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MateriaLab

Report No.: 0394/13/ED/0363A

Quarterly EM&A Report

May 2017 - July 2017

Client : China International Water & Electric Corporation

Project: Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel – CV/2013/04

Report No.: 0394/13/ED/0363A

Project Proponent:

Civil Engineering & Development Department
101 Princess Margaret Road,
Homantin,
Kowloon, Hong Kong.

Prepared by: Andy Choi

Reviewed by: Cyrus Lai

Certified by: ______________________
Colin Yung
Environmental Team Leader for
MateriaLab Consultants Limited

RAMBOLL ENVIRON

Ref.: CEDDWKTBEM00_0_0344L.17

4 October 2017
By Post and Fax (2419 6218)

Mott MacDonald Hong Kong Ltd.
20/F, AIA Kowloon Tower,
Landmark East,
100 How Ming Street,
Kwun Tong, Kowloon

Attention: Mr Chan T P, Pan, Engineer's Representative

Dear Mr Chan,

Re: Agreement No. CE 63/2008 (CE)
Dredging Works in Kwai Tsing Container Basin and its Approach Channel – Investigation, Design and Construction)

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Verification of Quarterly EM&A Report for May 2017 to July 2017

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for May 2017 to July 2017 (ET's Report. No. 0394/13/ED/0363A) received by e-mail on 3 October 2017.

We write to verify the captioned report in accordance with Section 12.4 iii of EM&A Manual (AEIAR-156/2010).

Thank you very much for your kind attention and please do not hesitate to contact our Mr Harris Wong or the undersigned should you have any queries.

Yours faithfully,
For and on behalf of
Ramboll Environ Hong Kong Limited

Y H Hui
Independent Environmental Checker

Cc:

MMHK	Mr. C M Howley	2827 1823 (by fax)
MateriaLab	Mr. Colin Yung	2450 6138 (by fax)
CIWE	Mr. K.O. Leung and Mr. Lam Wai-hung	2419 6028 (by fax)

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EXECUTIVE SUMMARY

i. This is the Thirteenth Quarterly Environmental Monitoring Audit (EM&A) Report – May 2017 – July 2017 for Contract No. CV/2013/04 – Dredging Works in Kwai Tsing and its Approach Channel (CE63/2008 – Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel). The dredging works commenced on 23 April 2014. This report presents the environmental monitoring and audit works conducted from 23 April 2017 to 22 July 2017.

ii. Construction Activities for the Reporting Period
During this reporting period, the principal work activities included:

May 2017	June 2017	July 2017
• Preparation Works of Dredging at Portion A / Zone 1A, Zone 2B1, 2B2 and 2C1 in EP. • Dredging at Portion A / Zone 1A, Zone 2B1, 2B2 and 2C1 in EP.	• Preparation Works of Dredging at Portion A / Zone 2B1 and 2B2 in EP. • Dredging at Portion A / Zone 2B1 and 2B2 in EP.	• Preparation Works of Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP. • Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP.

Note: Hotspot area was completed excepted hard materials and buffer zone was almost completed except known highspot and hard materials

iii. Water Quality Monitoring
Routine impact water quality monitoring at 9 designated monitoring stations namely C1A, C2A, G2, SR2, SR3, SR4, SR5, SR12, SR13 were conducted during the reporting period. Exceedances of NH3-N (in-situ & Lab), TIN (in-situ & lab), TSS and *E.coli* were recorded at various monitoring stations, detail of exceedance are summarized in **Table I and II**. However, investigation indicated these exceedances were not related to the Project works.

Table I Summary of Water Quality Exceedances – Routine Impact Monitoring (In-situ)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	0	1	0	0	-	-	0	1
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	1	0	1	0
	Limit	0	0	0	0	0	0	-	-	-	-	36	37	36	37
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	1	0	0	1	0	2	
	Limit	0	0	0	0	0	0	0	0	0	0	36	37	73	

Table II Summary of Water Quality Exceedances – Routine Impact Monitoring (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD_5		*E. coli*		NH_3-N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	1	0	-	-	-	-	0	1	0	0	-	-	-	-	1	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	3	1	0	0	1	2	0	0	0	0	0	0	-	-	4	3
SR5	Action	2	0	-	-	-	-	-	-	-	-	-	-	1	0	3	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	36	37	36	37
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	2	0	0	0	0	0	0	0	0	0	0	-	-	2	2
SR13	Action	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
Total	Action	4	0	0	0	0	0	0	1	0	0	0	0	1	0	6	
	Limit	5	3	0	0	1	2	0	0	0	0	0	0	36	37	84	

Among the 9 monitoring stations, supplementary 24-hr water quality monitoring was also conducted at 4 of the stations, which are SR4, SR5, SR12 and SR13. No exceedance was recorded in the reporting month. Number of exceedances recorded in the reporting month at each impact station is summarized in **Table III**.

Table III Summary of the Exceedances Recorded in Reporting Quarter – 24-hr Monitoring

Station	Exceedance Level	Turbidity	DO	NH_3-N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

iv. Waste Management

There was marine sediment Type 1 sediment (Open Sea Disposal) disposed to South Cheung Chau Open Sea Sediment Disposal Area and Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit and a small amount of general refuse were disposed off site in the reporting month.

v. Non-Compliance, Complaints, Notifications of Summons and Successful Prosecutions

No complaint, notification of prosecutions or summons was received in the reporting period.

vi. Site Inspections and Audit

The Environmental Team conducted 13 site inspections in the reporting period. No particular observation was recorded in the reporting month except stagnant water was found at drip tray of the wire at drilling barge 998.

According to Contractor, no archaeological deposit was found during reporting period.

vii. Compliance with Specific EP conditions

Implementation of contractor's mitigation for dredging work and the associated dredging records were checked. It was concluded that the dredging is conducted orderly in compliance with the EP requirements on site mitigation measures in general.

viii. Construction Activities for the Coming Reporting Period

During the coming reporting period, the principal work activities included:

- Preparation Works of Dredging at Portion A / Zone 2B1 and 2B2 in EP
- Dredging at Portion A / Zone 2B1 and 2B2 in EP

Future Key Issues include:

- Regular inspection on silt curtain deployment
- Regular inspection on silt screen deployment
- Implementation of EM&A Programme
- Maintain dredging below allowable dredging rate in EP.
- Cleaning of excess material from the decks and exposed fittings of barges and dredgers before the vessel is moved.
- Barge loading shall be monitored to ensure material is not lost during transportation.
- Conditions in dumping permit shall be followed strictly.

1. INTRODUCTION

1.1 Background

1.1.1 The Project objective is to dredge approximately 4.0 million cubic metres of sediment from the seabed of Kwai Tsing Container Basin, as well as portions of Northern Fairway and Western Fairway, to provide sufficient depth of container basin and approach channel to Kwai Tsing Container Terminal (KTCT) for the safe navigation of Ultra Large Container Ships (ULCS).

1.1.2 The environmental monitoring and audit works of this Project is governed by Environmental Permit (EP) No. EP-426/2011/A, EM&A Manual (AEIAR-156/2010) and EM&A TIN (EPD Letter Ref: (34) in Ax(1) to EP2/N3/C/57Pt.7)).

1.1.3 The project proponent was the Civil Engineering & Development Department, HKSAR (CEDD). The Project General Layout is shown in **Figure 1**.

1.1.4 Mott MacDonald Hong Kong Ltd. (MMHK) was commissioned by CEDD as the Engineer for the Project. Ramboll Environ Hong Kong Limited (REHK) was employed as the Independent Environmental Checker (IEC) in the Project.

1.1.5 China International Water & Electric Corporation Limited (CIWE) was appointed as the main contractor for the dredging works.

1.1.6 MateriaLab Consultants Limited (MCL) was appointed as the Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme for the Project.

1.1.7 The construction phase of the Project under the EP was commenced on 23 April 2014.The impact EM&A programme of the Project commenced on 23 April 2014.

1.2 Purpose of the Report

1.2.1 This Thirteenth Quarterly EM&A Report is prepared by MCL. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in 23 April 2017 to 22 July 2017.

1.3 Structure of the Report

1.3.1 The structure of this report is as follows:

Section 1: Introduction, including background, purpose and structure of the report

Section 2: Basic Project Information – summaries background and scope of the Contract, site description, project organization and contract details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting period.

Section 3: Routine Impact Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 4: 24-hr Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 5: Environmental Site Inspection – summaries the audit findings of the weekly site inspections undertaken within the reporting period.

Section 7: Non-Compliance, Complaints, notifications of summons and Prosecution – summaries any environmental complaints, environmental summons and successful prosecutions within the reporting period.

Section 8: Conclusions and Recommendation

2. BASIC PROJECT INFORMATION

2.1 Project Organizations

2.1.1 The Project Organization structure is shown in **Appendix A**. The key personnel contact names and numbers are summarized in **Table 2.1**.

Table 2-1 Key Personnel Contact of the Contract

Party	Position	Name	Telephone	Fax
Engineer's Representative (MMHK)	Resident Engineer	Mr. Pan Chan	2419 6008	2419 6218
Independent Environmental Checker (REHK)	Independent Environmental Checker	Mr. YH Hui	3465 2888	3465 2899
Contractor (CIWE)	Site Agent	Mr. KO Leung	2419 6008	2419 6218
	Environmental Officer	Mr. WH Lam	2419 6008	2419 6218
Environmental Team (MCL)	Environmental Team Leader	Mr. Colin Yung	3565 4114	3565 4160

2.2 Construction Programme and Synopsis of Work

2.2.1 The construction phase of the Project under the EP commenced on 23 April 2014.

2.2.2 The construction programme of the Project is shown in **Appendix B**.

2.2.3 The environmental mitigation measures implementation schedule is presented in **Appendix F**.

2.3 Works undertaken during the quarter

During the reporting period, according to the Contractor, the principal work activities include:

May 2017	June 2017	July 2017
• Preparation Works of Dredging at Portion A / Zone 1A, Zone 2B1, 2B2 and 2C1 in EP. • Dredging at Portion A / Zone 1A, Zone 2B1, 2B2 and 2C1 in EP.	• Preparation Works of Dredging at Portion A / Zone 2B1 and 2B2 in EP. • Dredging at Portion A / Zone 2B1 and 2B2 in EP.	• Preparation Works of Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP. • Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP.

