








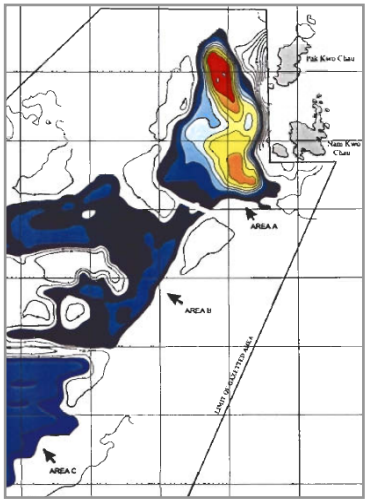

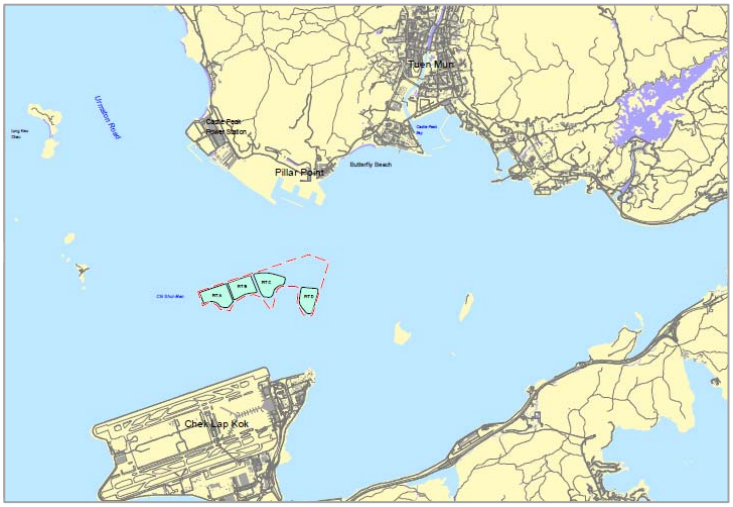

土木工程拓展署
Civil Engineering and Development Department

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

Agreement No. CE 4/2009(EP)

29th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – November 2011

Revision 0

5 December 2011

Environmental Resources Management
21/F Lincoln House
Taikoo Place, 979 King's Road
Island East, Hong Kong
Telephone 2271 3000
Facsimile 2723 5660

www.erm.com

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

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Revision 0

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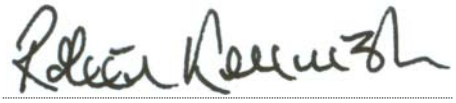
Environmental Resources Management

21/F Lincoln House
979 King's Road
Taikoo Place
Island East
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
E-mail: post.hk@erm.com
http://www.erm.com

Client:	Project No:
Civil Engineering and Development Department (CEDD)	0103262
Summary: This document presents progress of monitoring works on contaminated mud pits at Sha Chau in November 2011 under Agreement No. CE 4/2009 (EP).	Date: 5 December 2011 Approved by:  *Dr Robin Kennish* *Director*

Revision	Description	By	Checked	Approved	Date
0	29th Monthly Progress Report for CMP	CL	JT	RK	05/12/11

Distribution

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CONTENTS

ANNEXES

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

29th MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS AT SHA CHAU November 2011

1.1 BACKGROUND

Since 1992, the East of Sha Chau 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. CMP IVc is presently in operation for backfilling by contaminated mud and is anticipated to reach its capacity in 2011. A series of four newly constructed seabed pits at the East of Sha Chau area, CMP Va-d, will be provided for the disposal of contaminated mud after CMP IVc is full. Dredging operations were completed for the construction of CMP Va-b and are now taking place to construct CMP Vc. The environmental monitoring and audit (EM&A) programme for the CMPs at the East of Sha Chau area presently covers disposal and capping operations at CMP IV and dredging operations at CMP Vc.

1.2 REPORTING PERIOD

This *Monthly Progress Report* covers the monitoring period of November 2011.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

No field sampling was scheduled for CMP IV in November 2011.

For CMP V, sampling for *Impact Water Quality Monitoring during Dredging Operations* was conducted on 4 November 2011. A summary of field activities are presented in *Annex A*.

A summary of monitoring data submitted by the Contractor in this reporting month is presented in *Table 1.1*.

