; 4. Implement the agreed proposals; and 5. Amend proposal if appropriate.
Exceedance for two or more consecutive samples	1. Repeat measurement to confirm findings; 2. If exceedance is confirmed, inform IEC, ER, Contractor and EPD; 3. Identify source(s), investigate the causes of	1. Check monitoring data submitted by the ET; 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions;	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented;	1. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to the

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
	exceedance and propose remedial measures; 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; and 8. If exceedance stops, cease additional monitoring.	3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 4. Supervise the implementation of remedial measures.	3. Supervise the implementation of remedial measures; and 4. 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.	ER, IEC and ET within three working days of notification for agreement; 4. Implement the agreed proposals; 5. Revise and resubmit proposals if problem still not under control; and 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note: ET – Environmental Team; ER – Engineer's Representative; IEC – Independent Environmental Checker

NOISE IMPACT MONITORING

Event	Action			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC, ER and Contractor of exceedance; 2. Identify source 3. Investigate the causes of exceedance and propose remedial measures; 4. Report the results of investigation to the IEC, ER and Contractor; 5. Discuss with the IEC, ER and Contractor and formulate remedial measures; 6. Increase monitoring frequency to check mitigation effectiveness	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to ER with copy to ET and IEC; Implement noise mitigation proposals.

Event	Action			
	ET	**IEC**	**ER**	**CONTRACTOR**
Limit Level				
	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented; 5. If exceedance continues, investigate what portion of the work is responsible and instruct the Contractor to terminate that portion of work until the exceedance ceases.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to ER with copy to ET and IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Terminate the relevant portion of works as determined by the ER until the exceedance ceases.

APPENDIX I - NOISE MONITORING EQUIPMENT CALIBRATION CERTIFICATES

東業德勤測試顧問有限公司
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Form Q/AS/C/02 Issue 1(1/4) [02/22]

Calibration Certificate

Certificate No. : **CSA27669**
Page : 1 of 2

Information Provided by Customer

Customer : ETS - Testconsult Limited
Address : 8/F., Block B, Veristrong Industrial Centre, 34 - 36 Au Pui Wan Street, Fotan, Shatin, Hong Kong

Information of Unit-under-test (UUT)

Description	: Sound Level Calibrator		
Manufacturer	: RION	Equipment I.D.	: ET/EN/002/01
Type	: NC-73	Serial No.	: 10196943

Laboratory Information

Lab. Ref. No.	: Q/CAL/22/9442/I	Procedure	: CQS/002/A
Date of Calibration	: 7-Nov-2022	Date of Receipt	: 1-Nov-2022
Date of Issue	: 10-Nov-2022	Calibration Location	: Calibration Laboratory

Calibration Condition

Ambient Temperature	: (20±3) °C	Relative Humidity	: (50±20) %
Stabilizing Time	: 30 minutes	Sampling	: As received
Ambient Pressure	: (1000±5) hPa		

Reference equipment

- Multi-function sound calibrator, ET/2801/01
- Measuring Amplifier, ET/2702/01/01
- Signal generator, ET/2503/01
- Reference Oscilloscope, ET/2502/01

Calibration specification

- To perform the calibration of sound level calibrator.

Calibration result

- The results are detailed on the subsequent pages.

Remarks

- The calibration results apply to the particular unit-under-test only.
- The values given in this calibration certificate only to the values measureed at the time of test & any uncertainties quoted will not include allowance for the equipment long term drift, varifications with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement

Calibrated By : Tommy TAM & Tony MA (Technician)

Approved By: CHAN Chi Wai

The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards.
This report shall not be reproduced unless with prior written approval from this laboratory.

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Form QAS/C/02 Issue 1(2/4) [02/22]

Calibration Certificate

Certificate No. : CSA27669

Page : 2 of 2

Calibration Result:

1. Measured Sound Pressure Level:

Nominal Frequency (Hz)	Nominal Output Sound Pressure (dB)	Measured Output (dB)	Expanded Uncertainty (dB)	Coverage Factor
1000	94.0	94.0	0.13	2.0

2. Actual Output Frequency:

Nominal Frequency (Hz)	Nominal Output Sound Pressure (dB)	Measured Output (Hz)	Expanded Uncertainty (Hz)	Coverage Factor
1000	94.0	981.906	0.13	2.0

Remark:

- The uncertainty quoted is based on 95 % confidence level.
- Measured output are mean of three measurements.

End of certificate

東業德勤測試顧問有限公司
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Form QIAS/C/02 Issue 1(1/4) [02/22]

Calibration Certificate

Certificate No. : **CSA33530**

Page : 1 of 2

Information Provided by Customer

Customer : ETS - Testconsult Limited

Address : 8/F., Block B, Veristrong Industrial Centre, 34 - 36 Au Pui Wan Street, Fotan, Shatin, Hong Kong

Information of Unit-under-test (UUT)

Description	: Sound Level Calibrator		
Manufacturer	: Castle	Equipment I.D.	: ET/EN/002/07
Type	: GA607	Serial No.	: 038641

Laboratory Information

Lab. Ref. No.	: Q/CAL/23/4006/I	Procedure	: CQS/002/A
Date of Calibration	: 19-May-2023	Date of Receipt	: 17-May-2023
Date of Issue	: 19-May-2023	Calibration Location	: Calibration Laboratory

Calibration Condition

Ambient Temperature	: (20 ± 3) °C	Relative Humidity	: (50±20) %
Stabilizing Time	: 30 minutes	Sampling	: As received
Ambient Pressure	: (1000 ± 50) hPa		

Reference equipment

- Multi-function sound calibrator, ET/2801/01
- Measuring Amplifier, ET/2702/01/01
- Signal generator, ET/2503/01
- Reference Oscilloscope, ET/2502/01

Calibration specification

- To perform the calibration of sound level calibrator.

Calibration result

- The results are detailed on the subsequent pages.

Remarks

- The calibration results apply to the particular unit-under-test only.
- The values given in this calibration certificate only to the values measureed at the time of test & any uncertainties quoted will not include allowance for the equipment long term drift, varifications with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement

Calibrated By : Tony MA (Technician)

Approved By: CHAN Chi Wai

The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards.

東業德勤測試顧問有限公司
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Form QIAS/C/02 Issue 1(2/4) [02/22]

Calibration Certificate

Certificate No. : CSA33530

Page : 2 of 2

Calibration Result:

1. Measured Sound Pressure Level:

Nominal Frequency (Hz)	Nominal Output Sound Pressure (dB)	Measured Output (dB)	Expanded Uncertainty (dB)	Coverage Factor
1000	94.0	94.1	0.13	2.0
1000	104.0	104.0	0.13	2.0

2. Actual Output Frequency:

Nominal Frequency (Hz)	Nominal Output Sound Pressure (dB)	Measured Output (Hz)	Expanded Uncertainty (Hz)	Coverage Factor
1000	94.0	1000.020	0.057	2.0
1000	104.0	1000.017	0.057	2.0

Remark:

- The uncertainty quoted is based on 95 % confidence level.
- Measured output are mean of three measurements.

End of certificate

東業德勤測試顧問有限公司
ETS-TESTCONSULT LTD.™

8/F Block B,
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34-36 Au Pui Wan Street,
Fo Tan, Hong Kong

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F: +852 2695 3944
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Form Q/AS/C/01 Issue 1(1/7) [09/21]

Calibration Certificate

Certificate No. : **CSA32590**

Page : 1 of 3

Information Provided by Customer

Customer : ETS - TESTCONSULT LIMITED

Address : 8/F., Block B, Veristrong Industrial Centre, 34 - 36 Au Pui Wan Street, Fotan, Shatin, Hong Kong

Information of Unit-under-test (UUT)

	Sound Level Meter	Microphone	Pre-amplifier
Manufacturer	RION	RION	-
Type	NL-52	UC-59	NH-25
Equipment I.D. no.	ET/EN/003/18	-	-
Serial No.	00264520	09668	64646
Adaptors used	-	-	-
Resolution	0.1 dB	-	-

Laboratory Information

Lab. Ref. No. : Q/CAL/23/2956/I

Date of Calibration : 19-Apr-2023

Date of Issue : 20-Apr-2023

Procedure : CQS/001/A

Date of Receipt : 13-Apr-2023

Calibration Location : Calibration Laboratory

Calibration Condition

Ambient Temperature : (20 ± 3) °C

Stabilizing Time : 30 minutes

Ambient Pressure : (1000 ± 50) hPa

Relative Humidity : (50 ± 20) %

Sampling : As received

Reference equipment

- Multi-function sound calibrator, ET/2801/01
- Signal generator, ET/2503/01

Calibration specification

- To perform the calibration of linearity and frequency response by multi-function sound calibrator.

Calibration result

- The results are detailed on the subsequent pages.

Remarks

- The calibration results apply to the particular unit-under-test only.
- The values given in this calibration certificate only to the values measureed at the time of test & any uncertainties quoted will not include allowance for the equipment long term drift, varifications with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement

Calibrated By : Tommy TAM (Technician)

Approved By: CHAN Chi Wai

The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards.