Note: Hotspot area was completed excepted hard materials and buffer zone was almost completed except known highspot and hard materials

Daily dredging quantity in the reporting month is provided in **Table 2.2**.

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Table 2-2 Detail Dredging Quantity

Date (dd/mm/yyyy)	Dredged Quantity (in-situ, m^3)		Date (dd/mm/yyyy)	Dredged Quantity (in-situ, m^3)	Date (dd/mm/yyyy)	Dredged Quantity (in-situ, m^3)	
	Portion A			Portion A		Portion A	
	Zone (Maximum Allowable Daily Dredged Rate)			Zone (Maximum Allowable Daily Dredged Rate)		Zone (Maximum Allowable Daily Dredged Rate)	
23/4/2017	0	0	23/5/2017	0	23/6/2017	0	0
24/4/2017	2B1: 385 (800)	0	24/5/2017	0	24/6/2017	0	0
25/4/2017	0	0	25/5/2017	2B2: 385 (1450)	25/6/2017	0	0
26/4/2017	2B2: 385 (1450)	0	26/5/2017	0	26/6/2017	0	0
27/4/2017	0	0	27/5/2017	0	27/6/2017	0	0
28/4/2017	0	0	28/5/2017	0	28/6/2017	1A: 385 (900)	0
29/4/2017	2B2: 385 (1450)	0	29/5/2017	0	29/6/2017	2B2: 385 (1450)	0
30/4/2017	0	0	30/5/2017	0	30/6/2017	0	0
1/5/2017	0	0	31/5/2017	0	01/7/2017	1A: 385 (900)	2B2: 385 (1450)
2/5/2017	0	0	01/6/2017	0	02/7/2017	0	0
3/5/2017	1A: 385 (900)	2B1: 385 (800)	02/6/2017	0	03/7/2017	0	0
4/5/2017	0	0	03/6/2017	0	04/7/2017	0	0
5/5/2017	0	0	04/6/2017	0	05/7/2017	0	0
6/5/2017	2B2: 385 (1450)	0	05/6/2017	0	06/7/2017	0	0
7/5/2017	2B2: 385 (1450)	0	06/6/2017	0	07/7/2017	2B1: 192 (800)	0
8/5/2017	2B2: 385 (1450)	0	07/6/2017	0	08/7/2017	0	0
9/5/2017	0	0	08/6/2017	0	09/7/2017	2B2: 192 (1450)	0
10/5/2017	2B2: 192 (1450)	2C1: 192 (1550)	09/6/2017	0	10/7/2017	0	0
11/5/2017	2B2: 385 (1450)	0	10/6/2017	0	11/7/2017	1A: 385 (900)	2B2: 385 (1450)
12/5/2017	0	0	11/6/2017	0	12/7/2017	0	0
13/5/2017	0	0	12/6/2017	0	13/7/2017	1A: 385 (900)	0
14/5/2017	0	0	13/6/2017	0	14/7/2017	2B1: 128 (800)	0
15/5/2017	0	0	14/6/2017	0	15/7/2017	0	0
16/5/2017	0	0	15/6/2017	2B2: 385 (1450)	16/7/2017	2B2: 385 (1450)	0
17/5/2017	0	0	16/6/2017	2B1: 385 (800)	17/7/2017	2B2: 385 (1450)	0
18/5/2017	0	0	17/6/2017	2B2: 385 (1450)	18/7/2017	2B2: 385 (1450)	0
19/5/2017	0	0	18/6/2017	0	19/7/2017	0	0
20/5/2017	0	0	19/6/2017	0	20/7/2017	2B2: 385 (1450)	0
21/5/2017	0	0	20/6/2017	0	21/7/2017	2B2: 385 (1450)	0
22/5/2017	0	0	21/6/2017	0	22/7/2017	0	0
			22/6/2017	0			

Note: Hotspot area was completed excepted hard materials and buffer zone was almost completed except known highspot and hard materials

3. EM&A REQUIREMENTS – ROUTINE IMPACT MONITORING

3.1 Monitoring Parameters

3.1.1 The monitoring parameters and frequency for both in-situ measurement and laboratory analysis are summarised in **Table 3.1**. Parameters for each monitoring station are specified in **Table 3.2**.

Table 3-1 **Monitoring Parameters and Frequency**

Parameters	**Monitoring Frequency**
In-situ Measurement Turbidity (in NTU), pH, Dissolved Oxygen (in mg/L and %), Temperature (in °C), Salinity (in ppt), [1]Ammonia-N (in mg/L-N and UIA); [2]TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L) Laboratory Analysis [1]Ammonia-N (in mg/L-N and UIA), Suspended Solids (SS), [3]BOD_5, [3]*E.coli*, [3]Synthetic Detergent; [2]TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L)	3 days per week, at mid-flood and mid-ebb tides (except [3]detergent which shall be taken one day per month, at mid-flood and mid-ebb) 36 hours interval was allowed between subsequent sets of measurement.

Notes:
1. Ammonia measurements and samples were taken at SR2, SR3, SR4, SR12, C1A, C2A only;
   UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH_3-N, temperature, pH and salinity; Laboratory determined unionized ammonia was calculated from analysed NH_3-N from water samples and in-situ measurement of temperature, pH and salinity;
2. Total Inorganic Nitrogen (TIN) measurements and samples were taken at SR5, G2, C1A and C2A only;
3. BOD_5, *E.coli* and Synthetic Detergent samples were taken at SR4, SR12, C1A, C2A only.

Table 3-2 **Water Quality Monitoring Parameters**

ID	In-situ Measurement							Laboratory Analysis					
	pH	**Temperature**	**Salinity**	**Turbidity**	**Dissolved Oxygen / Dissolved Oxygen%**	**NH_3-N / UIA**	**TIN (NH_3-N, NO_2 & NO_3)**	**Suspended Solids**	**BOD_5**	***E. coli***	**NH_3-N / UIA**	**Synthetic Detergent**	**TIN (NH_3-N, NO_2 & NO_3)**
SR2	O	O	O	O	O	O		O			O		
SR3	O	O	O	O	O	O		O			O		
SR4	O	O	O	O	O	O		O	O	O	O	O	
SR5	O	O	O	O	O		O	O					O
SR12	O	O	O	O	O	O		O	O	O	O	O	
SR13	O	O	O	O	O			O					
G2	O	O	O	O	O		O	O					O
C1A	O	O	O	O	O	O	O	O	O	O	O	O	O
C2A	O	O	O	O	O	O	O	O	O	O	O	O	O

Note:

1. UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH_3-N, temperature, pH and salinity; laboratory determined unionized ammonia was calculated from analysed NH_3-N from water samples taken and in-situ measurement of temperature, pH and salinity.

3.2 Monitoring Locations

3.2.1 Referring to the Proposal for Temporary Suspension of Impact Water Quality Monitoring (0394_13_ED_0326F) which was submitted to EPD in August 2016 with no objection was received from EPD; removal of routine water quality monitoring stations at SR1 was effective on 24 December 2016.

3.2.2 Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of routine water quality monitoring stations at SR6, SR7, SR8, SR9, SR10 and SR11 was effective from 23 January 2017. Due to removal of some sensitive receivers in routine water quality monitoring, gradient stations G3, G5 and G6 were also be removed and gradient stations G1 and G4 replaced the previous control stations C1, C2 and C3 as C1A and C2A with reference to the approved proposal (0394_13_ED_0332I) which was effective from 23 January 2017.

3.2.3 Impact water quality monitoring was conducted at 9 locations, including 6 sensitive receivers (SR2, SR3, SR4, SR5, SR12, SR13), 1 gradient station (G2) and 2 control stations (C1A, C2A). The locations of the stations are shown in **Figure 2**.

3.3 Results and Observations

3.3.1 Impact water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Impact water quality monitoring results graphical presentations are provided in **Appendix D**.

3.3.2 During the monitoring period, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Rainstorm Warning signal, Thunderstorm Warning signals, Tropical Cyclone Warning Signals and Strong Monsoon Signal were reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality. The above conditions may affect monitoring results. Furthermore, the fish culturing or other activities occurring on the fish rack may cause adverse impact on the receiving water.

3.3.3 Exceedances were recorded for NH3-N (in-situ & Lab), TIN (in-situ & lab), Suspended Solids and *E.coli*. Number of exceedances recorded in the reporting quarter at each impact station is summarized in **Table 3-3 and 3-4**.

Table 3-3 Summary of Water Quality Exceedance (In-situ Measurement)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	0	1	0	0	-	-	0	1
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	1	0	1	0
	Limit	0	0	0	0	0	0	-	-	-	-	36	37	36	37
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	1	0	0	1	0	2	
	Limit	0	0	0	0	0	0	0	0	0	0	36	37	73	

Table 3-4 Summary of Water Quality Exceedance (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD_5		*E. coli*		NH_3-N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	1	0	-	-	-	-	0	1	0	0	-	-	-	-	1	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	3	1	0	0	1	2	0	0	0	0	0	0	-	-	4	3
SR5	Action	2	0	-	-	-	-	-	-	-	-	-	-	1	0	3	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	36	37	36	37
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	2	0	0	0	0	0	0	0	0	0	0	-	-	2	2
SR13	Action	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
Total	Action	4	0	0	0	0	0	0	1	0	0	0	0	1	0	6	
	Limit	5	3	0	0	1	2	0	0	0	0	0	0	36	37	84	

3.3.4 During the reporting period, 1 AL exceedances for NH_3-N (in-situ), 1 AL and 73 LL exceedances for TIN (in-situ), 4 AL and 8 LL exceedances for Total Suspended Solids, 3 LL exceedances for *E.coli*, 1 AL exceedances for NH_3-N (lab), and 1 AL and 73 LL exceedances for TIN (lab) were recorded.

3.3.5 According to the investigations, the exceedances were considered caused by influences in the vicinity of the station or changes in ambient conditions and not related to the Project.

4. EM&A REQUIREMENTS – 24-HR WATER QUALITY MONITORING

4.1 Monitoring Parameters

4.1.1 Dissolved oxygen, temperature and turbidity are recorded every 5 minutes, 24 hours a day 7 days a week during dredging works.