Table 1.1 Summary of monitoring data submitted by the Contractor during the reporting month

Key Task	Monitoring Component	Results Received from the Contractor
CMP V		
Impact Monitoring during Dredging Operations	Water Quality	October 2011 sampling: 28 *November 2011*

1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS

No outstanding sampling and laboratory analysis remained from November 2011.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS

1.5.1 CMP V

Impact Water Quality Monitoring during Dredging Operations of CMP V – November 2011

Impact Water Quality Monitoring during Dredging Operations of CMP V was conducted on 4 November 2011. 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 Vc (*Figure 1.1*). Monitoring was also conducted at the 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).

Monitoring results are presented in *Table B1* of *Annex B*. Levels of Dissolved Oxygen (DO), Turbidity and Total Suspended Solids (TSS) generally complied with the Action and Limit Levels set in the *Baseline Monitoring Report* (1). Levels of TSS and Turbidity exceeded the Action Levels in the downstream station DS1 during the mid-flood tide. Station DS1 is located on the edge of the works area of CMP Vc (*Figure 1.1*) and the compliance of Action and Limit Levels at other downstream stations (i.e. DS2-4) outside the works area would indicate that there is no evidence of any unacceptable adverse water quality impacts arising from the dredging operations of CMP Vc at ESC. No additional measures are thus considered required.

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

The following monitoring programmes will be conducted in the next monthly period of December 2011:

- *Water Column Profiling* for CMP IV;
- *Water Quality Monitoring during Capping* for CMP IV;
- *Pit Specific Sediment Chemistry* for CMP IV;

(1) ERM (2009) Baseline Monitoring Report. Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation. Agreement No. CE 4/2009(EP). Submitted to EPD in September 2009.

- *Cumulative Impact Sediment Chemistry* for CMP IV;
- *Sediment Toxicity Tests* for CMP IV;
- *Benthic Recolonisation Studies* for CMP IV; and
- *Impact Water Quality Monitoring during Dredging Operations* for CMP V.

The sampling schedule is presented in *Annex A*.

1.7 STUDY PROGRAMME

A summary of the Study Programme is presented in *Annex C*.

Annex A

Sampling Schedule

Annex A1 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP IVc (July 2009 - April 2011)

