




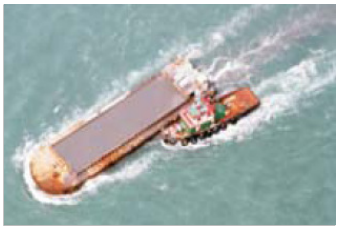
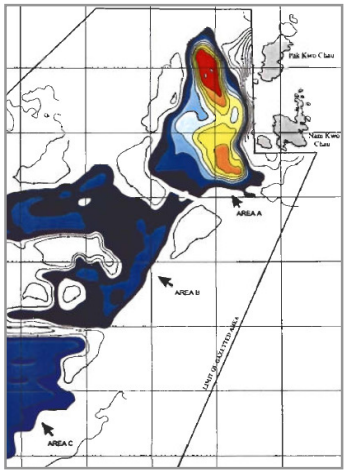

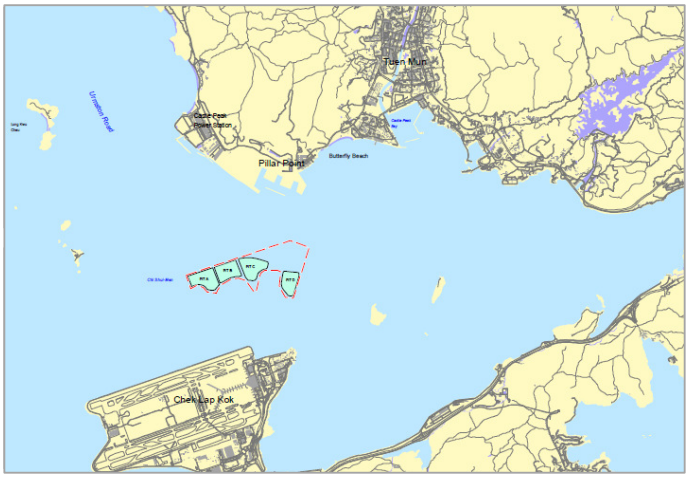


CEDD 土木工程拓展署
Civil Engineering and Development Department

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

***Agreement No. CE 4/2009(EP)***

## 44th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – February 2013

Revision 0

14 March 2013

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

## 44th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – February 2013

*Revision 0*

***Document Code: 0103262 Monthly Progress Feb 13_v0.doc***


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| | |
|---|---|
| Client:<br><br>Civil Engineering and Development Department (CEDD) | Project No:<br><br>0103262 |
| Summary:<br><br>This document presents progress of monitoring works on contaminated mud pits at Sha Chau in February 2013 under Agreement No. CE 4/2009 (EP). | Date:<br>14 March 2013<br>Approved by:<br>  <br>*Dr Robin Kennish*<br>*Director* |

| Revision | Description | By | Checked | Approved | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| 0 | 44th Monthly Progress Report for ESC CMP | RC | JT | RK | 14/3/13 |



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CEDD Civil Engineering and Development Department

# 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: | 44th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – February 2013 |
| Date of Report: 14/03/2013 | |
| Date received by ET: 14/03/2013 | |
| Date received by IA: 14/03/2013 | |

**Reference EP Condition**

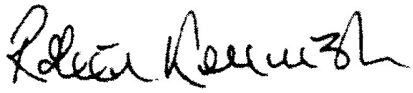
Environmental Permit Condition: Condition No.: 3.4

*Content:*

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.

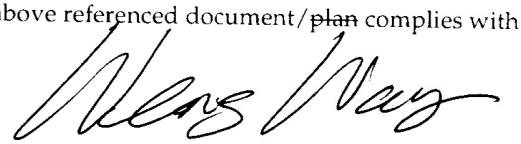
**ET Certification**

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: 14/03/2013

**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: 14/3/2013

Notes:

*CONTENTS*



*ANNEXES*

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

# 44TH MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS AT SHA CHAU FEBRUARY 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 February 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.

***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 February 2013.

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

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

- *Pit Specific Sediment Chemistry* was conducted for CMP Va on 1 February 2013;
- *Cumulative Impact Sediment Chemistry* was conducted for CMP Va on 7 February 2013;
- *Sediment Toxicity Tests* was conducted for CMP Va on 20 February 2013;
- *Demersal Trawling* was conducted for CMP Va on 21 and 22 February 2013;
- *Routine Water Quality Monitoring* was conducted for CMP Va on 25 February 2013;

- *Impact Water Quality Monitoring during Dredging Operations* for CMP Vd were conducted on 27 February 2013; and

- *Water Column Profiling* was scheduled to be undertaken on 27 February 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*.

***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*, *Cumulative Impact Sediment Chemistry*, *Sediment Toxicity Tests* and *Demersal Trawling* conducted in February 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 January / February 2013***

| Monitoring activities | Date of Monitoring | Monitoring results presented in this report? |
|---|---|---|
| Pit Specific Sediment Chemistry Monitoring for CMP Va | 11 Jan 2013 | Yes |
| | 1 Feb 2013 | No. Laboratory analysis yet to be completed during preparation of this monthly report. |
| Cumulative Impact Sediment Chemistry Monitoring for CMP Va | 7 Feb 2013 | No. Laboratory analysis yet to be completed during preparation of this monthly report. |
| Sediment Toxicity Tests | 20 Feb 2013 | No. Laboratory analysis yet to be completed during preparation of this monthly report. |
| Demersal Trawling for CMP Va | 21,22 Feb 2013 | No. The results will be presented in the subsequent quarterly report. |
| Routine Water Quality Monitoring for CMP Va | 25 Feb 2013 | Yes |

| Monitoring activities | Date of Monitoring | Monitoring results presented in this report? |
|---|---|---|
| Water Column Profiling for CMP Va | 27 Feb 2013 | No *in-situ* measurements and water sampling as there was no dumping activity on the monitoring day. |
| Impact Water Quality Monitoring during Dredging Operations of CMP Vd | 27 Feb 2013 | Yes |

### *1.5.2 Pit Specific Sediment Chemistry of CMP Va – January 2013*

*1.5.3* Monitoring locations for Pit Specific Sediment Chemistry for CMP Va are shown in *Figure 1.1*. A total of six monitoring stations were sampled in January 2013. Concentrations of Arsenic exceeded the Lower Chemical Exceedance Level (LCEL) at Pit Edge stations NEDA and NEDB and Near Pit station NNDA. Concentrations of Mercury and Zinc exceeded the LCEL at Active Pit station NPDA while concentrations of Silver exceeded the Upper Chemical Exceedance Level (UCEL) and LCEL at Active Pit stations NPDA and NPDB, respectively (*Figures 1-2* of *Annex B*). It is also observed that the variations of metal concentrations at Active Pit Stations were much larger (ie greater standard deviation) when compared to other stations. Whilst the average concentration of Arsenic in the Earth's crust is generally ~2mg/kg, significantly higher Arsenic concentrations (median = 14 mg/kg) have been recorded in Hong Kong's onshore sediments [1]. It is presumed that the natural concentrations of Arsenic are similar in onshore and offshore sediments [2], and relatively high Arsenic levels may thus occur throughout Hong Kong. Therefore, the slight exceedances of the LCEL for Arsenic are unlikely to be caused by the disposal operations at CMP Va but rather as a result of naturally occurring deposits. In addition, the Active Pit stations are located within CMP Va which was receiving contaminated mud during the reporting period. As such, the exceedances of LCEL/UCEL for Mercury, Silver and Zinc which were recorded at Active Pit stations only are not considered as indicating any dispersal of contaminated mud from CMP Va.

[1] Sewell RJ (1999) Geochemical Atlas of Hong Kong. Geotechnical Engineering Office, Government of the Hong Kong Special Administrative Region

[2] Whiteside PGD (2000) Natural geochemistry and contamination of marine sediments in Hong Kong. In: The Urban Geology of Hong Kong (ed Page A & Reels SJ). Geological Society of Hong Kong Bulletin No. 6, p109-121