4.1.2 In-situ NH_3-N at WSD Flushing Water Intake is measured every 20 minutes, 24 hours a day 7 days a week during works.

4.1.3 The water quality parameters measured at particular locations are shown in **Table 4.1**.

Table 4-1 24-hr Water Quality Monitoring Parameters

ID	Description	Parameters				
		Temperature	Turbidity	DO (mg/L)	DO%	NH_3-N
SR4	Tsuen Wan, WSD Flushing Water Intake	O	O	O	O	O
SR5	Ma Wan, Fish Culture Zone	O	O	O	O	
SR12	Tsing Yi, WSD Flushing Water Intake	O	O	O	O	O
SR13	EMSD Cooling Water Intake for Kwai Chung Hospital	O	O	O	O	

4.2 Monitoring Locations

4.2.1 Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of 24 hour monitoring stations at SR9, SR10 and SR11 was effective from 23 January 2017. The setups of 24 hour monitoring stations at SR9, SR10 and SR11 were removed on 7 February 2017.

4.2.2 As shown in Table 4.1, the 24 hours water quality monitoring works are performed at SR4, SR5, SR12 and SR13.

4.2.3 Revisions on monitoring locations were proposed in previous submission (MateriaLab Report No. Ref: 0394/13/ED/0103 – WATER QUALITY MONITORING LOCATION) and were agreed among AFCD, EMSD, WSD and EPD.

4.3 Results and Observations

4.3.1 24-hr water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Monitoring result graphical presentations are provided in **Appendix E**.

4.3.2 During the reporting period, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Rainstorm Warning signal, Thunderstorm Warning signals, Tropical Cyclone Warning Signals and Strong Monsoon Signal were reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality. The above conditions may affect monitoring results. Furthermore, the fish culturing or other activities occurring on the fish rack may cause adverse impact on the receiving water.

4.3.3 Number of exceedances recorded in the reporting period at each impact station is summarized in Table 4.2.

Table 4-2 Summary of Water Quality Exceedance (24-hr Monitoring)

Station	Exceedance Level	Turbidity	DO	NH_3-N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

4.3.4 No exceedance was recorded in the reporting quarter.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1 Site Inspections

5.1.1 The Environmental Team conducted 13 site inspections in the reporting period. No particular observation was recorded in the reporting month except stagnant water was found at drip tray of the wire at drilling barge 998.

5.1.2 According to Contractor, no archaeological deposit was found during reporting period.

5.2 Implementation Status of Environmental Mitigation Measures

5.2.1 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix F**. Most of the necessary mitigation measures were implemented properly.

5.2.2 The mitigation measures recommended in the EIA report and required by the EP are considered effective in minimizing environmental impacts. The Contractor has implemented the recommended mitigation measures except those mitigation measures not applicable at this stage.

5.3 Summary of Action taken

5.3.1 The exceedances recorded were considered not related to the Project, follow-up actions are not required.

5.4 Advice on the Solid and Liquid Waste Management Status

5.4.1 According to the Contractor, $30m^3$ general refuse was generated and disposed of in the reporting period. Summary of waste flow table is detailed in **Appendix G**.

5.4.2 There was marine sediment Type 1 sediment (Open Sea Disposal) disposed to South Cheung Chau Open Sea Sediment Disposal Area and Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit and a small amount of general refuse were disposed off site in the reporting quarter. The details can be referred to the **Table 5-1.**

Table 5-1 Waste Quantities of Dredging Works

Month	Marine Sediment Type	Quantity Generated in Reporting Period (m^3)	Cumulative-to Reporting Period (m^3)	Disposal / Dumping Ground
May 2017	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	5000	633280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
June 2017	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	2000	635280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
July 2017	Type 1 – Open Sea Disposal	500	1684350	NA
	Type 2 – Confined Marine Disposal	6500	641280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA

Note: Note: All the Type 3 (Cat. Hf) sediment dredging and disposal was completed on 18 May 2016

5.5 Review of Action and Limit Level

5.5.1 Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015. The Action and Limit Level is given in **Appendix C**.

5.6 Quarterly Review of Constructional Impacts on Water Quality

5.6.1 The construction impact on water quality was assessed by comparing the quarterly mean values with the relevant ambient or baseline mean values. Results showed that the mean values of Ammonia (in-situ & lab), *E.coli* (at mid flood) and TSS at all clusters of monitoring stations were below the 1.3 x baseline value. Cluster stations with higher impact data are statistically compared to 1.3 x baseline levels or other relevant levels to assess the constructional impacts.

5.6.2 Quarterly means of cluster 1 station (i.e. SR5) of TIN (in-situ) and TIN (lab) are compared to their 1.3 x baseline data respectively. Result shows the 1.3 x baseline level are significantly smaller than the quarterly mean ($p<0.05$). Quarterly mean of impact station is further compared to the quarterly mean of gradient station (G2) which is gradient station in vicinity of cluster 1 stations and is located between the Project site and the impact station SR5. Data from flood tide are compared for cluster 1 as according to their relative position to the Project (data analysed for flood tide where impact station of cluster 1, i.e. SR5, situated at downstream position and may be subject to project impact, reference made to Figure 3.). For cluster 1, at flood tide, results show TIN (in-situ) and TIN (lab) level at gradient (G2) is not significantly different to the TIN (in-situ) and TIN (lab) of impact station (SR5) ($p>0.05$) respectively, indicating there was no increasing gradient and trend shown towards the project, thus the project impact was not significant.

5.6.3 Data from ebb tide of cluster 1 stations of *E.coli* were not further compared to their 1.3 x baseline data as cluster 1 stations were situated at upstream position at ebb tide and not subject to project impact. Comparison between quarterly mean and 1.3 x baseline mean is given in Table 5.2, while the summary of key statistical analysis is provided in Table 5.3. Details of key statistical analysis results are provided in **Appendix H**.

5.6.4 As 24-hr monitoring is to supplement the routine WQM activities (EM&A Manual Section 2.1.10) and there is no baseline value and/or control / gradient value for a meaningful statistical analysis. Thus no statistical analysis was done for 24-hr monitoring. Also, statistical analysis was not performed for some parameters without exceendances (Turbidity, DO (S&M), DO (B), UIA for both in-situ and lab results, BOD_5 and Synthetic Detergent) in the reporting quarter.

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Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		Ammonia - Insitu						TIN - Insitu					
		Baseline	Baseline x 1.3	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3	Wet Season Baseline	Baseline x 1.3	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	NA	NA	NA	0.10	NA	NA	0.42	0.55	NA	0.98	NA	NA
	C2A				0.24			0.56	0.73		0.75		
Control (Ebb)	C1A	NA	NA	NA	0.10	NA	NA	0.40	0.52	NA	0.98	NA	NA
	C2A				0.23			0.53	0.69		0.75		
Gradient (Flood)	G2	NA	NA	NA	NA	NA	NA	0.44	0.57	0.57	0.88	0.88	yes
Gradient (Ebb)	G2	NA	NA	NA	NA	NA	NA	0.38	0.49	0.49	0.88	0.88	yes
Cluster 1 (Flood)	SR2	0.22	0.29	0.33	0.08	0.10	no	NA	NA	0.64	NA	0.96	yes
	SR3	0.24	0.31		0.09			NA	NA		NA		
	SR4	0.26	0.34		0.11			NA	NA		NA		
	SR5	NA	NA		NA			0.49	0.64		0.96		
	SR12	0.28	0.36		0.13			NA	NA		NA		
Cluster 1 (Ebb)	SR2	0.22	0.29	0.32	0.08	0.10	no	NA	NA	0.67	NA	0.95	yes
	SR3	0.22	0.29		0.09			NA	NA		NA		
	SR4	0.25	0.33		0.11			NA	NA		NA		
	SR5	NA	NA		NA			0.52	0.67		0.95		
	SR12	0.27	0.35		0.13			NA	NA		NA		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA		NA			NA	NA		NA		

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

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		TSS						Ammonia - lab					
		Baseline	1.3 x Baseline	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3	Baseline	1.3 x Baseline	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	7	10	NA	4	NA	no	NA	NA	NA	0.10	NA	NA
	C2A	8	10		6		no	NA	NA		0.24		NA
Control (Ebb)	C1A	5	7	NA	4	NA	no	NA	NA	NA	0.10	NA	NA
	C2A	7	9		5		no	NA	NA		0.24		NA
Gradient (Flood)	G2	5	7	NA	5	NA	no	NA	NA	NA	NA	NA	NA
Gradient (Ebb)	G2	5	7	NA	4	NA	no	NA	NA	NA	NA	NA	NA
Cluster 1 (Flood)	SR2	5	7	8.60	4	4.20	no	0.12	0.16	0.17	0.08	0.10	no
	SR3	5	7		4			0.12	0.16		0.09		
	SR4	7	9		4			0.13	0.17		0.11		
	SR5	6	8		4			NA	NA		NA		
	SR12	9	12		5			0.15	0.20		0.13		
Cluster 1 (Ebb)	SR2	5	7	7.00	4	4.20	no	0.12	0.16	0.18	0.08	0.10	no
	SR3	5	6		4			0.12	0.16		0.09		
	SR4	5	7		4			0.14	0.18		0.11		
	SR5	5	6		4			NA	NA		NA		
	SR12	7	9		5			0.15	0.20		0.13		
Cluster 3 (Flood)	SR13	16	21	21.00	5	5.00	no	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	10	14	14.00	5	5.00	no	NA	NA		NA		

