

- Investigation

Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – April 2025

May 2025

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Agreement No. CE 59/2020 (EP) Environmental Monitoring and Audit for Disposal Facility to the East of Sha Chau (2021-2026) – Investigation

Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – April 2025

May 2025



100 July



Dredging, Management and Capping of Contaminated Sediment Disposal

Facility at Sha Chau

Environmental Certification Sheet

Environmental Permit No. EP-312/2008/A

Reference Document /Plan

Monthly EM&A Report for Contaminated Mud Pits to the Document/Plan to be Certified/ Verified:

East of Sha Chau - April 2025

Date of Report:

7 May 2025

Date prepared by ET:

7 May 2025

Date received by IA:

7 May 2025

Reference EP Condition

Environmental Permit Condition:

Condition 3.4 of EP-312/2008/A:

4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 10 working days after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be verified by the Independent Auditor. Additional copies of the submission shall be provided to the Director upon request by the Director.

ET Certification

I hereby certify that the above referenced document/plan complies with the above referenced condition of EP-312/2008/A.

Ir Thomas Chan,
Environmental Team Leader (ETL):

Date: 7 May 2025

IA Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of EP-312/2008/A.

Dr Wang Wen Xiong, Independent Auditor (IA):

Date: 7 May 2025

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	May 2025	Various	Sunny Chan	Thomas Chan	Revision A of Submission
В	May 2025	Various	Sunny Chan	Thomas Chan	Revision B of Submission

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Contents

1	Intro	eduction	1
	1.1	Background	1
	1.2	Reporting Period	2
	1.3	Details of Sampling and Laboratory Testing Activities	2
	1.4	Details of Outstanding Sampling or Analysis	2
2	Brie	f Discussion of Monitoring Results for ESC CMP V	3
	2.1	Introduction	3
	2.2	Water Column Profiling of ESC CMP Vb – in April 2025	3
		2.2.1 In-situ Measurements	3
		2.2.2 Laboratory Measurements for Suspended Solids (SS)	3
	2.3	Routine Water Quality Monitoring of ESC CMPs – in April 2025	3
		2.3.1 In-situ Measurements	4
		2.3.2 Laboratory Measurements	4
	2.4	Pit Specific Sediment Chemistry of ESC CMP Vb – in April 2025	4
3	Futu	ire Key Issues	6
	3.1	Activities Scheduled for the Next Reporting Period	6
	3.2	Study Programme	6
Tab	les		
Table	e 1.1	Works Schedule for ESC CMP V	
Figu	ıres		
Figur	e 2.1	Routine & Capping Water Quality Sampling Stations (Ebb-Tide) for ESC CMF	's
Figur	e 2.2	Pit Specific Sediment Quality Monitoring Stations for CMP V	

Appendices

Appendix A Sampling Schedule

Appendix B Water Quality Monitoring Results

Appendix C Graphical Presentations

Appendix D Study Programme

1 Introduction

1.1 Background

The Civil Engineering and Development Department (CEDD) is managing a number of marine disposal facilities in Hong Kong waters, including the Contaminated Mud Pits (CMPs) to the East of Sha Chau (ESC) for the disposal of contaminated sediment, and various open-sea disposal grounds located to the South of Cheung Chau (SCC), East of Tung Lung Chau (ETLC) and East of Ninepins (ENP) for the disposal of uncontaminated sediment.

Environmental Permits (EPs) (Ref. No. EP-312/2008/A) was issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for the Project - Disposal of Contaminated Sediment – Dredging, Management and Capping of Sediment Disposal Facility at Sha Chau.

Under the requirements of the EP, EM&A programmes which encompass water and sediment chemistry, fisheries assessment, tissue and whole body analysis, sediment toxicity and benthic recolonisation studies as set out in the EM&A Manuals are required to be implemented. EM&A programmes have been continuously carried out during the operation of the CMPs at ESC. A review of the collection and analysis of such environmental data from the monitoring programme demonstrated that there had not been any adverse environmental impacts resulting from disposal activities. The current programme will assess the impacts resulting from dredging, disposal and capping operations of CMP V.

A proposal on the change of number of sample replication of water quality and sediment monitoring as well as combination of routine water quality monitoring and water quality monitoring during capping operation was submitted to EPD and agreed by EPD on 3 December 2020. The proposed changes have been effective for the EM&A activities since December 2020. In early 2022, after implementing the Phase 1 optimisation for at least one year, a further data review was conducted. The monitoring data has been reviewed and demonstrated that the data robustness and representativeness are maintained. Therefore, a technical note presenting the data review results served as a supplementary information was submitted to EPD and presented that Phase 2 optimization of sample replication of water quality and sediment monitoring for the Project will be implemented in 2022. EPD expressed no comment on the review and note the implementation of Phase 2 optimization of sample replication on 18 May 2022, and thus this optimization has been effective for the EM&A activities since July 2022.

The latest sampling schedule is provided in **Appendix A**.

The present EM&A programme under Agreement No. CE 59/2020 (EP) covers the dredging, disposal and capping operations of the ESC CMP V (see **Appendix A** for the EM&A programme.) Detailed works schedule for ESC CMP V is shown in **Table 1.1**. In April 2025, the following works were undertaken:

- Disposal of contaminated mud at ESC CMP Vb; and
- Capping operations at ESC CMP Vd.

¹ ERM (2013) Final Report. Submitted under Agreement No. CE 4/2009 (EP) Environmental Monitoring and Audit for Contaminated Mud Pit at East Sha Chau. For CEDD.

² ERM (2017) Final Report. Submitted under Agreement No. CE 23/2012 (EP) Environmental Monitoring and Audit for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012 - 2017). For CEDD.

