

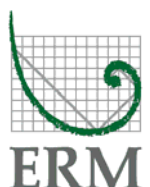
**Environmental Monitoring and Audit  
 for Contaminated Mud Pits to the  
 South of The Brothers and at East  
 Sha Chau (2012-2017) – Investigation  
 Agreement No. CE 23/2012(EP)**

**54<sup>th</sup> Monthly Progress Report for Contaminated  
 Mud Pits to the South of The Brothers and at  
 East Sha Chau – February 2017**

Draft (Revision 0)

March 2017

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# Environmental Monitoring and Audit for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012-2017) – Investigation




## 54<sup>th</sup> Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – February 2017

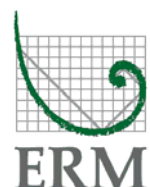
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Client: Civil Engineering and Development Department (CEDD)		Project No: 0175086			
Summary:  This document presents the 54 <sup>th</sup> monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau.		Date: 9 March 2017			
		Approved by:   Craig A. Reid Partner			
v0	54 <sup>th</sup> Monthly Progress Report for ESC CMPs and SB CMPs	RC	JT	CAR	09/03/17
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p> <div style="text-align: right;">    </div>			



**Dredging, Management and Capping of Contaminated Sediment Disposal  
Facility at Sha Chau and to the South of The Brothers**

**Environmental Certification Sheet  
EP-312/2008/A & EP-427/2011/A**

**Reference Document/Plan**

Document/ <del>Plan</del> -to be-Certified/ Verified:	54 <sup>th</sup> Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau - February 2017
Date of Report:	9 March 2017
Date prepared by ET:	9 March 2017
Date received by IA:	9 March 2017

**Reference EP Condition**

Environmental Permit Condition:

Condition 3.4 of EP-312/2008/A and Condition 4.4 of EP-427/2011/A:  
4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks 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 certified by the ET Leader and 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 and EP-427/2011/A

Craig A. Reid,  
Environmental Team Leader:

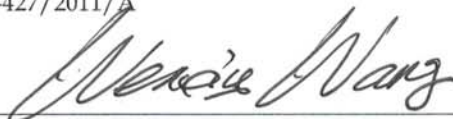


Date: 9/3/2017

**IA Verification**

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-312/2008/A and EP-427/2011/A

Dr Wang Wen Xiong,  
Independent Auditor:



Date: 9/3/2017

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**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) - Investigation**

**54<sup>TH</sup> MONTHLY PROGRESS REPORT FOR FEBRUARY 2017**

**1.1 BACKGROUND**

1.1.1 Since early 1990s, contaminated sediment <sup>(1)</sup> arising from various construction works (e.g. dredging and reclamation projects) in Hong Kong has been disposed of at a series of seabed pits at East of Sha Chau (ESC). In late 2008, a review indicated that the existing and planned facilities at ESC would not be able to meet the disposal demand after 2012. In order to meet this demand, the Hong Kong Special Administrative Region Government (HKSARG) decided to implement a new contained aquatic disposal (CAD) <sup>(2)</sup> facility at the South of The Brothers (SB CMPs) which had been under consideration for a number of years.

1.1.2 The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) study completed in 2005 under *Agreement No. CE 12/2002(EP)* <sup>(3)</sup>. The Director of Environmental Protection (DEP) approved this EIA report under the *Environmental Impact Assessment Ordinance (Cap. 499) (EIAO)* in September 2005 (*EIA Register No.: AEIAR-089/2005*).

1.1.3 In accordance with the EIA recommendation, prior to commencement of construction works for the SB CMPs, the Civil Engineering and Development Department (CEDD) undertook a detailed review and update of the EIA findings for the SB site <sup>(4)</sup>. Findings of the EIA review undertaken in 2009/2010 confirmed that the construction and operation of the SB site had been predicted to be environmentally acceptable.

(1) According to the Management Framework of Dredged/ Excavated Sediment of ETWB TC(W) No. 34/2002, contaminated sediment in general shall mean those sediment requiring Type 2 – Confined Marine Disposal as determined according to this TC(W).

(2) CAD options may involve use of excavated borrow pits, or may involve purpose-built excavated pits. CAD sites are those which involve filling a seabed pit with contaminated mud and capping it with uncontaminated material such that the original seabed level is restored and the contaminated material is isolated from the surrounding marine environment.<sup>7</sup>

(3) Detailed Site Selection Study for a Proposed Contaminated Mud Disposal Facility within the Airport East/ East of Sha Chau Area (*Agreement No. CE 12/2002(EP)*)

(4) Under the CEDD study *Contaminated Sediment Disposal Facility to the South of The Brothers (Agreement No. FM 2/2009)*

1.1.4 *Environmental Permits (EPs) (EP-312/2008/A and EP-427/2011/A)* were issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for ESC CMP V and on 23 December 2011 for SB CMPs, respectively. Under the requirements of the *EPs*, an Environmental Monitoring and Audit (EM&A) programme as set out in the *EM&A Manuals* <sup>(1) (2)</sup> is required to be implemented for the CMPs.

1.1.5 The present EM&A programme under *Agreement No. CE 23/2012 (EP)* covers the dredging, disposal and capping operations of the SB CMPs as well as ESC CMPs. Detailed works schedule for ESC CMPs and SB CMPs is shown in *Figure 1.1*. In February 2017, the following works were being undertaken:

- Disposal of contaminated mud at ESC CMP Vd.

**Figure 1.1 Works Schedule for ESC CMPs and SB CMPs**

Pit	Operation	2012			2013					2014					2015					2016					2017						
		S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
ESC CMP	Dredging																														
	Backfilling																														
	Capping																														
SB CMP 1	Dredging																														
	Backfilling																														
	Capping																														
SB CMP 2	Dredging																														
	Backfilling																														
	Capping																														

**1.2 REPORTING PERIOD**

1.2.1 This 54<sup>th</sup> Monthly Progress Report covers the EM&A activities for the reporting month of February 2017.

**1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES**

1.3.1 The following monitoring activities have been undertaken for ESC CMPs in February 2017:

- *Demersal Trawling* of ESC CMPs was undertaken on 8 and 9 February 2017;
- *Routine Water Quality Monitoring* of ESC CMPs was undertaken on 20 February 2017;
- *Cumulative Impact Sediment Chemistry* of ESC CMPs was undertaken on 21 and 23 February 2017;

(1) ERM (2012) Environmental Monitoring and Audit (EM&A) Manual. Final First Review. Environmental Monitoring and Audit for Contaminated Mud Pits to the South of the Brothers and at East Sha Chau (2012-2017) - Investigation. Agreement No. CE 23/2012(EP). Submitted to EPD in November 2012.  
 (2) ERM (2010) Environmental Monitoring and Audit (EM&A) Manual. Final Second Review. Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) - Investigation. Agreement No. CE 4/2009(EP). Submitted to EPD in November 2010.

