

 土木工程拓展署
Civil Engineering and
Development Department

**Environmental Monitoring and Audit
for Contaminated Mud Pit at Sha
Chau (2009-2013) – Investigation
Agreement No. CE 4/2009(EP)**

**47th Monthly Progress Report for
Contaminated Mud Pits at Sha Chau –
May 2013**

Revision 0

17 June 2013

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Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation

Environmental Resources Management

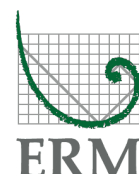
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47th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – May 2013

Revision 0

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Client:		Project No:			
Civil Engineering and Development Department (CEDD)		0103262			
Summary:		Date:			
This document presents progress of monitoring works on contaminated mud pits at Sha Chau in May 2013 under Agreement No. CE 4/2009 (EP).		17 June 2013			
		Approved by:			
		 Dr Robin Kennish Director			
0	47 th Monthly Progress Report for ESC CMP	RC	JT	RK	17/6/13
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>		Distribution <input checked="" type="checkbox"/> Internal <input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential			
		 			



New Contaminated Mud Marine Disposal Facility at Airport East/East Sha
Chau Area

Environmental Certification Sheet
EP-312/2008/A


Reference Document/Plan

Document/ Plan to be Certified / Verified:	47 th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – May 2013
Date of Report:	17/06/2013
Date received by ET:	17/06/2013
Date received by IA:	17/06/2013


Reference EP Condition

Environmental Permit Condition:	Condition No.: 3.4
<i>Content:</i> Four hard copies and one 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	
Dr Robin Kennish, Environmental Team Leader:	 Date: 17/6/2013

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:	 Date: 17/6/2013

Notes:

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Agreement No. CE 4/2009 (EP)
Environmental Monitoring and Audit
for Contaminated Mud Pit at Sha Chau (2009-2013) - Investigation

47TH MONTHLY PROGRESS REPORT
FOR CONTAMINATED MUD PITS AT SHA CHAU
MAY 2013

1.1 BACKGROUND

1.1.1 Since 1992, the East of Sha Chau (ESC) area has been the site of a series of dredged contaminated mud pits (CMPs) designed to provide confined marine disposal capacity for contaminated mud arising from the HKSAR's dredging and reclamation projects. In May 2013, the following works were being undertaken at the CMPs:

- Capping was being undertaken at CMP IVc;
- Disposal of contaminated mud was taking place at CMP Va; and
- Dredging of CMP Vd was in progress and completed on 15 May 2013.

1.1.2 The Environmental Monitoring and Audit (EM&A) programme for the CMPs at the ESC area presently covers the above operations.

1.2 REPORTING PERIOD

1.2.1 This Monthly Progress Report covers the monitoring period of May 2013.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 The following monitoring activities have been undertaken for CMP V in May 2013:

- *Impact Water Quality Monitoring during Dredging Operations* for CMP Vd was conducted on 7 May 2013;
- *Pit Specific Sediment Chemistry* was conducted for CMP Va on 14 May 2013;
- *Routine Water Quality Monitoring* was conducted for CMP Va on 16 May 2013; and
- *Water Column Profiling* was scheduled to be undertaken on 28 May 2013. However, there was no dumping activity at CMP Va while the monitoring team was on-site. As such, *in-situ* measurements and water sampling were not undertaken for *Water Column Profiling* in May 2013.

1.3.2 A summary of field activities are presented in *Annex A*.

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

1.4.1 No outstanding sampling remained and laboratory analyses of *Pit Specific Sediment Chemistry* conducted in April and May 2013 were yet to be completed during preparation of this monthly report.

1.5 **BRIEF DISCUSSION OF THE MONITORING RESULTS FOR CMP V**

1.5.1 *Table 1.1* summarises the monitoring results that are presented in the current monthly report. Brief discussion of the monitoring results is presented in this section. Detailed discussion will be presented in the corresponding *Quarterly Report*.

Table 1.1 *Monitoring activities in April / May 2013*

Monitoring activities	Date of Monitoring	Monitoring results presented in this report?
Pit Specific Sediment Chemistry Monitoring for CMP Va	23 Apr 2013	No. Laboratory analysis yet to be completed during preparation of this monthly report.
	14 May 2013	No. Laboratory analysis yet to be completed during preparation of this monthly report.
Impact Water Quality Monitoring during Dredging Operations of CMP Vd	7 May 2013	Yes
Water Column Profiling for CMP Va	28 May 2013	No. <i>In-situ</i> measurements and water sampling were not undertaken as there was no dumping activity on the monitoring day.
Routine Water Quality Monitoring for CMP Va	16 May 2013	Yes

- 1.5.2** *Impact Water Quality Monitoring during Dredging Operations of CMP Vd – May 2013*
- 1.5.3** *Impact Water Quality Monitoring during Dredging Operations of CMP Vd* was conducted on 7 May 2013. On the survey day, sampling was conducted during both mid-ebb and mid-flood tides at two Reference (Upstream) stations upstream and five Impact (Downstream) stations downstream of the dredging operations at CMP Vd (*Figure 1.1*). Monitoring was also conducted at Ma Wan station. At each station, *in-situ* measurements of water quality parameters as well as water samples were taken from three depths in the water column (ie surface: 1 m below sea surface, mid-depth and bottom: 1 m above the seabed). Where water depth was less than 6 m, the mid-depth station was omitted. If water depth was less than 3 m, only the mid-depth station was monitored.
- 1.5.4** Monitoring results are presented in *Table B1* of *Annex B*. Levels of Dissolved Oxygen (DO), Turbidity and Suspended Solids (SS) complied with the Action and Limit Levels set in the Baseline Monitoring Report ⁽¹⁾.
- 1.5.5** Overall, there appears to be no unacceptable water quality impacts causing by the dredging operations at CMP Vd and no additional measures are thus considered required except for those stated in the Environmental Permit (*EP-312/2008*).
- 1.5.6** *Routine Water Quality Monitoring for CMP Va – May2013*
- 1.5.7** The results for the Routine Water Quality Monitoring conducted during May 2013 in the wet season 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 1999-2010 from stations in the Northwestern Water Control Zone, where the CMPs are located. For Salinity, the average value obtained from the Upstream Station was used for the basis as the WQO. *In-situ* monitoring and laboratory results are shown in *Tables 1.2* and *1.3*, respectively, with graphical presentation provided in *Annex C*. Monitoring was undertaken at a total of 10 stations in the reporting month (see *Figure 1.2*).

