



JOB No.: TCS00881/18 & TCS00944/18

**SITE FORMATION AND ASSOCIATED INFRASTRUCTURAL
WORKS FOR DEVELOPMENT OF COLUMBARIUM,
CREMATORIUM AND RELATED FACILITIES AT SANDY
RIDGE CEMETERY**

**MONTHLY ENVIRONMENTAL MONITORING AND AUDIT
REPORT (No.63) – OCTOBER 2023**

**PREPARED FOR
HSIN CHONG TSUN YIP JOINT VENTURE &
SANG HING CIVIL CONTRACTORS CO., LTD**

Date	Reference No.	Prepared By	Certified By
15 November 2023	TCS00881/18/600/R0782v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	10 November 2023	First Submission
2	15 November 2023	Amended according to the IEC's comment on 13 November 2023

Our Ref: TCS00881/18/300/L0783

Civil Engineering and Development Department
2/F, Civil Engineering and Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Attn: Ms. LAM Hoi Ching, Jessica

15 November 2023

By e-mail

Dear Sirs,

**Re: Site Formation and Associated Infrastructural Works for Development of
Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Monthly Environmental Monitoring & Audit Report (No.63) – October 2023**

We confirmed that the captioned report has complied with the requirement set out in the EM&A Manual, we hereby certify the captioned report pursuant to Specific Condition 3.4 of the Environmental Permit No. FEP-01/534/2017/A and EP-534/2017/A.

Should you have any queries, please feel free to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or Email: twtam@fordbusiness.com.

Yours sincerely,

For and on Behalf of

Action-United Environmental Services & Consulting (AUES)



T. W. Tam
Environmental Team Leader
TW/nh

cc

ARUP (RE of Contracts 1 and 2)
HCTY-JV (Contractor of Contract 1)
Sang Hing (Contractor of Contract 2)
Acuity (IEC)

Mr. Anthony Lau
Mr. Ho Man To
Mr. Elvin Lam
Mr. Jacky Leung

by e-mail
by e-mail
by e-mail
by e-mail

Our Ref.: 202311043

Hsin Chong Tsun Yip Joint Venture (CV/2016/10)
Hsin Chong Centre
107 – 109 Wai Yip Street
Kwun Tong, Kowloon
Hong Kong

Attention: Mr. HO Man-to

15 November 2023

Dear Sir,

**Site Formation and Associated Infrastructural Works for Development of Columbarium at
Sandy Ridge Cemetery
Monthly Environmental Monitoring and Audit Report (No. 63) October 2023**

I refer to the email of the ET regarding the captioned Monthly Report. According to Section 3.4 of the EP-534/2017/A and the FEP-01/534/2017/A, I hereby verify the Monthly EM&A Report for October 2023 (Version 2) with Ref. No. TCS00881/18/600/R0782v2.

Yours faithfully,



Leung CH Jacky
Independent Environmental Checker

EXECUTIVE SUMMARY

- ES.01. This is the **63rd** Monthly Environmental Monitoring and Audit (EM&A) Report summarizing the monitoring results and inspection findings under the Project for the period from **1st to 31st October 2023** (the Reporting Month).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES.02. In the Reporting Month, the major construction works under the Project included Contract CV/2016/10 (hereinafter named “Contract 1”) and Contract CV/2017/02 (hereinafter named “Contract 2”). Environmental monitoring activities under the EM&A programme in this Reporting Month are summarized in the following table.

Table ES-1 Summary of EM&A Programme in the Reporting Month

Issues	Environmental Monitoring Parameters / Inspection	Monitoring Locations		Total Occasions/ dates
		CV/2016/10	CV/2017/02	
Air Quality	1-hour TSP	ASR-1	ASR-2	45
	24-hour TSP		ASR-3	15
Construction Noise	L _{eq} (30min) Daytime	CN-1 CN-2	CN-3 CN-4	16
Water Quality	In-situ measurement and Water sampling	M3	M1, M2 and M4	13
Ecology	Sensitive Habitat	Transect within site area of CV/2016/10	Transect within site area of CV/2017/02	17 th Oct
Landscape & Visual	Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	30 th Oct
Inspection & Audit	Environmental Team (ET) Regular Environmental Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	4

BREACH OF ACTION AND LIMIT (A/L) LEVELS

- ES.03. In the Reporting Month, no exceedance of air quality, noise monitoring was recorded. For water quality monitoring, there were 6 Limit Level non-project related exceedances recorded. The statistics of environmental exceedance, Notification and investigation of exceedance are summarized in the following table.

Table ES-2 Breach of Action and Limit (A/L) Levels in the Reporting Month

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action	
				Investigation Findings	Corrective Actions
Air Quality	1-hour TSP	0	0	-	-
	24-hour TSP	0	0	-	-
Construction Noise	Leq _{30min} Daytime	0	0	-	-
Water Quality	DO	0	0	-	-
	Turbidity	3	3	Not project-related	The Contractor was reminded to fully implement the water quality mitigation measures
	Suspended Solids (SS)	3	3		

- ES.04. In the Reporting Month, a total of 6 Limit level water quality exceedances, namely **3** exceedances of turbidity and **3** exceedances of SS were recorded. According to the current site programme, Contract 1 and Contract 2 have achieved substantial completion and there was no actual site work carried out under the Project. In ET’s investigation, the site area of both Contracts have been hard paved and hydroseeded, there were no adverse water quality impact observed during site inspection. It is concluded that exceedances recorded in the Reporting Month were caused by the impact of Severe Typhoon Koinu and successive rainstorm and not related to the Project. The Contractor was reminded to fully implement the water quality mitigation measures.

- ES.05. Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **17th October 2023**. After analysing survey results in October from 2019 to 2023, for Contract 1, there are increases in species richness and abundance for Wetland and Non-wetland habitat as recorded in October since 2022. For Contract 2, the records in species richness and abundance for wetland and non-wetland habitat are significantly increase compared to previous months. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site.
- ES.06. Since compensation planting works have been commenced in 2023, the disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement have been implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- ES.07. In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2. Precautionary check for the presence of nesting birds was not required to carry out beyond the breeding season.
- ES.08. Landscape and visual inspection at both Contracts were undertaken on **30th October 2023**. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone and ensure no works is allowed within the TPZ.

ENVIRONMENTAL COMPLAINT

- ES.09. No environmental complaint was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 31 st October 2023	Contract 1	0	2	(1) Air Quality (1) Noise
	Contract 2	0	5	(1) Water (2) Air Quality (1) Noise (1) soil/ muddy water

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.010. No environmental summons or successful prosecution was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-4 Environmental Summons Summaries in the Reporting Month

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Summons Nature
1 st – 31 st October 2023	Contract 1	0	0	NA
	Contract 2	0	0	NA

Table ES-5 Environmental Prosecution Summaries in the Reporting Month

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Prosecution Nature
1 st – 31 st October 2023	Contract 1	0	0	NA
	Contract 2	0	0	NA

- ES.011. In addition, no complaint and emergency event relating to violation of environmental legislation for illegal dumping and landfilling was received.

REPORTING CHANGE

ES.012. No reporting change was made in the Reporting Month.

SITE INSPECTION

ES.013. In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the Resident Engineer, ET and the Contractor of the Contract 1 on **5th, 12th, 19th and 26th October 2023**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out **5th, 12th, 19th and 26th October 2023**. No non-compliance was noted during the site inspections.

FUTURE KEY ISSUES

ES.014. In view of completion of construction activities, proposal for cessation of construction phase environmental monitoring for Contract 1 and Contract 2 have been submitted to EPD in late October for review and approval.

ES.015. In the remaining period, the Contractor should continue implement the necessary environmental mitigation measures according to the approved EM&A Manual.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department (CEDD) is the Project Proponent for the Project “*Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*”. The Project is a Designated Project to be implemented under Environmental Permit No. EP-534/2017/A and FEP-01/534/2017/A. The layout plan of the Project is shown in [Appendix A](#). Major works to be executed under the Project shall include the following:

Designated Works under EP-534/2017/A

- (i) Site formation of about 5.5 hectares of land and associated drainage, sewerage and landscape works for development of Columbarium and Crematorium facilities at the Sandy Ridge Cemetery;
- (ii) Construction of a new road (about 800m) connecting the Crematorium and Man Kam To Road and the pick-up/drop-off point at Man Kam To Road;
- (iii) Widening two sections of the existing Sha Ling Road (about 900m and 500m respectively);
- (iv) Widening of about 1.4km of the existing Lin Ma Hang Road; and
- (v) Improvement works to the existing barging point at Siu Lam (the barging point is rejected by Tuen Mun DC and no improvement works required)

Designated Works under FEP-01/534/2017/A

- (i) Site formation works for a formed platform of about 1.8 hectares and associated drainage, sewerage and landscape works for development of Columbarium at the Sandy Ridge Cemetery;
- (ii) Construction of the pick-up/drop-off point at Man Kam To Road;
- (iii) Widening of 900m of the existing Sha Ling Road;
- (iv) Improvement works to the existing barging point at Siu Lam (the barging point is rejected by Tuen Mun DC and no improvement works required)

- 1.1.2 To facilitate the Project management, the Project works were separated into three Contracts to be executed which are described in below sub-sections.

- 1.1.3 *Contract No. CV/2016/10 – Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery* (hereinafter named “Contract 1”):-

- Site formation of about 1.77 ha of land for the proposed pick-up and drop-off area for shuttle bus operation;
- Upgrading of a section of 900m existing Sha Ling Road from 3m wide carriageway to 7.3m wide carriageway with footpath at both sides;
- Construction of one EVA with a total length of about 160m;
- Construction of noise barriers along Sha Ling Road;
- Modification of junction between Man Kam To Road and Sha Ling Road;
- Construction of a new pick up / drop off point at Man Kam To Road;
- Relocation and construction of a new refuse collection point near junction between Man Kam To Road and Sha Ling Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures;
- Associated drainage, sewerage and waterworks along Sha Ling Road; and
- Associated landscaping works.

- 1.1.4 *Contract No. CV/2017/02 – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road for Development of Columbarium at Sandy Ridge Cemetery* (hereinafter named “Contract 2”):-

- Construction of a new road connecting Columbarium site to Crematorium site;
- Construction of one EVA with a total length of about 300m;
- Widening of a section of 1.4 km long Lin Ma Hang Road (between Man Kam To Road and Ping Yuen River) from 6m wide carriageway to 7.3m with 2m width footpath on both sides;
- Provision of a pair of lay-by at Lin Ma Hang Road;
- Construction of a new vehicular access connecting the Sheung Shui Landmark North PTI and Lung Sum Avenue;

- Construction of covered walkway along Fanling Station Road;
- Removal of planters and central divider along Fanling Station Road and San Wan Road;
- Associated drainage, sewerage, waterworks and utility works along Man Kam To Road and Lin Ma Hang Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works.

1.1.5 *CEDD Contract No. (to be confirmed):-*

- Site Formation for the platform of the columbarium site;
- Construction of two 2 at-grade access roads;
- Construction of road junction between Man Kam To Road and the new access road;
- Associated drainage, sewerage and waterworks along the two new access roads;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works

1.1.6 Hsin Chong Tsun Yip Joint Venture (hereafter referred as “HCTYJV”) has been awarded Contract 1 on 5 December 2017. According to the Contract requirement, HCTYJV shall take over the responsibility for part of the Environmental Permit No. EP-534/2017 for ease of management, therefore application for Further Environmental Permit was submitted by HCTYJV to EPD on 26 January 2018 and Further Environmental Permit No. FEP-01/534/2017 was granted to HCTYJV by EPD on 23 February 2018. Furthermore, EPD issued Environmental Permit No. FEP-01/534/2017/A on 24 December 2018.

1.1.7 Sang Hing Civil Contractors Company Limited (hereinafter referred as “Sang Hing”) was awarded Contract 2 on 23 May 2018. The Contract Works is a Designated Project as under Environmental Permit (EP) No. EP-534/2017. Furthermore, EPD issued Environmental Permit No. EP-534/2017/A on 24 December 2018.

1.1.8 Action-United Environmental Services & Consulting (AUES) has been commissioned by the Contractors as an Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme in accordance with the approved EM&A Manual as well as the associated duties. As part of the EM&A programme, baseline monitoring to determine the ambient environmental conditions was completed before construction work commencement. The Baseline Monitoring Report (air, noise and water) certified by ET Leader (ETL) and verified by Independent Environmental Checker (IEC) was submitted to Environmental Protection Department (EPD) and it was approved by EPD on 25 October 2018.

1.1.9 Major construction work of Contract 1 and Contract 2 was commenced on 16 August 2018 and 5 November 2018 respectively.

1.1.10 This is the 63rd Monthly EM&A Report summarizing the monitoring results and inspection findings for the period from 1st to 31st October 2023.

1.2 REPORT STRUCTURE

1.2.1 The Monthly EM&A Report is structured into the following sections:-

- Section 1** *Introduction*
- Section 2** *Project Organization and Construction Progress*
- Section 3** *Summary of Monitoring Requirements*
- Section 4** *Air Quality Monitoring Results*
- Section 5** *Noise Monitoring Results*
- Section 6** *Water Quality Monitoring Results*
- Section 7** *Ecology Monitoring Results*
- Section 8** *Landscape & Visual*
- Section 9** *Waste Management*
- Section 10** *Site Inspections*

Section 11	<i>Environmental Complaints and Non-Compliance</i>
Section 12	<i>Implementation Status of Mitigation Measures</i>
Section 13	<i>Conclusions and Recommendation</i>

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

2.1.1 To facilitate the project management and implementation, the Project was divided by the following contracts:

- Contract 1 (Contract No. CV/2016/10)
- Contract 2 (Contract No. CV/2017/02)
- Contract 3 (Contract No. TBA)

2.1.2 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Appendix B](#).

2.2 CONSTRUCTION PROGRESS

2.2.1 As the construction works under C1 and C2 have been completed. There is no updated three months rolling programme of C1 and C2. Remaining activities of the Contract 1 and Contract 2 undertaken in the Reporting Month are presented below.

Contract 1 (CV/2016/10)

- Planting works

Contract 2 (CV/2017/02)

- No works

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the Project in this Reporting Month is presented in [Tables 2-1 and 2-2](#).

Table 2-1 Status of Environmental Licenses and Permits for Contract 1

Item	Description	License/ Permit ref no.	License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 428909 Acknowledged by EPD on 20/12/2017	Valid
2	Chemical waste Producer Registration	WPN: 5231-641-H3937-01 Issued by EPD on 27/03/2018	Valid
3	Water Pollution Control Ordinance	License no. WT00030795-2018 Issued date: 9/5/2018 Expire Date: 31/5/2023	Expired (permanent drainage is implemented)
4	Billing Account for Disposal of Construction Waste	Account no.: 7029769	Valid

Table 2-2 Status of Environmental Licenses and Permits for Contract 2

Item	Description	License/ Permit ref no.		License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 440406 Acknowledged by EPD on 14/12/2018	Man Kam To Road (near Sha Ling Road to Kong Nga Po Road)	Valid
		Ref. no. 440405 Acknowledged by EPD on 14/12/2018	Fanling Station Road	Valid
		Ref. no. 440404 Acknowledged by EPD on 14/12/2018	Sa Ling Road (Sandy Ridge Cemetery)	Valid
		Ref. no. 440401 Acknowledged by EPD on	Lin Ma Hang Road (San Uk Ling – Muk	Valid

Item	Description	License/ Permit ref no.		License/ Permit Status
		14/12/2018	Wu Nga Yiu)	
		Ref. no. 440402 Acknowledged by EPD on 14/12/2018	Lung Sum Avenue (near Landmark North)	Valid
2	Chemical waste Producer Registration	WPN: 5213-641-S4151-01 Issued by EPD on 04/02/2019		Valid
3	Water Pollution Control Ordinance	License no: WT00032936-2018 Issued date: 16/01/2019 Expire Date: 31/01/2024	Man Kam To Road & Lin Ma Hang Road, Man Kam To	Valid
		License no: WT00033335-2019 Issued date: 29/03/2019 Expire Date: 31/03/2024	Columbarium at Sandy Ridge Cemetery	Valid
		License no: WT00034717-2019 Issued date: 9/10/2019 Expire Date: 31/10/2024	Fanling Station Road	Valid
4	Billing Account for Disposal of Construction Waste	Account no.: 7031098		Valid

2.4 SUMMARY OF SUBMISSION UNDER THE ENVIRONMENTAL PERMIT REQUIREMENTS

- 2.4.1 **Tables 2-3 to 2-4** summarized the submission status under the EP and/or FEP stipulation in the Reporting Month.

Table 2-3 Status of Submission as under FEP

Item	EP and / or FEP Stipulation	Description	Status
1	Condition 2.10 of FEP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted and no approval is required.
2	Condition 2.11 of FEP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted and no approval is required.
3	Condition 2.12 of FEP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
4	Condition 2.13 of FEP	Grassland Reinstatement Plan	Approved by EPD on 18 April 2023
5	Condition 2.14 to 2.16 of FEP	Vegetation Survey Report and Vegetation Transplantation Proposal for Contract 1	Approved by EPD on 12 October 2018
6	Condition 2.17 of FEP	Woodland Compensation Plan (Rev.05) Woodland Compensation Plan (Rev.09)	Approved by EPD on 30 Jun 2020 Approved by EPD on 4 May 2023
7	Condition 2.18 of FEP	Monitoring and Survey Plan for Golden-headed Cisticola for Contract 1 (Rev.02)	Approved by EPD on 22 Oct 2019
8	Condition 2.20 of FEP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 1 (Rev.04)	Pending approval
9	Condition 2.22 of FEP	Traffic Noise Mitigation Plan Contract 1 (Rev. 4)	Pending approval
10	Condition 3.3 of the FEP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018

Item	EP and / or FEP Stipulation	Description	Status
11	Condition 4.2 of the FEP	The Contract Internet website	Internet website address has notified EPD on 15 Jun 2018 and no approval is required.

Table 2-4 Status of Submission as under EP

Item	EP and / or FEP Stipulation	Description	Status
1	Condition 2.10 of EP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted and no approval is required.
2	Condition 2.11 of EP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted and no approval is required.
3	Condition 2.12 of EP	Layout Plan for the proposed footpath at Lin Ma Hang Road	Approved by EPD on 25 April 2022
4	Condition 2.13 of EP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
5	Condition 2.14 of EP	Grassland Reinstatement Plan	Approved by EPD on 18 April 2023
6	Condition 2.15 to 2.17 of EP	Vegetation Survey Report and Vegetation Transplantation Proposal under Contract 2	Approved by EPD on 15 June 2022
7	Condition 2.18 of EP	Woodland Compensation Plan (Rev.05) Woodland Compensation Plan (Rev.09)	Approved by EPD on 30 Jun 2020 Approved by EPD on 4 May 2023
8	Condition 2.19 of EP	Monitoring and Survey Plan for Golden-headed Cisticola Contract 2	Approved by EPD on 9 Nov 2022
9	Condition 2.21 – 2.22 of EP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 2	Pending approval
10	Condition 2.23 of EP	Traffic Noise Mitigation Plan Contract 2	Pending approval
11	Condition 3.3 of the EP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018
12	Condition 4.2 of the EP	The Contract Internet website	Internet website address has notified EPD on 15 June 2018 and no approval is required.

3. SUMMARY OF IMPACT MONITORING REQUIREMENT

3.1 GENERAL

3.1.1 The EM&A requirements are set out in the Approved EM&A Manual. Environmental issues such as air quality, construction noise, water quality and ecology were identified as the key issues during the construction phase of the Project.

3.1.2 A summary of construction phase EM&A requirements are presented in the sub-sections below.

3.2 MONITORING PARAMETERS

3.2.1 The EM&A impact monitoring shall cover the following environmental aspect:

- Air quality;
- Construction noise;
- Water quality;
- Ecology; and
- Landscape and visual

3.2.2 A summary of the monitoring parameters is presented in *Table 3-1* below

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP; • 24-hour TSP
Noise	<ul style="list-style-type: none"> • Leq_(30min) during normal working hours.; and • Leq_(15min) during the construction works undertaken in Restricted Hours
Water Quality	In-situ Measurements <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L) & Saturation (%); • Temperature (°C); • Turbidity (NTU); • Salinity (ppm) • pH unit; • Water depth (m); and • Stream Flow Velocity (m/sec).
	Laboratory Analysis <ul style="list-style-type: none"> • Suspended Solids (mg/L)
Ecology	Ecologically sensitive habitats (wetland habitats and non-wetland habitats)

3.3 MONITORING LOCATIONS

3.3.1 According to the Approved EM&A Manual of the Project – *Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*, the designated monitoring locations for air quality, noise, water quality and ecology under the monitoring programme, is shown in *Appendix D*.

3.3.2 Since the Project was divided into three Works Contracts and all Contracts will be commenced at different time, the construction phase impact monitoring will only be performed at the Contract-related monitoring stations upon commencement of each Contract Works.

Air Quality

3.3.3 There were three (3) designated air quality monitoring stations recommended in the Approved EM&A Manual Section 5.6.1.1. There was proposed relocation of air quality monitoring location ASR-3 in October 2018 since the landlord refused to set up the HVS at his premises and nearby Conservation Area due to noise nuisance and Muk Wu Nga Yiu House No. 2A was proposed as alternative location ASR-3a. The proposal dated on 9 November 2018 which verified by IEC was submitted to EPD for approval. Based on rationale in Section 3.3.2, the Contract-related air quality monitoring location for construction phase were summarized in *Table 3-2* and illustrated in *Appendix D*.

Table 3-2 Designated Air Quality Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
ASR-1	Village House along Man Kam To Road	Sha Ling Village House No.6	Contract 1
ASR-2	Village House at San Uk Ling	San Uk Ling Village House No.1	Contract 2
ASR-3	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.28	Contract 2
ASR-3a (#)	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.2A	Contract 2

Remark: (#) There was proposed relocation of air quality monitoring location ASR-3 in October 2018. The proposal dated on 9 November 2018 after verified by IEC was submitted to EPD for approval.

3.3.4 If the designated monitoring location is required to relocate, alternative monitoring location shall agree with IEC and seek for EPD approval which shall meet the following criteria:

- i) Be at the site boundary or such locations close to the major dust emission source;
- ii) Close to the sensitive receptors;
- iii) Take into account the prevailing meteorological conditions;
- iv) For monitoring location located in the vicinity of the ASRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- v) When positioning the HVS, the following points shall be noted:
 - a. a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
 - b. no two samplers shall be placed less than 2m apart;
 - c. the distance between the HVS and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the HVS;
 - d. a minimum of 2 m separation from walls, parapets and penthouses is required for HVS at the rooftop;
 - e. a minimum of 2 m separation from any supporting structure, measures horizontally is required;
 - f. no furnace or incinerator flue is nearby;
 - g. airflow around the sampler is unrestricted;
 - h. the HVS is more than 20 m from the dripline;
 - i. any wire fence and gate to protect the HVS, shall not cause any obstruction during monitoring;
 - j. permission must be obtained to set up the HVS and to obtain access to the monitoring stations; and
 - k. a secured supply of electricity is needed to operate the HVS.

Construction Noise

3.3.5 There were four (4) designated noise monitoring locations recommended in the Approved EM&A Manual Section 6.5.1.1. Based on rationale in Section 3.3.2, the Contract-related noise quality monitoring location for construction phase were summarized in **Table 3-3** and illustrated in **Appendix D**.

Table 3-3 Designated Construction Noise Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
CN-1	Village house to the west of Sha Ling Road	Village house to the west of Sha Ling Road (free field condition)	Contract 1
CN-2	Village house to the north of Man Kam To Road	Sha Ling Village House No. 25 (free field condition)	Contract 1 & 3
CN-3	Village house near San Uk Ling	San Uk Ling Village House No. 18 (free field condition)	Contract 2
CN-4	Village house of Muk Wu	Muk Wu Village House No. 267 (1m façade from the building)	Contract 2

Water Quality

- 3.3.6 There were four (4) water quality monitoring locations recommended in the Approved EM&A Manual Section 7.6.1.2. The locations and coordinates of water quality monitoring were listed in **Table 3-4**. Based on rationale in Section 3.3.2, the Contract-related water quality monitoring location for construction phase were summarized in **Table 3-4** and illustrated in [Appendix D](#).

Table 3-4 Designated Water Quality Monitoring Stations under the Project

Proposed Location ID	Co-ordinates		Description	Related Work Contract
	North	East		
M1	843 431	831 308	Midstream of Nam Hang Stream	Contract 2
M2	843 840	831 101	Downstream of Nam Hang Stream	Contract 2
M3	843 509	830 040	Wetland in the Conservation Area near Yuen Leng Chai	Contract 1
M4	843 997	831 783	Watercourse across Lin Ma Hang Road, running from east of San Uk Ling to Man Kam To Boundary Control Point	Contract 2

3.4 MONITORING FREQUENCY AND PERIOD

- 3.4.1 The requirements of impact monitoring were stipulated in *Sections 5.8.1.1, 6.7.1.1 and 7.8.1.4* of the approved *EM&A Manual* and presented as follows.

Air Quality Monitoring

- 3.4.2 Monitoring frequency for air quality impact monitoring is as follows:
- 1-Hour TSP 3 sets of 1-hour TSP monitoring shall be carried out once every six days during construction periods
 - 24-Hour TSP 24-hour TSP monitoring shall be carried out every six days during construction periods

Noise Monitoring

- 3.4.3 Noise impact monitoring shall be carried out once per week during construction periods. The noise measurement for the time period between 0700 and 1900 hours shall be measured in terms of L_{eq} (30 minutes) or 6 sets of L_{eq} (5mins).

Water Quality Monitoring

- 3.4.4 The monitoring frequency shall be 3 days per week during construction phase and the interval between two sets of monitoring shall not be less than 36 hours.

3.5 MONITORING EQUIPMENT

- 3.5.1 The monitoring equipment using for the EM&A program as proposed by the ET shall be verified by the IEC.

Air Quality Monitoring

- 3.5.2 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to IEC for approval.
- 3.5.3 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.
- 3.5.4 All equipment used by ET for air quality monitoring is listed in **Table 3-5**.

Table 3-5 Air Quality Monitoring Equipment

Equipment	Model
24-hour TSP	
High Volume Air Sampler (HVAS)	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A

Equipment	Model
<i>1-Hour TSP</i>	
Portable Dust Meter	Laser Dust Monitor, Model AM510 / Sibata LD-3 Laser Dust monitor Particle Mass Profiler & Counter

Wind Data Monitoring Equipment

- 3.5.5 According to the approved EM&A Manual, wind data monitoring equipment shall also be provided and set up 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:
- 1) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.
 - 2) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.
 - 3) The wind data monitoring equipment should be re-calibrated at least once every six months.
 - 4) Wind direction should be divided into 16 sectors of 22.5 degrees each.
- 3.5.6 ET has liaised with the premises owners/ landlords to grant the permission for the HVS installation. However, they rejected to set up wind data monitoring equipment installation in their premises.
- 3.5.7 Under this situation, the ET proposed to obtain representative wind data from the Hong Kong Observatory Ta Kwu Ling Weather Station. Ta Kwu Ling Station is located near the Project site which situated at the sea level above 15mPD and the wind data monitoring equipment is installed 10 m above the existing ground.

Noise Monitoring

- 3.5.8 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} before each noise monitoring event. Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1} .
- 3.5.9 Noise monitoring equipment used for impact monitoring is listed in **Table 3-6**.

Table 3-6 Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	Rion NL-52 Sound Level Meter
Calibrator	Rion NC-75 Acoustical Calibrator
Portable Wind Speed Indicator	Testo Anemometer

- 3.5.10 Sound level meters listed above comply with the *International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1)* specifications, as recommended in TM issued under the NCO.

Water Quality Monitoring

- 3.5.11 Water quality parameters include dissolved oxygen, water temperature & depth, turbidity, salinity, pH and stream flow velocity shall be measured *in-situ*, and suspended solids shall be analyzed by a HOKLAS-accredited testing laboratory.

Dissolved Oxygen and Temperature Measurement

- 3.5.12 The dissolved oxygen (DO) measuring instruments should be portable and weatherproof. The equipment should also complete with cable and sensor, and DC power source. It should be capable of measuring:

- A DO level in the range of 0 – 20 mg/L and 0 – 200% saturation; and
- A temperature of 0 – 45 degree Celsius.

3.5.13 The equipment should have a membrane electrode with automatic temperature compensation complete with a cable.

3.5.14 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO measuring instruments prior to each measurement.

Turbidity Measurement

3.5.15 The turbidity measuring instruments should be a portable and weatherproof with DC power source. It should have a photoelectric sensor capable of measuring turbidity level between 0–1000 NTU (for example, Hach model 2100Q or an approved similar instrument).

Salinity Measurement

3.5.16 A portable salinometer capable of measuring salinity in the range of 0–40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.

pH Measurement

3.5.17 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions accordingly to the APHA Standard Methods.

Water Depth Measurement

3.5.18 A portable, battery-operated echo sounder or an approved similar instrument should be used for water depths determination at each designated monitoring station.

Stream Flow Velocity Equipment

3.5.19 Since the EM&A Manuals do not specified instrument to use stream flow velocity measurement, the monitoring of stream flow velocity is therefore proposed to be conducted by using a flow probe which is a digital water velocity meter.

Water Sampling Equipment

3.5.20 A water sampler is required for suspended solid (SS) monitoring. A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres, will be used for water sampling if water depth over than 0.5m.

3.5.21 For sampling from very shallow water depths e.g. <0.5 m, water sample will be collected from water surface below 100mm using plastic bottle to avoid inclusion of bottom sediment or humus. Moreover, Teflon/stainless steel bailer or self-made sampling buckets maybe used for water sampling. The equipment used for sampling will be depended the sampling location and depth situations.

Sample Containers and Storage

3.5.22 Water samples for suspended solid should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory within 24 hours of collection and be analyzed as soon as possible after collection.

3.5.23 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.

3.5.24 Details of the equipment used for water quality monitoring are listed in **Table 3-7** below.

Table 3-7 Water Quality Monitoring Equipment

Equipment	Model
Water Depth Detector	Tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or Teflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Professional DSS
pH meter	YSI Professional DSS
Turbidimeter	YSI Professional DSS
Salinometer	YSI Professional DSS
Stream Flow Velocity	FP211 Global Flow Probe
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-litter plastic cool box with Ice pad

- 3.5.25 Furthermore, Suspended Solids (SS) analysis was carried out by *ALS Technichem (HK) Pty Ltd.* Which is one a local HOKLAS-accredited laboratory

3.6 EQUIPMENT CALIBRATION

- 3.6.1 The HVAS is operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out at fortnightly interval. The calibration data are properly documented and the records are maintained by ET for future reference. Furthermore, Tisch Calibration Kit will be calibrated by the manufacturer in yearly basis.
- 3.6.2 The 1-hour TSP meter calibrated by a local HOKLAS-accredited laboratory would be undertaken in yearly basis. Zero response of the equipment was checked before and after each monitoring event.
- 3.6.3 The sound level meter and acoustic calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.6.4 The multi-parameter Water Quality Monitoring System is calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.6.5 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in this Reporting Month are attached in [Appendix E](#).

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.7.1 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.
- 3.7.2 The monitoring data recorded in the equipment e.g. 1-hour TSP meter, noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

3.8 DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

- 3.8.1 The baseline monitoring results form the basis for determining the environmental acceptance criteria for the impact monitoring. The air quality, construction noise and water quality criteria, namely Action and Limit levels were established according to Approved EM&A Manual, and they are listed in **Tables 3-8, 3-9 and 3-10** below.

Table 3-8 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
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	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
ASR-1	331	181	500	260
ASR-2	316	165	500	260
ASR-3	307	160	500	260

Table 3-9 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
CN-1,CN-2, CN-3, CN-4	When one or more documented complaints are received	75 dB(A)

Note: * Reduces to 70 dB(A) for schools and 65 dB(A) during the school examination periods.

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location			
		M1	M2	M3	M4
DO (mg/L)	Action Level	3.03	4.99	4.58	3.62
	Limit Level	2.97	4.90	4.49	3.52
Turbidity (NTU)	Action Level	7.1	39.7	5.6	5.4
	Limit Level	7.6	42.2	5.9	5.9
SS (mg/L)	Action Level	8.5	29.0	9.3	4.8
	Limit Level	10.1	31.0	9.5	5.0

Notes:

- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits
- For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

- 3.8.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in [Appendix F](#).

4. AIR QUALITY

4.1 MONITORING RESULTS

4.1.1 In the Reporting Month, air quality monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).

4.1.2 In this Reporting Month, there were 5 sessions of 24-hour TSP and 15 sessions of 1-hour TSP undertaken at each designated station for air quality monitoring. The air quality monitoring results are summarized in [Tables 4-1 to 4-3](#). The database of 24-hour TSP is shown in [Appendix H](#) and the graphical plots of monitoring result are shown in [Appendix I](#).

Table 4-1 Summary of Air Quality Monitoring Results at ASR-1 under Contract 1

Date	24-hour TSP (µg/m³)	1-hour TSP (µg/m³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
4 Oct 23	47	5-Oct-23	9:30	22	14	25
10 Oct 23	11	11-Oct-23	9:15	16	15	14
16 Oct 23	28	17-Oct-23	9:03	61	50	47
20 Oct 23	25	21-Oct-23	9:00	83	87	90
26 Oct 23	21	27-Oct-23	9:00	19	24	28
Average (Range)	26 (11 – 28)	Average (Range)		40 (14 – 90)		

Table 4-2 Summary of Air Quality Monitoring Results at ASR-2 under Contract 2

Date	24-hour TSP (µg/m³)	1-hour TSP (µg/m³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
4 Oct 23	59	5-Oct-23	9:35	19	26	16
10 Oct 23	34	11-Oct-23	9:21	15	14	15
16 Oct 23	59	17-Oct-23	9:06	57	52	43
20 Oct 23	58	21-Oct-23	9:20	88	83	85
26 Oct 23	42	27-Oct-23	9:09	20	21	19
Average (Range)	50 (34 – 59)	Average (Range)		38 (14 – 88)		

Table 4-3 Summary of Air Quality Monitoring Results at ASR-3a under Contract 2

Date	24-hour TSP (µg/m³)	1-hour TSP (µg/m³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
4 Oct 23	34	5-Oct-23	9:41	20	29	22
10 Oct 23	24	11-Oct-23	9:30	15	16	11
16 Oct 23	24	17-Oct-23	9:11	50	46	44
20 Oct 23	26	21-Oct-23	13:00	87	82	84
26 Oct 23	24	27-Oct-23	10:40	11	10	13
Average (Range)	26 (24 – 34)	Average (Range)		36 (10 – 87)		

4.2 AIR MONITORING EXCEEDANCE

4.2.1 As shown in [Tables 4-1 to 4-3](#), the monitoring results of 24-hour and 1-hour TSP monitoring in the Reporting Month were below the Action/ Limit Level. No Notification of Exceedance (NOE) of air quality monitoring criteria was issued and therefore corrective action was not required. The meteorological data during the impact monitoring days are summarized in [Appendix J](#).

5. CONSTRUCTION NOISE

5.1 MONITORING RESULTS

- 5.1.1 In the Reporting Month, noise monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).
- 5.1.2 In this Reporting Month, 4 sessions of noise monitoring were undertaken at each designated noise monitoring location. The sound level were set in a free field situation for CN1, CN2 and CN3 and therefore a façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines. The monitoring result of noise monitoring is show in [Tables 5-1 and 5-2](#) and the graphical plots are shown in [Appendix I](#).

Table 5-1 Summary of Construction Noise Monitoring Results under Contract 1

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	Start Time	CN1(*)	Start Time	CN2(*)
5 Oct 23	9:29	68	13:20	68
11 Oct 23	9:12	65	13:13	66
17 Oct 23	9:04	68	14:42	68
27 Oct 23	9:11	61	13:13	65
Limit Level	75 dB(A)			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Table 5-2 Summary of Construction Noise Monitoring Results under Contract 2

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	Start Time	CN3 (*)	Start Time	CN4
5 Oct 23	14:06	60	14:48	62
11 Oct 23	14:01	64	14:36	63
17 Oct 23	14:02	65	13:14	63
27 Oct 23	14:27	65	13:54	63
Limit Level	75 dB(A)			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

- 5.1.3 Prior and after noise monitoring, the accuracy of the sound level meter has been checked by an acoustic calibrator to ensure the measurement within acceptance range of ± 0.5 dB. Moreover, wind speed checked by portable wind speed meter has been performed before noise monitoring. No noise measurement was performed in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1} .

5.2 NOISE MONITORING EXCEEDANCE

- 5.2.1 As shown in [Tables 5-1 and 5-2](#), no noise complaint (which triggered Action Level) and Limit Level exceedance for noise monitoring exceedance was recorded in the Reporting Month.