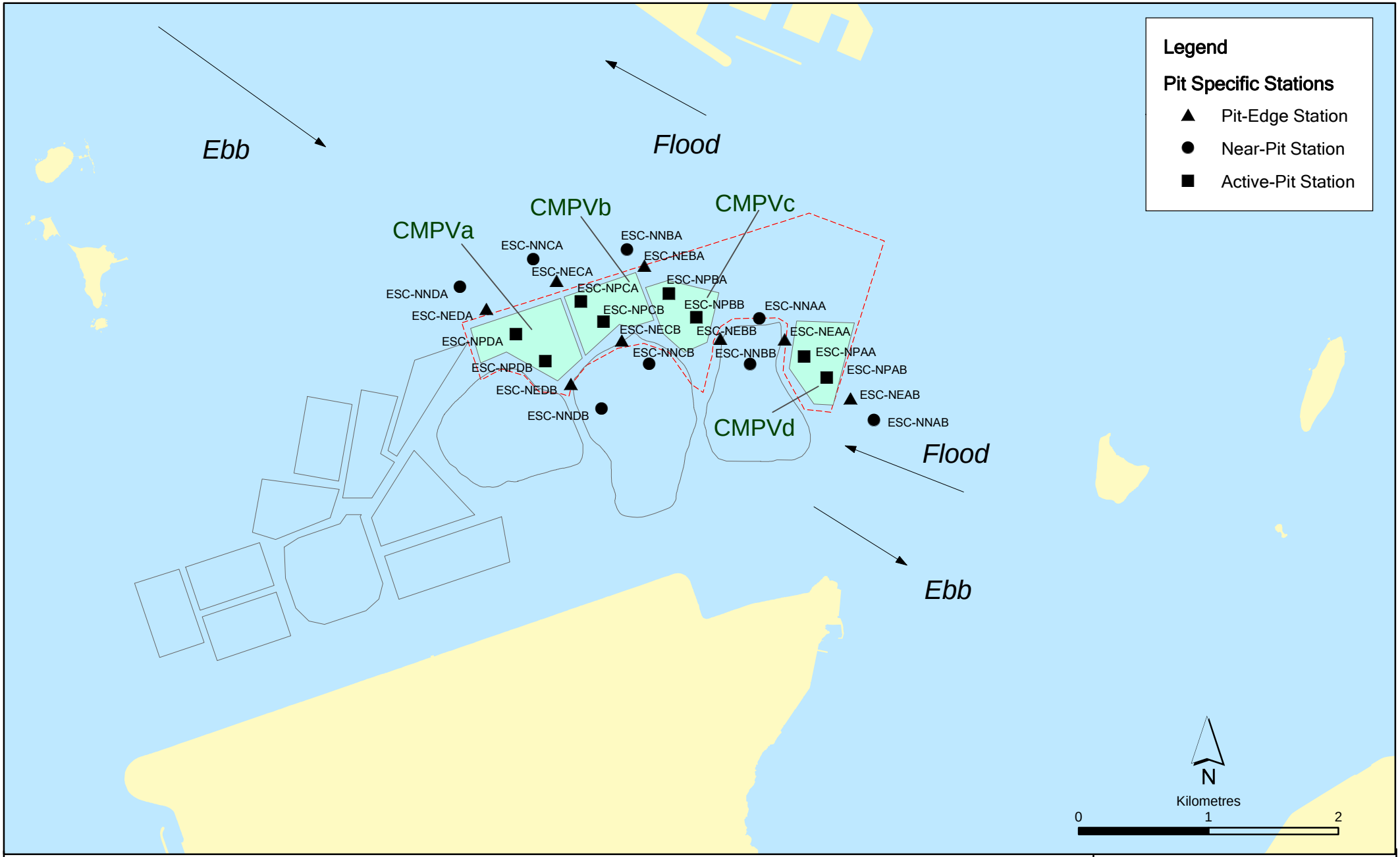



Figure 1.1

Pit Specific Sediment Quality Monitoring Stations for CMPV

File: CMPV\0103262_SQMS_pit specific.mxd
Date: 29/10/2009

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***1.5.4*** For organic contaminants, Total Organic Carbon (TOC) concentration was similar amongst all stations (*Figure 3* of *Annex B*). Tributyltin (TBT) concentration was higher at Active Pit stations NPDA and NPDB when compared to other stations (*Figure 4 of Annex B*). High Molecular Weight Polycyclic Aromatics Hydrocarbons (High MW PAHs) concentrations were below the limit of reporting at all stations except at Active Pit stations (NPDA and NPDB) and Pit-Edge station (NEDB) (*Figure 5 of Annex B*). Low Molecular Weigh Polycyclic Aromatics Hydrocarbons (Low MW PAHs) concentrations were below the limit of reporting at all stations except at Active Pit stations (NPDA and NPDB). Total Polychlorinated Biphenyls (PCBs), Total Dichloro-diphenyl-trichloroethane (DDT) and 4,4'-Dichloro-diphenyl-dichloroethylene (4,4'-DDE) were below the limit of reporting at all stations.

***1.5.5*** As described in *Section 1.5.3*, the higher concentrations of contaminants (including metals and organic contaminants) recorded at the Active Pit stations only are not considered as indicating any dispersal of contaminated mud from CMP Va. Nevertheless, detailed analysis will be presented in the *Quarterly Report* to reveal any trend of increasing sediment contaminant concentrations towards CMP Va.

***1.5.6*** Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP Va during this monthly period.

***1.5.7*** ***Impact Water Quality Monitoring during Dredging Operations of CMP Vd – February 2013***

***1.5.8*** *Impact Water Quality Monitoring during Dredging Operations of CMP Vd* was conducted on 27 February 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 1.2*). 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 is less than 6 m, the mid-depth station was omitted. If water depth is less than 3 m, only the mid-depth station was monitored.

***1.5.9*** Monitoring results are presented in *Table C1* of *Annex C*. Levels of Dissolved Oxygen (DO), Turbidity and Suspended Solids (SS) complied with the Action and Limit Levels set in the Baseline Monitoring Report (1).

***1.5.10*** 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) 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).

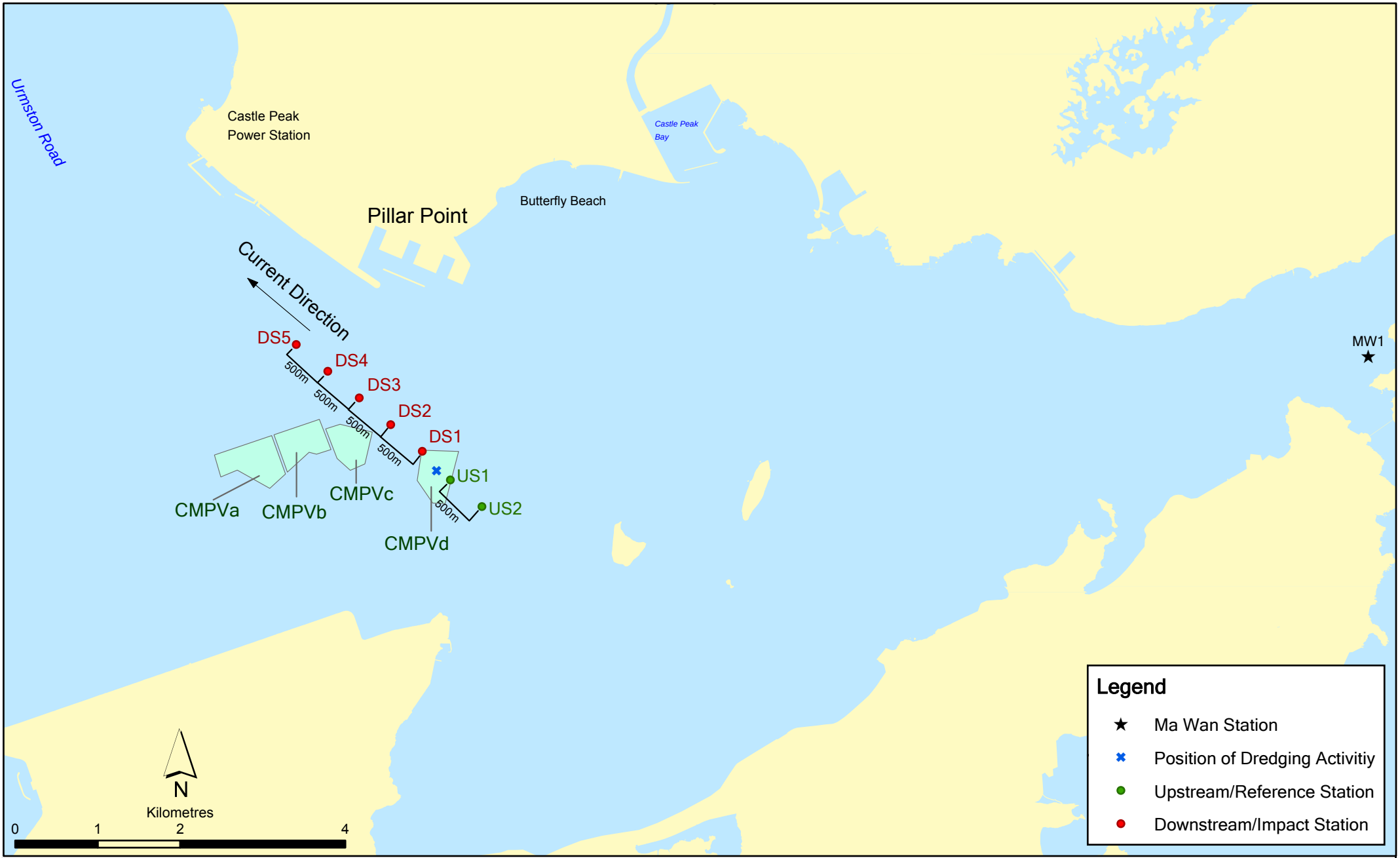


Figure 1.2

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.

File: T:\GIS\CONTRACT\0103262\Mxd\CMPV\0103262_modelling stations2.mxd
Date: 28/11/2012

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### *1.5.11 Routine Water Quality Monitoring for CMP Va – February 2013*

***1.5.12*** The results for the Routine Water Quality Monitoring conducted during February 2013 in the dry 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 dry season period (November to March) 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 B*. Monitoring was undertaken at a total of 10 stations in the reporting month (see *Figure 1.3*).