(2) ERM (2009). Draft Second Review of the EM&A Manual. Prepared for CEDD for EM&A for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation Agreement No. CE 4/2009 (EP).

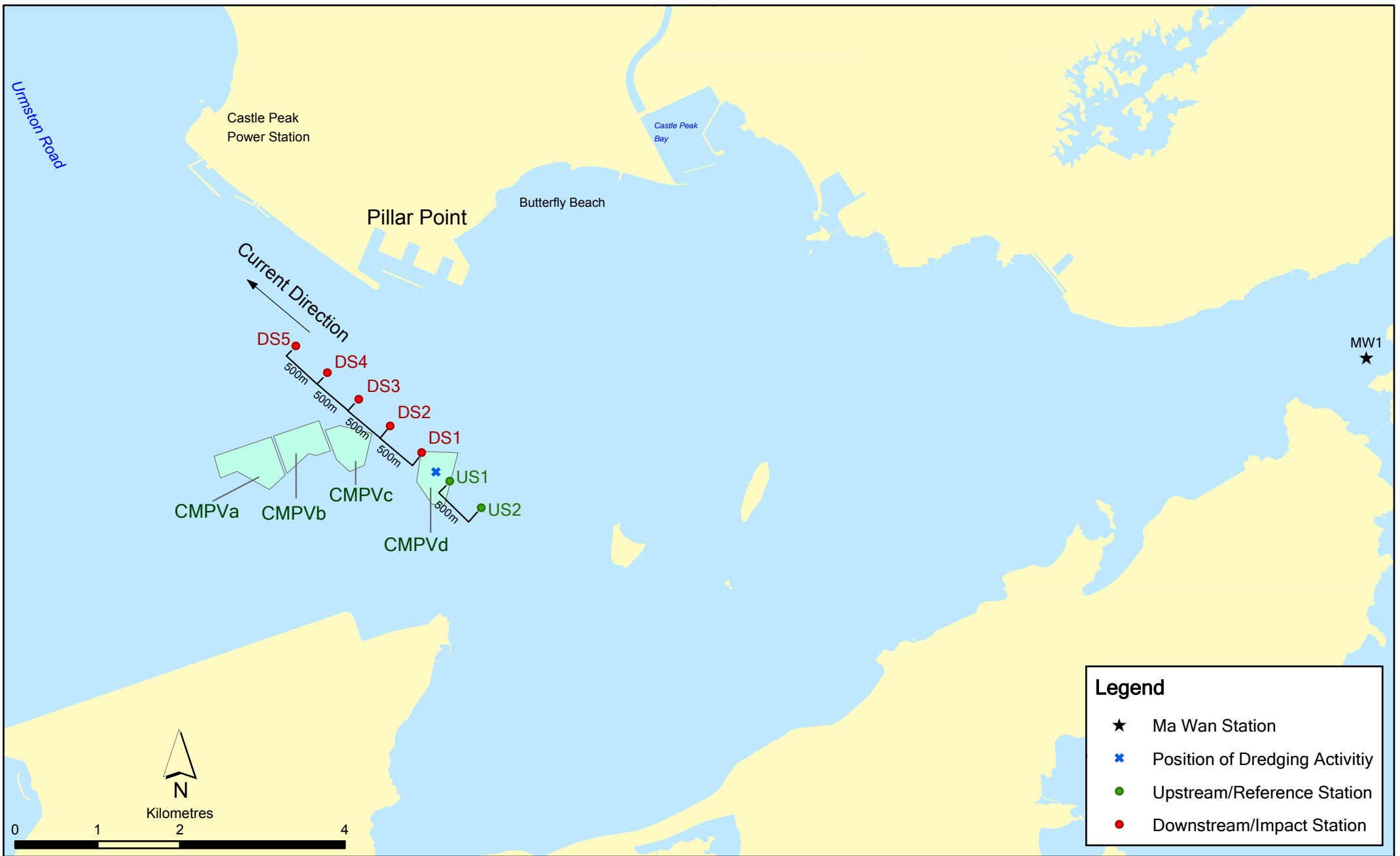


Figure 1.1

Indicative Dredging Impact Sampling Stations for CMPVd

Note: The locations of sampling stations will be determined on site based on current direction and position of dredging activities.



Figure 1.2

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

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Date: 3/12/2012

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In-situ Measurements

- 1.5.8** Analysis of results for May 2013 indicated that for all stations (Impact, Intermediate, Reference and Ma Wan), levels of pH and DO complied with the WQOs (Figures 1 and 2 of Annex C). Levels of Salinity complied with the WQO at all stations, except at Ma Wan Station (Figure 4 of Annex C). The higher salinity recorded at Ma Wan station is likely to be caused by its greater separation distance from the Pearl River mouth, which is a key source of freshwater inputs in the area, when compared to the Reference stations. Levels of DO and Turbidity within the reporting month complied with the Action and Limit Levels set in the *EM&A Manual* ⁽²⁾ (Figures 2 and 5 of Annex C). All *in-situ* water quality measurements showed relatively minor variations amongst Impact, Intermediate and Reference stations (Figures 1-5 of Annex C).