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

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		TIN - lab						E.coli					
		Wet Season Baseline	1.3 x Baseline	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3	Baseline	1.3 x Baseline	Average	May 2017 - Jul 2017	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	0.30	0.39	NA	0.98	NA	yes	NA	NA	NA	NA	NA	NA
	C2A	0.35	0.46		0.75		yes	NA	NA		NA		NA
Control (Ebb)	C1A	0.28	0.36	NA	0.98	NA	yes	NA	NA	NA	NA	NA	NA
	C2A	0.34	0.44		0.75		yes	NA	NA		NA		NA
Gradient (Flood)	G2	0.31	0.40	NA	0.88	0.88	yes	NA	NA	NA	NA	NA	NA
Gradient (Ebb)	G2	0.28	0.36	NA	0.88	0.88	yes	NA	NA	NA	NA	NA	NA
Cluster 1 (Flood)	SR2	NA	NA	0.48	NA	0.96	yes	NA	NA	397	NA	318	no
	SR3	NA	NA		NA			NA	NA		NA		
	SR4	NA	NA		NA			184	239		318		
	SR5	0.37	0.48		0.96			NA	NA		NA		
	SR12	NA	NA		NA			427	555		356		
Cluster 1 (Ebb)	SR2	NA	NA	0.46	NA	0.95	yes	NA	NA	662	NA	1248	yes
	SR3	NA	NA		NA			NA	NA		NA		
	SR4	NA	NA		NA			718	934		1248		
	SR5	0.35	0.46		0.95			NA	NA		NA		
	SR12	NA	NA		NA			300	390		380		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA	NA	NA	NA	NA	NA	NA		NA		

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

Table 5-3 Summary of Statistical Analysis

Parameter	Cluster	Compared against	Results and Conclusions
TIN (in-situ)	Cluster 1	Quarterly Mean at Impact Stations (flood tide) against 1.3 x Baseline Level (flood tide) Quarterly Mean at Impact Station (flood tide) against Upstream Gradient (G2) Mean (flood tide)	Quarterly mean at Impact Station (flood tide) is significantly higher than 1.3 x Baseline mean (flood tide) ($p<0.05$). Impact Mean (flood tide) is not significantly different to Upstream Gradient (G2) Mean (flood tide) ($p>0.05$), indicating there was no increasing gradient and trend shown towards the project and the project impact is not significant.
TIN (lab)	Cluster 1	Quarterly Mean at Impact Stations (flood tide) against 1.3 x Baseline Level (flood tide) Quarterly Mean at Impact Station (flood tide) against Upstream Gradient (G2) Mean (flood tide)	Quarterly mean at Impact Station (flood tide) is significantly higher than 1.3 x Baseline mean (flood tide) ($p<0.05$). Impact Mean (flood tide) is not significantly different to Upstream Gradient (G2) Mean (flood tide) ($p>0.05$), indicating there was no increasing gradient and trend shown towards the project and the project impact is not significant.

5.6.5 Exceedance are considered to be due to change in ambient conditions or influences in the vicinity of the stations. Mitigation measures for dredging works were implemented in accordance with EP and EIA requirements.

6. NON-COMPLIANCE, COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

6.1.1 In this reporting period, no complaint, inspection notice, notification of summons or prosecution was received. Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Tables 6.1, 6.2 and 6.3**.

Table 6-1 Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and Received By	Nature of Complaint	Date Investigated	Outcome	Date of Reply
Nil	-	-	-	-	-	-

Table 6-2 Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Table 6-3 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Prosecutions This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

7. CONCLUSIONS

7.1.1 The dredging works was commenced on 23 April 2014. The EM&A programme was carried out in accordance with the EM&A Manual requirements. As per the EM&A Manual, water quality impact monitoring was conducted during the dredging works.

7.1.2 During the reporting period, exceedances were recorded for NH3-N (in-situ & Lab), TIN (in-situ & lab), TSS and *E.coli* in the routine impact monitoring. No exceedance was recorded in 24-hr monitoring. Investigation found that the exceedances were not project related and were considered caused by influences in the vicinity of the stations or change in ambient conditions.

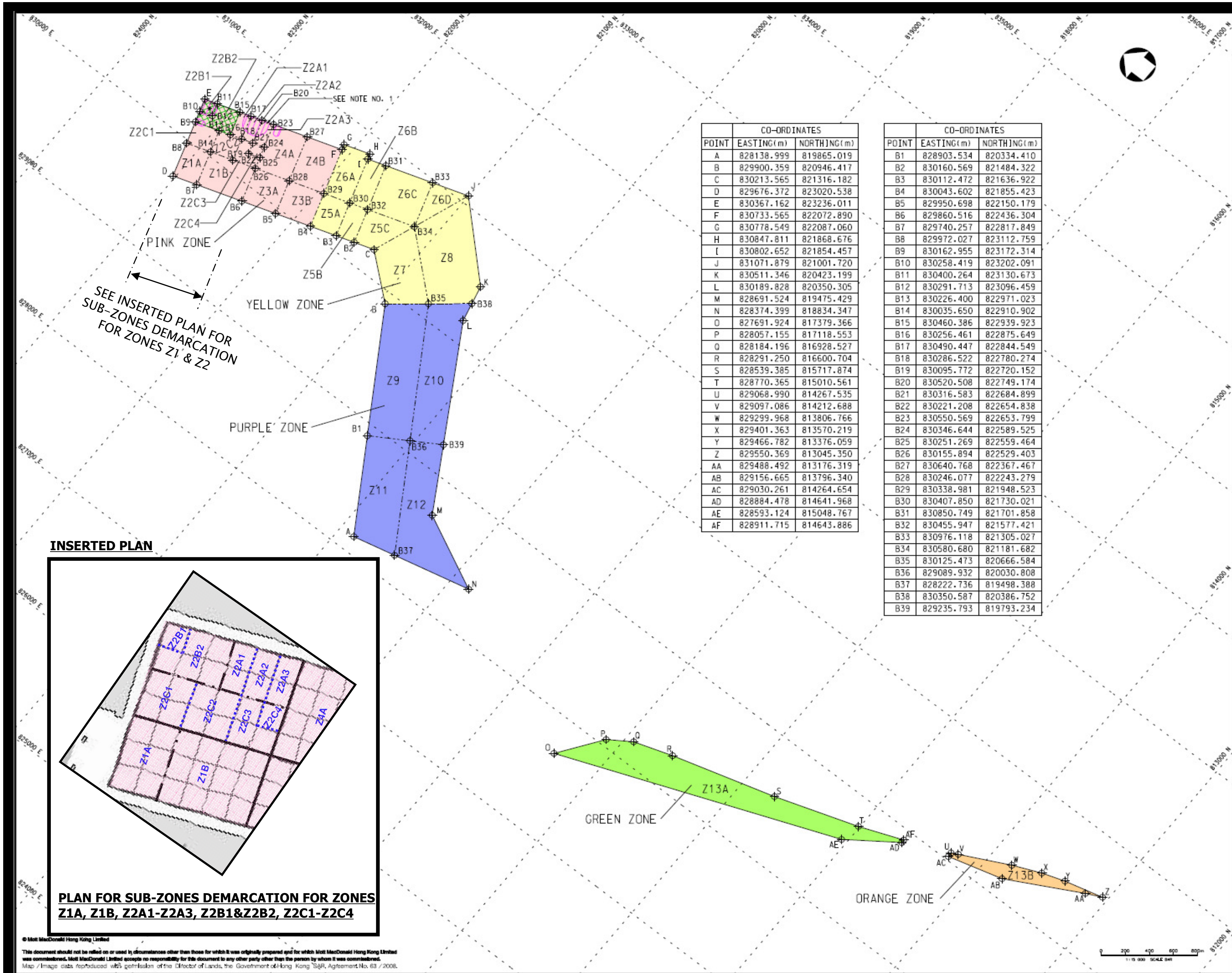
7.1.3 13 environmental site inspections were carried out weekly in the reporting period.

7.1.4 No environmental complaint was received and followed up by Environmental Team in the reporting period.

7.1.5 No notification of summons and prosecution was received in the reporting period.

Figure 1

Project General Layout



	CO-ORDINATES	
POINT	EASTING(m)	NORTHING(m)
A	828138.999	819865.019
B	829900.359	820946.417
C	830213.565	821316.182
D	829676.372	823020.538
E	830367.162	823236.011
F	830733.565	822072.890
G	830778.549	822087.060
H	830847.811	821868.676
I	830802.652	821854.457
J	831071.879	821001.720
K	830511.346	820423.199
L	830189.828	820350.305
M	828691.524	819475.429
N	828374.399	818834.347
O	827691.924	817379.366
P	828057.155	817118.553
Q	828184.196	816928.527
R	828291.250	816600.704
S	828539.385	815717.874
T	828770.365	815010.561
U	829068.990	814267.535
V	829097.086	814212.688
W	829299.968	813806.766
X	829401.363	813570.219
Y	829466.782	813376.059
Z	829550.369	813045.350
AA	829488.492	813176.319
AB	829156.665	813796.340
AC	829030.261	814264.654
AD	828884.478	814641.968
AE	828593.124	815048.767
AF	828911.715	814643.886

	CO-ORDINATES	
POINT	EASTING(m)	NORTHING(m)
B1	828903.534	820334.410
B2	830160.569	821484.322
B3	830112.472	821636.922
B4	830043.602	821855.423
B5	829950.698	822150.179
B6	829860.516	822436.304
B7	829740.257	822817.849
B8	829972.027	823112.759
B9	830162.955	823172.314
B10	830258.419	823202.091
B11	830400.264	823130.673
B12	830291.713	823096.459
B13	830226.400	822971.023
B14	830035.650	822910.902
B15	830460.386	822939.923
B16	830256.461	822875.649
B17	830490.447	822844.549
B18	830286.522	822780.274
B19	830095.772	822720.152
B20	830520.508	822749.174
B21	830316.583	822684.899
B22	830221.208	822654.838
B23	830550.569	822653.799
B24	830346.644	822589.525
B25	830251.269	822559.464
B26	830155.894	822529.403
B27	830640.768	822367.467
B28	830246.077	822243.279
B29	830338.981	821948.523
B30	830407.850	821730.021
B31	830850.749	821701.858
B32	830455.947	821577.421
B33	830976.118	821305.027
B34	830580.680	821181.682
B35	830125.473	820666.584
B36	829089.932	820030.808
B37	828222.736	819498.388
B38	830350.587	820386.752
B39	829235.793	819793.234

Project Title: Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

Figure 2: Zones and Sub-zone of Dredging Plan Layout (Extracted from Figure 2 of Justification for the Proposed Demarcation of the Dredging Zones)

Environmental Permit No.:

EP-426/2011/A

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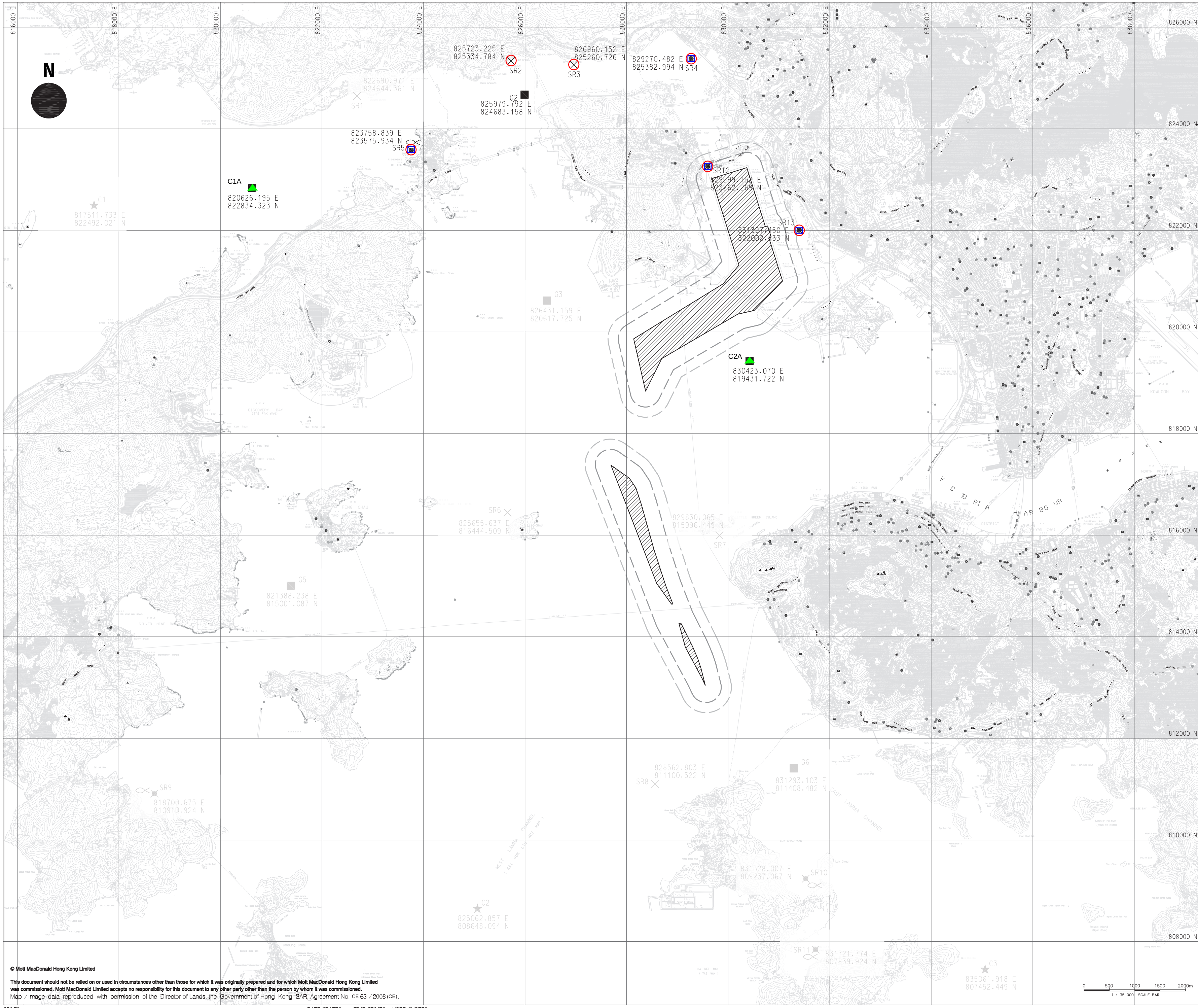
MateriaLab

Report No.: 0394/13/ED/0363A

Figure 2

Locations of Water Quality Monitoring Stations



NOTES:
1. ALL COORDINATES ARE IN HONG KONG METRIC GRID (1980).
2. THE CONTRACTOR SHALL REFER TO RELEVANT SECTION(S) AND APPENDICES OF THE PARTICULAR SPECIFICATION REGARDING THE WATER QUALITY MONITORING.

LEGEND:

SITE BOUNDARY

MONITORING STATION

24 HOUR STATION

CONTROL STATION

GRADIENT STATION

Client

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

CONTRACT NO. : CV/2013/04
DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL

Title

PROVISIONAL LOCATION OF WATER QUALITY MONITORING STATIONS

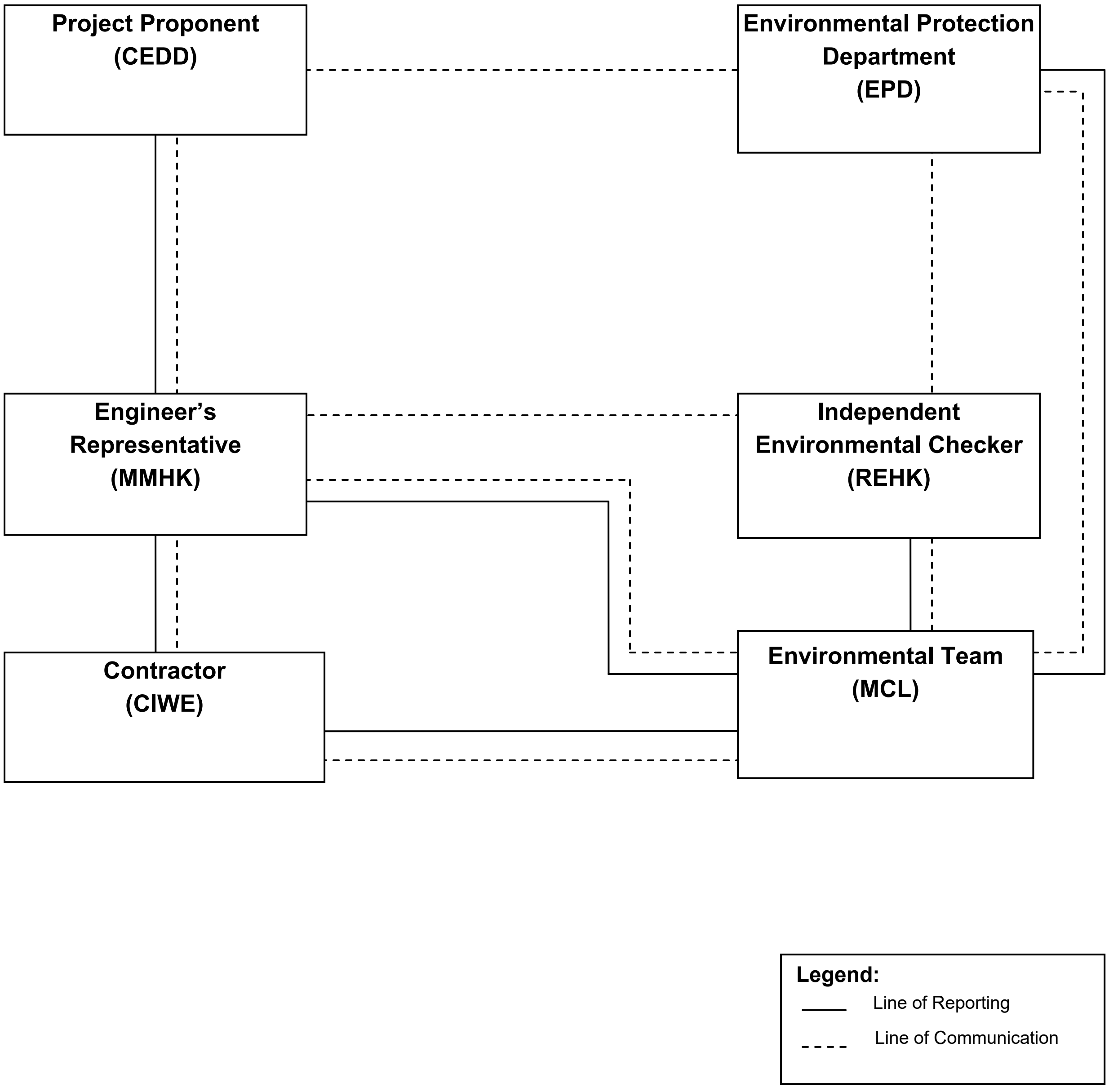
Scale at A1	Status	Rev
1:35000	TEN	2

$FILE$ DATE: $DATE$ TIME: $TIME$ USER: $USER$

Figure 2 - Location of Monitoring Stations

Appendix A

Project Organization Chart


Project Proponent
(CEDD)
Environmental Protection
Department
(EPD)
Engineer's
Representative
(MMHK)
Independent
Environmental Checker
(REHK)
Contractor
(CIWE)
Environmental Team
(MCL)
Legend:
Line of Reporting
Line of Communication

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MateriaLab

Appendix B

Construction Programme

The Revised Contract Completion Date is 31 August 2017.