- *Sediment Toxicity Test of ESC CMPs* was undertaken on 21 and 23 February 2017;
- *Pit Specific Sediment Chemistry of ESC CMP Vd* was undertaken on 24 February 2017; and
- *Water Column Profiling of ESC CMP Vd* was undertaken on 25 February 2017.

1.3.2 No monitoring activities were scheduled to be undertaken for SB CMPs in February 2017.

#### **1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS**

1.4.1 No outstanding sampling remained for February 2017.

1.4.2 A summary of field activities conducted are presented in *Annex A*. The following analyses are in progress and will be presented in the corresponding quarterly report:

- Species identification of the biota samples collected from *Demersal Trawling for ESC CMPs* in February 2017; and
- Laboratory analyses for *Sediment Toxicity Test* of ESC CMPs in February 2017.

1.4.3 The following laboratory analyses are in progress during the preparation of this monthly report and will be presented in the next monthly report once the data are available:

- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry of ESC CMP Vd* in February 2017; and
- Laboratory analyses of sediment samples collected for *Cumulative Impact Sediment Chemistry of ESC CMPs* in February 2017.

#### **1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS FOR ESC CMPs**

1.5.1 Brief discussion of the monitoring results of the following activities for ESC CMPs is presented in this 54<sup>th</sup> *Monthly Progress Report*:

- *Water Column Profiling of ESC CMP Vd* in February 2017; and
- *Routine Water Quality Monitoring of ESC CMPs* in February 2017.

1.5.2 *Water Column Profiling of ESC CMP Vd - February 2017*

1.5.3 *Water Column Profiling* was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 25 February 2017. 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 dry season period (November to March) of 2006 - 2015 from stations in the Northwestern Water Control Zone (WCZ), where the ESC CMPs are located <sup>(1)</sup>. 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 Annex B* for details).

*In-situ Measurements*

1.5.4 Analyses of results for February 2017 indicated that levels of DO and pH complied with the WQOs at both Downstream and Upstream stations (*Table B2 of Annex B*). In addition, DO and Turbidity at all stations complied with the Action and Limit Levels (*Tables B1 and B2 of Annex B*).

*Laboratory Measurements for Suspended Solids (SS)*

1.5.5 Analyses of results for February 2017 indicated that the SS levels complied with the WQO and the Action and Limit Levels at both Upstream and Downstream stations (*Tables B1 and B2 of Annex B*).

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

(1) <http://epic.epd.gov.hk/EPICRIVER/marine/?lang=en>



1.5.7 ***Routine Water Quality Monitoring of ESC CMPs – February 2017***

1.5.8 *Routine Water Quality Monitoring of ESC CMPs* was undertaken on 20 February 2017. The monitoring results have been assessed for compliance with the WQOs (see *Section 1.5.3* for details). The monitoring results are shown in *Tables B3 and B4 of Annex B* and *Figures 1 - 10 of Annex C*. A total of ten (10) monitoring stations were sampled in February 2017 as shown in *Figure 1.2*.

*In-situ Measurements*

1.5.9 Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in *Figures 1 - 6 of Annex C*. Analyses of results for February 2017 indicated that the levels of pH, Salinity and DO complied with the WQOs at all stations (Impact, Intermediate, Reference and Ma Wan stations) in February 2017 (*Table B3 of Annex B; Figures 1, 3 and 5 of Annex C*).

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

1.5.11 Overall, *in-situ* measurement results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable impacts in water quality in February 2017.

*Laboratory Measurements*

1.5.12 Laboratory analysis of February 2017 results indicated that concentrations of Cadmium, Chromium, Silver and Mercury were below their limit of reporting at all stations. Arsenic, Nickel, Lead, Copper and Zinc were detected in February 2017 samples and the concentrations of these metals and metalloids were similar amongst stations (*Table B4 of Annex B; Figure 7 of Annex C*).

1.5.13 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations in February 2017 were higher than the WQO (0.5 mg/L) (*Table B4 of Annex B; Figure 8 of Annex C*). It should be noted that due to the effect of Pearl River, the North Western WCZ has historically experienced higher levels of TIN<sup>(1)</sup>. Therefore, the exceedances of TIN WQO at these stations are unlikely to be caused by the disposal operation at ESC CMP Vd. Concentrations of Ammonia Nitrogen (NH<sub>3</sub>-N) were relatively similar amongst all stations (*Table B4 of Annex B; Figure 8 of Annex C*). Levels of 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) appear to be higher at Impact stations than at other stations in February 2017 (*Table B4 of Annex B; Figure 9 of Annex C*).

1.5.14 Analyses of results for February 2017 indicated that the SS levels complied with the WQO (13.2 mg/L for dry season) and the Action and Limit Levels at all stations (*Tables B1 and B4 of Annex B; Figure 10 of Annex C*).