Laboratory Measurements

- 1.5.9** Analyses of May 2013 results indicate that concentrations of Arsenic, Cadmium, Chromium, Lead, Mercury and Silver were below their limit of reporting at all stations while Copper, Nickel and Zinc were detected in samples from all stations. Concentrations of Copper and Zinc were slightly higher at Impact stations while concentrations of Nickel were similar amongst all stations (Figure 6 of Annex C). Levels of 5-day Biochemical Oxygen Demand (BOD₅), Total Inorganic Nitrogen (TIN) and Ammoniacal-Nitrogen (NH₃-N) were similar amongst all stations (Figures 7 and 8 of Annex C). Concentrations of SS complied with the WQO (12.74 mg/L for wet season) and Action and Limit Levels at all stations during the reporting month (Figure 9 of Annex C).
- 1.5.10** Overall, the results indicated that the disposal operation at CMP Va did not appear to cause any unacceptable deterioration in water quality during this reporting period.

(2) ERM (2009). Draft Second Review of the EM&A Manual. Prepared for CEDD for EM&A for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation Agreement No. CE 4/2009 (EP).

Table 1.2 *In-situ Monitoring Results for Routine Water Quality Monitoring of CMP Va in May 2013*

Stations	Temp (°C)	Salinity	Turbidity (NTU)	pH	Dissolved Oxygen (mg L ⁻¹)	
RFF (Reference)	25.24	22.24	3.19	7.70	87.45	6.34
IPF (Impact)	25.13	23.14	2.41	7.76	85.67	6.19
INF (Intermediate)	25.05	23.13	1.89	7.75	84.84	6.14
Ma Wan Station	24.45	26.88	1.36	7.72	87.39	6.26
WQO	N/A	20.01-24.46 [#]	N/A	6.5-8.5	N/A	>4

Note: [#]Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

Table 1.3 *Laboratory Results for Routine Water Quality Monitoring of CMP Va in May 2013*

Stations	As (µg/L)	Ag (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Hg (µg/L)	Pb (µg/L)	Ni (µg/L)	Zn (µg/L)	NH ₃ -N (mg/L)	TIN (mg/L)	BOD ₅ (mg/L)	SS (mg/L)
RFF	<LOR	<LOR	<LOR	<LOR	2.83	<LOR	<LOR	4.17	4.58	0.19	1.25	1.03	6.04
IPF	<LOR	<LOR	<LOR	<LOR	6.54	<LOR	<LOR	3.83	6.67	0.19	1.15	0.78	3.58
INF	<LOR	<LOR	<LOR	<LOR	2.13	<LOR	<LOR	3.83	2.25	0.19	1.16	0.82	4.63
Ma Wan Station	<LOR	<LOR	<LOR	<LOR	3.63	<LOR	<LOR	3.38	7.13	0.17	0.80	0.90	4.63
													WQO of SS: 12.74 mg/L

Note: LOR = Limit Of Reporting

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.6.1 The following monitoring activities will be conducted in the next monthly period of June 2013 for CMP V:

- *Pit Specific Sediment Chemistry* for CMP Va;
- *Cumulative Impact Sediment Chemistry* for CMP Va; and
- *Water Column Profiling* for CMP Va.

1.6.2 *Water Quality Monitoring during Capping* will be conducted for CMP IVc in the next monthly period of June 2013.

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 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP IV (January 2012 - December 2013)

		2012												2013											
Tissue/ Whole Body Sampling		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Near-Pit Stations	INA		*																						
	INB		*																						
Reference North	TNA		*																						
	TNB		*																						
Reference South	TSA		*																						
	TSB		*																						
Demersal Trawling		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Near Pit Stations	INA 1-5		*	*																					
	INB 1-5		*	*																					
Reference North	TNA 1-5		*	*																					
	TNB 1-5		*	*																					
Reference South	TSA 1-5		*	*																					
	TSB 1-5		*	*																					
Capping		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<i>Ebb Tide</i>																									
Impact Station Downcurrent	IPE1		*				*	*				*	*		*				*	*			*	*	*
	IPE2		*				*	*				*	*		*				*	*			*	*	*
	IPE3		*				*	*				*	*		*				*	*			*	*	*
	IPE4		*				*	*				*	*		*				*	*			*	*	*
	PFC1		*				*	*				*	*		*				*	*			*	*	*
Intermediate Station Downcurrent	INE1		*				*	*				*	*		*				*	*			*	*	*
	INE2		*				*	*				*	*		*				*	*			*	*	*
	INE3		*				*	*				*	*		*				*	*			*	*	*
	INE4		*				*	*				*	*		*				*	*			*	*	*
	INE5		*				*	*				*	*		*				*	*			*	*	*
Reference Station Upcurrent	RFE1		*				*	*				*	*		*				*	*			*	*	*
	RFE2		*				*	*				*	*		*				*	*			*	*	*
	RFE3		*				*	*				*	*		*				*	*			*	*	*
	RFE4		*				*	*				*	*		*				*	*			*	*	*
	RFE5		*				*	*				*	*		*				*	*			*	*	*
<i>Flood Tide</i>																									
Impact Station Downcurrent	INF1		*				*	*				*	*		*				*	*			*	*	*
	PFC2		*				*	*				*	*		*				*	*			*	*	*
	INF3		*				*	*				*	*		*				*	*			*	*	*
Intermediate Station Downcurrent	IPF1		*				*	*				*	*		*				*	*			*	*	*
	IPF2		*				*	*				*	*		*				*	*			*	*	*
	IPF3		*				*	*				*	*		*				*	*			*	*	*
Reference Station Upcurrent	RFF1		*				*	*				*	*		*				*	*			*	*	*
	RFF2		*				*	*				*	*		*				*	*			*	*	*
	RFF3		*				*	*				*	*		*				*	*			*	*	*
Water Column Profiling		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Plume Stations	WCP1		*																						
	WCP2		*																						
Benthic Recolonisation Studies		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Capped Contaminated Mud Pits III																									
CPA	1 grab per station							*																	
CPB	1 grab per station							*																	
CPC	1 grab per station							*																	
Reference Stations																									
RBA	1 grab per station							*																	
RBB	1 grab per station							*																	
RBC	1 grab per station							*																	