Table 1.1: Works Schedule for ESC CMP V

Pit	Operation					20	21										2	022						Т						202:	3					Т					2	024												2025						2	026	
FIL	Operation	Ap	e Ma	y Ju	ı Ju	i Au	g So	ep (Oct N	lov	Dec	ğ	Feb	Mar	Apr	May	Jur	Jul	Aug	g Sep	Oct	No	v De	c Ja	n Fe	b M	ar Ap	r Ma	ay Ji	un J	ul A	ug S	ер О	ct No	ov De	c Ja	n Fe	b Ma	r Ap	er Ma	y Ju	ı Ju	il Au	g Sep	00	t No	v De	sc Ja	n F	eb N	lar A	pr Ma	ay J	un Ju	il Au	g Se	p Oct	Nov	Dec	Jan	Feb	Aar
	Dredging	Т	Т	Т	Т	Т	Т	Т	Т	П					Г	Г	Г	Г	Г	Т	Г	Г	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Г	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т					П.
ESC CMP V	Disposal				Т		Т																Т		Т	Т		Т								Т						П			Г				Т													
	Capping		Т	Т	Т	Т	Т	Т		П					Г	Г	Г	П	Г	Т	П	Г	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	П				

1.2 Reporting Period

This Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – April 2025 covers the EM&A activities for the reporting period of April 2025 (from 1 to 30 April 2025).

1.3 Details of Sampling and Laboratory Testing Activities

The following monitoring activities were undertaken for ESC CMP V during the reporting period:

- Water Column Profiling of ESC CMP Vb;
- · Routine Water Quality Monitoring of ESC CMPs; and
- Pit Specific Sediment Chemistry of ESC CMP Vb.

1.4 Details of Outstanding Sampling or Analysis

No outstanding sampling remained for the reporting month (April 2025).

2 Brief Discussion of Monitoring Results for ESC CMP V

2.1 Introduction

This section presents a brief discussion of the results obtained from the following monitoring activities for ESC CMP V during the reporting period:

- Water Column Profiling of ESC CMP Vb;
- Routine Water Quality Monitoring of ESC CMPs; and
- Pit Specific Sediment Chemistry of ESC CMP Vb.

2.2 Water Column Profiling of ESC CMP Vb – in April 2025

Water Column Profiling was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 2 April 2025. The monitoring results have been assessed for compliance with the Water Quality Objectives (WQOs) set by Environmental Protection Department (EPD). This consists of a review of the EPD routine water quality monitoring data for the wet season period (April to October) of 2014 – 2023 from stations in the North Western Water Control Zone (WCZ), where the ESC CMPs are located.³ For Salinity, the averaged value obtained from the Reference (Upstream) station was used for the basis as the WQO. Levels of Dissolved Oxygen (DO) and Turbidity were also assessed for compliance with the Action and Limit Levels (see **Table B1** of **Appendix B** for details).

2.2.1 In-situ Measurements

Analyses of results for April 2025 indicated that levels of Salinity, pH and DO complied with the WQOs at both Downstream and Upstream stations (**Table B2** of **Appendix B**). Levels of DO and Turbidity at all stations complied with the Action and Limit Levels (**Tables B1 and B2** of **Appendix B**).

2.2.2 Laboratory Measurements for Suspended Solids (SS)

Analyses of results for April 2025 indicated that the SS level at Downstream station was higher than the WQO while the SS level at Upstream station complied with the WQO. However, both SS levels at Upstream and Downstream stations complied with the Action and Limit Levels (**Tables B1 and B2** of **Appendix B**).

Overall, the monitoring results indicated that the mud disposal operation at ESC CMP Vb did not appear to cause any deterioration in water quality during this reporting period.

2.3 Routine Water Quality Monitoring of ESC CMPs – in April 2025

Routine Water Quality Monitoring of ESC CMPs was undertaken on 1 April 2025. The monitoring results have been assessed for compliance with the WQOs (see **Section 2.2** above for details). The monitoring results are shown in **Tables B3**, **B4 and B5** of **Appendix B** and **Figures 1 to 11** of **Appendix C**. A total of sixteen (16) monitoring stations were sampled in April 2025 as shown in **Figure 2.1**.

³ http://epic.epd.gov.hk/EPICRIVER/marine/?lang=en

2.3.1 In-situ Measurements

Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in **Figures 1 to 6** of **Appendix C**. Analyses of results indicated that the levels of pH, and DO complied with the WQOs at all stations in April 2025.

The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (**Table B3** of **Appendix B**; **Figures 3 and 6** of **Appendix C**).

Overall, *in-situ* measurement results of the Routine Water Quality Monitoring indicated that the disposal and capping operation at ESC CMPs did not appear to cause any unacceptable impacts in water quality in April 2025.

2.3.2 Laboratory Measurements

Laboratory analysis of samples obtained in April 2025 indicated that the concentrations of Arsenic, Cadmium, Chromium, Copper, Lead, Nickel and Zinc were detected in the samples at some/ all stations and their concentrations were generally similar across stations; except the concentration of Silver were only detected at Reference, Impact and Intermediate stations; and the concentration of Zinc were slightly higher at Ma Wan station (**Table B4** of **Appendix B**; **Figure 7** and 8 of **Appendix C**).

