



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)*

39th Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – November 2015

Draft (Revision 0)

14 December 2015

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		Craig A.	. Reid		
		Partner			
v0	39 th Monthly Progress Report for ESC CMPs and SB CMPs	EL	JT	CAR	14/12/15
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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: 3

39th Monthly Progress Report for Contaminated Mud Pits to

the South of The Brothers and at East Sha Chau -

November 2015

Date of Report:

14 December 2015

Date prepared by ET:

14 December 2015

Date received by IA:

14 December 2015

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/ $\frac{plan}{plan}$ complies with the above referenced condition of EP-427/2011/A

Craig A. Reid,

Environmental Team Leader:

Date:

14/12/2015

IA Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of

Jeny Mang

EP-427/2011/A

Dr Wang Wen Xiong, Independent Auditor: Date:

14/12/2015

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Agreement No. CE 23/2012 (EP) Environmental Monitoring and Audi

Environmental Monitoring and Audit

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

39TH MONTHLY PROGRESS REPORT FOR NOVEMBER 2015

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.

- (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)

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).

- 1.1.4 Environmental Permits (EPs) (EP-312/2008/A and EP-427/2011A) 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 both CMPs is shown in *Figure 1.1*. In November 2015, the following works were being undertaken at the CMPs:
 - Dredging operation at ESC CMP Vd;
 - Capping operations at ESC CMP Va; and
 - Disposal of contaminated mud at SB CMP 2.

Figure 1.1 Works Schedule for ESC CMPs and SB CMPs

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1.2 REPORTING PERIOD

1.2.1 This 39th Monthly Progress Report covers the EM&A activities for the reporting month of November 2015.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

- 1.3.1 The following monitoring activities have been undertaken for ESC CMPs in November 2015:
 - Impact Water Quality Monitoring during Dredging Operations of ESC CMPs was undertaken on 13, 16, 18 and 20 November 2015.

⁽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.

- 1.3.2 The following monitoring activities have been undertaken for SB CMPs in November 2015:
 - *Pit Specific Sediment Chemistry of CMP* 2 was undertaken on 3 November 2015;
 - Water Column Profiling of CMP 2 was undertaken on 5 November 2015;
 and
 - Routine Water Quality Monitoring of CMP 2 was undertaken on 12 November 2015.
- 1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS
- 1.4.1 No outstanding sampling remained for November 2015.
- 1.4.2 A summary of field activities conducted are presented in *Annex A*. The following laboratory analyses were still in progress during the preparation of this monthly report and hence are not presented in this monthly report:
 - Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry of SB CMP 2* in November 2015.

1.5 Brief Discussion of the Monitoring Results for ESC CMPs

- 1.5.1 Brief discussion of the monitoring results of the *Impact Water Quality Monitoring during Dredging Operations of ESC CMP Vd* conducted in November 2015 is presented below.
- 1.5.2 Impact Water Quality Monitoring during Dredging Operations of ESC CMP Vd November 2015
- 1.5.3 Dredging activities were carried out on 13 and 14 November 2015 during this reporting period. As such, *Impact Water Quality Monitoring during Dredging Operations of ESC CMP Vd* was conducted three times per week from 13 to 20 November 2015 to monitor water quality around the CMP during dredging activities. On each survey day, monitoring was conducted during both midebb and mid-flood tides at two Reference (Upstream) stations and five Impact (Downstream) stations around the dredging operations at ESC CMP Vd. 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 2015 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).
- 1.5.5 The results indicated that the dredging operations at ESC CMP Vd 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.

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

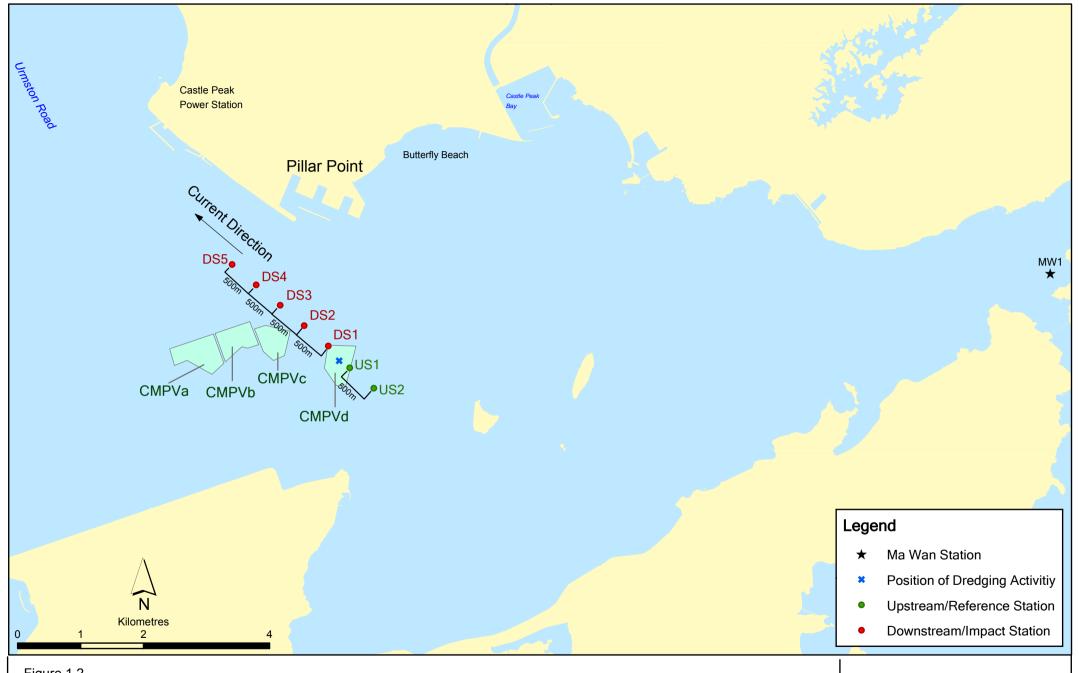


Figure 1.2

Indicative Dredging Impact Sampling Stations for CMPVd

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

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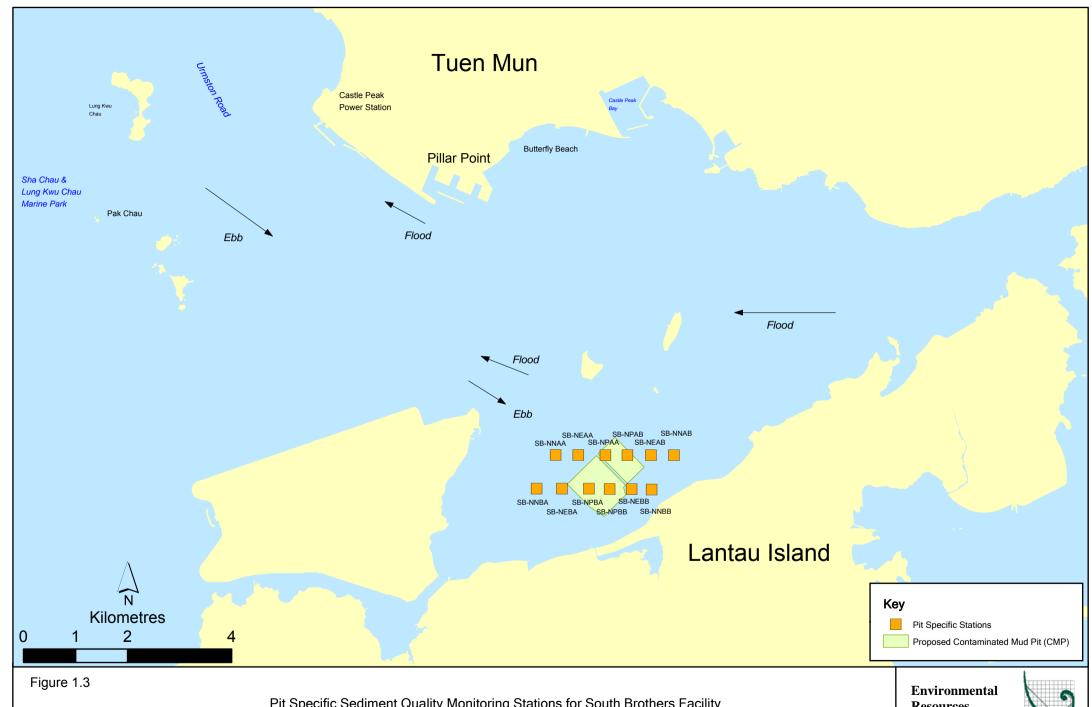


1.6 Brief Discussion of the Monitoring Results for SB CMPs

- 1.6.1 Brief discussion of the monitoring results of the following activities for SB CMPs is presented in this 39th Monthly Progress Report:
 - Pit Specific Sediment Chemistry of CMP 2 in October 2015;
 - Routine Water Quality Monitoring of CMP 2 in November 2015; and
 - *Water Column Profiling* of CMP 2 in November 2015.