*n = Number of replicates depends on field catch or parameters

Light blue = Sampling completed
Yellow = Sampling to be completed

		2012												2013												2014	
Routine Water Quality Monitoring		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
<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	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
Water Column Profiling		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
Plume Stations	WCP1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	WCP2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Benthic Recolonisation Studies		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
Capped Contaminated Mud Pits IVa-c																											
Reference Stations	ESC-CPA							*				*								*				*			
	ESC-CPB							*				*								*				*			
	ESC-CPC							*				*								*				*			
	ESC-RBA							*				*								*				*			
	ESC-RBB							*				*								*				*			
	ESC-RBC							*				*								*				*			
Impact Monitoring for Dredging		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
Upstream/Reference Stations	US1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	US2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Downstream/Impact Stations	DS1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	DS2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	DS3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	DS4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	DS5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Ma Wan Station	MW1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		

Sampling completed
 Sampling to be completed

Annex B

Results of Impact
Monitoring during CMP Vd
Dredging Operations for
May 2013

Table B1 *Summary Table of DO, Turbidity and SS Levels Recorded in May 2013*

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/05/07	ME	DS1	6.41	6.30	13.85	17.83
		DS2	6.42	6.33	11.05	16.50
		DS3	6.46	6.37	11.22	12.50
		DS4	6.54	6.40	8.12	10.67
		DS5	6.56	6.49	7.52	9.17
		MW1	6.32	6.35	3.72	5.00
	MF	US1	6.41	6.32	9.37	12.00
		US2	6.39	6.36	10.43	12.67
		DS1	6.35	6.42	13.33	18.33
		DS2	6.36	6.39	13.83	17.17
		DS3	6.25	6.37	19.63	21.00
		DS4	6.31	6.27	10.97	10.50
		DS5	6.30	6.31	6.03	6.33
		MW1	6.39	6.44	8.43	8.17
		US1	6.42	6.49	13.15	15.17
		US2	6.41	6.61	9.10	11.83

Notes:

1. Please refer to Table C2 below for the Action and Limit Levels for dredging activities.
2. Cell shaded yellow indicated value exceeding the Action Level criteria.
3. Cell shaded red indicated value exceeding the Limit Level criteria.

Table B2

Action and Limit Levels of Water Quality for Dredging Activities

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO) ⁽¹⁾	<u>Surface and Mid-depth</u> ⁽²⁾ 5%-ile of baseline data for surface and middle layer = 3.76 mg L ⁻¹	<u>Surface and Mid-depth</u> ⁽²⁾ 1%-ile of baseline data for surface and middle layer = 3.11 mg L ⁻¹ ⁽³⁾
	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 = 2.96 mg L ⁻¹	<u>Bottom</u> The average of the impact station readings are <2 mg/L
	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) ⁽⁴⁾⁽⁵⁾	95%-ile of baseline data for depth average = 37.88 mg L ⁻¹	99%-ile of baseline data for depth average = 61.92 mg L ⁻¹
	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) ⁽⁴⁾⁽⁵⁾	95%-ile of baseline data = 28.14 NTU	99%-ile of baseline data = 38.32 NTU
	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⁻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.

Annex C

Monitoring Results

Routine Water Quality Monitoring for CMP V - May 2013

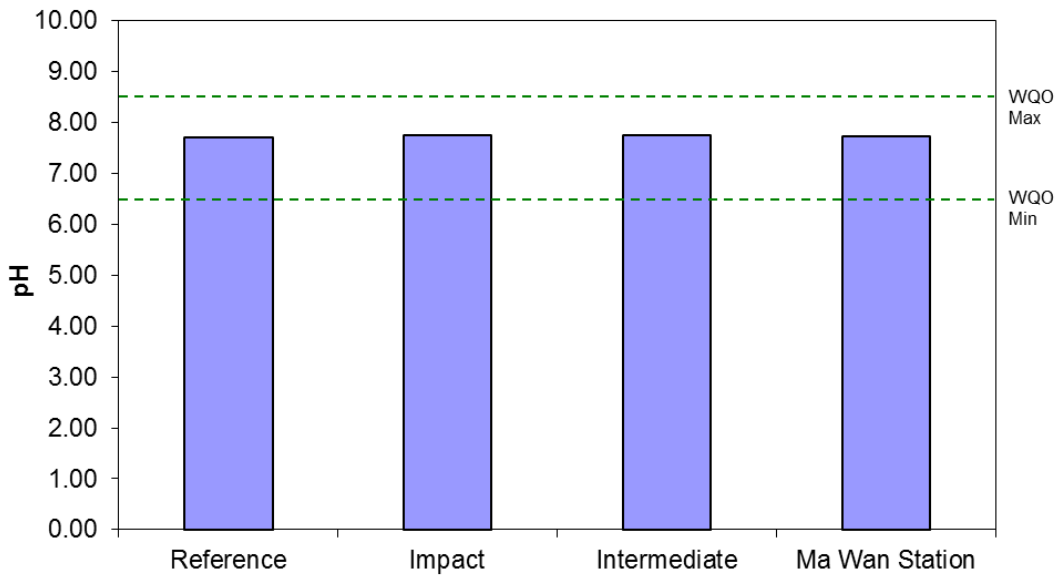


Figure 1: Level of pH (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Routine Water Quality Monitoring for CMP V - May 2013

