

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

**51st Monthly Progress Report for Contaminated
Mud Pits to the South of The Brothers and at
East Sha Chau – November 2016**

Draft (Revision 0)

14 December 2016

Environmental Resources Management
16/F Berkshire House
25 Westlands Road
Quarry Bay, Hong Kong
Telephone (852) 2271 3000
Facsimile (852) 2723 5660
www.erm.com



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




51st Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – November 2016

Draft (Revision 0)

Document Code: 0175086 Monthly November 2016_v0.doc

Environmental Resources Management

16/F
 Berkshire House
 25 Westlands Road
 Quarry Bay
 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) | | 0175086 | | | |
| Summary: | | Date: | | | |
| This document presents the 51 st monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau. | | 14 December 2016 | | | |
| | | Approved by: | | | |
| | |  | | | |
| | | Craig A. Reid Partner | | | |
| | | | | | |
| | | | | | |
| v0 | 51 st Monthly Progress Report for ESC CMPs and SB CMPs | RC | JT | CAR | 14/12/16 |
| Revision | Description | By | Checked | Approved | Date |
| <p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p> | | <p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p> | | | |
| | |   | | | |

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

**Environmental Certification Sheet
EP-427/2011/A**


Reference Document/Plan

| | |
|--|--|
| Document/ Plan to be Certified/ Verified: | 51 st Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau - November 2016 |
| Date of Report: | 14 December 2016 |
| Date prepared by ET: | 14 December 2016 |
| Date received by IA: | 14 December 2016 |


Reference EP Condition

| | |
|---|--------------------|
| Environmental Permit Condition: | Condition No.: 4.4 |
| 4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be certified by the ET Leader and verified by the Independent Auditor. Additional copies of the submission shall be provided to the Director upon request by the Director. | |

ET Certification

| | |
|--|--|
| I hereby certify that the above referenced document/ plan complies with the above referenced condition of EP-427/2011/A | |
| Craig A. Reid, Environmental Team Leader: |  Date: 14/12/2016 |

IA Verification

| | |
|---|--|
| I hereby verify that the above referenced document/ plan complies with the above referenced condition of EP-427/2011/A | |
| Dr Wang Wen Xiong, Independent Auditor: |  Date: 14/12/2016 |

CONTENTS

| | | |
|------------|--|----------|
| 1.1 | BACKGROUND | 1 |
| 1.2 | REPORTING PERIOD | 2 |
| 1.3 | DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES | 2 |
| 1.4 | DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS | 3 |
| 1.5 | BRIEF DISCUSSION OF THE MONITORING RESULTS FOR ESC CMPs | 3 |
| 1.6 | ACTIVITIES SCHEDULED FOR THE NEXT MONTH | 8 |
| 1.7 | STUDY PROGRAMME | 8 |

ANNEXES

| | |
|----------------|---|
| ANNEX A | SAMPLING SCHEDULE |
| ANNEX B | WATER QUALITY MONITORING RESULTS |
| ANNEX C | DREDGING RECORD FOR ESC CMP VB |
| ANNEX D | GRAPHICAL PRESENTATIONS |
| ANNEX E | STUDY PROGRAMME |

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

51ST MONTHLY PROGRESS REPORT FOR NOVEMBER 2016

1.1 BACKGROUND

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

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

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

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

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

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

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

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

1.1.5 The present EM&A programme under *Agreement No. CE 23/2012 (EP)* covers the dredging, disposal and capping operations of the SB CMPs as well as ESC CMPs. Detailed works schedule for ESC CMPs and SB CMPs is shown in *Figure 1.1*. In November 2016, the following works were being undertaken:

- Dredging operation at ESC CMP Vb;
- Disposal of contaminated mud at ESC CMP Vd; and
- Capping operation at SB CMP 2.

Figure 1.1 Works Schedule for ESC CMPs and SB CMPs

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

1.2 REPORTING PERIOD

1.2.1 This 51st *Monthly Progress Report* covers the EM&A activities for the reporting month of November 2016.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 The following monitoring activities have been undertaken for ESC CMPs in November 2016:

- *Routine Water Quality Monitoring of ESC CMPs* was undertaken on 1 November 2016;

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

- *Water Quality Monitoring During Dredging of ESC CMP Vb* was undertaken on 2, 4, 8, 10, 12, 14, 16, 18, 21, 23, 25, 28 and 30 November 2016;
- *Pit Specific Sediment Chemistry of ESC CMP Vd* was undertaken on 7 November 2016; and
- *Water Column Profiling of ESC CMP Vd* was undertaken on 9 November 2016.

1.3.2 No monitoring activities were scheduled to be undertaken for SB CMPs in November 2016.

1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS

1.4.1 No outstanding sampling remained for November 2016.

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

- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry of ESC CMP Vd* in November 2016.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS FOR ESC CMPs

1.5.1 Brief discussion of the monitoring results of the following activities for ESC CMPs is presented in this *51st Monthly Progress Report*:

- *Water Quality Monitoring During Dredging of ESC CMP Vb* in November 2016;
- *Water Column Profiling of ESC CMP Vd* in November 2016;
- *Routine Water Quality Monitoring of ESC CMPs* in November 2016; and

- 1.5.2 ***Impact Water Quality Monitoring during Dredging Operations of ESC CMP Vb – November 2016***
- 1.5.3 Water quality monitoring was conducted three times per week during the reporting period on 2, 4, 8, 10, 12, 14, 16, 18, 21, 23, 25, 28 and 30 November 2016. During each survey day, monitoring was conducted during both mid-ebb and mid-flood tides at two Reference (Upstream) stations and five Impact (Downstream) stations around the dredging operations at ESC CMP Vb. Monitoring was also conducted at one Sensitive Receiver station situated in Ma Wan. A total of eight (8) stations were monitored and locations of the sampling stations are shown in *Figure 1.2*.
- 1.5.4 Monitoring results are presented in *Table B1 of Annex B*. Daily dredging volume in November 2016 is reported in *Annex C*. Levels of Dissolved Oxygen (DO), Turbidity and Suspended Solid (SS) complied with the Action and Limit Levels (see *Table B2 of Annex B* for details) set in the *Baseline Monitoring Report* ⁽¹⁾, except for the following occasion of exceedances discussed in *Table 1.1* below.
- 1.5.5 The results indicated that the dredging operations at ESC CMP Vb did not appear to cause any unacceptable deterioration in water quality during this reporting period. Therefore, no further action, except for those recommended in the Environmental Permit (*EP-312/2008/A*), are considered necessary for the dredging operations.