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
GCC Clause 16 Programme (Version 20)

Date: 11 July 2017

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
1	**Contract Period**	**1470 days**	**Fri 30/8/13**	**Thu 7/9/17**			
2	**Contract Commencement Date**	**0 days**	**Fri 30/8/13**	**Fri 30/8/13**		4SS	
3	**Extended Contract Completion Date**	**0 days**	**Sat 8/7/17**	**Sat 8/7/17**		327FF	
4	**Possession of Site**	-			S,31SS,41SS		N
5	**Section 1**	**1470 days**	**Fri 30/8/13**	**Thu 7/9/17**			
6	**Submission**	**1210 days**	**Fri 30/8/13**	**Wed 21/12/16**			
7	**Routine Monitoring / Temporary Marine Traffic Management**	**484 days**	**Fri 30/8/13**	**Fri 26/12/14**			
8	**Environmental Management**	**484 days**	**Fri 30/8/13**	**Fri 26/12/14**			
9	**Baseline monitoring**	**231 days**	**Fri 30/8/13**	**Thu 17/4/14**			
10	ETL and relevant site personal	30 days	Fri 30/8/13	Sat 28/9/13		4SS,13	N
11	Lab Test	30 days	Fri 30/8/13	Sat 28/9/13		4SS,13	N
12	**Monitoring (Location see Drg No. EM/401)**	**201 days**	**Sun 29/9/13**	**Thu 17/4/14**			
13	Plan	93 days	Sun 29/9/13	Mon 30/12/13	10,11	154	N
14	**Sediment Report**	**88 days**	**Mon 20/1/14**	**Thu 17/4/14**			
15	Preliminary report	19 days	Mon 20/1/14	Fri 7/2/14	158	159	N
16	Final report	27 days	Sat 22/3/14	Thu 17/4/14	159	205,207,224	N
17	**Grab sample (Portions A, B & C)**	**321 days**	**Fri 30/8/13**	**Wed 16/7/14**			
18	Grab sample specialist	30 days	Fri 30/8/13	Sat 28/9/13		4SS,19	N
19	Sediment testing and sampling plan	162 days	Sun 29/9/13	Sun 9/3/14	18	162	N
20	**Sediment report**	**105 days**	**Thu 3/4/14**	**Wed 16/7/14**			
21	Preliminary report	26 days	Thu 3/4/14	Mon 28/4/14	166	167	N
22	Final report	37 days	Tue 10/6/14	Wed 16/7/14	167	209	N
23	**Vibro-coring (Portions A, B & C)**	**159 days**	**Mon 21/7/14**	**Fri 26/12/14**			
24	Sediment testing and sampling plan	28 days	Mon 21/7/14	Sun 17/8/14		170	N
25	**Sediment report**	**105 days**	**Sat 13/9/14**	**Fri 26/12/14**			
26	Preliminary report	26 days	Sat 13/9/14	Wed 8/10/14	174	175	N
27	Final report	37 days	Thu 20/11/14	Fri 26/12/14	175	209FS-139 days	N
28	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**79 days**	**Mon 25/11/13**	**Tue 11/2/14**			
29	Instrumentation	79 days	Mon 25/11/13	Tue 11/2/14		177	N
30	**Survey**	**179 days**	**Fri 30/8/13**	**Mon 24/2/14**			
31	Surveyor	35 days	Fri 30/8/13	Thu 3/10/13		4SS,35,38	N
32	Geophysicist	35 days	Sun 3/11/13	Sat 7/12/13		224	N
33	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**67 days**	**Tue 26/11/13**	**Fri 31/1/14**			
34	**Settlement markers**	**67 days**	**Tue 26/11/13**	**Fri 31/1/14**			
35	Method Statement for Installation and Monitoring	24 days	Tue 26/11/13	Thu 19/12/13	31	185	N
36	Initial report	12 days	Mon 20/1/14	Fri 31/1/14	186	187	N
37	**Hydrographic Survey (Portions A to E)**	**144 days**	**Fri 4/10/13**	**Mon 24/2/14**			
38	Method Statement	36 days	Fri 4/10/13	Fri 8/11/13	31	190	N
39	Initial survey Report	29 days	Mon 27/1/14	Mon 24/2/14	190	191	N
40	**Temporary Marine Traffic Management (Portions A to E)**	**144 days**	**Fri 30/8/13**	**Mon 20/1/14**			
41	Consultant, Risk Manager and Marine Traffic Engineer	28 days	Fri 30/8/13	Thu 26/9/13		4SS,43	N
42	Independent Checking Engineer (ICE)	25 days	Fri 27/12/13	Mon 20/1/14		196FS-60 days	N
43	Webbase software and Trial Run	50 days	Fri 27/9/13	Fri 15/11/13	41	196	N
44	**Dredging Works (Portions A to E)**	**896 days**	**Thu 14/11/13**	**Wed 27/4/16**			
45	Independent Checking Engineer (ICE)	21 days	Thu 14/11/13	Wed 4/12/13		51	N
46	**Silt screen deployment plan and report (Location see Drg No. EM/401)**	**77 days**	**Fri 6/12/13**	**Thu 20/2/14**			
47	Method statement	77 days	Fri 6/12/13	Thu 20/2/14		207,201	N
48	**Dredging method statement and silt curtain deployment plan**	**118 days**	**Thu 28/11/13**	**Tue 25/3/14**			
49	Method statement for dredging works	104 days	Thu 28/11/13	Tue 11/3/14		224	N
50	**Silt curtain deployment plan**	**118 days**	**Thu 28/11/13**	**Tue 25/3/14**			
51	Design	70 days	Tue 17/12/13	Mon 24/2/14	45	52FS-89 days	N
52	Deployment plan	118 days	Thu 28/11/13	Tue 25/3/14	51FS-89 days	224	N
53	**Dredging Works at Portions A and B**	**891 days**	**Tue 19/11/13**	**Wed 27/4/16**			
54	**General seabed**	**891 days**	**Tue 19/11/13**	**Wed 27/4/16**			
55	Marine Notice approval by Marine Departemnt	247 days	Tue 19/11/13	Wed 23/7/14		207	N

China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

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ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
56	**Noise Permit**	**739 days**	**Mon 23/12/13**	**Thu 31/12/15**			
57	General	101 days	Mon 23/12/13	Wed 2/4/14		205,207	N
58	**Portion A from 11pm to 7am next day**	**518 days**	**Fri 1/8/14**	**Thu 31/12/15**			
59	Preparation and submission	14 days	Fri 1/8/14	Thu 14/8/14		60	N
60	Rejected by EPD	4 days	Fri 15/8/14	Mon 18/8/14	59	61	N
61	Resubmission	10 days	Tue 9/12/14	Thu 18/12/14	60	62	N
62	Rejected by EPD	13 days	Fri 19/12/14	Wed 31/12/14	61	63	N
63	Resubmission	10 days	Tue 6/1/15	Thu 15/1/15	62	64	N
64	Rejected by EPD	18 days	Fri 16/1/15	Mon 2/2/15	63	65	N
65	Awaiting HIT to release their permit	245 days	Tue 3/2/15	Mon 5/10/15	64	66	N
66	Preparation and submission	1 day	Tue 6/10/15	Tue 6/10/15	65	67	N
67	Rejected by EPD	16 days	Wed 7/10/15	Thu 22/10/15	66	68	N
68	Resubmission	3 days	Thu 17/12/15	Sat 19/12/15	67	69	N
69	Rejected by EPD	12 days	Sun 20/12/15	Thu 31/12/15	68	210	N
70	**Dumping Permit**	**801 days**	**Mon 17/2/14**	**Wed 27/4/16**			
71	**Type 1 and Tpye 2 Sediment**	**88 days**	**Mon 17/2/14**	**Thu 15/5/14**			
72	**Type 1 Sediment**	**57 days**	**Mon 17/2/14**	**Mon 14/4/14**			
73	Preparation and submission	50 days	Mon 17/2/14	Mon 7/4/14		74	N
74	Approval by EPD	7 days	Tue 8/4/14	Mon 14/4/14	73	205,207,224,209	N
75	**Type 2 Sediment**	**42 days**	**Fri 4/4/14**	**Thu 15/5/14**			
76	Preparation and submission	28 days	Fri 4/4/14	Thu 1/5/14		77	N
77	Approval by EPD	14 days	Fri 2/5/14	Thu 15/5/14	76	205,209	N
78	**Type 3 Sediment**	**201 days**	**Sat 10/10/15**	**Wed 27/4/16**			
79	Preparation and submission	14 days	Sat 10/10/15	Fri 23/10/15	104	80	N
80	Comment by EPD	17 days	Sat 24/10/15	Mon 9/11/15	79	81	N
81	Resubmission	21 days	Tue 10/11/15	Mon 30/11/15	80	83	N
82	**Trial dumping operation of Type 2 sediment using geo-containers**	**87 days**	**Tue 1/12/15**	**Thu 25/2/16**			
83	Preparation of method statement	41 days	Tue 1/12/15	Sun 10/1/16	81	84	N
84	Application for Marine Dumping Permit	1 day	Mon 11/1/16	Mon 11/1/16	83	85	N
85	Approval by EPD	45 days	Tue 12/1/16	Thu 25/2/16	84	214	N
86	Preparation and submission	9 days	Thu 31/3/16	Fri 8/4/16	214	87	N
87	Approval by EPD	19 days	Sat 9/4/16	Wed 27/4/16	86	215	N
88	**Type 3 Cat Hf Sediment (Portion A)**	**519 days**	**Fri 31/1/14**	**Fri 3/7/15**			
89	**Method statement for disposal**	**519 days**	**Fri 31/1/14**	**Fri 3/7/15**			
90	**Preparation and submission**	**519 days**	**Fri 31/1/14**	**Fri 3/7/15**			
91	Preparation and submission	60 days	Fri 31/1/14	Mon 31/3/14		92	N
92	Approval by Mott	30 days	Tue 1/4/14	Wed 30/4/14	91	94	N
93	**Resubmission based on Mott's previous submission to EPD**	205 days	Thu 11/12/14	Fri 3/7/15			
94	Preparation and submission	75 days	Thu 11/12/14	Mon 23/2/15	92	95	N
95	Approval by Mott	8 days	Tue 24/2/15	Tue 3/3/15	94	96	N
96	Comment by EPD	40 days	Wed 4/3/15	Sun 12/4/15	95	97	N
97	Mott's instruction to add monitoring stations at disposal ground	1 day	Tue 12/5/15	Tue 12/5/15	96	98	N
98	Resubmission to Mott	4 days	Wed 13/5/15	Sat 16/5/15	97	99	N
99	Approval by Mott	1 day	Sun 17/5/15	Sun 17/5/15	98	100	N
100	Resubmission to EPD	1 day	Mon 18/5/15	Mon 18/5/15	99	101	N
101	Comment by EPD	18 days	Tue 19/5/15	Fri 5/6/15	100	102	N
102	Resubmission to Mott	12 days	Sat 6/6/15	Wed 17/6/15	101	103	N
103	Resubmission to EPD	2 days	Thu 18/6/15	Fri 19/6/15	102	104	N
104	Approved by EPD	14 days	Sat 20/6/15	Fri 3/7/15	103	212,79,215	N
105	**Hot Spot (Portion A)**	**327 days**	**Tue 31/12/13**	**Sat 22/11/14**			
106	**Proposal for field trial at Zone Z2C**	**180 days**	**Tue 31/12/13**	**Sat 28/6/14**			
107	Preparation and submission	115 days	Tue 31/12/13	Thu 24/4/14		108	N
108	Approval by Mott	30 days	Fri 30/5/14	Sat 28/6/14	107	217	N
109	**Method statement for dredging works at Zone Z2B**	**61 days**	**Tue 23/9/14**	**Sat 22/11/14**			
110	Preparation and submission	14 days	Tue 23/9/14	Mon 6/10/14	217	111	N