*In-situ Measurements*

***1.5.13*** Analysis of results for February 2013 indicated that for all stations (Impact, Intermediate, Reference and Ma Wan), levels of pH, DO and salinity complied with the WQOs (*Figures 6-9* of *Annex B*). Levels of DO and Turbidity within the reporting month complied with the Action and Limit Levels set in the *EM&A Manual* (1) (*Figures 7 and 10 of Annex B*). All *in-situ* water quality measurements showed relatively minor variations amongst Impact, Intermediate and Reference stations (*Figures 6-10* of *Annex B*).

*Laboratory Measurements*

***1.5.14*** Analyses of February 2013 results indicate that concentrations of Cadmium, Chromium, Mercury and Silver were below their limit of reporting at all stations. Arsenic, Copper, Lead, Nickel and Zinc were detected in samples from all stations (*Figures 11 and 12 of Annex B*). Concentrations of Arsenic, Lead and Nickel appeared to be similar amongst all stations while concentration of Zinc was the highest at Ma Wan Station. Levels of 5-day Biochemical Oxygen Demand ($BOD_5$), Total Inorganic Nitrogen (TIN) and $NH_3$-N were similar amongst all stations (*Figures 13 and 14 of Annex B*). Concentrations of SS complied with the WQO (15.34 mg/L for dry season) and Action and Limit Levels at all stations within the reporting month (*Figure 15 of Annex B*).

***1.5.15*** Overall, the results indicated that the disposal operation at CMP Va did not appear to cause any deterioration in water quality during this reporting period.

(1) 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).

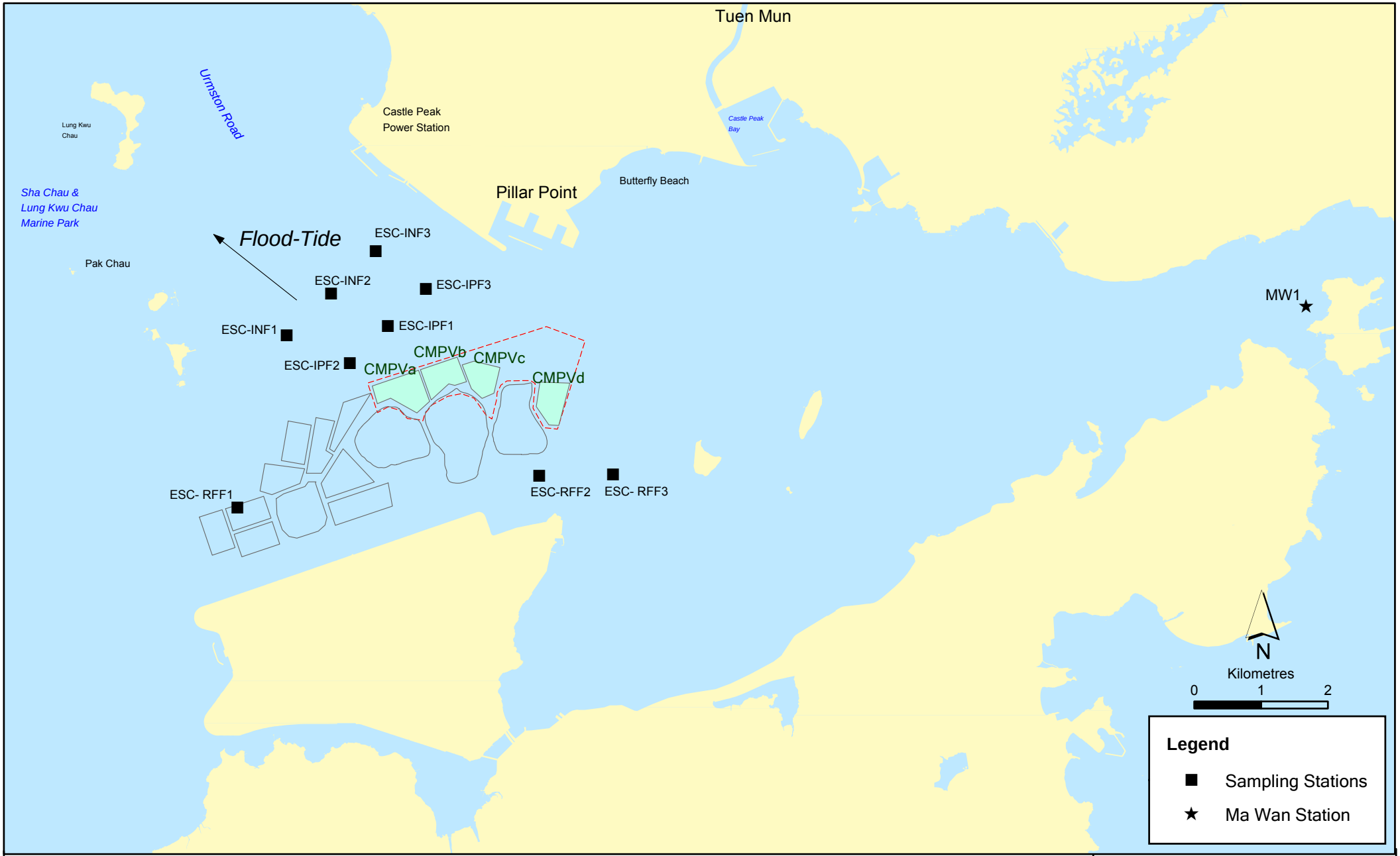


Figure 1.3

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

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Date: 3/12/2012

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

| Stations | Temp (°C) | Salinity | Turbidity (NTU) | pH | Dissolved Oxygen (%) | Dissolved Oxygen (mg $L^{-1}$) |
|---|---|---|---|---|---|---|
| RFF (Reference) | 18.78 | 31.07 | 3.83 | 8.12 | 110.70 | 8.57 |
| IPF (Impact) | 18.80 | 30.98 | 3.87 | 8.13 | 114.53 | 8.87 |
| INF (Intermediate) | 19.04 | 30.55 | 5.90 | 8.13 | 113.00 | 8.74 |
| Ma Wan Station | 18.78 | 31.35 | 1.30 | 7.96 | 103.36 | 7.99 |
| WQO | *N/A* | 27.97-34.18# | *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 February 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 | 1.38 | <LOR | <LOR | <LOR | 1.60 | <LOR | <LOR | 1.42 | 3.42 | 0.02 | 0.21 | 0.95 | 4.88 |
| IPF | 1.25 | <LOR | <LOR | <LOR | 0.94 | <LOR | <LOR | 1.38 | 2.29 | 0.02 | 0.20 | 0.87 | 8.46 |
| INF | 1.50 | <LOR | <LOR | <LOR | 1.23 | <LOR | <LOR | 1.75 | 2.42 | 0.02 | 0.29 | 1.28 | 5.08 |
| Ma Wan Station | 1.50 | <LOR | <LOR | <LOR | 2.63 | <LOR | 0.56 | <LOR | 5.50 | 0.05 | 0.29 | 0.62 | 4.13 |
| | | | | | | | | | | | | | WQO of SS: 15.34mg/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 March 2013 for CMP V:

- *Pit Specific Sediment Chemistry* for CMP Va;
- *Water Column Profiling* for CMP Va; and
- *Impact Water Quality Monitoring during Dredging Operations* for CMP Vd.

***1.6.2*** 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** |
| ***Ebb Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impact Station Downcurrent | | | | | | | | | | | | | | | | | | | | | | | | | |
| | IPE1 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | IPE2 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | IPE3 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | IPE4 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | PFC1 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| Intermediate Station Downcurrent | | | | | | | | | | | | | | | | | | | | | | | | | |
| | INE1 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | INE2 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | INE3 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | INE4 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | INE5 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| Reference Station Upcurrent | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RFE1 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | RFE2 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | RFE3 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | RFE4 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| | RFE5 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | * |
| ***Flood Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | * | | | | | | | | | | | | | | | | |

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

Sampling completed

Sampling to be completed

*Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V (January 2012 - February 2014)*

| | | 2012 | | | | | | | | | | | | 2013 | | | | | | | | | | | | 2014 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pit Specific Sediment Chemistry** | **Code** | **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** |
| Active-Pit | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-NPDA | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| | ESC-NPDB | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| Pit-Edge | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-NEDA | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| | ESC-NEDB | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| Near-Pit | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-NNDA | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| | ESC-NNDB | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |

| **Cumulative Impact Sediment Chemistry** | **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** |
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| Near-field Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-RNA | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| ESC-RNB | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| Mid-field Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-RMA | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| ESC-RMB | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| Capped Pit Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-RCA | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| ESC-RCB | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| Far-Field Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-RFA | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| ESC-RFB | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |
| Ma Wan Station | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MW1 | | * | | | | * | | * | | | | * | | * | | | | * | | * | | | | | | |

| **Sediment Toxicity Tests** | **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** |
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| Near-Field Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TDA | | * | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| ESC-TDB | | * | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| Reference Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TRA | | * | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| ESC-TRB | | * | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| Ma Wan Station | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MW1 | | * | | | | | | * | | | | | | * | | | | | | * | | | | | | |

| **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** | **J** | **F** |
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| Impact Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-INA | | | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| ESC-INB | | | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| Reference | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TNA | | | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| ESC-TNB | | | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TSA | | | | | | | | * | | | | | | * | | | | | | * | | | | | | |
| ESC-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** | **J** | **F** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Impact Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-INA | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |
| ESC-INB | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |
| Reference Stations | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TNA | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |
| ESC-TNB | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESC-TSA | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |
| ESC-TSB | | | | | | | * | * | | | | | * | * | | | | | * | * | | | | | | |

| **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** | **J** | **F** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Ebb Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | * | | * |
| ***Flood Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | * | | * |

| | | 2012 | | | | | | | | | | | | 2013 | | | | | | | | | | | | 2014 | |
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| **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** |
| ***Ebb Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | * | | * | * | | * | * | | * | * | | * | * | | * | * | | * | * | | | | | | |
| ***Flood Tide*** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-CPA | | | | | | | | * | | | | * | | | | | | | | * | | | | * | | |
| | ESC-CPB | | | | | | | | * | | | | * | | | | | | | | * | | | | * | | |
| | ESC-CPC | | | | | | | | * | | | | * | | | | | | | | * | | | | * | | |
| Reference Stations | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 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

# Monitoring Results

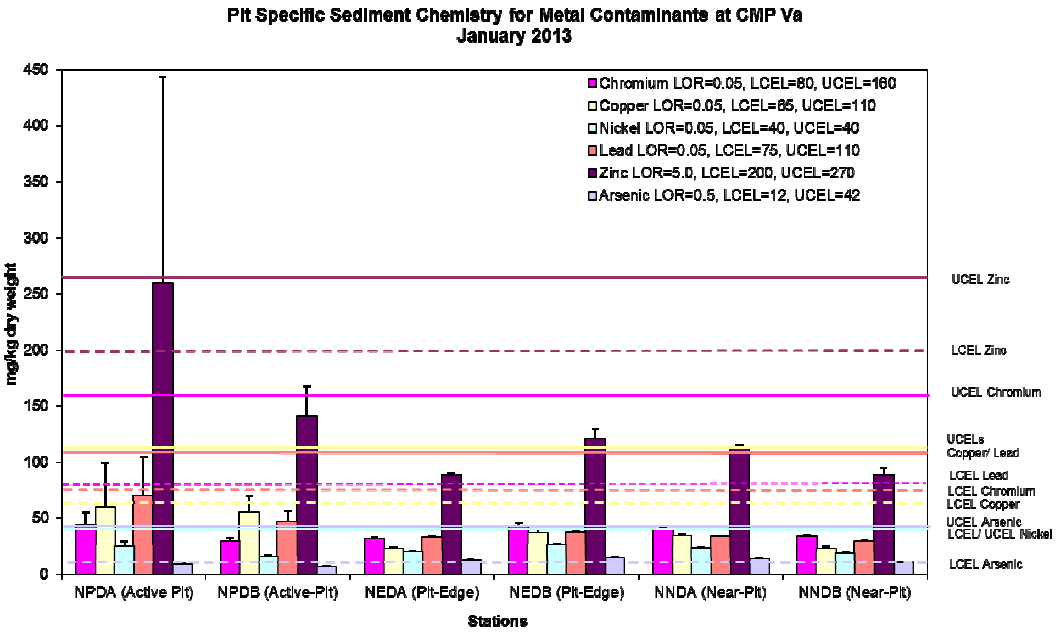


Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in January 2013.

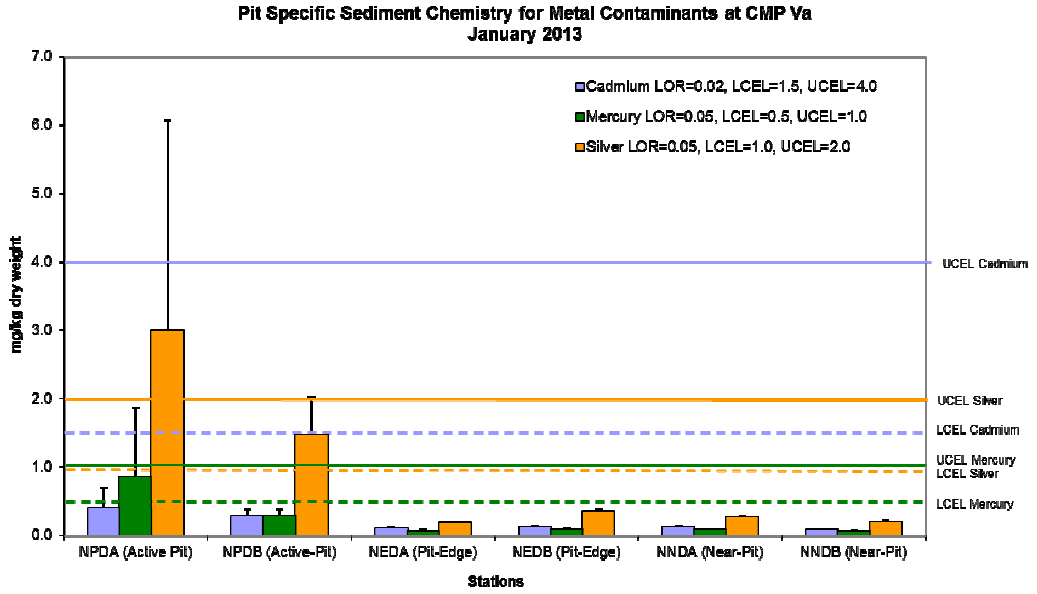


Figure 2: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in January 2013.

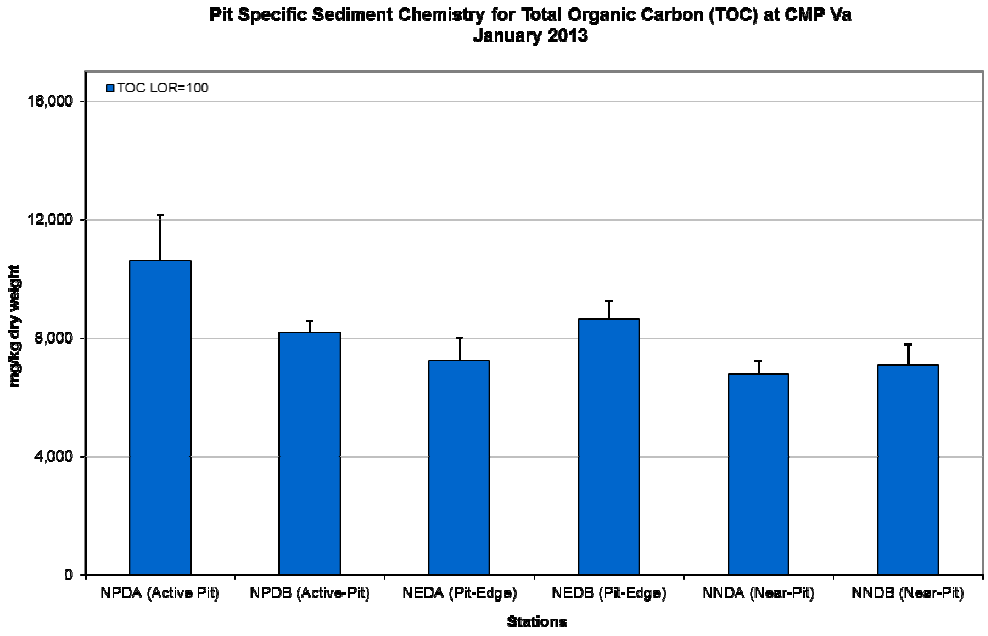


Figure 3: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in January 2013.

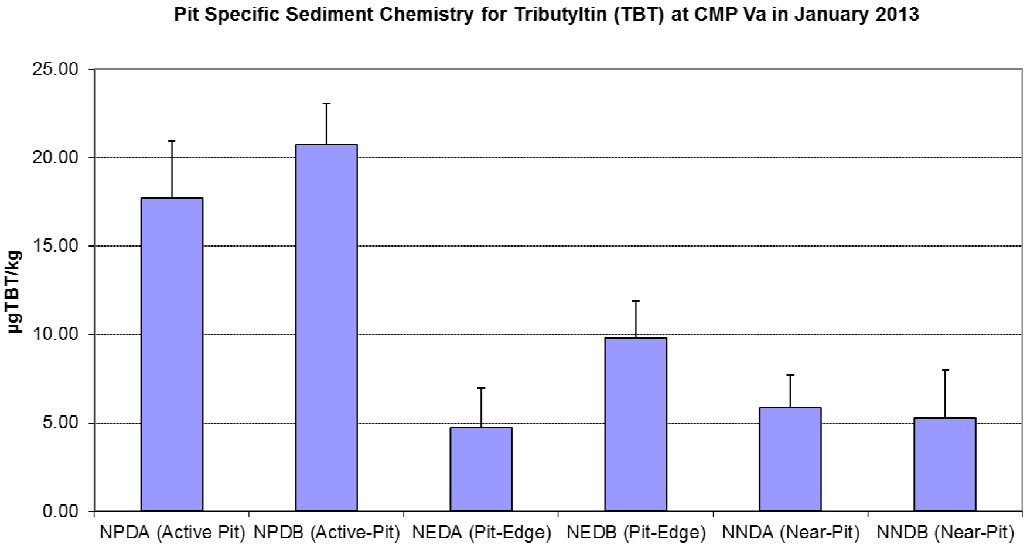


Figure 4: Concentration of Tributyltin (µg TBT/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring of CMP Va in January 2013.