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

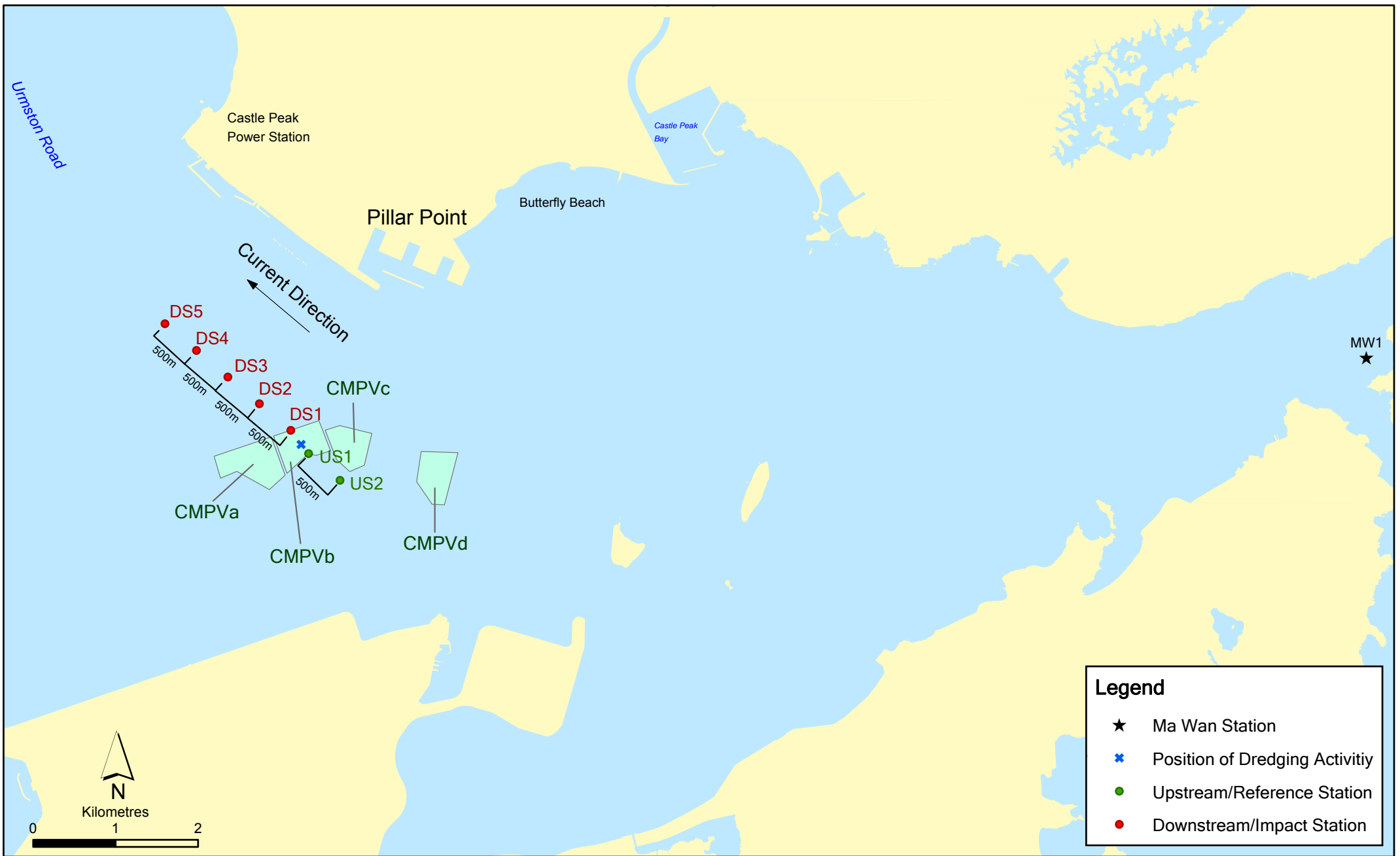


Figure 1.2

Indicative Dredging Impact Sampling Stations for CMPVb

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

Table 1.1 *Details of Exceedances Recorded at ESC CMP Vb between 2 and 30 November 2016*

| Date | Tide | Parameter | Station | Type | Remarks |
|------------------|-------------|------------------|----------------|-------------|---|
| 16 November 2016 | Mid-Flood | Turbidity | DS1 | Action | These exceedances were not considered as indicating any unacceptable impacts from the dredging operations to WSRs outside the works area because dredging activities were not carried out during the period of 10 – 17 November 2016. |
| 16 November 2016 | Mid-Flood | Turbidity | DS2 | Limit | |
| 16 November 2016 | Mid-Flood | Turbidity | DS3 | Limit | |
| 16 November 2016 | Mid-Flood | Turbidity | DS4 | Limit | |
| 16 November 2016 | Mid-Flood | Turbidity | DS5 | Limit | |
| 16 November 2016 | Mid-Flood | SS | DS4 | Action | |
| 18 November 2016 | Mid-Flood | Turbidity | DS1 | Action | <p>These exceedances were not considered as indicating any unacceptable impacts from the dredging operations to Water Sensitive Receivers (WSRs) outside the works area due to the following reason:</p> <ul style="list-style-type: none"> • The Action Level Exceedance of Turbidity was recorded at Station DS1 which are located in the vicinity of the works area during one tidal period only, and exceedances were not recorded at stations WSR45C and WSR46 which are the nearest WSRs. It is thus considered that the exceedances were not indicating any unacceptable impacts from the dredging operations to the nearby WSRs. • Reference stations US1 and US2 have high Turbidity levels similar to the levels recorded at station DS1 during the same tidal period. The Action Level Exceedance of Turbidity at station DS1 is considered to be isolated sporadic event which may be caused by natural background variation in water quality characteristics of the monitoring area. |

1.5.6 *Water Column Profiling of ESC CMP Vd – November 2016*

1.5.7 *Water Column Profiling* was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 9 November 2016. The monitoring results have been assessed for compliance with the Water Quality Objectives (WQOs) set by Environmental Protection Department (EPD). This consists of a review of the EPD routine water quality monitoring data for the dry season period (November to March) of 2006 - 2015 from stations in the Northwestern Water Control Zone (WCZ), where the ESC CMPs are located ⁽¹⁾. For Salinity, the averaged value obtained from the Reference stations was used for the basis as the WQO. Levels of DO and Turbidity were also assessed for compliance with the Action and Limit Levels (see *Table B2 of Annex B* for details).

In-situ Measurements

1.5.8 Analyses of results for November 2016 indicated that levels of DO and pH complied with the WQOs at both Downstream and Upstream stations (*Table B3 of Annex B*). In addition, DO and Turbidity at all stations complied with the Action and Limit Levels (*Tables B2 and B3 of Annex B*).

Laboratory Measurements for Suspended Solids (SS)

1.5.9 Analyses of results for November 2016 indicated that the SS levels at all stations complied with the WQOs and the Action and Limit Levels (*Tables B2 and B3 of Annex B*).

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

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

1.5.11 ***Routine Water Quality Monitoring of ESC CMPs – November 2016***

1.5.12 *Routine Water Quality Monitoring of ESC CMPs* was undertaken on 1 November 2016. The monitoring results have been assessed for compliance with the WQOs (see *Section 1.5.7* for details). The monitoring results are shown in *Tables B4 and B5 of Annex B* and *Figures 1 - 10 of Annex D*. A total of sixteen (16) monitoring stations were sampled in November 2016 as shown in *Figure 1.3*.

In-situ Measurements

1.5.13 Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in *Figures 1 - 6 of Annex D*. Analyses of results for November 2016 indicated that the levels of pH, Salinity and DO complied with the WQOs at all stations (Impact, Intermediate, Reference and Ma Wan stations) in November 2016 (*Table B4 of Annex B; Figures 1, 3 and 5 of Annex D*).

1.5.14 The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (*Table B4 of Annex B; Figures 3 and 6 of Annex D*).

1.5.15 Overall, *in-situ* measurement results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable impacts in water quality in November 2016.

Laboratory Measurements

1.5.16 Laboratory analysis of November 2016 results indicated that concentrations of Cadmium, Silver and Mercury were below their limit of reporting at all stations. Arsenic, Chromium, Nickel, Copper, Lead and Zinc were detected in November 2016 samples and the concentrations of these metals and metalloids were similar amongst stations (*Table B5 of Annex B; Figure 7 of Annex D*).

1.5.17 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations except Ma Wan station in November 2016 were higher than the WQO (0.5 mg/L) (*Table B5 of Annex B; Figure 8 of Annex D*). It should be noted that due to the effect of Pearl River, the North Western WCZ has historically experienced higher levels of TIN⁽¹⁾. Therefore, the exceedances of TIN WQO at these stations are unlikely to be caused by the disposal operation at ESC CMP Vd. Concentrations of Ammonia Nitrogen (NH₃-N) were relatively similar amongst all stations (*Table B5 of Annex B; Figure 8 of Annex D*). Levels of 5-day Biochemical Oxygen Demand (BOD₅) appear to be higher at Reference stations in November 2016 (*Table B5 of Annex B; Figure 9 of Annex D*).

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



Figure 1.3

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

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

Environmental
Resources
Management



1.5.18 Analyses of results for November 2016 indicated that the SS levels at Intermediate and Ma Wan stations were higher than the WQO (13.2 mg/L for dry season), however SS levels at all stations complied with the Action and Limit Levels (*Tables B2 and B5 of Annex B; Figure 10 of Annex D*).

1.5.19 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable deterioration in water quality in November 2016. Detailed statistical analysis will be presented in the Quarterly Report to investigate any spatial and temporal trends of potential concern.