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Calibration Certificate

Certificate No. : CSA32590

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Calibration Result:

1 Reference Sound Pressure Level : (Unit in: dB)

Range / Mode			Reference Level	REF Frequency (kHz)	UUT Reading	Deviation	Expanded Uncertainty	Coverage Factor
A-Weighting	Self-cal	Before	94.0	1	94.8	0.8	0.13	2.0
	Range	30 to 130	104.0		104.8	0.8	0.13	2.0
	Mode	Fast	114.0		114.8	0.8	0.13	2.0
A-Weighting	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.1	0.1	0.13	2.0
	Mode	Fast	114.0		114.0	0.0	0.13	2.0
	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.1	0.1	0.13	2.0
	Mode	Slow	114.0		114.0	0.0	0.13	2.0
C-Weighting	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.0	0.0	0.13	2.0
	Mode	Fast	114.0		114.0	0.0	0.13	2.0
	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.0	0.0	0.13	2.0
	Mode	Slow	114.0		114.0	0.0	0.13	2.0
Z-Weighting	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.0	0.0	0.13	2.0
	Mode	Fast	114.0		114.0	0.0	0.13	2.0
	Self-cal	After	94.0	1	94.0	0.0	0.13	2.0
	Range	30 to 130	104.0		104.0	0.0	0.13	2.0
	Mode	Slow	114.0		114.0	0.0	0.13	2.0

Remark:

- The uncertainty quoted is based on 95 % confidence level.
- UUT reading are mean of three measurements.
- Deviation = UUT Reading - Reference Level
- Laboratory reference multi-function sound calibrator was used to adjust the "Self cal" reading of UUT.

***

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Form GIAS/C/01 Issue 1(3/7) [09/21]

Calibration Certificate

Certificate No. : CSA32590

Calibration Result:

Acoustic Sensitivity and Frequency Response:

2 Frequency Response A-Weighting (Unit in: dB)

Range	Mode	Applied Level	Frequency (Hz)	Reference Level	UUT Reading	Deviation	IEC 61672-1:2002 class 1 Specification
30 to 130	Fast	94	31.5	54.8	54.7	0.1	-39.4 +/- 2.0
			63	67.8	67.9	0.1	-26.2 +/- 1.5
			125	77.9	78.0	0.1	-16.1 +/- 1.5
			250	85.4	85.4	0.0	-8.6 +/- 1.4
			500	90.8	90.8	0.0	-3.2 +/- 1.4
			1000 (Ref.)	94.0	94.0	0.0	0 +/- 1.1
			2000	95.1	95.2	0.1	+1.2 +/- 1.6
			4000	94.9	94.9	0.0	+1.0 +/- 1.6
			8000	92.9	92.0	-0.9	-1.1 (+2.1 ; - 3.1)
			12500	89.7	85.1	-4.6	-4.3 (+3.0 ; -6.0)
			16000	87.5	79.8	-7.7	-8.6 (+3.5 ; -17.0)

3 Frequency Response C-Weighting : (Unit in: dB)

Range	Mode	Applied Level	Frequency (Hz)	Reference Level	UUT Reading	Deviation	IEC 61672-1:2002 class 1 Specification
30 to 130	Fast	94	31.5	91.0	90.9	-0.1	-3.0 +/- 2.0
			63	93.2	93.2	0.0	-0.8 +/- 1.5
			125	93.8	93.9	0.1	-0.2 +/- 1.5
			250	94.0	94.0	0.0	0.0 +/- 1.4
			500	94.0	94.0	0.0	0.0 +/- 1.4
			1000 (Ref.)	94.0	94.0	0.0	0 +/- 1.1
			2000	93.7	93.8	0.1	-0.2 +/- 1.6
			4000	93.1	93.1	0.0	-0.8 +/- 1.6
			8000	91.0	90.1	-0.9	-3.0 (+2.1 ; -3.1)
			12500	87.8	83.2	-4.6	-6.2 (+3.0 ; -6.0)
			16000	85.6	77.9	-7.7	-8.5 (+3.5 ; -17.0)

4 Frequency Response Z-Weighting : (Unit in: dB)

Range	Mode	Applied Level	Frequency (Hz)	Reference Level	UUT Reading	Deviation	IEC 61672-1:2002 class 1 Specification
30 to 130	Fast	94	31.5	94.0	94.0	0.0	0.0 +/- 2.0
			63	94.0	94.0	0.0	0.0 +/- 1.5
			125	94.0	94.0	0.0	0.0 +/- 1.5
			250	94.0	94.0	0.0	0.0 +/- 1.4
			500	94.0	94.0	0.0	0.0 +/- 1.4
			1000 (Ref.)	94.0	94.0	0.0	0 +/- 1.1
			2000	94.0	94.0	0.0	0.0 +/- 1.6
			4000	94.0	93.9	0.0	0.0 +/- 1.6
			8000	94.0	93.0	-1.0	0.0 (+2.1 ; -3.1)
			12500	94.0	89.7	-4.3	0.0 (+3.0 ; -6.0)
			16000	94.0	87.6	-6.4	0.0 (+3.5 ; -17.0)

- Expended uncertainty of measurement:

	Range (Hz)	(dB)	Range (Hz)	(dB)
94 dB	31.5	0.15	2000	0.13
	63	0.15	4000	0.13
	125	0.15	8000	0.14
	250	0.14	12500	0.14
	500	0.12	16000	0.14
	1000	0.13		

Remark:
- Manufacturer specification: IEC 61672 class 1
- Signal level at 1000 Hz is set as indication of reference sound pressure level.
- The uncertainty quoted is based on 95 % confidence level with coverage factor k=2.0.
- UUT reading are mean of three measurements.
- Deviation = UUT Reading - Reference Level

End of certificate

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Calibration record of Anemometer

Equipment Ref. No. :	ET/EN/001/05	Manufacturer :	AZ Instrument
Model No. :	AZ 8908	Serial No. :	1064869
Date of Check :	28-Oct-2022	Due Date :	27-Oct-2023

Method

1 Pipe with diameter about 10cm and length about 1m was used.
2 A fan with various speed control had set in on end of the pipe
3 Adjust the speed and direction of the fan to achieve the target wind speeds
4 Use the reference anemometer and the unit under test to check the wind speed in the other end of pipe.
5 Record the indicated value of both anemometer
6 Apply the corrected value in the reference anemometer and calculate the corrected value of UUT.
7 The corrected value in the UUT should not over ±5% of the Full scale

Reference Anemometer

Equipment Ref. No. : ET/1215/01 Calibration Due Date : 15-Aug-2024

Environmental Condition

Ambient Temperature : 23.0 Relative Humidity : 55%

Results

Applied Range (m/s)	Reference Anemometer (m/s)		Unit Under Test (m/s)	
	Indicated Value	Corrected Value	Indicated Value	Corrected Value
0	0.00	0.00	0.0	0.0
2 - 3	2.52	2.51	2.4	+0.1
4 - 6	5.36	5.50	5.3	+0.2
9 - 11	10.1	10.2	9.8	+0.4
14 - 16	15.0	15.3	14.7	+0.6
18 - 20	18.9	19.2	18.5	+0.7

Acceptance Criteria

Correction value should < ±5% FS

The Anemometer complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use.
* Delete as appropriate

Checked by : Approved by :

APPENDIX J - NOISE IMPACT MONITORING RESULT

Monthly Environmental Monitoring & Audit Report for Port Shelter Phase 3, Po Toi O Sewerage Treatment Plant

2023 August Noise Monitoring Data

Monitoring Location: NMS1N

Date	Noise Monitoring (30min)		
	Leq dB(A)	L10 dB(A)	L90 dB(A)
10-Aug-23	59.9	61.8	51.2
16-Aug-23	67.1	68.8	60.1
22-Aug-23	62.1	64.4	57.4
28-Aug-23	64.7	67.8	56.9
Average	64.3		
Action Level:	When one valid documented complaint is received		
Limit Level:	75.0 dB(A)		

Monthly Environmental Monitoring & Audit Report for Port Shelter Phase 3, Po Toi O Sewerage Treatment Plant

2023 August Noise Monitoring Data

Monitoring Location: NMS2N1

Date	Noise Monitoring (30min)		
	Leq dB(A)	L10 dB(A)	L90 dB(A)
10-Aug-23	61.5	63.7	53.7
16-Aug-23	65.0	67.5	58.0
22-Aug-23	58.8	56.6	49.0
28-Aug-23	56.4	57.9	51.0
Average	61.6		
Action Level:	When one valid documented complaint is received		
Limit Level:	75.0 dB(A)		

Monthly Environmental Monitoring & Audit Report for Port Shelter Phase 3, Po Toi O Sewerage Treatment Plant