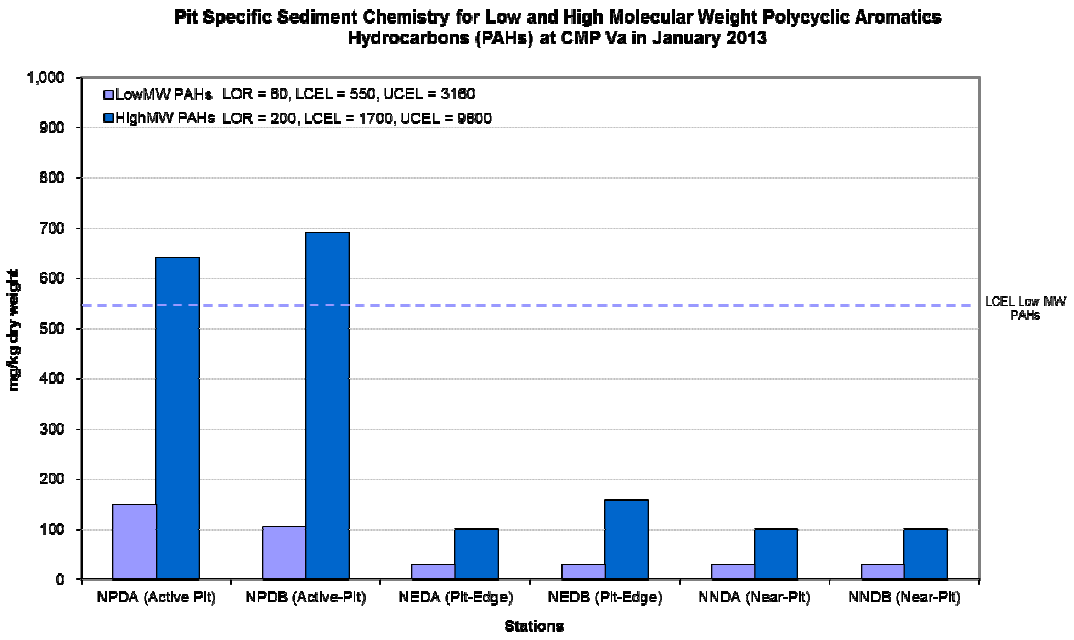


Figure 5: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) (µg/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in January 2013.