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.6.1 The following monitoring activities will be conducted in the next monthly period of December 2016 for ESC CMPs:

- *Water Column Profiling of ESC CMP Vd;*
- *Routine Water Quality Monitoring of ESC CMPs;*
- *Water Quality Monitoring During Dredging of ESC CMP Vb;*
- *Pit Specific Sediment Chemistry of ESC CMP Vd;*
- *Cumulative Impact Sediment Chemistry of ESC CMPs; and*
- *Benthic Recolonisation Studies of ESC CMP IV.*

1.6.2 The following monitoring activities will be conducted in the next monthly period of December 2016 for SB CMPs:

- *Water Quality Monitoring During Capping of SB CMPs;*
- *Benthic Recolonisation Studies of SB CMP 1.*

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 E*.

Annex A

Sampling Schedule

Annex B

Water Quality Monitoring Results

Table B1 *Summary Table of DO, Turbidity and SS Levels Recorded in November 2016 for Impact Water Quality Monitoring during Dredging Operations of ESC CMP Vb*

| Sampling Date | Tidal Period | Station | Average DO Levels (mg/L) | | Average Turbidity Level (NTU) | Average SS Level (mg/L) | | |
|---------------|--------------|------------|--------------------------|-----------------------|-------------------------------|-------------------------|------|-------|
| | | | Bottom | Surface and Mid Depth | | | | |
| 2016/11/02 | Mid-Ebb | DS1 | 6.83 | 6.73 | 7.51 | 22.77 | | |
| | | DS2 | 6.31 | 6.47 | 11.78 | 22.98 | | |
| | | DS3 | 6.33 | 6.32 | 13.73 | 24.85 | | |
| | | DS4 | 6.31 | 6.38 | 14.39 | 29.62 | | |
| | | DS5 | 6.46 | 6.46 | 13.78 | 28.27 | | |
| | | US1 | 6.90 | 6.67 | 7.15 | 15.27 | | |
| | Mid-Flood | US2 | 6.92 | 6.67 | 6.89 | 12.30 | | |
| | | MW1 | 6.15 | 6.11 | 5.44 | 11.08 | | |
| | | DS1 | 6.46 | 6.44 | 10.30 | 20.43 | | |
| | | DS2 | 6.41 | 6.40 | 12.37 | 20.68 | | |
| | | DS3 | 6.36 | 6.35 | 12.27 | 8.52 | | |
| | | DS4 | 6.34 | 6.32 | 8.09 | 18.48 | | |
| | | DS5 | 6.33 | 6.32 | 10.14 | 26.65 | | |
| | | US1 | 6.49 | 6.46 | 6.00 | 20.72 | | |
| | | US2 | 6.52 | 6.51 | 9.12 | 15.45 | | |
| | | MW1 | 6.14 | 6.15 | 8.44 | 13.83 | | |
| | | 2016/11/04 | Mid-Ebb | DS1 | 6.49 | 6.50 | 6.18 | 9.32 |
| | | | | DS2 | 6.43 | 6.52 | 6.36 | 10.03 |
| DS3 | 6.35 | | | 6.49 | 4.52 | 6.58 | | |
| DS4 | 6.14 | | | 6.41 | 4.68 | 7.83 | | |
| DS5 | 6.23 | | | 6.36 | 4.36 | 7.45 | | |
| US1 | 6.53 | | | 6.65 | 4.65 | 7.07 | | |
| Mid-Flood | US2 | | 6.60 | 6.62 | 4.43 | 7.33 | | |
| | MW1 | | 6.25 | 6.26 | 4.32 | 11.42 | | |
| | DS1 | | 6.60 | 6.60 | 5.40 | 8.53 | | |
| | DS2 | | 6.63 | 6.63 | 5.08 | 8.02 | | |
| | DS3 | | 6.68 | 6.67 | 4.65 | 8.00 | | |
| | DS4 | | 6.65 | 6.68 | 7.71 | 12.30 | | |
| | DS5 | | 6.64 | 6.65 | 4.46 | 6.10 | | |
| | US1 | | 6.57 | 6.56 | 7.51 | 11.60 | | |
| | US2 | | 6.55 | 6.55 | 7.80 | 11.87 | | |
| | MW1 | | 6.42 | 6.44 | 6.27 | 9.55 | | |
| | 2016/11/08 | | Mid-Ebb | DS1 | 6.21 | 6.32 | 5.51 | 5.02 |
| | | | | DS2 | 6.21 | 6.35 | 5.34 | 6.37 |
| DS3 | | 6.31 | | 6.41 | 3.93 | 7.63 | | |
| DS4 | | 6.27 | | 6.40 | 8.04 | 10.30 | | |
| DS5 | | 6.36 | | 6.43 | 3.93 | 4.57 | | |
| US1 | | 6.18 | | 6.42 | 3.69 | 6.13 | | |
| Mid-Flood | | US2 | 6.18 | 6.44 | 3.43 | 4.93 | | |
| | | MW1 | 5.90 | 5.99 | 2.39 | 3.32 | | |
| | | DS1 | 6.13 | 6.28 | 7.74 | 10.15 | | |
| | | DS2 | 6.25 | 6.37 | 5.06 | 6.08 | | |
| | | DS3 | 6.40 | 6.52 | 3.18 | 3.83 | | |
| | | DS4 | 6.31 | 6.48 | 4.09 | 6.30 | | |
| | | DS5 | 6.31 | 6.44 | 3.56 | 5.28 | | |
| | | US1 | 6.11 | 6.27 | 7.81 | 7.87 | | |
| | | US2 | 6.08 | 6.32 | 7.54 | 8.87 | | |
| | | MW1 | 5.71 | 5.85 | 5.48 | 6.40 | | |

| Sampling Date | Tidal Period | Station | Average DO Levels (mg/L) | | Average Turbidity Level (NTU) | Average SS Level (mg/L) | |
|---------------|--------------|------------|--------------------------|-----------------------|-------------------------------|-------------------------|-------|
| | | | Bottom | Surface and Mid Depth | | | |
| 2016/11/10 | Mid-Ebb | DS1 | 6.05 | 5.96 | 6.04 | 6.88 | |
| | | DS2 | 5.92 | 5.87 | 5.74 | 8.22 | |
| | | DS3 | 5.81 | 5.87 | 5.19 | 5.92 | |
| | | DS4 | 5.93 | 5.85 | 5.94 | 7.83 | |
| | | DS5 | 5.94 | 5.80 | 8.02 | 10.35 | |
| | | US1 | 6.08 | 6.03 | 6.16 | 6.63 | |
| | | US2 | 6.21 | 6.12 | 5.22 | 6.27 | |
| | MW1 | 5.79 | 5.79 | 4.39 | 5.83 | | |
| | Mid-Flood | DS1 | 6.27 | 6.16 | 5.96 | 7.08 | |
| | | DS2 | 6.23 | 6.16 | 6.12 | 8.33 | |
| | | DS3 | 6.23 | 6.16 | 5.24 | 6.28 | |
| | | DS4 | 6.20 | 6.13 | 5.67 | 9.62 | |
| | | DS5 | 6.23 | 6.10 | 5.79 | 9.58 | |
| | | US1 | 6.22 | 6.14 | 6.61 | 8.63 | |
| | | US2 | 6.15 | 6.12 | 7.12 | 8.70 | |
| | | MW1 | 5.73 | 5.68 | 6.44 | 8.62 | |
| | | 2016/11/12 | Mid-Ebb | DS1 | 6.34 | 6.31 | 10.52 |
| DS2 | | | | 6.34 | 6.35 | 7.73 | 8.15 |
| DS3 | 6.34 | | | 6.30 | 8.08 | 9.63 | |
| DS4 | 6.28 | | | 6.29 | 14.29 | 16.83 | |
| DS5 | 6.34 | | | 6.32 | 13.05 | 16.98 | |
| US1 | 6.32 | | | 6.28 | 9.36 | 10.35 | |
| US2 | 6.33 | | | 6.28 | 11.02 | 12.38 | |
| MW1 | 5.85 | | 5.89 | 7.48 | 9.88 | | |
| Mid-Flood | DS1 | | 6.13 | 6.12 | 6.36 | 8.25 | |
| | DS2 | | 6.14 | 6.13 | 7.58 | 10.97 | |
| | DS3 | | 6.24 | 6.14 | 8.81 | 10.43 | |
| | DS4 | | 6.13 | 6.14 | 10.29 | 13.75 | |
| | DS5 | | 6.10 | 6.16 | 8.06 | 8.90 | |
| | US1 | | 6.10 | 6.10 | 6.11 | 8.27 | |
| | US2 | | 6.18 | 6.19 | 8.36 | 9.67 | |
| | MW1 | | 5.70 | 5.71 | 11.11 | 11.78 | |
| | 2016/11/14 | | Mid-Ebb | DS1 | 6.15 | 6.17 | 16.25 |
| | | DS2 | | 6.23 | 6.21 | 16.22 | 13.12 |
| DS3 | | 6.18 | | 6.20 | 16.37 | 11.57 | |
| DS4 | | 6.22 | | 6.22 | 22.08 | 12.23 | |
| DS5 | | 6.20 | | 6.22 | 27.34 | 18.72 | |
| US1 | | 6.15 | | 6.18 | 14.50 | 18.23 | |
| US2 | | 6.20 | | 6.17 | 13.84 | 14.37 | |
| MW1 | | 5.59 | 5.66 | 9.82 | 12.85 | | |
| Mid-Flood | | DS1 | 6.15 | 6.17 | 21.05 | 21.23 | |
| | | DS2 | 6.17 | 6.17 | 17.03 | 18.55 | |
| | | DS3 | 6.14 | 6.15 | 23.18 | 21.02 | |
| | | DS4 | 6.17 | 6.18 | 18.97 | 22.10 | |
| | | DS5 | 6.10 | 6.11 | 26.71 | 20.83 | |
| | | US1 | 6.17 | 6.20 | 13.69 | 13.38 | |
| | | US2 | 6.20 | 6.22 | 18.71 | 20.48 | |
| | | MW1 | 5.69 | 5.71 | 12.67 | 16.18 | |
| | | 2016/11/16 | Mid-Ebb | DS1 | 6.00 | 6.06 | 14.40 |
| | DS2 | | | 5.93 | 6.04 | 14.22 | 18.57 |
| DS3 | 5.94 | | | 6.06 | 12.42 | 15.83 | |
| DS4 | 5.93 | | | 6.05 | 16.68 | 21.78 | |
| DS5 | 5.87 | | | 5.99 | 19.35 | 19.80 | |