For nutrients, concentrations of Total Inorganic Nitrogen (TIN) were lower than the WQO (0.5 mg/L) at all stations. (**Table B5** of **Appendix B**; **Figure 9** of **Appendix C**). The concentrations of Ammonia Nitrogen (NH3-N) were similar across all stations while the concentrations of Biochemical Oxygen Demand (BOD5) were slightly higher at Reference station. (**Table B5** of **Appendix B**; **Figure 9 and 10** of **Appendix C**)

Analyses of results for the reporting period indicated that the SS levels complied with the Action and Limit Levels at all stations, except SS levels were slightly higher than wet season WQO (11.8 mg/L) at Reference (RFE), Impact (IPE) and Intermediate (INE) stations. (**Tables B1 and B5** of **Appendix B**; **Figure 11** of **Appendix C**).

Based on the available results of the Routine Water Quality Monitoring which indicated that the disposal and capping operation at ESC CMPs did not appear to cause any unacceptable deterioration in water quality during the reporting period. Detailed statistical analysis will be presented in the Quarterly EM&A Report to investigate any spatial and temporal trends of potential concern.

2.4 Pit Specific Sediment Chemistry of ESC CMP Vb – in April 2025

Monitoring locations for Pit Specific Sediment Chemistry for ESC CMP Vb are shown in **Figure 2.2**. A total of six (6) monitoring stations were sampled on 3 April 2025.

The concentrations of most inorganic contaminants were lower than the Lower Chemical Exceedance Levels (LCELs) at all stations, except for Copper and Silver at Active-Pit stations. The concentrations of Copper were higher than the LCEL at Active-Pit station ESC-NPCB; and higher than Upper Chemical Exceedance Levels (UCELs) at Active-Pit stations ESC-NPCA. The concentrations of Silver were higher than the LCEL at Active-Pit stations ESC-NPCA and ESC-NPCB. (Figures 12 and 13 of Appendix C)

Considering that the higher levels of Copper and Silver occurred within Active-Pit station only but not at the Pit-Edge and Near-Pit stations, there is no evidence indicating any unacceptable environment impacts to sediment quality as a result of the contaminated mud disposal operation at ESC CMP Vb in April 2025.

For organic contaminants, the concentrations of Total Organic Carbon (TOC) were higher at Active-Pit stations ESC-NPCA and ESC-NPCB. (**Figure 14** of **Appendix C**). The concentrations

of Low Molecular Weight Polycyclic Aromatic Hydrocarbons (PAHs) were lower than LCEL (Lower Chemical Exceedance Level) at all stations. (**Figure 15** of **Appendix C**) The concentrations of High Molecular Weight Polycyclic Aromatic Hydrocarbons (PAHs) were higher than LCEL at Pit-Edge station ESC-NECA. (**Figure 15** of **Appendix C**)

The concentration of Tributyltin (TBT) were higher at Active-Pit station ESC-NPCA. (**Figure 16** of **Appendix C**) The concentration of Total Polychlorinated Biphenyls (PCBs), Total dichlorodiphenyl-trichloroethane (DDT) and 4,4'-dichlorodiphenyldichloroethylene (DDE) were below the limit of reporting at all stations during the reporting period.

It is observed that the elevated level concentration of High Molecular Weight PAHs higher than LCEL only occurred at Pit-Edge station ESC-NECA, but the concentrations of other organic and all inorganic contaminants were lower than the LCELs at the Pit-Edge stations.

The slightly elevated level of High Molecular Weight PAH at Pit-Edge station are possible induced by external factors rather than disposal operations. Therefore, there is no evidence indicating any unacceptable environmental impacts to sediment quality outside the pit area as a result of the contaminated mud disposal operations at ESC CMP Vb during the reporting period.

Therefore, there is no evidence indicating any unacceptable environmental impacts to sediment quality outside the pit area as a result of the contaminated mud disposal operations at ESC CMP Vb during the reporting period.

Statistical analysis will be undertaken and presented in the corresponding Quarterly EM&A Report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.

3 Future Key Issues

3.1 Activities Scheduled for the Next Reporting Period

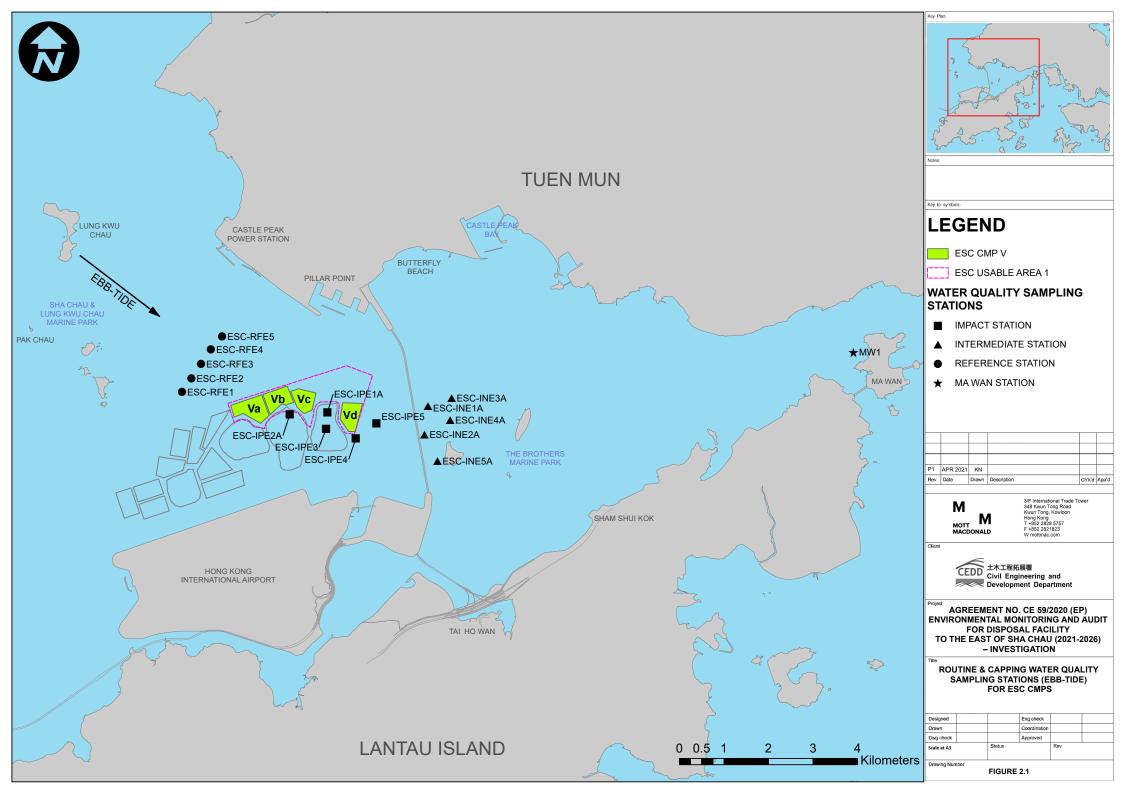
The following monitoring activities will be conducted in the next reporting period of May 2025 for ESC CMP V (see **Appendix A** for the sampling schedule):