6. WATER QUALITY

6.1 MONITORING RESULTS

- 6.1.1 In the Reporting Month, water quality monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).
- 6.1.2 In the Reporting Month, a total of **13** monitoring days carried out for water quality impact monitoring in the Reporting Month. On 9 October 2023, a fallen tree was obstructing access to Location M1 after the Severe Typhoon Koinu, therefore, water monitoring at M1 during 9 to 24 October could not be conducted. Notification was issued to all relevant parties for cancellation of monitoring event due to incident.
- 6.1.3 The monitoring result of key parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in [Tables 6-1](#) and [6-2](#). Detailed monitoring results including in-situ measurements and laboratory analysis data are shown in [Appendix H](#) and graphical plots for monitoring result are shown in [Appendix I](#).

Table 6-1 Summary of Water Quality Monitoring Results – M3 under Contract 1

Date	Parameters		
	DO (Averaged) (mg/L)	Turbidity (Averaged) (NTU)	Suspended Solids (Averaged) (mg/L)
3 Oct 23	6.83	2.6	4.0
5 Oct 23	6.93	3.2	4.5
7 Oct 23	6.96	3.6	7.0
9 Oct 23	7.52	34.2	51.0
11 Oct 23	7.36	3.8	7.5
13 Oct 23	7.03	5.6	6.5
16 Oct 23	7.02	5.5	8.5
18 Oct 23	7.18	5.3	7.0
20 Oct 23	7.10	4.9	5.5
24 Oct 23	7.45	5.3	5.5
26 Oct 23	7.43	5.2	7.0
28 Oct 23	7.31	5.1	5.0
30 Oct 23	7.40	5.2	7.0

Remark: bold and underlined indicated Limit Level exceedance

Table 6-2 Summary of Water Quality Monitoring Results (M1, M2 and M4) under Contract 2

Date	Parameters								
	DO (Averaged) (mg/L)			Turbidity (Averaged) (NTU)			Suspended Solids (Averaged) (mg/L)		
	M1	M2	M4	M1	M2	M4	M1	M2	M4
3 Oct 23	3.4	7.12	7.15	3.0	2.7	1.8	7.2	4.5	3.0
5 Oct 23	4.3	7.02	7.20	4.0	2.7	2.1	7.7	4.5	3.0
7 Oct 23	3.9	7.16	7.15	4.5	3.1	2.3	7.5	5.5	3.5
9 Oct 23	*	7.69	8.11	*	64.5	25.3	*	112.0	39.0
11 Oct 23	*	7.58	7.69	*	7.5	1.6	*	20.0	4.5
13 Oct 23	*	7.80	7.87	*	20.5	1.2	*	14.0	<2
16 Oct 23	*	7.12	7.40	*	15.6	2.2	*	17.5	3.5
18 Oct 23	*	7.48	7.42	*	14.8	1.6	*	17.0	2.0
20 Oct 23	*	7.54	7.71	*	14.9	1.0	*	17.0	<2
24 Oct 23	*	7.73	7.68	*	10.2	1.9	*	9.5	2.0
26 Oct 23	6.2	7.54	7.52	6.5	1.8	2.7	7.6	3.5	4.5
28 Oct 23	5.8	7.51	7.64	7.5	2.9	1.6	7.4	4.0	2.0
30 Oct 23	4.1	7.60	7.59	6.0	1.6	1.4	7.2	2.5	2.5

Remark: bold and italic indicated Action Level exceedance

bold and underlined indicated Limit Level exceedance

(*) A fallen tree was obstructing access to Location M1 after the Severe Typhoon Koinu, therefore, water monitoring at M1 during 9 to 24 October could not be conducted.

- 6.1.4 During the Reporting Month, field measurements including temperature of stream water, salinity concentrations, pH values and the stream flow velocity for all monitoring locations are summarized in [Table 6-3](#).

Table 6-3 Summary of Field Measurements for Water Quality

Monitoring Location	Parameters of field measurements							
	pH (Averaged) (unit)		Salinity (Averaged) (ppt)		Temp (Averaged) (°C)		Water Flow (Averaged) (m/s)	
	min	max	min	max	min	max	min	max
M1	7.2	7.7	0.01	0.08	24.3	27.5	<0.1	<0.1
M2	7.0	7.7	0.04	0.08	22.6	27.9	<0.1	<0.1
M3	7.1	7.6	0.01	0.02	22.1	27.4	<0.1	<0.1
M4	7.0	8.1	0.04	0.07	22.5	27.8	<0.1	<0.1

6.2 WATER QUALITY MONITORING EXCEEDANCE

- 6.2.1 In this Reporting Month, there were six (6) Limit Level exceedances recorded in water quality monitoring. The summary of non-compliance of water quality performance is shown in [Table 6-4](#).

Table 6-4 Action and Limit (A/L) Levels Exceedance Record

Station	DO		Turbidity		SS		Total Exceedance		Project Related exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit	Action	Limit
M1	0	0	0	0	0	0	0	0	0	0
M2	0	0	0	1	0	1	0	2	0	0
M3	0	0	0	1	0	1	0	2	0	0
M4	0	0	0	1	0	1	0	2	0	0

- 6.2.1 Notification of Exceedance and the investigation for exceedance in the Reporting Month is summarized in [Table 6-5](#).

Table 6-5 Summary of Investigation of Water Quality Exceedance in the Reporting Month

Date of Exceedance	Exceeded Location	Exceeded Parameter	Cause of Water Quality Exceedance
9 Oct 2023	M2 & M4	Turbidity & Suspended Solids	<p>According to construction programme of Contract 2 and ET's site inspection records, the major construction activities under Contract 2 were completed and only minor maintenance works were carried out.</p> <p>According to the weather data from Observatory, Tropical Cyclone Warning Signal No. 8 was hoisted on 8 October 2023 and brought a lot of rainstorm in following day. Due to the impact of rain, the water quality of seasonal watercourse was inevitably affected by the sediment stirred up from the surrounding environment, even beyond the boundaries of the construction site.</p> <p>In our investigation, there were no active work conducted near M1 and M4. Most of area on Sandy Ridge and Lin Ma Hang Road was hard paved and no adverse water quality impact was observed during site inspection. In view of the current site condition, it was considered that all the exceedances were likely related to the impact of Typhoon and rainstorm and not caused by the work under the project.</p>

Date of Exceedance	Exceeded Location	Exceeded Parameter	Cause of Water Quality Exceedance
9 Oct 2023	M3	Turbidity & Suspended Solids	<p>According to construction programme of Contract 1 and ET's site inspection records, the major construction activities under Contract 1 were completed and only minor maintenance works were carried out.</p> <p>According to the weather data from Observatory, Tropical Cyclone Warning Signal No. 8 was hoisted on 8 October 2023 and brought a lot of rainstorm in following day. Due to the impact of rain, the water quality of seasonal watercourse was inevitably affected by the sediment stirred up from the surrounding environment, even beyond the boundaries of the construction site.</p> <p>In our investigation, the construction works on Sandy Ridge were completed and hard paved and no adverse water quality impact was anticipated. In view of the current site condition, it was considered that all the exceedances were likely related to the impact of Typhoon and rainstorm and not caused by the work under the project.</p>

7. ECOLOGY MONITORING

7.1 REQUIREMENT

- 7.1.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 7.1.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution. In order to monitor the effectiveness of the measures to the minimize impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland habitats (*wet woodland and watercourse*) and non-wetland habitats (*upland grassland and woodland*).

7.2 METHODOLOGY

- 7.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardized quantitative methodology will conduct at fixed points. For seasonal watercourse, the survey will be conducted whenever the habitat appears. Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and Action/Limit levels to trigger these measures are detailed in **Table 7-1**.

Table 7-1 Action and Limit Levels for Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

- 7.2.2 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts. Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and Action/Limit levels to trigger these measures are detailed in **Table 7-2**.

Table 7-2 Action and Limit Levels for Non-Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

- 7.2.3 The ecological survey includes all taxa being investigated in accordance with EIA report. Schedule of faunal surveys in each year during construction phase is presented in **Table 7-3**.

Table 7-3 Schedule of Faunal Surveys in each year During Construction Phase

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Mammal Survey

- 7.2.4 Mammal surveys will be conducted along the proposed transects (shown in **Appendix K** - Ecological Survey Reports) in during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

Bird Survey

- 7.2.5 Bird surveys will be conducted along the transects (shown in **Appendix K** - Ecological Survey Reports) during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilizing.

Herpetofauna Survey

- 7.2.6 Reptile and amphibian surveys will be conducted along transects (shown in **Appendix K** - Ecological Survey Reports) during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

Dragonfly and Butterfly Survey

- 7.2.7 Dragonfly and Butterfly surveys will be conducted along transects (shown in **Appendix K** - Ecological Survey Reports) during surveys all dragonflies and Butterflies seen will be identified and counted as accurately as possible.

Aquatic Fauna Survey

- 7.2.8 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.
- 7.2.9 After each ecological monitoring survey, a monthly report of the survey result and data collected will be provided with reference to EM&A Manual. An annual analysis of data will be carried out in order to study if there is any significant reduction in taxa diversity and abundance.

7.3 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 1)

- 7.3.1 In the Reporting Month, ecological monitoring was undertaken on **17th October 2023**, a sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen would be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 1

Mammal

- 7.3.2 There was no mammal recorded in the monitoring area.

Birds

- 7.3.3 There were a total of 53 birds individuals from 16 species recorded in the monitoring area.

Herpetofauna

- 7.3.4 There was no reptile species recorded in monitoring area. There was one amphibian species recorded in the monitoring area.

Butterfly

7.3.5 There were a total of 4 butterfly individuals from 2 species recorded in the monitoring area.

Dragonfly

7.3.6 There was one odonate individuals from one species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

7.3.7 There were two species of freshwater crab recorded in the monitoring area.

7.3.8 The summaries of faunal survey result are shown in **Tables 7-4** and **7-5**.

Table 7-4 Result of Faunal Survey under Contract 1

Scientific Name	Common / Engineer Name	Chinese Name	Conservatio n Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
Mammal Survey								
N/A	--	--	--	--	--	--	--	--
Avifauna Survey								
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩		2				
<i>Centropus sinensis</i>	Greater Coucal	褐翅鴉鵂	Class 2 Protected Animal of China;China Red Data Book Status: (Vulnerable)		1			
<i>Centropus bengalensis</i>	Lesser Coucal	小鴉鵂	List of Wild Animals under State Priority Conservation: Class II	1				
<i>Strix leptogrammica</i>	Brown Wood Owl	褐林鴉	Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II	1				
<i>Apus nipalensis</i>	House Swift	小白腰雨燕		10				
<i>Corvus macrorhynchos</i>	Large-billed Crow	大嘴烏鴉		1				
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鸛		1			2	
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鸛		2				
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鸛鶯			1		1	
<i>Pterorhinus perspicillatus</i>	Masked Laughingthrush	黑臉噪鸛			2			
<i>Urocissa erythroryncha</i>	Red-billed Blue Magpie	紅嘴藍鸛		2				
<i>Coturnix japonica</i>	Japanese Quail	鸛鸛	Fellowes et al. (2002): LC	1				
<i>Falco tinnunculus</i>	Common Kestrel	紅隼	Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II	1				

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Locustella lanceolata</i>	Lanceolated Warbler	矛斑蝗鶯		3				
<i>Cisticola juncidis</i>	Zitting Cisticola	棕扇尾鶯	Fellowes et al. (2002): LC	1				
<i>Motacilla alba</i>	White Wagtail	白鵲鴝		20				
N/A	--	--	--	--	--	--	--	--
Amphibian Survey								
<i>Fejervarya limnocharis</i>	Paddy Frog	澤蛙						2
Butterfly Survey								
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶		2				
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶		2				
Odonate Survey								
<i>Ceriagrion auranticum</i>	Orange-tailed Sprite	翠胸黃蟬						1

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
+ Species appeared but uncountable

Table 7-5 Result of Freshwater Communities Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Somanniathelphusa zanklon</i>		鐮刀束腰蟹						10
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮						10

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
+: Species appeared but uncountable.

Discussion

- 7.3.9 After analysing survey results in October from 2019 to 2023, increase in species richness and the abundance for Wetland and Non-wetland habitat are recorded in October since 2022. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 7.3.10 Yet, good site practice during construction, with reference to EM&A Manual, is still required to prevent or alleviate environmental impacts. Continuous monitoring is also recommended to inspect any changes in species diversity.

7.4 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)

- 7.4.1 In the Reporting Month, ecological monitoring was undertaken at work area of Contract 2 on **17th October 2023**, a sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen would be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 2

Mammal

7.4.2 There was no mammal recorded in the monitoring area

Birds

7.4.3 There were a total of 16 bird individuals from 6 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.

Herpetofauna

7.4.4 There was no reptile recorded in the monitoring area. There was no amphibian recorded in the monitoring area.

Butterfly

7.4.5 There were total of 3 butterfly individuals from 2 species recorded in the monitoring area.

Dragonfly

7.4.6 There were total of 13 odonate individuals from 4 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

7.4.7 There were 4 species of freshwater fish were recorded in the monitoring area.

7.4.8 The summaries of faunal survey result are shown in **Tables 7-6** and **7-7**.

Table 7-6 Result of Faunal Survey under Contract 2

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
Mammal Survey								
--	--	--	--	--	--	--	--	--
Avifauna Survey								
Spilopelia chinensis	Spotted Dove	珠頸斑鳩		4				
Parus cinereus	Cinereous Tit	蒼背山雀			1			
Pycnonotus sinensis	Chinese Bulbul	白頭鵯			4			
Pycnonotus jocosus	Red-whiskered Bulbul	紅耳鵯				4		
Prinia flaviventris	Yellow-bellied Prinia	黃腹鷦鶯		1		1		
Orthotomus sutorius	Common Tailorbird	長尾縫葉鶯				1		
Reptile Survey								
--	--	--	--	--	--	--	--	--
Amphibian Survey								
--	--	--	--	--	--	--	--	--
Butterfly Survey								
Udaspes folus	Grass Demon	薑弄蝶				2		
Eurema hecabe	Common Grass Yellow	寬邊黃粉蝶				1		
Odonate Survey								
Copera marginipes	Yellow Featherlegs	黃狹扇蟌				1		
Orthetrum glaucum	Common Blue Skimmer	黑尾灰蜻				1		
Trithemis aurora	Crimson Dropwing	曉褐蜻				1		
Pantala flavescens	Wandering Glider	黃蜻				10		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7-7 Result of Freshwater Communities Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚						10

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮						10
<i>Oreochromis spp.</i>	Tilapia spp.	金山鯽						10
<i>Channa gachua</i>	Dwarf snakehead	緣鱧						10

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

+: Species appeared but uncountable.

Discussion

- 7.4.9 After analysing survey results in September from 2019 to 2022, records in species richness and abundance for wetland and non-wetland habitats are unstable, this may due to natural fluctuation. However, the records in October 2023 are significantly increased. The situation could be benefited by some positive factors such as the major construction works in this contract were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimized internally. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 7.4.10 Still, a good site practice during construction, with reference to EM&A Manual, is required to prevent or alleviate environmental impacts. For instance, the size of work areas should be minimized and disturbed areas should be reinstated immediately after completion of construction works. In addition, implementing proper waste disposal is necessary to reduce contamination to water and soil. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.
- 7.4.11 The detailed Ecological Survey Reports for Contract 1 and Contract 2 are attached in **Appendix K**.
- 7.4.12 The tentative ecology inspection and monitoring in the next Reporting Month (November 2023) is scheduled on **17th November 2023**.

7.5 MONITORING OF FLORA SPECIES OF CONSERVATION INTEREST UNDER CONTRACT 1

- 7.5.1 According to the approved vegetation survey report and transplantation proposal under FEP-01/534/2017/A, an individual of flora species of conservation interest (the transplanted T-2928) was identified and transplanted to the receptor site.
- 7.5.2 According to approved vegetation survey report and transplantation proposal, post-transplantation monitoring was conducted once per week in the first three months after the transplantation in Oct 2018 and once in each of the following month in the remaining establishment period for 12 month. During the remaining construction phase of the project, the transplanted T-2928 would be monitored on quarterly basis.
- 7.5.3 A landscape sub-contractor was employed by the Contractor to monitor the health condition of transplanted species and provide advice on necessary weeding, fertilizing and pest control. The monitoring records were submitted to ET and IEC for review and record. Moreover, inspection of the transplanted T-2928 was undertaken by ET as part of the weekly site inspection. No construction activity and disturbance were observed at the location of the transplanted T-2928. The health condition of the transplanted T-2928 was fair with normal foliage color and density.

7.6 MEASURE FOR PROTECTION OF NESTING BIRD

- 7.6.1 Pursuant to FEP-01/534/2017/A condition 2.19 and EP-534/2017/A condition 2.20, precautionary checks for the presence of nesting birds shall be carried out in the breeding season (February to July) before vegetation clearance.

- 7.6.2 In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2. Besides, precautionary check for the presence of nesting birds was not required to carry out beyond the breeding season.

8. LANDSCAPE AND VISUAL

8.1 REQUIREMENT

- 8.1.1 The EIA has recommended EM&A for landscape and visual resources to be undertaken during the design, construction and operational stages of the project. The design, implementation and maintenance of landscape mitigation measures is a key aspect of this and should be checked to ensure that they are fully realized and that potential conflicts between the proposed landscape measures and any other project works let its are resolved at the earliest possible date and without compromise to the intention of the mitigation measures. In addition, implementation of the mitigation measures recommended by the EIA will be monitored through the site audit programme.
- 8.1.2 A number of mitigation measures to ameliorate the landscape and visual impacts of the Project implementation is summarized in the EMIS of *Appendix 13.1* of the EIA Report.
- 8.1.3 The landscape and visual mitigation measures proposed should be incorporated in the landscape and engineering design. Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the entire construction period. Mitigation measures to be implemented during operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project. Tree transplantation and compensatory planting should be carried out as early as possible in the Project with transplantation carried out prior to construction starting in any particular area.
- 8.1.4 During construction phase, Landscape & Visual Monitoring of the contractor's operations should be conducted monthly and reported by ET, and countersigned by IEC.

8.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

- 8.2.1 In the Reporting Month, landscape & visual inspection was carried out by the Registered Landscape Architect for works area of Contract 1 and Contract 2 on **30th October 2023**. The findings / reminders recorded during the inspection are presented in *Tables 8-1 and 8-2*.

Table 8-1 Landscape & Visual Inspection Finding for Contract 1

Date	Findings and Reminder	Follow-Up Status
30 th October 2023	1. The Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement.	• Reminded only
	2. The Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.	• Reminder only
	3. Transplanted tree T2465 and T2928 were in fair health condition with normal foliage color and density. Contractor is reminded to provide proper maintenance according to the approved method statement.	• Reminder only

Table 8-2 Landscape & Visual Inspection Finding for Contract 2

Date	Findings and Reminder	Follow-Up Status
30 th October 2023	1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement. Contractor should prevent any construction material pile within TPZ and ensure no works is allowed within the TPZ.	• Reminder only

- 8.2.2 Inspection checklist of Landscape & Visual signed by RLA is attached in *Appendix L*.

9. WASTE MANAGEMENT

9.1 GENERAL WASTE MANAGEMENT

9.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time in accordance with the Waste Management Plan (WMP).

9.2 RECORDS OF WASTE QUANTITIES

9.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

9.2.2 The quantities of waste for disposal in this Reporting Month are summarized in [Table 9-1](#) and [9-2](#) and the Monthly Summary Waste Flow Table is shown in [Appendix M](#). Whenever possible, materials were reused on-site as far as practicable.

Table 9-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
Total generated C&D Materials (Inert) ('000m ³)	0	--	0	--
Reused in this Contract (Inert) ('000m ³)	0	--	0	--
Reused in other Projects (Inert) ('000m ³)	0	--	0	--
Disposal as Public Fill (Inert) ('000m ³)	0	--	0	--

Remark: (#) the unit is in '000kg

Table 9-2 Summary of Quantities of C&D Wastes

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
Recycled Metal ('000kg)	0	--	0	--
Recycled Paper / Cardboard Packing ('000kg)	0	--	0	--
Recycled Plastic ('000kg)	0	--	0	--
Chemical Wastes ('000kg)	0	--	0	--
General Refuses ('000m ³)	0	--	0	--

Remark: (#) the unit is in '000kg

9.2.3 Since canteen and/or kitchen are not allowed setting on the Project site, no domestic wastewater was generated from the Project.

10. SITE INSPECTION

10.1 REQUIREMENT

- 10.1.1 According to the approved EM&A Manual, environmental site inspection should be led by RE and attended by the Contractor and ET at least once per week. Regular environmental site inspections shall be carried out to assess the environmental performance.

10.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

Contract 1

- 10.2.1 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on **5th, 12th, 19th and 26th October 2023**. No non-compliance was noted in the Reporting Month. The findings / deficiencies that observed during the weekly site inspection are listed in **Table 10-1**.

Table 10-1 Site Observations for the Works of Contract 1

Date	Findings / Deficiencies	Follow-Up Status
5 th October 2023	• No adverse environmental issue was observed.	N/A
12 th October 2023	• No adverse environmental issue was observed.	N/A
19 th October 2023	• No adverse environmental issue was observed.	N/A
26 th October 2023	• No adverse environmental issue was observed.	N/A

Contract 2

- 10.2.2 In the Reporting Month, joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on **5th, 12th, 19th and 26th October 2023**. No non-compliance was noted in the Reporting Month. The findings / deficiencies that observed during the weekly site inspection are listed in **Table 10-2**.

Table 10-2 Site Observations for the Works of Contract 2

Date	Findings / Deficiencies	Follow-Up Status
5 th October 2023	• No adverse environmental issue was observed.	N/A
12 th October 2023	• No adverse environmental issue was observed.	N/A
19 th October 2023	• No adverse environmental issue was observed.	N/A
26 th October 2023	• No adverse environmental issue was observed.	N/A

11. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

11.1.1 In the Reporting Month, no environmental complaint was received for the project. No summons and prosecution was lodged for the Contract. The statistical summary table of the environmental complaint, summons and prosecution are presented in *Tables 11-1, 11-2* and *11-3*. The complaint log for the Project is shown in *Appendix N*.

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 31 st October 2023	Contract 1	0	2	(1) Air Quality (1) Noise
1 st – 31 st October 2023	Contract 2	0	5	(1) Water (2) Air Quality (1) Noise (1) Soil / muddy water

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 31 st October 2023	Contract 1	0	0	NA
1 st – 31 st October 2023	Contract 2	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 31 st October 2023	Contract 1	0	0	NA
1 st – 31 st October 2023	Contract 2	0	0	NA

11.1.2 In addition, no complaints received and emergency event relating to violation of environmental legislation for illegal dumping and landfilling were received.

12. IMPLEMENTATION STATUS OF MITIGATION MEASURES

12.1 GENERAL REQUIREMENTS

- 12.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste.
- 12.1.2 The Works of Contract 1 and Contract 2 under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual subject to the site condition and they summarized in **Table 12-1**. The status of the Environmental mitigation measures are presented in **Appendix O**.

Table 12-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Provided ditches, earth bunds or sand bag barriers to minimize polluted runoff. • Temporary drainage was provided to prevent runoff going through site surface and minimize polluted runoff. • Provided perimeter cut-off drains at site boundaries to intercept storm runoff from crossing the site. • Exposed slopes surface were compacted and covered with tarpaulin or similar means. • Provided portable chemical toilets on site.
Air Quality	<ul style="list-style-type: none"> • Maintain damp / wet surface on access road. • Maintain low vehicular speed within the works areas. • Provided vehicle wheel washing facilities at each construction site exit; • Provided water spraying every hour for all active works area. • Stockpiles of dusty material were covered with impervious sheeting. • Provided workers to clear dusty materials at the vehicle entrance or exit regularly. • Stockpile more than 20 bags of cement or dry pulverized fuel ash (PFA) has been covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.
Noise	<ul style="list-style-type: none"> • Restricted operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants. • Placed noisy plants away from residence and school. • Provided noise barriers or hoarding to enclose the noisy plants or works. • Shut down the plants when not in used.
Waste and Chemical Management	<ul style="list-style-type: none"> • Provided on-site sorting prior to disposal. • Followed requirements and procedures of the “Trip-ticket System” • Predicted required quantity of concrete accurately. • Collected the unused fresh concrete at designated locations in the sites for subsequent disposal.
Ecology	<ul style="list-style-type: none"> • Implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and impact to any aquatic fauna during the construction phase. • Demarcation fencing has been erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. • The construction work and site formation have been phased in order to reduce overall noise disturbance impacts in particular areas. • Works have been restricted to daytime and any construction lighting was designed and positioned as to not impact on adjacent ecologically sensitive areas.
General	<ul style="list-style-type: none"> • The site was generally kept tidy and clean. • Environmental Permit was displayed at site entrance.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

12.2.1 The construction activities under the Contract 1 and Contract 2 were substantially completed.

12.3 KEY ISSUES FOR THE COMING MONTH

- 12.3.1 In view of completion of construction activities, proposal for cessation of construction phase environmental monitoring for Contract 1 and Contract 2 have been submitted to EPD in late October for review and approval.
- 12.3.2 In the remaining period, the Contractor should continue implement the necessary environmental mitigation measures according to the approved EM&A Manual.

13. CONCLUSIONS AND RECOMMENTATIONS

13.1 CONCLUSIONS

- 13.1.1 This is the **63rd** Monthly EM&A Report presenting the monitoring results and inspection findings for the period of **1st to 31st October 2023**.
- 13.1.2 In the Reporting Month, no 24-hour or 1-hour TSP monitoring result that triggered the Action or Limit Levels was recorded. No NOEs or the associated corrective action was therefore required.
- 13.1.3 In the Reporting Month, no noise complaint (which triggered Action Level) was received and no Limit Level exceedance for noise monitoring exceedance was recorded.
- 13.1.4 In the Reporting Month, a total of 6 Limit level water quality exceedances, namely **3** exceedances of turbidity and **3** exceedances of SS were recorded. According to the current site programme, Contract 1 and Contract 2 have achieved substantial completion and there were no actual site work carried out under the Project. In ET's investigation, the site area of both Contracts have been hard paved and hydroseeded, there were no adverse water quality impact observed during site inspection. It is concluded that exceedances recorded in the Reporting Month were caused by the impact of Severe Typhoon Koinu and successive rainstorm and not related to the Project. The Contractor was reminded to fully implement the water quality mitigation measures.
- 13.1.5 Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **17th October 2023**. After analysing survey results in October from 2019 to 2023, for Contract 1, there are increases in species richness and abundance for Wetland and Non-wetland habitat as recorded in October since 2022. For Contract 2, the records in species richness and abundance for wetland and non-wetland habitat are significantly increase compared to previous months. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site.
- 13.1.6 Besides, compensation planting works have been conducted in 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement have been implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 13.1.7 In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2. Precautionary check for the presence of nesting birds was not required to carry out beyond the breeding season.
- 13.1.8 Landscape and visual inspection at both Contracts were undertaken on **30th October 2023**. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone and ensure no works is allowed within the TPZ.
- 13.1.9 In the Reporting Month, no environmental complaints, summons and prosecution were received. In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.
- 13.1.10 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the Resident Engineer, ET and the Contractor of the Contract 1 on **5th, 12th, 19th and 26th October 2023**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out on **5th, 12th, 19th and 26th October 2023**. No non-compliance was noted during the site inspections.

13.2 RECOMMENDATIONS

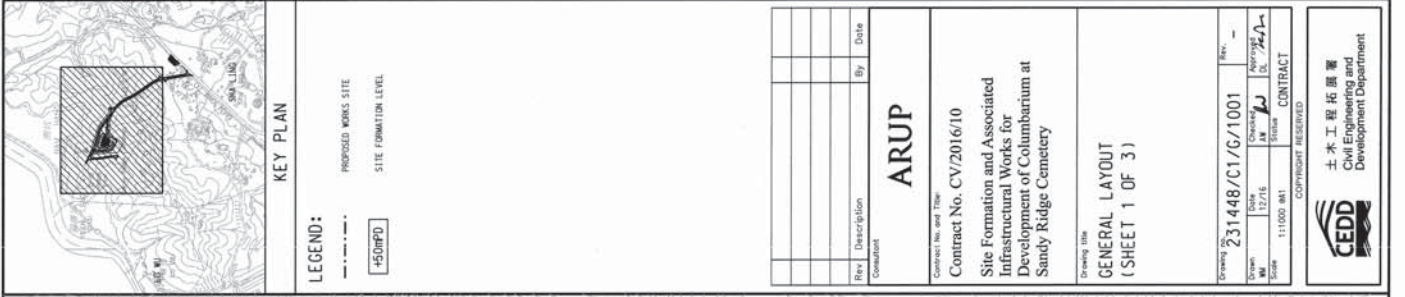
- 13.2.1 In view of completion of construction activities, proposal for cessation of construction phase environmental monitoring for Contract 1 and Contract 2 have been submitted to EPD in late October for review and approval.

- 13.2.2 In the remaining period, the Contractor should continue implement the necessary environmental mitigation measures according to the approved EM&A Manual.

Appendix A

Layout Plan of the Project

Layout Plan of Contract CV/2016/10



ARUP
Consultants

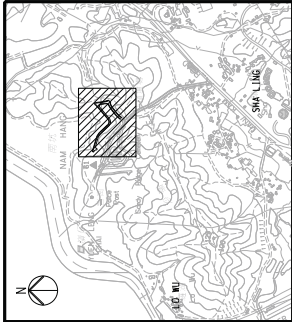
Contract No. and Title
Contract No. CV/2016/10

**Site Formation and Associated
Infrastructural Works for
Development of Columbarium at
Sandy Ridge Cemetery**

Drawing title
GENERAL LAYOUT
(SHEET 1 OF 3)

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Civil Engineering and
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Layout Plan of Contract CV/2017/02



KEY PLAN

LEGEND:

--- SITE BOUNDARY

Rev	By	Date
1	AM	11/17
2	By	Date
3	By	Date
4	By	Date
5	By	Date

ARUP

Contract No. and Title

Contract No. CV/2017/02

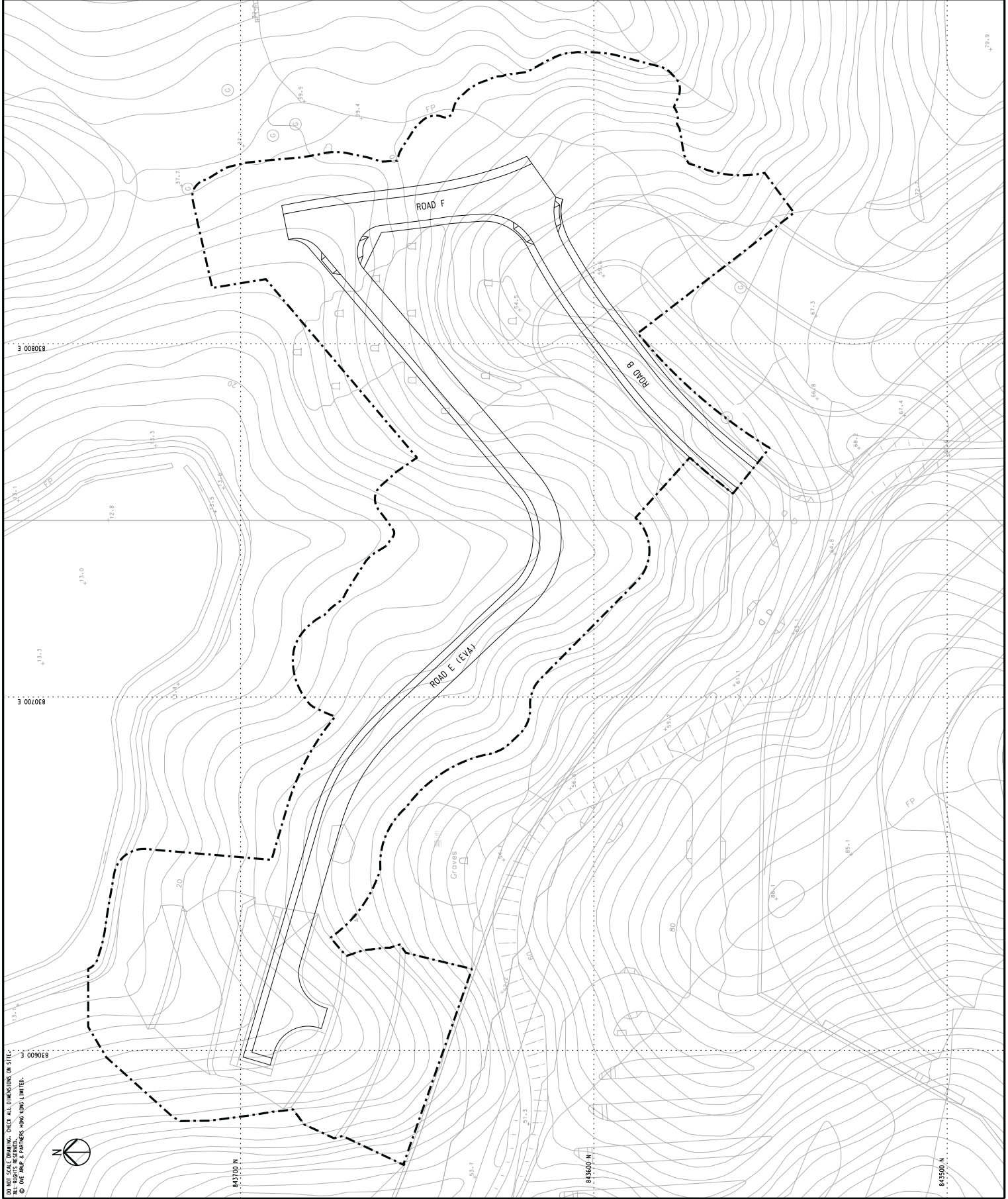
Development of Columbarium
at Sandy Ridge Cemetery -
Infrastructural Works at
Man Kam To Road and
Lin Ma Hang Road

Drawing Title

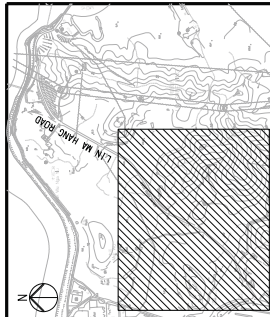
GENERAL LAYOUT
(SHEET 1 OF 5)

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KEY PLAN

SITE BOUNDARY

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ARUP

Contract No. and Title:

Contract No.