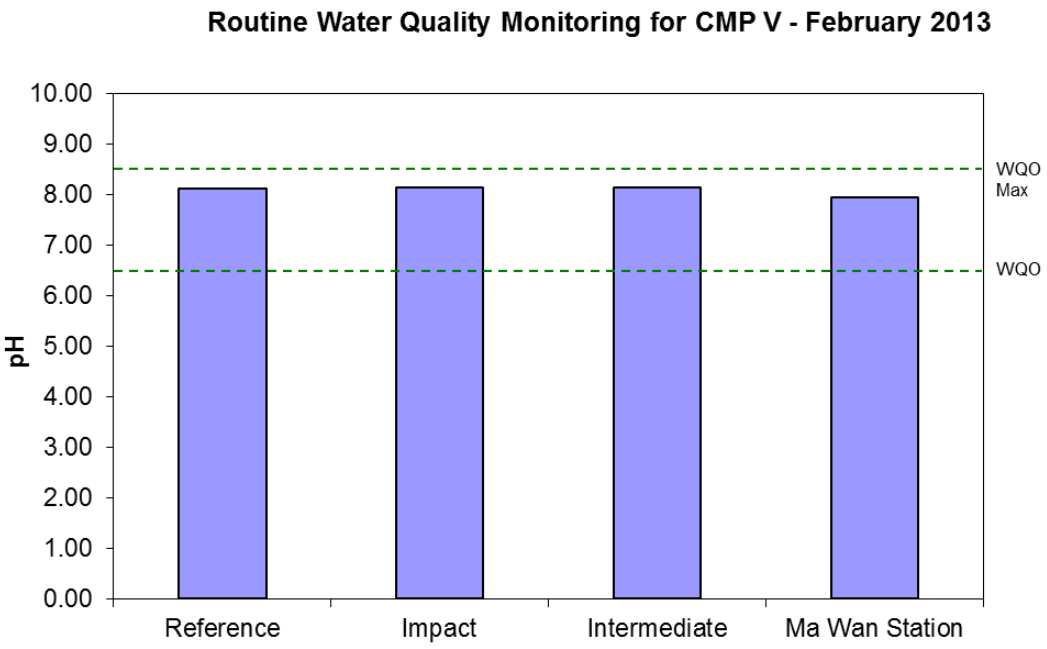


Figure 6: Level of pH (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

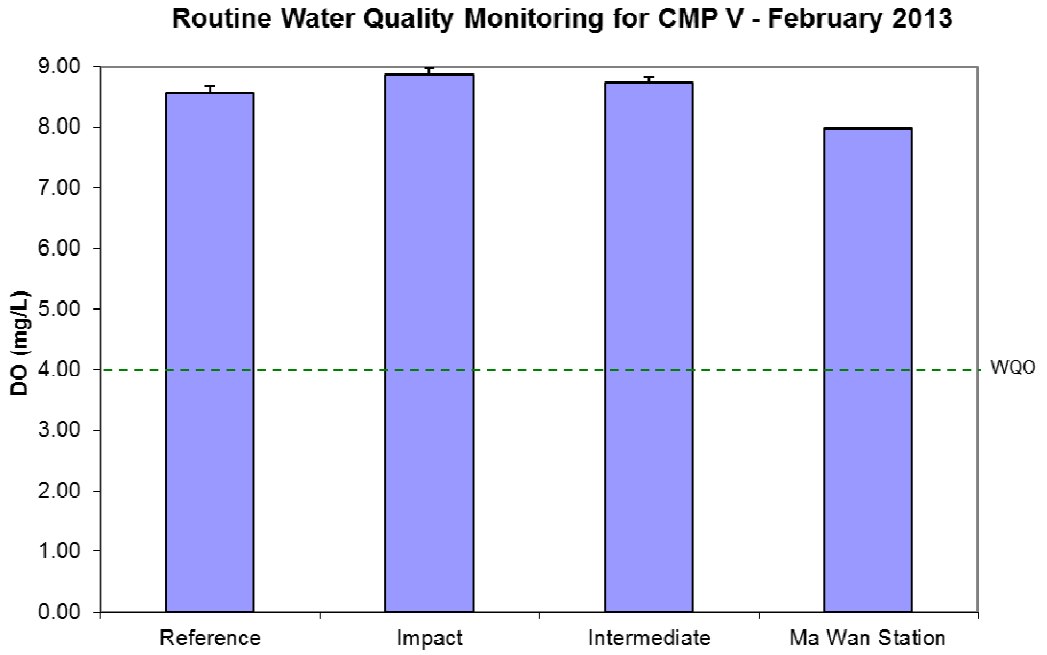


Figure 7: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

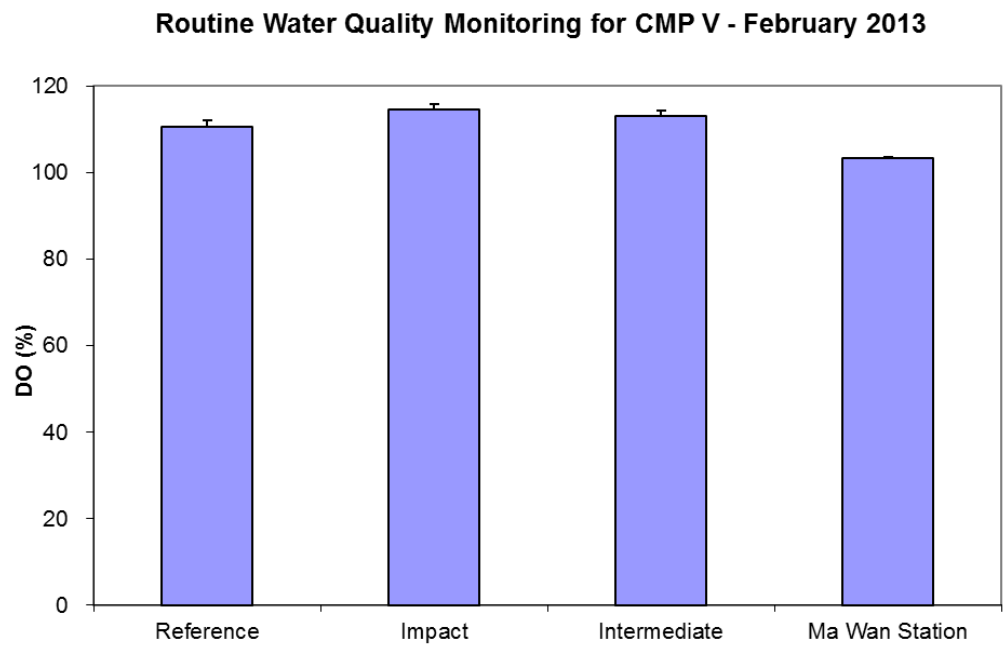


Figure 8: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

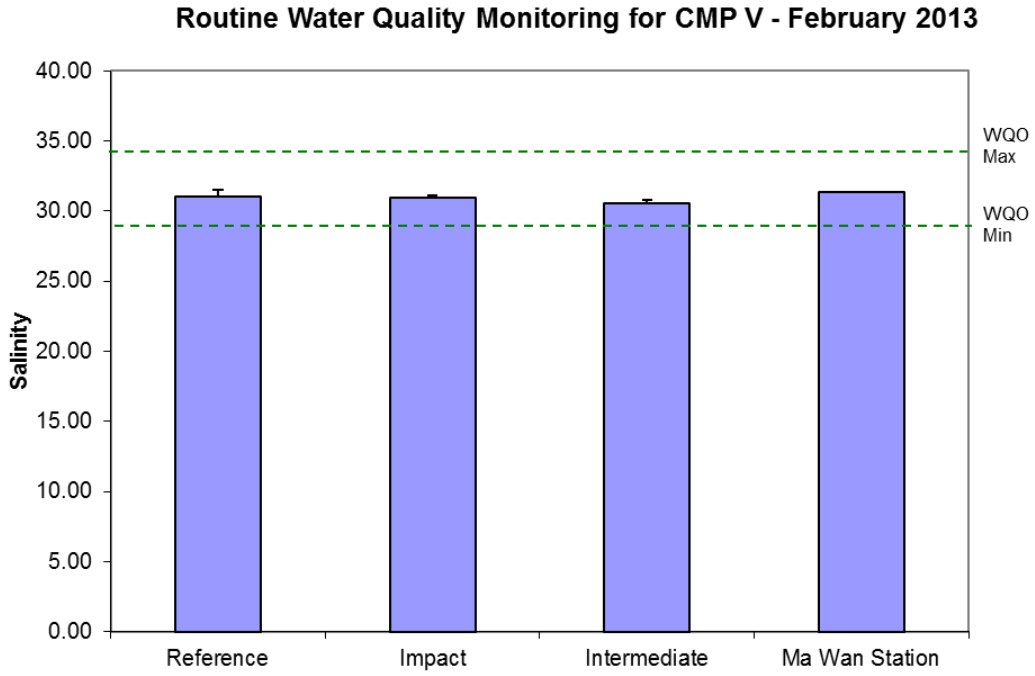


Figure 9: Level of Salinity (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

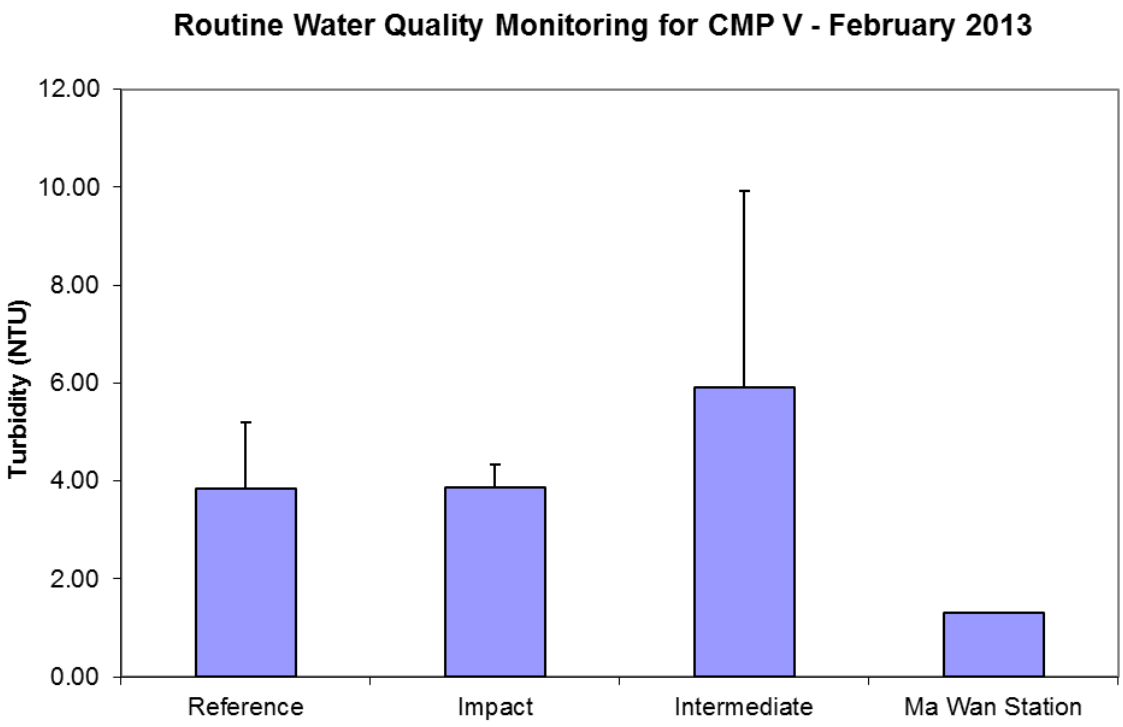


Figure 10: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

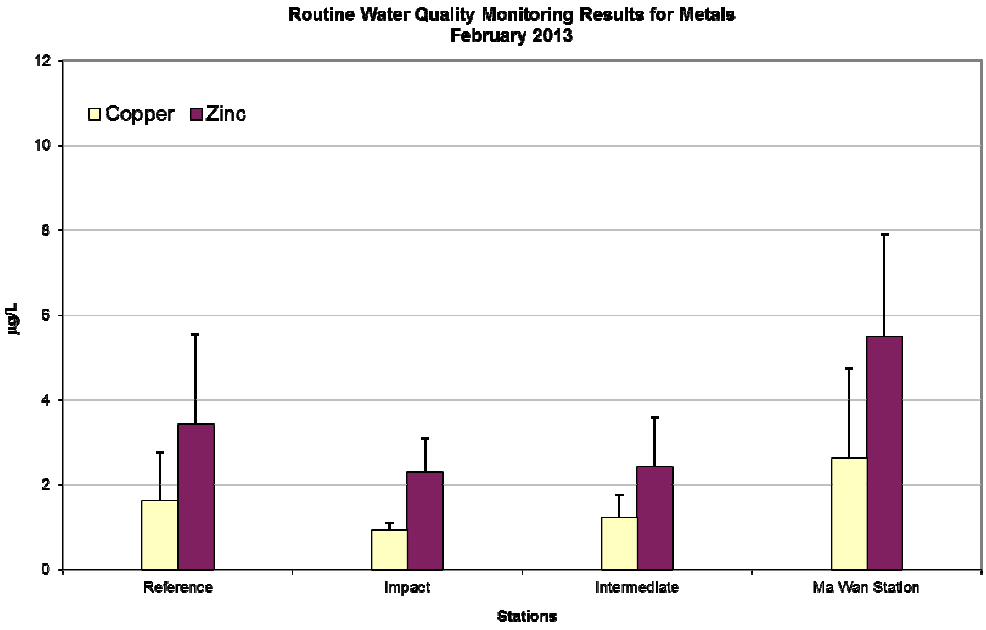


Figure 11: Concentration of Copper and Zinc (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

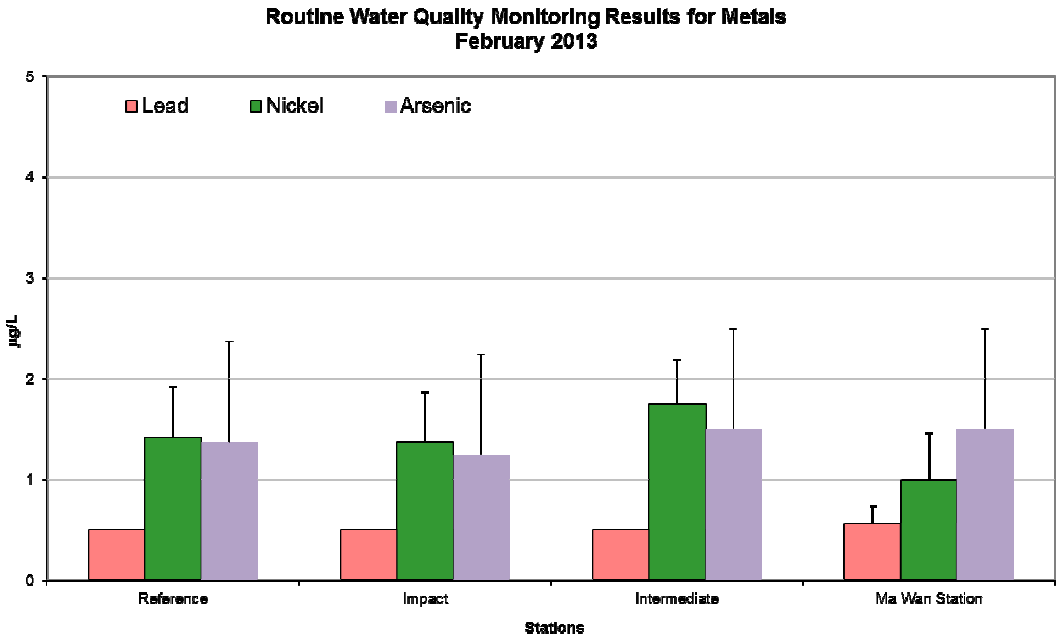


Figure 12: Concentration of Lead, Nickel and Arsenic (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