			2009						2010												2011										
Pit Specific Sediment Chemistry	**Code**	**Frequency**	**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**
Active-Pit																																
	NCA 1 - 8	3 times per year		*				*				*				*				*				*				*				*
	NCB 1 - 8	3 times per year		*				*				*				*				*				*				*				*
Pit-Edge																																
	CPA 1-8	3 times per year		*				*				*				*				*				*				*				*
	CPB 1-8	3 times per year		*				*				*				*				*				*				*				*
Near-Pit																																
	CNA 1-8	3 times per year		*				*				*				*				*				*				*				*
	CNB 1-8	3 times per year		*				*				*				*				*				*				*				*
Cumulative Impact Sediment Chemistry			**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**
Near-field Stations																																
	RNA 1-9	2 times per year		*				*								*				*								*				*
	RNB 1-9	2 times per year		*				*								*				*								*				*
Mid-field Stations																																
	RMA 1-9	2 times per year		*				*								*				*								*				*
	RMB 1-9	2 times per year		*				*								*				*								*				*
Capped Pit Stations																																
	RCA 1-9	2 times per year		*				*								*				*								*				*
	RCB 1-9	2 times per year		*				*								*				*								*				*
Far-Field Stations																																
	RFA 1-9	2 times per year		*				*								*				*								*				*
	RFB 1-9	2 times per year		*				*								*				*								*				*
Sediment Toxicity Tests			**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**
Near-Field Stations																																
	TCA	2 times per year		3				3								3				3								3				3
	TCB	2 times per year		3				3								3				3								3				3
Reference Stations																																
	TRA	2 times per year		3				3								3				3								3				3
	TRB	2 times per year		3				3								3				3								3				3
Tissue/ Whole Body Sampling			**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**
Near-Pit Stations																																
	INA	2 times per year		*						*						*						*						*				
	INB	2 times per year		*						*						*						*						*				
Reference North																																
	TNA	2 times per year		*						*						*						*						*				
	TNB	2 times per year		*						*						*						*						*				
Reference South																																
	TSA	2 times per year		*						*						*						*						*				
	TSB	2 times per year		*						*						*						*						*				
Demersal Trawling			**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**
Near Pit Stations																																
	INA 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
	INB 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
Reference North																																
	TNA 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
	TNB 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
Reference South																																
	TSA 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
	TSB 1-5	4 times per year	5	5					5	5				5	5	5				5	5	5	5				5	5				
Capping			**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**
Ebb Tide																																
Impact Station Downcurrent																																
	IPE1	4 times per year		3				3		3				3		3				3		3				3		3				3
	IPE2	4 times per year		3				3		3				3		3				3		3				3		3				3
	IPE3	4 times per year		3				3		3				3		3				3		3				3		3				3
	IPE4	4 times per year		3				3		3				3		3				3		3				3		3				3
	PFC1	4 times per year		3				3		3				3		3				3		3				3		3				3
Intermediate Station Downcurrent																																
	INE1	4 times per year		3				3		3				3		3				3		3				3		3				3
	INE2	4 times per year		3				3		3				3		3				3		3				3		3				3
	INE3	4 times per year		3				3		3				3		3				3		3				3		3				3
	INE4	4 times per year		3				3		3				3		3				3		3				3		3				3
	INE5	4 times per year		3				3		3				3		3				3		3				3		3				3
Reference Station Upcurrent																																
	RFE1	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFE2	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFE3	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFE4	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFE5	4 times per year		3				3		3				3		3				3		3				3		3				3
Flood Tide																																
Impact Station Downcurrent																																
	INF1	4 times per year		3				3		3				3		3				3		3				3		3				3
	PFC2	4 times per year		3				3		3				3		3				3		3				3		3				3
	INF3	4 times per year		3				3		3				3		3				3		3				3		3				3
Intermediate Station Downcurrent																																
	IPF1	4 times per year		3				3		3				3		3				3		3				3		3				3
	IPF2	4 times per year		3				3		3				3		3				3		3				3		3				3
	IPF3	4 times per year		3				3		3				3		3				3		3				3		3				3
Reference Station Upcurrent																																
	RFF1	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFF2	4 times per year		3				3		3				3		3				3		3				3		3				3
	RFF3	4 times per year		3				3		3				3		3				3		3				3		3				3
Routine Water Quality Monitoring			**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**
Ebb Tide																																
Impact Station Downcurrent																																
	IPE1	2 times per year		*						*						*						*						*				
	IPE2	2 times per year		*						*						*						*						*				
	IPE3	2 times per year		*						*						*						*						*				
	IPE4	2 times per year		*						*						*						*						*				
	IPE5	2 times per year		*						*						*						*						*				
Intermediate Station Downcurrent																																
	INE1	2 times per year		*						*						*						*						*				
	INE2	2 times per year		*						*						*						*						*				
	INE3	2 times per year		*						*						*						*						*				
	INE4	2 times per year		*						*						*						*						*				
	INE5	2 times per year		*						*						*						*						*				
Reference Station Upcurrent																																
	RFE1	2 times per year		*						*						*						*						*				
	RFE2	2 times per year		*						*						*						*						*				
	RFE3	2 times per year		*						*						*						*						*				
	RFE4	2 times per year		*						*						*						*						*				
	RFE5	2 times per year		*						*						*						*						*				
Flood Tide																																
Impact Station Downcurrent																																
	INF1	2 times per year		*						*						*						*						*				
	INF2	2 times per year		*						*						*						*						*				
	INF3	2 times per year		*						*						*						*						*				
Intermediate Station Downcurrent																																
	IPF1	2 times per year		*						*						*						*						*				
	IPF2	2 times per year		*						*						*						*						*				
	IPF3	2 times per year		*						*						*						*						*				
Reference Station Upcurrent																																
	RFF1	2 times per year		*						*						*						*						*				
	RFF2	2 times per year		*						*						*						*						*				
	RFF3	2 times per year		*						*						*						*						*				
Water Column Profiling			**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**
Plume Stations	WCP1	6 times per year	2	2				2	2	2				2	2	2				2	2	2				2	2	2				2
	WCP2	6 times per year	2	2				2	2	2				2	2	2				2	2	2				2	2	2				2
Benthic Recolonisation Studies			**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**
Capped Contaminated Mud Pits																																
	CPA 1-3	2 times per year		3				3								3				3								3				3
	CPB 1-3	2 times per year		3				3								3				3								3				3
	CPC 1-3	2 times per year		3				3								3				3								3				3
Reference Stations																																
	RBA 1-3	2 times per year		3				3								3				3								3				3
	RBB 1-3	2 times per year		3				3								3				3								3				3
	RBC 1-3	2 times per year		3				3								3				3								3				3