Development of Columbarium

at Sandy Ridge Cemetery -

Infrastructure Works at

Man Kam To Road and

Lin Ma Hang Road

Drawing title

GENERAL LAYOUT

(SHEET 3 OF 5)

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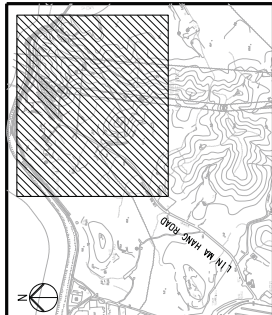
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Printed by : 12/27/2011
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KEY PLAN

LEGEND:
--- SITE BOUNDARY

ARUP

Contract No. CV/2017/02
Development of Columbarium
at Sandy Ridge Cemetery -
Infrastructural Works at
Man Kam To Road and
Lin Ma Hang Road

Drawing Title
GENERAL LAYOUT
(SHEET 4 OF 5)

Rev	Description	By	Date
1	TENDER DRAWING	AM	11/17

Contract No. and Title
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Lin Ma Hang Road

Drawing Title
GENERAL LAYOUT
(SHEET 4 OF 5)

Rev	Description	By	Date
1	TENDER DRAWING	AM	11/17

Contract No. and Title
Contract No. CV/2017/02
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at Sandy Ridge Cemetery -
Infrastructural Works at
Man Kam To Road and
Lin Ma Hang Road

Drawing Title
GENERAL LAYOUT
(SHEET 4 OF 5)

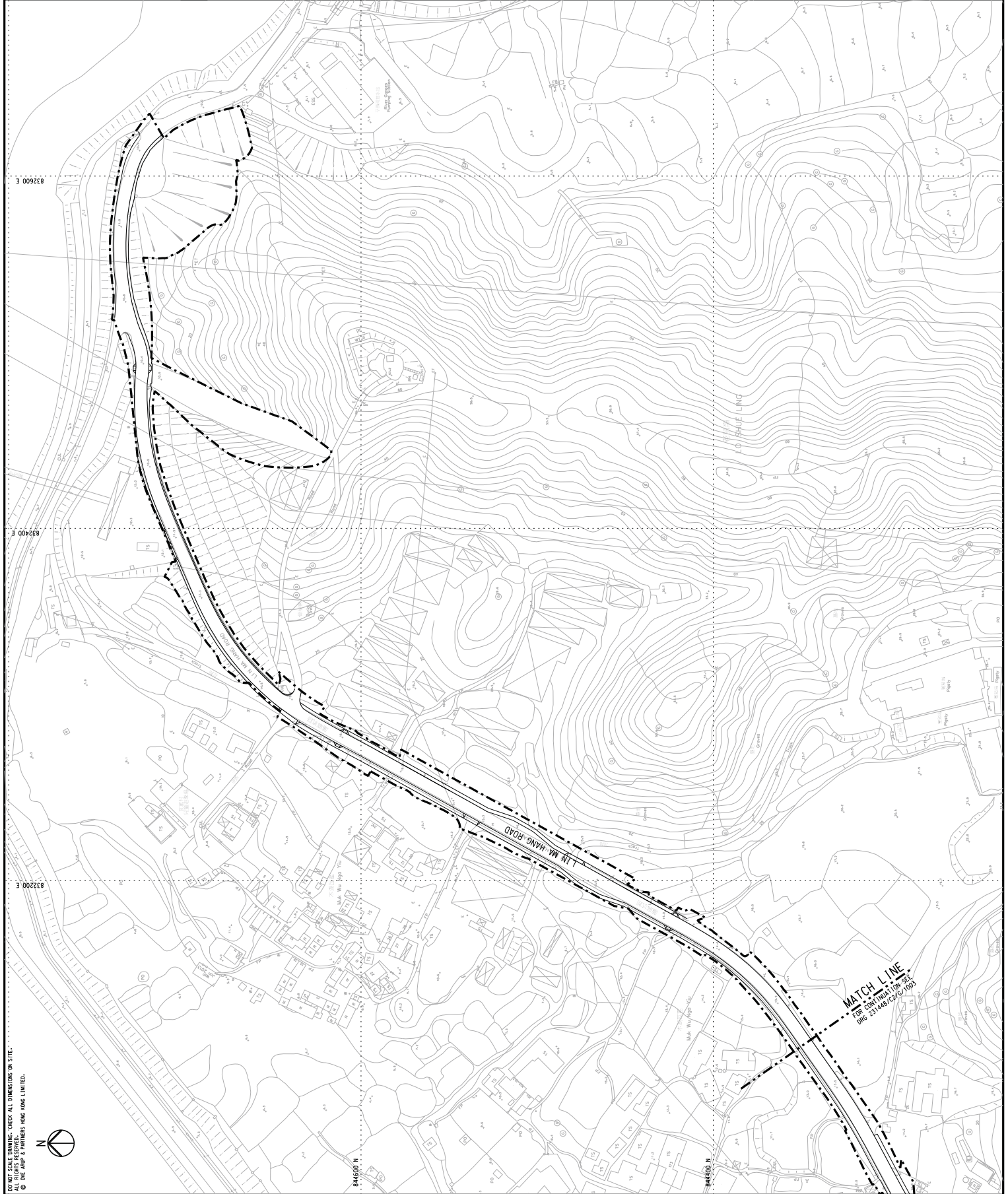
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Contract No. CV/2017/02
Development of Columbarium
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Infrastructural Works at
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Lin Ma Hang Road

Drawing Title
GENERAL LAYOUT
(SHEET 4 OF 5)

Rev	Description	By	Date
1	TENDER DRAWING	AM	11/17

Contract No. and Title
Contract No. CV/2017/02
Development of Columbarium
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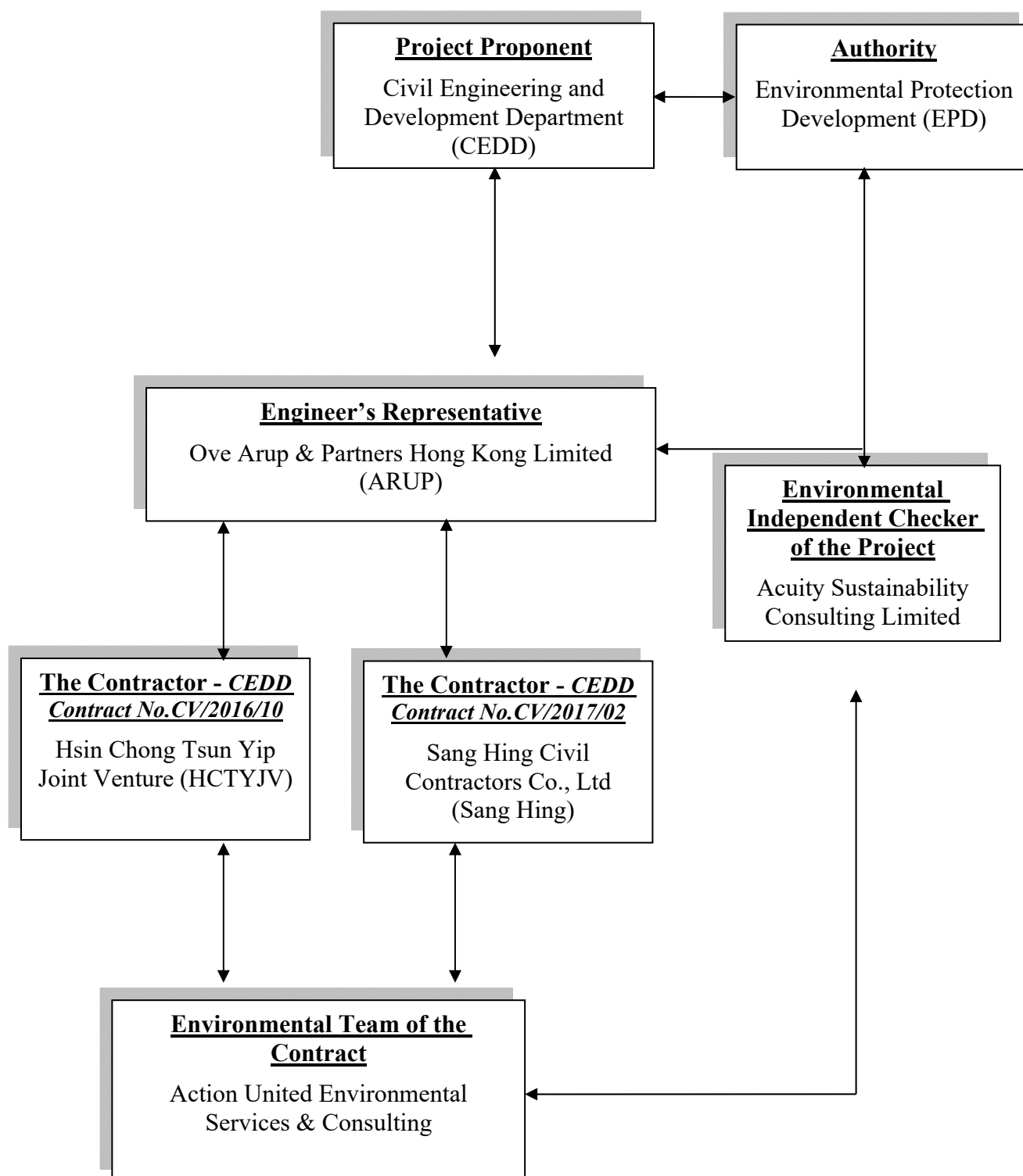
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Appendix B

Organization Structure and Contact Details of Relevant Parties

The Contract's Environmental Management Organization



Contact Details of Key Personnel for CV/2016/10 (Contract 1)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	BOK Kwok-ming, Aaron	2762-5624	2714-0695
ARUP	Engineer's Representative	Steve Tang	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Mr. Leung CH Jacky	2698-6833	2698-9383
HCTYJV	Project Director	Mr. Keniel Kwong	9495-2408	2633-4691
HCTYJV	Construction Manager	Mr. Ho Man To	9620-9794	2633-4691
HCTYJV	Environmental Officer	To be advised		
HCTYJV	Environmental supervisor	Mr. Leung Pak Sum	9437-3606	2633-4691
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Leung Wing Keung, Mike	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Keith L.W. Kei	2959-6059	2959-6079
AUES	Registered Landscape Architect	Mr. Shui Yau Bun, Ivan	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

HCTYJV (Main Contractor) – Hsin Chong Tsun Yip Joint Venture

ACUITY (IEC) – Acuity Sustainability Consulting Limited

AUES (ET) – Action-United Environmental Services & Consulting

Contact Details of Key Personnel for CV/2017/02 (Contract 2)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	BOK Kwok-ming, Aaron	2762-5624	2714-0695
ARUP	Engineer's Representative	Anthony Lau	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
SANG HING	Project Director	Edwin Au	9208-7329	2403-1162
SANG HING	Construction Manager	Raymond Wong	9272-1831	2403-1162
SANG HING	Site Agent	Elvin Lam	6285-0803	2403-1162
SANG HING	Environmental Officer	Keibi Chan	6090-0183	2403-1162
SANG HING	Environmental Supervisor	Kenny Chan	6115-0120	2403-1162
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Leung Wing Keung, Mike	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Keith L.W. Kei	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. N.L Lam, Alan	2959-6059	2959-6079
AUES	Registered Landscape Architect	Mr. Shui Yau Bun, Ivan	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

Sang Hing (Main Contractor) – Sang Hing Civil Contractors Co., Ltd

ACUITY (IEC) – Acuity Sustainability Consulting Limited

AUES (ET) – Action-United Environmental Services & Consulting

Appendix C

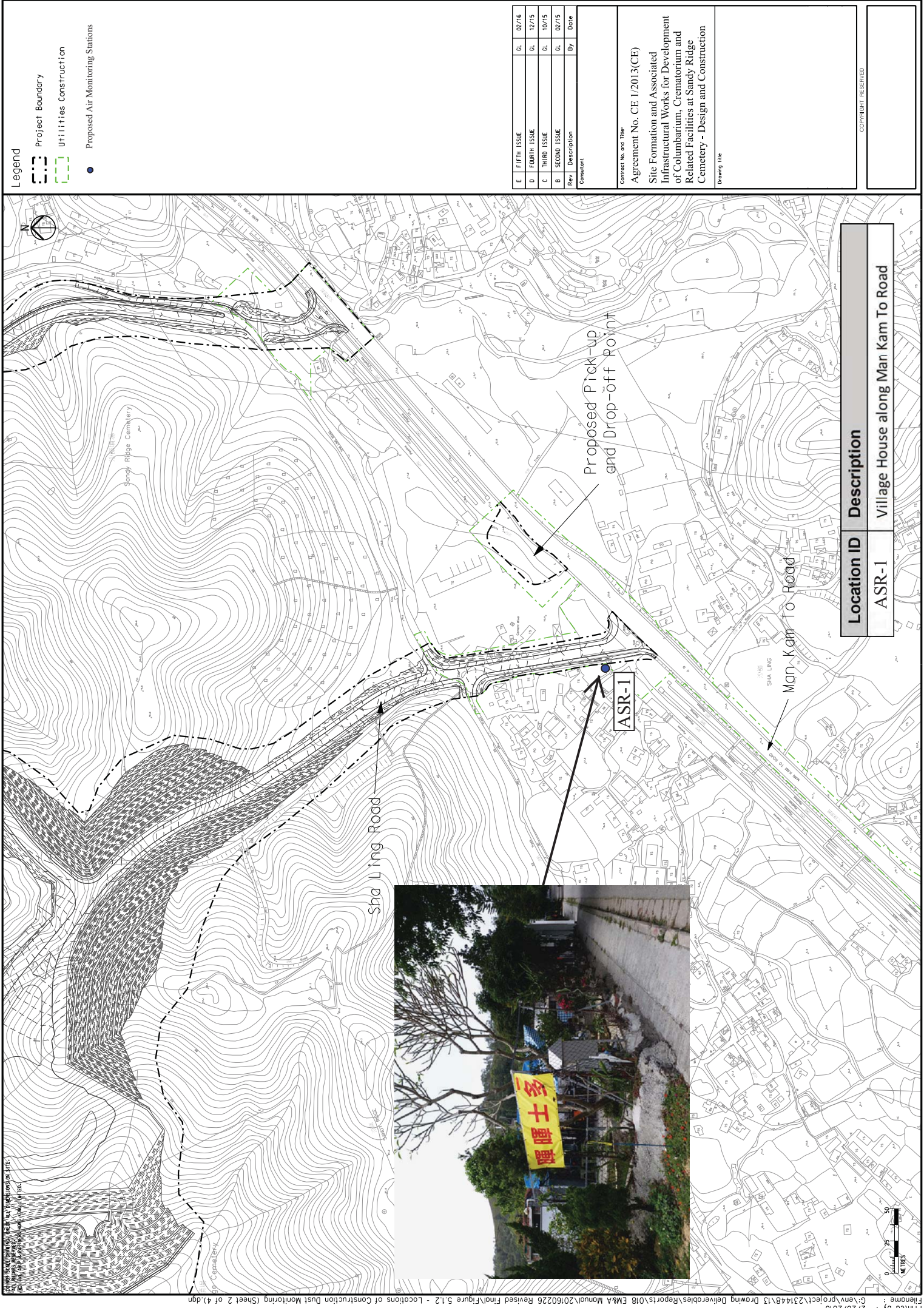
Three Months Rolling Programme

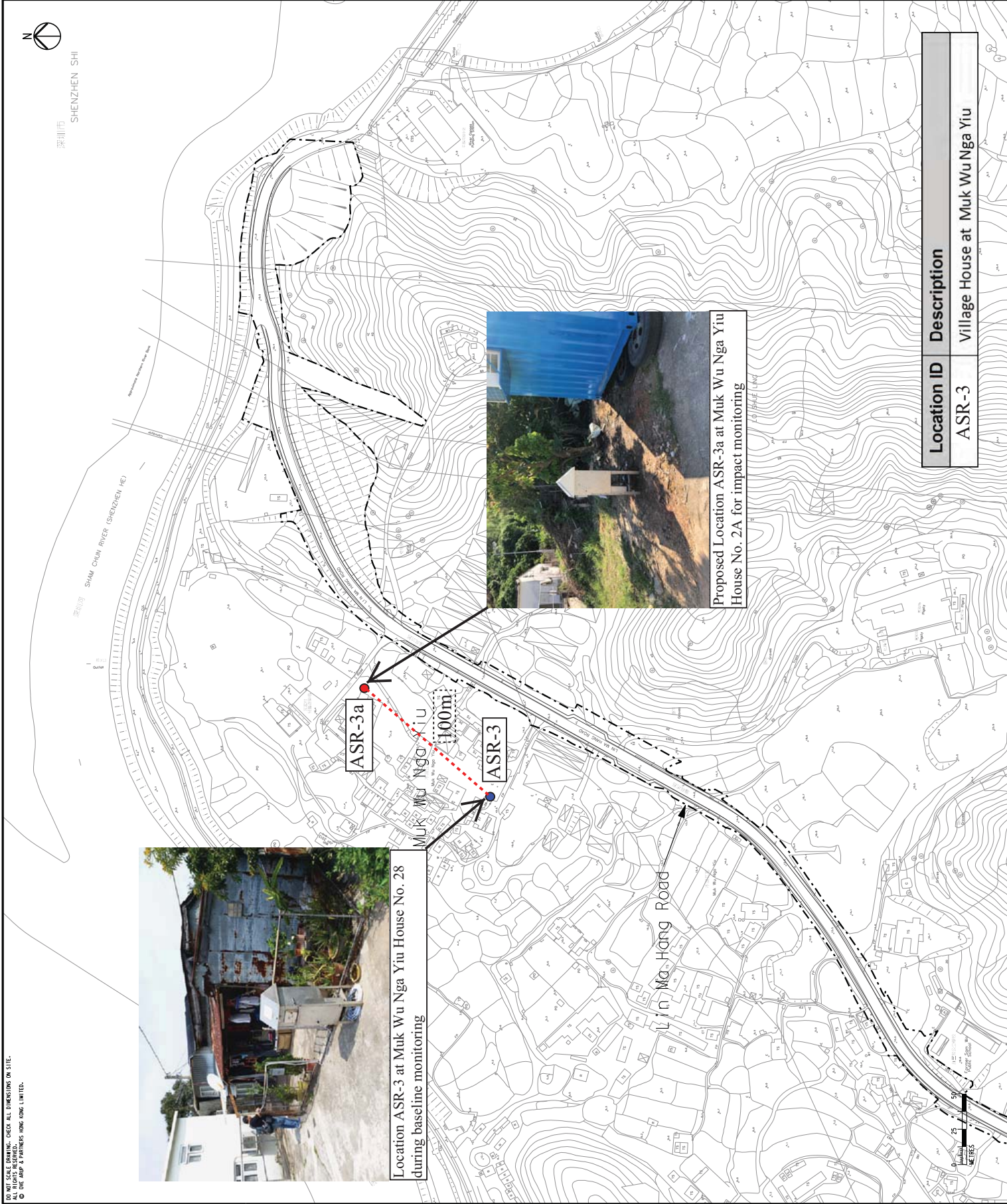
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Appendix D

Monitoring Locations

Air Quality Monitoring Location





Legend

Project Boundary

Existing Air Monitoring Station

Proposed Air Monitoring Station

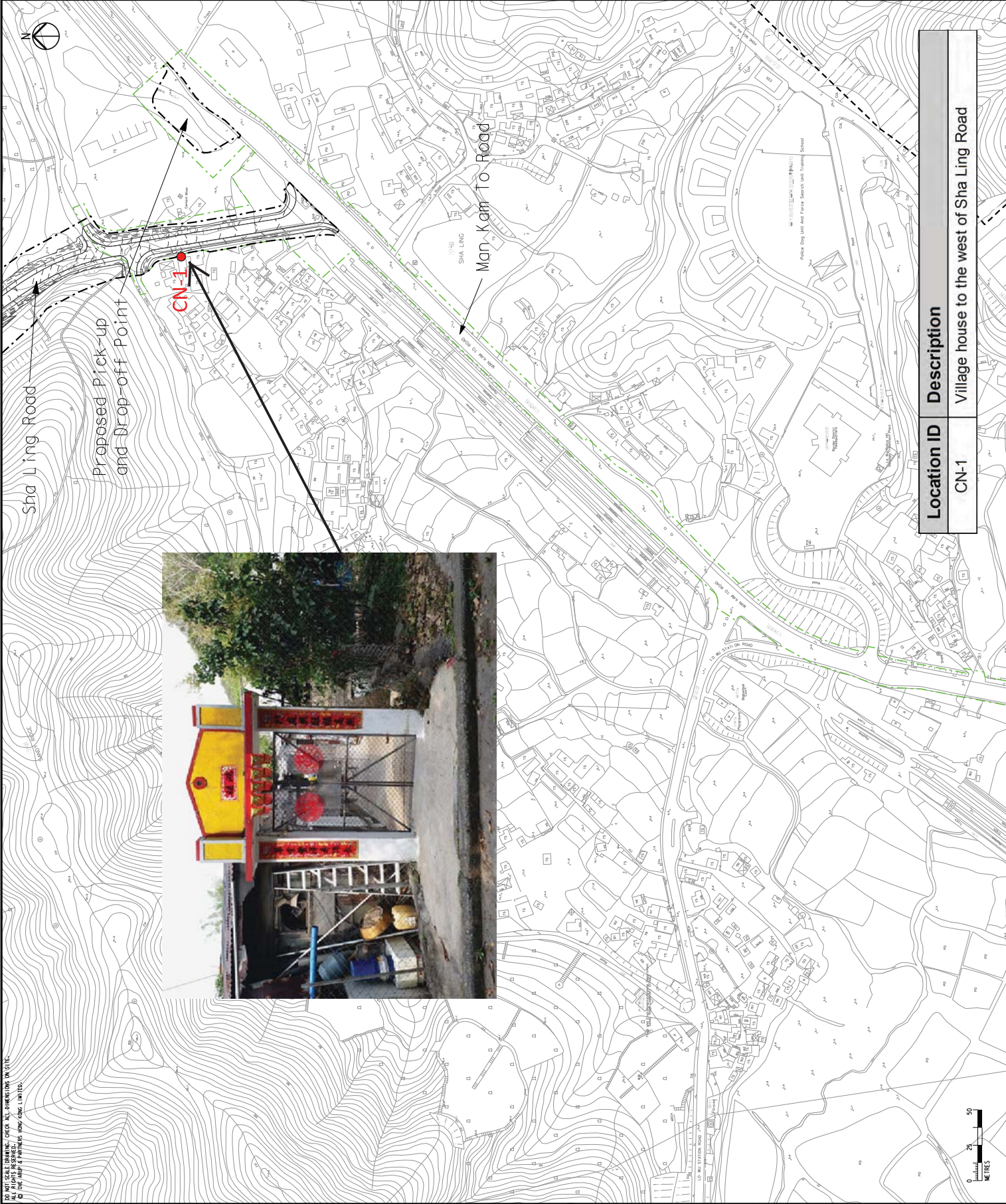
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D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date
Consultant			

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title
Figure 2
Air Quality Monitoring
Location (ASR-3)

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Noise Monitoring Location



- Legend
- Project Boundary
 - Utilities Construction
 - 300m Assessment Area
 - Proposed Construction Noise Monitoring Locations

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D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date
Consultant			

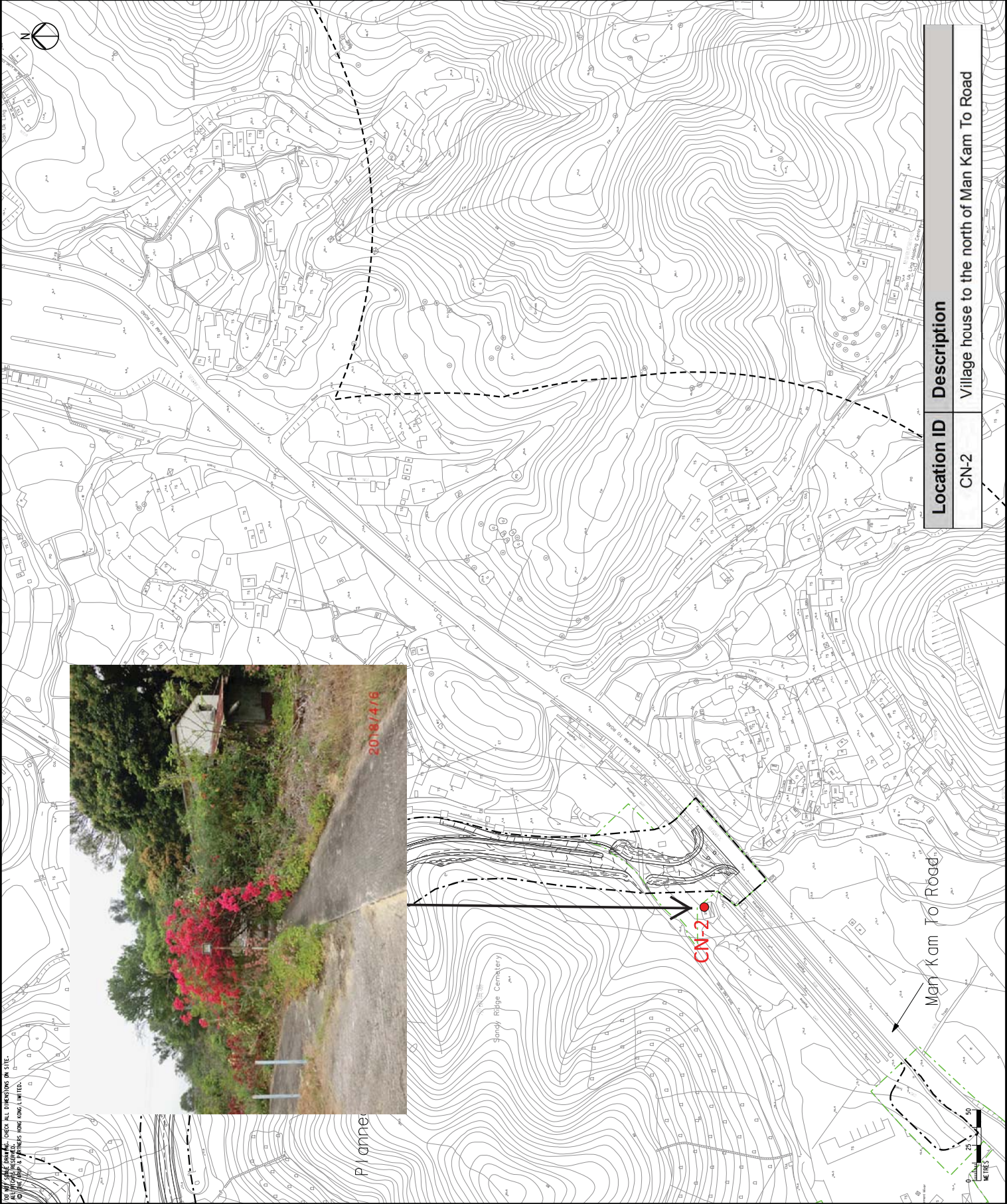
Contract No. and Title:
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Drawing title

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Location ID	Description
CN-1	Village house to the west of Sha Ling Road

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Legend

Project Boundary

Utilities Construction

300m Assessment Area

Proposed Construction Noise Monitoring Locations

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Drawing Title

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Location ID	Description
CN-2	Village house to the north of Man Kam To Road



Location ID	Description
CN-3	Village house near San Uk Ling
CN-4	Village house of Muk Wu

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Rev	Description	By	Date
Consultant			

Contract No. and Title:

Agreement No. CE 1/2013(CE)

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Drawing title

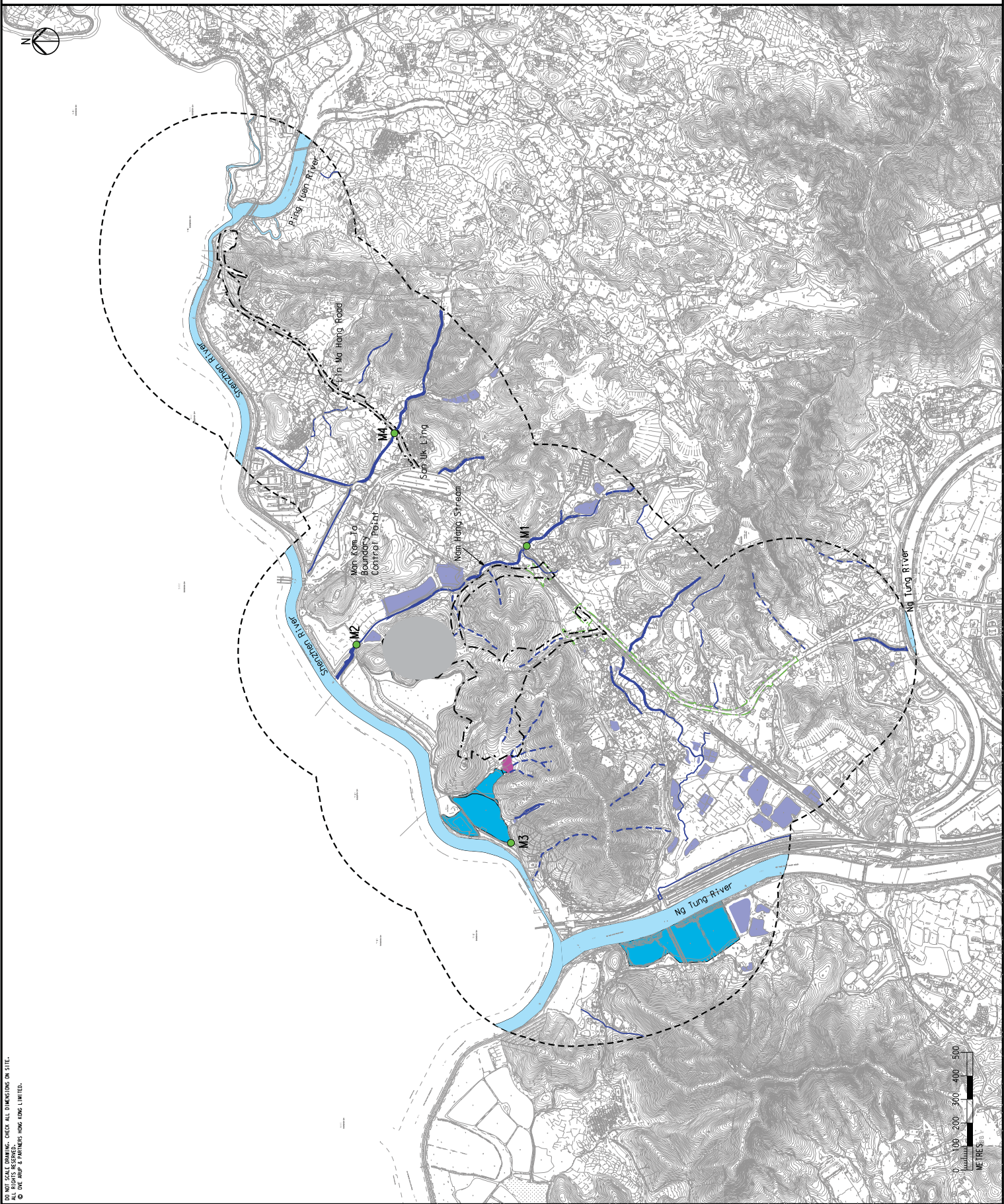
Legend

Project Boundary

300m Assessment Area

Proposed Construction Noise
Monitoring Locations

Water Quality Monitoring Station



- Legend
- Project Boundary
 - Utilities Construction
 - 500m Assessment Area
 - Channelized River
 - Pond
 - Watercourse
 - Conservation Area (CA)
 - Wet Woodland
 - Seasonal Watercourse
 - Baseline Monitoring Station

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
A	DESCRIPTION	By	Date
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Related Facilities at Sandy Ridge
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Drawing title
Water Quality Monitoring
Locations

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Appendix E

Calibration Certificate of Monitoring Equipment and Laboratory Certificate

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT USED IN THE REPORTING MONTH

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1a	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	3 Oct 2023	17 Oct 2023
1b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	17 Oct 2023	31 Oct 2023
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	3 Oct 2023	17 Oct 2023
2b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	17 Oct 2023	31 Oct 2023
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	3 Oct 2023	17 Oct 2023
3b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	17 Oct 2023	31 Oct 2023
4		Calibration Kit TISCH Model TE-5025A Orifice ID 4064 and Rootsmeter S/N 438320	15 Dec 22	15 Dec 23
5		Laser Dust Monitor, Model LD-3B (Serial No. 366407) – EQ107	13 Feb 23	13 Feb 24
6		Laser Dust Monitor, Model LD-3B (Serial No. 366418) – EQ108	13 Feb 23	13 Feb 24
7		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	13 Feb 23	13 Feb 24
9	Noise	Rion NL-52 Sound Level Meter (Serial No. 00921191) – EQ013	19 Nov 22	19 Nov 23
10		Rion NL-52 Sound Level Meter (Serial No. 00142581) – EQ015	19 Nov 22	19 Nov 23
11		Rion NC-75 Acoustical Calibrator (Serial No. 34680623) – EQ089	21 Mar 23	21 Mar 24
12	Water	YSI Professional DSS (Serial No.20J101862)	22 Sep 23	22 Dec 23
13		Global Water FP211 Flow Meter (Serial No. 22B106785)	2 May 23	2 May 24

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 3 Oct 23

Location ID : ASR-1

Next Calibration Date: 17 Oct 23

Name and Model: TISCH HVS Model TE-5170

Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1010.6	1002.7	Corrected Pressure (mm Hg)	757.95
Temperature (°C)	29.3		Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Serial # ->	4064		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.60	6.60	13.2	1.725	57	56.11	Slope = 34.9256
13	5.30	5.30	10.6	1.548	50	49.22	Intercept = -4.7531
10	4.10	4.10	8.2	1.364	42	41.35	Corr. coeff. = 0.9953
7	2.40	2.40	4.8	1.048	34	33.47	
5	1.60	1.60	3.2	0.859	25	24.61	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

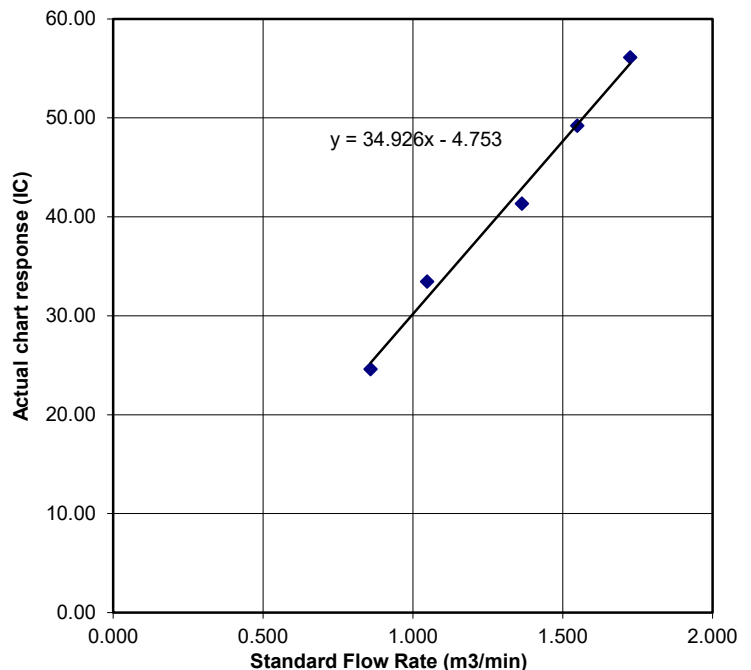
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1
 Location ID : ASR-2
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 3 Oct 23
 Next Calibration Date: 17 Oct 23
 Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa) 1010.6
 Temperature (°C) 29.3

Corrected Pressure (mm Hg) 757.95
 Temperature (K) 302

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 4064

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.60	6.60	13.2	1.725	55	54.14	Slope = 34.7700
13	5.00	5.00	10.0	1.504	46	45.28	Intercept = -6.3363
10	3.80	3.80	7.6	1.314	40	39.38	Corr. coeff. = 0.9993
7	2.60	2.60	5.2	1.090	32	31.50	
5	1.70	1.70	3.4	0.885	25	24.61	

Calculations :

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

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

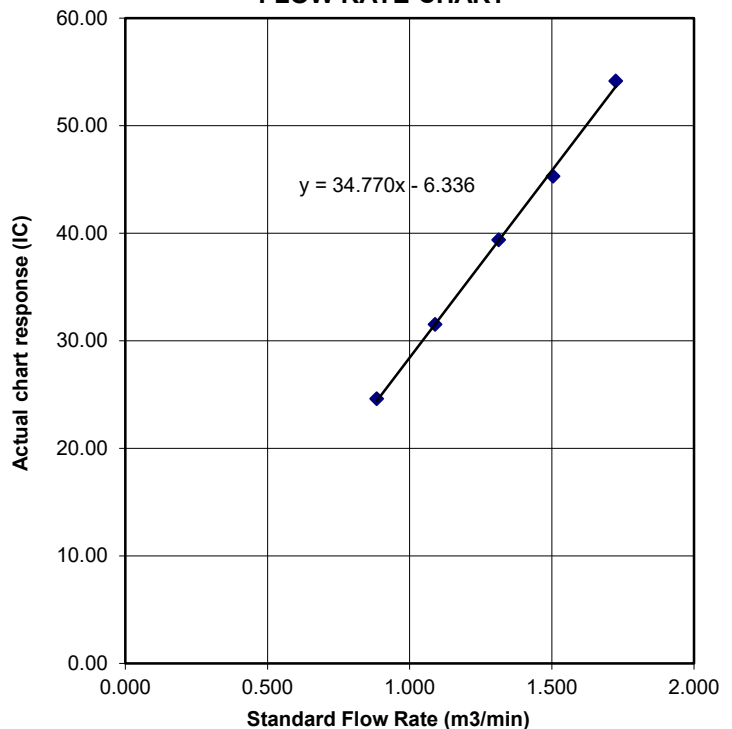
Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

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

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A	Date of Calibration: 3 Oct 23
Location ID : ASR-3a	Next Calibration Date: 17 Oct 23
Name and Model: TISCH HVS Model TE-5170	Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1010.6	Corrected Pressure (mm Hg)	757.95
Temperature (°C)	29.3	Temperature (K)	302

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->
Model-> 5025A	2.10977
Serial # -> 4064	Qstd Intercept ->
	-0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.712	56	55.13	Slope = 35.7008
13	5.10	5.10	10.2	1.519	48	47.25	Intercept = -6.2089
10	4.10	4.10	8.2	1.364	44	43.32	Corr. coeff. = 0.9987
7	2.50	2.50	5.0	1.069	32	31.50	
5	1.60	1.60	3.2	0.859	25	24.61	

Calculations :

$$Q_{std} = 1/m[\sqrt{H_{2O}(P_a/P_{std})(T_{std}/T_a)} - b]$$

$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

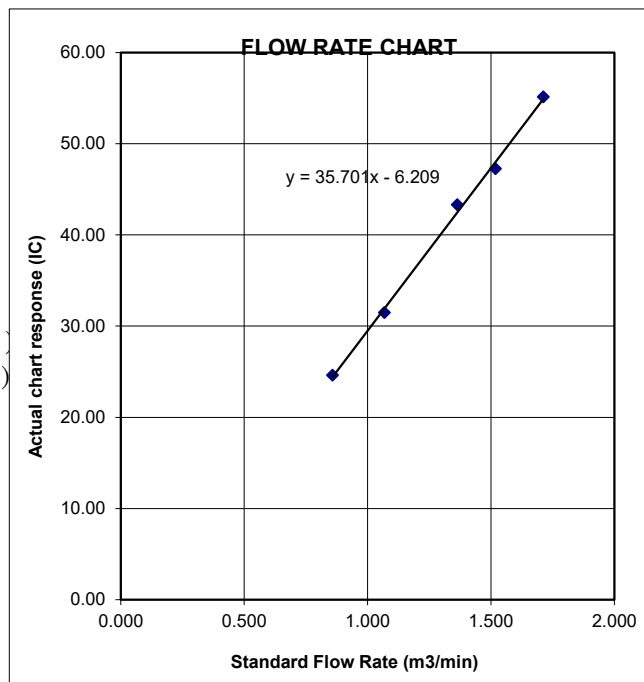
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 17 Oct 23