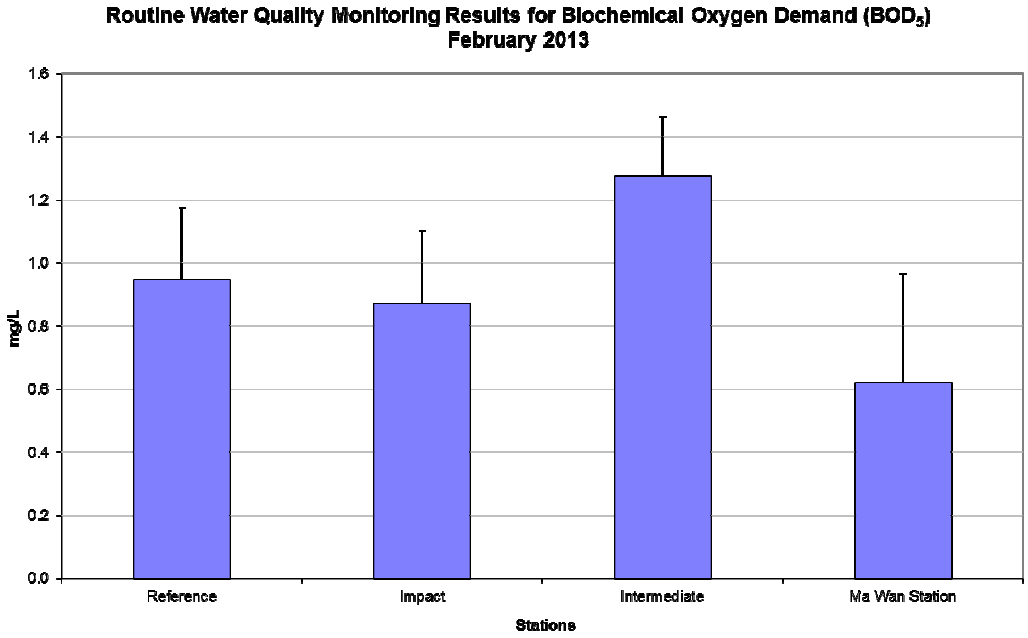


Figure 13: Level of Biochemical Oxygen Demand ($BOD_5$; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

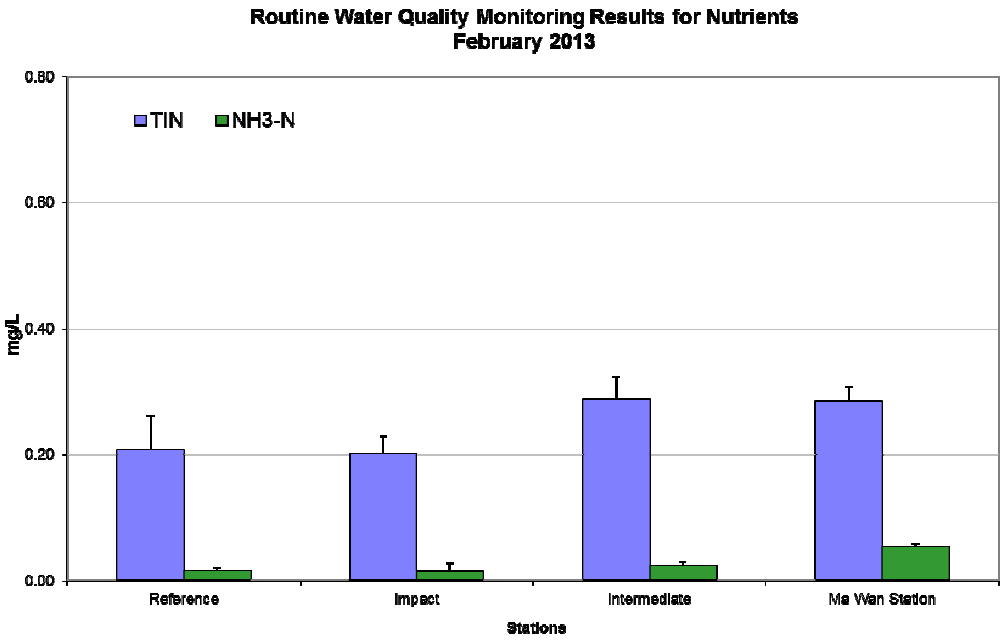


Figure 14: Concentration of Total Inorganic Nitrogen and $NH_3$-N (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

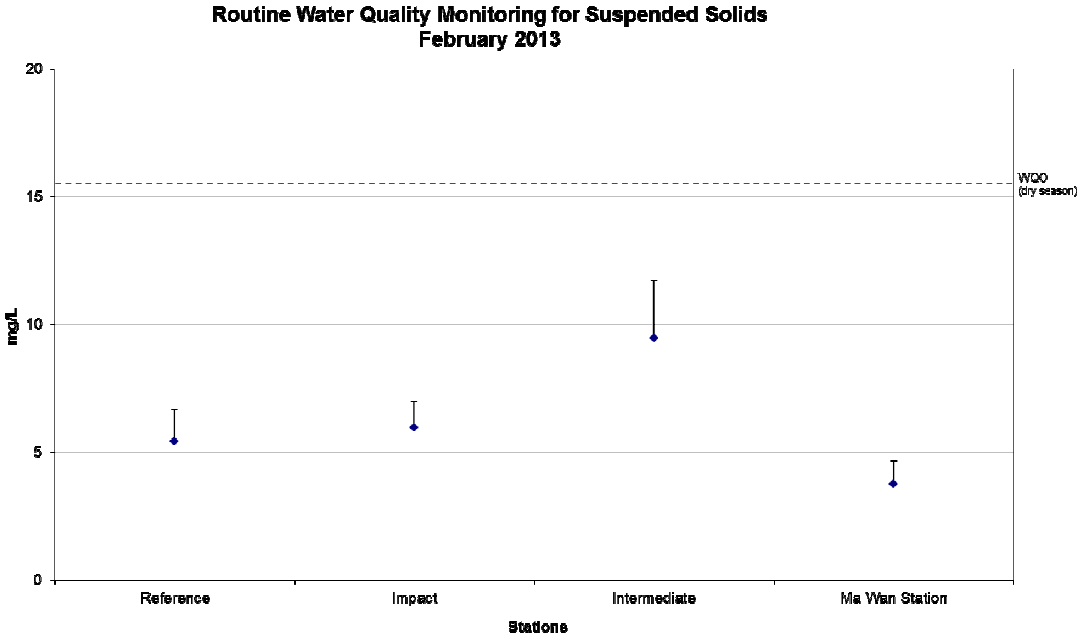


Figure 15: Concentration of Suspended Solids (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in February 2013.

Annex C

# Results of Impact Monitoring during CMP Vd Dredging Operations for February 2013

*Table C1 Summary Table of DO, Turbidity and SS Levels Recorded in February 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 | | |
| 2013/2/27 | ME | DS1 | 8.89 | 9.24 | 7.84 | 9.00 |
| | | DS2 | 9.03 | 9.34 | 2.67 | 4.50 |
| | | DS3 | 9.22 | 9.47 | 2.32 | 4.33 |
| | | DS4 | 9.32 | 9.57 | 2.61 | 4.33 |
| | | DS5 | 9.38 | 9.67 | 2.42 | 5.33 |
| | | MW1 | 8.46 | 8.63 | 1.26 | 2.33 |
| | | US1 | 8.56 | 9.32 | 2.16 | 3.67 |
| | | US2 | 8.87 | 9.32 | 3.34 | 6.33 |
| | MF | DS1 | 9.15 | 9.28 | 3.51 | 6.67 |
| | | DS2 | 9.13 | 9.20 | 5.06 | 9.50 |
| | | DS3 | 8.91 | 9.04 | 4.07 | 7.83 |
| | | DS4 | 8.89 | 9.09 | 3.86 | 6.50 |
| | | DS5 | 9.09 | 9.14 | 7.31 | 12.33 |
| | | MW1 | 8.48 | 8.71 | 2.61 | 4.33 |
| | | US1 | 9.17 | 9.31 | 3.54 | 5.17 |
| | | US2 | 9.25 | 9.34 | 2.96 | 4.17 |