1.6.2 Pit Specific Sediment Chemistry of CMP 2 - October 2015

- 1.6.3 Monitoring locations for *Pit Specific Sediment Chemistry for CMP 2* are shown in *Figure 1.3*. A total of six (6) monitoring stations were sampled in October 2015.
- 1.6.4 The concentrations of most inorganic contaminants (Arsenic, Cadmium, Chromium, Lead, Nickel and Zinc) were lower than the Lower Chemical Exceedance Level (LCEL) at all stations, except Copper, Mercury and Silver (*Figures 1* and 2 of *Annex D*). Copper exceeded the LCEL at Active Pit stations SB-NPBA (*Figure 1* of *Annex D*) while Silver exceeded the LCEL at both Active Pit stations SB-NPBA and SB-NPBB (*Figure 2* of *Annex D*). In addition, mercury exceeds LCEL at Near Pit Stations SB-NNBA and SB-NNBB and Pit-edge Station SB-NEBA (*Figure 2* of *Annex D*).
- 1.6.5 Higher Copper and Silver concentrations were recorded within the Active Pit stations only which were receiving contaminated mud during the reporting month whilst higher Mercury concentrations were only recorded at Near Pit stations and Pit-edge Station. Therefore, there is no evidence indicating any dispersal of contaminants from the Active Pit due to the disposal activities.
- 1.6.6 For organic contaminants, the concentrations of Total Organic Carbon (TOC) were similar at all stations (*Figure 3* of *Annex D*). Tributyltin (TBT) concentrations were observed to be higher at Active Pit station SB-NPBA (*Figure 4* of *Annex D*). Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (PAHs), Total Polychlorinated Biphenyls (PCBs), 4,4'-dichlorodiphenyldichloroethylene (DDE) and Total dichlorodiphenyltrichloroethane (DDT) concentrations were below the limit of reporting at most stations, except High Molecular Weight PAHs at Active Pit stations SB-NPBA and SB-NPBB (*Figure 5* of *Annex D*).



Pit Specific Sediment Quality Monitoring Stations for South Brothers Facility

Resources Management



1.6.7 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP 2 in October 2015. Statistical analysis will be undertaken and presented in the quarterly report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.

1.6.8 Routine Water Quality Monitoring of SB CMP 2 - November 2015

The monitoring results for the Routine Water Quality Monitoring conducted in November 2015 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 2005 - 2014 from stations in the Northwestern Water Control Zone (WCZ), where the 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 B3 of Annex B for details). The monitoring results are shown in Figures 6-16 of Annex D and Tables B4 and B5 of Annex B. A total of fourteen (14) monitoring stations were sampled in November 2015 as shown in Figure 1.4.

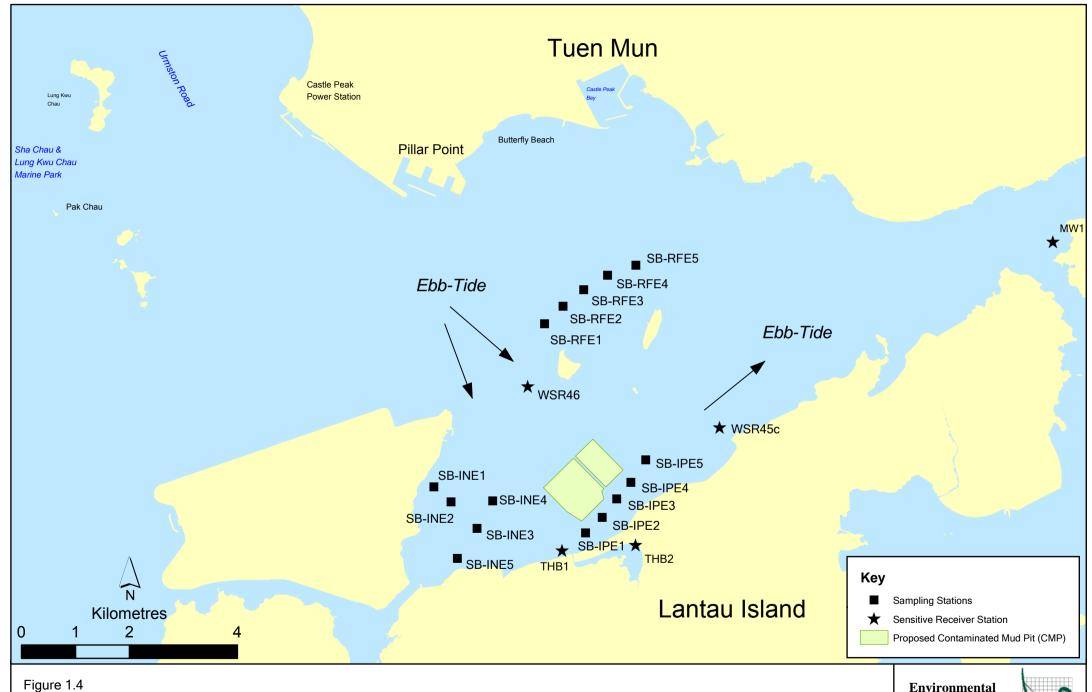


Figure 1.4
Routine Water Quality Sampling Stations (Ebb-Tide) for South Brothers Facility



In-situ Measurements

- 1.6.9 Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in *Figures 6 -11* of *Annex D*. Analyses of results for November 2015 indicated that the levels of pH, DO and Salinity complied with the WQOs at all stations (Impact, Intermediate, Reference and Water Sensitive Receiver stations) in November 2015 (*Figures 6 8, 10 of Annex D*).
- 1.6.10 The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (*Table B4* of *Annex B*; *Figures 8* and 11 of *Annex D*).
- 1.6.11 Overall, *in-situ* measurement results of the *Routine Water Quality Monitoring* indicated that the disposal operation at CMP 2 did not appear to cause any unacceptable impacts in water quality in November 2015.

Laboratory Measurements

- 1.6.12 Laboratory analysis of November 2015 results indicated that concentrations of Cadmium, Silver and Mercury were below their limit of reporting at all stations. Arsenic, Chromium, Copper, Lead, Nickel and Zinc were detected in November 2015 samples and the concentrations were similar amongst stations (*Figures 12 & 13* of *Annex D*). Results of laboratory analysis were shown in *Table B5* of *Annex B*.
- 1.6.13 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at Intermediate stations in November 2015 exceeded the WQO (0.5 mg/L) (*Figure 14 of Annex D*). Ammonia Nitrogen (NH3-N) concentration was relatively similar amongst all stations (*Figure 14 of Annex D*). Levels of 5-day Biochemical Oxygen Demand (BOD₅) appear to be higher at Shum Shui Kok and Tai Mo To stations in November 2015 (*Figure 15 of Annex D*).
- 1.6.14 Concentrations of SS exceeded the WQO (13.5 mg/L for dry season) at Reference and Sham Shui Kok stations in November 2015. Concentrations of SS also exceeded the Action Levels at Sham Shui Kok while it complied with the Action and Limit Levels at all other stations in November 2015 (*Figure 16* of *Annex D*; *Table B5* of *Annex B*). Since Sham Shui Kok station is located further away from Impact stations where exceedances of Action and Limit Levels did not occur, the exceedance of SS level was unlikely to be caused by mud disposal works at CMP 2 and it is considered to be sporadic events and characteristic of water quality in this area of Hong Kong.
- 1.6.15 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at CMP 2 did not appear to cause any unacceptable deterioration in water quality in November 2015. Detailed statistical analysis will be presented in the Quarterly Report to investigate any spatial and temporal trends of potential concern.