(1) [http://www.epd.gov.hk/epd/misc/marine\\_quality/1986-2005/textonly/eng/index.htm](http://www.epd.gov.hk/epd/misc/marine_quality/1986-2005/textonly/eng/index.htm)

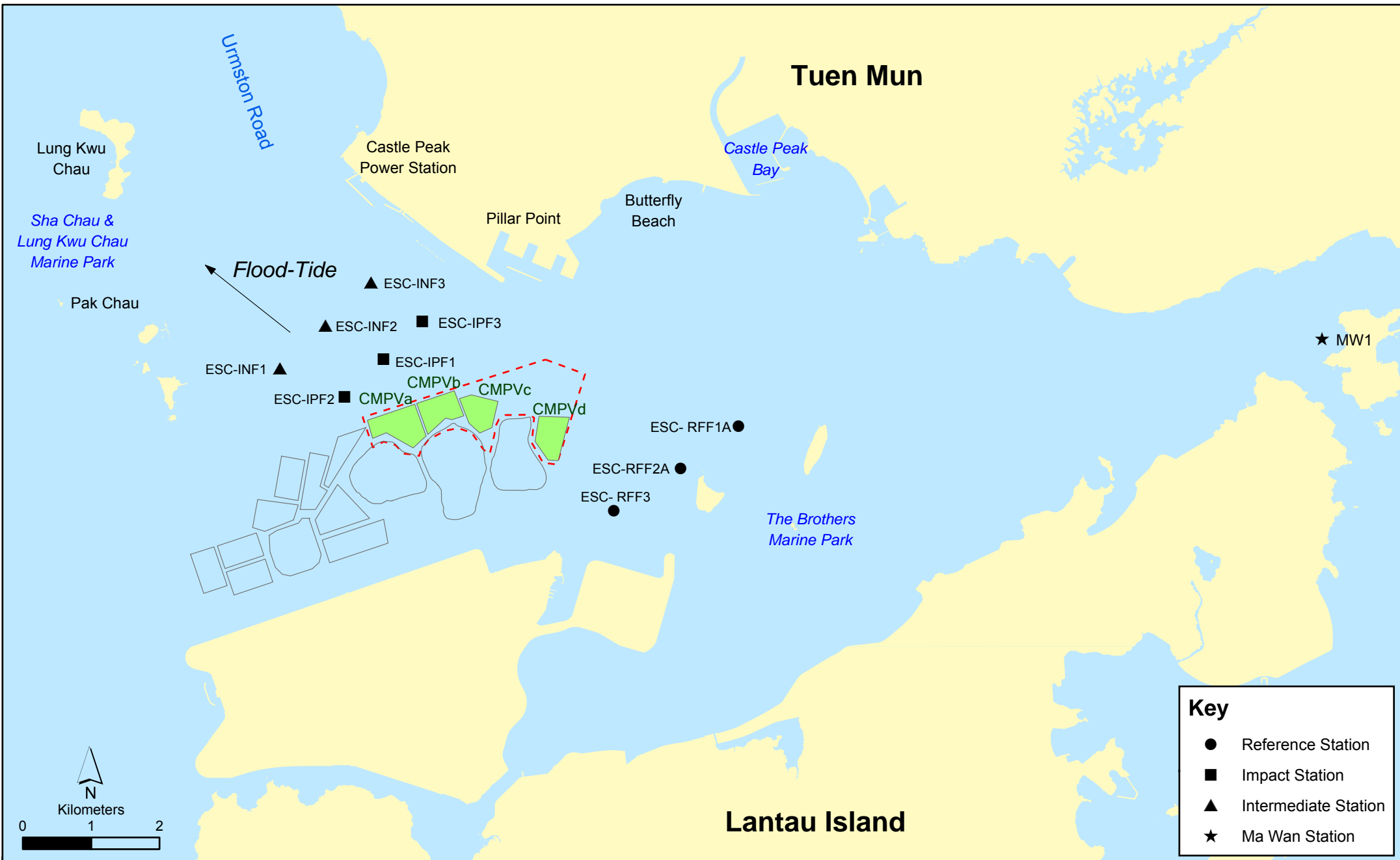


Figure 1.2

Routine & Capping Water Quality Sampling Stations (Flood-Tide) for ESC CMPs

1.5.15 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable deterioration in water quality in February 2017. Detailed statistical analysis will be presented in the Quarterly Report to investigate any spatial and temporal trends of potential concern.

## 1.6 *ACTIVITIES SCHEDULED FOR THE NEXT MONTH*

1.6.1 The following monitoring activities will be conducted in the next monthly period of March 2017 for ESC CMPs:

- *Water Column Profiling of ESC CMP Vd; and*
- *Pit Specific Sediment Chemistry of ESC CMP Vd.*

1.6.2 No monitoring activities are scheduled in the next monthly period of March 2017 for SB CMPs.

1.6.3 The sampling schedule is presented in *Annex A*.

## 1.7 *STUDY PROGRAMME*

1.7.1 A summary of the Study programme is presented in *Annex D*.

Annex A

## Sampling Schedule



Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (September 2012 - February 2017)

		2012				2013				2014				2015				2016				2017																						
		S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
<b>Benthic Recolonisation Studies</b>																																												
Capped Contaminated Mud Pits IVa-c																																												
	ESC-CPA			*												*									*								*											
	ESC-CPB			*												*									*								*											
	ESC-CPC			*												*									*							*												
Reference Stations																																												
	ESC-RBA			*												*									*						*													
	ESC-RBB			*												*									*						*													
	ESC-RBC			*												*									*						*													
<b>Impact Monitoring for Dredging</b>																																												
Upstream/Reference Stations																																												
	US1	*	*	*	*																				*	*	*	*	*	*					*	*	*							
	US2	*	*	*	*																				*	*	*	*	*	*					*	*	*							
Downstream/Impact Stations																																												
	DS1	*	*	*	*																				*	*	*	*	*	*					*	*	*							
	DS2	*	*	*	*																				*	*	*	*	*	*					*	*	*							
	DS3	*	*	*	*																				*	*	*	*	*	*					*	*	*							
	DS4	*	*	*	*																				*	*	*	*	*	*					*	*	*							
	DS5	*	*	*	*																				*	*	*	*	*	*					*	*	*							
Ma Wan Station																																												
	MW1	*	*	*	*																				*	*	*	*	*	*					*	*	*							
<b>Capping</b>																																												
<i>Ebb Tide</i>																																												
Impact Station																																												
	ESC-IPE1																*	*						*	*					*	*													
	ESC-IPE2																*	*						*	*					*	*													
	ESC-IPE3																*	*						*	*					*	*													
	ESC-IPE4																*	*						*	*					*	*													
	ESC-IPE5																*	*						*	*					*	*													
Intermediate Station																																												
	ESC-INE1																*	*						*	*				*	*														
	ESC-INE2																*	*						*	*				*	*														
	ESC-INE3																*	*						*	*				*	*														
	ESC-INE4																*	*						*	*				*	*														
	ESC-INE5																*	*						*	*				*	*														
Reference Station																																												
	ESC-RFE1																*	*						*	*				*	*														
	ESC-RFE2																*	*						*	*				*	*														
	ESC-RFE3																*	*						*	*				*	*														
	ESC-RFE4																*	*						*	*				*	*														
	ESC-RFE5																*	*						*	*				*	*														
Ma Wan Station																																												
	MW1																*	*						*	*				*	*														
<i>Flood Tide</i>																																												
Impact Station																																												
	ESC-IPF1																*	*						*	*				*	*														
	ESC-IPF2																*	*						*	*				*	*														
	ESC-IPF3																*	*						*	*				*	*														
Intermediate Station																																												
	ESC-INF1																*	*						*	*				*	*														
	ESC-INF2																*	*						*	*				*	*														
	ESC-INF3																*	*						*	*				*	*														
Reference Station																																												
	ESC-RFF1																*	*						*	*				*	*														
	ESC-RFF2																*	*						*	*				*	*														
	ESC-RFF3																*	*						*	*				*	*														
Ma Wan Station																																												
	MW1																*	*						*	*				*	*														











Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

			2012					2013					2014					2015					2016					2017																			
			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
<b>Capping Water Quality Monitoring</b>																																															
<i>Ebb Tide</i>																																															
Impact Stations Downcurrent																																															
	SB-IPE1	4 times per year																																													
	SB-IPE2	4 times per year																																													
	SB-IPE3	4 times per year																																													
	SB-IPE4	4 times per year																																													
	SB-IPE5	4 times per year																																													
Intermediate Stations Downcurrent																																															
	SB-INE1	4 times per year																																													
	SB-INE2	4 times per year																																													
	SB-INE3	4 times per year																																													
	SB-INE4	4 times per year																																													
	SB-INE5	4 times per year																																													
Reference Stations Upcurrent																																															
	SB-RFE1	4 times per year																																													
	SB-RFE2	4 times per year																																													
	SB-RFE3	4 times per year																																													
	SB-RFE4	4 times per year																																													
	SB-RFE5	4 times per year																																													
Sensitive Receiver Stations																																															
	MW1	4 times per year																																													
	THB1	4 times per year																																													
	THB2	4 times per year																																													
	WSR45C	4 times per year																																													
	WSR46	4 times per year																																													
<i>Flood Tide</i>																																															
Impact Stations Downcurrent																																															
	SB-IPF1	4 times per year																																													
	SB-IPF2	4 times per year																																													
	SB-IPF3	4 times per year																																													
Intermediate Stations Downcurrent																																															
	SB-INF1	4 times per year																																													
	SB-INF2	4 times per year																																													
	SB-INF3	4 times per year																																													
Reference Stations Upcurrent																																															
	SB-RFF1	4 times per year																																													
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	SB-CPA	2 times per year																																													
	SB-CPB	2 times per year																																													
Reference Stations																																															
	RBA	2 times per year																																													
	RBB	2 times per year																																													
	RBC	2 times per year																																													

Notes:  
 "n" = Number of replicates depends on parameters  
 Naming of stations are tentative only and will be subjected to changes

Annex B

## Water Quality Monitoring Results

**Table B1** *Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities at ESC CMPs*

<b>Parameter</b>	<b>Action Level</b>	<b>Limit Level</b>
Dissolved Oxygen (DO) <sup>(1)</sup>	<u>Surface and Mid-depth</u> <sup>(2)</sup> 5%-ile of baseline data for surface and middle layer = <b>3.76 mg L<sup>-1</sup></b>	<u>Surface and Mid-depth</u> <sup>(2)</sup> 1%-ile of baseline data for surface and middle layer = <b>3.11 mg L<sup>-1</sup></b> <sup>(3)</sup>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
	<u>Bottom</u> 5%-ile of baseline data for bottom layers = <b>2.96 mg L<sup>-1</sup></b>	<u>Bottom</u> The average of the impact station readings are <b>&lt;2 mg/L<sup>-1</sup></b>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
Depth-averaged Suspended Solids (SS) <sup>(4) (5)</sup>	95%-ile of baseline data for depth average = <b>37.88 mg L<sup>-1</sup></b>	99%-ile of baseline data for depth average = <b>61.92 mg L<sup>-1</sup></b>
	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
Depth-averaged Turbidity (Tby) <sup>(4) (5)</sup>	95%-ile of baseline data = <b>28.14 NTU</b>	99%-ile of baseline data = <b>38.32 NTU</b>
	and	and
	120% of control station's Tby at the same tide of the same day	130% of control station's Tby 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) The Action and Limit Levels for DO for Surface & 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 & Middle layers has already been lower than 4 mg L<sup>-1</sup>, it is proposed to set the Limit Level at 3.11 mg L<sup>-1</sup> 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 Vd in February 2017*

Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen		pH	Suspended Solids
				(%)	(mg L <sup>-1</sup> )	(mg L <sup>-1</sup> )	(mg L <sup>-1</sup> )
WCP 1 (Downstream)	17.51	29.81	5.20	92.93	7.43	7.97	4.98
WCP 2 (Upstream)	17.46	29.38	5.10	93.11	7.47	7.97	5.40
WQO (Dry season)	N/A	26.44 – 32.32 <sup>#</sup>	N/A	N/A	>4	6.5-8.5	13.2

**Note:**  
<sup>#</sup>Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.  
 Cell shaded yellow / red indicate value exceeding the Action/Limit levels.  
 Cell shaded grey indicate value exceeding the WQO.

**Table B3** *In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in February 2017*

Sampling Period	Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen		pH
					(%)	(mg L <sup>-1</sup> )	(mg L <sup>-1</sup> )
February 2017	RFF (Reference)	18.60	28.76	1.26	98.42	9.20	7.91
	IPF (Impact)	18.37	29.08	1.31	96.31	9.05	7.87
	INF (Intermediate)	18.43	28.68	1.13	98.53	9.25	7.89
	Ma Wan	18.07	30.40	0.46	91.32	8.63	7.94
	WQO	N/A	25.88 – 31.63 <sup>#</sup>	N/A	N/A	>4	6.5-8.5

**Notes:**

<sup>#</sup>Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.  
 Cell shaded yellow / red indicate value exceeding the Action/Limit levels.  
 Cell shaded grey indicate value exceeding the WQO.