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 C2 Action and Limit Levels of Water Quality for Dredging Activities*

| Parameter | Action Level | Limit Level |
|---|---|---|
| Dissolved Oxygen (DO) (1) | Surface and Mid-depth (2)<br>5%-ile of baseline data for surface and middle layer = 3.76 mg $L^{-1}$<br><br>and<br><br>Significantly less than the reference stations mean DO (at the same tide of the same day) | Surface and Mid-depth (2)<br>1%-ile of baseline data for surface and middle layer = 3.11 mg $L^{-1}$ (3)<br><br>and<br><br>Significantly less than the reference stations mean DO (at the same tide of the same day) |
| | Bottom<br>5%-ile of baseline data for bottom layers = 2.96 mg $L^{-1}$<br><br>and<br><br>Significantly less than the reference stations mean DO (at the same tide of the same day) | Bottom<br>The average of the impact station readings are <2 mg/L<br><br>and<br><br>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 $L^{-1}$<br><br>and<br><br>120% of control station's SS at the same tide of the same day | 99%-ile of baseline data for depth average = 61.92 mg $L^{-1}$<br><br>and<br>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<br><br>and<br><br>120% of control station's Tby at the same tide of the same day | 99%-ile of baseline data = 38.32 NTU<br><br>and<br><br>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 D

# 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 |

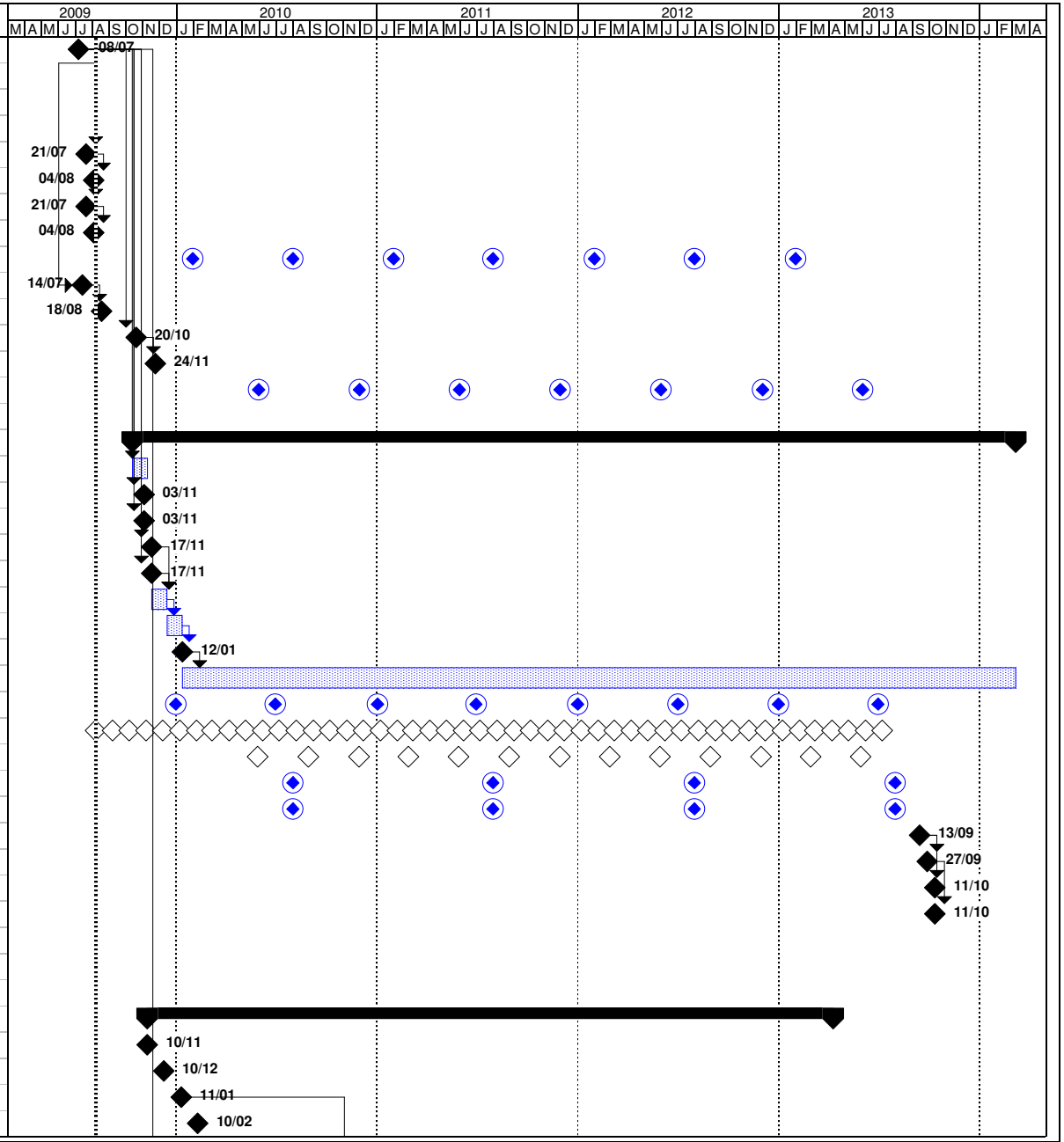


**Figure 4.1 - Study Programme**

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 |

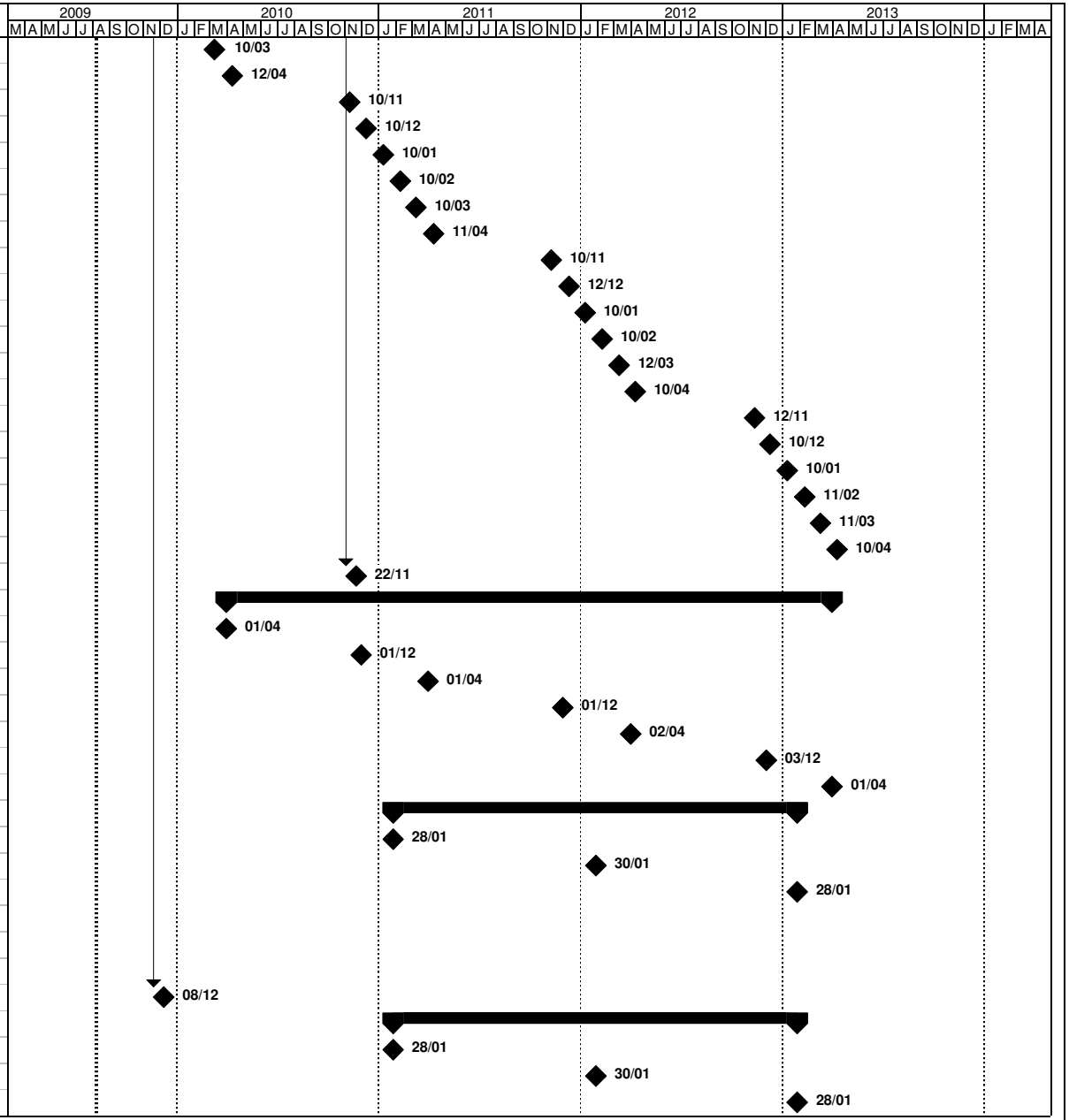


**Figure 4.1 - Study Programme**

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**