Location ID : ASR-1

Next Calibration Date: 31 Oct 23

Name and Model: TISCH HVS Model TE-5170

Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1015.4	1002.7	Corrected Pressure (mm Hg)	761.55
Temperature (°C)	25.8		Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Serial # ->	4064		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.726	57	56.91	Slope = 34.0971
13	5.30	5.30	10.6	1.561	49	48.92	Intercept = -3.0149
10	4.10	4.10	8.2	1.375	43	42.93	Corr. coeff. = 0.9891
7	2.30	2.30	4.6	1.034	35	34.94	
5	1.60	1.60	3.2	0.866	25	24.96	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

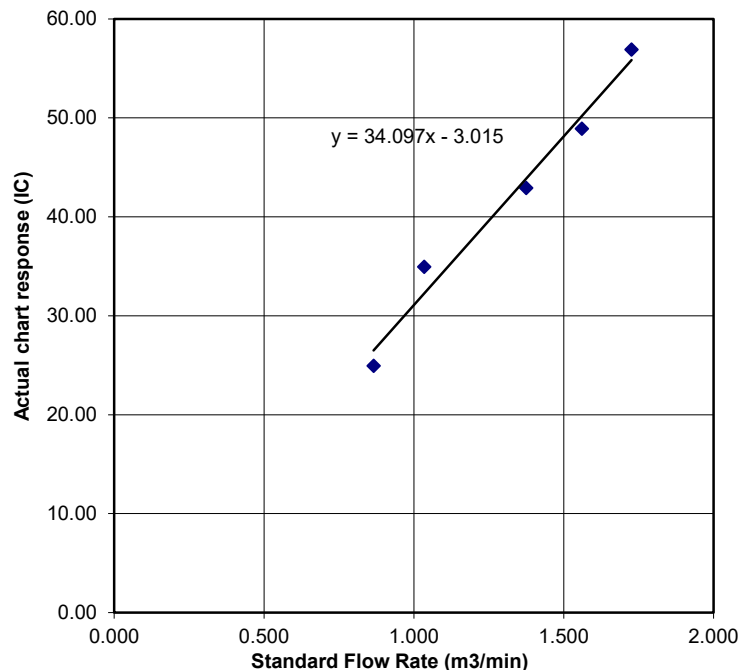
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1
 Location ID : ASR-2
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 17 Oct 23
 Next Calibration Date: 31 Oct 23
 Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1015.4
 25.8

Corrected Pressure (mm Hg)
 Temperature (K)

761.55
 299

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 4064

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.60	6.60	13.2	1.739	55	54.91	Slope = 33.6970
13	5.00	5.00	10.0	1.516	46	45.92	Intercept = -4.4857
10	3.70	3.70	7.4	1.307	39	38.94	Corr. coeff. = 0.9984
7	2.50	2.50	5.0	1.077	32	31.95	
5	1.70	1.70	3.4	0.892	26	25.96	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

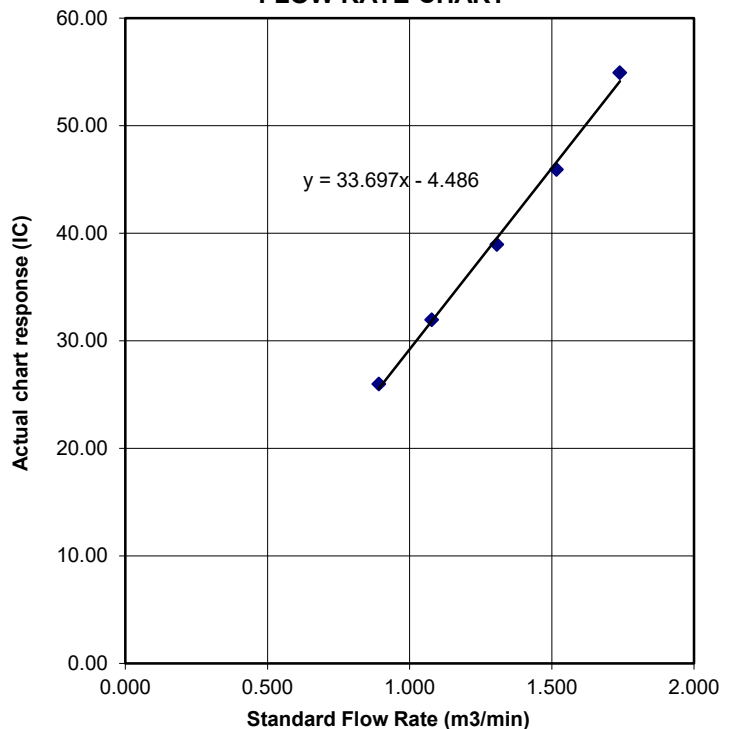
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A	Date of Calibration: 17 Oct 23
Location ID : ASR-3a	Next Calibration Date: 31 Oct 23
Name and Model: TISCH HVS Model TE-5170	Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1015.4	Corrected Pressure (mm Hg)	761.55
Temperature (°C)	25.8	Temperature (K)	299

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.10977
Model-> 5025A	Qstd Intercept -> -0.03782
Serial # -> 4064	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.726	56	55.91	Slope = 35.9212
13	5.00	5.00	10.0	1.516	48	47.92	Intercept = -6.3538
10	4.10	4.10	8.2	1.375	43	42.93	Corr. coeff. = 0.9998
7	2.54	2.40	4.9	1.071	32	31.95	
5	1.60	1.60	3.2	0.866	25	24.96	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

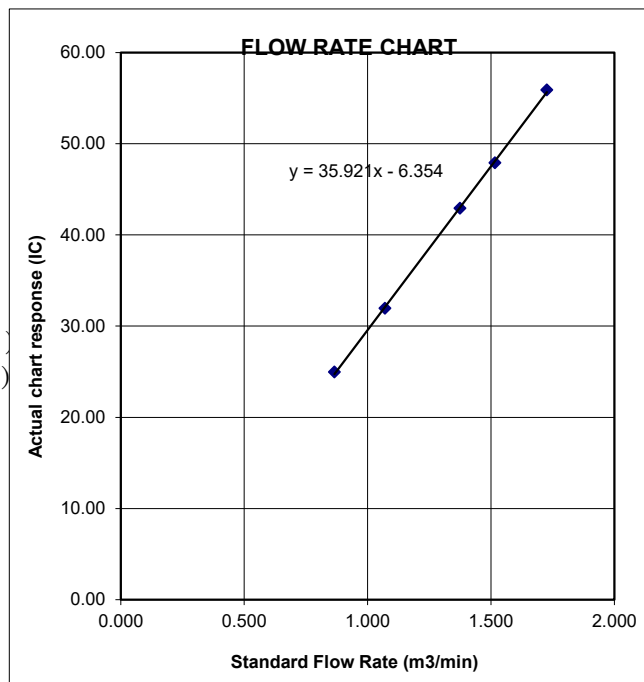
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2022 Rootsmeter S/N: 438320 Ta: 295 °K
Operator: Jim Tisch Pa: 748.0 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: **4064**

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	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)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

Calculations

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

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2307087
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
- Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Kwai Tsing Hong Kong

WORK ORDER : HK2307087

SUB-BATCH : 1

CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307087-001	S/N: 366407	AIR	20-Feb-2023	S/N: 366407

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366407
Equipment Ref: EQ107

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018 & HVS 019
Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	613	5.1
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1786	14.8
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1206	10.0
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3679	60.1
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2077	33.9

(*) Suspended particle was added into calibration room of HVS019 for high concentration test.

Sensitivity Adjustment Scale Setting (Before Calibration) 565 (CPM)

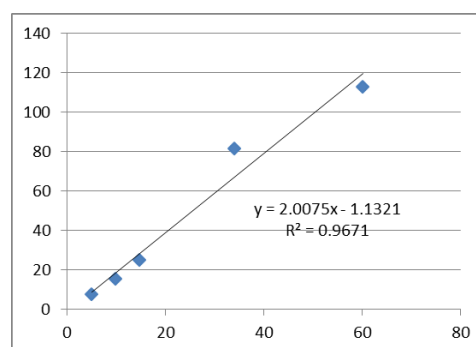
Sensitivity Adjustment Scale Setting (After Calibration) 565 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0075 (ug/m³)/CPM

Correlation Coefficient (R) 0.9834

Date of Issue 13 February 2023



Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 2.0075 (ug/m³)/CPM should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 13 February 2023

QC Reviewer : Ben Tam Signature :  Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 14-Dec-22
Location ID :	Calibration Room(HVS 018)	Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.783	54	55.39	Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

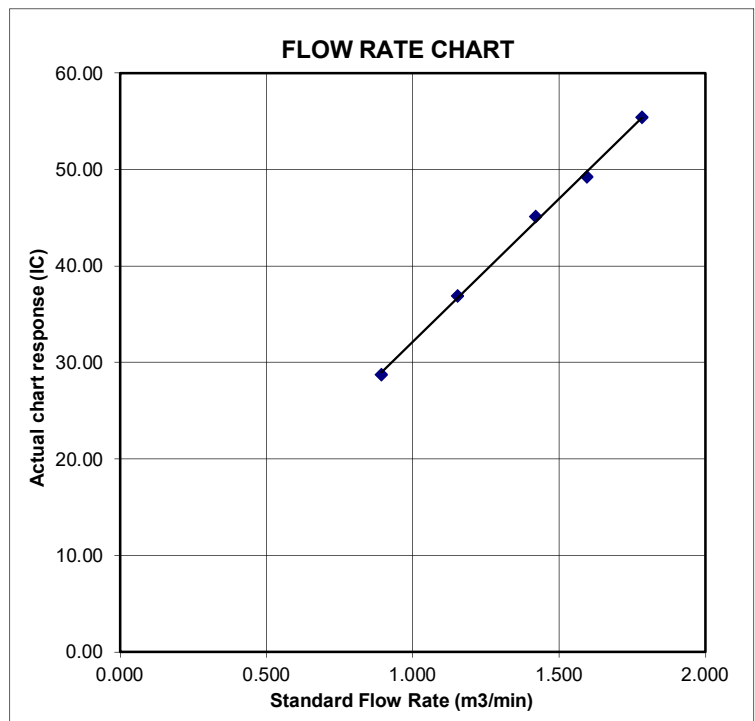
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date:	December 27, 2021	Rootsmeter S/N:	438320	Ta:	295	°K
Operator:	Jim Tisch	Pa:	740.4			mm Hg
Calibration Model #:	TE-5025A	Calibrator S/N:	1612			

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	r=	0.99999		r=	0.99999

Calculations

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

Standard Conditions

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

RECALIBRATION

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room(HVS 019)

Date of Calibration: 10-Jan-23
 Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa) 1018.8
 Temperature (°C) 18.2

Corrected Pressure (mm Hg) 764.1
 Temperature (K) 291

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 15-Dec-22

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782
 Expiry Date-> 15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

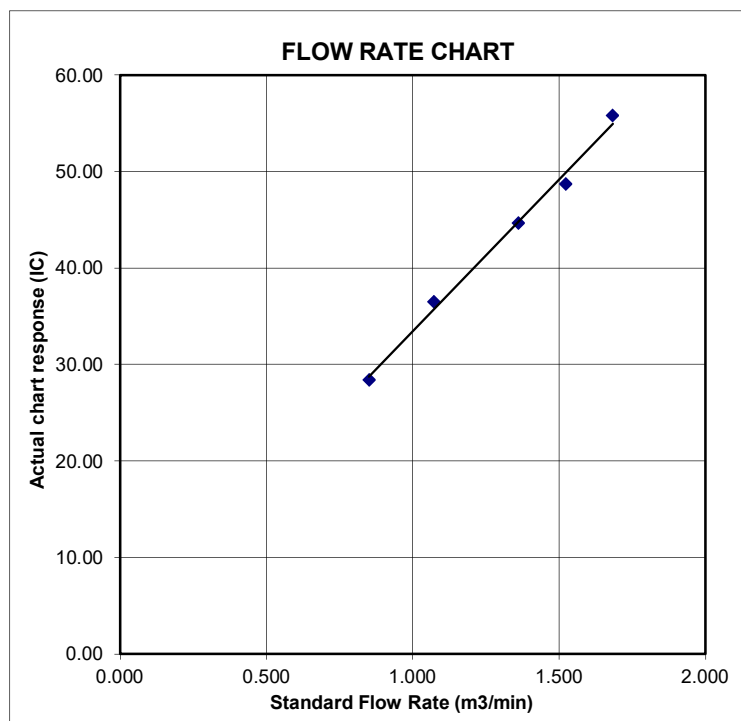
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2022 Rootsmeter S/N: 438320 Ta: 295 °K
Operator: Jim Tisch Pa: 748.0 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: 4064

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

Calculations

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

Standard Conditions

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2307088
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
- Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Kwai Tsing Hong Kong

WORK ORDER : HK2307088

SUB-BATCH : 1

CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307088-001	S/N: 366418	AIR	20-Feb-2023	S/N: 366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366418
Equipment Ref: EQ108

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018 & HVS 019
Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	584	4.8
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1677	13.9
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1106	9.1
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3546	57.9
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2110	34.5

(*) Suspended particle was added into calibration room of HVS019 for high concentration test.

Sensitivity Adjustment Scale Setting (Before Calibration) 685 (CPM)

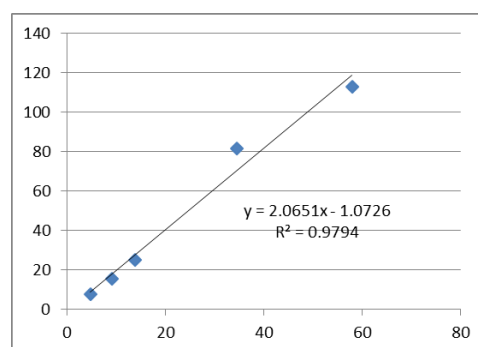
Sensitivity Adjustment Scale Setting (After Calibration) 685 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0651 (ug/m³)/CPM

Correlation Coefficient (R) 0.9896

Date of Issue 13 February 2023



Remarks:

1. Strong Correlation ($R > 0.8$)
2. Factor 2.0651 (ug/m³)/CPM should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 13 February 2023

QC Reviewer : Ben Tam Signature :  Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 14-Dec-22
Location ID :	Calibration Room(HVS 018)	Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.783	54	55.39	Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

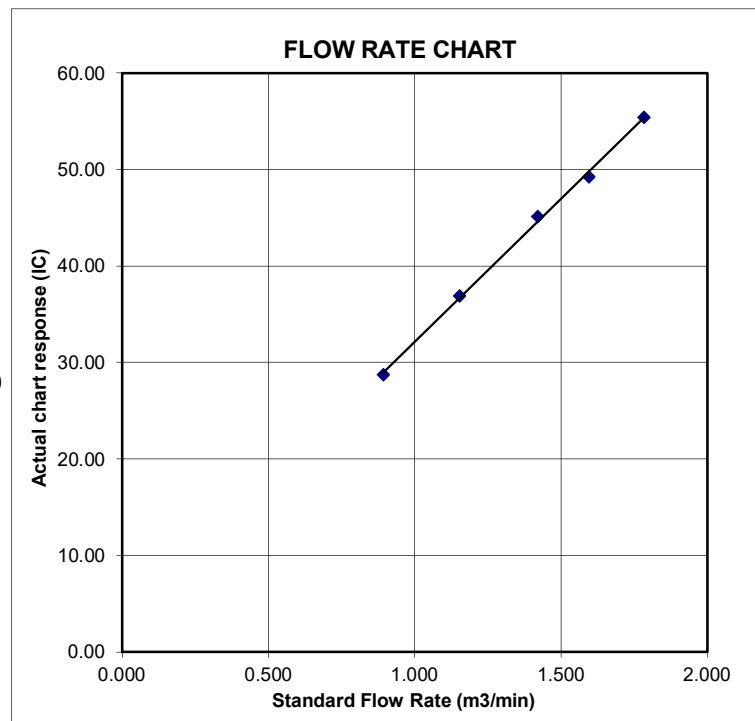
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date:	December 27, 2021	Rootsmeter S/N:	438320	Ta:	295	°K
Operator:	Jim Tisch	Pa:	740.4			mm Hg
Calibration Model #:	TE-5025A	Calibrator S/N:	1612			

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	r=	0.99999		r=	0.99999

Calculations

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

Standard Conditions

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

RECALIBRATION

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 10-Jan-23
Location ID :	Calibration Room(HVS 019)	Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	18.2	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Calibration Date->	15-Dec-22	Expiry Date->	15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

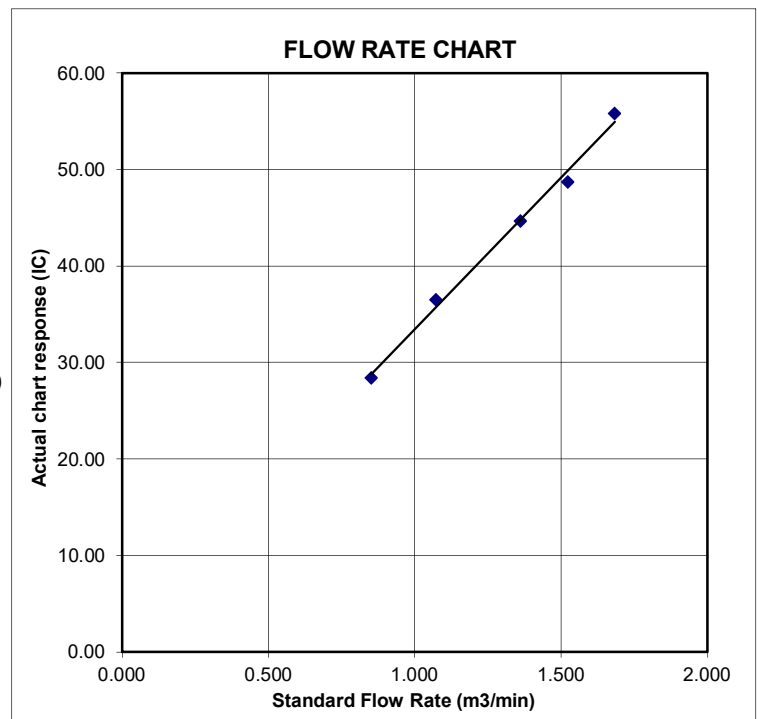
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2022 Rootsmeter S/N: 438320 Ta: 295 °K
Operator: Jim Tisch Pa: 748.0 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: 4064

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

Calculations

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

Standard Conditions

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2307089
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
- Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Kwai Tsing Hong Kong

WORK ORDER : HK2307089
SUB-BATCH : 1
CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307089-001	S/N: 366410	AIR	20-Feb-2023	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366410
Equipment Ref: EQ110

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018 & HVS 019
Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	584	4.8
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1470	12.2
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1103	9.1
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3507	57.3
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2311	37.8

(*) Suspended particle was added into calibration room of HVS019 for high concentration test.

Sensitivity Adjustment Scale Setting (Before Calibration) 674 (CPM)

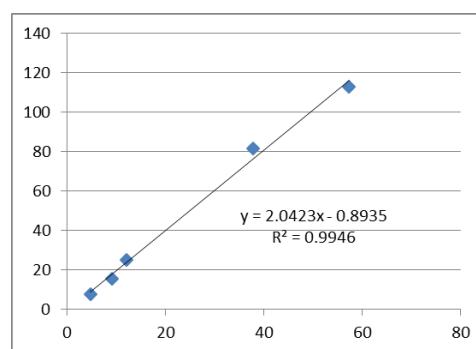
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0423 (ug/m³)/CPM

Correlation Coefficient (R) 0.9973

Date of Issue 13 February 2023



Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 2.0423 (ug/m³)/CPM should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 13 February 2023

QC Reviewer : Ben Tam Signature :  Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 14-Dec-22
Location ID :	Calibration Room(HVS 018)	Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.783	54	55.39	Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

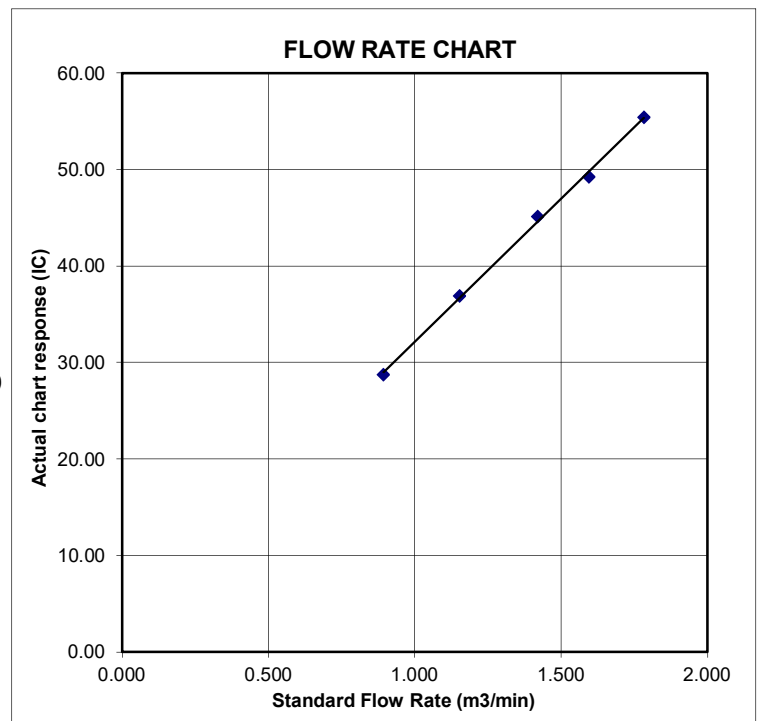
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date:	December 27, 2021	Rootsmeter S/N:	438320	Ta:	295	°K
Operator:	Jim Tisch	Pa:	740.4			mm Hg
Calibration Model #:	TE-5025A	Calibrator S/N:	1612			

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	r=	0.99999		r=	0.99999

Calculations

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

Standard Conditions

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

RECALIBRATION

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 10-Jan-23
Location ID :	Calibration Room(HVS 019)	Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	18.2	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Calibration Date->	15-Dec-22	Expiry Date->	15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

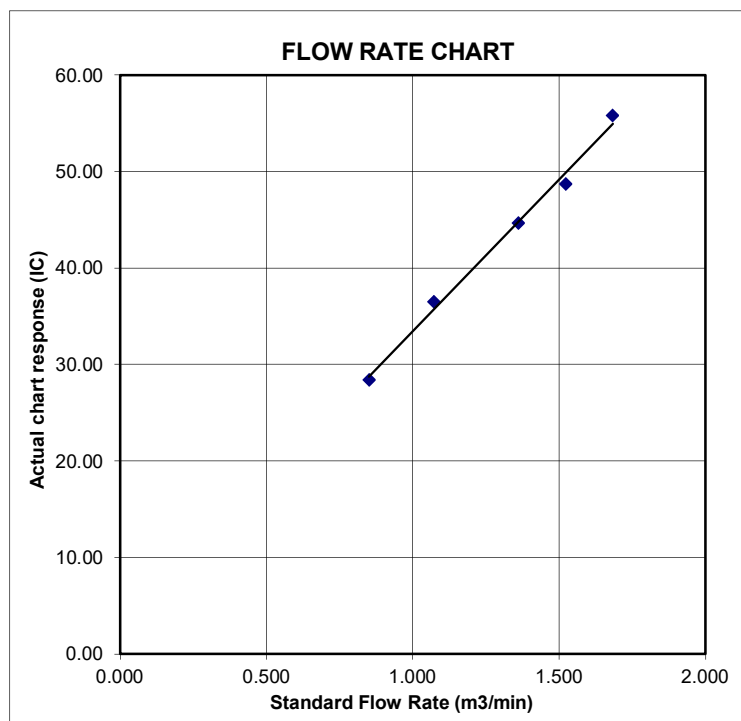
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2022 Rootsmeter S/N: 438320 Ta: 295 °K
Operator: Jim Tisch Pa: 748.0 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: **4064**

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

Calculations

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

Standard Conditions

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

RECALIBRATION

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

Certificate of Calibration

校正證書

Certificate No. : C226777

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2282) Date of Receipt / 收件日期 : 8 November 2022

Description / 儀器名稱 : Sound Level Meter (EQ013)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00921191
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2022

TEST RESULTS / 測試結果


The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By
測試

:


H T Wong
Assistant Engineer

Certified By
核證

:


K C Lee
Engineer

Date of Issue
簽發日期

:

21 November 2022

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C226777
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.9
				114.00		113.9

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C226777
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L _A	A	Fast	94.00	63 Hz	67.6	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.5	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					16 kHz	85.8	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L _C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.6	-0.2 ± 1.5
					250 Hz	93.8	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					16 kHz	83.9	-8.5 (+3.5 ; -17.0)

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Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C226777

證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 12910

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C226779

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2282) Date of Receipt / 收件日期 : 8 November 2022

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2022

TEST RESULTS / 測試結果

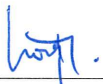
The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

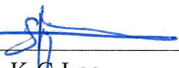
Tested By
測試

:


H T Wong
Assistant Engineer

Certified By
核證

:


K C Lee
Engineer

Date of Issue
簽發日期

:

21 November 2022

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C226779
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.8
				114.00		113.7

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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Certificate of Calibration

校正證書

Certificate No. : C226779
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.5	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.6	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					16 kHz	85.8	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.6	-0.2 ± 1.5
					250 Hz	93.8	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					16 kHz	83.9	-8.5 (+3.5 ; -17.0)

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c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C226779

證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 20044

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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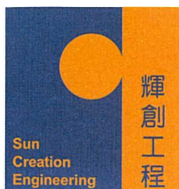
c/o 香港新界屯門興安里一號四樓

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C231627

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC23-0436) Date of Receipt / 收件日期 : 28 February 2023

Description / 儀器名稱 : Sound Calibrator (EQ089)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-75
Serial No. / 編號 : 34680623
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

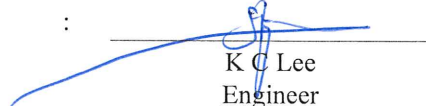
DATE OF TEST / 測試日期 : 21 March 2023


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed specified limits.
These limits refer to manufacturer's published tolerances as requested by the customer.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By : 
測試 K C Lee
Engineer

Certified By : 
核證 H C Chan
Engineer

Date of Issue : 21 March 2023
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

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Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C231627

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C223647
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C221750

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Limit (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.25	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Limit	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING
ADDRESS: RM A 20/F., GOLD KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG, N.T.

WORK ORDER: HK2336999
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 15-Sep-2023
DATE OF ISSUE: 25-Sep-2023

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type: Multifunctional Meter
Service Nature: Performance Check
Scope: Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 22-September-2023

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2336999
SUB-BATCH: 0
DATE OF ISSUE: 25-Sep-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 22-September-2023 Date of Next Calibration: 22-December-2023

PARAMETERS:

Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading ($\mu\text{S}/\text{cm}$)	Displayed Reading ($\mu\text{S}/\text{cm}$)	Tolerance (%)
146.9	154.7	+5.3
6667	6832	+2.5
12890	13384	+3.8
58670	59566	+1.5
	Tolerance Limit (%)	± 10.0

Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.57	2.70	+0.13
4.69	4.84	+0.15
7.91	7.88	-0.03
	Tolerance Limit (mg/L)	± 0.20

pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.83	-0.17
7.0	7.05	+0.05
10.0	9.95	-0.05
	Tolerance Limit (pH unit)	± 0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2336999
SUB-BATCH: 0
DATE OF ISSUE: 25-Sep-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 22-September-2023 Date of Next Calibration: 22-December-2023

PARAMETERS:

Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.62	--
4	4.25	+6.3
40	36.56	-8.6
80	73.33	-8.3
400	365.28	-8.7
800	735.99	-8.0
Tolerance Limit (%)		±10.0

Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.56	+5.6
20	21.19	+6.0
30	30.75	+2.5
Tolerance Limit (%)		±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2336999
SUB-BATCH: 0
DATE OF ISSUE: 25-Sep-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 22-September-2023 Date of Next Calibration: 22-December-2023

PARAMETERS:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.0	9.2	+0.2
27.0	25.9	-1.1
49.0	48.1	-0.9
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND
CONSULTING
ADDRESS: UNIT A ,20/F., GOLD KING INDUSTRIAL BUILDING,
NO. 35-41 TAI LIN PAI ROAD,
Kwai Chung, N.T. HONG KONG

WORK ORDER: HK2318969

SUB-BATCH: 0

LABORATORY: HONG KONG

DATE RECEIVED: 15-May-2023

DATE OF ISSUE: 22-May-2023

COMMENTS

The calibration of flow rate performed by AUES staff on 02 May 2023.

Scope of Test: Flow rate
Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 22B106785
Equipment No.: --
Calibration Factor: 318
Date of Calibration: 02 May, 2023

NOTES

This report superseded any previous report(s) with same work order number.

Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK2318969
Sub-batch: 0
Date of Issue: 22-May-2023
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Reference Equipment:

Model: SonTek IQ Standard
Serial Number : IQ1217004

Equipment to be calibrated:

Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 22B106785
Equipment No.: --
Calibration Factor: 318

Date of Calibration: 02 May, 2023

Parameters: The calibration of flow meter is verified with standard flow meter on site by AUES Staff.

Flow rate

Trial	Reading of Reference Equipment (m/s)	Reading of Equipment to be calibrated (m/s)
	SonTek IQ Standard Serial No: IQ1217004	Global Water FP211 Serial No. 22B106785
1	0.10	0.1
2	0.21	0.2
3	0.39	0.4
4	0.79	0.8
5	1.01	1.0
6	1.09	1.1


Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong



Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

*is accredited by the Hong Kong Accreditation Service (HKAS) to ISO/IEC 17025:2017
for performing specific laboratory activities as listed in the scope of accreditation within the test category of*
獲香港認可處根據ISO/IEC 17025:2017認可
進行載於認可範圍內下述測試類別中的指定實驗所活動

Environmental Testing
環境測試

*This accreditation to ISO/IEC 17025:2017 demonstrates technical competence for a defined scope and
the implementation of a management system relevant to laboratory operation
(see joint IAF-ILAC-ISO Communiqué).*
此項 ISO/IEC 17025:2017 的認可資格證明此實驗所具備指定範疇內所須的技術能力並
實施一套與實驗所運作相關的管理體系
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of HKAS is affixed hereto by the authority of the HKAS Executive
現經香港認可處執行機關授權在此蓋上香港認可處的印章


SHUM Wai-leung, Executive Administrator
執行幹事 沈偉良
Issue Date : 28 February 2020
簽發日期：二零二零年二月二十八日

Registration Number : **HOKLAS 066**
註冊號碼：



Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日

Appendix F

Event and Action Plan of Air Quality, Noise and Water Quality

Event and Action Plan for air quality

Event	Action			
	ET	IEC	ER	Contractor
Action level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action level exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit level exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

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

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level Exceedance	<ol style="list-style-type: none"> 1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analyzed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals
Limit Level Exceedance	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Event and Action Plan for Water Quality

Event	Action			
	ET	IEC	ER	Contractor
Action level exceedance for one sampling day	1. Inform IEC, Contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; and 3. Discuss remedial measures with IEC and Contractor and ER.	1. Discuss with ET, ER and Contractor on the implemented mitigation measures; 2. Review proposals on remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the implemented mitigation measures; 2. Make agreement on the remedial measures to be implemented; 3. Supervise the implementation of agreed remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment; 5. Consider changes of working methods; 6. Discuss with ER, ET and IEC and purpose remedial measures to IEC and ER; and 7. Implement the agreed mitigation measures.
Action level exceedance for more than one consecutive sampling days	1. Repeat in-situ measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Check monitoring data, all plant, equipment and Contractor's working methods; 4. Discuss remedial measures with IEC, contractor and ER 5. Ensure remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the proposed mitigation measures; 2. Make agreement on the remedial measures to be implemented ; and 3. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of remedial measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed mitigation measures.
Limit level exceedance for one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Rectify unacceptable practice; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 6. Consider changes of working methods; 7. Discuss mitigation measures with IEC, ER and Contractor; and 8. Ensure the agreed remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; and 4. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures.
Limit level exceedance for more than one consecutive sampling days	1. Inform IEC, contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; 3. Discuss mitigation measures with IEC, ER and Contractor; 4. Ensure mitigation measures are implemented; and 5. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; 4. Discuss with ET and IEC on the effectiveness of the implemented mitigation measures; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures; and 7. As directed by the ER, to slow down or stop all or part of the construction activities until no exceedance of Limit level.

Note: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative
Each step of actions required shall be implemented within 1 working day unless otherwise specified or agreed with EPD.