1.6.16 Water Column Profiling of CMP 2 - November 2015

1.6.17 Water Column Profiling was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 5 November 2015. The monitoring results have been assessed for compliance with the WQOs (see Section 1.6.9 for details).

In-situ Measurements

1.6.18 Analyses of results for November 2015 indicated that levels of Salinity, DO and pH complied with the WQOs at both Downstream and Upstream stations (*Table B6* of *Annex B*). In addition, DO and Turbidity at all stations complied with the Action and Limit Levels (*Tables B3* and *B6* of *Annex B*).

Laboratory Measurements for SS

1.6.19 Analyses of results for November 2015 indicated that the SS levels complied with the WQO at Downstream stations. Both Upstream and Downstream stations complied with the Action and Limit Levels (*Tables B3 and B6* of *Annex B*).

Overall, the monitoring results indicated that the mud disposal operation at CMP 2 did not appear to cause any deterioration in water quality during this reporting period.

1.7 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

- 1.7.1 The following monitoring activities will be conducted in the next monthly period of December 2015 for SB CMPs:
 - Pit Specific Sediment Chemistry of CMP 2;
 - Cumulative Impact Sediment Chemistry of SB CMPs;
 - Water Column Profiling of CMP 2;
 - Water Quality Monitoring During Capping of CMP 1; and
 - Benthic Recolonisation Studies of CMP 1.
- 1.7.2 The following monitoring activities will be conducted in the next monthly period of December 2015 for ESC CMPs:
 - Impact Water Quality Monitoring during Dredging Operations of CMP Vd
 - Benthic Recolonisation Studies of CMP IV; and
 - Water Quality Monitoring During Capping of ESC CMPs.
- 1.7.3 The sampling schedule is presented in *Annex A*.
- 1.8 STUDY PROGRAMME
- 1.8.1 A summary of the Study programme is presented in *Annex E*.

Annex A

Sampling Schedule

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

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	ESC-RFE3		* *	:	* *	k	*	*	*	*																						*	*	*	*		* *		*	*	*	*
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Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

			2012					2013						2)14							20	15								201	16				5	2017
Baseline Monitoring Prior to Dredging	Code	Frequency		NE) J	F M	A	M J J A	S O	N I	D J	F	M A			S	0 1	N D	J	F	M A M			A	$\mathbf{S} \mid \mathbf{C}$	O N	l D	JFI	M A	M			A S	0	N I		
Far Field Stations							П																											\Box		\top	Т
	SB-WFA	3 days per week for 4 weeks	* *																																		
	SB-WFB	3 days per week for 4 weeks	* *																																		
Mid Field Stations																																					\perp
	SB-WMA	3 days per week for 4 weeks	* *																																		\perp
	SB-WMB	3 days per week for 4 weeks	* *																																		\perp
Near Field Stations																																					\perp
		3 days per week for 4 weeks	* *																																		\perp
	SB-WNAB	* *	* *																																		\perp
	SB-WNBA	3 days per week for 4 weeks	* *																																		\bot
	SB-WNBB	3 days per week for 4 weeks	* *																															$\perp \perp \downarrow$			┷
Reference Stations																																		$\perp \perp \downarrow$			┷
	NM1	3 days per week for 4 weeks	* *																																		\bot
	NM2	3 days per week for 4 weeks	* *																															$\perp \perp \downarrow$			┷
	NM3	3 days per week for 4 weeks	* *																															$\perp \perp \downarrow$			┷
	NM5	3 days per week for 4 weeks	* *																															\perp			\bot
	NM6	3 days per week for 4 weeks	* *	\bot	\bot		igspace			$\sqcup \bot$	\bot					\bot				$\sqcup \downarrow$	\bot				\perp				\bot		\sqcup		\bot	\bot			4
Sensitive Receiver Stations				\bot	\bot		\sqcup			$\sqcup \bot$					igwdown	$\downarrow \downarrow \downarrow$		\perp		$\sqcup \bot$	\bot				\perp				\bot		\sqcup		\bot	$\downarrow \downarrow \downarrow$			_
	MW1	3 days per week for 4 weeks	* *	\bot			$\downarrow \downarrow \downarrow$			$\sqcup \bot$	_				igspace	$\downarrow \downarrow \downarrow$		\perp			\bot				\perp				\bot		$\sqcup \downarrow$		\bot	\bot			
	THB1	3 days per week for 4 weeks	* *	\bot			$\downarrow \downarrow \downarrow$								$oxed{oxed}$	$\downarrow \downarrow \downarrow$					\bot				\perp				\bot		$\sqcup \downarrow$		\bot	$\perp \perp \downarrow$			\bot
	THB2	3 days per week for 4 weeks	* *	\bot	$oldsymbol{\perp}$		$\perp \perp$			$\sqcup \bot$					igspace	$\downarrow \downarrow \downarrow$		\perp			\bot				\perp				\bot		$\sqcup \downarrow$		\bot	$\downarrow \downarrow \downarrow$			
	WSR45C	3 days per week for 4 weeks	* *	\bot			\sqcup				\bot		igwdown			\bot			\bot		\bot							$\sqcup \sqcup \sqcup$			\sqcup			$\downarrow \downarrow \downarrow$			+
	WSR46	3 days per week for 4 weeks	* *																																		丄
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Impact Monitoring for Dredging			J A S O	NL	<i>)</i>	F M	A	M J J A	S O	N I	υj	F	MI A	. M J	J A	. 5	O I	N D	J	F	M A M	J	J	A	$\mathbf{S} \mid \mathbf{C}$) N	1 D	J F	M A	M	J	J A	A S		N I	D J	F
Upstream Stations	US1	3 days per week		* *	k *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	* :	*	+		+				-	-			+		\vdash		-	+		+	+
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Downstream Stations	032	3 days per week					+			+						+	-	+	+		+		H	-	+	+	-		+	-	1		-	+		+	+
Downstream Stations	DS1	3 days per week		* *	* *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	* :	*																+		+	+
	DS2	3 days per week		* *	* *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	* :	*																+			+
	DS3	3 days per week		* *	* *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	* :	*																+		\top	+
	DS4	3 days per week		* *	* *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	*	*																T		\top	\top
	DS5	3 days per week		* *	* *	* *	*	* * * *	* *	*	* *	*	* *	* *	* *	*	* :	*																			\top
Sensitive Receiver Stations																																					
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	THB1	3 days per week		* *	* *	* *	*	* * * *	* *				* *		* *			*																		\bot	\perp
	THB2	3 days per week		* *	* *	* *		* * * *					* *		* *		* :	*																			丄
	WSR45C	3 days per week		* *	* *	* *		* * * *	* *			*		* *		*	* :	*																$\downarrow \downarrow \downarrow$		\bot	+
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Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