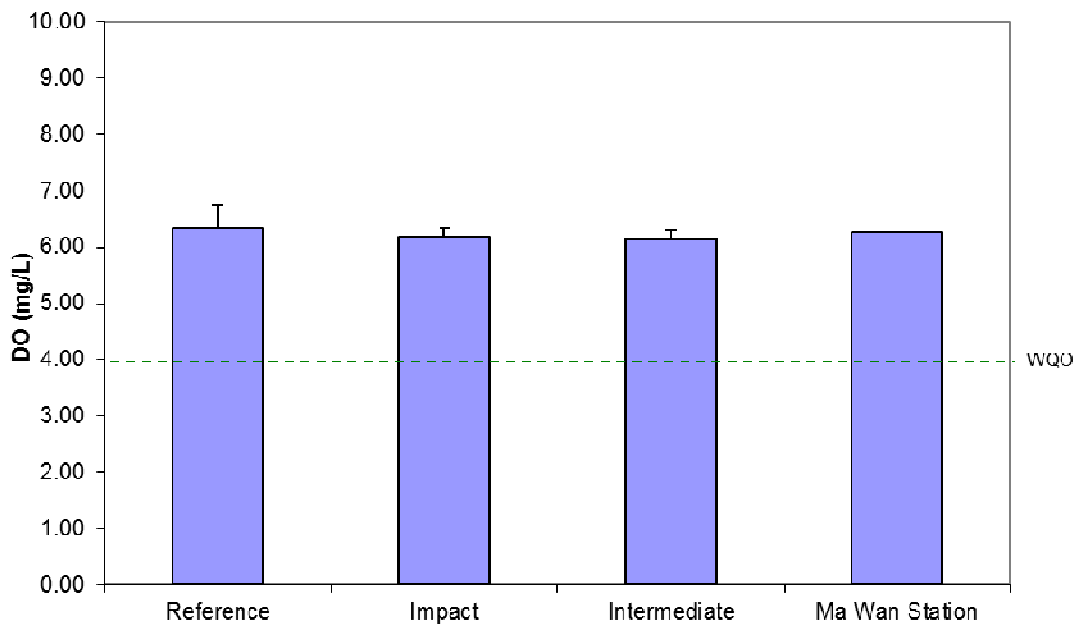


Figure 2: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Routine Water Quality Monitoring for CMP V - May 2013

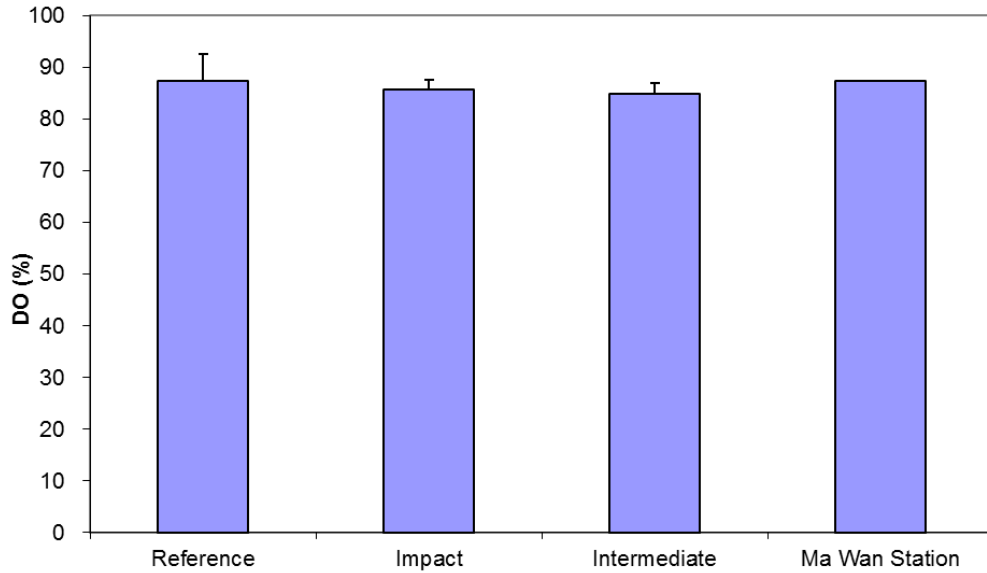


Figure 3: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Routine Water Quality Monitoring for CMP V - May 2013