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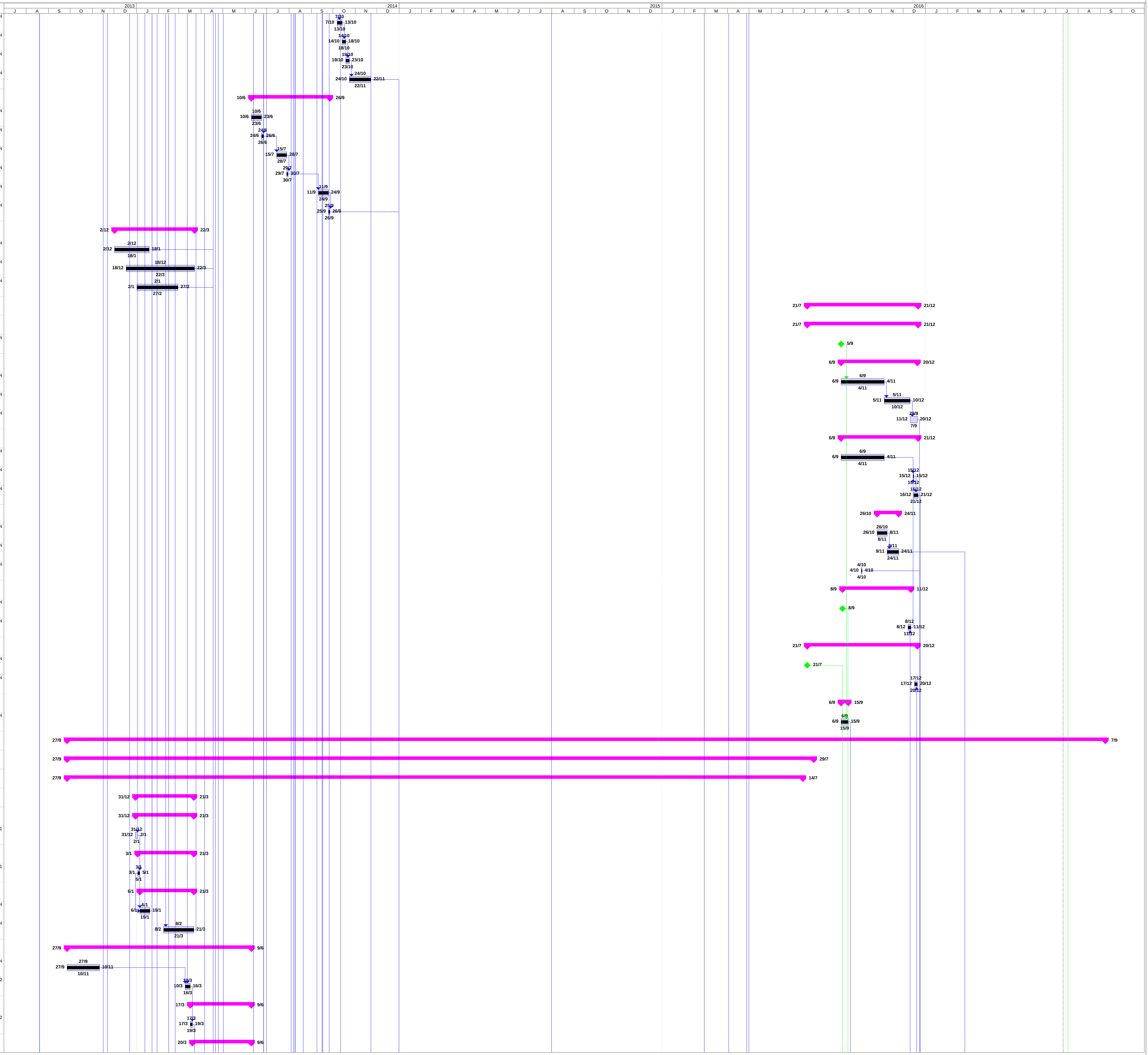
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
111	Approval by Mott	7 days	Tue 7/10/14	Mon 13/10/14	110	112	N
112	Endorsed by ETL	5 days	Tue 14/10/14	Sat 18/10/14	111	113	N
113	Verified by IEC	5 days	Sun 19/10/14	Thu 23/10/14	112	114	N
114	Approval by EPD	30 days	Fri 24/10/14	Sat 22/11/14	113	218	N
115	**Method staement for dredging hard material**	**109 days**	**Tue 10/6/14**	**Fri 26/9/14**			
116	Preparation and submission	14 days	Tue 10/6/14	Mon 23/6/14		117	N
117	Comment	3 days	Tue 24/6/14	Thu 26/6/14	116	118	N
118	Resubmission	14 days	Tue 15/7/14	Mon 28/7/14	117	119	N
119	Further comment	2 days	Tue 29/7/14	Wed 30/7/14	118	120	N
120	Resubmission	14 days	Thu 11/9/14	Wed 24/9/14	119	121	N
121	Approval by Mott	2 days	Thu 25/9/14	Fri 26/9/14	120	219	N
122	**Dredging Works at Portions C, D and E**	**111 days**	**Mon 2/12/13**	**Sat 22/3/14**			
123	Marine Notice approval by Marine Departemnt	48 days	Mon 2/12/13	Sat 18/1/14		224	N
124	Noise Permit	95 days	Wed 18/12/13	Sat 22/3/14		224	N
125	Dumping Permit	57 days	Thu 2/1/14	Thu 27/2/14		224	N
126	**Remaining Works (Portion A)**	**154 days**	**Thu 21/7/16**	**Wed 21/12/16**			
127	**Rock excavation works outside berth KC5**	**154 days**	**Thu 21/7/16**	**Wed 21/12/16**			
128	Works reviewed and agreed among CEDD and CIWE	0 days	Mon 5/9/16	Mon 5/9/16		130,148	N
129	**Method Statement**	**106 days**	**Tue 6/9/16**	**Tue 20/12/16**			
130	Preparation and submission	60 days	Tue 6/9/16	Fri 4/11/16	128	131	N
131	Resubmission	36 days	Sat 5/11/16	Sat 10/12/16	130	132	N
132	Approval	10 days	Sun 11/12/16	Tue 20/12/16	131	259	N
133	**Marine Department Notice**	**107 days**	**Tue 6/9/16**	**Wed 21/12/16**			
134	Preparation and submission	60 days	Tue 6/9/16	Fri 4/11/16		135	N
135	Resubmission	1 day	Thu 15/12/16	Thu 15/12/16	134,143	136	N
136	Approval	6 days	Fri 16/12/16	Wed 21/12/16	135	259	N
137	**Marine Dumping Permit**	**30 days**	**Wed 26/10/16**	**Thu 24/11/16**			
138	Preparation and submission	14 days	Wed 26/10/16	Tue 8/11/16		139	N
139	Approval	16 days	Wed 9/11/16	Thu 24/11/16	138	261	N
140	Pre-meeting with MTL	1 day	Tue 4/10/16	Tue 4/10/16		259	N
141	**Drilling Barge**	**95 days**	**Thu 8/9/16**	**Sun 11/12/16**			
142	AIP for Drilling Barge	0 days	Thu 8/9/16	Thu 8/9/16		249	N
143	Operating Licence for Drilling Barge	4 days	Thu 8/12/16	Sun 11/12/16	250	135	N
144	**Backhoe Dredger**	**153 days**	**Thu 21/7/16**	**Tue 20/12/16**			
145	AIP for Backhoe Dredger	0 days	Thu 21/7/16	Thu 21/7/16		252	N
146	Operating Licence for Backhoe Dredger	4 days	Sat 17/12/16	Tue 20/12/16	253		N
147	**Hydraulic Breaker**	**10 days**	**Tue 6/9/16**	**Thu 15/9/16**			
148	Purchase Order	10 days	Tue 6/9/16	Thu 15/9/16	128	255	N
149	**Works**	**1442 days**	**Fri 27/9/13**	**Thu 7/9/17**			
150	**Routine Monitoring / Temporary Marine Traffic Management**	**1037 days**	**Fri 27/9/13**	**Fri 29/7/16**			
151	**Environmental Management**	**1022 days**	**Fri 27/9/13**	**Thu 14/7/16**			
152	**Baseline monitoring**	**81 days**	**Tue 31/12/13**	**Fri 21/3/14**			
153	**Monitoring (Location see Drg No. EM/401)**	**81 days**	**Tue 31/12/13**	**Fri 21/3/14**			
154	Mobilization	3 days	Tue 31/12/13	Thu 2/1/14	13	156,158	1
155	**Field works and Lab Test**	**78 days**	**Fri 3/1/14**	**Fri 21/3/14**			
156	Field works	3 days	Fri 3/1/14	Sun 5/1/14	154	158SS+3 days	1
157	**Lab test**	**75 days**	**Mon 6/1/14**	**Fri 21/3/14**			
158	Chemical test	14 days	Mon 6/1/14	Sun 19/1/14	156SS+3 days,154	15	N
159	Biological test	42 days	Sat 8/2/14	Fri 21/3/14	15	16	N
160	**Grab sample (Portions A, B & C)**	**256 days**	**Fri 27/9/13**	**Mon 9/6/14**			
161	Marine Department Notice	45 days	Fri 27/9/13	Sun 10/11/13		162	N
162	Grab sample specialist mobilization	7 days	Mon 10/3/14	Sun 16/3/14	19,161	164	2
163	**Grab sample (field works) and Lab Test**	**85 days**	**Mon 17/3/14**	**Mon 9/6/14**			
164	Field works	3 days	Mon 17/3/14	Wed 19/3/14	162	166	2
165	**Lab test**	**82 days**	**Thu 20/3/14**	**Mon 9/6/14**			