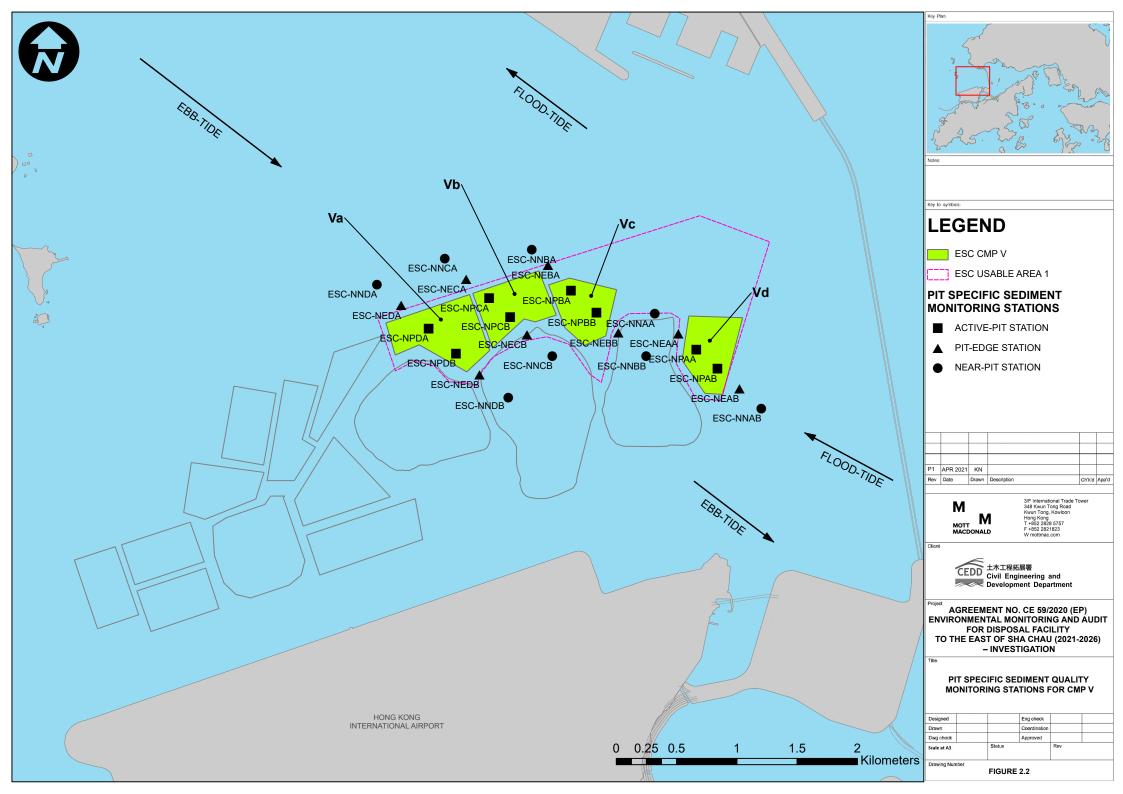
- Water Column Profiling of ESC CMP Vb;
- Routine Water Quality Monitoring of ESC CMPs; and
- Pit Specific Sediment Chemistry of ESC CMP Vb.

3.2 Study Programme

A summary of the Study Programme is presented in **Appendix D**.

Figures





Appendices

Appendix A Sampling Schedule

Appendix B Water Quality Monitoring Results

Appendix C Graphical Presentations

Appendix D Study Programme

Appendix A. Sampling Schedule

East of Sha Chau CMPs Environmental Monitoring and Audit Sampling Schedule (January 2021 - March 2026)