Appendix G

Monitoring Schedules of the Reporting Month and Coming Month

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – October 2023

Date		Noise Monitoring	Air Quality Monitoring		Water Quality
			1-Hour TSP	24-Hour TSP	
Sun	1-Oct-23				
Mon	2-Oct-23				
Tue	3-Oct-23				✓
Wed	4-Oct-23			✓	
Thu	5-Oct-23	✓	✓		✓
Fri	6-Oct-23				
Sat	7-Oct-23				✓
Sun	8-Oct-23				
Mon	9-Oct-23				✓
Tue	10-Oct-23			✓	
Wed	11-Oct-23	✓	✓		✓
Thu	12-Oct-23				
Fri	13-Oct-23				✓
Sat	14-Oct-23				
Sun	15-Oct-23				
Mon	16-Oct-23			✓	✓
Tue	17-Oct-23	✓	✓		
Wed	18-Oct-23				✓
Thu	19-Oct-23				
Fri	20-Oct-23			✓	✓
Sat	21-Oct-23		✓		
Sun	22-Oct-23				
Mon	23-Oct-23				
Tue	24-Oct-23				✓
Wed	25-Oct-23				
Thu	26-Oct-23			✓	✓
Fri	27-Oct-23	✓	✓		
Sat	28-Oct-23				✓
Sun	29-Oct-23				
Mon	30-Oct-23				✓
Tue	31-Oct-23				

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – November 2023

Date		Noise Monitoring	Air Quality Monitoring		Water Quality
			1-Hour TSP	24-Hour TSP	
Wed	1-Nov-23			✓	✓
Thu	2-Nov-23	✓	✓		
Fri	3-Nov-23				✓
Sat	4-Nov-23				
Sun	5-Nov-23				
Mon	6-Nov-23				✓
Tue	7-Nov-23			✓	
Wed	8-Nov-23	✓	✓		✓
Thu	9-Nov-23				
Fri	10-Nov-23				✓
Sat	11-Nov-23				
Sun	12-Nov-23				
Mon	13-Nov-23			✓	
Tue	14-Nov-23	✓	✓		✓
Wed	15-Nov-23				
Thu	16-Nov-23				✓
Fri	17-Nov-23				
Sat	18-Nov-23			✓	✓
Sun	19-Nov-23				
Mon	20-Nov-23	✓	✓		✓
Tue	21-Nov-23				
Wed	22-Nov-23				✓
Thu	23-Nov-23				
Fri	24-Nov-23			✓	✓
Sat	25-Nov-23		✓		
Sun	26-Nov-23				
Mon	27-Nov-23				
Tue	28-Nov-23				✓
Wed	29-Nov-23				
Thu	30-Nov-23			✓	✓

✓	Monitoring Day
	Sunday or Public Holiday

Appendix H

Monitoring Data

- **24-hour TSP Air Quality**
- **Noise**
- **Water Quality**

Air Quality (24-hour TSP)

24-Hour TSP Monitoring Data for ASR-1															
DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (µg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4 Oct 23	29776	27670.71	27694.71	1440.00	39	39	39.0	30.8	1009	1.23	1777	2.7848	2.8689	0.0841	47
10 Oct 23	29792	27694.71	27718.71	1440.00	39	39	39.0	25.3	1015.6	1.25	1797	2.7789	2.7984	0.0195	11
16 Oct 23	29797	27718.71	27742.71	1440.00	39	39	39.0	26.5	1014.9	1.25	1793	2.7667	2.8165	0.0498	28
20 Oct 23	29688	27742.71	27766.71	1440.00	39	39	39.0	27.6	1015.2	1.23	1769	2.7380	2.7820	0.0440	25
26 Oct 23	29682	27766.71	27790.71	1440.00	39	39	39.0	26.2	1014.6	1.23	1772	2.7509	2.7885	0.0376	21

24-Hour TSP Monitoring Data for ASR-2															
DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (µg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4 Oct 23	29775	25087.36	25111.36	1440.00	40	40	40.0	30.8	1009	1.31	1892	2.7570	2.8693	0.1123	59
10 Oct 23	29793	25111.36	25135.36	1440.00	40	40	40.0	25.3	1015.6	1.33	1912	2.7800	2.8449	0.0649	34
16 Oct 23	29669	25135.36	25159.36	1440.00	40	40	40.0	26.5	1014.9	1.33	1908	2.7210	2.8342	0.1132	59
20 Oct 23	29687	25159.36	25183.36	1440.00	40	40	40.0	27.6	1015.2	1.32	1895	2.7464	2.8555	0.1091	58
26 Oct 23	29681	25183.36	25207.36	1440.00	40	40	40.0	26.2	1014.6	1.32	1899	2.7438	2.8233	0.0795	42

24-Hour TSP Monitoring Data for ASR-3a															
DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (µg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
4 Oct 23	29774	18877.11	18901.11	1440.00	39	39	39	30.8	1009	1.25	1798	2.7780	2.8394	0.0614	34
10 Oct 23	29786	18901.11	18925.11	1440.00	39	39	39	25.3	1015.6	1.26	1817	2.7707	2.8141	0.0434	24
16 Oct 23	29670	18925.11	18949.11	1440.00	39	39	39	26.5	1014.9	1.26	1814	2.7295	2.7729	0.0434	24
20 Oct 23	29693	18949.11	18973.11	1440.00	39	39	39	27.6	1015.2	1.26	1813	2.7613	2.8077	0.0464	26
26 Oct 23	29680	18973.11	18997.11	1440.00	39	39	39	26.2	1014.6	1.26	1816	2.7514	2.7950	0.0436	24

Noise

Noise Measurement Results (dB(A)) of CN-1																					
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30 min}	Façade Correction (*)
5 Oct 23	9:29	64.2	66.4	49.3	66.8	64.6	47.6	63.2	53.6	47	65.2	64.7	46.9	63.2	63.6	58.9	67.2	64.7	60.1	65.3	68
11 Oct 23	9:12	64.4	68.1	55.2	59.5	64.4	47.7	65.3	64.3	50.6	61.2	62.7	33.5	58	45.4	30.8	38	36.5	31	61.8	65
17 Oct 23	9:04	67.1	71.1	55.2	66.2	69.2	55.5	64.9	66.7	55.2	59.5	61.6	53.2	66.3	69.9	53	61.2	61.2	50.3	65.0	68
27 Oct 23	9:11	59.4	62.7	50.6	56.3	59.4	50.3	59.6	62.6	54	56.6	60.1	48.3	56.2	60.6	43.5	57.4	61	46.7	57.8	61

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-2																					
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq ₃₀ min	Façade Correction (*)
5 Oct 23	13:20	63.1	63.4	57.9	64.9	67	57.6	66.4	69.6	57.5	62.8	59.8	55.8	68.1	70.9	57.9	62.4	60.9	57.5	65	68
11 Oct 23	13:13	62.7	64	59.6	65.6	65.6	60.1	62.3	64.1	57.9	62.4	64.8	58.4	61.6	63.9	58.3	61.6	63.5	58.4	63	66
17 Oct 23	14:42	66.3	67.8	60.5	67.2	68.3	60.4	65.8	68.3	61.5	64.1	66.6	59.7	63.7	66	58.3	63.7	66	58.9	65	68
27 Oct 23	13:13	61	65.3	49.1	62.4	66.4	53.1	64.2	68.3	52.1	62.8	67.1	51.6	61.2	65.3	49.8	62	66.3	50.6	62	65

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-3																					
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30 min}	Façade Correction (*)
5 Oct 23	14:06	58.9	60.5	51.3	56	58.9	51.9	55.9	58.9	51.2	56.6	59.3	51.5	56.4	59.3	51.7	55.8	58.3	51.1	57	60
11 Oct 23	14:01	64.5	64.7	59.1	62.1	62.7	57.8	60.2	61.8	58.3	60.4	62.1	58.2	59.6	60.8	57.2	59.7	61.8	57	61	64
17 Oct 23	14:02	62.9	64.9	57.3	63.1	65.9	57.1	63.4	65	57.4	60.7	63.3	55.1	60.5	63	54.9	61.9	57	57	62	65
27 Oct 23	14:27	63	67.7	42.9	62.5	67.7	44.2	61.9	67.4	43.7	63.2	67.8	43	62.3	67.4	43.9	61.3	65.9	42.7	62	65

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-4																				
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30min}
5 Oct 23	14:48	62.9	64.7	60.1	62.9	64.4	60.2	62.4	64	59.6	61.9	63.7	59.5	61.9	63.6	59.6	61.8	63.6	59.2	62
11 Oct 23	14:36	62.5	64.4	59.4	62.8	65	59.6	62.5	64.5	59.5	62.8	64.9	59.3	62.8	65.1	59.7	62.4	64.5	59.7	63
17 Oct 23	13:14	65.7	68.8	60.5	64.1	66	58.5	61.2	63.7	57	61.6	64	57.5	61.3	63.9	56.9	63.1	66.3	56.9	63
27 Oct 23	13:54	62.6	65.8	58	64.3	64.5	57.2	64.1	67.4	57.2	65.2	68.5	52.9	58.5	61.9	48.6	60.5	64.1	50.9	63

Water Quality

Water Quality Impact Monitoring Result for M1

Date	3 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:15	0.15	27.5	27.5	<0.1	<0.1	6.56	6.55	84.2	84.2	3.25	3.4	7.24	7.2	0.01	0.01	3	3.0
			27.5		<0.1		6.53		84.1		3.61		7.22		0.01		3	
Date	5 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	11:10	0.15	27.2	27.2	<0.1	<0.1	5.71	5.74	72.2	72.7	4.35	4.3	7.68	7.7	0.02	0.02	4	4.0
			27.2		<0.1		5.76		73.2		4.32		7.66		0.02		4	
Date	7 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:45	0.15	25.5	25.5	<0.1	<0.1	6.55	6.52	88.5	88.6	3.89	3.9	7.50	7.5	0.02	0.02	4	4.5
			25.5		<0.1		6.49		88.7		3.88		7.50		0.01		5	
Date	9 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1																		
Date	11 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1																		
Date	13 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1																		
Date	16 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1																		
Date	18 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1																		

[illegible][illegible][illegible]

Date	26 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.15	24.6	24.6	<0.1	<0.1	7.81	7.80	98.2	98.1	6.21	6.2	7.55	7.6	0.05	0.05	6	6.5
			24.6		<0.1		7.79		97.9		6.17		7.55		0.05		7	

Date	28 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:00	0.15	25.3	25.3	<0.1	<0.1	7.77	7.78	97.6	97.7	5.85	5.8	7.36	7.4	0.08	0.08	8	7.5
			25.3		<0.1		7.78		97.7		5.78		7.36		0.08		7	

Date	30 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.15	24.3	24.3	<0.1	<0.1	7.6	7.59	95.8	95.8	4.15	4.1	7.20	7.2	0.08	0.08	6	6.0
			24.3		<0.1		7.57		95.7		4.13		7.20		0.08		6	

Water Quality Impact Monitoring Result for M2

Date	3 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:30	0.11	27.9	27.9	<0.1	<0.1	7.12	7.12	96.6	96.5	2.67	2.7	7.44	7.4	0.08	0.08	4	4.5
			27.9		<0.1		7.11		96.4		2.68		7.44		0.08		5	

Date	5 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:30	0.11	27.5	27.5	<0.1	<0.1	7.03	7.02	94.9	94.9	2.87	2.7	7.23	7.2	0.08	0.08	4	4.5
			27.5		<0.1		7.01		94.8		2.61		7.23		0.08		5	

Date	7 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:00	0.11	26	26.0	<0.1	<0.1	7.17	7.16	95.3	95.1	3.18	3.1	7.43	7.4	0.08	0.08	6	5.5
			26		<0.1		7.14		94.8		3.08		7.43		0.08		5	

Date	9 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	13:30	0.15	22.6	22.6	<0.1	<0.1	7.69	7.69	93.7	93.6	66	64.5	7.04	7.0	0.04	0.04	114	112.0
			22.6		<0.1		7.68		93.5		63		7.04		0.04		110	

Date	11 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:30	0.12	25.3	25.3	<0.1	<0.1	7.58	7.58	94.7	94.7	7.5	7.5	7.48	7.5	0.08	0.08	20	20.0
			25.3		<0.1		7.57		94.6		7.4		7.48		0.08		20	

Date	13 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	15:15	0.12	25.5	25.5	<0.1	<0.1	7.79	7.80	95.0	95.1	20.4	20.5	7.49	7.5	0.08	0.08	14	14.0
			25.5		<0.1		7.8		95.2		20.5		7.49		0.08		14	

Date	16 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:10	0.12	24.7	24.7	<0.1	<0.1	7.13	7.12	90.8	90.7	15.7	15.6	7.36	7.4	0.08	0.08	17	17.5
			24.7		<0.1		7.11		90.6		15.4		7.36		0.08		18	

Date	18 Oct 23														
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)					

M2	10:10	0.12	23.7 23.7	23.7	<0.1 <0.1	<0.1	7.5 7.46	7.48	93.9 93.5	93.7	14.7 14.8	14.8	7.01 7.01	7.0	0.08 0.08	0.08	16 18	17.0
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Date	20 Oct 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)								
M2	9:50	0.12	24.8 24.8	24.8	<0.1 <0.1	<0.1	7.55 7.53	7.54	95.3 95.0	95.2	15 14.7	14.9	7.41 7.41	7.4	0.08 0.08	0.08	16 18	17.0

Date	24 Oct 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)								
M2	10:05	0.12	24.8 24.8	24.8	<0.1 <0.1	<0.1	7.74 7.72	7.73	98.3 98.0	98.2	10.38 9.96	10.2	7.67 7.67	7.7	0.07 0.07	0.07	10 9	9.5

Date	26 Oct 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)								
M2	10:05	0.12	25.1 25.1	25.1	<0.1 <0.1	<0.1	7.55 7.53	7.54	96.9 96.6	96.8	1.84 1.83	1.8	7.44 7.44	7.4	0.08 0.08	0.08	4 3	3.5

Date	28 Oct 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)								
M2	13:30	0.12	25.4 25.4	25.4	<0.1 <0.1	<0.1	7.5 7.52	7.51	97.7 97.9	97.8	2.9 2.89	2.9	7.21 7.21	7.2	0.08 0.08	0.08	4 4	4.0

Date	30 Oct 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)								
M2	10:20	0.12	24.8 24.8	24.8	<0.1 <0.1	<0.1	7.6 7.59	7.60	96.0 95.9	96.0	1.59 1.54	1.6	7.15 7.15	7.2	0.08 0.08	0.08	3 2	2.5

Water Quality Impact Monitoring Result for M3

Date	3 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:45	2.44	27.4	27.4	<0.1	<0.1	6.85	6.83	92.3	92.0	2.55	2.6	7.31	7.3	0.01	0.01	4	4.0
			27.4		<0.1		6.81		91.7		2.6		7.31		0.01		4	

Date	5 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	11:40	2.43	27.3	27.3	<0.1	<0.1	6.94	6.93	93.4	93.3	3.2	3.2	7.16	7.2	0.01	0.01	5	4.5
			27.3		<0.1		6.92		93.1		3.18		7.16		0.01		4	

Date	7 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:10	2.42	25.7	25.7	<0.1	<0.1	6.97	6.96	92.7	92.5	3.6	3.6	7.38	7.4	0.01	0.01	10	7.0
			25.7		<0.1		6.94		92.3		3.53		7.38		0.01		4	

Date	9 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	13:45	2.45	22.1	22.1	<0.1	<0.1	7.54	7.52	93.4	93.1	34.6	34.2	7.25	7.3	0.02	0.02	51	51.0
			22.1		<0.1		7.49		92.8		33.7		7.25		0.02		51	

Date	11 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:45	2.45	24.4	24.4	<0.1	<0.1	7.36	7.36	91.8	91.8	3.83	3.8	7.34	7.3	0.01	0.01	7	7.5
			24.4		<0.1		7.35		91.7		3.75		7.34		0.01		8	

Date	13 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	16:25	2.45	24.7	24.7	<0.1	<0.1	7.04	7.03	84.7	84.6	5.6	5.6	7.60	7.6	0.01	0.01	6	6.5
			24.7		<0.1		7.01		84.4		5.5		7.60		0.01		7	

Date	16 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:20	2.45	24.4	24.4	<0.1	<0.1	7.06	7.02	90.4	89.9	5.3	5.5	7.39	7.4	0.01	0.01	8	8.5
			24.4		<0.1		6.98		89.4		5.7		7.39		0.01		9	

Date	18 Oct 23									
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)

M3	10:20	2.45	23.2 23.2	23.2	<0.1 <0.1	<0.1	7.19 7.17	7.18	90.4 90.1	90.3	5.4 5.1	5.3	7.40 7.40	7.4	0.01 0.01	0.01	7 7	7.0
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Date	20 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:00	2.44	24.6 24.6	24.6	<0.1 <0.1	<0.1	7.1 7.09	7.10	89.4 89.3	89.4	4.9 4.8	4.9	7.18 7.18	7.2	0.01 0.01	0.01	5 6	5.5

Date	24 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:15	2.44	24.7 24.7	24.7	<0.1 <0.1	<0.1	7.45 7.44	7.45	94.8 94.7	94.8	5.53 5.1	5.3	7.37 7.37	7.4	0.01 0.01	0.01	5 6	5.5

Date	26 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:15	2.43	24.9 24.9	24.9	<0.1 <0.1	<0.1	7.42 7.43	7.43	95.9 96.0	96.0	5.1 5.2	5.2	7.20 7.20	7.2	0.01 0.01	0.01	7 7	7.0

Date	28 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	13:40	2.44	25.1 25.1	25.1	<0.1 <0.1	<0.1	7.31 7.3	7.31	95.6 95.5	95.6	5.1 5.1	5.1	7.11 7.11	7.1	0.01 0.01	0.01	5 5	5.0

Date	30 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.43	24.6 24.6	24.6	<0.1 <0.1	<0.1	7.4 7.39	7.40	94.0 93.8	93.9	5.08 5.34	5.2	7.09 7.09	7.1	0.01 0.01	0.01	7 7	7.0

Water Quality Impact Monitoring Result for M4

Date	3 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:10	0.46	27.6	27.6	<0.1	<0.1	7.15	7.15	96.4	96.3	1.8	1.8	7.21	7.2	0.06	0.06	3	3.0
			27.6		<0.1		7.14		96.2		1.8		7.21		0.06		3	

Date	5 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	12:00	0.15	27.8	27.8	<0.1	<0.1	7.2	7.20	96.9	96.9	2.1	2.1	7.11	7.1	0.06	0.06	3	3.0
			27.8		<0.1		7.19		96.8		2.1		7.11		0.06		3	

Date	7 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:30	0.48	25.9	25.9	<0.1	<0.1	7.16	7.15	95.5	95.4	2.4	2.3	7.27	7.3	0.06	0.06	3	3.5
			25.9		<0.1		7.14		95.2		2.2		7.27		0.06		4	

Date	9 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:00	0.60	22.5	22.5	<0.1	<0.1	8.11	8.11	93.8	93.7	25.5	25.3	8.09	8.1	0.04	0.04	39	39.0
			22.5		<0.1		8.1		93.6		25.1		8.09		0.04		39	

Date	11 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:10	0.50	25.1	25.1	<0.1	<0.1	7.7	7.69	95.9	95.8	1.7	1.6	7.21	7.2	0.06	0.06	4	4.5
			25.1		<0.1		7.68		95.6		1.6		7.21		0.06		5	

Date	13 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	16:40	0.48	25.4	25.4	<0.1	<0.1	7.88	7.87	97.2	97.1	1.2	1.2	7.32	7.3	0.07	0.07	<2	<2
			25.4		<0.1		7.86		96.9		1.3		7.32		0.07		<2	

Date	16 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:40	0.48	24.6	24.6	<0.1	<0.1	7.43	7.40	95.4	95.0	2.2	2.2	7.26	7.3	0.06	0.06	4	3.5
			24.6		<0.1		7.37		94.5		2.2		7.26		0.06		3	

Date	18 Oct 23																
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Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:40	0.47	23.5	23.5	<0.1	<0.1	7.44	7.42	92.9	92.7	1.6	1.6	7.05	7.1	0.07	0.07	2	2.0
			23.5		<0.1		7.4		92.5		1.6		7.05		0.07		2	

Date	20 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:40	0.47	25	25.0	<0.1	<0.1	7.69	7.71	97.1	97.3	1.0	1.0	7.18	7.2	0.07	0.07	<2	<2
			25		<0.1		7.72		97.5		1.0		7.18		0.07		<2	

Date	24 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:30	0.18	25.2	25.2	<0.1	<0.1	7.68	7.68	97.5	97.5	1.9	1.9	7.30	7.3	0.06	0.06	2	2.0
			25.2		<0.1		7.67		97.4		2.0		7.30		0.06		2	

Date	26 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:35	0.47	25.3	25.3	<0.1	<0.1	7.51	7.52	96.5	96.5	2.8	2.7	7.04	7.0	0.04	0.04	5	4.5
			25.3		<0.1		7.52		96.5		2.7		7.04		0.04		4	

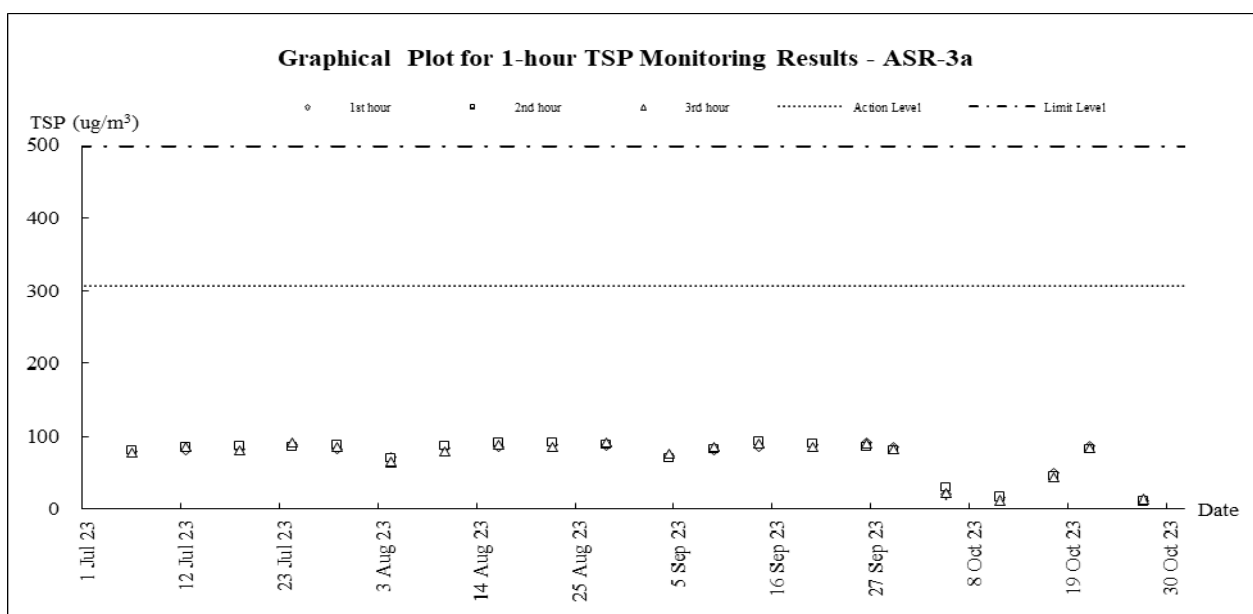
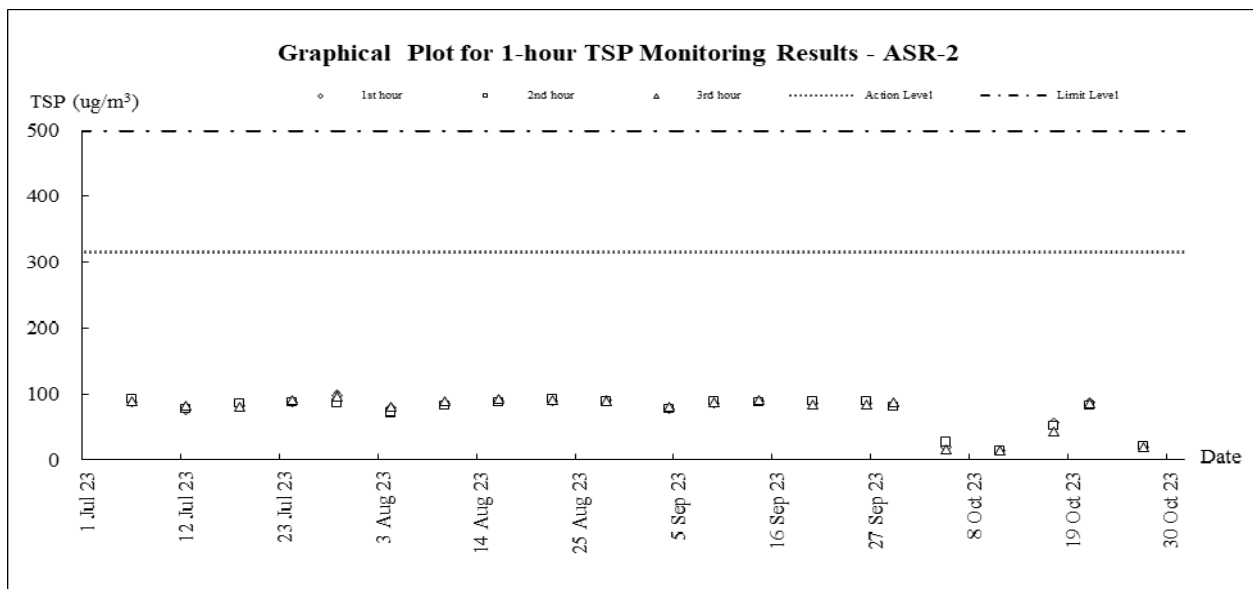
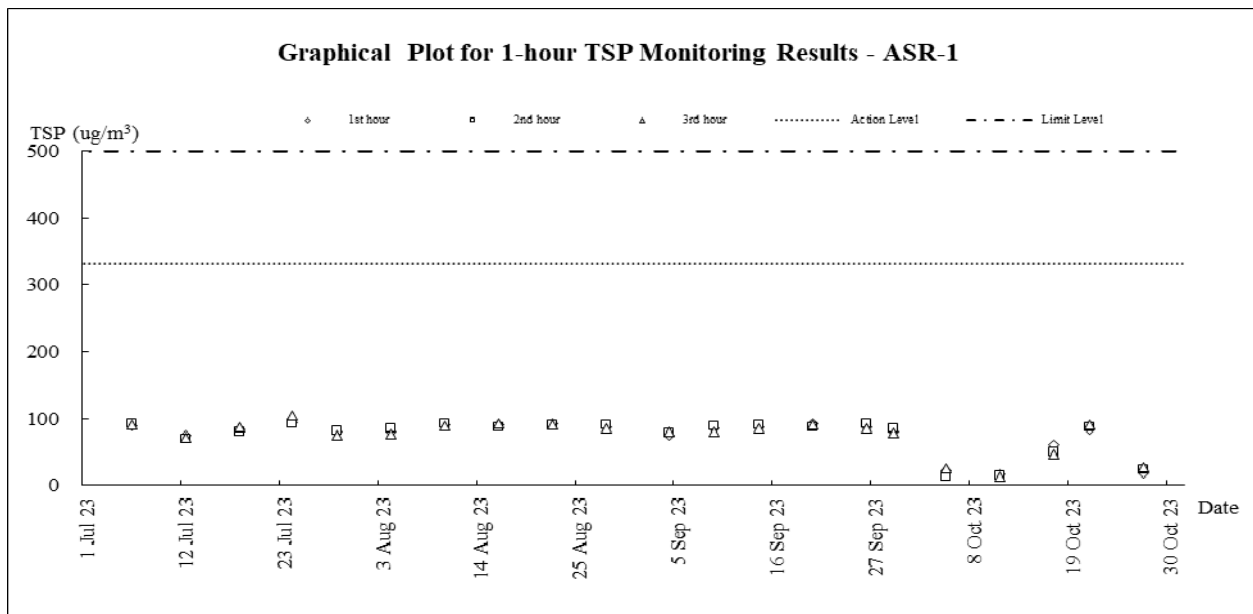
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M4	14:00	0.45	25.6	25.6	<0.1	<0.1	7.63	7.64	98.0	98.1	1.5	1.6	7.12	7.1	0.07	0.07	2	2.0
			25.6		<0.1		7.64		98.1		1.6		7.12		0.07		2	

Date	30 Oct 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:50	0.46	25	25.0	<0.1	<0.1	7.58	7.59	96.5	96.6	1.4	1.4	7.22	7.2	0.04	0.04	3	2.5
			25		<0.1		7.59		96.7		1.4		7.23		0.04		2	

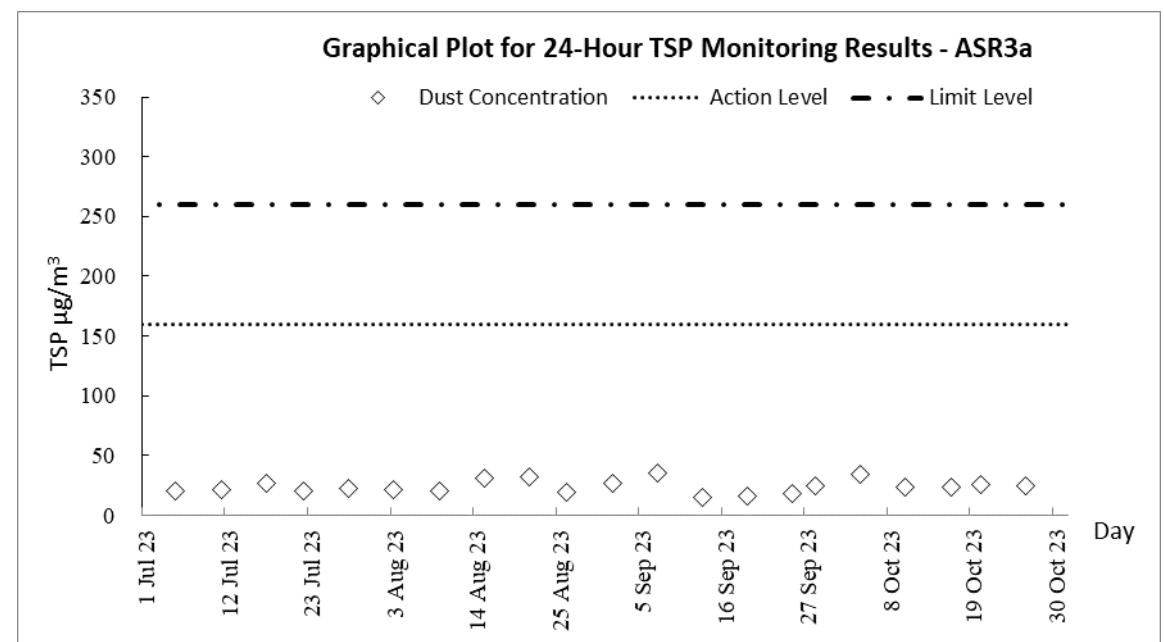
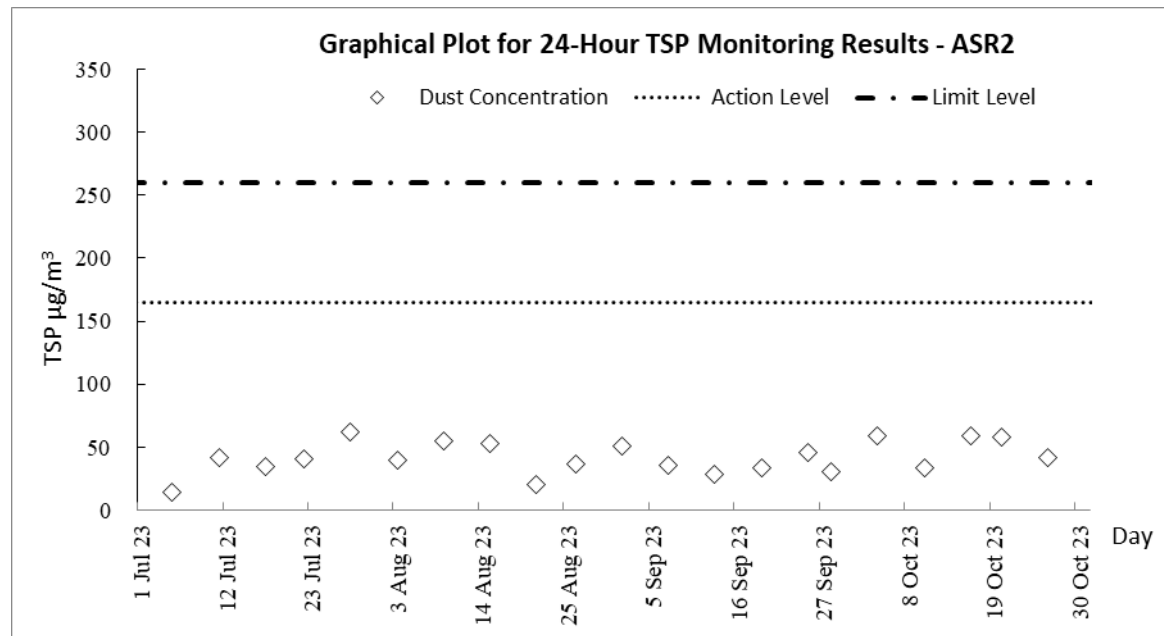
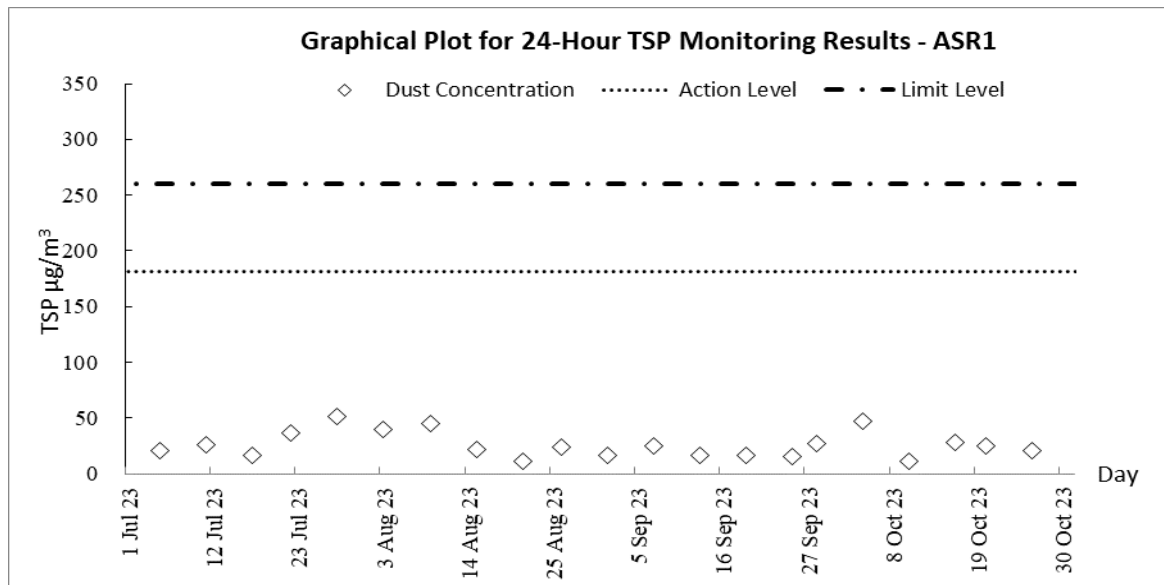
Appendix I