2023 August Noise Monitoring Data

Monitoring Location: NMS3N

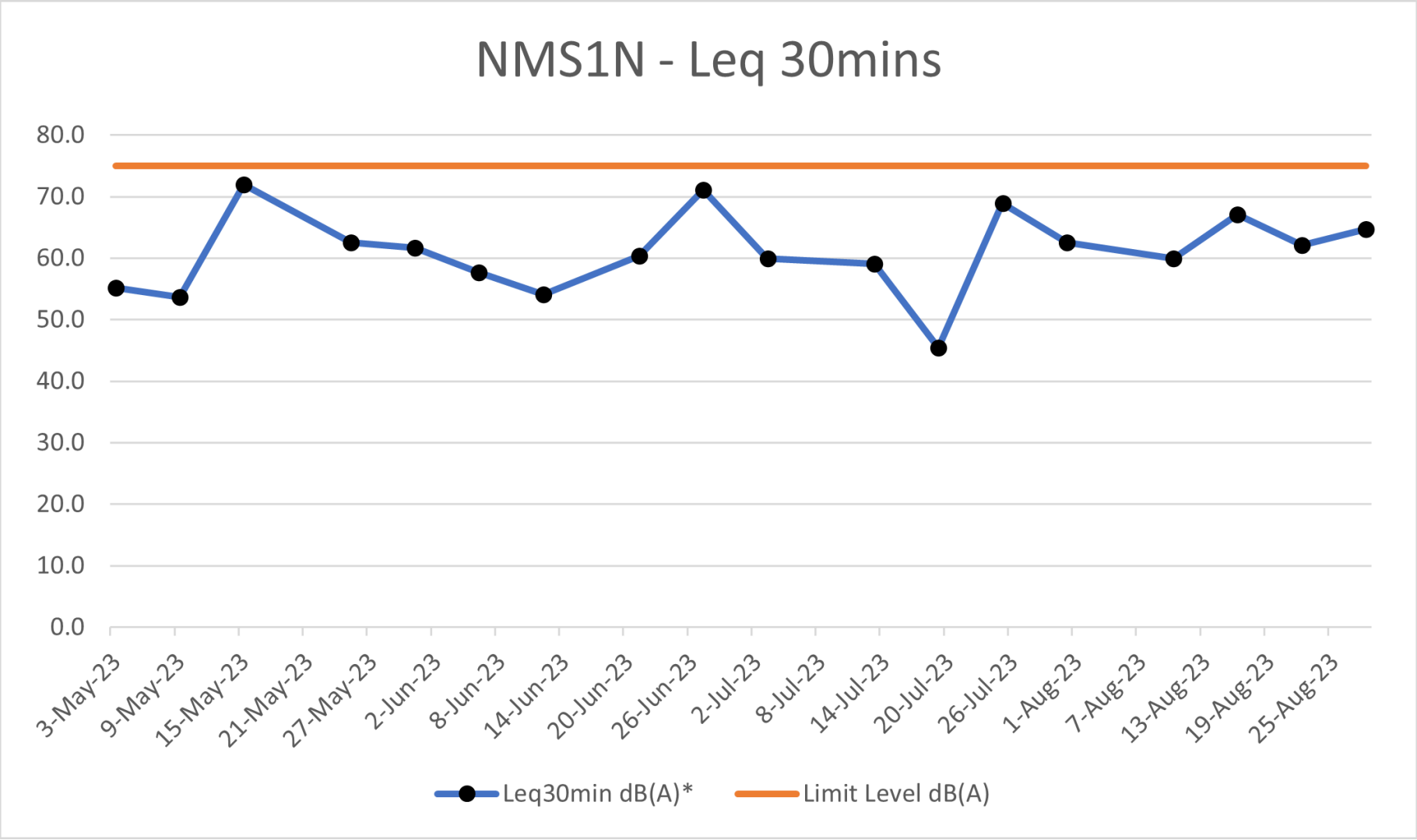
Date	Noise Monitoring (30min)		
	Leq dB(A)	L10 dB(A)	L90 dB(A)
10-Aug-23	62.3	63.2	55.3
16-Aug-23	58.4	60.0	55.1
22-Aug-23	57.0	60.1	49.3
28-Aug-23	53.6	56.4	46.5
Average	58.9		
Action Level:	When one valid documented complaint is received		
Limit Level:	75.0 dB(A)		

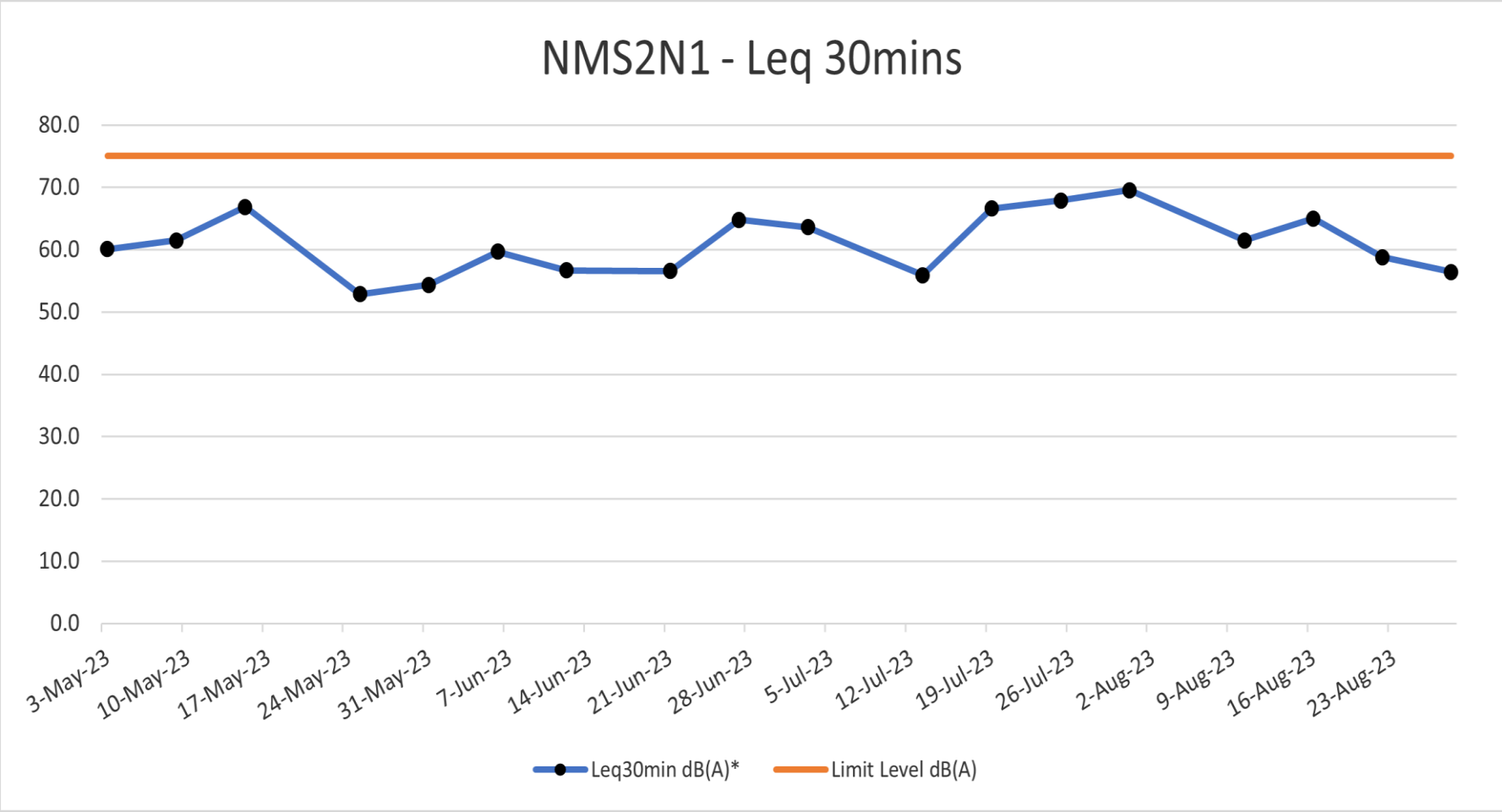
Monthly Environmental Monitoring & Audit Report for Port Shelter Phase 3, Po Toi O Sewerage Treatment Plant