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

Sampling completed

Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V (July 2009 - April 2011)

			2009						2010												2011											
Baseline Water Quality Monitoring			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
Near Field	ESC-WNAA		*	*																												
	ESC-WNAB		*	*																												
	ESC-WNAC		*	*																												
	ESC-WNAD	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																												
	ESC-WNBA		*	*																												
	ESC-WNBB		*	*																												
	ESC-WNBC		*	*																												
	ESC-WNBD		*	*																												
Mid Field	ESC-WMB	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																												
	ESC-WMA		*	*																												
Far Field	ESC-WFA	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																												
	ESC-WFB		*	*																												
	MW1		*	*																												
Reference Stations	NM1		*	*																												
	NM2		*	*																												
	NM3	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																												
	NM5		*	*																												
	NM6		*	*																												

Water Column Profiling		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
Plume Stations	Upstream			2	2	2	2	2	2																						
	Downstream			2	2	2	2	2	2																						

Water Quality Impact Monitoring for Dredging		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
Downcurrent Impact Stations	1			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	3			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	4			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	5			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Upcurrent Stations	1			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW1			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Sampling completed
Sampling to be completed

Annex B

Monitoring Results

Table B1 Summary Table of DO, Turbidity and TSS Levels Recorded in November 2011

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)
			Bottom	Surface and Mid Depth		
2011/11/04	ME	DS1	5.94	6.10	6.48	6.50
		DS2	5.92	6.05	6.86	7.67
		DS3	5.98	6.09	6.48	6.50
		DS4	6.00	6.13	5.52	6.00
		DS5	5.98	6.10	6.70	11.17
		MW1	5.81	5.87	3.19	4.00
		US1	6.02	6.09	8.53	9.83
		US2	5.95	6.10	12.48	11.83
	MF	DS1	5.75	5.91	31.76	41.00
		DS2	5.69	5.98	13.84	12.67
		DS3	5.93	6.05	6.96	5.17
		DS4	5.83	5.98	7.51	7.00
		DS5	5.87	6.14	5.23	4.50
		MW1	5.73	5.81	6.75	6.17
		US1	5.70	6.01	12.63	11.83
		US2	5.78	6.10	13.79	13.50

Notes:

1. Cell shaded yellow indicates value exceeding the Action Level.

Annex C

Study Programme

ID	Task Name
1	**Project Commencement**
2	
3	**For CMP IV and New Facility at East Sha Chau**
4	
5	Submission of Draft Inception Report & Draft Programme
6	Submission of Final Inception Report & Final Programme
7	Submission of Draft Operations Manual
8	Submission of Final Operations Manual
9	**Submission of Operations Manual Updates**
17	Submission of Draft Monitoring And Audit Manual (Rev 1)
18	Submission of Final Monitoring And Audit Manual (Rev 1)
19	Submission of Draft Monitoring And Audit Manual (Rev 2)
20	Submission of Final Monitoring And Audit Manual (Rev 2)
21	**Submission of EM&A Manual Updates**
29	
30	**Monitoring Contract Works**
31	Prepare Draft Letters of Invitation, Gazette Documents & Tender Documents
32	Submission of Draft Tender Documents
33	Submission of Draft Gazette Documents
34	Submission of Final Tender Documents
35	Submission of Final Gazette Documents
36	Tendering and Tender Assessment
37	Prepare Contact Documents
38	Submission of Contract Documents
39	Administrate and Supervise Contracted Field and Laboratory Works
40	**Submission of Report on Dredging & Capping Operations**
49	**Monthly Progress Report**
101	**Quarterly EM&A Reports**
115	**Submission of Annual Review Report**
120	**Submission of Annual Risk Assessment Report**
125	**Submission of Draft Final Report**
126	**Submission of the Final Report**
127	**Submission of Draft Executive Summary Report**
128	**Submission of Final Executive Summary Reports**
129	
130	**For East Tung Lung Chau Disposal Facility**
131	
132	**Submission of Monitoring Results & Monthly EM&A Progress Report**
133	October 2009
134	November 2009
135	December 2009
136	January 2010