Parameter / Station Type Pit Specific Sediment Ch		Frequency	2021 2022 2023 2024 2025 2026 2025 2026 20
Active-Pit Pit-Edge	ESC-NPAA ESC-NPAB	Monthly Monthly	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
Near-Pit	ESC-NEAA ESC-NEAB	Monthly Monthly	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
	ESC-NNAA ESC-NNAB	Monthly Monthly	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
Cumulative Impact Sedin Near-field Stations	ESC-RNA	4 times per year	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
Mid-field Stations		4 times per year	6 6 6 6 6 2
Capped Pit Stations		4 times per year	6 6 6 6 6 6 2 2 2 2
Far-field Stations	ESC-RCB1 ESC-RFA ESC-RFB	4 times per year 4 times per year 4 times per year	6 6 6 6 6 6 2 2 2 2
Ma Wan Station	MW1	4 times per year	6 6 6 6 6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Sediment Toxicity Tests Near-pit Stations	ESC-TDA	2 times per year	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
Reference Stations	ESC-TDB1	2 times per year	
Ma Wan Station	ESC-TRB	2 times per year	
Tissue / Whole Body San Near-pit Stations		z umos por your	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Au
Reference North	ESC-INA ESC-INB	2 times per year 2 times per year	
Reference South	TNA TNB	2 times per year 2 times per year	
	TSA TSB	2 times per year 2 times per year	
Demersal Trawling Near-pit Stations	ESC-INA ESC-INB	4 times per year 4 times per year	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul
Reference North	TNA TNB	4 times per year 4 times per year 4 times per year	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Reference South	TSA TSB	4 times per year 4 times per year 4 times per year	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Capping * Ebb Tide			Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Au
Impact Station Downcurr	ESC-IPE1A	4 times per year * 4 times per year * 4 times per year *	
Intermediate Station Dow	ESC-IPE4 ESC-IPE5	4 times per year * 4 times per year *	
	ESC-INE1A ESC-INE2A ESC-INE3A	4 times per year * 4 times per year * 4 times per year *	
Reference Station Upcur	ESC-INE5A	4 times per year * 4 times per year *	
	ESC-RFE2 ESC-RFE3	4 times per year * 4 times per year * 4 times per year *	
Ma Wan Station	ESC-RFE4 ESC-RFE5	4 times per year * 4 times per year *	
Flood Tide Impact Station Downcurr		4 unies per year	
	ESC-IPF1 ESC-IPF2 ESC-IPF3	4 times per year * 4 times per year * 4 times per year *	
Intermediate Station Dow	ESC-INF1 ESC-INF2	4 times per year * 4 times per year *	
Reference Station Upcur	ESC-RFF1A	4 times per year * 4 times per year * 4 times per year *	
Ma Wan Station		4 times per year *	
Routine Water Quality Me			Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Au
Impact Station Downcurr	ESC-IPE1A ESC-IPE2A	Monthly*	4 4
Intermediate Station Dow	ESC-IPE3 ESC-IPE4 ESC-IPE5	Monthly* Monthly* Monthly*	4 4
Station Dow	ESC-INE1A ESC-INE2A ESC-INE3A	Monthly*	4 4
Reference Station Upcur	ESC-INE4A ESC-INE5A	Monthly* Monthly*	
	ESC-RFE1 ESC-RFE2 ESC-RFE3	Monthly* Monthly* Monthly*	4 4 4 4 4 4 4 4 2
Ma Wan Station	ESC-RFE5 MW1	Monthly* Monthly*	4 4
Flood Tide Impact Station Downcurr	rent		
	ESC-IPF1 ESC-IPF2 ESC-IPF3	Monthly* Monthly* Monthly*	4 4
Intermediate Station Dow	ESC-INF1 ESC-INF2 ESC-INF3	Monthly* Monthly* Monthly*	4 4 4 4 4 4 4 4 4 4 4 4 4 4 2 2 2 2 2 2
Reference Station Upcur		Monthly*	4 4
Ma Wan Station	ESC-RFF3	Monthly*	4 4
Water Column Profiling *			Jani Febi Mari Apri May Juni Juli Aug Sepi Octi Nov Dec Jani Febi Mari Apri May Juni J
Ponthis Parallel III	WCP1 WCP2	Monthly* Monthly*	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Benthic Recoloinisation Capped Stations at CMP	V ESCV-CPA	2 times per year 2 times per year	Jan Feb Mar Apr May Jun Jun Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Apr Apr May Jun Jul Aug Sep Oct Apr Apr Apr May Apr
Reference Stations	ESCV-CPC	2 times per year 2 times per year 2 times per year	
	RBA RBB RBC1	2 times per year 2 times per year 2 times per year	
Impact Monitoring for Dr Upstream Stations			Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apri May Jun Jul Aug Sep
Downstream Stations	US1 US2	3 times per week	
	DS1 DS2 DS3 DS4	3 times per week 3 times per week 3 times per week 3 times per week	
Ma Wan Station	DS5 MW1	3 times per week 3 times per week 3 times per week	
	IVIVV I		

Notes:
(1) The number shown in each cell represents the numbers of replicates per monitoring station. The number shown in green boided text represented monitoring works have been conducted before/ during the reporting period of this Monthly EM&A Report, while the number shown in black represent planned monitoring works after the reporting period of this Monthly EM&A Report, while the number shown in black represent planned monitoring works after the reporting period of this Monthly EM&A Report.

⁽²⁾ For the planned Routine Water Quality Monitoring (i.e. the numbers of replicates per monitoring station shown in black), the monitoring will be conducted at mid-ebb OR mid-flood tide. The yearly tidal selection of this monitoring will be based on a principle to obtain 6 months monitoring data at mid-ebb, and 6 months monitoring data at mid-flood.

⁽³⁾ Impact Monitoring for Dredging will be scheduled when dredging operations commence.

⁽³⁾ impact Monitoring for Dredging will be scheduled when dredging operations commence.

(4) Benthic Recolonisation Studies for CMP V will be scheduled when capping operation for CMP V is completed.

Remarks:

A proposal on the change of number of sample replication of water quality & sediment monitoring and combination of routine water quality monitoring during capping operation was submitted to EPD and agreed by EPD on 3 December 2020. The proposed changes have been implemented for the EM&A activities since December 2020. Water Quality Monitoring during Capping Operation and Routine Water Quality Monitoring are combined such that Routine Water Quality Monitoring have been conducted monthly starting in December 2020. A technical note presenting the data review results served as a supplementary information was submitted to EPD and presented that Phase 2 optimization of sample replication of water quality and sediment monitoring for the Project will be implemented in 2022 was provided to EPD in April 2022. Phase 2 optimization of sample replication induced by the panderine which adversely affecting the supply of international species adopted in testing programme of Sediment Toxicity! Tests, as such; Tests as explained and such sediments and such that Place 2022.