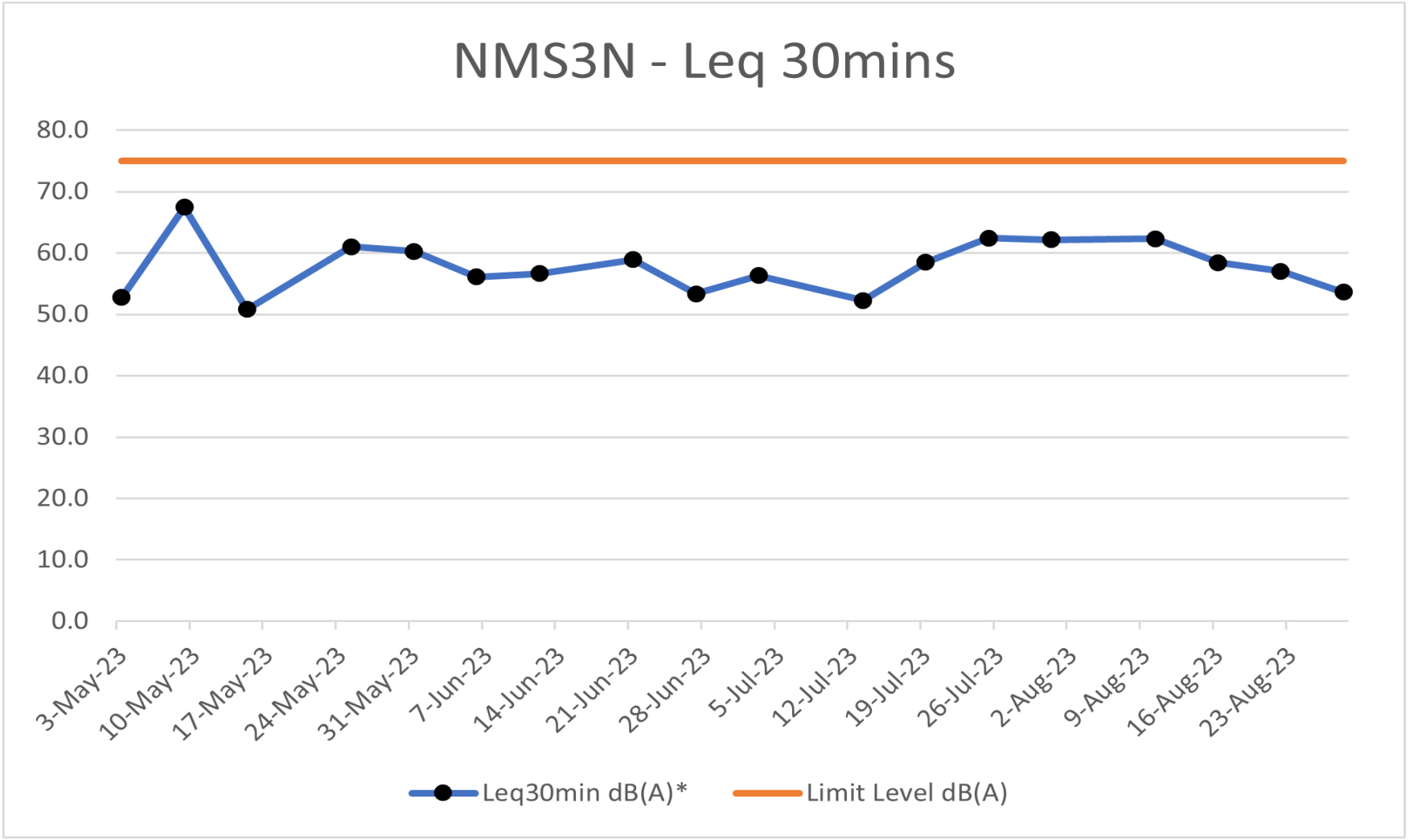
2023 August Noise Monitoring Data

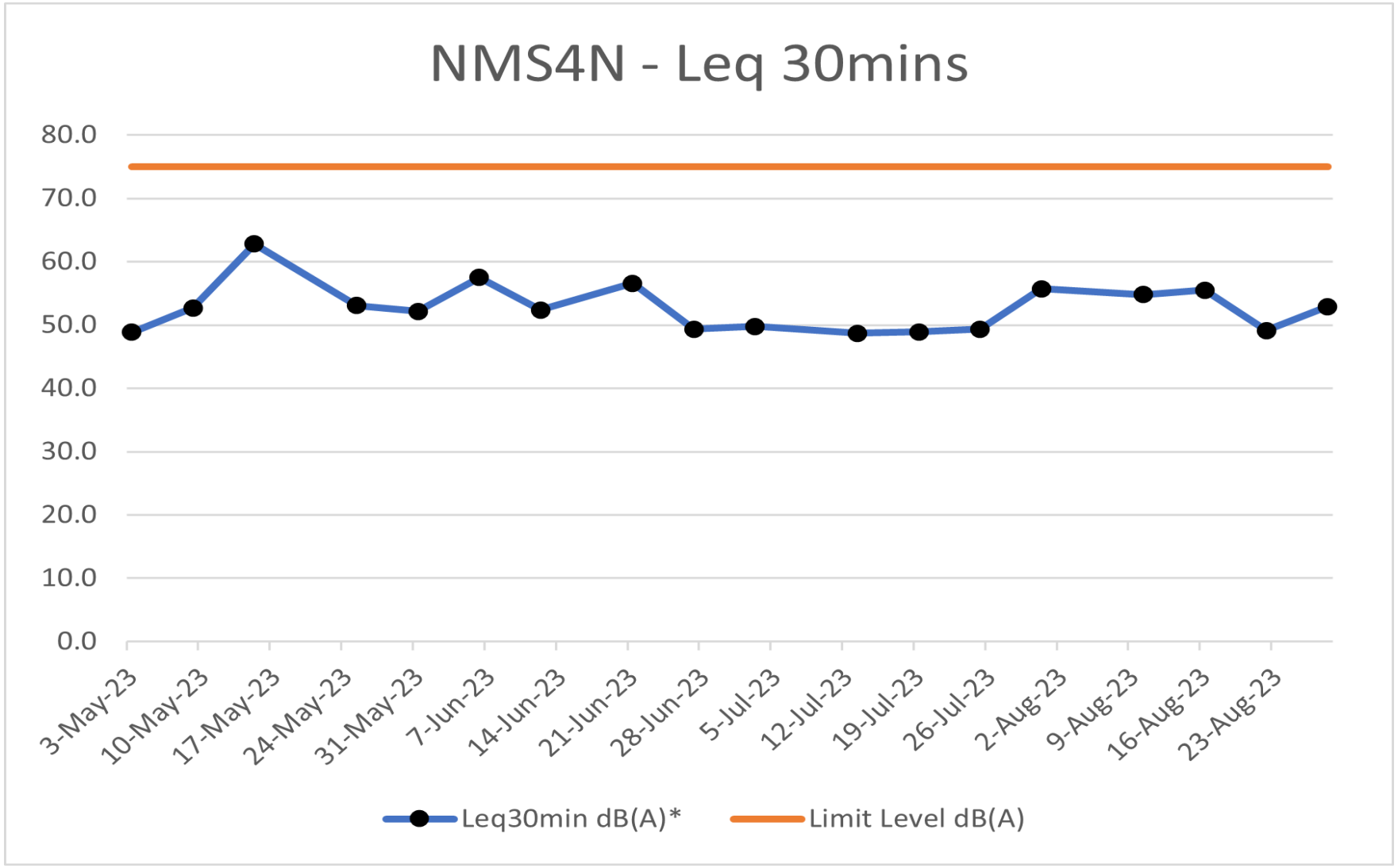
Monitoring Location: NMS4N

Date	Noise Monitoring (30min)		
	Leq dB(A)	L10 dB(A)	L90 dB(A)
10-Aug-23	54.8	56.4	50.5
16-Aug-23	55.5	57.2	51.7
22-Aug-23	49.1	51.5	44.5
28-Aug-23	52.9	55.8	46.0
Average	53.7		
Action Level:	When one valid documented complaint is received		
Limit Level:	75.0 dB(A)		


NMS1N - Leq 30mins
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
3-May-23
9-May-23
15-May-23
21-May-23
27-May-23
2-Jun-23
8-Jun-23
14-Jun-23
20-Jun-23
26-Jun-23
2-Jul-23
8-Jul-23
14-Jul-23
20-Jul-23
26-Jul-23
1-Aug-23
7-Aug-23
13-Aug-23
19-Aug-23
25-Aug-23
Leq30min dB(A)*
Limit Level dB(A)


NMS2N1 - Leq 30mins
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
3-May-23
10-May-23
17-May-23
24-May-23
31-May-23
7-Jun-23
14-Jun-23
21-Jun-23
28-Jun-23
5-Jul-23
12-Jul-23
19-Jul-23
26-Jul-23
2-Aug-23
9-Aug-23
16-Aug-23
23-Aug-23
Leq30min dB(A)*
Limit Level dB(A)


NMS3N - Leq 30mins
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
3-May-23
10-May-23
17-May-23
24-May-23
31-May-23
7-Jun-23
14-Jun-23
21-Jun-23
28-Jun-23
5-Jul-23
12-Jul-23
19-Jul-23
26-Jul-23
2-Aug-23
9-Aug-23
16-Aug-23
23-Aug-23
Leq30min dB(A)*
Limit Level dB(A)


NMS4N - Leq 30mins
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
3-May-23
10-May-23
17-May-23
24-May-23
31-May-23
7-Jun-23
14-Jun-23
21-Jun-23
28-Jun-23
5-Jul-23
12-Jul-23
19-Jul-23
26-Jul-23
2-Aug-23
9-Aug-23
16-Aug-23
23-Aug-23
Leq30min dB(A)*
Limit Level dB(A)

APPENDIX K – MONTHLY SUMMARY OF WASTE FLOW

Monthly Summary Waste Flow Table for 2023 Year

Month		Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Imported Fill	Metals	Paper / Cardboard Packaging	Plastics (see note 3)	Chemical Waste	Other, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	[in Tonne]
Jan	0.003	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000
Feb	0.007	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Mar	0.676	0.000	0.000	0.000	0.676	0.000	0.000	0.000	0.000	0.000	0.000
Apr	0.336	0.000	0.000	0.000	0.336	0.000	0.000	0.000	0.000	0.000	0.000
May	0.091	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.000	0.000
June	0.004	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Sub-Total	1.117	0.000	0.000	0.000	1.117	0.000	0.000	0.000	0.000	0.000	0.000
July	0.004	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Aug	0.096	0.000	0.000	0.000	0.096	0.000	0.000	0.000	0.000	0.000	0.000
Sep											
Oct											
Nov											
Dec											
Total	1.217	0.000	0.000	0.000	1.217	0.000	0.000	0.000	0.000	0.000	0.000

Note:

1) The performance targets are given in the Environmental Management Plan.
(2) The waste flow table shall also include C&D materials to be imported for use at the Site.
(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