| Sampling Date | Tidal Period | Station | Average DO Levels (mg/L) | | Average Turbidity Level (NTU) | Average SS Level (mg/L) | | |
|---------------|--------------|------------|--------------------------|-----------------------|-------------------------------|-------------------------|-------|-------|
| | | | Bottom | Surface and Mid Depth | | | | |
| | Mid-Flood | US1 | 6.08 | 6.09 | 15.65 | 14.15 | | |
| | | US2 | 6.12 | 6.16 | 12.17 | 13.97 | | |
| | | MW1 | 5.72 | 5.79 | 8.72 | 16.47 | | |
| | | DS1 | 6.13 | 6.13 | 36.30 | 32.52 | | |
| | | DS2 | 6.03 | 6.03 | 38.45 | 31.32 | | |
| | | DS3 | 6.03 | 6.05 | 44.07 | 34.13 | | |
| | | DS4 | 6.11 | 6.09 | 54.21 | 42.90 | | |
| | | DS5 | 6.06 | 6.03 | 32.78 | 24.78 | | |
| | | US1 | 6.10 | 6.12 | 33.10 | 24.58 | | |
| | | US2 | 6.15 | 6.14 | 29.22 | 35.63 | | |
| | | MW1 | 5.78 | 5.83 | 20.78 | 27.72 | | |
| | | 2016/11/18 | Mid-Ebb | DS1 | 5.96 | 5.90 | 13.70 | 23.42 |
| | | | | DS2 | 5.94 | 5.91 | 12.97 | 23.72 |
| DS3 | 5.86 | | | 5.90 | 16.07 | 22.88 | | |
| DS4 | 5.79 | | | 5.93 | 11.77 | 18.38 | | |
| DS5 | 5.83 | | | 5.90 | 12.25 | 25.97 | | |
| US1 | 6.01 | | | 6.02 | 8.29 | 10.00 | | |
| US2 | 5.97 | | | 5.99 | 9.51 | 12.32 | | |
| MW1 | 5.71 | | | 5.68 | 8.32 | 22.48 | | |
| Mid-Flood | DS1 | | | 5.97 | 5.97 | 30.19 | 25.77 | |
| | DS2 | | 6.03 | 5.99 | 24.74 | 28.48 | | |
| | DS3 | | 6.02 | 6.02 | 21.28 | 31.40 | | |
| | DS4 | | 6.01 | 6.00 | 26.42 | 21.37 | | |
| | DS5 | | 5.95 | 5.93 | 21.98 | 26.87 | | |
| | US1 | | 6.05 | 6.00 | 29.45 | 32.92 | | |
| | US2 | | 6.08 | 6.04 | 32.24 | 33.90 | | |
| | MW1 | | 5.71 | 5.80 | 18.30 | 23.07 | | |
| | 2016/11/21 | | Mid-Ebb | DS1 | 5.89 | 5.94 | 7.86 | 9.95 |
| DS2 | | | | 6.06 | 6.03 | 6.74 | 9.23 | |
| DS3 | | 5.92 | | 5.97 | 6.71 | 8.33 | | |
| DS4 | | 5.91 | | 5.95 | 7.91 | 11.20 | | |
| DS5 | | 5.80 | | 5.93 | 9.77 | 11.77 | | |
| US1 | | 5.96 | | 6.00 | 9.64 | 14.82 | | |
| US2 | | 6.20 | | 6.20 | 7.96 | 9.87 | | |
| MW1 | | 5.58 | | 5.60 | 3.87 | 5.18 | | |
| Mid-Flood | | DS1 | | 5.99 | 6.01 | 14.69 | 16.55 | |
| | | DS2 | 6.04 | 6.07 | 14.24 | 14.50 | | |
| | | DS3 | 5.99 | 6.16 | 12.26 | 15.00 | | |
| | | DS4 | 6.26 | 6.23 | 10.01 | 13.87 | | |
| | | DS5 | 6.27 | 6.23 | 10.57 | 13.95 | | |
| | | US1 | 6.13 | 6.12 | 11.77 | 14.90 | | |
| | | US2 | 6.13 | 6.12 | 17.50 | 20.93 | | |
| | | MW1 | 5.69 | 5.73 | 6.14 | 12.43 | | |
| | | 2016/11/23 | Mid-Ebb | DS1 | 5.93 | 6.12 | 6.13 | 9.05 |
| DS2 | | | | 6.02 | 6.10 | 5.91 | 8.50 | |
| DS3 | 5.99 | | | 6.12 | 7.33 | 19.60 | | |
| DS4 | 6.11 | | | 6.17 | 4.42 | 6.48 | | |
| DS5 | 6.09 | | | 6.18 | 3.95 | 7.07 | | |
| US1 | 6.12 | | | 6.17 | 3.70 | 8.45 | | |
| US2 | 6.06 | | | 6.11 | 6.23 | 7.10 | | |
| Mid-Flood | MW1 | | 5.56 | 5.64 | 2.77 | 5.05 | | |
| | DS1 | | 5.95 | 6.06 | 6.03 | 6.80 | | |
| | DS2 | | 5.95 | 6.10 | 7.43 | 11.20 | | |