**Table B4** *Laboratory Results for Routine Water Quality Monitoring of ESC CMPs in February 2017*

Sampling Period	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
February 2017	RFF	2.08	<LOR	<LOR	0.83	1.39	<LOR	2.45	<LOR	50.49	0.17	0.67	1.55	2.34
	IPF	2.00	<LOR	<LOR	0.53	0.94	<LOR	1.79	<LOR	36.88	0.15	0.68	0.29	2.63
	INF	2.37	<LOR	<LOR	<LOR	1.35	<LOR	1.64	<LOR	16.88	0.16	0.76	0.70	2.41
	Ma Wan	2.06	<LOR	<LOR	<LOR	1.52	<LOR	1.39	<LOR	43.59	0.21	0.55	0.86	1.51

WQO of TIN: 0.5 mg/L  
 Dry Season WQO of SS : 13.2 mg/L

**Notes:**

Cell shaded yellow / red indicate value exceeding the Action/Limit levels.  
 Cell shaded grey indicate value exceeding the WQO.

Annex C

## Graphical Presentations

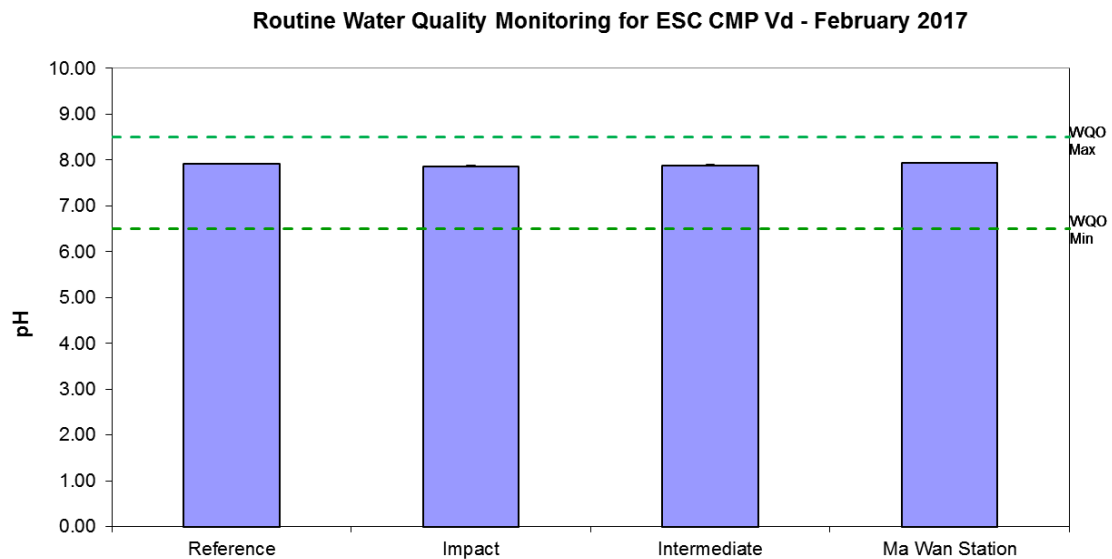


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

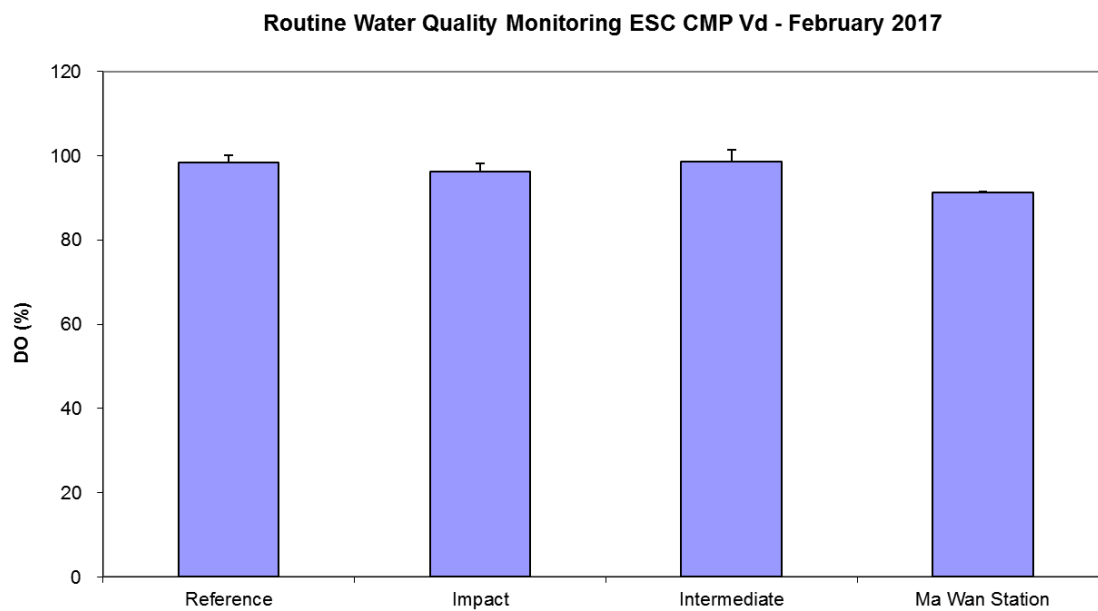


Figure 2: Level of Dissolved Oxygen (DO) (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.