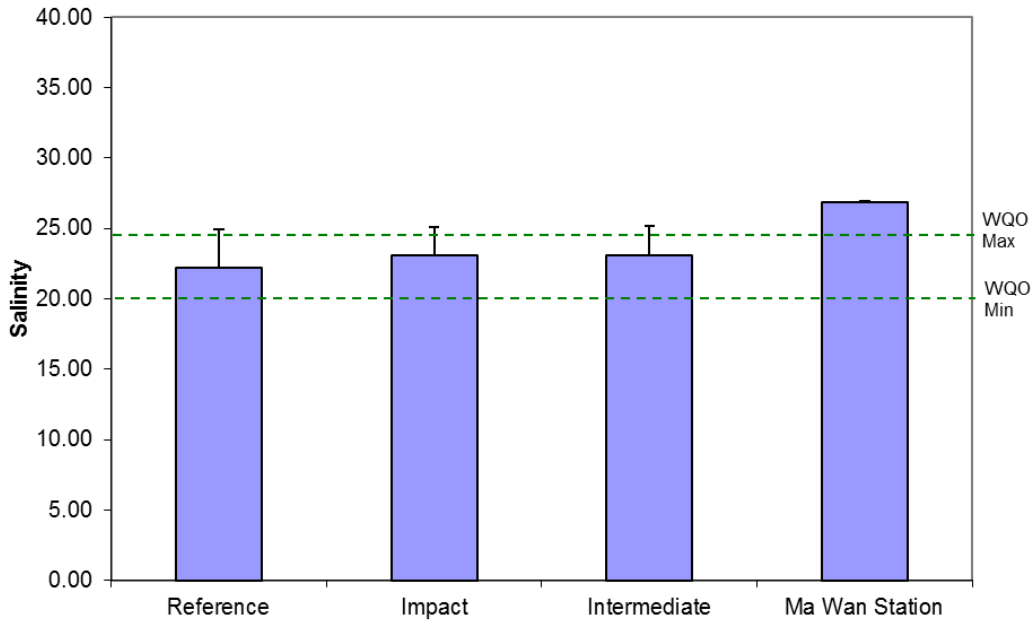


Figure 4: Level of Salinity (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Routine Water Quality Monitoring for CMP V - May 2013

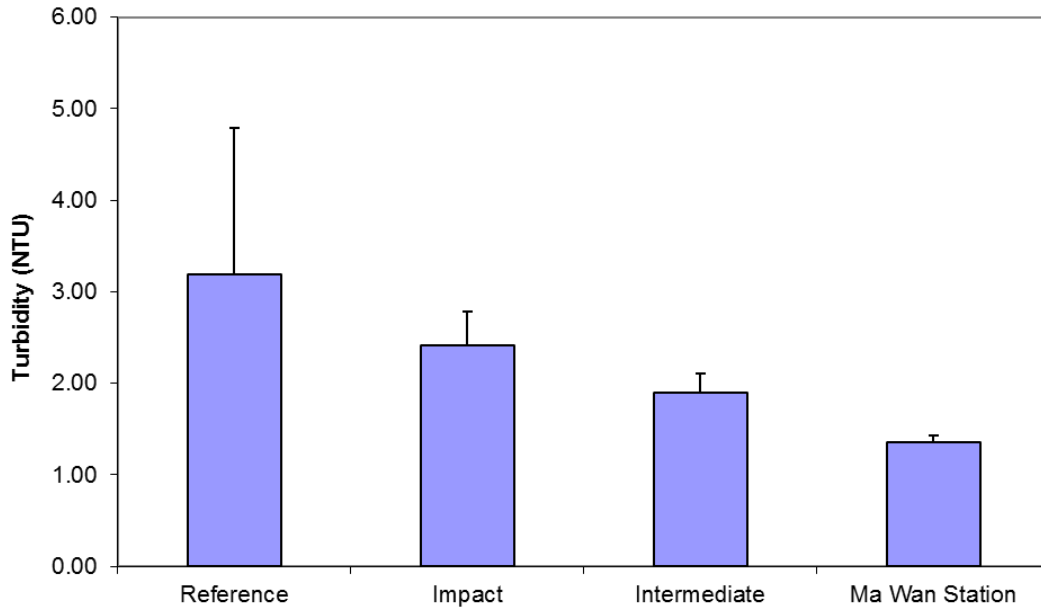


Figure 5: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Routine Water Quality Monitoring Results for Metals May 2013

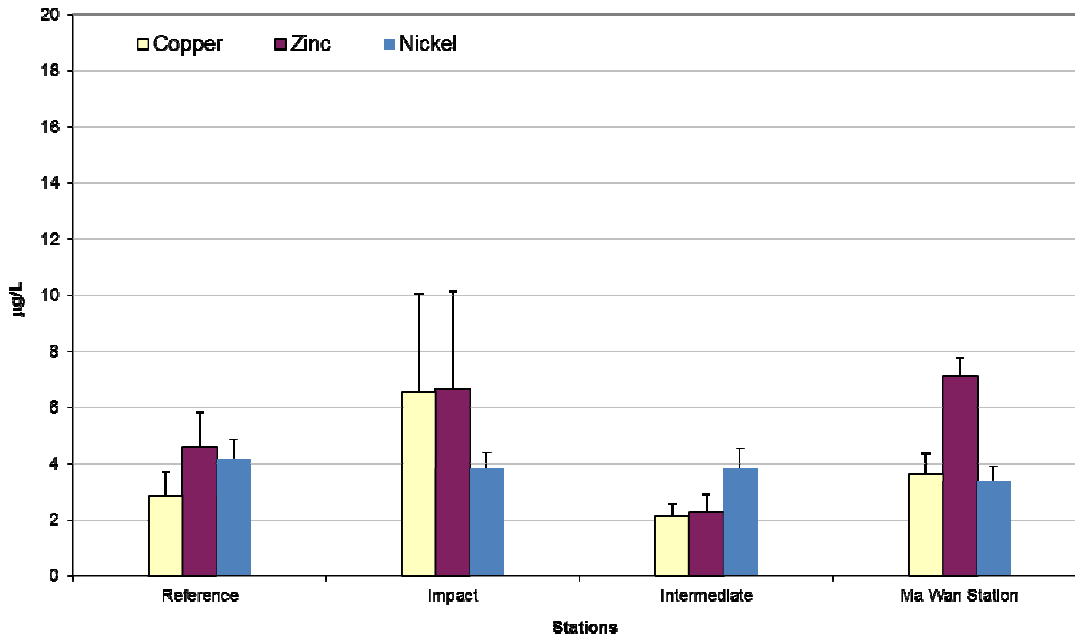


Figure 6: Concentration of Copper, Zinc and Nickel (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

**Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD₅)
May 2013**

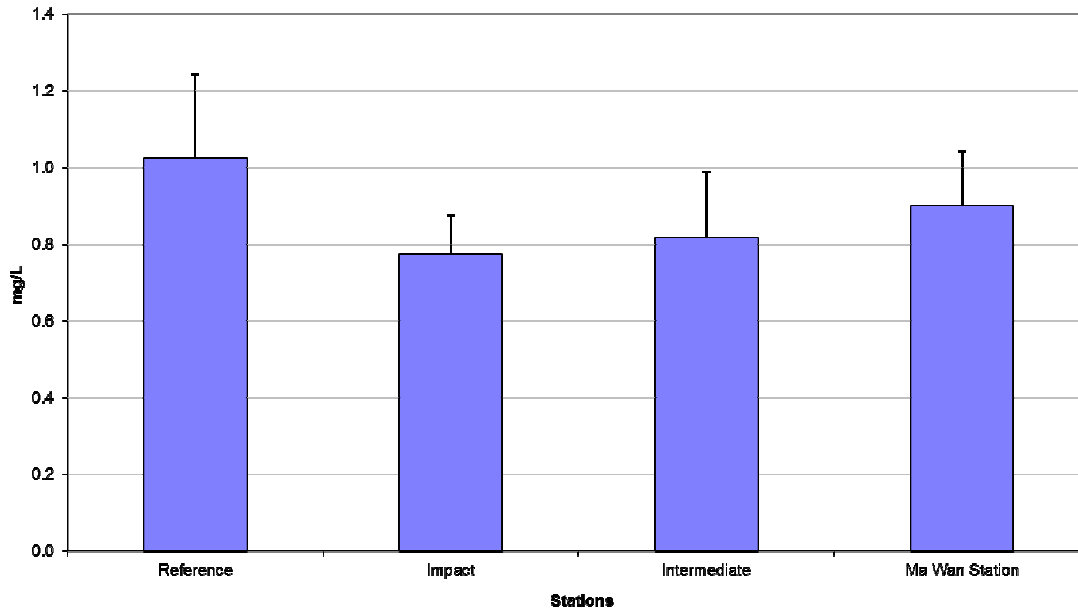


Figure 7: Level of Biochemical Oxygen Demand (BOD₅; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

**Routine Water Quality Monitoring Results for Nutrients
May 2013**

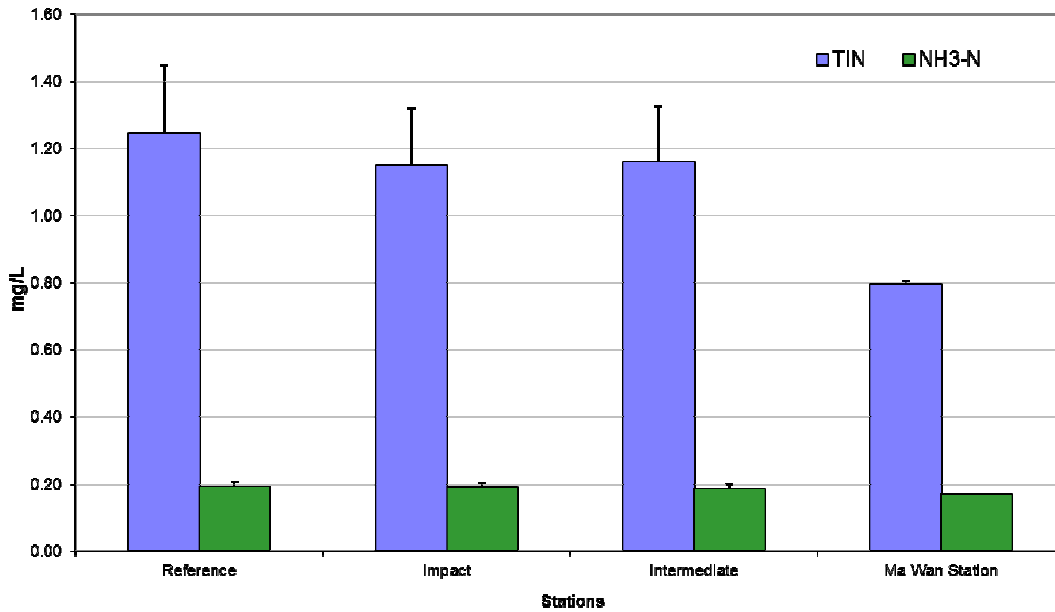


Figure 8: Concentration of Total Inorganic Nitrogen and NH₃-N (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