Graphical Plots of Air Quality, Noise and Water Quality

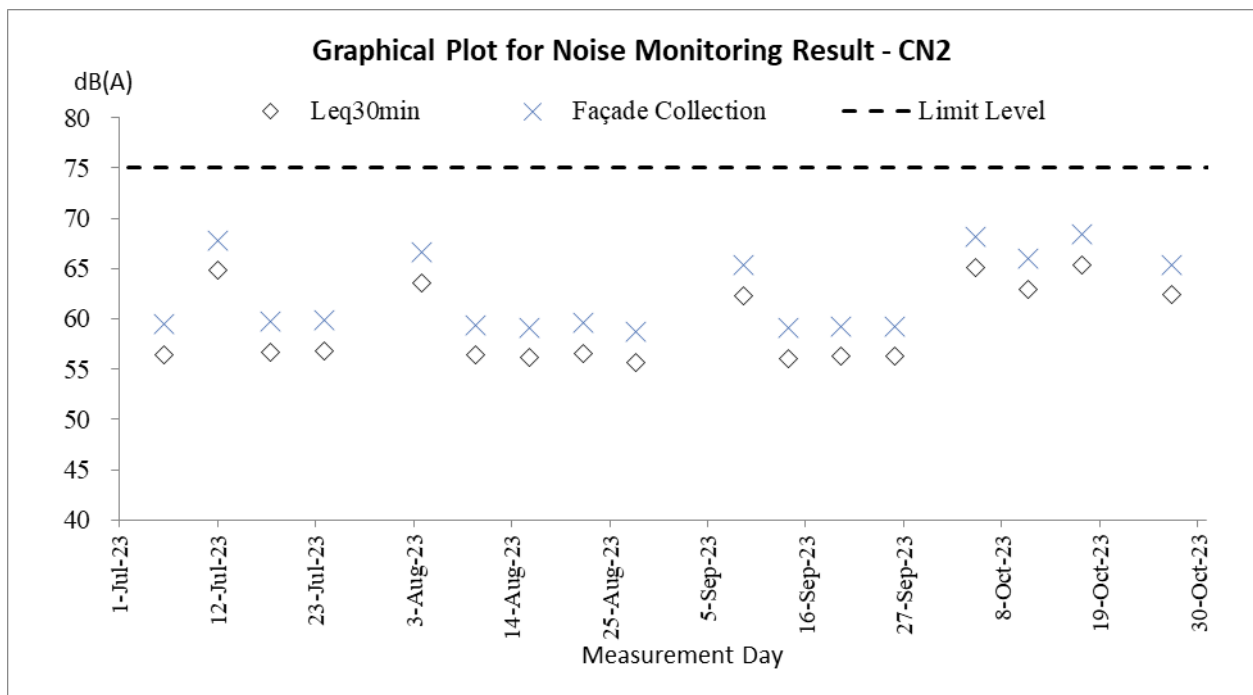
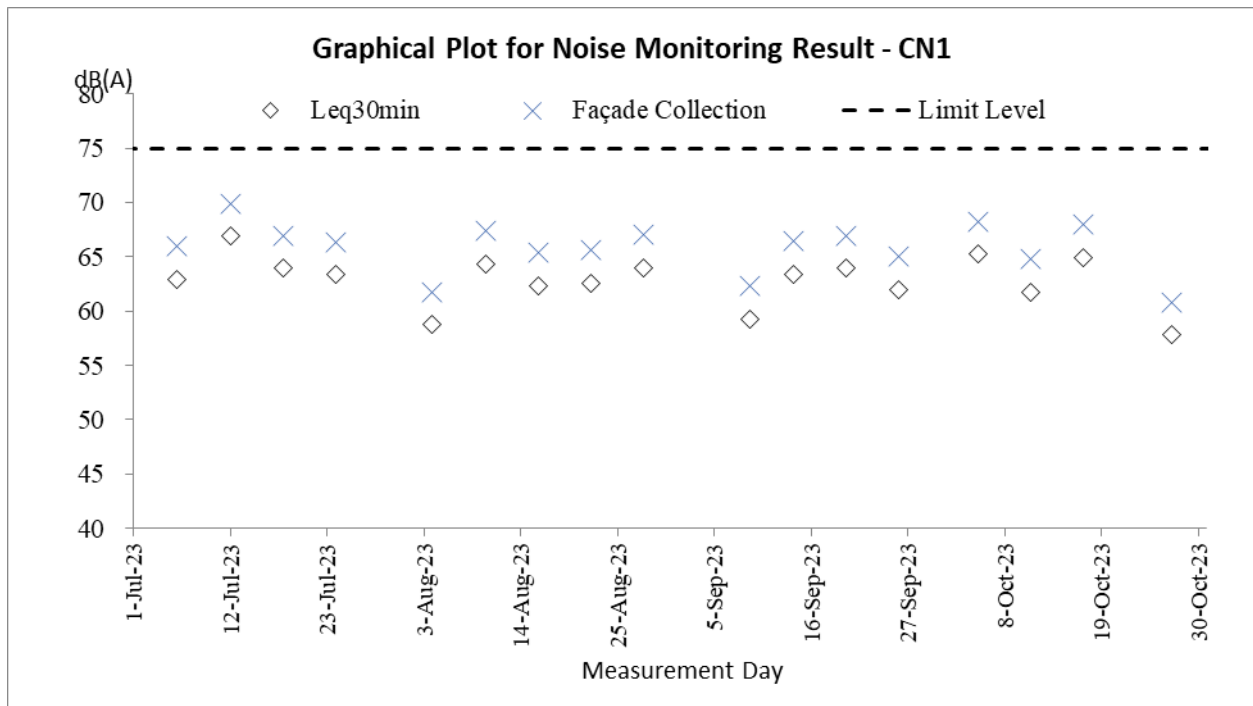
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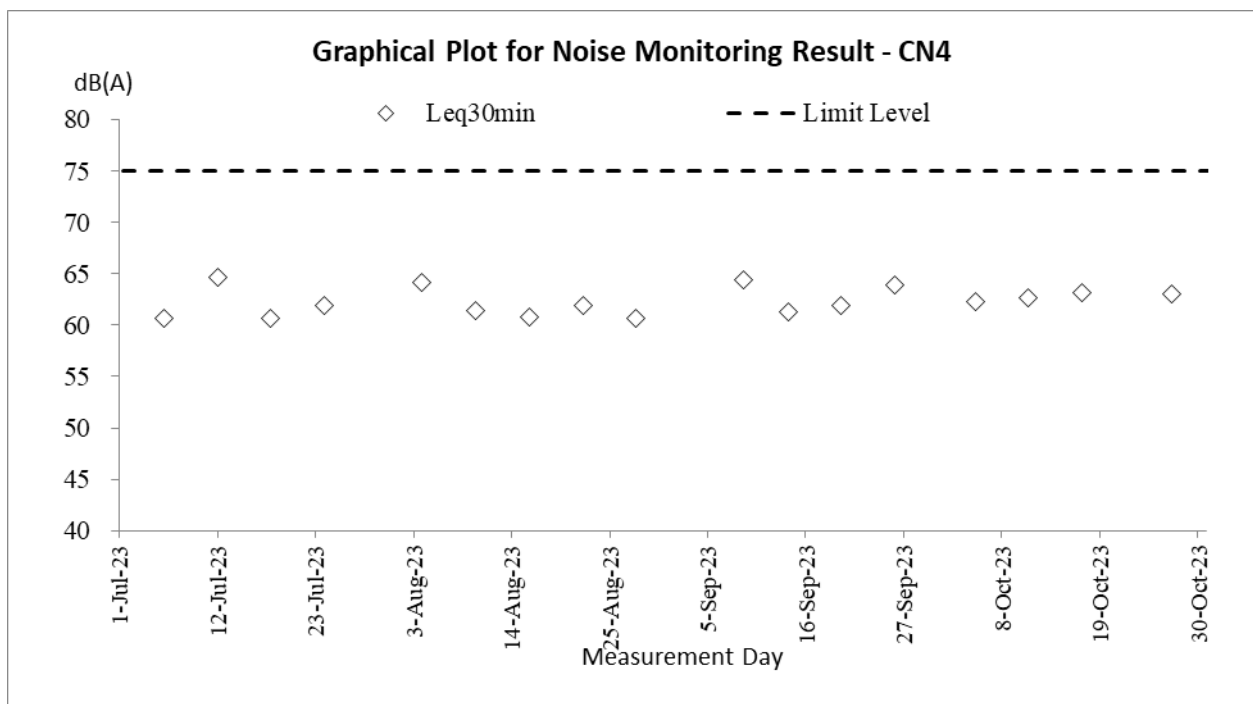
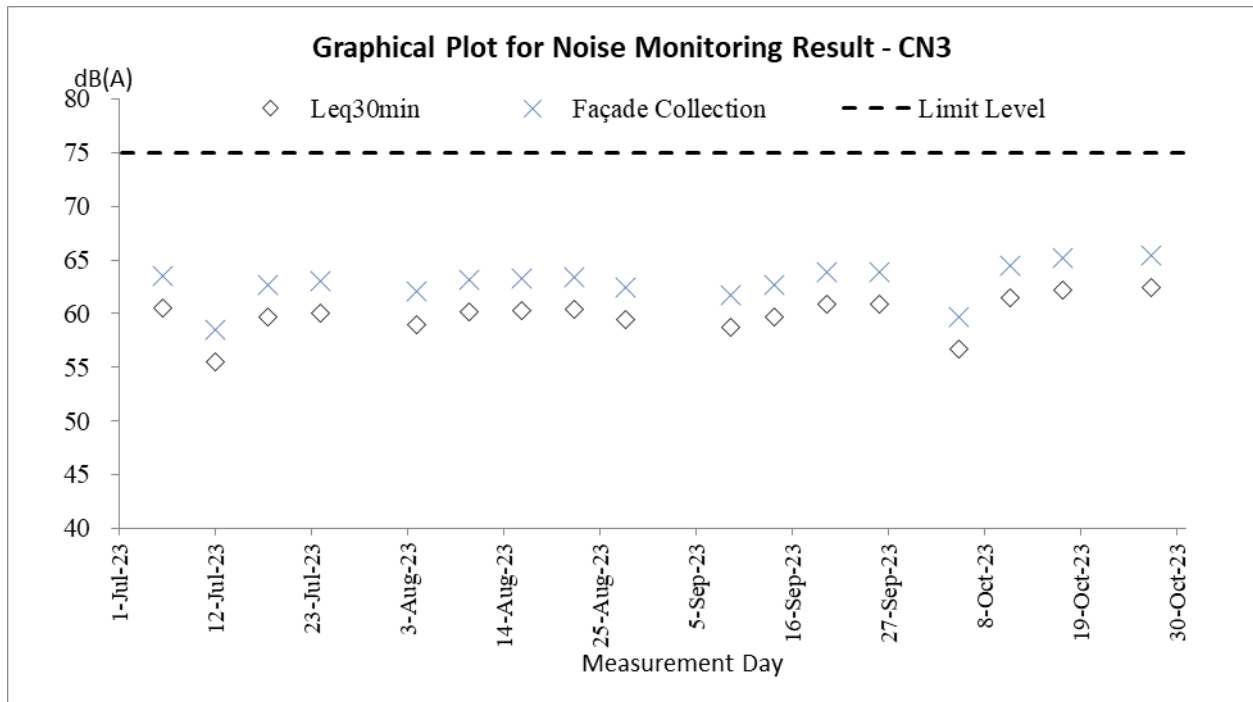


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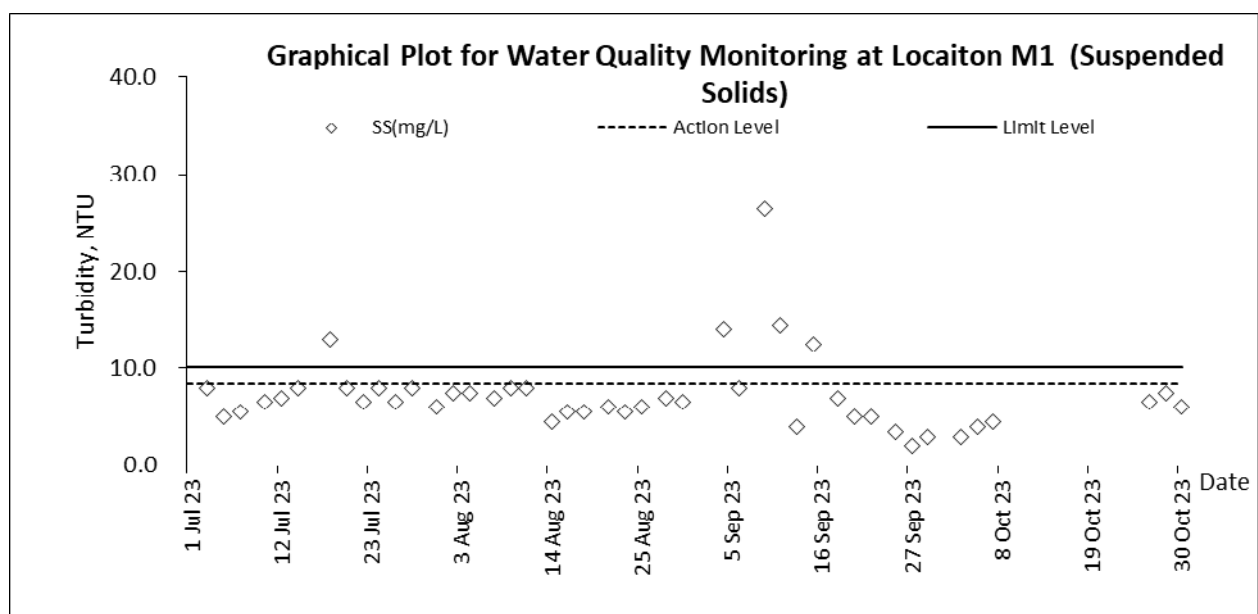
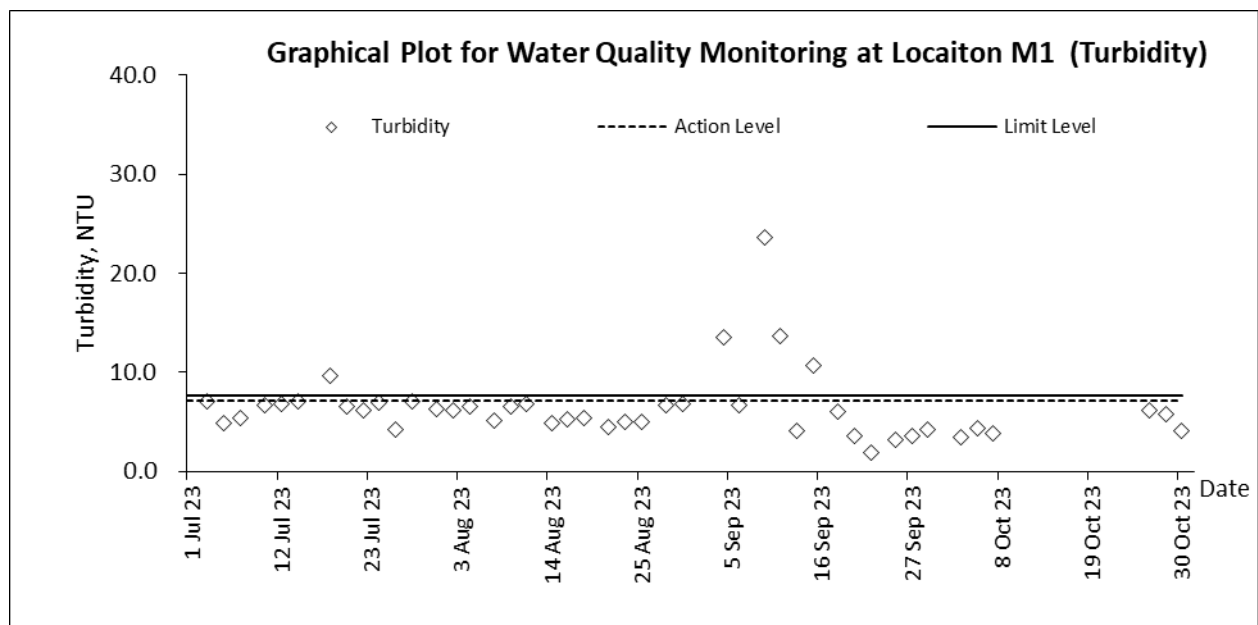
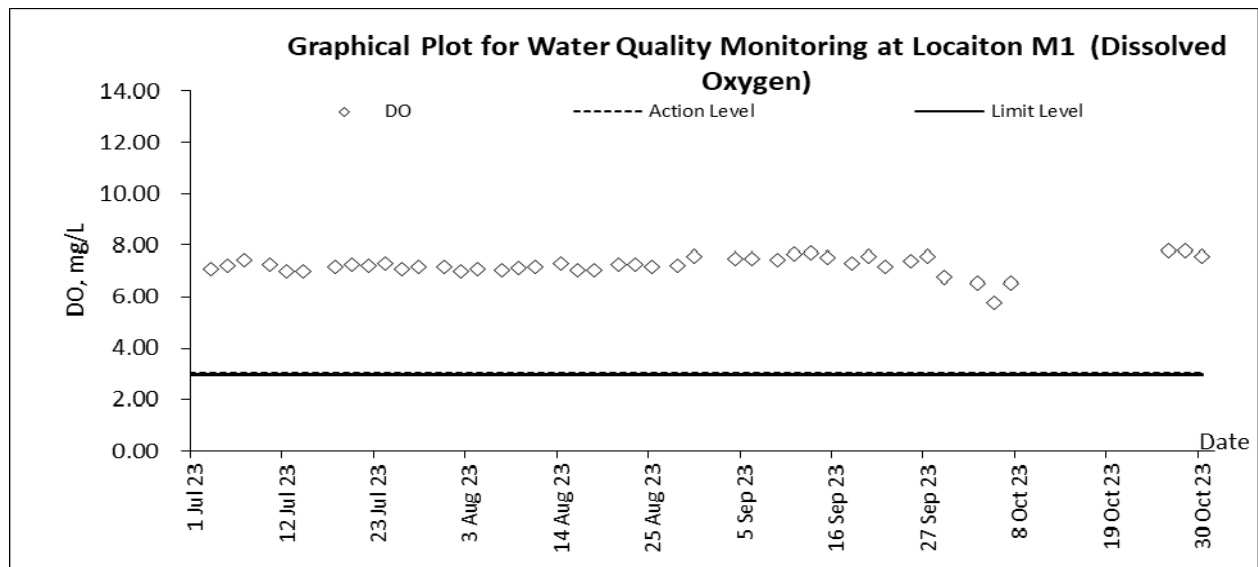


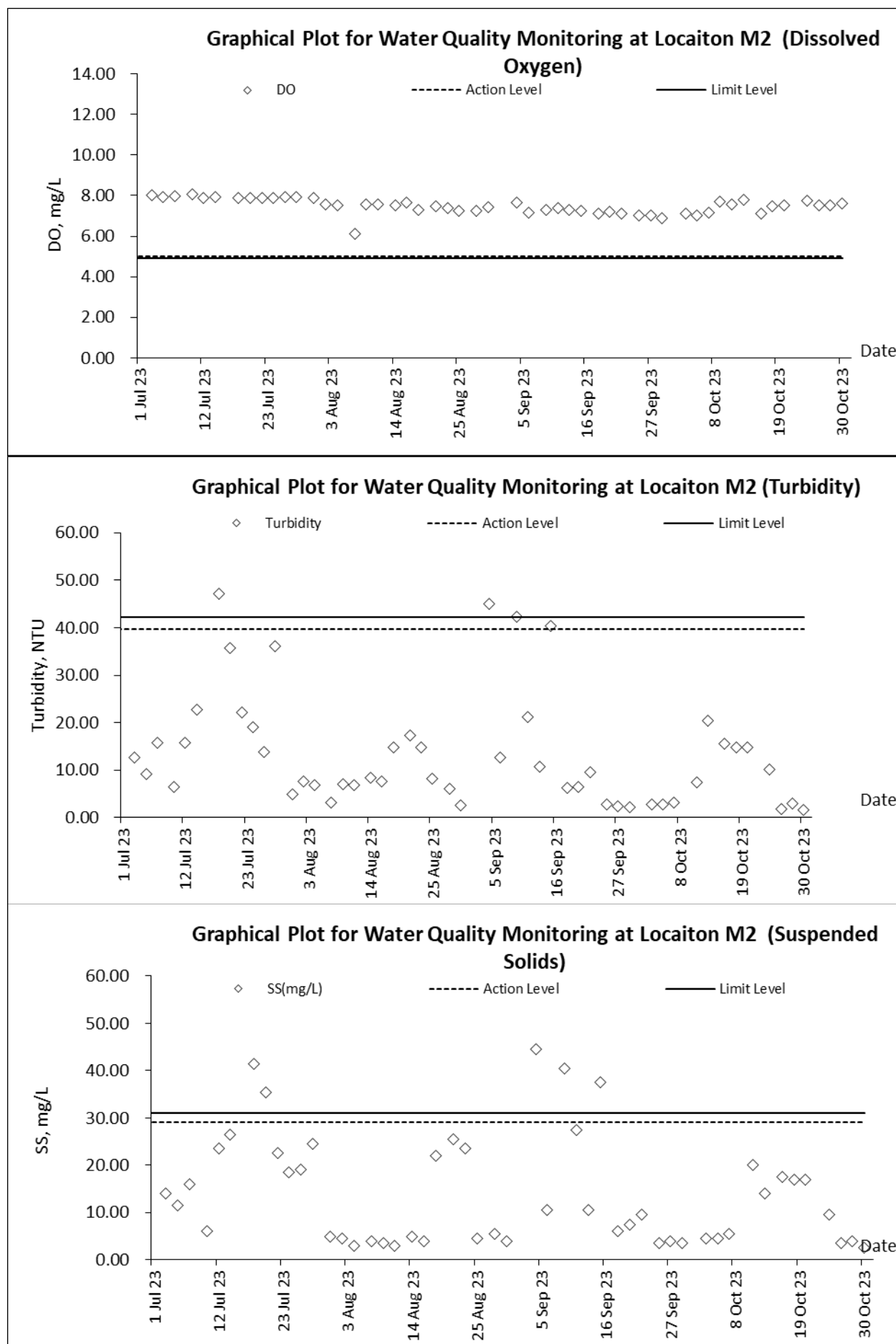
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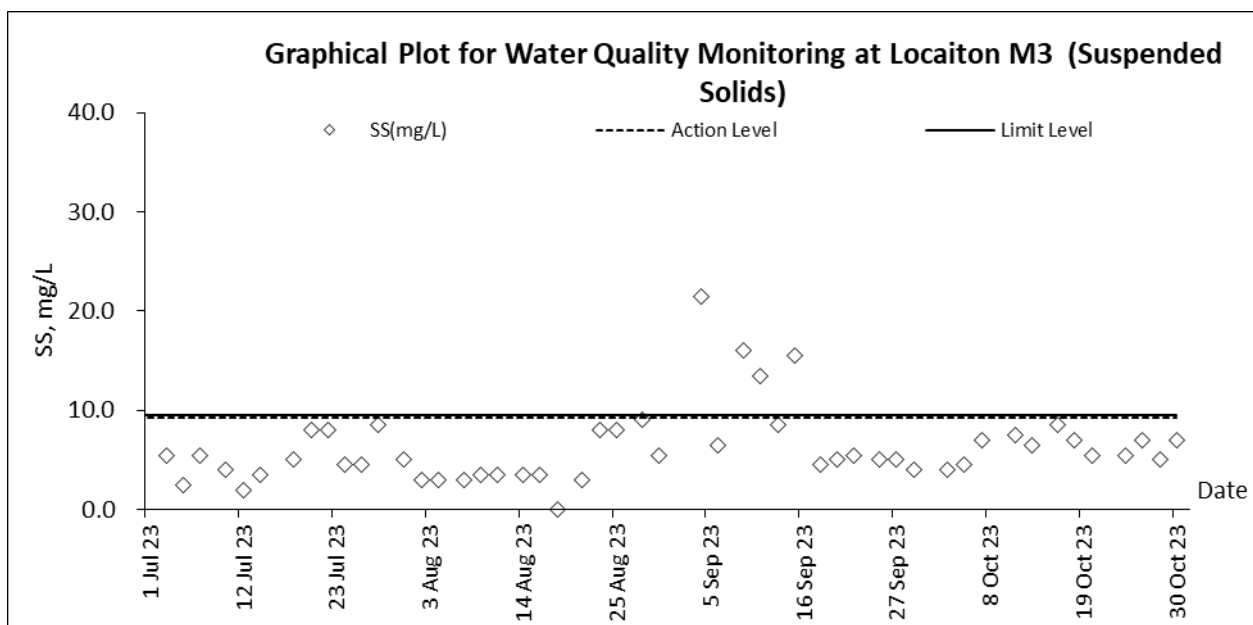
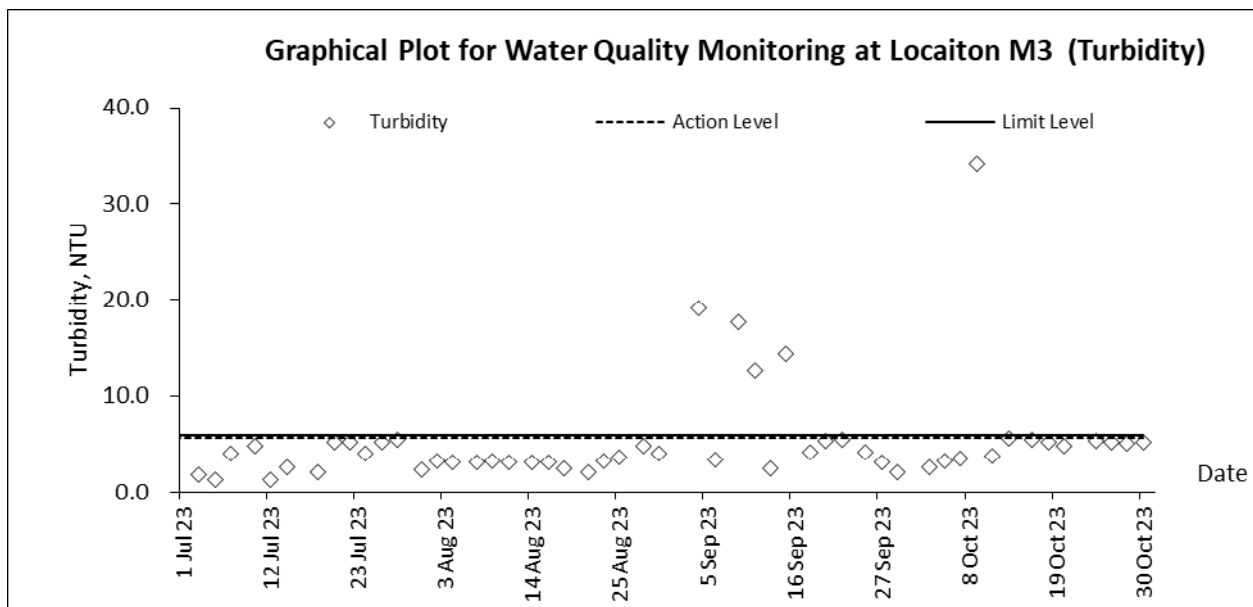
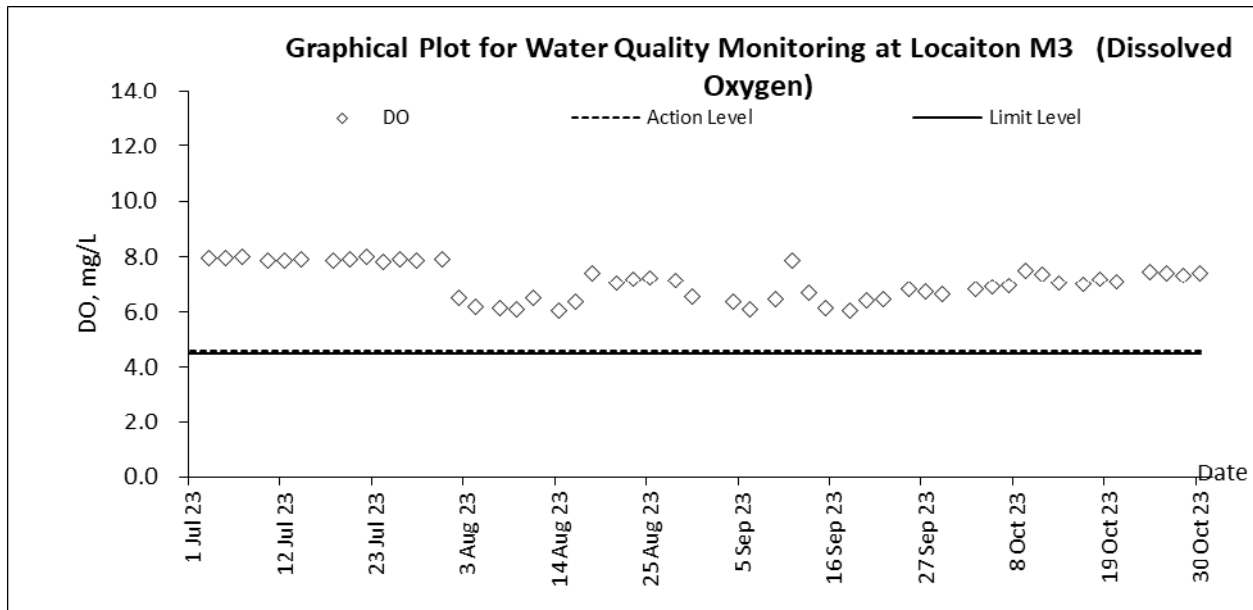


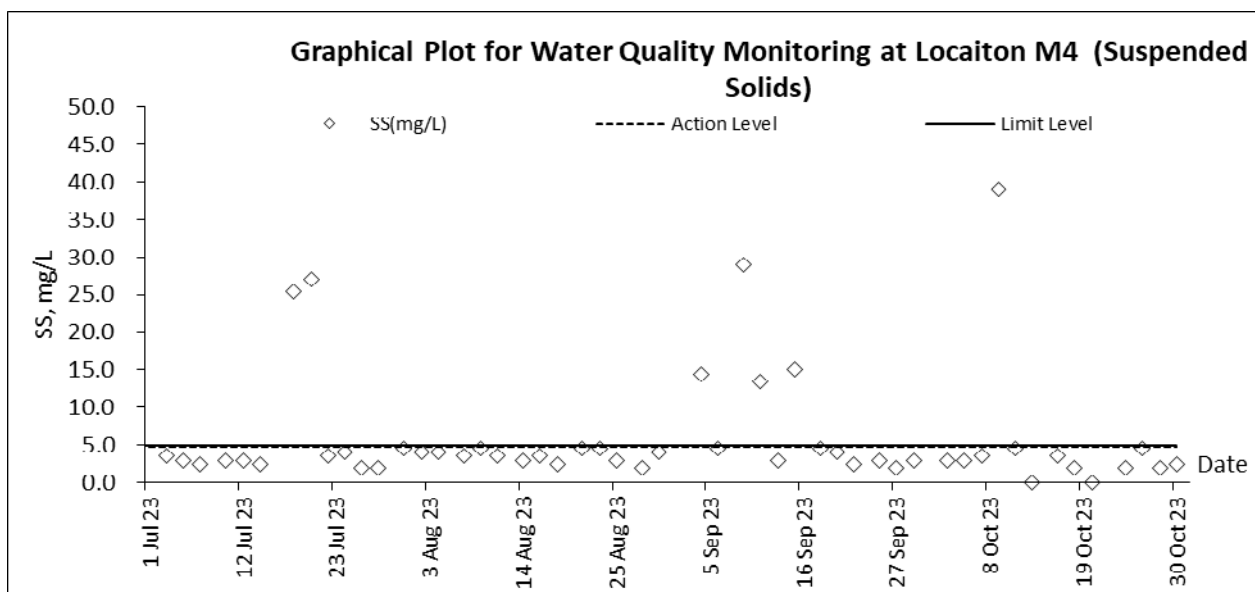
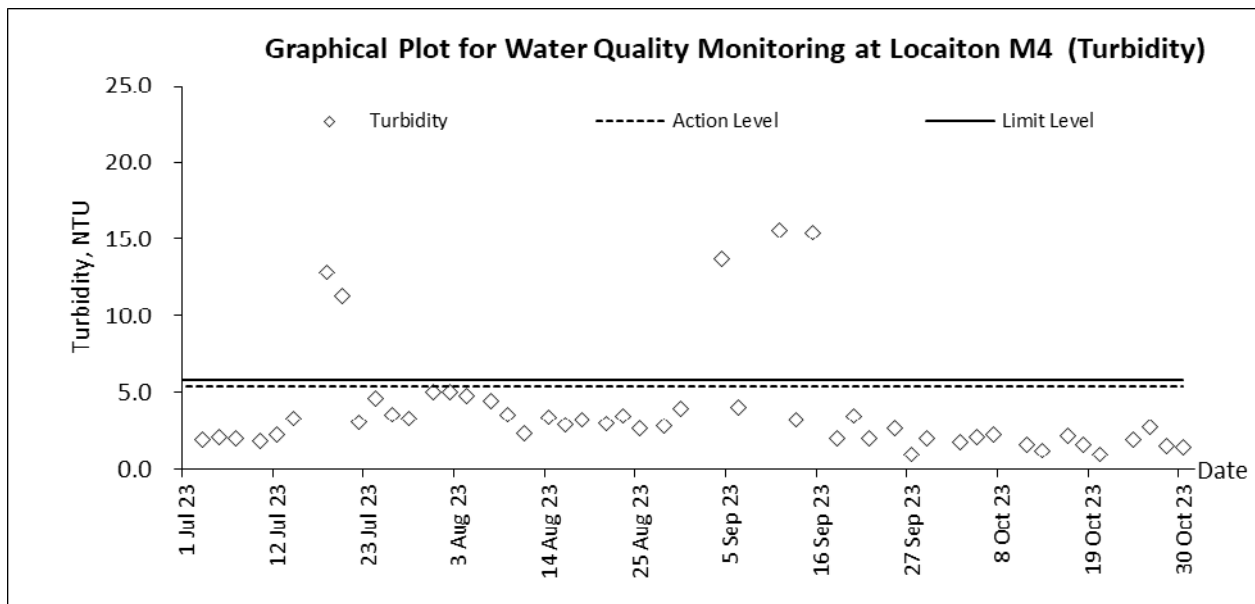
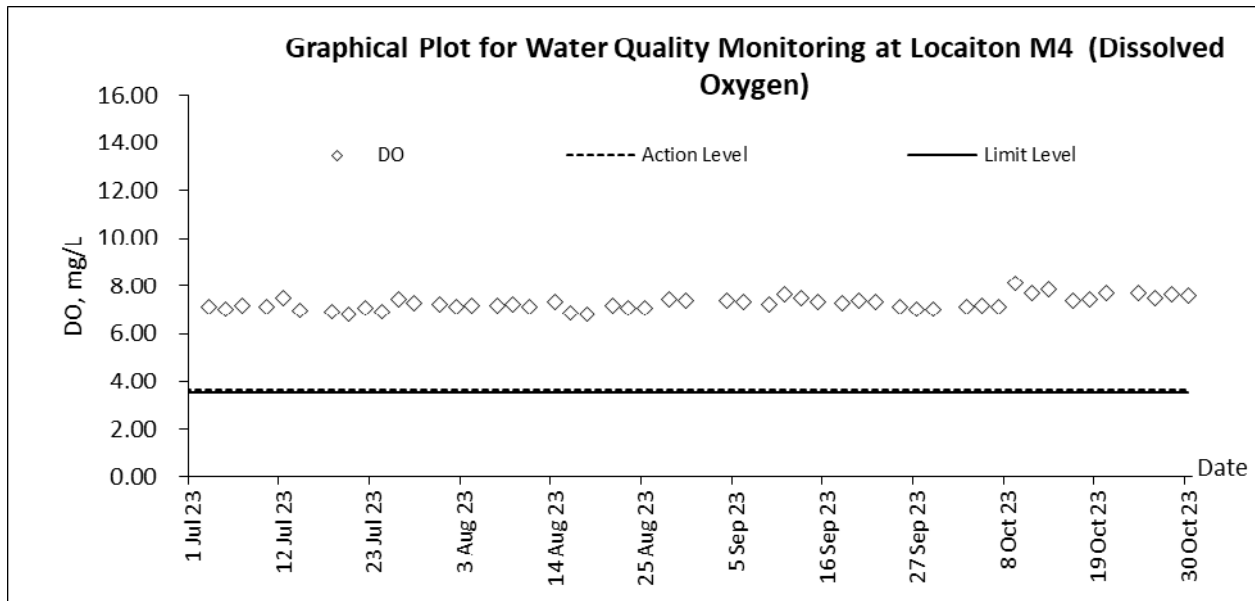


Water Quality Impact Monitoring









Appendix J

Meteorological Data of the Reporting Month

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Oct-23	Sun	Dry with sunny periods.	0	29.6	8.7	70.5	E/SE
2-Oct-23	Mon	Very hot in the afternoon.	0.4	29.3	7.5	74.5	E/SE
3-Oct-23	Tue	One or two squally showers later.	Trace	29.3	4	77.5	SW
4-Oct-23	Wed	Moderate to fresh northerly winds.	0	30.2	6.2	75.0	N/NE
5-Oct-23	Thu	There will be swells.	0	29.2	11.2	68.0	N
6-Oct-23	Fri	Dry with sunny periods.	Trace	27.7	11.5	67.5	N/NE
7-Oct-23	Sat	Showers will be heavy at times.	Trace	27.7	14.2	81.2	N/NE
8-Oct-23	Sun	Strong east to northeasterly winds, weakening gradually later.	92.2	22.3	6.2	91.5	N/NE
9-Oct-23	Mon	Seas will be rough with swells.	369.7	22.4	9	95.2	N
10-Oct-23	Tue	Mainly fine in the afternoon.	2.3	23.9	7	87.5	N
11-Oct-23	Wed	Moderate northeasterly winds	0	24.2	9.5	75.0	N/NE
12-Oct-23	Thu	Sunny periods. Moderate northeasterly winds.	0	Maintena nce	7.9	Maintena nce	N/NE
13-Oct-23	Fri	Mainly fine and dry in the afternoon.	0	26.8	9.7	67.0	N/NE
14-Oct-23	Sat	Cloudy periods tonight.	0	26.3	7.5	69.0	N/NE
15-Oct-23	Sun	Moderate east to northeasterly winds.	0.1	25.8	6.2	69.5	E/SE
16-Oct-23	Mon	Mainly cloudy with one or two light rain patches tonight.	0	26.1	7	74.5	N/NE
17-Oct-23	Tue	Cloudy with a few showers.	Trace	26.4	9.2	53.7	E
18-Oct-23	Wed	Fresh easterly winds, strong offshore	38.3	23.7	10	78.0	E
19-Oct-23	Thu	Mainly cloudy with a few showers.	27.9	24.7	8.7	92.2	E
20-Oct-23	Fri	Mainly cloudy tonight.	0.2	25.3	9	85.5	E
21-Oct-23	Sat	Moderate easterly winds.	Trace	21.1	8.5	87.0	E/NE
22-Oct-23	Sun	Sunny periods in the afternoon.	Trace	23.0	7.5	81.2	E/SE
23-Oct-23	Mon	Mainly cloudy tonight.	Trace	25.5	6.7	76.0	E/SE
24-Oct-23	Tue	Moderate east to northeasterly winds.	0	26.7	7.5	75.0	E/SE
25-Oct-23	Wed	Bright periods during the day tomorrow.	0	26.9	6.7	79.5	E/SE
26-Oct-23	Thu	Mainly cloudy. One or two showers	0	26.4	7.5	76.5	E
27-Oct-23	Fri	Moderate easterly winds, fresh later tomorrow.	0	26.6	7.5	79.7	E/SE
28-Oct-23	Sat	Mainly cloudy with sunny periods.	9.5	26.6	8.2	77.2	E/SE
29-Oct-23	Sun	Moderate east to northeasterly winds	3.5	25.7	8.7	78.0	E
30-Oct-23	Mon	Fine and dry.	Trace	25.4	7	75.5	N/NE
31-Oct-23	Tue	Moderate east to northeasterly winds	0	25	6.5	75	E

Appendix K

Ecological Survey Report

**Ecological Survey Report for
Contract CV/2016/10**

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Monthly Report of Ecologically Sensitive Habitats Monitoring – October 2023




Revision	1	
Date of issue	15 Nov 2023	
Prepared by	Alan Lam	
Reviewed by	Rachel Siu	
Verified by	Mike Leung	

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1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.
- 1.1.2 The project includes site formation and associated works for development of C&C facilities at the Sandy Ridge Cemetery, road works within Sandy Ridge Cemetery, widening a section of Lin Ma Hang Road (from 6.5m to 7.3m), provision of off-site pick-up/drop-off points for shuttle buses as well as barging point at Siu Lam, Lok On Pai.
- 1.1.3 The Environmental Impact Assessment (EIA) report, including Environmental Monitoring and Audit Manual (EM&A Manual), was approved with conditions on 8 August 2016 (Register No.: AEIAR-198/2016). EPD issued an Environmental Permit (EP) for the Project (EP-534/2017) on 7 April 2017. A Further Environment Permit (FEP) for the Project (FEP-01/534/2017) was issued on 23 February 2018, variation of EP (EP-534/2017/A) and variation of FEP (FEP-01/534/2017/A) were issued on 24 December 2018.
- 1.1.4 According to Clause 3.1 of the FEP (FEP-01/534/2017/A), “The Permit Holder shall implement the EM&A programme in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the programme shall be justified by the ET Leader and verified by the IEC as conforming to the information and requirements contained in the EM&A Manual before submission to the Director for approval”.
- 1.1.5 This Ecologically Sensitive Habitats Monitoring Methodology articulates the protocol of monitoring the ecology of concerned habitats as specified in EM&A Manual.

1.2 OBJECTIVE

- 1.2.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 1.2.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution.

2 ECOLOGICALLY SENSITIVE HABITATS

2.1 DESCRIPTION OF HABITATS

- 2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

- 2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conservation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
- 2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

- 2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

- 2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.
- 2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

- 2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.
- 2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

- 3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

- 3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

- 3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

- 3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

- 3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all butterflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

- 3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 17th October 2023, a sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen would be identified and counted as accurately as possible.

- Mammal

There was no mammal recorded in the monitoring area.

- Bird

There was a total of 53 bird individuals from 16 species recorded in the monitoring area.

- Herpetofauna

There was no reptile species recorded in the monitoring area.

There were one amphibian species recorded in the monitoring area.