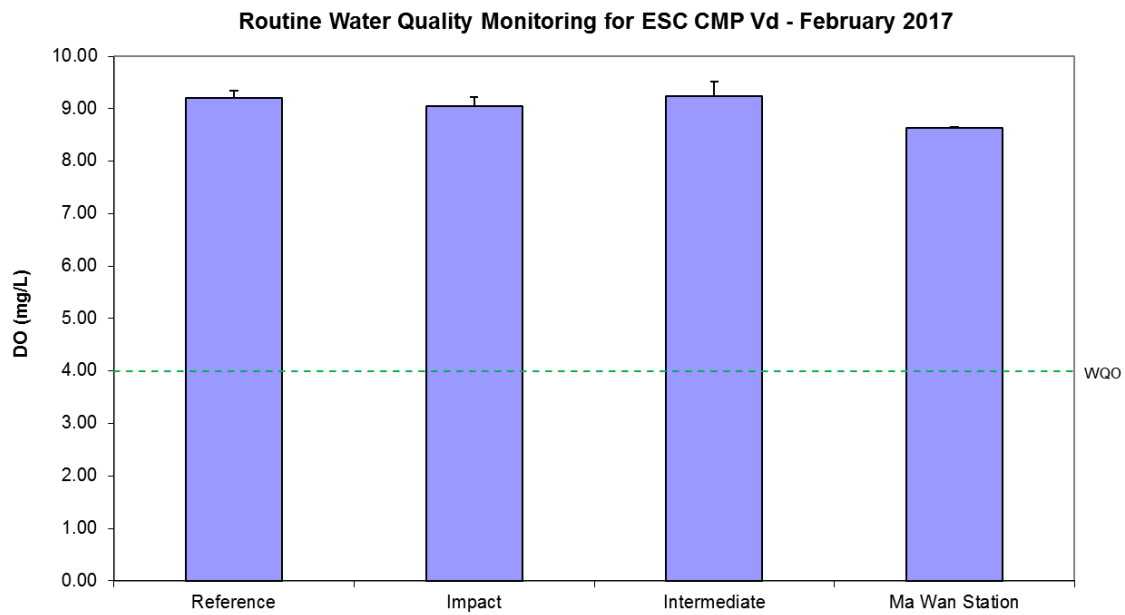


Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

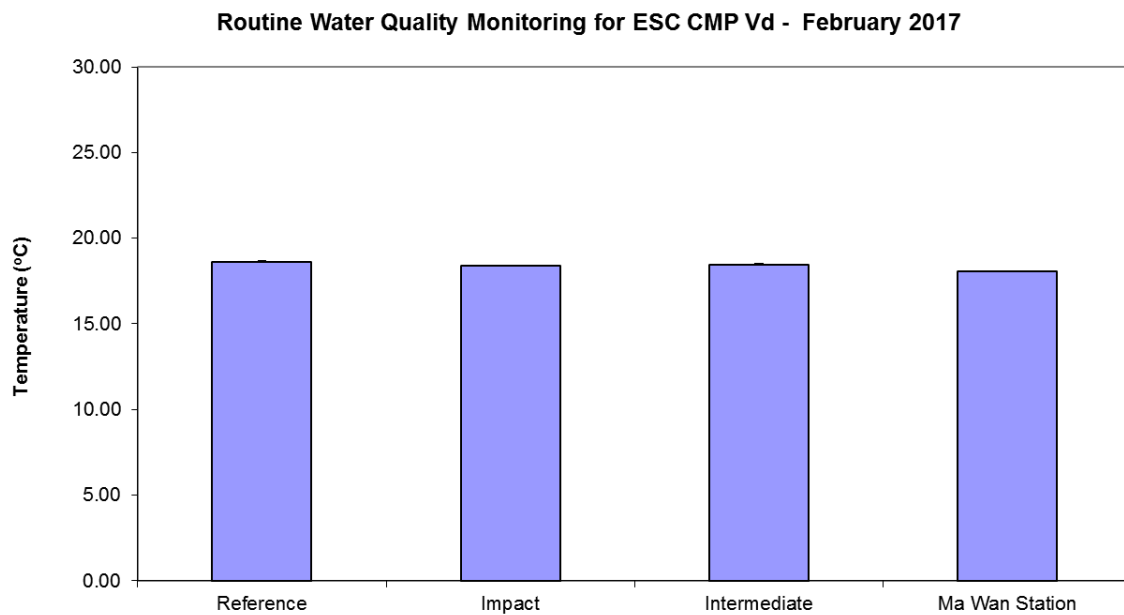


Figure 4: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

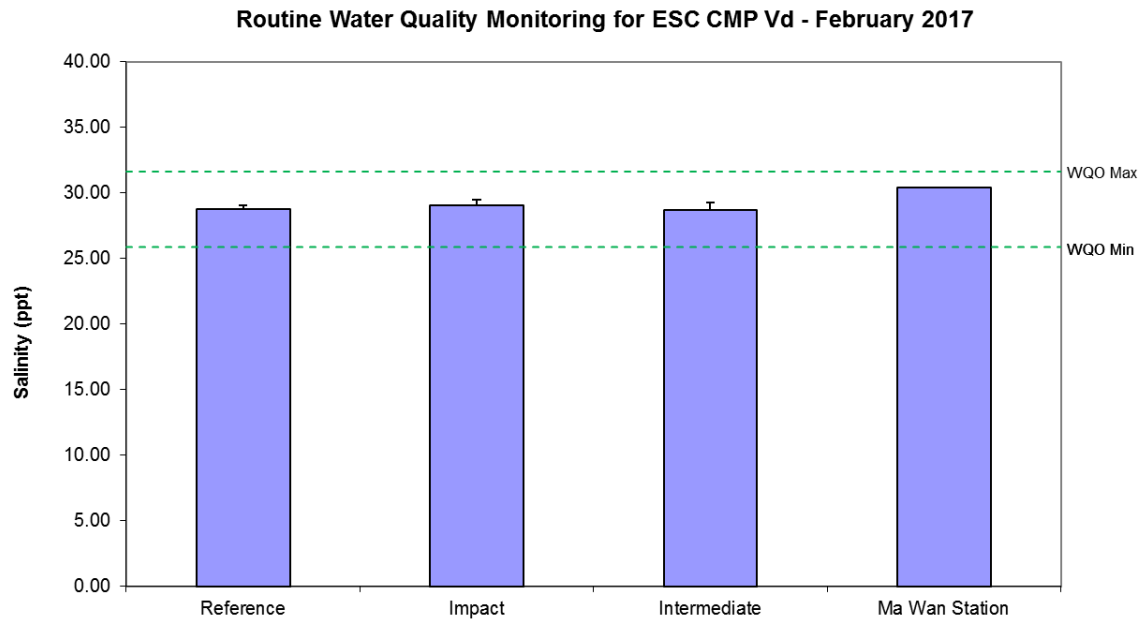


Figure 5: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