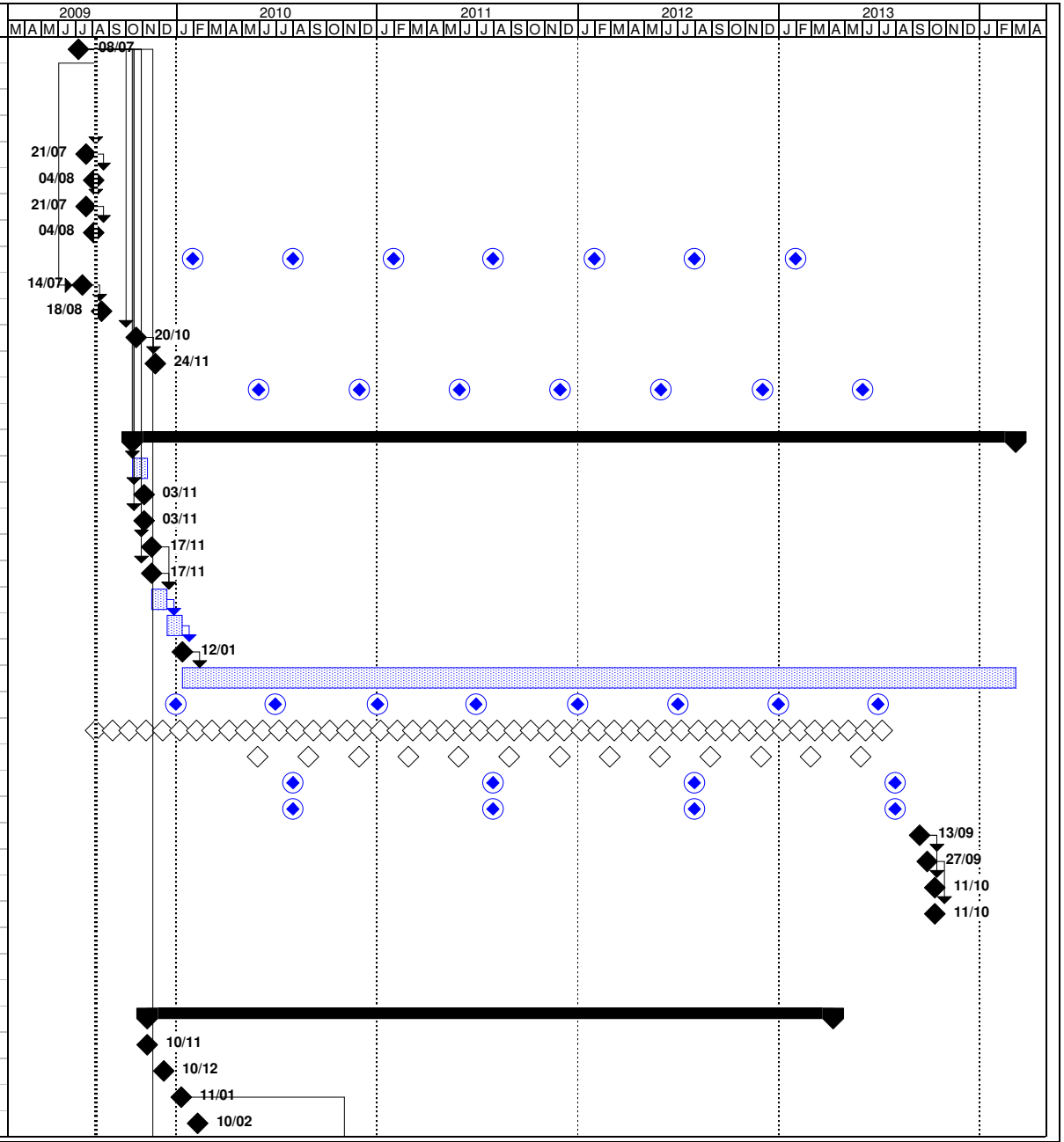

Figure 4.1 - Study Programme

Task | Milestone | Rolled Up Task
Progress | Summary | Rolled Up Milestone

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

ID	Task Name
137	February 2010
138	March 2010
139	October 2010
140	November 2010
141	December 2010
142	January 2011
143	February 2011
144	March 2011
145	October 2011
146	November 2011
147	December 2011
148	January 2012
149	February 2012
150	March 2012
151	October 2012
152	November 2012
153	December 2012
154	January 2013
155	February 2013
156	March 2013
157	**Submission of Initial Review Report**
158	**Submission of Quarterly EM&A Report**
159	Quarter 1 2010
160	Quarter 2 2010
161	Quarter 3 2011
162	Quarter 4 2011
163	Quarter 5 2012
164	Quarter 2 2012
165	Quarter 1 2013
166	**Submission of Annual Report**
167	Annual Report 1 2010
168	Annual Report 2 2011
169	Annual Report 3 2012
170	
171	**Alternative / Modified Capping Design**
172	
173	**Submission of Investigation Report**
174	**Submission of Annual Report**
175	Capping Design Annual Report 2010
176	Capping Design Annual Report 2011
177	Capping Design Annual Report 2012