Cumulative Impact Sediment Chemistry Near-field Stations Mid-field Stations Far-Field Stations Capped Pit Stations Sensitive Receiver Stations	SB-RNA SB-RNB SB-RMA SB-RMB	4 times per year	J A S	O N	D J	F	M A	2013 M J J A 12 12 12	SO	N D 12 12 12	12	2	12	12	O 1	N D	J F M A M	2015JJ12	A 12	SO	N D 12	J F M	I A		016 J A	AS	O N	D J F
Mid-field Stations Far-Field Stations Capped Pit Stations	SB-RNB SB-RMA SB-RMB SB-RFA	4 times per year 4 times per year											$-\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!$			12	12	12	12				\blacksquare			\blacksquare		\mp
Far-Field Stations Capped Pit Stations	SB-RNB SB-RMA SB-RMB SB-RFA	4 times per year 4 times per year		+	+				\dashv				$-\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!\!-\!\!\!\!$			12	12	12	12		12		$\perp \perp \perp$					
Far-Field Stations Capped Pit Stations	SB-RMA SB-RMB SB-RFA	4 times per year		+				12		1 12	1 1						1.0											-
Far-Field Stations Capped Pit Stations	SB-RMB SB-RFA			+						12	14	2	12	12		12	12	12	12		12		+++		\vdash	-		-++
Capped Pit Stations	SB-RMB SB-RFA					+ +		12		12	12	2	12	12		12	12	12	12		12		+++		\vdash	+		++
Capped Pit Stations	SB-RFA	1 3			++			12		12		2	12	12		12		12	12		12		+++	+	\vdash	+++		++
	CD DED	4 times per year						12		12		2		12		12		12	12		12		\Box					
	SB-RFB	4 times per year		++	+		_	12		12	12	2	12	12		12	12	12	12		12		\bot		\perp			
Sensitive Receiver Stations	SB-RCA	4 times man reason		+	+	+ +		12		12	11	2	12	12		10	12	12	12		12		++		\vdash	+++		
Sensitive Receiver Stations	SB-RCA SB-RCB	4 times per year 4 times per year		+	++	+ +		12		12		2		12		12		12	12		12		++		\vdash	+	+++	
	ob Reb	r times per year		++	++					12						12		12	1				+++	+	\vdash	+++		++
	MW1	4 times per year						12		12	12	2	12	12		12	12	12	12		12							
	THB1	4 times per year						12		12			12	12		12	12	12	12		12		\Box					
	THB2	4 times per year						12		12	12	2	12	12		12	12	12	12		12							
Sediment Toxicity Tests			T A C	LOLN		Е	мГа	MITIAI	6 1 0 1	N. D	7 7	E M	A M T T	A . C		NID	J F M A M	T T			N D	I E M	[_ A _]	MI	T		ON	DIT
SB CMP 1 Active			J A S	U N		F	A A	M J J A	3 0	ND	J	F M	A M J J	A S	0	N D	J F M A M	J	A	3 0	N D	J F M	A	IVI J	J P	3	O N	D J I
Reference			 	+-	+	+		- - - 	++			++	- - - - -		+	+	- 		+			++	++		++	++	++	++
	SB-TRA	2 times per year		++	++	++	+	5				5	 	5	++	+	 		++			++	++		十十	++	++	++
	SB-TRB	2 times per year						5				5		5									<u> </u>			力寸		
Near-Field																												
	SB-TAA	2 times per year		\bot				5				5		5									44	'	$\perp \perp$			\bot
Sensitive Receiver Stations	SB-TAB	2 times per year		+	++	+		5				5	+	5									+	'	\vdash	\longrightarrow		-+-
Sensitive Receiver Stations	MW1	2 times per year		+-+	++	+		5				5		5									++		\vdash	+	+++	++
	THB1	2 times per year 2 times per year		++	++	+ +		5				5		5									++		\vdash	+++		++
	THB2	2 times per year		++	++	+ +		5				5		5									++		\vdash	+		++
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Reference																												
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N	SB-TRB	2 times per year		++	++												5		5				+	'	<u> </u>	\perp		++
Near-Field	SB-TBA	2 6		++	++	+ +	+							_	+			_	+				++		\vdash	+		++
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Sensitive Receiver Stations	02 122	2 times per year		++	+	+ +													+				+	+-	十十	+		++
	MW1	2 times per year															5		5				+			11		
	THB1	2 times per year															5		5									
	THB2	2 times per year															5		5									
T'/XATL-1- D- 4- C1'			T A C	LOLN		r r	N	MITIAI		ND	T T		A M T T	A C		N D	J F M A M	т т			N D	T F M	- I A I	N/ T	T .		O N	DI II
Tissue/ Whole Body Sampling Near-Pit Stations			J A S	UN		F 1	M A	M J J A	SO	N D	J F	F M	A M J J	A 5		ND	J F WI A WI	JJ	A	SO	N D	J F IVI	I A	IVI J	J A	AS	UN	D J I
real in Santons	SB-INA	2 times per year	 	++	+	+ +		- 	++		*	k	- - - 	*	+ +	+	*		*	\dashv		++	+++		+	++	++	++
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Reference North																							\Box			\Box		
	TNA	2 times per year		++	\bot						*	k		*			*		*				\bot	'	<u> </u>	\bot		+
Defence of Court	TNB	2 times per year		+-	+	+		-	+		*	*	++++	*	++	+	*		*	-		-+	++	'	++	+	+	++
Reference South	TSA	2 times per year		+-	+-		_	- 			*	k	- - - 	*		+	*		*				++		+	++	+	++
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Demersal Trawling			J A S	O N	D J	F	M A	M J J A	S O	N D	JF	F M	A M J J	A S	O 1	N D	J F M A M	J J	A	S O	N D	J F M	A	M J	J A	A S	O N	D J I
Impact	<u> </u>																						\Box					
		4 times per year		+	+			5	\longrightarrow		5 5	5	5			\perp	5 5	5	5			\bot	$\downarrow \downarrow \downarrow$	'	+	$\downarrow \downarrow \downarrow$	\rightarrow	\bot
I	SB-INB 1-5	4 times per year		+	+			5			5 5	5	5	5	+	\dashv	5 5	5	5			-+	++	'	++	+	\longrightarrow	+
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											5 5	5		5				5	5 5				\mp		Ħ	#		

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

				2012					201	13							2014							2	015							201	6			20
Routine Water Quality Monitoring			I A	s o	N	DI	F M	A M	ı	I A	A S	O	N D	I I	F M	I A M	ı ı	AS	0	N D) I F	M	AN	иГ	I	A S	О	N I) I	F M		M I I	I A	S	O N	
Ebb Tide									1									_															,			
Impact Stations Downcurrent									+							1 1 									1 1									1 1		+
	SB-IPE1	8 times per year			1					8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8			1 1	+++			+++	
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	SB-IPE3	8 times per year								8	-	8 8		8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8			1 1			1 1		-
	SB-IPE4	8 times per year									3	8 8	_	8 8	8	8 8	8	8	8	Ŭ	8 8		8	3	8	8	8	8						+ +		
	SB-IPE5	8 times per year									3	8 8	_	,	8	8 8	8	8	Ü	8	8 8		8 8	3	8	8	8	8		+ + -	+ +			+ +		+
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	THB2	8 times per year								8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8								
	WSR45C	8 times per year								8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8								
	WSR46	8 times per year								8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8								
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	SB-IPF3	8 times per year		+ +					+ +	`	3		8	8 8	8	8 8	8	8	8	8	8 8	+	8 8	3	8	8	Ü	8		+	+ +	+++		+	+	+
Intermediate Stations Downcurrent	<i>32</i> 11 1 3	o times per year			1				1		,		3	0 0	0		0	0	0	0	0 0	+ -	0 (,	0	0	0	0	-	++	+			+ +	+	-
intermediate Stations Downcurrent	SB-INF1	O time as man year							+ +		3	8 8	0	8 8	8	8 8	8	0	8	0	8 8	+	8 8)	8	0	8	0	-	+-+	+			+		+
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	SB-INF3	8 times per year									3		-		_			8	_	 	+	_	-				_		-	+				+ +	+++	 -
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	SB-RFF2	8 times per year	 	+					+		3	8 8	_		8	8 8	8		8		8 8		8 8		8		8		-		+	\dashv		+	\dashv	——
	SB-RFF3	8 times per year		1 —	+				+	8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8	+	8 8	3	8	8	8	8			\perp	\dashv		$\downarrow \downarrow \downarrow$	+	<u> </u>
Sensitive Receiver Stations				+	+				+			$\vdash \vdash$		$\vdash \vdash$		+	+							\perp	$\downarrow \downarrow \downarrow$		\sqcup				+	\dashv		\bot	\rightarrow	——
	MW1	8 times per year		\bot	\bot				+		3		8	, ,	8	8 8	U	8	8	Ŭ	8 8	\bot	8 8	_	U	8	8	8			\bot	\rightarrow		\bot	\longrightarrow	
	THB1	8 times per year							$\downarrow \downarrow$		3	8 8			8	8 8	8	_	8		8 8		8 8		8		8		_	\bot		\rightarrow		\bot	\perp	
	THB2	8 times per year									3	8 8	8		8	8 8	8		8		8 8		8 8		8		8			$\perp \perp \perp$	\bot	\perp			\perp	
	WSR45C	8 times per year								8	3		8	8 8	8	8 8	8		8	8	8 8		8 8		8		8	8								
	WSR46	8 times per year								8	3	8 8	8	8 8	8	8 8	8	8	8	8	8 8		8 8	3	8	8	8	8								
Water Column Profiling			IIA	S O	N	DII	F M	A M	I	I A	AS	0 1	N D	I I	F M	И А М	1 1	AS	0	N D	J F	M	AN	M I	I	A S	0	NI) I	F M	[A]	M I	I A	S	O N	DI
Plume Stations	WCP1	Monthly				,					4 4	4	1 1			4 4		4 4	Δ	4 1	1 1		4 4		+ -		4	4 4	1							+
1 mile stations	WCF1 WCP2	Monthly	 	+ +	+ +	+			+ +		1 4	4 4	1 1	 	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		4 4	1 4	1	1 1	1 1	_	4 4	_	_	4 4	1	1 1	1	+	+ +	+		+	+	
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Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