APPENDIX L - IMPLEMENTATION SCHEDULE OF RECOMMENDED MITIGATION MEASURES

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Air Quality impact								
Project Specific Measures								
3.8	A1	Deodourizer should have at least 99.5% hydrogen sulfide removal efficiency.	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A2	Odourous materials (sludge, screenings and grits, worn filter) should be stored and removed in sealed tankers and containers.	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A3	Sludge should be transferred to sludge tanker by coupling method.	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A4	During release of pressure from the tanker, the odourous gas should be discharged into the sludge storage room for extraction to deodourization unit.	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A5	Regular inspection should be conducted to check for leakage of odourous gas.	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A6	Maintain the removal efficiency of screenings and grits by flushing the screens and grit sump regularly to prevent buildup of solids	To maintain the removal efficiency of screenings and grits	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A7	Maintain the efficiency of MBR membrane by removing organic and inorganic debris regularly	To maintain the efficiency of MBR membrane	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A8	Replace worn filter to maintain the odour removal efficiency at 99.5%	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
3.8	A9	Clean all the tanks with water regularly	To minimize odour nuisance to sensitive receivers	DSD	Sewage Treatment Plant	Throughout operational phase	Operational phase	EIAO-TM
General/Standard Measures								
3.8	A10	Good housekeeping to minimize dust generation, e.g. by properly handling and storing dusty materials	To minimize dust generation	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM, APCO
3.8	A11	Adopt dust control measures, such as dust suppression using water spray on exposed soil (at least 4 times per day), in areas with dusty construction activities and during material handling	To minimize dust generation due to erosion	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
3.8	A12	Store cement bags in shelter with 3 sides and the top covered by impervious materials if the stack exceeds 20 bags	To prevent leakage of cement	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A13	Maintain a reasonable height when dropping excavated materials to limit dust generation	To minimize dust generation during movement of excavated materials	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A14	Limit vehicle speed within construction site and in Po Toi O to 10km/hr and confine vehicle movement in haul road	To minimize dust generation due to traffic movement	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A15	Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating, soil compacting or covering with bitumen	To minimize dust generation due to erosion	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A16	Provide wheel washing at construction site exit to clean the vehicle body and wheel	To prevent dust from being brought offsite	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A17	Cover materials on trucks before leaving the construction site to prevent debris from dropping during traffic movement or being blown away by wind	To prevent falling of debris during traffic movement and by wind	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A18	Regular maintenance of plant equipment to prevent black smoke emission	To minimize black smoke emission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A19	Throttle down or switch off unused machines or machine in intermittent use	To minimize unnecessary emission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A20	Minimize excavation area as far as possible	To minimize dust emission and potential release of odour from exposed ground	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
3.8	A21	Store odourous excavated materials in covered containers and remove off-site as soon as possible within 24 hours	To minimize odour nuisance to sensitive receivers	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A22	Cover open stockpiles of construction materials (e.g. aggregates, sand and fill materials) with impermeable materials such as tarpaulin during rainstorms	To prevent soil erosion under rainstorm	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A23	Hoarding of not less than 2.4 m high shall be erected from ground level to surround the construction site for sewage treatment plant along Po Toi O Chuen Road except for a construction site entrance or exit	To minimize dust emission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
3.8	A24	Carry out air quality monitoring throughout the construction period	To monitor construction dust level	DSD's Contractor	At representative ASRs	Prior to and throughout construction phase	Construction phase	EIAO-TM
3.8	A25	Carry out regular site inspection to audit the implementation of mitigation measures	To check the implementation status and effectiveness of mitigation measures	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Noise Impact								
Project Specific Measures								
4.7	N1	Use hand-held plant equipment or manual equipment within village area	To minimize construction noise level	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	NCO, EIAO-TM
4.7	N2	For HDD, enclose the stationary plant equipment on three sides with cover. Only the side facing the sea shall be opened for heat exhaustion.	To lower noise transmission	DSD's Contractor	HDD work site	Throughout construction phase	Construction Phase	NCO, EIAO-TM
4.7	N3	Generator should be placed at a fixed location at least 5-6m away from the NSRs and screened by noise barrier whenever excavation work has to be carried out at their front doors	To lower noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	NCO, EIAO-TM
4.7	N4	Avoid carrying out noisy activities at the same time. The work front of village sewer installation near NSRs PTO_N1 and PTO_N3 shall not be conducted concurrently with installation of Po Toi O Chuen Road sewer and horizontal directional drilling respectively.	To minimize noise production	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	NCO, EIAO-TM
4.7	N5	Vibratory poker shall only be operated 4m away from NSR and with noise barrier properly erected. Surfacing work within 4m from NSR shall be carried out by manual method	To minimize noise production	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	NCO, EIAO-TM
Generic/Standard Measures								
4.7	N6	Schedule noisy activities to minimise exposure of nearby NSRs to high levels of construction noise	To minimize construction noise level	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	NCO, EIAO-TM
4.7	N7	Use Quality Powered Mechanical Equipment (QPME) which produces lower noise level	To minimize construction noise level	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	NCO, EIAO-TM
4.7	N8	Erect 3m high mobile barriers with skid footing and a small cantilevered upper portion within a few metres of stationary plants and within about 5m of more mobile plant.	To lower noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	NCO, EIAO-TM

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4.7	N9	Hand-held breaker shall be fitted with mufflers. A movable enclosure made up of plywood is proposed to surround both worker and breaker during breaking process. The internal wall of the enclosure should be laid with sound absorbent such as mineral wool.	To lower noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N10	Regular maintenance of plant equipment to prevent noise emission due to impair	To prevent noise emission due to impair	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N11	Position mobile noisy equipment in location and direction away from NSR	To minimize noise transmission to NSR	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N12	Use silencer or muffler on plant equipment and should be properly maintained	To minimize noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N13	Throttle down or switch off unused machines or machine in Intermittent use between work	To minimize noise production	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N14	Make good use of stockpiles or other structures for noise screening	To minimize noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N15	Mobile plant should be sited as far away from NSRs as possible	To minimize noise transmission	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N16	Reduce the percentage on-time for some noisy PMEs	To mimize noise production	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
4.7	N17	Carry out noise monitoring	To monitor construction noise level	DSD's Contractor	At representative NSRs	Prior to and throughout construction phase	Construction phase	EIAO-TM, APCO

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Water Quality Impact								
Project Specific Measures								
5.8	W1	Divert the water from outfall of W3 (stream near Fairway Vista) during open cut excavation for laying of gravity sewer nearby	To prevent the excavated materials from falling into the water and being carried into the sea	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAOTM
5.8	W2	Place sandbag along the upstream section of the stream near Fairway Vista and along rocky shore during open cut excavation for laying of gravity sewers/rising mains nearby.	To prevent the excavated materials from falling into the water and being carried into the sea	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	ProPECC PN 1/94, EIAOTM
5.8	W3	Intercept the water from u-channel at the foot of the slope where the STP will be built	To prevent water from entering the construction site	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM
5.8	W4	Install cofferdam around the proposed excavation area for entry pit of HDD work to prevent falling of debris into the sea	To prevent debris from entering the waterbodies	DSD's Contractor	HDD work site	Throughout construction phase	Construction Phase	EIAO-TM
5.8	W5	Install sheet piles in marine waters by vibratory action.	To minimize dispersion of marine sediment	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
5.8	W6	Marine works (dredging, construction and installation works at diffuser location, backfilling) shall be carried out inside the watertight cofferdam. The cofferdam can only be removed after completion of work	To minimize dispersion of marine sediment	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM
5.8	W7	Dredging should be carried out by grab dredgers anchored outside the cofferdam. The marine sediment should be placed in sealed compartment of the marine barge.	To minimize dispersion of marine sediment	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM
5.8	W8	Water removed from the cofferdam should be desilted before discharge back into the sea.	To prevent discharge of silty water into the sea	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
5.8	W9	Carry out water quality monitoring at water sensitive receivers before and during cofferdam installation works, throughout dredging works, and during cofferdam extraction works	To identify any water quality impact due to construction works	DSD's Contractor	Water Monitoirng Stations	Before and throughout installation and extraction works of cofferdam	Construction phase	EIAO-TM
5.8	W10	The following summarizes the precautionary measures for minimizing chance of emergency discharge: • Provision of dual power by CLP; • Equipped with Supervisory control and data acquisition system (SCADA), which signals to the operation and maintenance personnel for emergency attendance in case of plant failure; • Provision of standby pump and screen at the PTOSTW. • Provision of emergency generator within 4 hours by DSD's future term contractor. • Provision of emergency storage with capacity of 4-hr sewage retention time. • Arrangement of tankers for removing incoming sewage to other sewage treatment plants for treatment.	To prevent emergency discharge	DSD	Sewage Treatment Plant	Operational phase	Operational phase	EIAO-TM
5.8	W11	Carry out water quality monitoring at water sensitive receivers during normal operation	To identify any water quality impact due to the normal operation of the Sewage Treatment Plant (STP)	DSD	At representative WSRs	6 months before and in 1st year of operation	Operational phase	WPCO, EIAO-TM
Generic/Standard Measures								
5.8	W12	Set up sedimentation tank for settling suspended solids in wastewater before discharge into storm drains. Sand/silt removal facilities such as sand traps, silt traps and sedimentation basin should be provided with adequate capacity.	To reduce the amount of suspended solid in wastewater	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W13	Follow ProPECC PN 1/94 "Construction Site Drainage" as far as practicable	To minimize surface runoff and chance of erosion	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W14	Construct catchpits and perimeter channels prior to commencement of site formation works and earthworks.	To stop runoff from flowing across the construction site	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W15	Maintain silt removal facilities, channels, manholes before and after rainstorm.	To prevent failure that may lead to flooding	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
5.8	W16	Remove silt and grit from silt trap at regular interval.	To prevent blockage the may lead to flooding	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W17	Well design works program to minimize the work areas to minimize the soil exposure and site runoff.	To minimize surface runoff and chance of erosion	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W18	Arrange soil excavation works outside rainy seasons (April to September) as far as possible. If this cannot be achieved, the following measures should be implemented: - Cover temporary exposed slope surfaces with impermeable materials, e.g. tarpaulin - Protect temporary access roads by crushed stone or gravel - Provide intercepting channels along crest/edge of excavation - Carry out adequate surface protection measures well before the arrival of a rainstorm	To minimize surface runoff and chance of erosion	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W19	Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating, soil compacting or covering with bitumen	To prevent soil erosion under Rainstorm	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W20	Prevent rainwater from entering trenches. Excavation of trenches should be dug and backfilled in short sections during rainy seasons. Remove silt in rainwater collected from the trenches or foundation excavations prior to discharge to storm drains.	To prevent soil erosion under Rainstorm	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W21	Cover open stockpiles of construction materials (e.g. aggregates, sand and fill materials) with impermeable materials such as tarpaulin during rainstorms.	To prevent soil erosion under rainstorm	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W22	Cover and temporary seal manholes to prevent silt, construction materials or debris and surface runoff from entering foul sewers.	To prevent overloading of foul sewers	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAO-TM
5.8	W23	Remove waste from the construction site regularly.	To prevent waste accumulation	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
5.8	W24	Apply discharge license for effluent discharge. Treat the discharge to comply with the requirement in TM-DSS.	To ensure compliance with effluent discharge requirement	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	WPCO, TM-DSS, EIAOTM

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5.8	W25	Reuse treated effluent onsite, e.g. dust suppression, wheel washing and general cleaning.	To minimize wastewater generation	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
5.8	W26	Monitor effluent water quality	To ensure compliance with effluent discharge requirement	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	WPCO, EIAO-TM
5.8	W27	Register as chemical waste producer if chemical waste will be generated.	To control chemical waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
5.8	W28	Perform maintenance of vehicles and equipment that have oil leakage and spillage potential on hard standings within a bunded area with sumps and oil interceptors.	To prevent oil leakage or spillage	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
5.8	W29	Dispose chemical waste in accordance to Waste Disposal Ordinance. Follow the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes,* examples as follows: - Store chemical wastes with suitable containers to avoid leakage or spillage during storage, handling and transport - Label chemical waste containers according to the CoP to notify and warn the waste handlers - Store chemical wastes at designated safe location with adequate space	To avoid accident in waste storage and handling	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
5.8	W30	Provide sufficient chemical toilets with regular maintenance by registered waste collector where necessary	To proper collection of tasks force waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
5.8	W31	Provide a drip tray/container underneath the bentonite recycling system	To prevent any leaked bentonite from entering the watercourse or sea	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
5.8	W32	Carry out regular site inspection to audit the implementation of mitigation measures	To check the implementation status and effectiveness of mitigation measures	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM, APCO
5.8	W33	Carry out effluent quality monitoring at location specified in the discharge licence	To ensure compliance with effluent discharge requirement	DSD	Effluent outlet	Operational phase	Operational phase	WPCO, EIAO-TM