| Sampling Date | Tidal Period | Station | Average DO Levels (mg/L) | | Average Turbidity Level (NTU) | Average SS Level (mg/L) | | |
|---------------|--------------|------------|--------------------------|-----------------------|-------------------------------|-------------------------|-------|-------|
| | | | Bottom | Surface and Mid Depth | | | | |
| | | DS3 | 6.03 | 6.15 | 5.81 | 8.97 | | |
| | | DS4 | 6.10 | 6.27 | 4.12 | 5.85 | | |
| | | DS5 | 6.10 | 6.24 | 3.08 | 4.95 | | |
| | | US1 | 6.01 | 6.17 | 4.91 | 8.13 | | |
| | | US2 | 6.00 | 6.13 | 4.96 | 8.47 | | |
| | | MW1 | 5.63 | 5.68 | 5.99 | 8.82 | | |
| 2016/11/25 | Mid-Ebb | DS1 | 6.23 | 6.16 | 11.64 | 17.82 | | |
| | | DS2 | 6.11 | 6.15 | 7.76 | 12.03 | | |
| | | DS3 | 6.14 | 6.09 | 9.47 | 11.58 | | |
| | | DS4 | 6.11 | 6.03 | 12.54 | 19.27 | | |
| | | DS5 | 6.14 | 6.06 | 8.49 | 11.30 | | |
| | | US1 | 6.43 | 6.36 | 11.52 | 11.27 | | |
| | Mid-Flood | US2 | 6.48 | 6.42 | 7.96 | 10.55 | | |
| | | MW1 | 6.12 | 6.07 | 4.25 | 13.50 | | |
| | | DS1 | 6.28 | 6.17 | 9.56 | 15.52 | | |
| | | DS2 | 6.41 | 6.33 | 12.37 | 20.17 | | |
| | | DS3 | 6.58 | 6.42 | 11.37 | 18.73 | | |
| | | DS4 | 6.52 | 6.46 | 10.61 | 22.02 | | |
| | | DS5 | 6.53 | 6.54 | 6.89 | 23.17 | | |
| | | US1 | 6.21 | 6.16 | 10.82 | 13.10 | | |
| | | US2 | 6.24 | 6.19 | 8.96 | 15.12 | | |
| | | MW1 | 6.07 | 6.07 | 5.10 | 13.50 | | |
| | | 2016/11/28 | Mid-Ebb | DS1 | 6.56 | 6.56 | 9.62 | 10.53 |
| | | | | DS2 | 6.55 | 6.53 | 7.97 | 10.07 |
| | | | | DS3 | 6.59 | 6.53 | 7.58 | 10.18 |
| DS4 | 6.49 | | | 6.52 | 6.96 | 9.58 | | |
| DS5 | 6.60 | | | 6.54 | 8.18 | 10.05 | | |
| US1 | 6.57 | | | 6.53 | 7.44 | 8.65 | | |
| US2 | 6.64 | | | 6.56 | 9.44 | 11.12 | | |
| MW1 | 6.37 | | | 6.37 | 6.03 | 7.63 | | |
| Mid-Flood | DS1 | | | 6.80 | 6.69 | 8.24 | 10.27 | |
| | DS2 | | 6.80 | 6.77 | 15.98 | 21.00 | | |
| | DS3 | | 6.82 | 6.81 | 16.09 | 16.78 | | |
| | DS4 | | 6.87 | 6.82 | 14.99 | 16.15 | | |
| | DS5 | | 6.78 | 6.81 | 16.65 | 17.52 | | |
| | US1 | | 6.68 | 6.62 | 10.26 | 12.42 | | |
| | US2 | | 6.65 | 6.61 | 14.65 | 17.95 | | |
| | MW1 | | 6.27 | 6.28 | 7.86 | 10.58 | | |
| | 2016/11/30 | | Mid-Ebb | DS1 | 6.48 | 6.51 | 11.62 | 15.20 |
| | | | | DS2 | 6.53 | 6.52 | 8.17 | 11.10 |
| DS3 | | | | 6.54 | 6.51 | 7.84 | 10.03 | |
| DS4 | | 6.42 | | 6.50 | 7.67 | 10.00 | | |
| DS5 | | 6.58 | | 6.55 | 7.64 | 9.92 | | |
| US1 | | 6.58 | | 6.57 | 7.92 | 9.42 | | |
| US2 | | 6.66 | | 6.62 | 9.16 | 12.15 | | |
| MW1 | | 6.21 | | 6.23 | 6.69 | 8.87 | | |
| Mid-Flood | | DS1 | | 6.68 | 6.60 | 20.45 | 14.17 | |
| | | DS2 | 6.68 | 6.61 | 20.93 | 13.83 | | |
| | | DS3 | 6.71 | 6.64 | 20.20 | 12.15 | | |
| | | DS4 | 6.79 | 6.65 | 19.95 | 15.10 | | |
| | | DS5 | 6.54 | 6.49 | 18.40 | 9.98 | | |
| | | US1 | 6.73 | 6.66 | 17.85 | 18.50 | | |
| | | US2 | 6.70 | 6.62 | 18.08 | 19.88 | | |

| Sampling Date | Tidal Period | Station | Average DO Levels (mg/L) | | Average Turbidity Level (NTU) | Average SS Level (mg/L) |
|---------------|--------------|---------|--------------------------|-----------------------|-------------------------------|-------------------------|
| | | | Bottom | Surface and Mid Depth | | |
| | | MW1 | 6.27 | 6.28 | 11.49 | 9.53 |

Notes:

1. Please refer to Table B2 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, Backfilling and Capping Activities at ESC CMPs*

| 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⁻¹ |
| | 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.

Table B3 *Water Column Profiling Results for ESC CMP Vd in November 2016*

| Stations | Temp (°C) | Salinity (ppt) | Turbidity (NTU) | Dissolved Oxygen (%) (mg L ⁻¹) | | pH (mg L ⁻¹) | Suspended Solids (mg L ⁻¹) |
|-----------------------|--------------|-------------------|--------------------|---|------|-----------------------------|---|
| WCP 1 (Downstream) | 25.91 | 29.56 | 4.68 | 86.56 | 5.95 | 8.03 | 5.38 |
| WCP 2 (Upstream) | 25.76 | 29.46 | 5.70 | 86.56 | 5.97 | 7.99 | 5.35 |
| WQO (Dry season) | N/A | 26.52 – 32.41# | N/A | N/A | >4 | 6.5-8.5 | 13.2 |

Note:

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

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

Cell shaded grey indicate value exceeding the WQO.

Table B4 *In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in November 2016*

| Sampling Period | Stations | Temp (°C) | Salinity (ppt) | Turbidity (NTU) | Dissolved Oxygen (%) (mg L ⁻¹) | | pH (mg L ⁻¹) |
|-----------------|--------------------|--------------|-------------------|--------------------|---|------|-----------------------------|
| November 2016 | RFE (Reference) | 26.88 | 27.84 | 10.63 | 96.84 | 6.61 | 7.97 |
| | IPE (Impact) | 26.93 | 28.41 | 9.64 | 96.99 | 6.60 | 7.94 |
| | INE (Intermediate) | 26.85 | 29.04 | 8.83 | 98.56 | 6.69 | 7.99 |
| | Ma Wan | 27.11 | 30.28 | 3.82 | 93.30 | 6.26 | 7.91 |
| | WQO | N/A | 25.06 – 30.62# | N/A | N/A | >4 | 6.5-8.5 |

Notes:

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

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

Cell shaded grey indicate value exceeding the WQO.

Table B5 *Laboratory Results for Routine Water Quality Monitoring of ESC CMPs in November 2016*

| Sampling Period | Stations | As (µg/L) | Cd (µg/L) | Cr (µg/L) | Cu (µg/L) | Pb (µg/L) | Hg (µg/L) | Ni (µg/L) | Ag (µg/L) | Zn (µg/L) | NH ₃ (mg/L) | TIN (mg/L) | BOD ₅ (mg/L) | SS (mg/L) |
|-----------------|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------------|---------------|----------------------------|--------------|
| November 2016 | RFE | 1.97 | <LOR | 0.50 | 0.55 | 0.50 | <LOR | 0.57 | <LOR | 7.37 | 0.09 | 0.59 | 3.10 | 12.04 |
| | IPE | 1.92 | <LOR | 0.69 | 0.50 | 0.52 | <LOR | 0.58 | <LOR | 7.70 | 0.07 | 0.60 | 1.73 | 12.83 |
| | INE | 2.05 | <LOR | 0.50 | 0.51 | 0.52 | <LOR | 0.72 | <LOR | 6.19 | 0.08 | 0.53 | 2.12 | 16.97 |
| | Ma Wan | 1.95 | <LOR | 0.50 | 0.58 | 0.50 | <LOR | 0.50 | <LOR | 6.13 | 0.10 | 0.47 | 2.31 | 17.81 |

WQO of TIN: 0.5 mg/L

Dry Season WQO of SS : 13.2 mg/L

Notes:

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

Cell shaded grey indicate value exceeding the WQO.