				201	2					2013						2014							2015							201	.6			2017
Capping Water Quality Monitoring			J			D	J	F M	I A		s o	N	D J	F	M A M		A	S	o N	D	J I	F M A M J		A	s C	N	D 1	J F M	A M			s	O N	D J F
Ebb Tide				$\overline{}$																						$\overline{}$							$\overline{}$	
Impact Stations Downcurrent															1 1 1																			
	SB-IPE1	4 times per year																		3		3 3	3	3			3	3		3	3			3
	SB-IPE2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-IPE3	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-IPE4	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-IPE5	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Intermediate Stations Downcurrent																																		
	SB-INE1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INE2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INE3	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INE4	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INE5	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Reference Stations Upcurrent																																		
	SB-RFE1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-RFE2	4 times per year																		3		3 3	3	3		<u> </u>	3	3		3	3			3
	SB-RFE3	4 times per year																		3	(3	3	3			3	3		3	3			3
	SB-RFE4	4 times per year																		3	(3	3	3			3	3		3	3			3
	SB-RFE5	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Sensitive Receiver Stations																																		
	MW1	4 times per year																		3		3 3	3	3			3	3		3	3			3
	THB1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	THB2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	WSR45C	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	WSR46	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Flood Tide																																		\top
Impact Stations Downcurrent																																		
	SB-IPF1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-IPF2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-IPF3	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Intermediate Stations Downcurrent																																		
	SB-INF1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INF2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-INF3	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Reference Stations Upcurrent																																		
	SB-RFF1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-RFF2	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	SB-RFF3	4 times per year																		3	(3 3	3	3			3	3		3	3			3
Sensitive Receiver Stations																																		
	MW1	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	THB1	4 times per year												L						3		3 3	3	3			3	3		3	3			3
	THB2	4 times per year												Ĺ						3	,	3 3	3	3			3	3		3	3			3
	WSR45C	4 times per year																		3	(3 3	3	3			3	3		3	3			3
	WSR46	4 times per year																		3		3 3	3	3			3	3		3	3			3
Benthic Recolonisation Studies			J	A S	O N	D	J	F M	I A	M J J A	S O	N	D J	F	M A M	JJ	A	S	O N	D	J	F M A M J	J	A	S C	N	D]	J F M	A M	J	J A	S	O N I	D J F
Capped Contaminated Mud Pits																																		
	SB-CPA	2 times per year																						12			12				12		1	12
	SB-CPB	2 times per year																						12			12				12		1	12
		·																																
Reference Stations																																		
	RBA	2 times per year																						12			12				12		1	12
	RBB	2 times per year				1 1									1 1 1	1								12			12				12			12
	RBC	2 times per year																						12			12				12		1	12
					•		-	_	•		•	•	-			-			_				-			-			•	•	•	•		

"*" = Number of replicates depends on parameters

Naming of stations are tentative only and will be subjected to changes

Annex B

Water Quality Monitoring Results

Table B1 Summary Table of DO, Turbidity and SS Levels Recorded in November 2015

Sampling Date	Tidal Period	Station	_	DO Levels ng/L)	Average Turbidity	Average SS Level	
			Bottom	Surface and Mid Depth	Level (NTU)	(mg/L)	
2015/11/13	Mid-Ebb	DS1	6.13	6.19	6.32	7.55	
		DS2	6.05	6.18	7.43	10.60	
		DS3	6.13	6.17	6.45	8.30	
		DS4	6.22	6.23	8.46	9.48	
		DS5	6.25	6.24	6.35	9.20	
		US1	5.86	6.12	10.09	9.22	
		US2	6.04	6.15	7.65	8.63	
		MW1	5.69	5.79	4.74	6.42	
	Mid-Flood	DS1	6.08	6.15	13.57	14.65	
		DS2	5.98	6.12	14.17	14.95	
		DS3	5.95	6.07	12.97	16.88	
		DS4	6.03	6.14	13.12	14.28	
		DS5	5.98	6.13	18.20	15.28	
		US1	6.31	6.28	11.42	13.70	
		US2	6.27	6.25	13.65	16.65	
		MW1	5.79	5.83	10.29	13.05	
2015/11/16	Mid-Ebb	DS1	6.12	6.27	5.59	7.72	
		DS2	6.09	6.28	5.92	10.28	
		DS3	6.20	6.37	5.15	6.00	
		DS4	5.99	6.08	7.62	5.57	
		DS5	6.45	6.56	4.87	6.15	
		US1	6.17	6.36	4.95	5.98	
		US2	6.06	6.28	5.27	6.77	
		MW1	5.85	5.92	4.57	6.40	
	Mid-Flood	DS1	5.85	5.94	16.53	15.33	
		DS2	5.87	5.93	16.43	13.57	
		DS3	5.86	6.00	9.89	10.18	
		DS4	5.78	5.89	12.46	12.95	
		DS5	5.77	5.93	15.27	12.50	
		US1	5.87	6.06	17.30	12.47	
		US2	5.98	6.14	11.81	12.28	
		MW1	5.73	5.84	10.20	12.27	
2015/11/18	Mid-Ebb	DS1	5.84	6.15	5.34	5.82	
		DS2	5.82	6.21	4.97	5.48	
		DS3	5.97	6.34	4.30	5.37	
		DS4	6.25	6.42	3.64	4.50	
		DS5	6.48	6.50	4.04	4.37	
		US1	5.71	6.00	9.10	10.02	
		US2	5.75	6.10	6.78	6.35	
		MW1	5.61	6.01	3.96	10.02	
	Mid-Flood	DS1	5.73	5.85	8.96	10.28	
		DS2	5.70	5.89	7.95	8.48	
		DS3	5.70	5.98	5.37	6.08	
		DS4	5.74	6.10	4.52	4.48	
		DS5	5.73	6.06	5.00	6.38	
		US1	5.70	6.00	7.48	7.92	
		US2	5.70	5.93	7.48	7.02	
		MW1	5.62	5.71	7.92	10.02	

Sampling Date	Tidal Period	Station	•	Average DO Levels (mg/L)		Average SS Level
Dute	Terrou		Bottom	Surface and Mid Depth	Turbidity Level (NTU)	(mg/L)
2015/11/20	Mid-Ebb	DS1	5.58	6.04	5.28	6.25
		DS2	5.84	6.00	4.13	5.10
		DS3	5.78	5.94	6.36	7.83
		DS4	6.05	5.99	3.83	3.75
		DS5	6.07	5.94	4.03	4.98
		US1	5.74	5.97	4.16	4.53
		US2	5.64	5.95	5.05	5.07
		MW1	5.63	5.84	3.20	4.18
	Mid-Flood	DS1	5.46	5.70	6.30	5.93
		DS2	5.56	5.75	5.98	5.52
		DS3	5.67	6.05	3.71	4.07
		DS4	5.66	6.19	4.46	5.88
		DS5	5.82	6.20	4.60	6.13
		US1	5.73	6.14	5.76	7.25
		US2	5.73	5.99	6.11	8.10
		MW1	5.65	5.59	4.90	6.82