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Terrestrial Ecology								
Project Specific Measures								
6.12	E1	Erect bright color fencing along the boundary of the undisturbed region of the shrubland and woodland, and around *Diospyros vaccinioides* , a plant species of conservation importance, near the work boundary to remind workers not to trespass or occupy the area, and to be careful during operation of equipment.	To protect the shrub from being Damaged	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
6.12	E2	Reinstate the disturbed rocky shore with the rocks temporarily removed	To restore the rocky shore habitat	DSD's Contractor	HDD work site	After completion of works near the rocky shore	Construction Phase	EIAO-TM
6.12	E3	Place sandbag around the section of W3 next to Fairway Vista and along the shore during open cut excavation for laying of gravity sewer nearby.	To prevent the excavated materials from falling into the water and being carried into the sea	DSD's Contractor	Whole construction site	When construction work is carried out in the vicinity of W3	Construction Phase	EIAO-TM
6.12	E4	Temporarily divert the water from outfall of W3 away from excavation area.	To prevent the excavated materials from falling into the water and being carried into the sea	DSD's Contractor	Whole construction site	When construction work is carried out in the vicinity of W3	Construction Phase	EIAO-TM
6.12	E5	Inspect the condition of the *Diospyros vaccinioides* near the work boundary as part of weekly site audit	To inspect the condition of the *Diospyros vaccinioides*	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
Generic/Standard Measures								
6.12	E6	Erection of hoarding, fencing or provision of clear demarcation of work zones	To remind workers not to damage area outside the work boundary	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM
6.12	E7	Designate areas for placement of equipment, building materials and wastes away from the natural environment	To prevent damage on the natural environment	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	EIAO-TM
6.12	E8	Carry out tree preservation and compensatory tree planting will be carried out in accordance with DEVB TCW No. 7/2015.	To reinstated woodland habitat	DSD's Contractor	Whole construction site	After completion of works near woodland	Construction phase	EIAO-TM

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Terrestrial Ecology								
Project Specific Measures								
9.8	WM1	Sludge will be delivered by sealed sludge tanker for treatment at Sludge Treatment Facilities	To prevent odour nuisance	DSD	STP	Throughout construction phase	Operational phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
9.8	WM2	Debris from screening process and general refuse should be stored within the STP in sealed container and be disposed of at landfill regularly.	To prevent odour nuisance	DSD	STP	Throughout construction phase	Operational phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
9.8	WM3	Worn filters and MBR membrane shall be stored and labelled as in construction phase. Chemical wastes shall be treated at chemical treatment facility by licensed contractor	To prevent odour nuisance	DSD	STP	Throughout construction phase	Operational phase	Waste Disposal Ordinance, EIAO-TM
Generic/Standard Measures								
9.8	WM4	Allocate an area for waste sorting and storage of C&D materials into the following categories for reuse, recycle or disposal if possible. Remove waste from the construction site for sorting once generated if no suitable space can be identified. - excavated materials suitable for reuse - inert C&D materials (or public fill) for disposal offsite - non-inert C&D materials (or C&D waste) for disposal at landfills - chemical waste - bentonite slurry for reconditioning and reuse - general refuse	To minimize waste generation	DSD's Contractor	Whole construction site	Throughout construction phase	Construction Phase	Waste Disposal Ordinance, EIAO-TM

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9.8	WM5	Adopt good site practice as follows: - Provide training to workers on site cleanliness, waste management (waste reduction, reuse and recycle) and chemical handling procedures - Provide sufficient waste collection points and regular removal - Cover waste materials with tarpaulin or in enclosure during transportation - Maintain drainage systems, sumps and oil interceptors - Sort out chemical waste for proper handling and treatment onsite or offsite	To proper handling of waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM6	Adopt waste reduction measures as follows: - Allocate area/containers for sorting, recovering and storing waste for reuse, recycle or disposal (e.g. demolition debris and excavated materials, general refuse like aluminium cans.) Remove waste from the construction site for sorting once generated if no suitable space can be identified. - Allocate area for proper storage of construction materials to prevent contamination - Minimize wastage through careful planning and avoiding overpurchase of construction materials	To minimize waste generation	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM7	Prepare and implement a site-specific Waste Management Plan (WMP) as part of Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005. Detail waste management method in the form of avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal according to the recommendations on the EIA and EM&A Manual. It should be approved by the ER and regularly reviewed.	To provide guidance to waste management	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ETWB TCW No. 19/2005, EIAO-TM

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9.8	WM8	Store waste materials properly as follows: - Avoid contamination by proper handling and storing waste - Prevent erosion by covering waste - Apply water spray on excavated materials - Maintain and clean storage area regularly - Sort and stockpile different materials at designated location to enhance reuse	To properly store waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAOTM
9.8	WM9	Apply for relevant waste disposal permits in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28), Dumping at Sea Ordinance (Cap. 466).	To properly dispose waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28), Dumping at Sea Ordinance (Cap. 466), EIAO-TM
9.8	WM10	Hire licensed waste disposal contractors for waste collection and removal. Dispose waste at licensed waste disposal facilities	To properly dispose waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM11	Implement trip-ticket system for recording the amount of waste generated, recycled and disposed, including chemical wastes	To monitor movement of waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, Waste Disposal Ordinance, EIAO-TM
9.8	WM12	Provide wheel washing at construction site exit to clean the vehicle body and wheel	To prevent dust from being brought offsite	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	ProPECC PN 1/94, EIAOTM
9.8	WM13	Reduce water content in wet spoil generated from piling work by mixing with dry materials. Only dispose treated spoil with less than 25% dry density to Public Fill Reception Facilities	To minimize load to reception facilities	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
9.8	WM14	Dispose dry waste or waste with less than 70% water content by weight to landfill	To minimize load to reception facilities	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM15	Follow the *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* as follows: - Store chemical wastes with suitable containers. Seal and maintain the container to avoid leakage or spillage during storage, handling and transport - Label chemical waste containers in both English and Chinese with instructions in accordance to Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation - The container capacity should be smaller than 450 litres unless agreed by the EPD	To avoid accident in waste storage and handling	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM16	Comply with the requirement of the chemical storage area: - Store only chemical waste and label clearly the chemical characters of the waste - Have at least 3 sides enclosed and protected from rainfall with cover - Provide sufficient ventilation - Have impermeable floor and has bunds to contain 110% of the capacity of the largest container or 20% of the total volume of the stored waste in the area, whichever is larger - Adequately spaced incompatible materials	To ensure proper storage of chemical waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM17	Transfer used lubricants, waste oils and other chemicals to oil recycling companies, if possible, and empty oil drums for reuse or refill. No direct or indirect discharge is permitted	To ensure proper disposal of chemical waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
9.8	WM18	Hire licensed chemical waste disposal contractors for waste collection and removal. Dispose chemical waste at the approved Chemical Waste Treatment Centre at Tsing Yi or other licensed facility	To ensure proper disposal of chemical waste	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM
9.8	WM19	Hire reputable waste collector to separately collect and dispose general refuse from other wastes. Cover the waste to prevent being blown away	To ensure proper disposal of general refuse	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
9.8	WM20	Provide recycling bins for sorting out recyclables for collection by recycling companies. Non-recyclables should be removed to designated landfills every day by licensed collectors to prevent environmental and health nuisance.	To ensure proper recycling and disposal of general refuse	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	Waste Disposal Ordinance, EIAO-TM
9.8	WM21	Organize training and reminders to site staff on waste minimization through avoidance and reduction, reusing and recycling	To ensure proper management of general refuse	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
9.8	WM22	Used bentonite shall be reconditioned onsite and reused as far as practical to minimize wastage. If this is deemed not viable, the used bentonite shall be delivered offsite for reconditioning.	To minimize wastage of bentonite	DSD's Contractor	Whole construction site	Throughout construction phase	Construction phase	EIAO-TM
9.8	WM23	Characterize the sediment quality of the marine sediment to be dredged and submit a Sediment Quality Report for EPD's approval. Dispose the dredged marine sediment in accordance with ETWB TC(W) No. 34/2002	To verify the categories of sediment to be disposed in accordance with ETWB TC(W) No. 34/2002	DSD's Contractor	To be allocated by CEDD	Before dredging works	Construction phase	ETWB TC(W) No. 34/2002

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Project Specific Measures								
Table 10-6	CM8	Protective materials to be provided to natural rocky coastline to prevent damage to existing landform from plant and machinery during temporary drilling operations. Reinstatement following removal of plant & equipment to original or improved condition shall be undertaken.	To protect landscape resources	DSD's contractor	Temporary drilling site for submarine outfall	Construction planning and during construction period	Construction phase	Particular Specification
Table 10-7	OM1	Sensitive design of sewage treatment plant in terms of scale, height and bulk (visual weight) to integrate the building into the existing topography.	To mitigate visual impacts	DSD's Design Architect/ Engineer	STP	Design Phase	Design Phase	Detailed Design Drawings and Specifications
Table 10-7	OM2	Use of appropriate building materials and colors for Sewage Treatment Plant to complement surroundings	To mitigate visual impacts	DSD's Design Architect/ Engineer DSD's contractor Building Operator/DSD	STP	Design Phase Construction Phase & first year in Operational Phase Operational phase	Design, Construction and Operational Phases	Detailed Design Drawings and Specifications
Generic/Standard Measures								
Table 10-6	CM1	The construction area and contractor's temporary works areas should be minimized to avoid impacts on adjacent landscape. All slope excavation shall take place from within the work boundary to minimize impacts on adjacent slopes.	To avoid impact on adjacent landscape areas	DSD's Contractor	STP, along gravity sewers and rising mains construction route and at temporary drilling site for submarine outfall	Construction planning and during construction period	Construction Phase	Detailed Design drawings and particular specifications
Table 10-6	CM2	Reduction of construction period to practical minimum	To minimize duration of impact	DSD's contractor	N/A	Construction planning and during construction period	Construction phase	N/A