Annex C

Dredging Record for ESC CMP Vb

Table C1 Dredging Record at ESC CMP Vb

| Date | Daily Dredging Volume (m ³) | Weekly Dredging Volume (m ³) (From Sunday to Saturday) |
|-------------|---|---|
| 30-Oct-2016 | 4,550 | 32,500 |
| 31-Oct-2016 | 5,200 | |
| 01-Nov-2016 | 5,200 | |
| 02-Nov-2016 | 3,900 | |
| 03-Nov-2016 | 4,550 | |
| 04-Nov-2016 | 3,900 | |
| 05-Nov-2016 | 5,200 | |
| 06-Nov-2016 | 5,200 | 19,500 |
| 07-Nov-2016 | 5,200 | |
| 08-Nov-2016 | 5,200 | |
| 09-Nov-2016 | 3,900 | |
| 10-Nov-2016 | 0 | |
| 11-Nov-2016 | 0 | |
| 12-Nov-2016 | 0 | |
| 13-Nov-2016 | 0 | 5,850 |
| 14-Nov-2016 | 0 | |
| 15-Nov-2016 | 0 | |
| 16-Nov-2016 | 0 | |
| 17-Nov-2016 | 0 | |
| 18-Nov-2016 | 1,300 | |
| 19-Nov-2016 | 4,550 | |
| 20-Nov-2016 | 5,850 | 36,400 |
| 21-Nov-2016 | 5,200 | |
| 22-Nov-2016 | 5,200 | |
| 23-Nov-2016 | 5,200 | |
| 24-Nov-2016 | 4,550 | |
| 25-Nov-2016 | 5,200 | |
| 26-Nov-2016 | 5,200 | |
| 27-Nov-2016 | 5,200 | 24,050 |
| 28-Nov-2016 | 4,550 | |
| 29-Nov-2016 | 5,850 | |
| 30-Nov-2016 | 8,450 | |

Annex D

Graphical Presentations

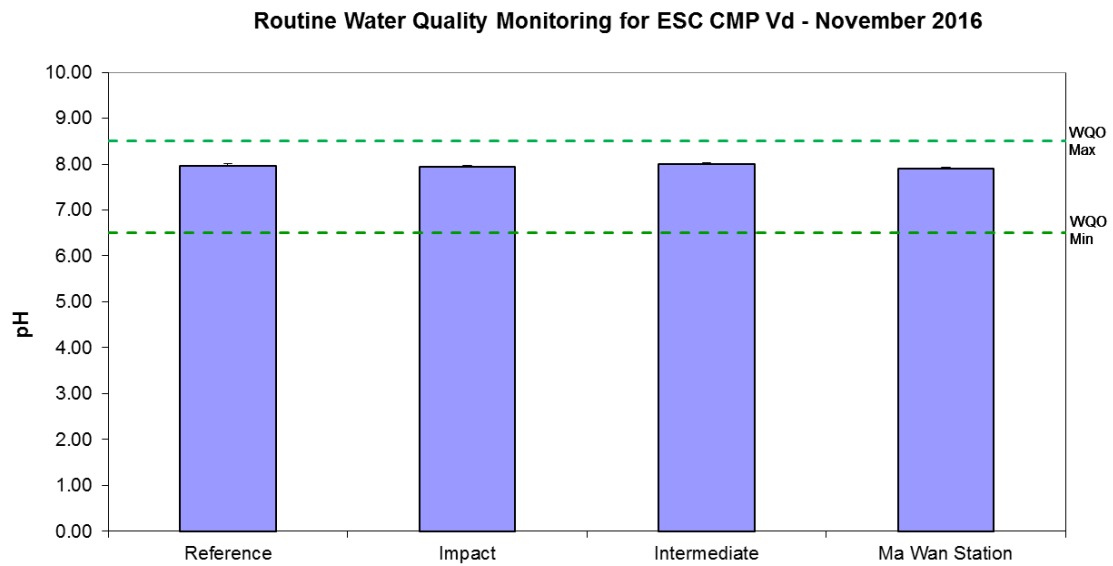


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

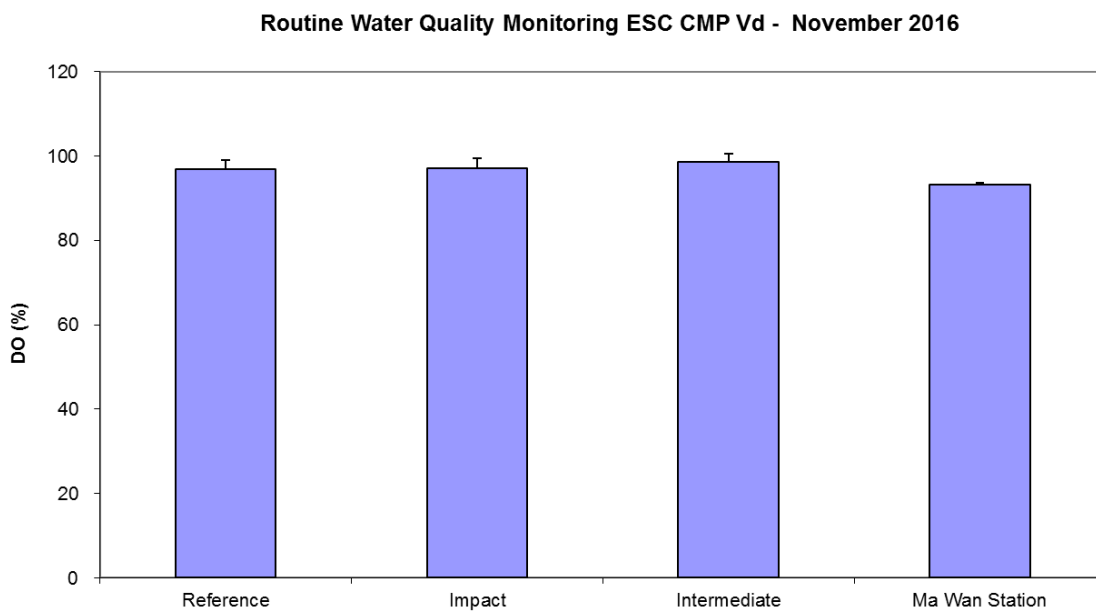


Figure 2: Level of Dissolved Oxygen (DO) (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