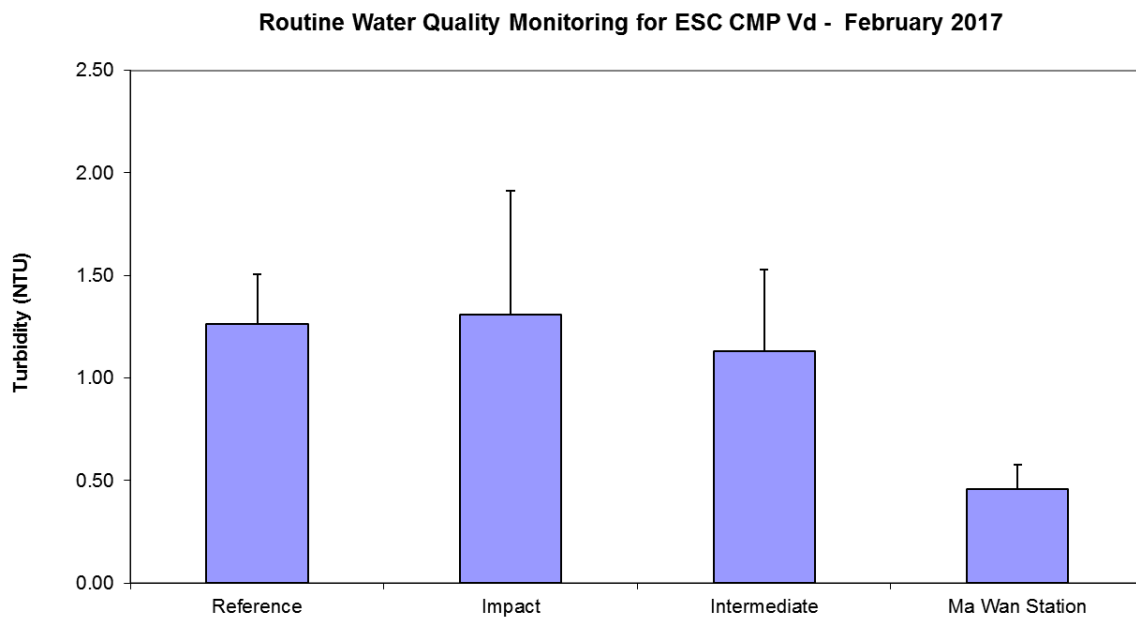


Figure 6: Levels of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

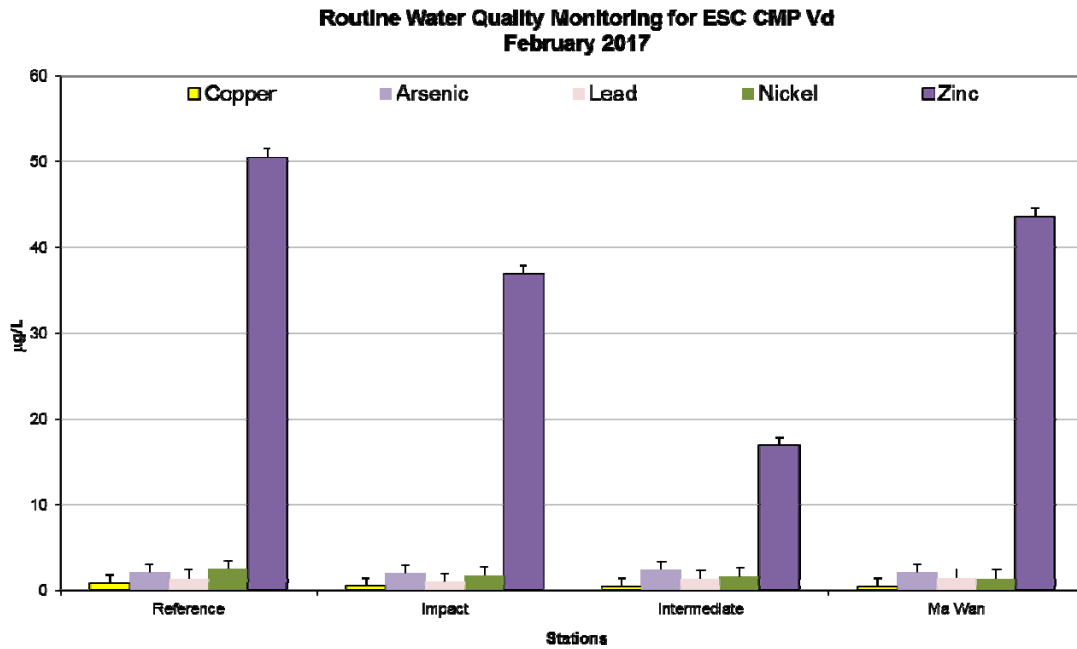


Figure 7: Concentration of Copper, Zinc, Arsenic and Nickel ( $\mu\text{g/L}$ ; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