* To enable the required Research Fishing Permit could be granted by the time undertaking the Demersal Trawling, trawling originally scheduled in July and August 2022 was postponed to August and September 2022.

Appendix B. Water Quality Monitoring Results



Table B1: Action and Limit Levels of Water Quality for Dredging, Disposal and Capping Activities at ESC CMP V

Parameters	Action	Limit				
Dissolved Oxygen (DO)	Surface and Middle Depth ⁽²⁾	Surface and Middle Depth ⁽²⁾				
in mg L ⁻¹ (Surface, Middle & Bottom) ⁽¹⁾	5%-ile of baseline data for surface and middle layer = 3.76	1%-ile of baseline data for surface and middle layer = 3.11 ⁽³⁾				
	and	and				
	Significantly less than the reference station's mean DO (at the same tide of the same day)	Significantly less than the reference station's mean DO (at the same tide of the same day)				
	Bottom	Bottom				
	5%-ile of baseline data for surface and middle layer = 2.96	The average of the impact station readings are < 2				
	and	and				
	Significantly less than the reference station's mean DO (at the same tide of the same day)	Significantly less than the reference station's mean DO (at the same tide of the same day)				
Suspended Solids (SS) in mg L ⁻¹	95%-ile of baseline data for depth- averaged = 37.88	99%-ile of baseline data for depth- averaged = 61.92				
(depth-averaged) ⁽⁵⁾	and	and				
	120% of control station's SS at the same tide of the same day	130% of control station's SS at the same tide of the same day				
Turbidity	95%-ile of baseline data = 28.14	99%-ile of baseline data = 38.32				
in NTU	and	and				
(depth-averaged) ⁽⁴⁾⁽⁵⁾	120% of control station's Turbidity at the same tide of the same day	130% of control station's Turbidity at the same tide of the same day				

Notes:

- 1. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- 2. Action and Limit Levels for DO for Surface and Middle layers were calculated from the combined pool of baseline surface layer data and baseline middle layer data.
- 3. Given the Action Level for DO for Surface and Middle layers has already been lower than 4 mg L⁻¹, it is proposed to set the Limit Level at 3.11 mg L⁻¹ which is the first percentile of the baseline data.
- 4. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- 5. For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.



Table B2: Water Column Profiling Results for ESC CMP Vb in April 2025

Station	Temp.	Salinity	Turbidity	Dissolve	ed Oxygen	рН	Suspended Solids
	(°C)	(ppt)	(NTU)	(%)	(mg L ⁻¹)		(mg L ⁻¹)
WCP 1 (Downstream)	19.41	30.99	13.98	88.73	6.79	8.01	18.0
WCP 2 (Upstream)	19.28	30.78	8.70	90.34	6.94	8.00	7.0
WQO (Wet Season)	N/A	27.70-33.85#	N/A	N/A	>4	6.5-8.5	11.8

Notes:

- 1. *Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.
- 2. Cell shaded yellow / red indicates value exceeding the Action/Limit levels.
- 3. Cell shaded grey indicates value exceeding the WQO.

Table B3: In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in April 2025

Station	Temp.	Salinity	Turbidity	Dissolv	ed Oxygen	pН
	(°C)	(ppt)	(NTU)	(%)	(mg L ⁻¹)	
RFE (Reference)	19.32	30.87	9.68	93.43	7.17	8.11
IPE (Impact)	19.28	30.75	16.15	93.25	7.17	8.10
INE (Intermediate)	19.45	30.86	11.41	92.93	7.11	8.07
Ma Wan	19.74	31.61	5.57	92.16	6.99	8.03
WQO (Wet Season)	N/A	27.78-33.95#	N/A	N/A	>4	6.5-8.5

Notes:

- 1. *Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.
- 2. Cell shaded yellow / red indicates value exceeding the Action/Limit levels.
- 3. Cell shaded grey indicates value exceeding the WQO.



Table B4: Laboratory Results for Dissolved Metals and Metalloid in Routine Water Quality Monitoring of ESC CMPs in April 2025

Station	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Zn
	(µg/L)								
RFF	1.43	0.03	0.10	0.53	0.01	ND	0.64	0.01	0.75
IPF	1.49	0.03	0.09	0.55	0.01	ND	0.67	0.03	0.27
INF	1.47	0.02	0.11	0.65	0.02	ND	0.67	0.01	0.40
Ma Wan	1.53	0.03	0.08	0.45	0.01	ND	0.51	ND	1.38

Note:

Table B5: Laboratory Results for Nutrients and Suspended Solid in Routine Water Quality Monitoring of ESC CMPs in April 2025

Station	NH ₃	TIN	BOD ₅	SS
	(mg/L)	(mg/L)	(mg/L)	(mg/L)
RFE	0.05	0.24	0.85	13.2
IPE	0.05	0.25	0.72	27.4
INE	0.06	0.26	0.66	18.0
Ma Wan	0.08	0.25	0.70	6.5

WQO of TIN: 0.5 mg/L Wet Season WQO of SS: 11.8 mg/L

Notes:

- 1. "<LOR" indicates the concentrations of contaminants are below the limit of reporting.
- 2. Cell shaded yellow / red indicates value exceeding the Action/Limit levels.
- 3. Cell shaded grey indicates value exceeding the WQO.
- Cell shaded yellow / red indicates value exceeding the Action/Limit levels.
- 5. Cell shaded grey indicates value exceeding the WQO.