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Table 10-6	CM3	Construction traffic (land and sea) including construction plant, construction vessels and barges to be kept to a practical minimum.	To minimize visual impacts to local residents and surrounding VSRs	DSD's Contractor	STP, along gravity sewers and rising mains construction route at temporary drilling and dredging sites for submarine outfall	Construction planning and during construction period	Construction phase	As per the Particular Specification
Table 10-6	CM4	Erection of decorative mesh screens or construction hoardings and/or temporary noise barriers around works areas in visually unobtrusive colors.	To screen construction works from local residents and surrounding VSRs	DSD's Contractor	STP, along gravity sewers and rising mains construction route and at temporary drilling site for submarine outfall	Construction planning and during construction period	Construction phase	As per the Particular Specification
Table 10-6	CM5	Avoidance of excessive height and bulk of site buildings and structures.	To reduce visual impact	DSD's Contractor	STP, and at temporary drilling site for submarine outfall	Construction planning and during construction period	Construction phase	As per the Particular Specification
Table 10-6	CM6	Control of night-time lighting by hooding all lights and through minimization of night working periods.	To maximize screening of the works	DSD's Contractor	STP and at temporary drilling and dredging site for submarine outfall	Construction planning and during construction period	Construction phase	As per the Particular Specification

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Table 10-6	CM7	All existing trees shall be carefully protected during construction. A Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. Tree risk assessment shall be undertaken to all existing trees within the project site as per "Guidelines for Tree Risk Assessment and Management Arrangement"	To maximize protection of existing trees	DSD's Contractor	STP and all other construction areas	Construction planning and during construction period	Construction phase	As per Tree Protection Particular Specification, DEVB TC (W) No.10/2013 and Guidelines for Tree Risk Assessment and Management Arrangement
Table 10-7	OM3	Lighting units to be directional and minimize unnecessary light spill and glare.	To mitigate visual impacts	DSD's Design Architect/ Engineer DSD's contractor Building Operator/DSD	STP	Design Phase Construction Phase & first year in Operational Phase Operational phase	Design, Construction and Operational Phases	Detailed Design Drawings and Specifications
Table 10-7	OM4	Greening measures to reinstate the landscape which are appropriate to the context, including tree and shrub planting and vertical greening, shall be implemented.	To mitigate visual impacts	DSD's Design Landscape Architect DSD's contractor Building Operator/DSD	STP	Design Phase Construction Phase & first year in Operational Phase Operational phase	Design, Construction and Operational Phases	Detailed Design Drawings and Specifications

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Table 10-7	OM5	Compensatory tree planting for all felled trees shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under the relevant technical circulars. Tree risk assessment shall be undertaken to all existing trees within the project site as per "Guidelines for Tree Risk Assessment and Management Arrangement"	To mitigate landscape and visual impacts of tree loss	DSD's Landscape Architect	STP and at temporary drilling site for submarine outfall	Design Phase	Design, Construction and Operational Phases	As per approved Tree Removal Application, Detailed Design Drawings, Tree Protection Particular Specification and Guidelines for Tree Risk Assessment and Management Arrangement
				Contractor's Landscape Architect		Construction Phase & first year in Operational Phase		
				Building Operator/DSD		Operational phase		

EIA Ref.	EM & A Ref.	Recommended Mitigation Measures *	Objectives of the Recommended Measure & Main Concerns to address	Implementation Agent	Location of the measure	Duration of the measure	Implementation stages	Relevant Legislation & Guidelines
Built Heritage								
Project Specific Measures								
11.6	BH1	Undertake condition survey by professional qualified building surveyor or engineer to record the existing condition of the built heritage resources.	To record the condition of the built heritage resources before the commencement of construction works	DSD's Contractor	GB01, BH02, LF04	Before commencement of construction works	Construction Phase	EIAO-TM and Guidelines for CHIA
11.6	BH2	Carry out vibration and settlement monitoring to built heritage resources. A maximum vibration level 7.5mm/s shall be adopted for the Grade 3 Hung Shing Temple and settlement check points in the Alert/Alarm/Action limit levels at 6mm/8mm/10mm shall be adopted.	To minimize the potential impact by mechanical vibration and settlement of built heritage resources	DSD's Contractor	GB01, BH02, LF04	During construction works	Construction phase	EIAO-TM and Guidelines for CHIA
11.6	BH3	Provision of protective covering or protective screen to built heritage resources which are close to the works area	To prevent direct impact from the machine and damages by construction tools or waste	DSD's Contractor	GB01, BH02, LF01, LF04	During construction works	Construction phase	EIAO-TM and Guidelines for CHIA
11.6	BH4	Maintain public access to the cultural landscape features as far as possible	To avoid the proposed works affecting the worshippers	DSD's Contractor	LF01, LF04, LF05	During construction works	Construction phase	EIAO-TM and Guidelines for CHIA
11.6	BH5	Provision of buffer zone of at least 1m from the proposed works as far as possible	To avoid the proposed works affecting the worshippers	DSD's Contractor	BH02, LF01, LF04	During construction works	Construction phase	EIAO-TM and Guidelines for CHIA

* All recommendations and requirements resulted during the course of EIA Process, including ACE and/or accepted public comment to the proposed proj

APPENDIX M - RECOMMENDED MITIGATION MEASURES AND PROACTIVE ENVIRONMENTAL PROTECTION PROFORMA

Reporting Period: 2023-06-01 – 2023-06-30

Construction Works Area: PTO-SW-03, PTO-Trenchless -01& STP

Anticipated Impacts: Dust, Noise, Water Quality, Terrestrial Ecology, Marine Ecology, Fisheries, Waste Management, Landscape and Visual and Build Heritage Impact