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

Table B2 Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities at ESC CMPs

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO) (1)	Surface and Mid-depth (2)	Surface and Mid-depth (2)
	5%-ile of baseline data for surface and	1%-ile of baseline data for surface and
	middle layer = 3.76 mg L-1	middle layer = 3.11 mg L^{-1} (3)
	and	and
	Significantly less than the reference	Significantly less than the reference
	stations mean DO (at the same tide of	stations mean DO (at the same tide of
	the same day)	the same day)
	Bottom	Bottom
	5%-ile of baseline data for bottom	The average of the impact station
	layers = 2.96 mg L-1	readings are <2 mg/L-1
	and	and
	Significantly less than the reference	Significantly less than the reference
	stations mean DO (at the same tide of the same day)	stations mean DO (at the same tide of the same day)
Depth-averaged Suspended	95%-ile of baseline data for depth	99%-ile of baseline data for depth
Solids (SS) (4) (5)	average = 37.88 mg L-1	average = 61.92 mg L -1
	and	
		and
	120% of control station's SS at the same	130% of control station's SS at the same
	tide of the same day	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

- (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 Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities for SB CMPs

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO) (1)	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and middle layer = 4.32 mg L-1	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are < 4 mg L-1
	and Significantly less than the reference stations mean DO (at the same tide of the same day)	and Significantly less than the reference stations mean DO (at the same tide of the same day)
	Bottom The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = 3.12 mg L-1	$\frac{\text{Bottom}}{\text{The average of the impact station,}}$ WSR 45C and WSR 46 readings are $<$ 2 mg L ⁻¹
	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) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = 21.60 mg L-1	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data for depth average = 40.10 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) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = 25.04 NTU	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = 32.68 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
NT-1		

- (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) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- (4) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table B4 In-situ Monitoring Results for Routine Water Quality Monitoring of SB CMP in November 2015

Sampling	Stations	Temp	Salinity	Turbidity	Dissolve	d Oxygen	pН
Period	Stations	(°C)	(ppt)	(NTU)	(%)	(mg L-1)	(mg L-1)
November	RFF (Reference)	26.25	31.08	7.92	85.35	5.79	7.89
2015	IPF (Impact)	26.05	29.06	10.09	89.29	6.14	7.88
	INF (Intermediate)	25.77	28.35	8.10	93.09	6.46	7.88
	Ma Wan	26.22	31.36	3.92	86.19	5.84	7.87
	Shum Shui Kok	26.19	29.45	13.86	86.55	5.93	7.87
	Tai Mo To	26.11	30.12	8.30	89.25	6.10	7.89
	Tai Ho Bay 1	25.89	28.49	11.17	91.70	6.35	7.90
	Tai Ho Bay 2	26.07	29.55	10.21	85.81	5.89	7.66
	WQO	N/A	27.97 - 34.19#	N/A	N/A	>4	6.5-8.5

Table B5 Laboratory Results for Routine Water Quality Monitoring of SB CMP in November 2015

Sampling	Stations	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Zn	NH ₃	TIN	BOD ₅	SS
Period	Stations	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
November	RFF	2.31	<lor< td=""><td>1.39</td><td>6.56</td><td><lor< td=""><td><lor< td=""><td>1.68</td><td><lor< td=""><td>16.57</td><td>0.07</td><td>0.36</td><td>1.09</td><td>13.81</td></lor<></td></lor<></td></lor<></td></lor<>	1.39	6.56	<lor< td=""><td><lor< td=""><td>1.68</td><td><lor< td=""><td>16.57</td><td>0.07</td><td>0.36</td><td>1.09</td><td>13.81</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.68</td><td><lor< td=""><td>16.57</td><td>0.07</td><td>0.36</td><td>1.09</td><td>13.81</td></lor<></td></lor<>	1.68	<lor< td=""><td>16.57</td><td>0.07</td><td>0.36</td><td>1.09</td><td>13.81</td></lor<>	16.57	0.07	0.36	1.09	13.81
2015	IPF	2.48	<lor< td=""><td>1.70</td><td>7.55</td><td>1.08</td><td><lor< td=""><td>1.93</td><td><lor< td=""><td>15.12</td><td>0.08</td><td>0.45</td><td>1.54</td><td>11.63</td></lor<></td></lor<></td></lor<>	1.70	7.55	1.08	<lor< td=""><td>1.93</td><td><lor< td=""><td>15.12</td><td>0.08</td><td>0.45</td><td>1.54</td><td>11.63</td></lor<></td></lor<>	1.93	<lor< td=""><td>15.12</td><td>0.08</td><td>0.45</td><td>1.54</td><td>11.63</td></lor<>	15.12	0.08	0.45	1.54	11.63
	INF	2.76	<lor< td=""><td>1.14</td><td>2.61</td><td><lor< td=""><td><lor< td=""><td>1.53</td><td><lor< td=""><td>6.16</td><td>0.06</td><td>0.56</td><td>1.38</td><td>9.48</td></lor<></td></lor<></td></lor<></td></lor<>	1.14	2.61	<lor< td=""><td><lor< td=""><td>1.53</td><td><lor< td=""><td>6.16</td><td>0.06</td><td>0.56</td><td>1.38</td><td>9.48</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.53</td><td><lor< td=""><td>6.16</td><td>0.06</td><td>0.56</td><td>1.38</td><td>9.48</td></lor<></td></lor<>	1.53	<lor< td=""><td>6.16</td><td>0.06</td><td>0.56</td><td>1.38</td><td>9.48</td></lor<>	6.16	0.06	0.56	1.38	9.48
	Ma Wan	1.73	<lor< td=""><td>2.37</td><td>5.73</td><td><lor< td=""><td><lor< td=""><td>1.97</td><td><lor< td=""><td>20.27</td><td>0.07</td><td>0.34</td><td>0.91</td><td>11.70</td></lor<></td></lor<></td></lor<></td></lor<>	2.37	5.73	<lor< td=""><td><lor< td=""><td>1.97</td><td><lor< td=""><td>20.27</td><td>0.07</td><td>0.34</td><td>0.91</td><td>11.70</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.97</td><td><lor< td=""><td>20.27</td><td>0.07</td><td>0.34</td><td>0.91</td><td>11.70</td></lor<></td></lor<>	1.97	<lor< td=""><td>20.27</td><td>0.07</td><td>0.34</td><td>0.91</td><td>11.70</td></lor<>	20.27	0.07	0.34	0.91	11.70
	Shum Shui Kok	2.48	<lor< td=""><td>1.63</td><td>6.13</td><td><lor< td=""><td><lor< td=""><td>1.65</td><td><lor< td=""><td>11.20</td><td>0.08</td><td>0.43</td><td>3.39</td><td>28.07</td></lor<></td></lor<></td></lor<></td></lor<>	1.63	6.13	<lor< td=""><td><lor< td=""><td>1.65</td><td><lor< td=""><td>11.20</td><td>0.08</td><td>0.43</td><td>3.39</td><td>28.07</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.65</td><td><lor< td=""><td>11.20</td><td>0.08</td><td>0.43</td><td>3.39</td><td>28.07</td></lor<></td></lor<>	1.65	<lor< td=""><td>11.20</td><td>0.08</td><td>0.43</td><td>3.39</td><td>28.07</td></lor<>	11.20	0.08	0.43	3.39	28.07
	Tai Mo To	2.54	<lor< td=""><td>2.15</td><td>7.76</td><td><lor< td=""><td><lor< td=""><td>1.46</td><td><lor< td=""><td>12.04</td><td>0.07</td><td>0.42</td><td>2.90</td><td>13.33</td></lor<></td></lor<></td></lor<></td></lor<>	2.15	7.76	<lor< td=""><td><lor< td=""><td>1.46</td><td><lor< td=""><td>12.04</td><td>0.07</td><td>0.42</td><td>2.90</td><td>13.33</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.46</td><td><lor< td=""><td>12.04</td><td>0.07</td><td>0.42</td><td>2.90</td><td>13.33</td></lor<></td></lor<>	1.46	<lor< td=""><td>12.04</td><td>0.07</td><td>0.42</td><td>2.90</td><td>13.33</td></lor<>	12.04	0.07	0.42	2.90	13.33
	Tai Ho Bay 1	1.97	<lor< td=""><td>1.62</td><td>1.52</td><td><lor< td=""><td><lor< td=""><td>1.77</td><td><lor< td=""><td>11.96</td><td>0.05</td><td>0.44</td><td>1.06</td><td>13.09</td></lor<></td></lor<></td></lor<></td></lor<>	1.62	1.52	<lor< td=""><td><lor< td=""><td>1.77</td><td><lor< td=""><td>11.96</td><td>0.05</td><td>0.44</td><td>1.06</td><td>13.09</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.77</td><td><lor< td=""><td>11.96</td><td>0.05</td><td>0.44</td><td>1.06</td><td>13.09</td></lor<></td></lor<>	1.77	<lor< td=""><td>11.96</td><td>0.05</td><td>0.44</td><td>1.06</td><td>13.09</td></lor<>	11.96	0.05	0.44	1.06	13.09
	Tai Ho Bay 2	1.96	<lor< td=""><td>2.26</td><td>3.03</td><td><lor< td=""><td><lor< td=""><td>1.94</td><td><lor< td=""><td>12.46</td><td>0.08</td><td>0.50</td><td>1.32</td><td>8.35</td></lor<></td></lor<></td></lor<></td></lor<>	2.26	3.03	<lor< td=""><td><lor< td=""><td>1.94</td><td><lor< td=""><td>12.46</td><td>0.08</td><td>0.50</td><td>1.32</td><td>8.35</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.94</td><td><lor< td=""><td>12.46</td><td>0.08</td><td>0.50</td><td>1.32</td><td>8.35</td></lor<></td></lor<>	1.94	<lor< td=""><td>12.46</td><td>0.08</td><td>0.50</td><td>1.32</td><td>8.35</td></lor<>	12.46	0.08	0.50	1.32	8.35