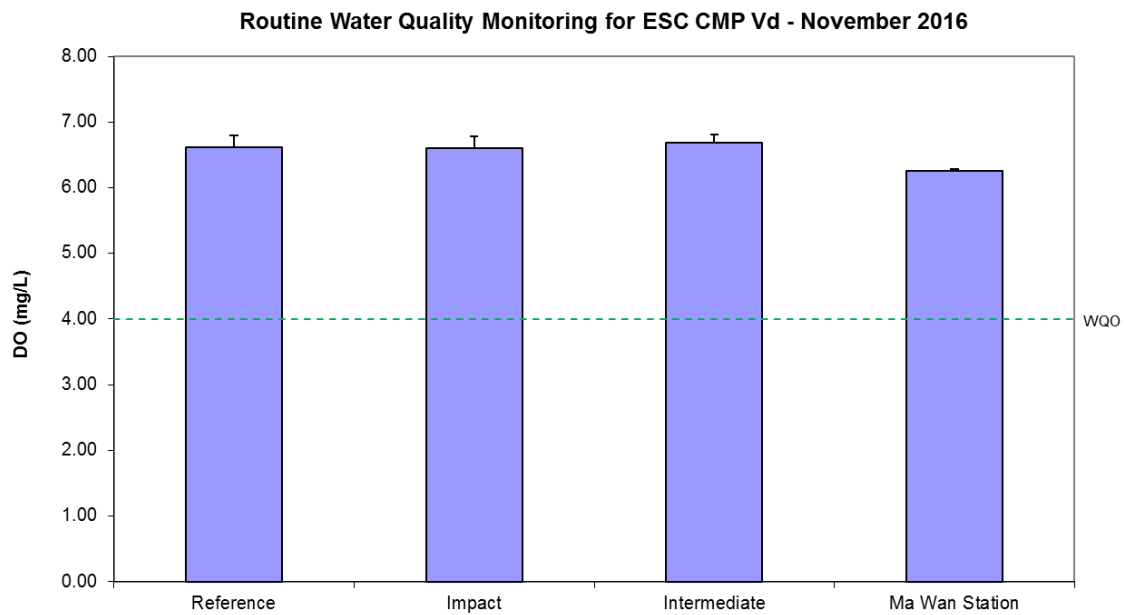


Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

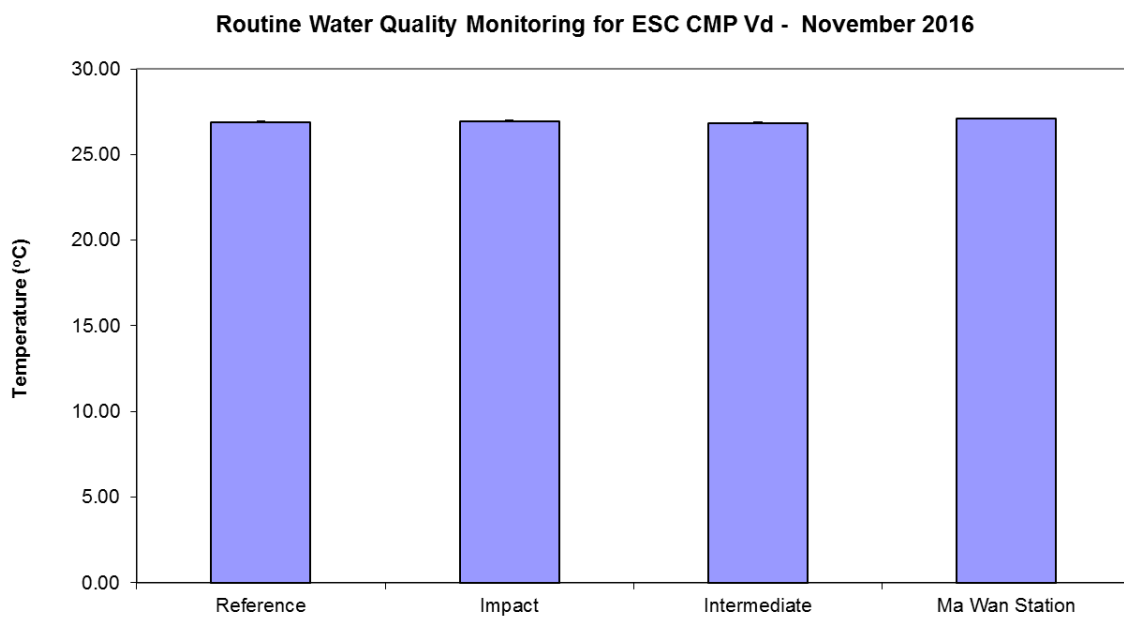


Figure 4: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

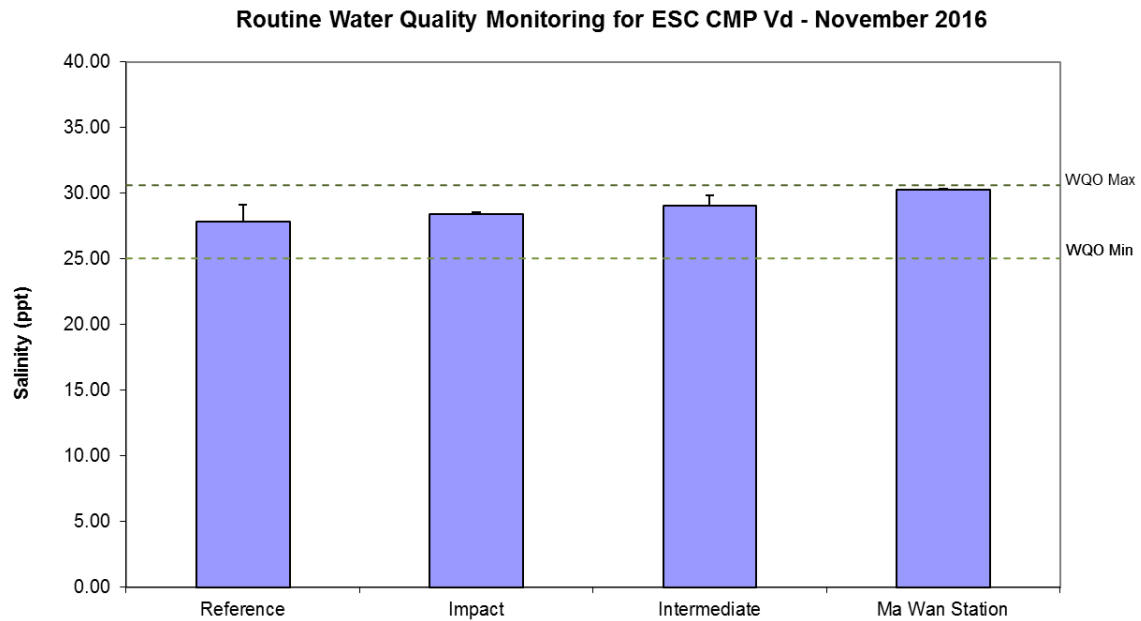


Figure 5: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

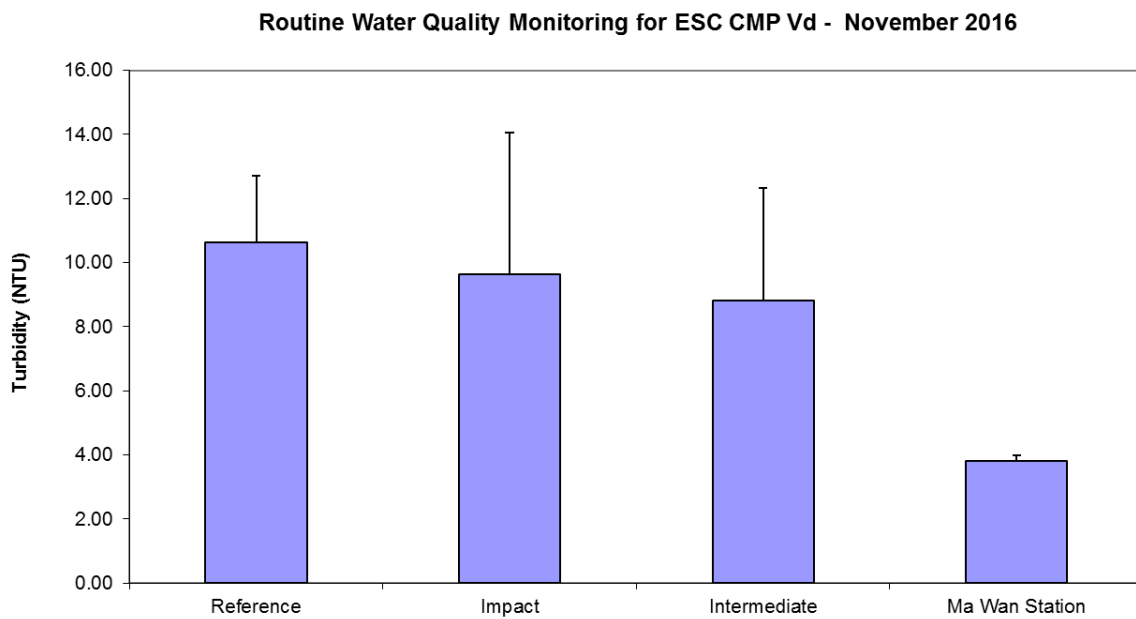


Figure 6: Levels of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

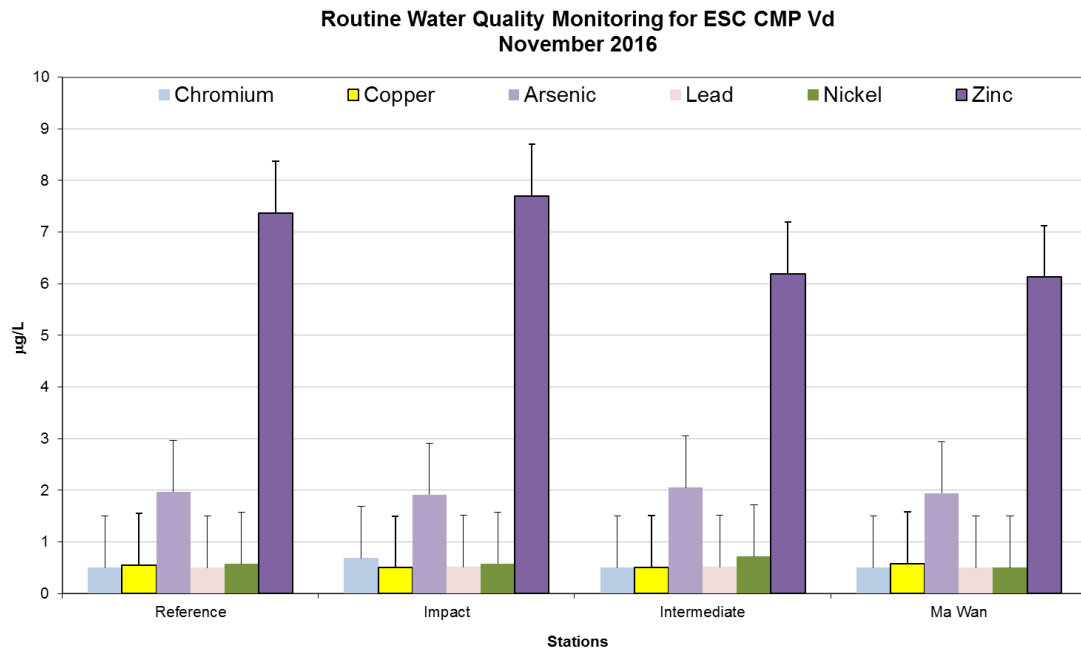


Figure 7: Concentration of Copper, Chromium, Zinc, Arsenic and Nickel ($\mu\text{g/L}$; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