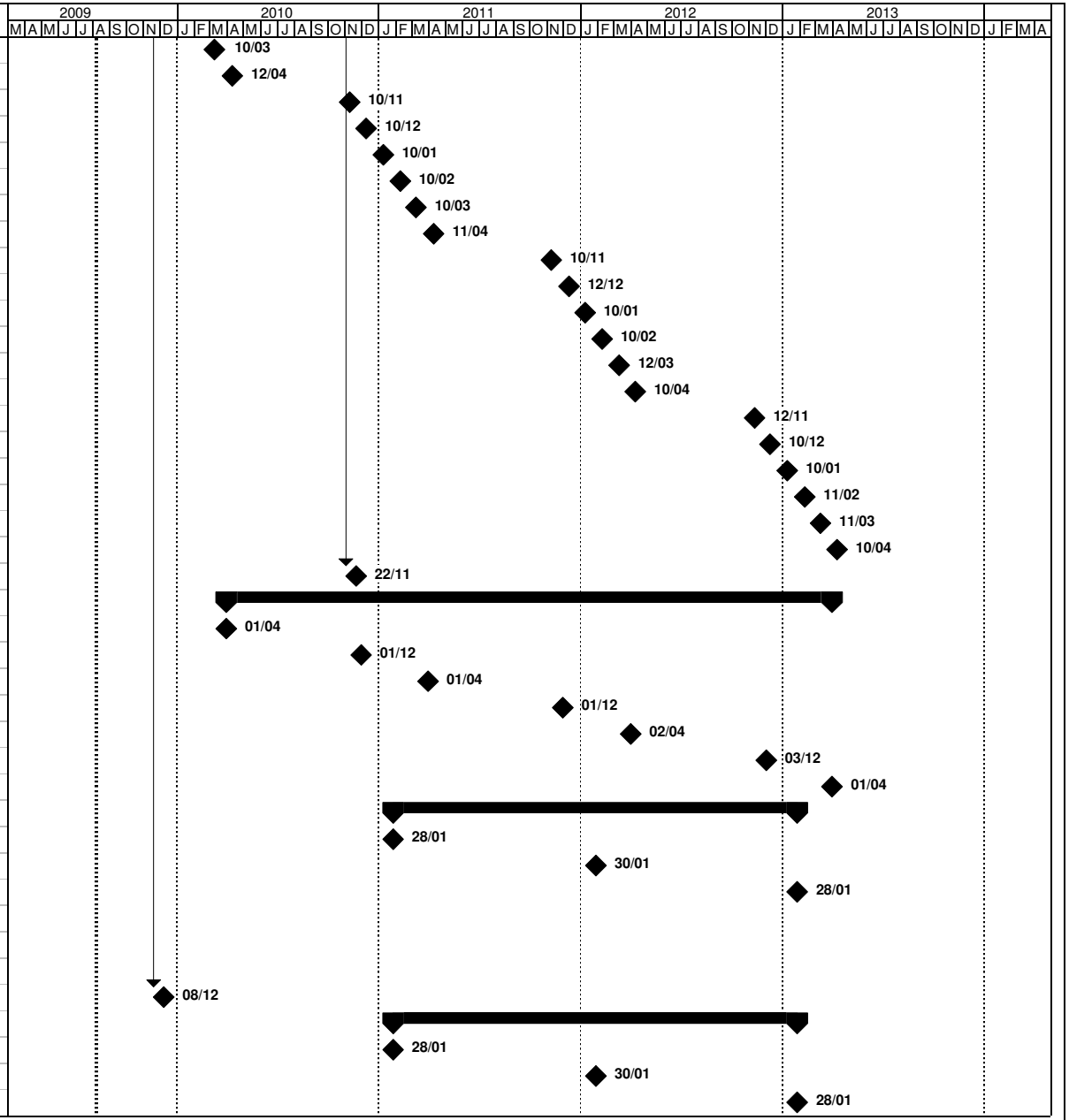

Figure 4.1 - Study Programme

Task | Milestone | Rolled Up Task
Progress | Summary | Rolled Up Milestone

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