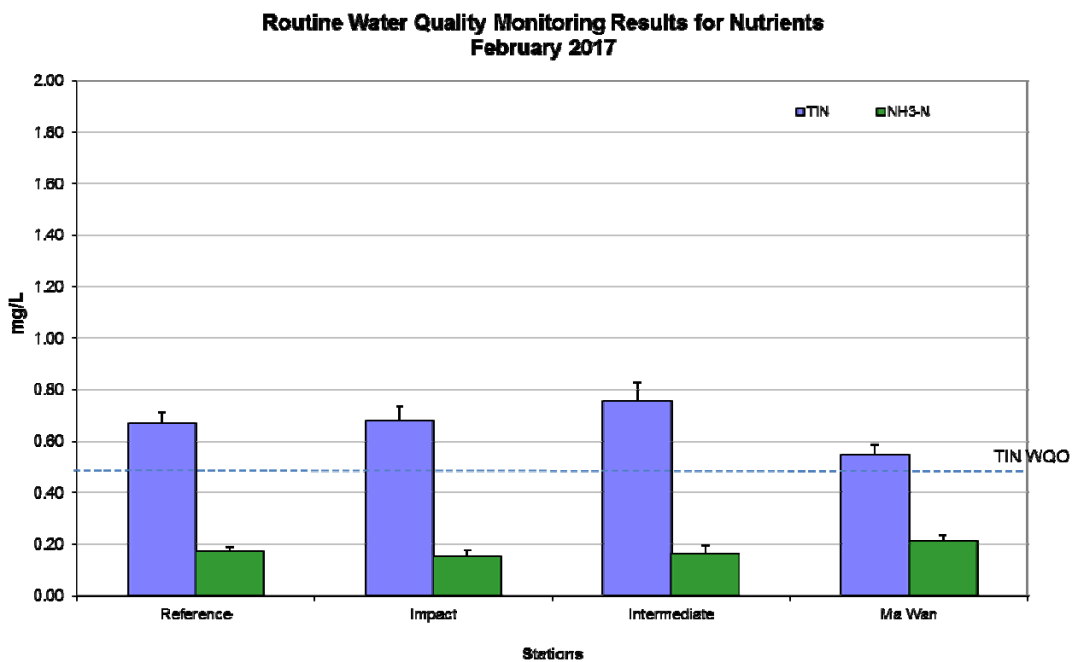


Figure 8: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen ( $\text{NH}_3\text{-N}$ ) ( $\mu\text{g/L}$ ; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

**Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD<sub>5</sub>)  
February 2017**

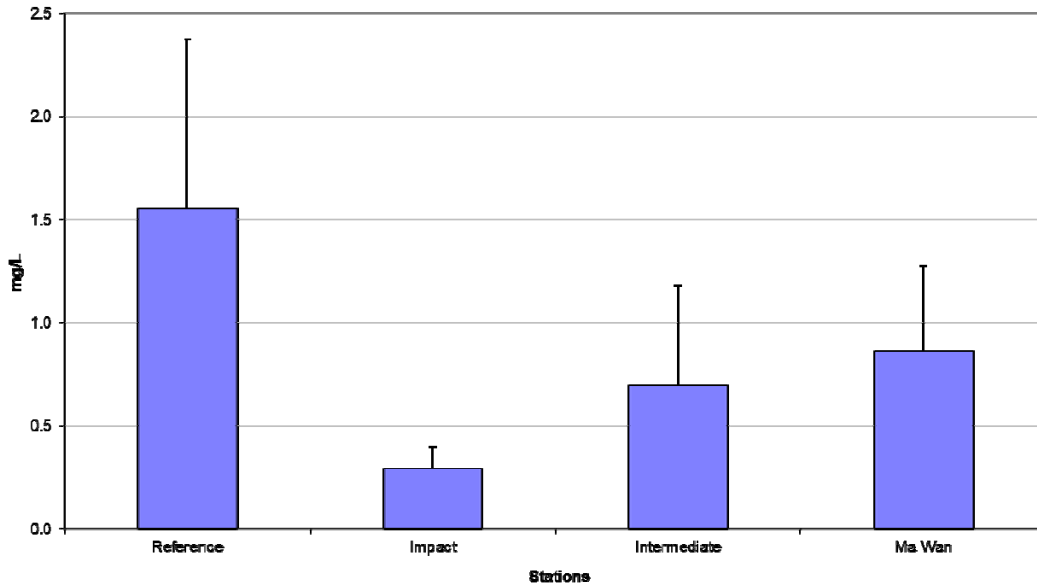


Figure 9: Level of Biochemical Oxygen Demand (BOD<sub>5</sub>) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

**Routine Water Quality Monitoring for Suspended Solids  
February 2017**

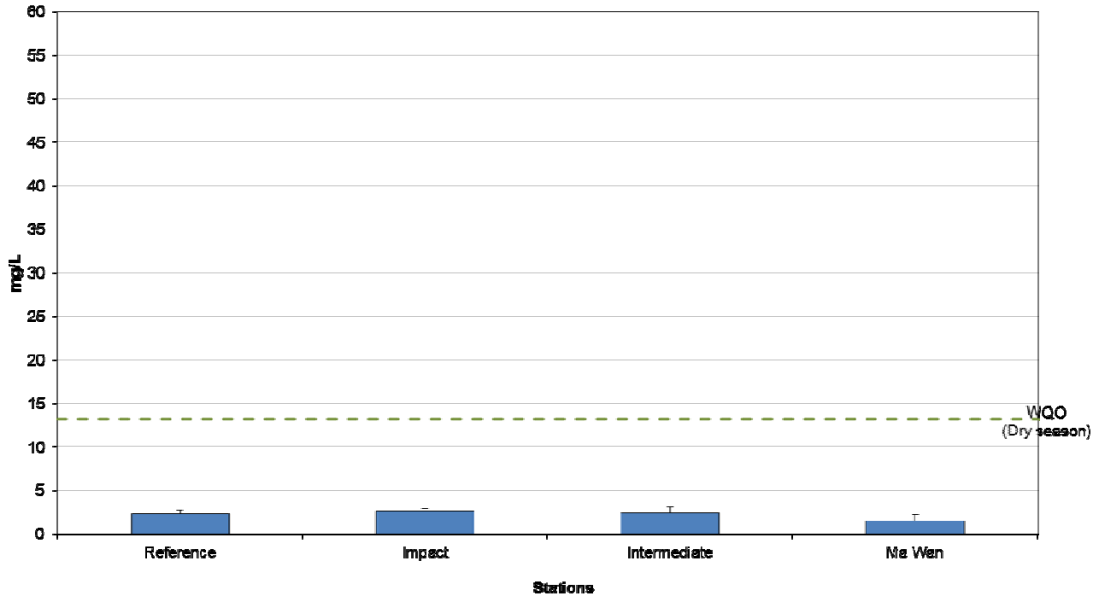


Figure 10: Concentration of Suspended Solids (SS) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in February 2017.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\54th (February 2017)

Date: March 2017

**Environmental  
Resources  
Management**



Annex D

## Study Programme