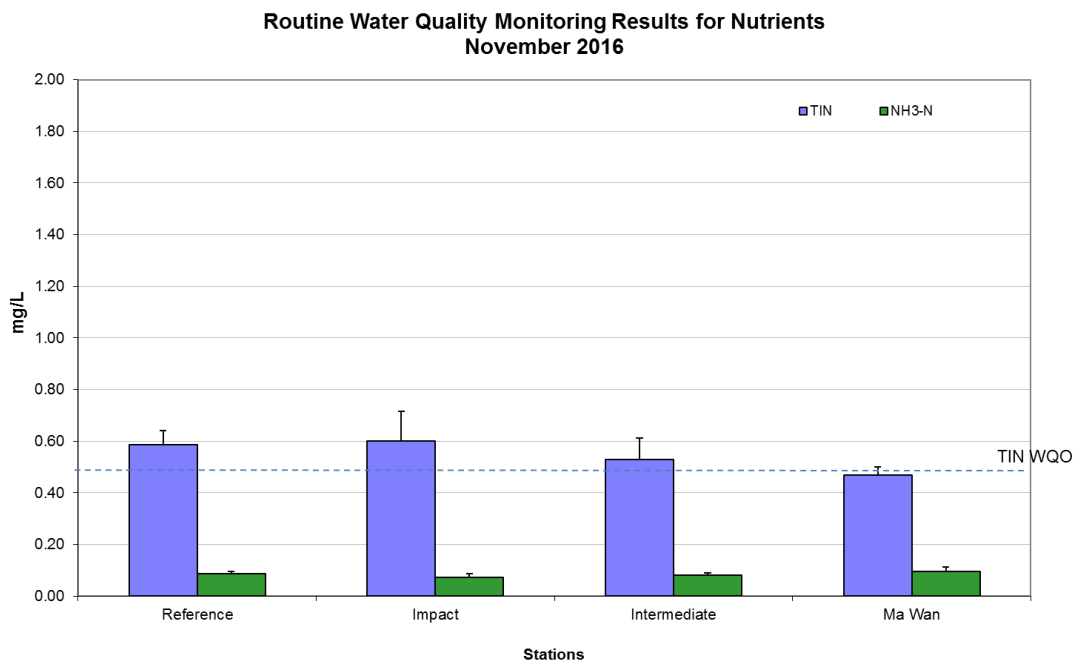


Figure 8: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen ($\text{NH}_3\text{-N}$) ($\mu\text{g/L}$; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

**Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD₅)
November 2016**

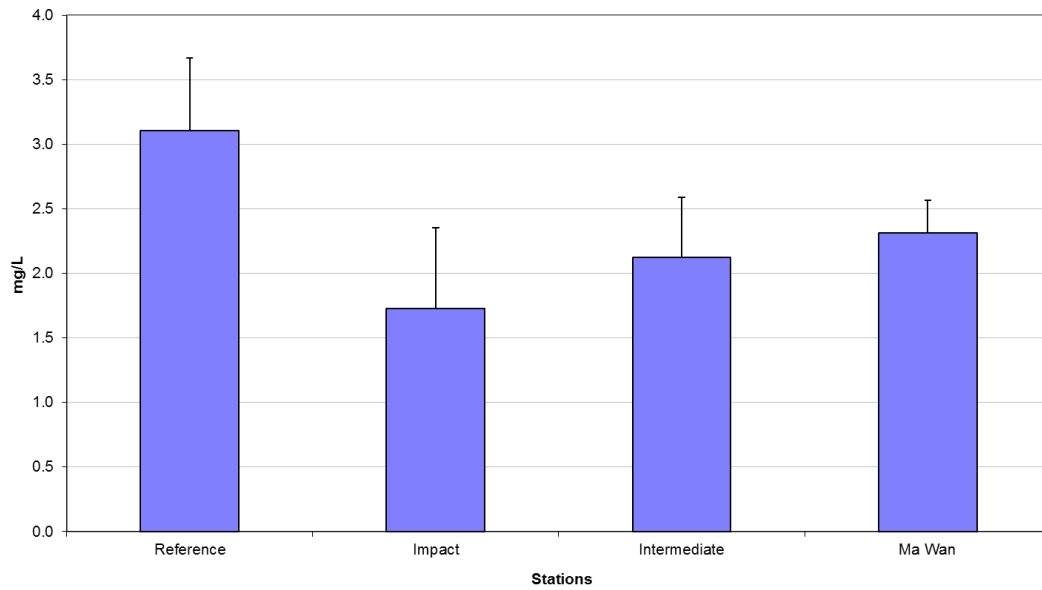


Figure 9: Level of Biochemical Oxygen Demand (BOD₅) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

**Routine Water Quality Monitoring for Suspended Solids
November 2016**

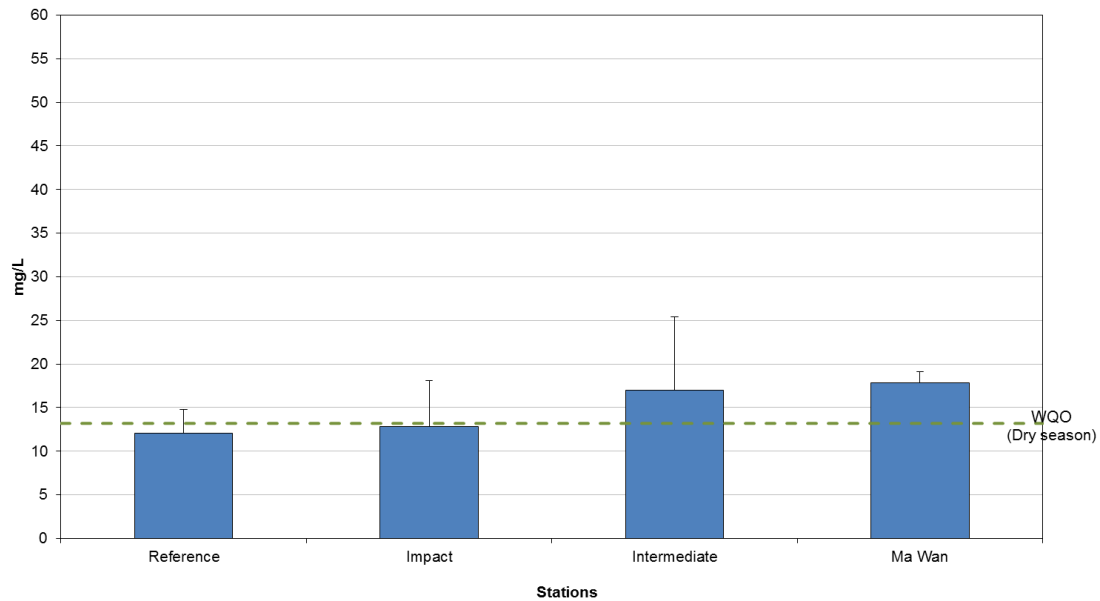


Figure 10: Concentration of Suspended Solids (SS) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP Vd in November 2016.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\51st (November 2016)

Date: 6/12/2016

**Environmental
Resources
Management**



Annex E

Study Programme