^{1. &}quot;ND" indicates the concentrations of metals and metalloids are not detected.

Appendix C. Graphical Presentations





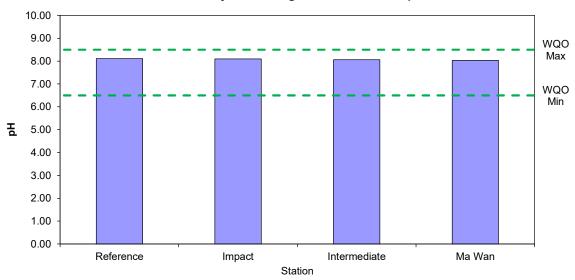


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

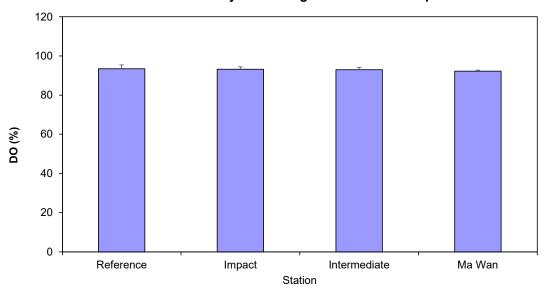


Figure 2: Level of Dissolved Oxygen (DO) (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



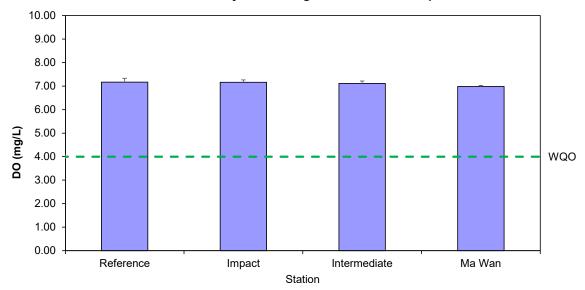


Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

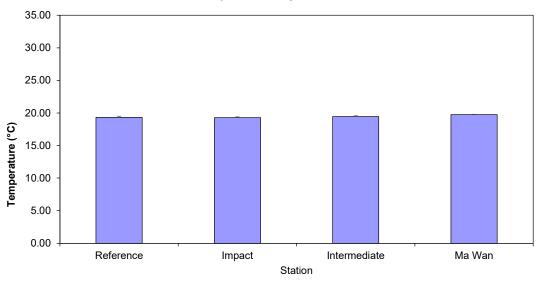


Figure 4: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



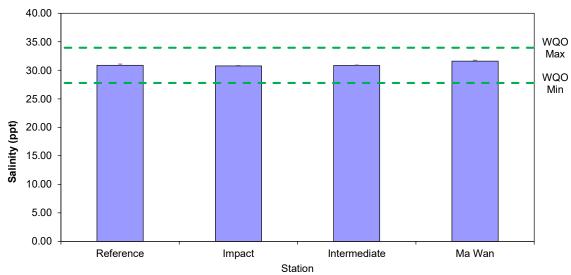


Figure 5: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

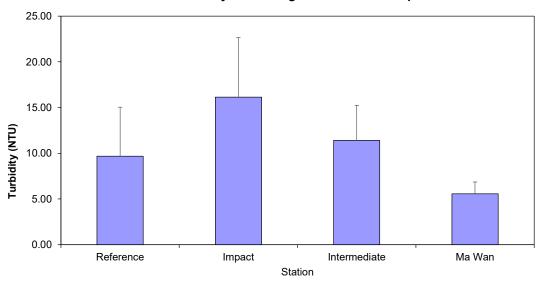


Figure 6: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



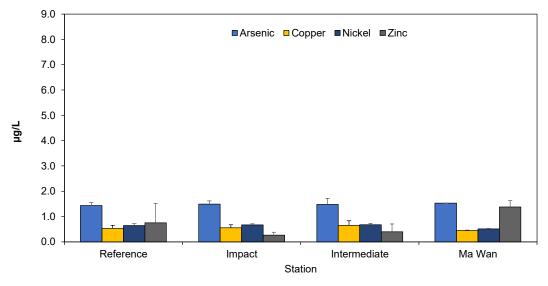


Figure 7: Concentration of Arsenic, Copper, Nickel, and Zinc (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

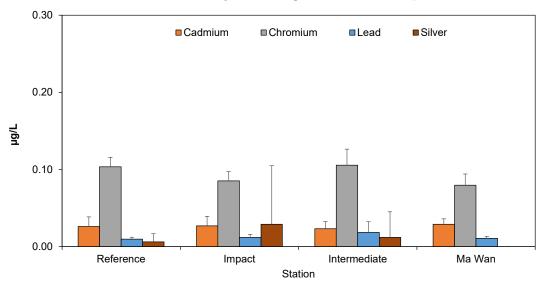


Figure 8: Concentration of Cadmium, Chromium, Lead and Silver, (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025



Routine Water Quality Monitoring for Nutrients - April 2025

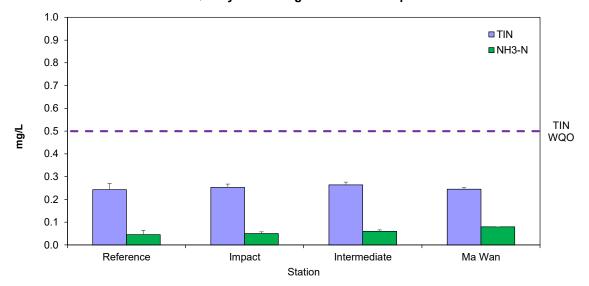


Figure 9: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen (NH3-N) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