- Butterfly

There was a total of 4 butterfly individuals from 2 species recorded in the monitoring area.

- Dragonfly

There was one odonate individuals from one species recorded in the monitoring area.

- Freshwater communities

There were two freshwater community recorded in the monitoring area.

Picture 1

Fejervarya limnocharis Paddy Frog 澤蛙



Picture 2

Somanniathelphusa zanklon 鎌刀束腰蟹

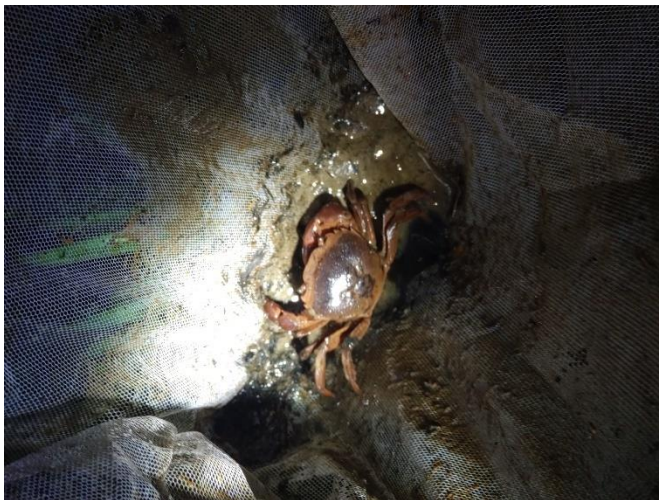


Table 4 Result of Mammal in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 5 Result of Avifauna in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩		2				
<i>Centropus sinensis</i>	Greater Coucal	褐翅鴉鵂	Class 2 Protected Animal of China; China Red Data Book Status: (Vulnerable)		1			
<i>Centropus bengalensis</i>	Lesser Coucal	小鴉鵂	List of Wild Animals under State Priority Conservation: Class II	1				
<i>Strix leptogrammica</i>	Brown Wood Owl	褐林鴉	Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II	1				
<i>Apus nipalensis</i>	House Swift	小白腰雨燕		10				
<i>Corvus macrorhynchos</i>	Large-billed Crow	大嘴烏鴉		1				
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲		1			2	
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鵲		2				
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯			1		1	
<i>Pterorhinus perspicillatus</i>	Masked Laughingthrush	黑臉噪鵲			2			
<i>Urocissa erythroryncha</i>	Red-billed Blue Magpie	紅嘴藍鵲		2				
<i>Coturnix japonica</i>	Japanese Quail	鵲鴉	Fellowes et al. (2002): LC	1				

<i>Falco tinnunculus</i>	Common Kestrel	紅隼	Cap. 586; List of Wild Animals under State Priority Conservation: Class II; CITES: Appendix II	1				
<i>Locustella lanceolata</i>	Lanceolated Warbler	矛斑蝗鶯	-	3				
<i>Cisticola juncidis</i>	Zitting Cisticola	棕扇尾鶯	Fellowes et al. (2002): LC	1				
<i>Motacilla alba</i>	White Wagtail	白鵲鴿	-	20				

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 6 Result of Reptile in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7 Result of Amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Fejervarya limnocharis</i>	Paddy Frog	澤蛙						2

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
+ Species appeared but uncountable**Table 8 Result of Butterfly in survey**

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶		2				
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶		2				

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Ceriagrion auranticum</i>	Orange-tailed Sprite	翠胸黃蟬						1

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 10 Result of Freshwater Communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Somaniathelphusa zanklon</i>		鎌刀束腰蟹						10
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮						10

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

+ Species appeared but uncountable

5 DISCUSSION

Data analysis was carried out to compare with the biodiversity within the site boundary in the same month over years. General description of the ecological conditions is first revealed in terms of abundance as well as species richness, following by statistical analysis of the existing database. The result is considered as significant whenever the drop of diversity indexes exceeds the percentages mentioned in previous sections 2.2 and 2.3.

5.1 Total abundance and species richness in September over years were compared to show the trends. Figures 1 and 2 indicate the total species richness and total abundance within the site boundary respectively.

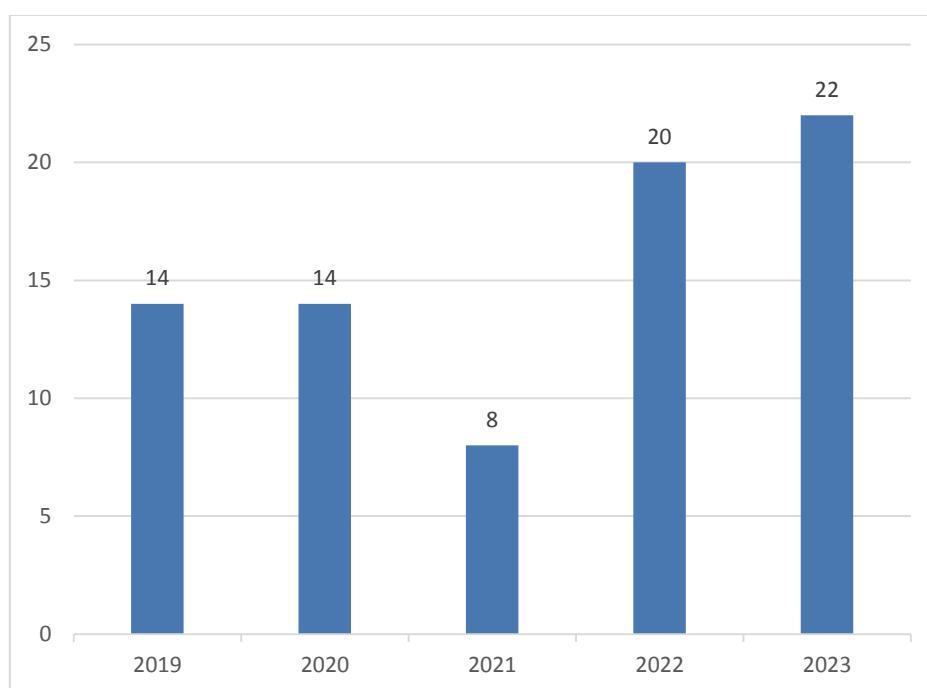


Figure 1: Bar chart showing the total species richness within site boundary from 2019 to 2023
(Actual quantity annotated at the top of each bar)

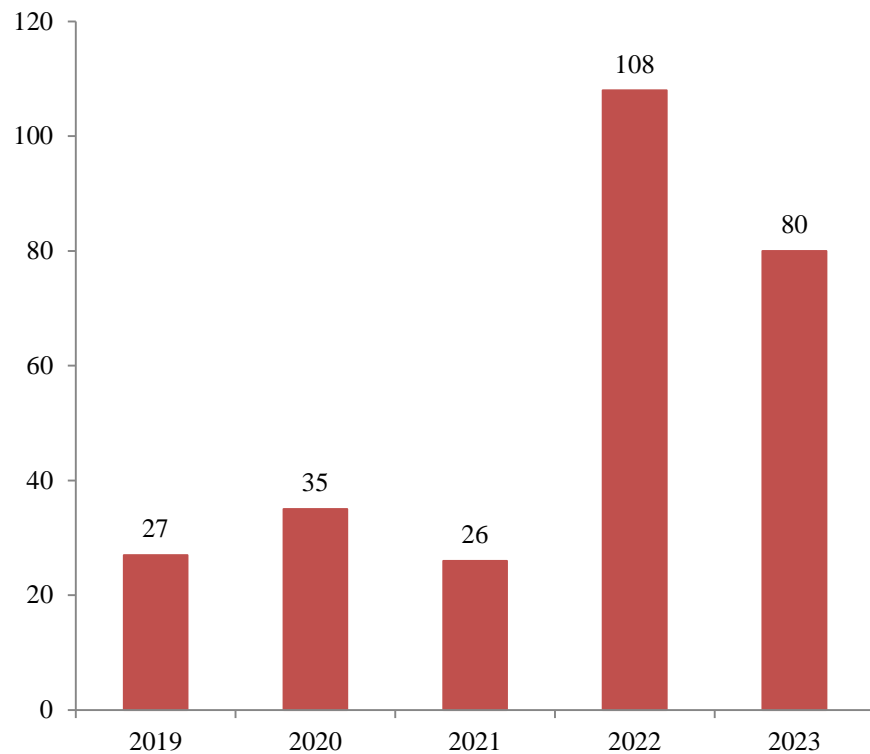


Figure 2: Bar chart showing the total abundance within site boundary from 2019 to 2023
 (Actual quantity annotated at the top of each bar)

5.2 As results in section 4 were categorized by taxa, a detailed breakdown of each taxon is shown in figure 3 to further investigate the trend of specific taxa over contract period.

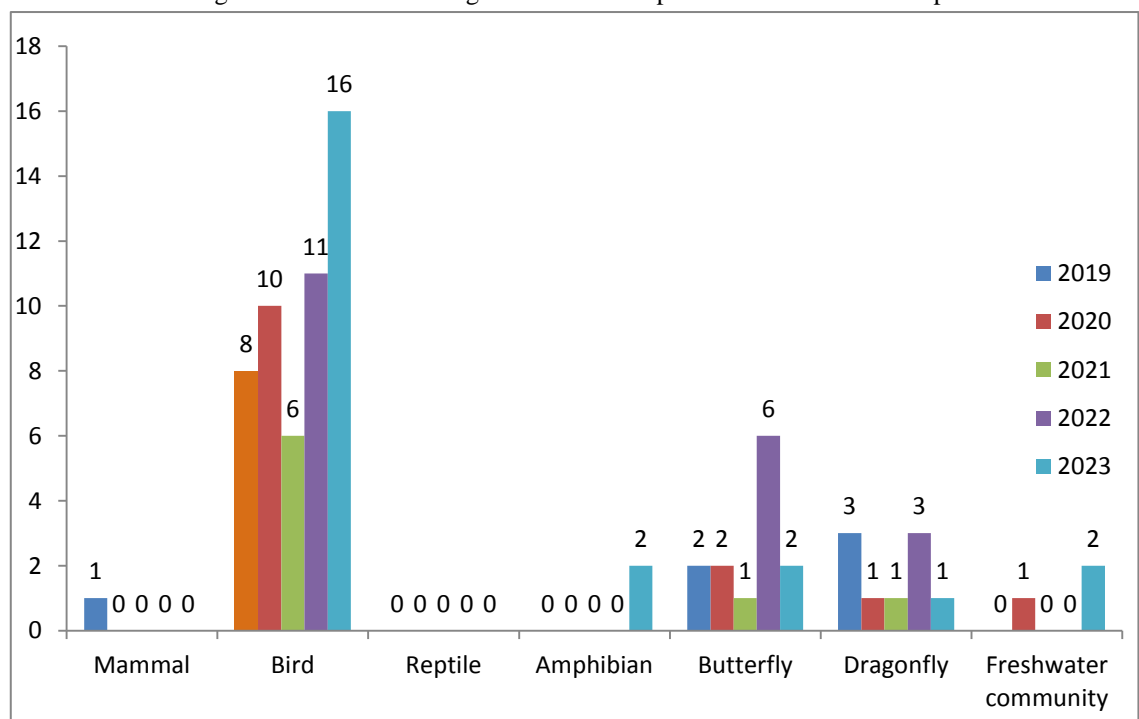


Figure 3: Bar chart showing the species richness within site boundary by taxa from 2019 to 2023
 (Actual quantity annotated at the top of each bar)

5.3 According to EM&A Manual, monitoring measures was determined by the species diversity of types of sensitive habitats, i.e. non-wetland and wetland habitats. Abundance and species richness by habitat type in September over years were compared in Figures 4 and 5.

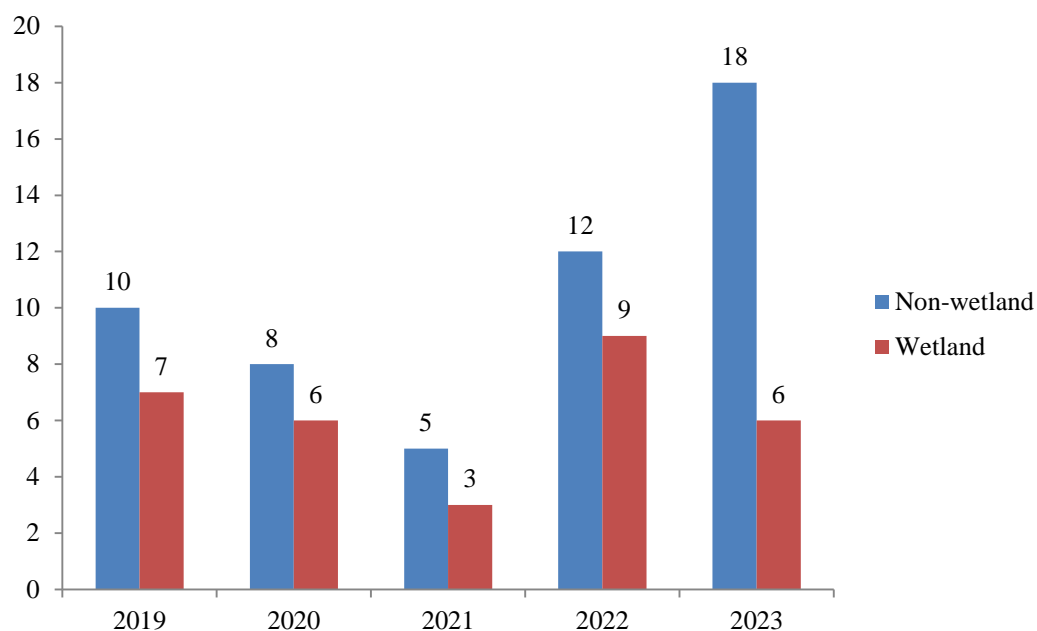


Figure 4: Bar chart showing the species richness based on habitat type from 2019 to 2023
 (Actual quantity annotated at the top of each bar)

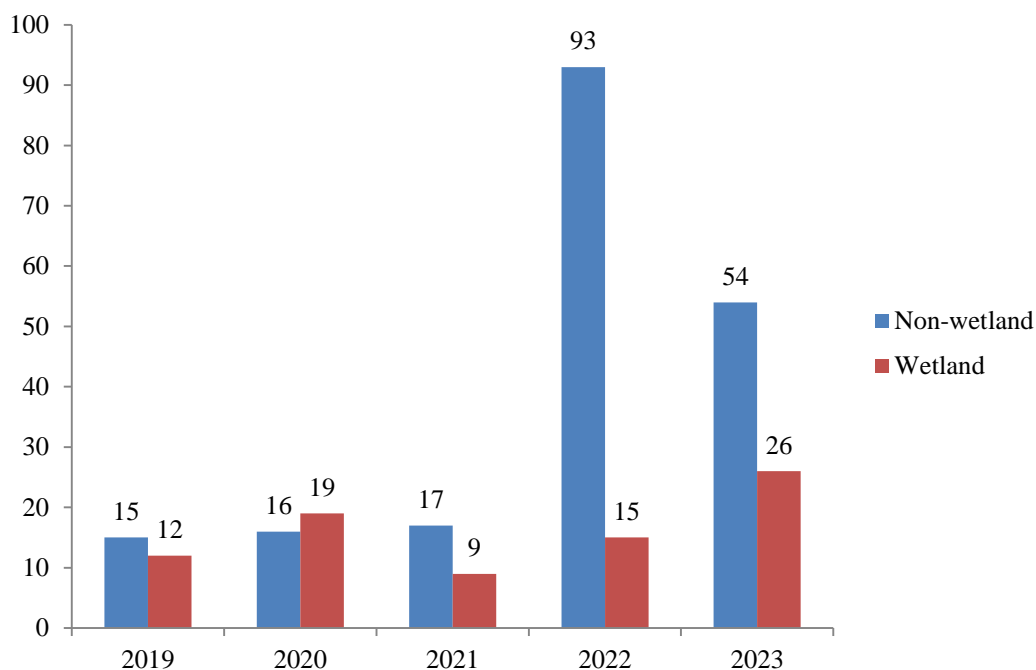
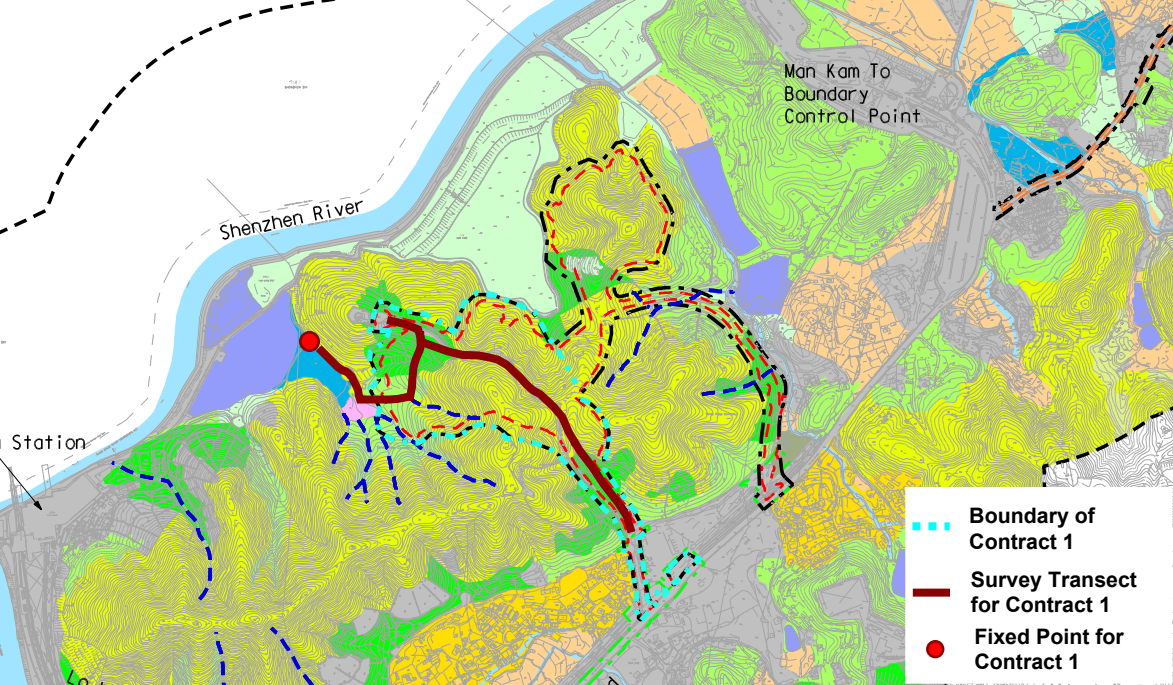


Figure 5: Bar chart showing the abundance based on habitat type from 2019 to 2023
 (Actual quantity annotated at the top of each bar)

5.4 After analysing survey results in October from 2019 to 2023, increase in species richness and the abundance for Wetland and Non-wetland habitat are recorded in October since 2022. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.

Yet, good site practice during construction, with reference to EM&A Manual, is still required to prevent or alleviate environmental impacts. Continuous monitoring is also recommended to inspect any changes in species diversity.

Appendix I – Transect Routes for Contract CV/2016/10



**Ecological Survey Report for
Contract CV/2017/02**

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Monthly Report of Ecologically Sensitive Habitats Monitoring – October 2023




Revision	1	
Date of issue	15 November 2023	
Prepared by	Alan Lam	
Reviewed by	Rachel Siu	
Verified by	Mike Leung	

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1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.
- 1.1.2 The project includes site formation and associated works for development of C&C facilities at the Sandy Ridge Cemetery, road works within Sandy Ridge Cemetery, widening a section of Lin Ma Hang Road (from 6.5m to 7.3m), provision of off-site pick-up/drop-off points for shuttle buses as well as barging point at Siu Lam, Lok On Pai.
- 1.1.3 The Environmental Impact Assessment (EIA) report, including Environmental Monitoring and Audit Manual (EM&A Manual), was approved with conditions on 8 August 2016 (Register No.: AEIAR-198/2016). EPD issued an Environmental Permit (EP) for the Project (EP-534/2017) on 7 April 2017, variation of EP (EP-534/2017/A) were issued on 24 December 2018.
- 1.1.4 According to Clause 3.1 of the EP (EP-534/2017/A), “The Permit Holder shall implement the EM&A programme in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the programme shall be justified by the ET Leader and verified by the IEC as conforming to the information and requirements contained in the EM&A Manual before submission to the Director for approval”.
- 1.1.5 This Ecologically Sensitive Habitats Monitoring Methodology articulates the protocol of monitoring the ecology of concerned habitats as specified in EM&A Manual.

1.2 OBJECTIVE

- 1.2.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 1.2.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution.

2 ECOLOGICALLY SENSITIVE HABITATS

2.1 DESCRIPTION OF HABITATS

- 2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

- 2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conservation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
- 2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

- 2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

- 2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.
- 2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

- 2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.
- 2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

- 3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

- 3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

- 3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

- 3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

- 3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all butterflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

- 3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 17th October 2023, a sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen would be identified and counted as accurately as possible.

- Mammal

There was no mammal recorded in the monitoring area.

- Bird

There were total of 16 bird individuals from 6 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.

- Herpetofauna

There was no reptile recorded in the monitoring area.

There was no amphibian recorded in the monitoring area.

- Butterfly

There were a total of 3 butterfly individuals from 2 species recorded in the monitoring area.

- Dragonfly

There were a total of 13 odonate individuals from 4 species recorded in the monitoring area.

- Freshwater communities

There were 4 species of freshwater fish recorded in the monitoring area.

Picture 1

Watercourse in monitoring area.



Picture 2

Watercourse in monitoring area.



Table 4 Result of mammal in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 5 Result of Avifauna in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩		4				
<i>Parus cinereus</i>	Cinereous Tit	蒼背山雀			1			
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鵲			4			
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲				4		
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯		1		1		
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯				1		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Udaspes folus</i>	Grass Demon	薑弄蝶				2		
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶				1		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Copera marginipes</i>	Yellow Featherlegs	黃狹扇尾				1		
<i>Orthetrum glaucum</i>	Common Blue Skimmer	黑尾灰蜻				1		
<i>Trithemis aurora</i>	Crimson Dropwing	曉褐蜻				1		
<i>Pantala flavescens</i>	Wandering Glider	黃蜻				10		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	17/10/2023				
				UG	WL	MA	WW	WC
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚						10
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮						10
<i>Oreochromis spp.</i>	Tilapia spp.	金山鯽						10
<i>Channa gachua</i>	Dwarf snakehead	緣鱧						10

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
+ Species appeared but uncountable

5 DISCUSSION

Data analysis was carried out to compare with the biodiversity within the site boundary in the same month over years. General description of the ecological conditions is first revealed in terms of abundance as well as species richness, following by statistical analysis of the existing database. The result is considered as significant whenever the drop of diversity indexes exceeds the percentages mentioned in previous sections 2.2 and 2.3.

5.1 Total abundance and species richness in September over years were compared to show the trends. Figures 1 and 2 indicate total species richness and total abundance within the site boundary respectively.

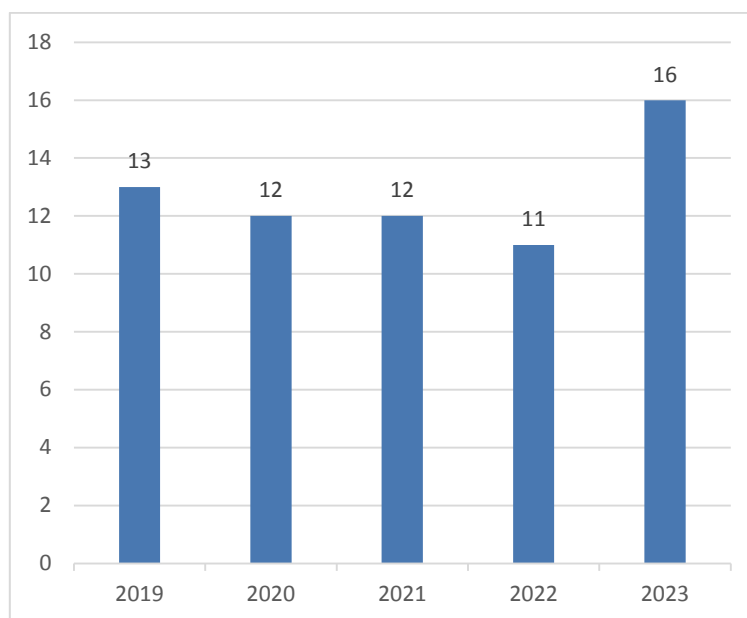


Figure 1: Bar chart showing the total species richness within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

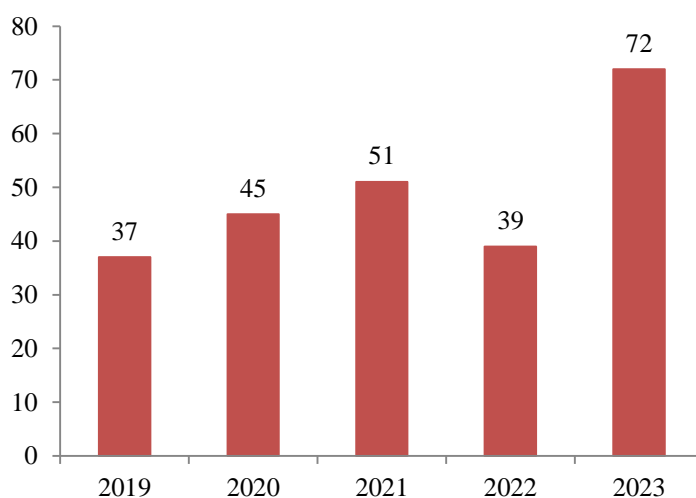


Figure 2: Bar chart showing the total abundance within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

5.2 As results in section 4 were categorized by taxa, a detailed breakdown of each taxon is shown in figure 3 to further investigate the trend of specific taxa over contract period.

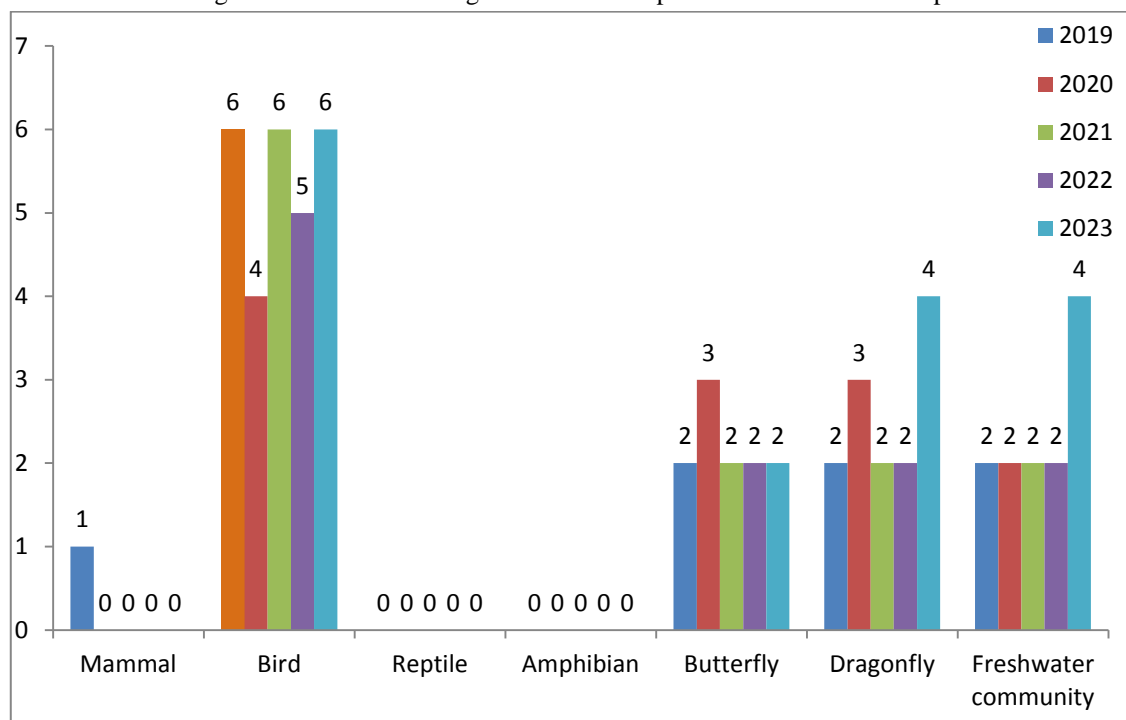


Figure 3: Bar chart showing the species richness within site boundary by taxa from 2019 to 2023
(Actual quantity annotated at the top of each bar)

5.3 According to EM&A Manual, monitoring measures was determined by the species diversity of types of sensitive habitats, i.e. non-wetland and wetland habitats. Abundance and species richness by habitat type in September over years were compared in figures 4 and 5.

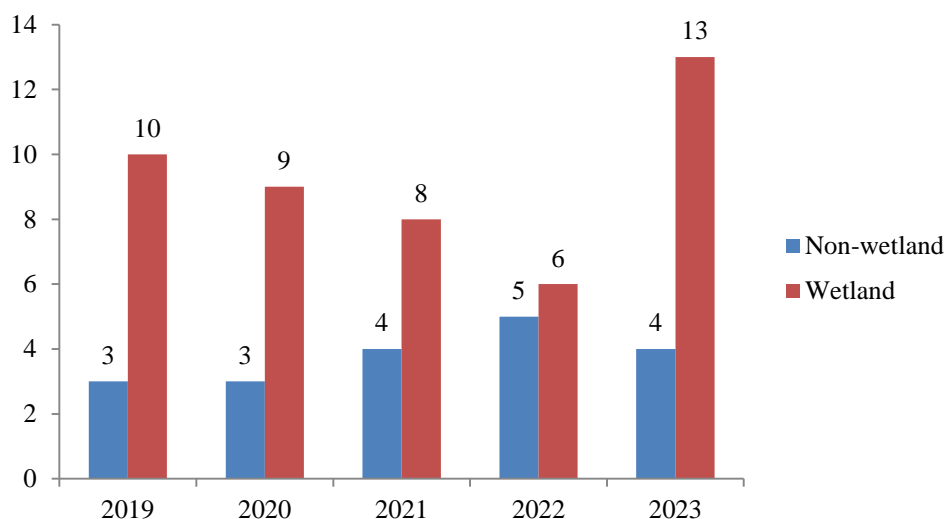


Figure 4: bar chart showing the species richness based on habitat type from 2019 to 2023
(Actual quantity annotated at the top of each bar)

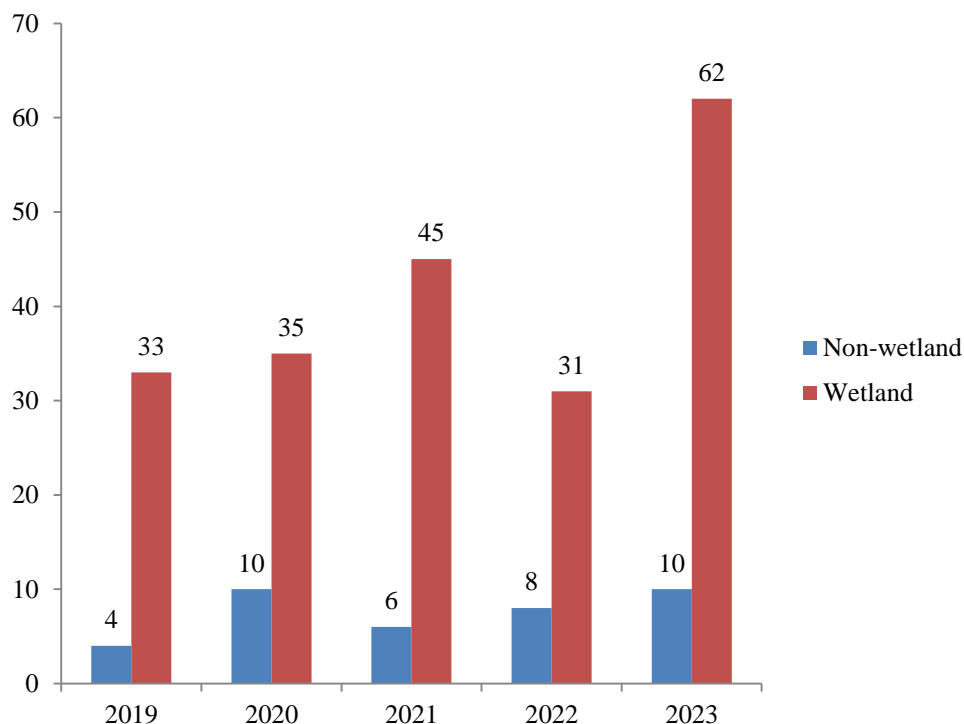


Figure 5: bar chart showing the abundance based on habitat type from 2019 to 2023
 (Actual quantity annotated at the top of each bar)

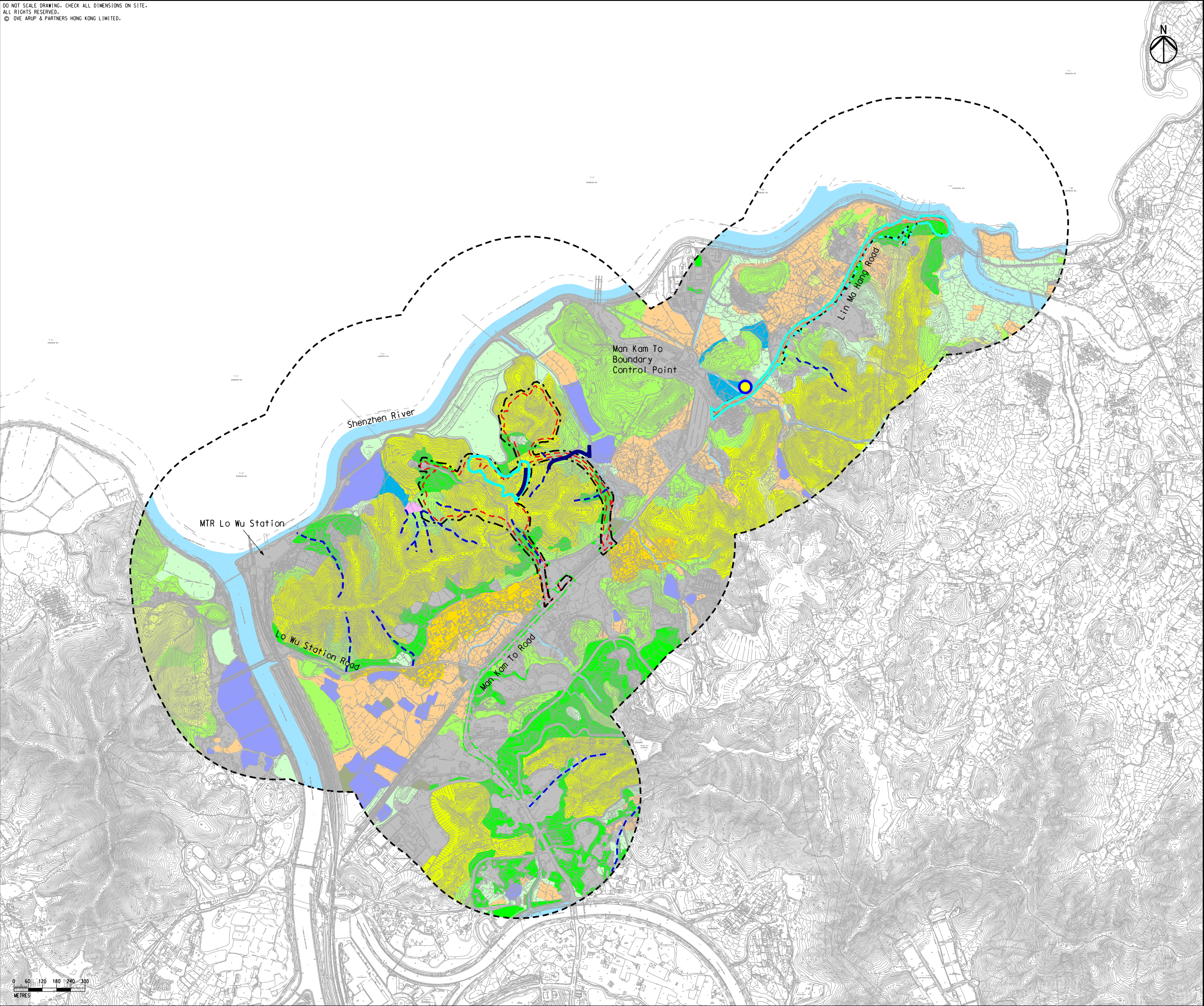
5.4 After analysing survey results in September from 2019 to 2022, records in species richness and abundance for wetland and non-wetland habitats are unstable, this may due to natural fluctuation. However, the records in October 2023 are significantly increased. The situation could be benefited by some positive factors such as the major construction works in this contract were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimized internally. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.

Still, a good site practice during construction, with reference to EM&A Manual, is required to prevent or alleviate environmental impacts. For instance, the size of work areas should be minimized and disturbed areas should be reinstated immediately after completion of construction works. In addition, implementing proper waste disposal is necessary to reduce contamination to water and soil. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.