**Routine Water Quality Monitoring for Suspended Solids
May 2013**

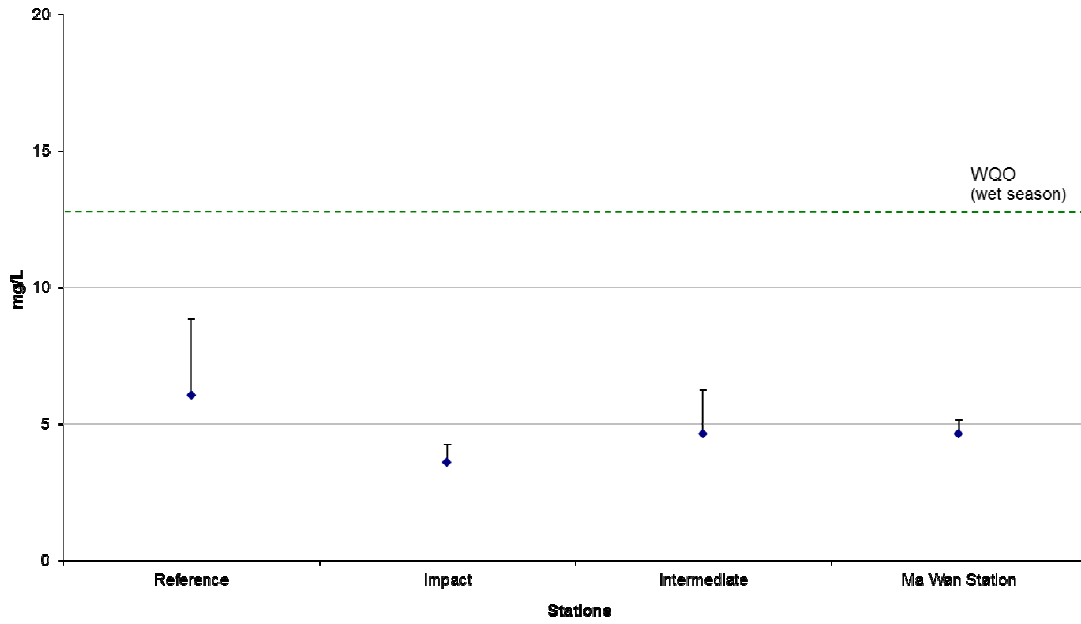


Figure 9: Concentration of Suspended Solids (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in May 2013.

Annex D

Study Programme

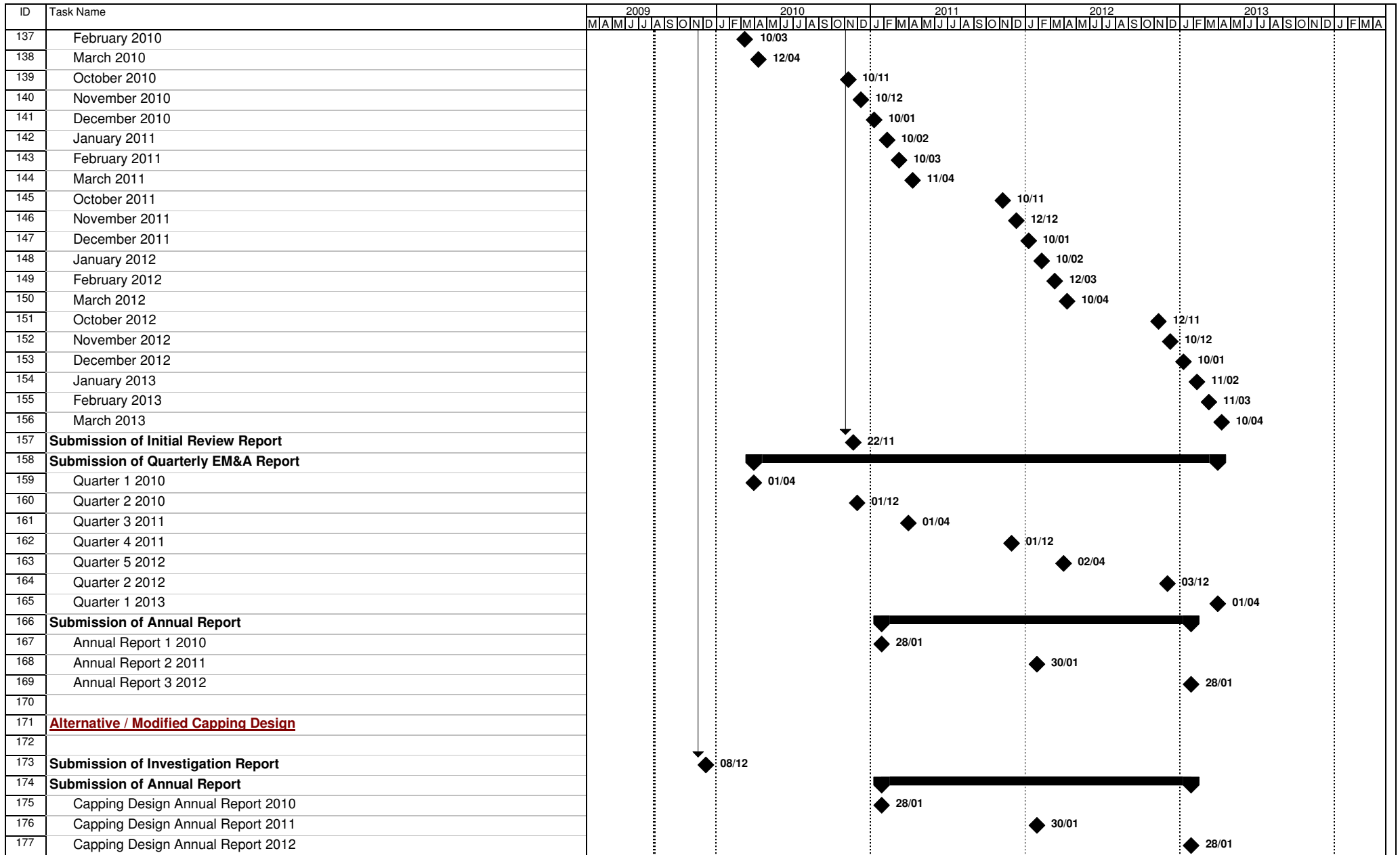


Figure 4.1 - Study Programme