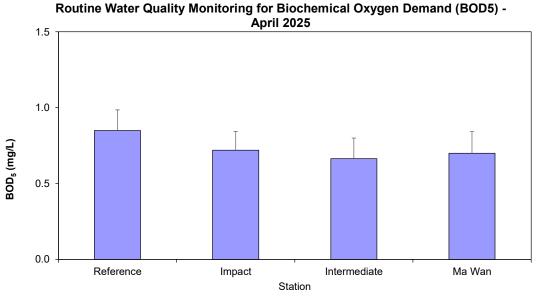


Figure 10: Level of Biochemical Oxygen Demand (BOD5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025



Routine Water Quality Monitoring for Suspended Solids - April 2025

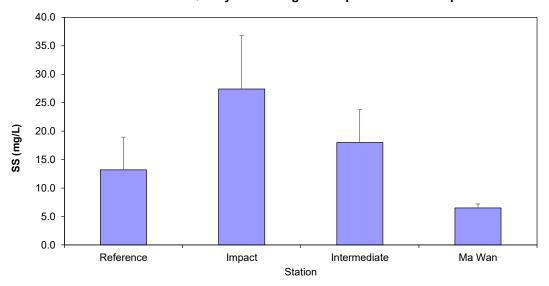


Figure 11 Concentration of Suspended Solids (SS) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in April 2025

Pit Specific Sediment Chemistry for Metal and Metalloid Contaminants at ESC CMP Vb - April 2025

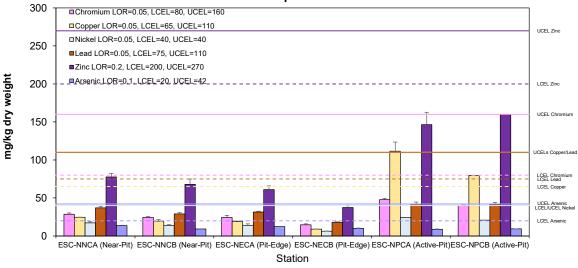


Figure 12: Concentration of Metals and Metalloid (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in April 2025

The LCEL and UCEL of Cadmium, Mercury and Arsenic have been updated according to the standard promulgated starting from 19 January 2024. https://www.cedd.gov.hk/filemanager/eng/content_80/PAH 2022 Chapter 4 Rev 06_240321_Clean.pdf



Pit Specific Sediment Chemistry for Metal Contaminants at ESC CMP Vb - April

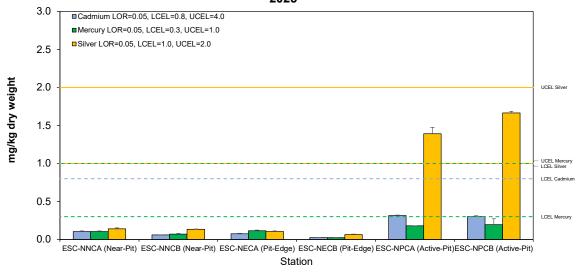


Figure 13: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in April 2025

Pit Specific Sediment Chemistry for Total Organic Carbon (TOC) at ESC CMP Vb - April 2025

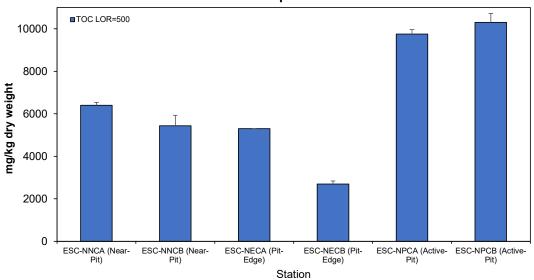


Figure 14: Concentration of Total Organic Carbon (TOC) (mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in April 2025



Pit Specific Sediment Chemistry for Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) at ESC CMP Vb - April 2025

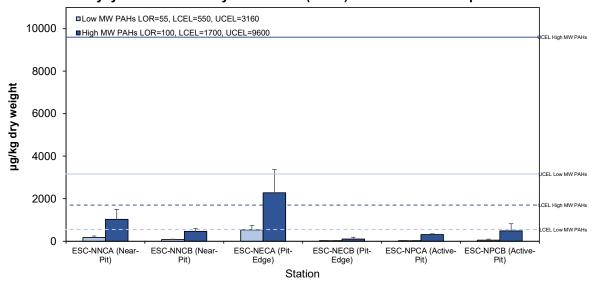


Figure 15: Concentration of Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (μg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in April 2025

Pit Specific Sediment Chemistry for Tributyltin (TBT) at ESC CMP Vb - April 2025

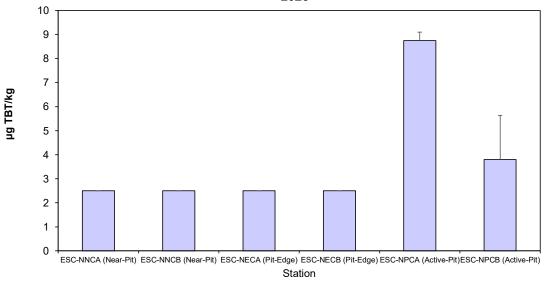


Figure 16: Concentration of Tributyltin (TBT) (µg TBT/kg; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in April 2025

Appendix D. Study Programme

Study Programme

Agreement No. CE 59/2020 (EP) Environmental Monitoring and Audit for Disposal Facility to the East of Sha Chau (2021-2026) - Investigation

Mott MacDonald Hong Kong Limited