Appendix I – Transect Routes for Contract CV/2017/02

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
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Printed by : 2/29/2016
Filename : G:\env\project\2314448\13 Drawing Deliverables\Reports\015 EIA\20160229 Revised FinalEIA_v1\Ch 9 Ecology\Figure 9.4b - Habitat Map at Sandy Ridge.dgn



Legend

- Project Boundary
- Utilities Construction
- Sandy Ridge Works Area
- Lin Ma Hang Road Works Area
- 500m Assessment Area
- Watercourse
- Seasonal Watercourse
- Pond
- Developed Area
- Agricultural Land
- Marsh
- Wasteland
- Grassland
- Upland Grassland
- Shrubland
- Plantation
- Woodland
- Wet Woodland
- Village Area
- Site boundary of Contract 2
- Survey Transect for Contract 2
- Fixed Point for Contract 2

G	SEVENTH ISSUE	GL	02/16
F	SIXTH ISSUE	GL	01/16
E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15
Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Habitat Map at Sandy Ridge

Drawing no.		Rev.	
Figure 9.4b		G	
Drawn	Date	Checked	Approved
GL	02/16	EL	ST
Scale	Status		
AS SHOWN	PRELIMINARY		

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土木工程拓展署
Civil Engineering and Development Department

Appendix L

Landscape & Visual Inspection Checklist

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 30/10/2023 10:30 **Weather:** Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	Landscape and Visual				
1.1	Is the construction period become shortened?			✓	Under review.
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)	✓			
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?	✓			
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?	✓			
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?	✓			Compensatory planting is in progress
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)	✓			
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)	✓			

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New observation:

N/A

Reminders:

1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement.
2. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
3. Transplanted trees T2465 and T2928 were in fair health condition with normal foliage color and density. Contractor is reminded to provide proper maintenance according to approved method statement.

Photo Record:

Fig A.



General view (1)

Fig B.



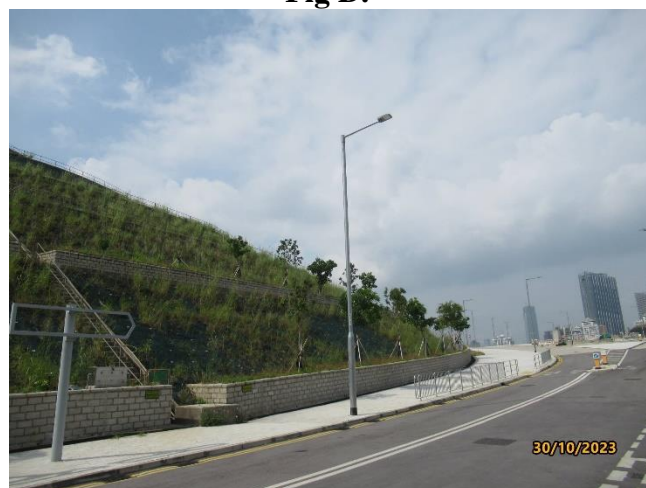
General view (2)

Fig C.



General view (3)

Fig D.



General view (4)

Fig E.



Transplanted tree (T-2465)

Fig F.



Transplanted tree (T-2928)

Contract No. CV/2017/02

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Development of Columbarium at Sandy Ridge Cemetery –

Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 30/10/2023 11:30 **Weather:** Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	Landscape and Visual				
1.1	Is the construction period become shortened?			✓	Under review
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)	✓			
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?	✓			
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?			✓	
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)			✓	
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)			✓	

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New Observation:

N/A

Reminders:

1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement. Contractor should prevent any construction material pile within TPZ and ensure no works is allowed within the TPZ.

Photo Record:

Fig A.



General view (1)

Fig B.



General view (2)

Fig C.



General view (3)

Fig D.



General view (4)

Signature:

		Signature	Date
Recorded by	Registered Landscape Architect	 	31 Oct 2023
Checked by	Environmental Team Leader		10 Nov 2023
	Independent Environmental Checker		13 Nov 2023

Appendix M

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for 2023

Department: Civil Engineering and Development Department Contract No.: CV/2016/10
 Contract Title: Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
 Commencement Date: 15-Dec-2017 Estimated completion Date 22-Dec-2023 Estimated Contract Sum: 780M

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	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	0.340	0.000	0.000	0.000	0.340	0.000	0.000	0.000	0.000	0.000	0.020
Feb	0.300	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000	0.000	0.015
Mar	0.157	0.000	0.000	0.000	0.157	0.000	0.000	0.000	0.000	0.000	0.015
Apr	0.120	0.000	0.000	0.000	0.120	0.000	0.000	0.000	0.000	0.000	0.010
May	0.160	0.000	0.000	0.000	0.160	0.000	0.000	0.000	0.000	0.000	0.015
June	0.100	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.010
Sub-total	1.177	0.000	0.000	0.000	1.177	0.000	0.000	0.000	0.000	0.000	0.085
July	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025
Aug	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020
Sept	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010
Oct	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nov											
Dec											
Total	1.177	0.000	0.000	0.000	1.177	0.000	0.000	0.000	0.000	0.000	0.140

- Notes: (1) The waste flow table should cover the whole construction period of the Contract.
- (2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
- (3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
- (4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
- (5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (6) Broken concrete for recycling into aggregates.

Name of Department: CEDD

Monthly Summary Waste Flow Table for 2023

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	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in Litre)	(in '000kg)
JAN	191.800	0.000	0.000	0.000	191.800	0.000	0.000	0.000	0.000	0.000	5.800
FEB	356.600	0.000	0.000	0.000	356.600	0.000	0.000	0.000	0.000	0.000	9.600
MAR	352.230	0.000	0.000	0.000	352.230	0.000	0.000	0.000	0.000	0.000	4.640
APRIL	87.490	0.000	0.000	0.000	87.490	0.000	0.000	0.000	0.000	0.000	2.090
MAY	165.760	0.000	0.000	0.000	165.760	0.000	0.000	0.000	0.000	0.000	3.330
JUN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.130
Sub Total	1153.880	0.000	0.000	0.000	1153.880	0.000	0.000	0.000	0.000	0.000	32.590
JUL	29.560	0.000	0.000	0.000	29.560	0.000	0.000	0.000	0.000	0.000	4.600
AUG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.140
SEP	15.230	0.000	0.000	0.000	15.230	0.000	0.000	0.000	0.000	0.000	1.600
OCT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NOV											
DEC											
Total	1201.670	0.000	0.000	0.000	1201.670	0.000	0.000	0.000	0.000	0.000	47.93

Notes: * estimated quantity (pending from EPD NENT (soil) to update the actual quantity)

Name of Department: CEDD

Forecast of Total Quantities of C&D Materials to be Generated from the Contract (see Note 4)										
Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported Fill	Metal	Paper / cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
0	0	0	0	0	0	0	0	0	1	0

Notes:

- (1) The performance targets are given in PS clause 6(14) above.
- (2) The waste flow table shall also include C&D materials that are specified in the Contractor to be imported for use at the Site.
- (3) Plastic refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature
 - Hard Rocks and Large Broken Concrete = Cannot be defined at this stage
 - Imported Fill = Estimated by the Contractor
 - Metal = Estimated by the Contractor
 - Paper/cardboard packaging = Estimated by the Contractor
 - Plastics = Estimated by the Contractor
 - Chemical Waste = Estimated by the Contractor (Spent lubricating oil, assume density 0.9kg/L)
 - Other, e.g. general refuse = Estimated by the Contractor

Appendix N

Complaint Log

Complaint Log for Contract 1

Log ref.	Date of complaint	Complaint route	Reference no.	Complaint nature	Investigation finding	Status
1	15-Apr-21	EPD	EPD Ref.: EP3/N07/RN/8770-21	Air Quality	Non-project related	Interim IR was submitted to EPD on 22 April 2021 and included in EM&A Report – Apr 2021
2	11-Feb-22	EPD	EPD Ref.: EP3/N07/RN/03921-22	Noise	Non-project related	Interim IR was submitted to EPD on 25 Feb 2022 and included in EM&A Report – Feb 2021

Complaint Log for Contract 2

Log ref.	Date of complaint	Complaint route	Reference no.	Complaint nature	Investigation finding	Status
1	4-Sep-20	EPD	EPD Ref.: EP/RN/419300	Water quality	Non-project related	Interim IR was submitted to EPD on 14 Sep 2020 and included in EM&A Report – Sep 2020
2	15-Apr-21	EPD	EPD Ref.: EP3/N07/RN/8770-21	Air Quality	Non-project related	Interim IR was submitted to EPD on 22 April 2021 and Included in EM&A Report – Apr 2020
3	11-Feb-22	EPD	EPD Ref.: EP3/N07/RN/03921-22	Noise	Non-project related	Interim IR was submitted to EPD on 25 Feb 2022 and included in EM&A Report – Feb 2021
4	14-July-22	EPD	EPD Ref.: N07/RN/00014141-22	Soil/muddy water	Non-project related	Interim IR was submitted to EPD on 19 Aug 2022 and included in EM&A Report – Aug 2022
5	23-9-22	EPD	EPD Ref.: N07/RN/00020415-22	Air Quality	Non-project related	Interim IR was submitted to EPD on 30 Sep 2022 and included in EM&A Report – Sep 2022

Appendix O

Implementation Schedule for Environmental Mitigation Measures

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
	<p>dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet;</p> <ul style="list-style-type: none"> Any skip hoist for material transport should be totally enclosed by impervious sheeting; Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. <p>Implement regular dust monitoring under EM&A programme during the construction stage.</p>						Implemented
S4.4.5.1			Contractor	Selected representative dust monitoring station	Construction phase	• TM-EIAO	Implemented. 3 dust monitoring stations were Implemented.
S4.4.5.3	<ul style="list-style-type: none"> All road surface within the barging facilities will be paved. Dust enclosures will be provided for the loading ramp, installation of 3- sided screen with top cover and the provision of water sprays at the discharge point would be provided. Vehicles will be required to pass through designated wheel wash facilities. Continuous water spray at the loading point. 	Minimise dust impact at the nearby sensitive receivers	Contractor	Barging point at Siu Lam	Construction phase	• TM-EIAO	No Applicable. * Barging point at Siu Lam is not in used.
Construction Noise							
S5.5.5.3	<p>Implement the following good site management practices:</p> <ul style="list-style-type: none"> only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from onsite construction 	Control construction noise	Contractor	All construction sites	Construction phase	• Annex 5, TM-EIAO	Implemented Implemented Implemented Implemented Implemented Implemented

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
	activities.						
S5.5.5.5	Adopt quiet plants during the construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road. The quiet plants should be made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in EPD web pages or taken from BS5228: Part 1: 2009 Noise Control on Construction and Open Sites as far as possible.	Reduce the noise levels of plant items	Contractor	Works area for construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road	Construction phase	• Annex 5, TM-EIAO	Implemented * Quiet plants were in used.
S5.5.5.6	Install temporary noise barriers (in the form of site hoardings, approx. 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites where practicable	Construction phase	Annex 5, TM-EIAO	Implemented where necessary. * Temporary noise barriers are not practicable due to site constraint.
S5.5.5.7 – S5.5.5.12	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered upper portion of superficial density no less than 7kg/m2 on a skid footing with 25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators etc.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where practicable	Construction phase	Annex 5, TM-EIAO	Implemented where necessary. * Movable noise barriers are not practicable due to site constraint.
S5.5.5.13	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction noise	Contractor	All construction sites where practicable	Construction phase	Annex 5, TM-EIAO	Implemented

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
S13.2.1.1 – S13.4.1.2	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction phase	TM-EIAO	Implemented. * 4 noise monitoring stations were Implemented.
Operational Noise (Road Traffic Noise)							
S5.6.6.4	Provide a series of noise mitigation measures including absorptive noise barriers and low noise road surfacing materials along Lin Ma Hang Road and Sha Ling Road before operation of the proposed project for existing and planned representative NSRs. Locations of noise mitigation measures are stated as following: <i>For existing representative NSRs</i> <ul style="list-style-type: none"> Approx. 12m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM1); Approx. 92m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM2); Approx. 28m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM3); Approx. 51m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM4); Approx. 25m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM5); Approx. 21m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM6); Approx. 14m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM7); Approx. 18m of absorptive noise barrier 3m above road level along Lin Ma Hang Road near San Uk Ling (MM8); Approx. 42m of absorptive noise barrier 3m above road level along temporary pullover space opposite San Uk Ling (MM9); Approx. 93m of absorptive noise barrier 3m above road level along Lin Ma Hang Road opposite San Uk Ling (MM10); Approx. 185m of low noise surfacing materials along Lin Ma Hang Road near San Uk Ling (MM11); For planned representative NSRs Approx. 36m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM12); Approx. 47m of absorptive noise barrier 5m above road level along Lin Ma Hang 	Reduce operation noise from road traffic	Contractor	Refer to Figures 5.6.9 – 5.6.13 of the EIA Report	Prior to operation of the Project for existing representative NSRs. While for barriers to protect planned representative NSRs, it should be constructed before intake of planned representative NSRs.	• TM-EIAO	Shall be implemented Prior to operation of the Project.

[illegible]

[illegible]

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
	<ul style="list-style-type: none"> Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts; All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby; Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the water bodies, marsh and ponds; Adopt best management practices. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S6.4.4.4 – S6.4.4.5	<p><u>Sewage from workforce</u></p> <ul style="list-style-type: none"> Portable chemical toilets and sewage holding tanks are recommended for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance; Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project; Regular environmental audit on the construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. 	To minimise water quality from sewage effluent	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS 	<p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S6.4.4.6	<p><u>Operation of Barging Point at Siu Lam</u></p> <ul style="list-style-type: none"> All barges should be fitted with tight bottom seals to prevent leakage of materials during transport; Barges or hoppers should not be filled to a level that will cause overflow of materials or polluted water during loading or transportation; All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Mitigation measures for land-based activities as outlined in Section 6.4.4 should be applied to minimise water quality impacts from site runoff and open stockpile spoils at the proposed barging facilities where appropriate. 	To minimise water quality from operation of barging point at Siu Lam	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS 	<p>No Applicable.</p> <p>* Barging point at Siu Lam is not in used.</p>

Water Quality (Operational Phase)

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
S6.5.4.1 – S6.5.4.6	<p>The following mitigation measures during operational phase are recommended:</p> <ul style="list-style-type: none"> • Sewage and wastewater discharge should be connected to foul sewerage system; • Proper drainage systems with silt traps and oil interceptors should be installed; • The design of road gullies with silt traps should be incorporated especially for the catchment leading to the existing wet woodland area located at the north of the site; • The silt traps and oil interceptors should be cleaned and maintained regularly, especially before peak seasons of the visitors in Ching Ming Festival and Chung Yeung Festival; • Energy dissipaters should be installed at the seasonally wet watercourses to reduce the magnitude of the first flush in order to minimise the erosion impact to the wet woodland. 	To minimise the road runoff, wastewater discharge and erosion of seasonal watercourse during the operational phase	Highways Department /Contractors	Whole alignment	Construction / Operational Phase	<ul style="list-style-type: none"> • Water Pollution Control Ordinance • TM-DSS 	For Operational phase
Waste Management (Construction Waste)							
S7.3.3.8	<p>Construction & Demolition Material Management Plan (C&DMMP)</p> <ul style="list-style-type: none"> • A C&DMMP shall be submitted to the Public Fill Committee for approval in the case of C&D materials disposal exceeding 50,000m³. 	To enhance the management of construction and demolition (C&D) material including rock in public works projects	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • Project Administrative Handbook for Civil Engineering Works, 2012 Edition 	
S7.3.4.2	<p><u>Good Site Practice</u></p> <p>The following good site practices are recommended throughout the construction activities:</p> <ul style="list-style-type: none"> • nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; • provision of sufficient waste disposal points and regular collection for disposal; • appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • a Waste Management Plan (WMP) should be prepared by the contractor and submitted to the Engineer for approval. 	Minimise waste generation during construction	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • Waste Disposal Ordinance 	<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
S7.3.4.3	<u>Waste Reduction Measures</u> Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction: <ul style="list-style-type: none"> segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; proper storage and site practices to minimise the potential for damage and contamination of construction materials; plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete metal etc.); provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling. 	Reduce waste generation	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance 	Implemented Implemented Implemented Implemented Implemented
S7.3.4.5	<u>Storage of Waste</u> The following recommendation should be implemented to minimise the impacts: <ul style="list-style-type: none"> non-inert C&D materials such as soil should be handled and stored well to ensure secure containment; stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; different locations should be designated to stockpile each material to enhance reuse; 	Good site practice to minimise the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETWB TCW No. 19/2005 	Implemented Implemented Implemented
S7.3.4.6	<u>Collection and Transportation of Waste</u> The following recommendation should be implemented to minimise the impacts: <ul style="list-style-type: none"> remove waste in timely manner; employ the trucks with cover or enclosed containers for waste transportation; obtain relevant waste disposal permits from the appropriate authorities; and disposal of waste should be done at licensed waste disposal facilities. 	Minimise waste impacts from storage	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance 	Implemented Implemented Implemented Implemented
S7.3.4.8 – S7.3.4.15	<u>Excavated and C&D Materials</u> Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at public filling areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials: <ul style="list-style-type: none"> maintain temporary stockpiles and reuse excavated fill material for backfilling; carry out on-site sorting; make provisions in the Contract documents to allow and promote the 	Minimise waste impacts from excavated and C&D materials	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance 	Implemented Implemented Implemented

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
	<ul style="list-style-type: none"> • use of recycled aggregates where appropriate; and • implement a recording system for the amount of waste generated, recycled and disposed of for checking. • The recommended C&D materials handling should include: • On-site sorting of C&D materials; • Reuse of C&D materials; and • Use of Standard Formwork and Planning of Construction Material purchasing. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S7.3.4.17 – S7.3.4.18	<p><u>Chemical Waste</u></p> <p>If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producer. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste Contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • Waste Disposal (Chemical Waste) • Code of Practice on the Packaging, Labelling and Storage of Chemical Waste 	Implemented
S7.3.4.19	<p><u>General Refuse</u></p> <ul style="list-style-type: none"> • General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. • Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. • A reputable waste collector should be employed to remove general refuse on a daily basis. 	Minimise production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • Waste Disposal Ordinance 	<p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S7.3.4.20	<p><u>Sewage</u></p> <ul style="list-style-type: none"> • The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability, site condition and activities. • Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts. 	Minimise production of sewage impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • Waste Disposal Ordinance 	<p>Implemented</p> <p>Implemented</p>
Waste Management (Operational Waste)							
S7.4.4.1	<p><u>General Refuse</u></p> <p>A reputable waste collector should be employed to remove general refuse on a daily basis.</p>	Remove general refuse during routine road cleaning activities on the roads network and avoid odour, pest and litter impacts	Highways Department /Contractor	Roads network for the C&C facilities and Lin Ma Hang Road	Operational phase	<ul style="list-style-type: none"> • Waste Disposal Ordinance 	Implemented

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
Land Contamination							
S8.9.1.1	Re-appraisal of the potentially contaminated site (SRC-1)	Identify any hot spots for SI within the southeast and western portions of SRC-1	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Once the works area for the Project is confirmed and site access is available (e.g. after land resumption)	<ul style="list-style-type: none"> Annex 19 of the TM-EIAO, Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3 :Potential Contaminated Land Issues); Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management; Guidance Notes for Contaminated Land Assessment and Remediation; and Practice Guide for Investigation and Remediation of Contaminated Land Recommendations in Health Risk Assessment 	Implemented
S8.11.1.1	Preparation and submission of Contamination Assessment Plan (CAP) to EPD for review and approval, if required	Present the findings of the reappraisal and strategy of the recommended SI, if required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	After land resumption and prior to the construction phase	Ditto	Implemented
S8.11.1.2	Preparation and submission of Contamination Assessment Report (CAR) to EPD for review and approval, if required	Present the findings of SI, if any, and evaluate the level and extent of potential contamination	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto	Implemented
S8.11.1.2	Preparation and submission of Remediation Action Plan (RAP) to EPD for review and approval if contamination is identified	Recommend appropriate mitigation	Project Proponent /	Potentially contaminated	Prior to the construction	Ditto	Not required as no contamination is

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		measures for the contaminated soil and groundwater identified in the assessment if remediation is required	Detailed Design Consultant	site (SRC-1)	phase		identified.
S8.11.1.2	Preparation and submission of Remediation Report (RR) to EPD for review and approval following the completion of any necessary remediation works	Demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto	Not required as no contamination is identified.
Ecology (Construction Phase)							
S9.7.2.3	Preparation and submission of Upland Grassland Reinstatement Plan to EPD for agreement.	<p>An Upland Grassland Reinstatement Plan will be prepared by a qualified ecologist/botanist with full details of the findings of a baseline grassland survey, the practical details and methodology of the physical excavation, transport and storage or turves/topsoil and their subsequent reinstatement once the receptor sites have been established, along with an implementation programme of reinstatement, post-reinstatement monitoring and maintenance programme.</p> <p>A contingency plan</p>	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Upland Grassland Reinstatement Plan	Engineered slopes Of Crenatorium Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	<ul style="list-style-type: none"> Reinstatement and establishment requirements to be detailed in Upland Grassland Reinstatement Plan TM-EIAO 	<p>Implemented</p> <p>*Upland Grassland Reinstatement Plan was submitted to EPD.</p>

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
		should be proposed in the Grassland Reinstatement Plan so as to describe the action and limit levels and the action plan if certain performance criteria (such as area of preferred habitat) are not met during the monitoring and maintenance period.					
S9.7.2.5 – S9.7.2.6	Preparation and submission of a Vegetation Survey Report and Transplantation Proposal (if needed as concluded in the Vegetation Survey Report) to EPD for agreement.	<p>The Vegetation Survey will report the presence, as well as update the conditions, number, locations and habitat types of any identified floral species of conservation importance to be impacted by the development, and evaluate suitability and/or practicality of transplantation.</p> <p>The Transplantation Proposal will recommend locations of the receptor site(s), transplantation methodology, implementation programme of transplantation and post-transplantation monitoring</p>	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Vegetation Survey Report and Transplantation Proposal.	Within the Project Area where applicable	Prior to construction phase	<ul style="list-style-type: none"> Survey findings and transplantation methodology to be detailed in Vegetation Survey Report and Transplantation Plan respectively. TM-EIAO. 	<p>Implemented</p> <p>* Vegetation Survey Report and Transplantation Proposals for Contract 1 and Contract 2 were submitted to EPD.</p>

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
		and maintenance programme.					
S9.7.5.3 – S9.7.5.5, S9.8.1.6	Preparation and submission of Enhancement Woodland Proposal to EPD for agreement.	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	<ul style="list-style-type: none"> Enhancement planting and establishment requirements to be detailed in Wooded Enhancement Proposal. TM-EIAO 	Implemented *Woodland compensation plan was submitted to EPD.
S9.7.3.1 – S9.7.3.3	<p>Indirect impacts due to potential changes in water quality, hydrology and sedimentation could occur to a series of downstream watercourses and wetland systems (including the wet woodland, marsh and mitigation ponds) during both the construction (for the Platform and LMHR widening works) and operational stages.</p> <p>Generally, indirect water impact to any aquatic fauna during the construction phase should easily be avoided by implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and good site practices (further details are discussed in Section 6 of the EIA Report).</p> <p>In addition, construction phase impacts on the watercourses, riparian corridor and fauna using these areas will be minimised by erection of a 2m high, solid, dull green site boundary fence on the edge of any active works area, 30m from the watercourse. Where this is not practicable due to site constraints, demarcation fencing will need to be erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. Detailed mitigation measures will be designed at the detailed design stage.</p>	Minimise the indirect impacts to Water Quality and Hydrology	Contractor /detailed design consultant.	On the edge of any active works area, 30m from The watercourse	Prior to commencement and during construction phase	<ul style="list-style-type: none"> ETWB TCW No. 5/2005 TM-EIAO 	Implemented.

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S9.7.3.4 – S9.7.3.6	<p>Mitigation for noise disturbance (details refer to S5.5.5 to S5.6.6 of this table). Site formation and construction are tentatively proposed to cover a 65-month period from mid 2017 to late 2022.</p> <p>As a precautionary approach, consideration should be given at the detailed design stage to avoid the use of highly reflective materials in the design and implementing the use of opaque materials, fritting, breaking up external reflections with stickers or plastic wrap and/or any other birdfriendly design for noise barriers.</p> <p>Works will be restricted to daytime and any construction lighting should be designed and positioned as to not impact on adjacent ecologically sensitive areas.</p>	<p>The construction work and site formation will be phased in order to reduce overall noise disturbance impacts in particular areas. Collisions usually occurs as a result of birds perceiving a clear path through an object that is transparent or appears to be transparent at some distance, or if the noise barrier is highly reflective which would appear to be composed of the adjacent natural vegetation. Furthermore, mitigation measures to control noise disturbance during this phase will involve the selection of quieter plant, use of movable noise barriers and erection of hoarding and fencing to demarcate the site boundary</p>	Contractor Project Proponent	All construction sites	Prior to commencement and during construction phase	<ul style="list-style-type: none"> TM-EIAO. 	
9.7.3.7	<p>In order to demonstrate ecological awareness and to minimise the risk of indirect impacts from water pollution and hill fires, a series of good site practices should be adopted by site staff throughout the construction phase at each works site. These are as follows:</p> <ul style="list-style-type: none"> Put up signs to alert site staff about any locations which are ecologically sensitive and measures to prevent accidental impacts; Erection of temporary geotextile silt or sediment fences/oil traps around any earth-moving works to trap any sediments and prevent them from entering 	<p>Minimise impacts on hydrological condition and water quality of hillside watercourses and reduce chances of hillfires.</p>	Contractor	All construction sites	Prior to commencement and during construction phase	<ul style="list-style-type: none"> TM-EIAO. 	<p>Implemented</p> <p>Implemented</p>

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
	<p>watercourses;</p> <ul style="list-style-type: none"> • Prohibition of soil storage against trees or close to waterbodies; • Delineation of works site to prevent encroachment onto adjacent habitats and fence off areas which have some ecological value; • No smoking, hot works or sources of fire close to upland grassland; • No on-site burning of waste; and • Waste and refuse in appropriate receptacles. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S.9.7.3.9	Precautionary checks by a suitably experienced ecologist of the vegetation for the presence of nesting birds should be carried out in the breeding season (February to July) before vegetation clearance. These impacts can be avoided by conducting vegetation clearance during the non-breeding season (tentatively August-January) and phased through the project period to minimise impacts.	Minimise the impacts to breeding birds within the works areas.	Contractor	All construction sites	Prior to site clearance	<ul style="list-style-type: none"> • TM-EIAO • WAPO 	Implemented during breeding season.
Ecology (Operational Phase)							
S9.7.2	Establishment, maintenance and monitoring of a Upland Grassland Reinstatement Area	Reinstatement of upland grassland and to maintain connectivity in Sandy Ridge.	Project Proponent/ Contractor / Maintenance Authority	Engineered slopes of Crematorium	Operational phase	<ul style="list-style-type: none"> • Monitoring methodology and successfulness of survival of upland grassland should follow Upland Grassland Reinstatement Plan. • TM-EIAO. 	Upland Grassland Reinstatement Area will be implemented by other contract.
S9.7.5.3 – S9.7.5.6	Establishment, maintenance and monitoring of an enhancement woodland	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort	Operational phase	<ul style="list-style-type: none"> • Enhancement planting and establishment requirements to be detailed in Wooded Area Proposal. • TM-EIAO. 	

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
		maintenance programme.		Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report			
S9.7.4.1 – S9.7.4.5	<p><u>Mitigation for Impacts to Water Quality and Hydrology (Operational Phase)</u></p> <ul style="list-style-type: none"> Stormwater drainage system will be further developed in detailed design stage to collect dusty materials from water collected from the platform and associated road system. Silt traps will be installed to ensure removal of dusty materials. Regular cleaning will be conducted to avoid debris entering downstream rivers during first flush; and The proposed small diameter bore pile system at the foundation of the proposed platform structure. 	<p>Specific mitigation measures will be implemented to prevent indirect impacts wetland habitats and fauna. Mitigation measures are to be further developed in the detailed design stage to address any water quality impacts due to the drainage from the proposed platform, and any erosion issues due to the drainage from the proposed platform.</p> <p>The surface runoff collected on the platform will be captured by a stormwater drainage system, which will be further developed at the detailed design stage.</p> <p>The proposed small diameter bore pile system at the foundation of the</p>	Detailed Design Consultant	Wet woodland (and further down the marsh and mitigation ponds) and the seasonal watercourse to the east of the Project boundary	Detailed Design phase/Operational phase	<ul style="list-style-type: none"> TM-EIAO 	Implemented before Operational phase

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		proposed platform structure would allow a notional free area of about 87 – 91% for groundwater to pass through.					
S9.7.4.6 – S9.7.4.7	Minimise the potential indirect light disturbance on the Street Lighting on fireflies surrounding the Project Site during operational phase • It is considered that at the detailed design stage, street lighting of similar lux/light intensity as to what is currently present is utilised. Furthermore, as a precautionary measure, it is suggested that deflectors are fixed to the back of the street lights to prevent additional light reaching the marsh and causing adverse impacts to fireflies.	Reduce light pollution and impact on the nearby habitats and their associated wildlife groups, particularly nocturnal fireflies.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO	Implemented before Operational phase
S9.7.4.9 – S9.7.4.9	The increase in visitors to the columbarium allows greater public access to the upland grassland of Sandy Ridge and in turn, the potential for hill fires is also increased. Fires may emanate from discarded cigarettes and from specific practices during festivals or grave-sweeping. In order to reduce the risk of hill fires, sufficient educational signage should be displayed throughout the columbarium warning people of the risks of fire and strictly prohibits practices that could cause hill fires. This will require input in the detailed design phase.	Minimise the risk of hill fires.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO	Implemented before Operational phase
Fisheries							
S10.5.1.1	No loss of fish ponds is anticipated and no <i>in situ</i> mitigation is required. However, mitigation measures for water quality (S6.4.4 – S6.5.4 in this table) proposed are also pertinent in ensuring that fisheries impacts of the Project do not occur downstream of the Project area either locally or in Inner Deep Bay.	-	-	-	-	-	Not applicable
Landscape & Visual							
S11.8.1.3 , Table 11.9	CM1 – The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape, and the reliance on off-site construction.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-	Implemented.

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
S11.8.1.3, Table 11.9	CM3 – Screening of construction works by hoardings/noise barriers around works area in visually unobtrusive colours and to screen construction works. It is proposed that screening be compatible with the surrounding environment and non-reflective, recessive colours be used. Hoarding should be taken down at the end of the construction period.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-	Implemented.
S11.8.1.3, Table 11.9	CM4 – Dust and Erosion Control for Exposed Soil - Excavation works and demolition of existing building blocks shall be well planned with precautions to suppress dust. Exposed soil shall be covered or watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Suitable drainage shall be provided around construction sites to avoid discharge of contaminants and sediments into sensitive water-based habitat.	Minimise landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-	Implemented.
S11.8.1.3, Table 11.9	CM5 – Control night-time lighting and glare by hooding all lights.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-	Implemented.
S11.8.1.3, Table 11.9	CM6 – Tree Protection and Preservation – Woodland, plantation and other vegetation within the Study Area will be protected and preserved as far as possible in accordance with ETWB TCW No. 29/2004 - Registration of Old and Valuable Trees, and Guidelines for their Preservation and DEVB TCW No.07/2015 – Tree Preservation. Detailed Design Considerations are made to avoid impacts to trees, e.g. proper viaduct/ bridge design routing to avoid majority of the woodland, locating the columbarium buildings in areas with less trees and ensuring design of the buildings has as small a footprint as practical.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB 	Implemented.
S11.8.1.3, Table 11.9	CM7 – Tree Transplantation – Tree(s) will be affected according to the Tree Preservation and Removal Proposal to be carried out in a later stage. Established trees of value are to be re-located where practically feasible.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	<ul style="list-style-type: none"> • ‘Guidelines for Tree Risk Management And Assessment Arrangement on an Area Basis and on a Tree Basis’, issued January 2011, Greening, Landscape and Tree Management 	Implemented.

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						(GLTM) Section, DevB • Latest recommended horticultural practices from GLTM Section, DevB	
S11.8.1.3, Table 11.9	CM8 - Implementing precautionary control measures during construction stage according to ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works to avoid direct or indirect impacts any watercourses and good site practices.	Minimize landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	• ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works	Implemented.
S11.8.1.3, Table 11.9	OM1 – Compensatory Woodland Planting - The arrangement of compensatory planting (e.g. areas of woodland to be compensated and space to be allowed within the Project Site) will be subject to detailed engineering design, landscape design and planting plan, and is recommended to be implemented prior to the construction activities as far as practical.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Prior to Construction phase	• DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features	Implemented
S11.8.1.3, Table 11.9	OM2 – Compensatory Tree Planting for Plantation and Other Vegetated Areas - Compensatory planting should be provided in accordance with DEVB TCW No. 07/2015 to compensate for those trees felled. According to the preliminary design, compensatory trees will be planted on the cut/fill slopes, along new roads and in car parks. The selection of planting species shall be made with reference to the species identified in the future Detailed Tree Survey and be native to Hong Kong or the South China region.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	• DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 –	Implemented

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
						Maintenance of Vegetation and Hard Landscape Features	
S11.8.1.3, Table 11.9	OM3 – Amenity Planting and aesthetic streetscape design of hard landscaping for Pedestrian Walkway, Roadside - Roadside amenity planting should be provided along Sha Ling Road, Lin Ma Hang Road, as well as the internal road within Sandy Ridge columbarium and crematorium site; to enhance the landscape quality of the existing and proposed transport routes. Climbers are proposed to cover vertical, hard surfaces of the piers of the proposed viaducts, and also the newly formed retaining wall within the site. Shade tolerant plants will be planted, where light is sufficient, to improve aesthetic value of areas under viaducts.	Minimise visual impact and also enhance landscape.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	<ul style="list-style-type: none"> Guidelines on Greening of Noise Barriers, issued April 2012, GLTMS, DevB DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features 	Implemented
S11.8.1.3, Table 11.9	OM4 – Greening Works and Contour Grading Works on Cut/ Fill Slopes - Greening works such as hydroseeding/ terraces of shrub or tree planting will be provided where slope gradient allows, according to Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.	Implemented
S11.8.1.3, Table 11.9	OM5 – Landscape design treatment to be provided by relevant government department.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-	Implemented after handover to the relevant department
S11.8.1.3, Table 11.9	OM6 – Architectural and chromatic treatment of the hard architectural and engineering structures and facilities.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-	Implemented after handover to the relevant department
S11.8.1.3, Table 11.9	OM7 – Aesthetic design of the proposed noise barriers.	Mitigate the visual impact	Funded by CEDD and implemented by Contractor	Along Sha Ling Road and Lin Ma Hang Road	Construction phase	<ul style="list-style-type: none"> WBTC No. 36/2004 - ACABAS - submission is required to ACABAS for approval of any bridges and associated structures within the public highway 	Implemented

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SI1.8.1.3 , Table 11.9	OM8 - Silt traps should also be incorporated into design of road gullies for the natural water stream(s).	Minimise the landscape impact on natural stream	Funded by CEDD and implemented by Contractor	Within Project Site	Construction Phase	system.	Implemented

Notes:

- A detailed Tree Survey Report showing all identified valuable trees and OVT will be undertaken in a separate Tree Preservation and Removal Proposal.
- Wood resulting from tree removal should be recycled as mulch or soil conditioner for re-use within the Project or in other projects as far as possible e.g. for the construction of soft landscape work, were practical.
- Contractor is responsible for landscaping during the agreed establishment and maintenance period. Other designated management and maintenance agents to take up maintenance and management of landscaping after end of agreed period
- Highways Department (HyD) is responsible for maintenance and management of landscaping of public road side slope, Leisure and Cultural Services Department (LCSD) is responsible for the management and maintenance of soft landscapes along non-expressway public roads outside Country Park and Food and Environmental Hygiene Department (FEHD) is responsible for maintenance and management of landscaping of other areas allocated to FEHD..
- The landscape mitigation treatment of the future development site shall follow the below frameworks:
 - Buffer planting shall be provided to soften the edge of the site.
 - Aesthetic landscape treatment including both soft and hard landscape features shall be provided.
 - Vertical greening shall be provided as far as practicable.
 - At-grade tree planting shall be provided as far as possible while planting space is allowed, to enhance the overall environment.
 - Architectural design shall blend in with the surrounding environment.
 - Overall greening ratio shall comply with TC(W) No.3/2012 Site coverage of Greenery for Government Building Projects.

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The compensatory woodland planting shall be included woodland mixed whips, seeding, and shrubs. The principle of the location shall be the extension of the existing woodland, as well as the original lost woodland location. The proposal will be agreed with AFCD, the woodland enhancement planting shall refer to Chapter 9.

EM&A Project

SI13.1.1.1 , SI13.2.1.2	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control Performance	Highways Department	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO	Implemented
SI13.2.1.1 – SI13.4.1.2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Highways Department / Contractor	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO	Implemented