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Air Quality Impact	3.8	A10 - A25	a) Major air quality impact in construction phase would arise from excavation of slope at the proposed sewage treatment plant. b) Excavation, Gas welding, slope cutting, Rock dowel, fencing, flexible barrier installation Loading & Unloading Dusty Materials storage, Dusty Waste Sorting, Temporary Site Traffic Control	a) All construction plants / machineries will be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission. b) All dump trucks will be equipped with mechanical covers to prevent the dust emission during transportation when necessary. c) Dust control measures, such as water spraying, will be provided during demolition works when necessary. d) Maintaining of wet surface on access road and keep slow speed in the site. e) Conditions in the Environmental Permit and Discharge License should be followed. f) Predict required quantity of concrete accurately and collect the unused fresh concrete at designated locations in the site for subsequent disposal. g) Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.	(a) Hoarding of not less than 2.4 m high shall be erected from ground level to surround the work area along Po Toi O Chuen Road except for a site entrance or exit. (b) Good housekeeping to minimize dust generation, e.g. by properly handling and storing dusty materials. (c) Adopt dust control measures, such as dust suppression using water spray on exposed soil at least 4 times a day, in areas with dusty construction activities and during material handling. d) Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating, soil compacting or covering with bitumen. (e) Provide wheel washing at site exit to prevent carrying dust outside of the site. (f) Cover materials on trucks before leaving the site. (g) Limit vehicle speed of construction trucks within the construction site and in Po Toi O, maximum at 10km/hr, and confine vehicle movement in haul road. (h) As there is limited space in Po Toi O, stockpiling should be avoided. However, if found necessary, the materials should be covered by impervious materials such as tarpaulin.	Contractor	a) 1-hour and 24-hour TSP levels will be measured in accordance to the standard high-volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix A. b) Due to objection from the residents of Po Toi O village of the use of high-volume sampler (HVS) in conducting 24-hours TSP measurement, 24-hour TSP measures for impact monitoring is to be measured by portable dust meters during construction phase of the project. This is to be approved and verified by ER and IEC. c) Other than using high volume sampler, 1-hour TSP levels can be measured alternatively by direct reading from portable dust meters upon approval from ER. The meters should be capable of producing comparable results as that by the high-volume sampling method, to indicate short event impacts. d) -The ET shall agree with the IEC on the monitoring position and the corrections adopted. e) -The agreed position shall be chosen in subsequent baseline and impact monitoring.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Noise Impact Control	4.7	N1 - N175	a) The Project comprises three main works including the construction of sewage treatment plant (STP), underground sewers and rising main, and the submarine outfall. b) The major noise impact will arise from the use of powered mechanical equipment. c) Excavation, Gas welding, slope cutting, Rock dowel, fencing, flexible barrier installation Loading & Unloading Dusty Materials storage, Temporary Site Traffic Control.	a) Conditions in the Environmental Permit and Discharge License should be followed. b) Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.		Contractor	a) Noise measurement shall normally be at a point 1 m from the exterior of the sensitive receiver building façade and be at a position 1.2 m above the ground. If the normal monitoring position cannot be accessed, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3 dB(A) shall be made to the free field measurements. b) The ET shall agree with the IEC on the monitoring position and the corrections adopted. c) The agreed position shall be chosen in subsequent baseline and impact monitoring.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Water Quality impact	5.8	W1-W33	a) Major Water quality impact will be originated from minor displacement of suspended solids during installation, testing pipe and extraction of cofferdam around the proposed diffuser.	a) Wastewater to be treated by wastewater treatment facilities before discharge. b) Conditions in the Environmental Permit and Discharge License should be followed.	a) Well manage construction materials, chemicals, sewage for proper storage and usage and to prevent accumulation onsite. (b) Immediately clean up contaminated soil upon chemical and oil leakage. (c) Label chemical waste containers according to the Code of Practice to notify and warn the waste handlers. Store fuels, chemicals and chemical waste at designated area with locks and bunds. (d) Register as chemical waste producer. (e) Set up sedimentation tank for settling suspended solids in wastewater before discharge into storm drains. Sand/silt removal facilities such as sand traps, silt traps and sedimentation basin should be provided with adequate capacity. (f) Provide sufficient number of chemical toilets if necessary and employ licensed contractor for regular clean-up and maintenance. (g) Provide wheel washing at site exit to prevent dust and silty water from leaving the construction site. (h) Cover slope and loose materials with tarpaulin before rainstorm and inspect the area afterwards. (i) Cover manhole to prevent silt, construction materials or debris and surface runoff from entering the foul sewer. (j) Install fully enclosed cofferdam around the proposed diffuser and deploy a dredger barge outside the cofferdam for dredging and filling works.	Contractor	a) Weekly site audit to monitor the implementation of the proposed water quality mitigation measures and check the Contractor's work practice on water pollution prevention during construction phase. b) Should water pollution is observed (e.g. discharge of silty water into storm drains), the ET should record the environmental deficiency for investigation. c) The Contractor should be notified and responsible for carrying out rectification work immediately. d) The ET shall re-inspect the Project Site and review the effectiveness of the remedial measure performed until satisfaction. e) The Contractor shall implement preventive measure to avoid causing the same problem.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Terrestrial Ecology	6.12	E1-E8	a) The proposed Project will cause minor habitat loss of shrubland, temporary habitat loss of woodland, developed area and rocky shore, and removal of one individual climber species of conservation importance that is common within the Study Area and Hong Kong. Indirect water quality impact may arise from surface runoff or accidental spillage of chemicals in construction Phase. b) Use of powered plant equipment may bring noise disturbance on wildlife	a) Conditions in the Environmental Permit and Discharge License should be followed. b) Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.	a) Construction noise and water quality mitigation measures proposed in the previous sections will be applicable to terrestrial ecology.	Contractor	(a) Bright colour fencing shall be erected along the boundary of the undisturbed region of the shrubland and woodland, and around *Diospyros vaccinioides*, a plant species of conservation importance, near the work boundary to remind workers not to trespass or occupy the area, and to be careful during operation of equipment. (b)Inspect the condition of *Diospyros vaccinioides* as part of weekly site audit. (c) Reinstate the disturbed rocky shore with the rocks temporarily removed. (d) Carry out compensatory tree planting in accordance with DEVB TCW No. 7/2015 to reinstate the affected woodland.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Marine Ecology	7	7	a) The proposed Project will cause minor habitat loss of muddy seabed. b) Indirect water quality impact may arise from installation and extraction of sheet pile of cofferdam in construction phase. c) Dredging and backfilling for installation of diffuser will be conducted inside fully enclosed cofferdam. No marine sediment loss to water column is expected.	a) Conditions in the Environmental Permit and Discharge License should be followed	a) The variation in water quality at coral and amphioxus habitats during cofferdam installation and extraction works will be overseen by water quality monitoring mentioned.	Contractor	(a) No specific monitoring and audit programme is required. With proper implementation of water quality mitigation measures, residual impact is expected to be acceptable.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Fisheries	8	8	a) No direct encroachment on Fish Culture Zone and Artificial Reefs in the Study Area is expected. b) About 1,920 m2 of fishing ground and 500 m2 of benthic spawning ground will be affected. Except the 5 m2 benthic spawning ground will be lost permanently, other impacted area will only be affected in construction phase temporarily (reversible impact). Indirect impact on fisheries resources by the water quality deterioration will be insignificant with proper implementation of water quality mitigation measures.	a) Conditions in the Environmental Permit and Discharge License should be followed	Water quality at FCZ will be monitored during cofferdam installation and extraction works and dredging works in the construction phase as proposed.	Contractor	(a) No specific monitoring and audit programme are required. With proper implementation of water quality mitigation measures, residual impact is expected to be acceptable.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Waste Management	9.8	WM4-WM23	a) Construction of the sewage treatment plant, laying of gravity sewers and rising mains and submarine outfall are expected to generate mainly inert construction and demolition (C&D) materials (or public fill) from excavation, and unused building materials. Other wastes include noninert C&D materials (or C&D waste), plant materials, scaffolding, formwork and packaging, chemical waste from plant maintenance, bentonite slurry from drilling works and general refuse from workers. b) Dredging at the proposed diffuser location will generate marine sediment.	a) All C&D materials generated will be transported and stored at temporary storage area. Cover will be provided during transportation of dusty materials. Suitable materials will be sorted for reuse on-site. Only non-inert C&D material will be disposed offsite to NENT Landfill. b) Conditions in the Environmental Permit and Discharge License should be followed c) Fueling of equipment will be conducted carefully onsite by mobile tanker to avoid storage of fuel and oil spillage. d) Provision of drip trays for equipment likely cause spillage of chemical / fuel and provide routine maintenance.	(a) Reuse C&D materials onsite and dispose excess uncontaminated ones to public fill. (b) Provide sufficient waste collection points for general refuse and regularly maintained to avoid accumulation. Dispose the waste at waste transfer or disposal facilities. (c) Minimize wastage through careful planning and avoiding over purchase of construction materials. (d) Provide training to workers on site cleanliness, waste management (waste reduction, reuse and recycle) and chemical handling procedures. (e) Hire licensed waste disposal contractors for waste collection and removal. Dispose waste at licensed waste disposal facilities. (f) Recondition and reuse bentonite as far as practical. (g) Conduct marine sediment test and dump dredged marine sediment according to *ETWB TCW No. 34/2002 Management of Dredged/Excavated Sediment* and Dumping at Sea Ordinance. (h) Chemical waste shall be handled, stored and disposed properly, according to the relevant guidelines.	Contractor	The Contractor should apply for relevant licenses/permits for waste disposal under different regulations and ordinances as follows: (a) Chemical Waste Permits/licenses under the Waste Disposal Ordinance (Cap 354); (b) Public Dumping License under the Land Miscellaneous Provisions) Ordinance (Cap 28); (c) Marine Dumping Permit under Dumping at Sea Ordinance (Cap 466); and (d) Effluent Discharge License under the Water Pollution Control Ordinance (Cap 358). b) Reference should be made to EPD's booklets on licenses/permits. The Contractor shall also document recycling receipts/ disposal record to keep track of waste movement. The ET shall check with the Contractor that these licenses/permits have been obtained. He should also review the above documentations regularly to ensure compliance with legislations and specifications.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Landscape and Visual impact	Table 10-6 & 10-7	CM1-CM8 & OM1-OM5	a) Minor landscape and visual impact is expected due to dredging work in open sea, construction of the STP and pipelines on land and the loss of existing trees and vegetation at the sewage treatment plant site in the construction phase.	a) Conditions in the Environmental Permit and Discharge License should be followed. b) Implement the recommended mitigation proposed in EM&A manual.	a) The contractor shall employ a professionally qualified Registered Landscape Architect (RLA) on the Environmental Team to supervise and monitor the implementation of construction phase landscape and visual mitigation measures. This is necessary to ensure that all the recommended landscape and visual mitigation measures under Chapter 10 of the EIA are effectively implemented including minimization of the works footprint, ensuring that those existing trees earmarked for retention on site or transplanting are protected and planting works are correctly implemented.	Contractor	a) Tree risk assessment shall be undertaken by the contractor during construction to all existing trees within the project site as per “Guidelines for Tree Risk Assessment and Management Arrangement”. b) Site inspections by appointed RLA shall be undertaken at monthly intervals to closely monitor all these aspects of work. Inspection findings shall be logged in a site monitoring report with any discrepancies or concerns regarding the implementation and effectiveness of mitigation measures highlighted.

Item	EIA Ref.	EM&A Ref.	**Environmental Aspect**	**Corresponding Mitigation Measures**	**EM&A Manual Recommended Mitigation/ Actions**	**Action By**	**Measurement Procedures/Methods**
Build Heritage	11.6	BH1 - BH5	a) As the proposed work is close to some of the identified built heritage resources, condition survey, vibration and settlement monitoring is recommended to identified built heritage to prevent indirect damage by mechanical vibration and settlement.	a) Conditions in the Environmental Permit and Discharge License should be followed. b) Implement the recommended mitigation proposed in EM&A manual.	a) Provision of protective covering or protective screen is recommended to identified built heritage to prevent damages by construction tools or waste. b) Maintenance of public access is suggested for identified built heritage. Besides, buffer zone of at least 1m from the works boundary should be provided for identified built heritage as far as possible. c) Condition survey, vibration and settlement monitoring to identified built heritage.	Contractor	a) A maximum vibration level of 7.5mm/s shall be adopted for the Grade 3 Hung Shing Temple and settlement check points in the Alert/Alarm/Action limit levels at 6mm/8mm/10mm shall be adopted.

APPENDIX N - CUMULATIVE STATISTICS ON COMPLAINTS, NOTIFICATIONS OF SUMMONS

Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From	Received By	Nature of Environmental Complaint	Relevant to the Construction Work of Project Site? (Y/N)	Investigation/ Mitigation Action	Status
001	28 December 2021	EPD	ET	Waste Management	N	The investigation reports was submitted on 7 January 2022	Closed

Remark:

** No complaints, Notifications of Summons, or Successful Prosecutions were received in the reporting period.*

Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions and Public Engagement Activities

Reporting Period	Complaints	Notifications of Summons and Prosecutions	Public Engagement Activities
This Month	0	0	0
Cumulative Project-to-Date	1	0	0