 $WQO \ of \ TIN: 0.5 \ mg/L$ Dry Season WQO of SS : 13.5 mg/L

 $\textbf{Note:} \ \mathsf{Cell} \ \mathsf{shaded} \ \mathsf{yellow} \ \mathsf{/} \ \mathsf{red} \ \mathsf{indicate} \ \mathsf{value} \ \mathsf{exceeding} \ \mathsf{the} \ \mathsf{Action} \mathsf{/} \mathsf{Limit} \ \mathsf{levels}.$

Cell shaded grey indicate value exceeding the WQO.

Table B6 Water Column Profiling Results for SB CMP 2 in November 2015

Stations	Temp	Salinity	Turbidity	Dissolved Oxygen		рН	
	(°C)	(ppt)	(NTU)	(%)	(mg L-1)	(mg L-1)	(mg L-1)
WCP 1							_
(Downstream) WCP 2	26.26	29.05	12.51	87.53	6.00	7.90	11.53
(Upstream)	26.35	29.08	11.36	88.00	6.02	7.91	14.35
WQO (Dry season)	N/A	26.16 - 31.99#	N/A	N/A	>4	6.5-8.5	13.5

Note:

*Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station. Cell shaded grey indicate value exceeding the WQO.

[#] Not exceeding 2°C of change of the results from the Reference Station.

 $^{^{\#}}$ 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.

Annex C

Dredging Record for ESC CMP Vd in November 2015

Date	Daily Dredging Volume (m ³)	Weekly Dredging Volume (m³) (From Sunday to Saturday)
01-Nov-2015	0	
02-Nov-2015	0	1
03-Nov-2015	0	1
04-Nov-2015	0	0
05-Nov-2015	0	1
06-Nov-2015	0	1
07-Nov-2015	0	1
08-Nov-2015	0	
09-Nov-2015	0	1
10-Nov-2015	0	1
11-Nov-2015	0	3,250
12-Nov-2015	0	1
13-Nov-2015	1,300	1
14-Nov-2015	1,950	1
15-Nov-2015	0	
16-Nov-2015	0	1
17-Nov-2015	0	1
18-Nov-2015	0	0
19-Nov-2015	0	1
20-Nov-2015	0	1
21-Nov-2015	0	1
22-Nov-2015	0	
23-Nov-2015	0	1
24-Nov-2015	0	1
25-Nov-2015	0	0
26-Nov-2015	0	1
27-Nov-2015	0	1
28-Nov-2015	0	1
29-Nov-2015	0	0
30-Nov-2015	0	0

Annex D

Graphical Presentations

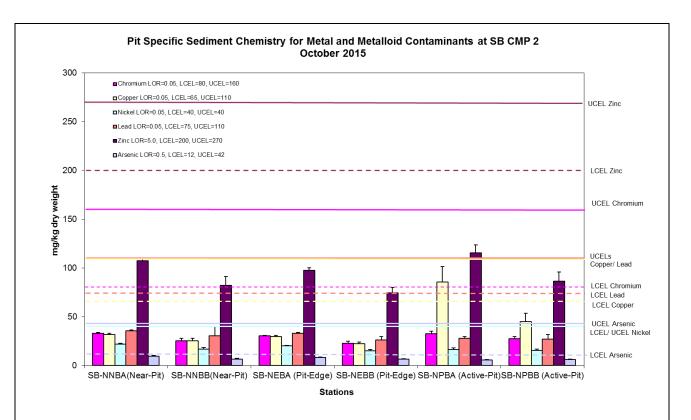


Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in October 2015.

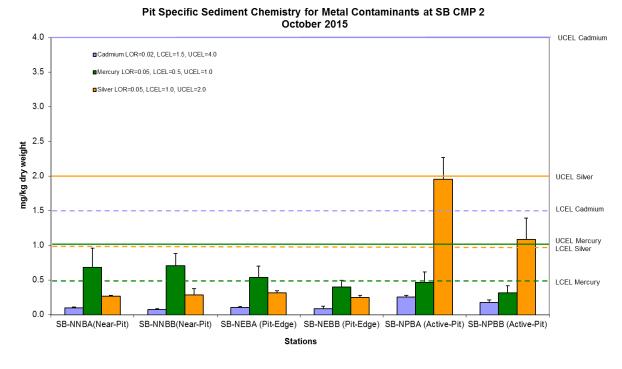


Figure 2: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in October 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



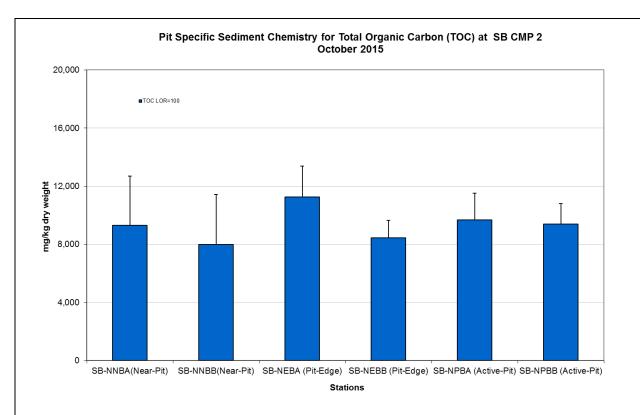


Figure 3: Concentration of Total Organic Carbon (TOC) (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in October 2015.

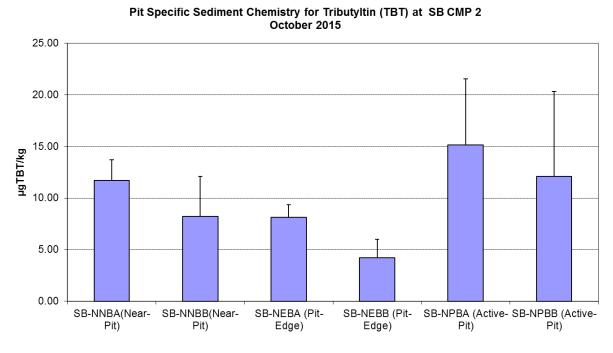


Figure 4: Concentration of Tributyltin (TBT) (µg TBT/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in October 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\39th (November 2015)

14/12/2015 Date:



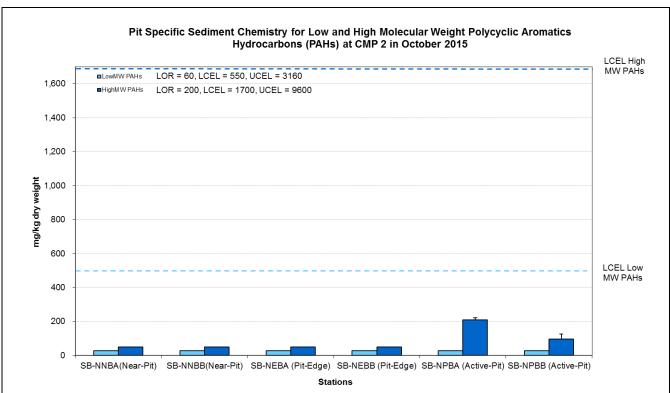


Figure 5: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in October 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



Routine Water Quality Monitoring for CMP 2 - November 2015 10.00 9.00 WQO Max 8.00 7.00 WQO Min 6.00 5.00 H 4.00 3.00 2.00 1.00 0.00 Shum Shui Intermediate Ma Wan Tai Mo To Tai Ho Bay Tai Ho Bay Reference Impact Station Kok Station Station 1 Station 2

Figure 6: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Routine Water Quality Monitoring CMP 2 - November 2015 120 100 80 (%) od 60 40 20 0 Reference Impact Intermediate Ma Wan Shum Shui Tai Mo To Tai Ho Bay Tai Ho Bay Station Kok Station Station 1 Station 2

Figure 7: Level of Dissolved Oxygen (DO) (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



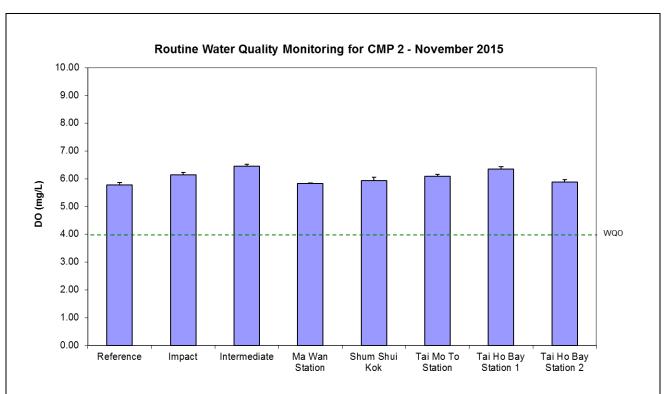


Figure 8: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Routine Water Quality Monitoring for CMP 2 - November 2015 30.00 25.00 20.00 Temperature (°C) 15.00 10.00 5.00 0.00 Reference Impact Intermediate Ma Wan Shum Shui Tai Mo To Tai Ho Bay

Figure 9: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



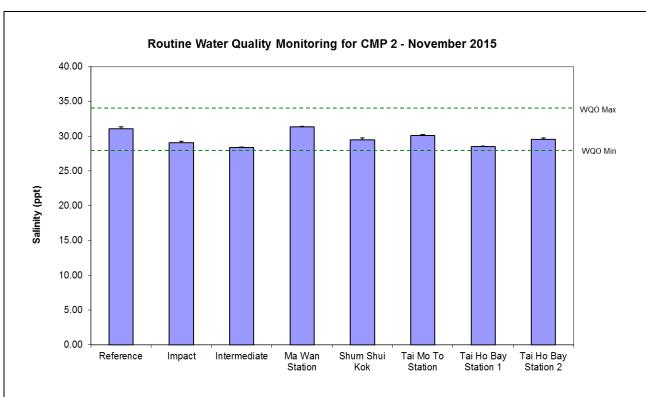


Figure 10: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

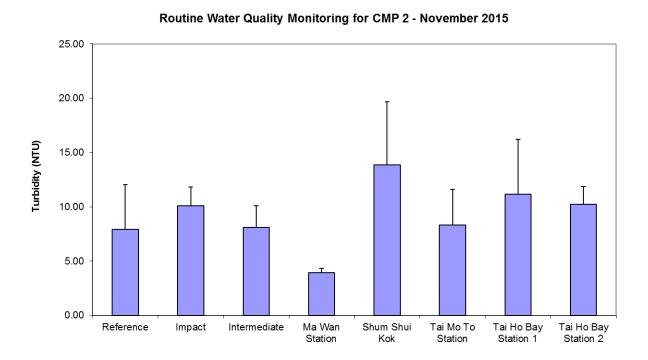


Figure 11: Levels of Turbidity (NTU; ,mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



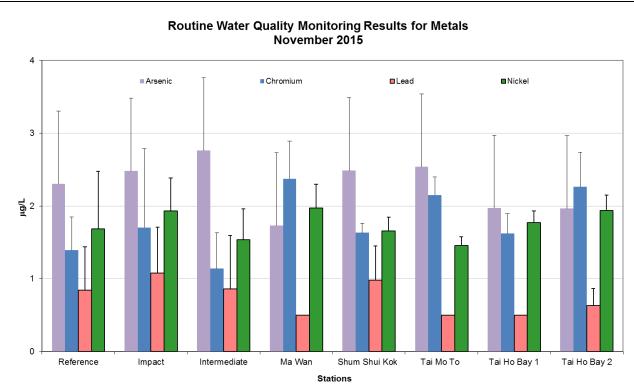


Figure 12: Concentration of Arsenic, Chromium, Copper and Lead ($\mu g/L$; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

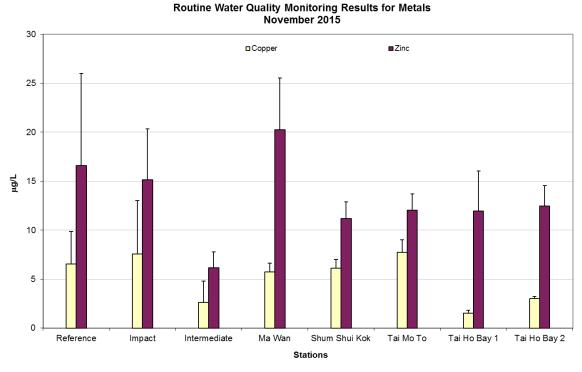


Figure 13: Concentration of Nickel and Zinc (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



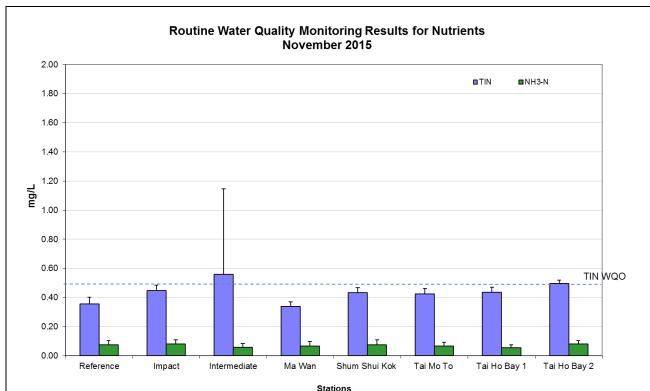


Figure 14: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen (NH3-N) (μ g/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD₅) November 2015 4.0 3.5 3.0 2.5 **J** 2.0 1.5 1.0 0.5 Reference Impact Intermediate Ma Wan Shum Shui Kok Tai Mo To Tai Ho Bay 1 Tai Ho Bay 2 Stations

Figure 15: Level of Biochemical Oxygen Demand (BOD5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in October 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



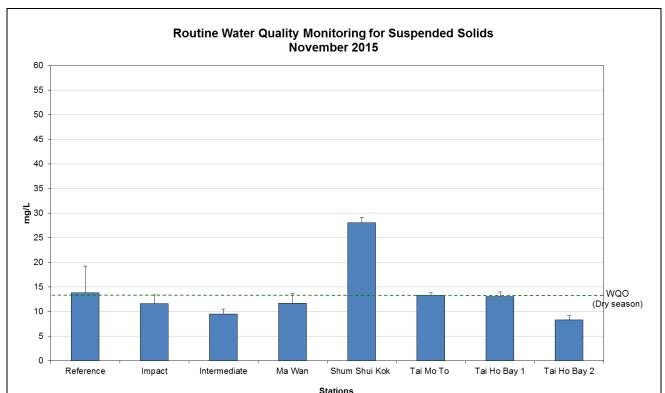


Figure 16: Concentration of Suspended Solids (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in November 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\39th (November 2015)

Date: 14/12/2015



Annex E

Study Programme