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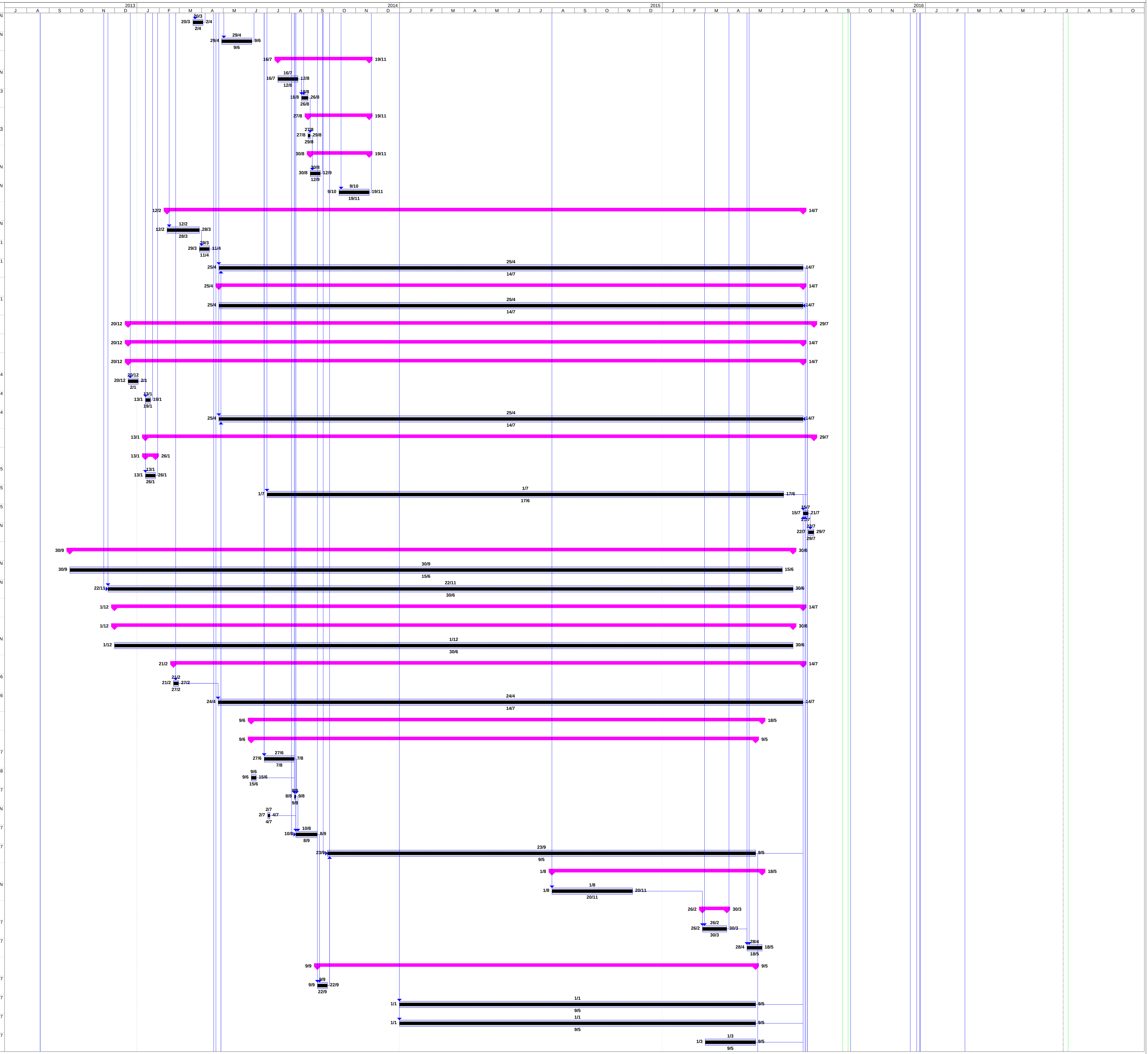
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
166	Chemical test	14 days	Thu 20/3/14	Wed 2/4/14	164	21	N
167	Biological test	42 days	Tue 29/4/14	Mon 9/6/14	21	22	N
168	**Vibro-coring (Portions A, B & C)**	**127 days**	**Wed 16/7/14**	**Wed 19/11/14**			
169	Marine Department Notice	28 days	Wed 16/7/14	Tue 12/8/14		170	N
170	Vibro-coring specialist mobilization	9 days	Mon 18/8/14	Tue 26/8/14	24,169	172	3
171	**Vibro-coring (field works) and Lab Test**	**85 days**	**Wed 27/8/14**	**Wed 19/11/14**			
172	Field works	3 days	Wed 27/8/14	Fri 29/8/14	170	174	3
173	**Lab test**	**82 days**	**Sat 30/8/14**	**Wed 19/11/14**			
174	Chemical test	14 days	Sat 30/8/14	Fri 12/9/14	172	26	N
175	Biological test	42 days	Thu 9/10/14	Wed 19/11/14	26	27	N
176	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**884 days**	**Wed 12/2/14**	**Thu 14/7/16**			
177	Procurement and delivery	45 days	Wed 12/2/14	Fri 28/3/14	29	178	N
178	Installation	14 days	Sat 29/3/14	Fri 11/4/14	177	179	1
179	Monitoring	812 days	Fri 25/4/14	Thu 14/7/16	178,224	181FF,221FF,243	1
180	**Impact monitoring (Location see Drg No. EM/401)**	**812 days**	**Fri 25/4/14**	**Thu 14/7/16**			
181	Impact monitoring and report submission	812 days	Fri 25/4/14	Thu 14/7/16	179FF	221FF	1
182	**Survey**	**953 days**	**Fri 20/12/13**	**Fri 29/7/16**			
183	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**938 days**	**Fri 20/12/13**	**Thu 14/7/16**			
184	**Settlement markers**	**938 days**	**Fri 20/12/13**	**Thu 14/7/16**			
185	Installation	14 days	Fri 20/12/13	Thu 2/1/14	35	186	4
186	Initial survey	7 days	Mon 13/1/14	Sun 19/1/14	185	36	4
187	Interim monitoring	812 days	Fri 25/4/14	Thu 14/7/16	191FF,224,36	221FF,247	4
188	**Hydrographic Survey (Portions A to E)**	**929 days**	**Mon 13/1/14**	**Fri 29/7/16**			
189	**Initial survey**	**14 days**	**Mon 13/1/14**	**Sun 26/1/14**			
190	Field works	14 days	Mon 13/1/14	Sun 26/1/14	38	39	5
191	Interim survey	718 days	Tue 1/7/14	Fri 17/6/16	39	192,187FF	5
192	Final survey	7 days	Fri 15/		,231,228,221	193	5
193	Final survey report	8 days	Fri 22/7/16	Fri 29/7/16	192		N
194	**Temporary Marine Traffic Management (Portions A to E)**	**1005 days**	**Mon 30/9/13**	**Thu 30/6/16**			
195	Organizing meeting for information collection	990 days	Mon 30/9/13	Wed 15/6/16			N
196	Temporary marine traffic management and TMTM meeting	952 days	Fri 22/11/13	Thu 30/6/16	42FS-60 days,43	244	N
197	**Dredging Works (Portions A to E)**	**957 days**	**Sun 1/12/13**	**Thu 14/7/16**			
198	**Interface with other contractors or utility undertakeings**	**943 days**	**Sun 1/12/13**	**Thu 30/6/16**			
199	Organizing coordination meeting	943 days	Sun 1/12/13	Thu 30/6/16			N
200	**Silt screen (Location see Drg No. EM/401)**	**875 days**	**Fri 21/2/14**	**Thu 14/7/16**			
201	Installation of silt screen	7 days	Fri 21/2/14	Thu 27/2/14	47	202,224	6
202	Maintenance of silt screen	813 days	Thu 24/4/14	Thu 14/7/16	201	221FF,245	6
203	**Dredging Works at Portions A and B**	**710 days**	**Mon 9/6/14**	**Wed 18/5/16**			
204	**General seabed**	**701 days**	**Mon 9/6/14**	**Mon 9/5/16**			
205	Mobililzation	42 days	Fri 27/6/14	Thu 7/8/14	74,77,16,57	207	7
206	Fabrication of silt curtain	7 days	Mon 9/6/14	Sun 15/6/14		207	8
207	Pilot test for silt curtain	2 days	Fri 8/8/14	Sat	'4,16,47,55,57	209	7
208	Monitoring brief for unidentified sonar contacts & masked areas	3 days	Wed 2/7/14	Fri 4/7/14		209	N
209	Dredging works 1 (subject to availability of working windows)	30 days	Sun 10/8/14		',22,27FS-139 days	217	7
210	Dredging works 2 (subject to availability of working windows)	595 days	Tue 23/9/14	Mon 9/5/16	217,69	192,221	7
211	**Type 3 Cat Hf Sediment (Portion A)**	**292 days**	**Sat 1/8/15**	**Wed 18/5/16**			
212	Procurement and delivery of Geo-container	112 days	Sat 1/8/15	Fri 20/11/15	104	214	N
213	**Trial dumping operation of Type 2 sediment using geo-containers**	**34 days**	**Fri 26/2/16**	**Wed 30/3/16**			
214	Trial dumping	34 days	Fri 26/2/16	Wed 30/3/16	85,212	215,86	7
215	Dredging works	21 days	Thu 28/4/16	Wed 18/5/16	104,214,87		7
216	**Hot Spot (Portion A)**	**609 days**	**Tue 9/9/14**	**Mon 9/5/16**			
217	Field trial at Zone Z2C	14 days	Tue 9/9/14	Mon 22/9/14	209,108	210,110	7
218	Dredging works at Z2B *	493 days	Thu 1/1/15	Mon 9/5/16	114	192	7
219	Dredging of hard material *	493 days	Thu 1/1/15	Mon 9/5/16	121	192	7
220	Outfall demolition works*	70 days	Tue 1/3/16	Mon 9/5/16		192,221	7



China International Water & Electric Corp. | Task | Critical Task | Milestone | Summary

* Subject to availability of working windows
** The removal of broken rock material will be carried out biweekly
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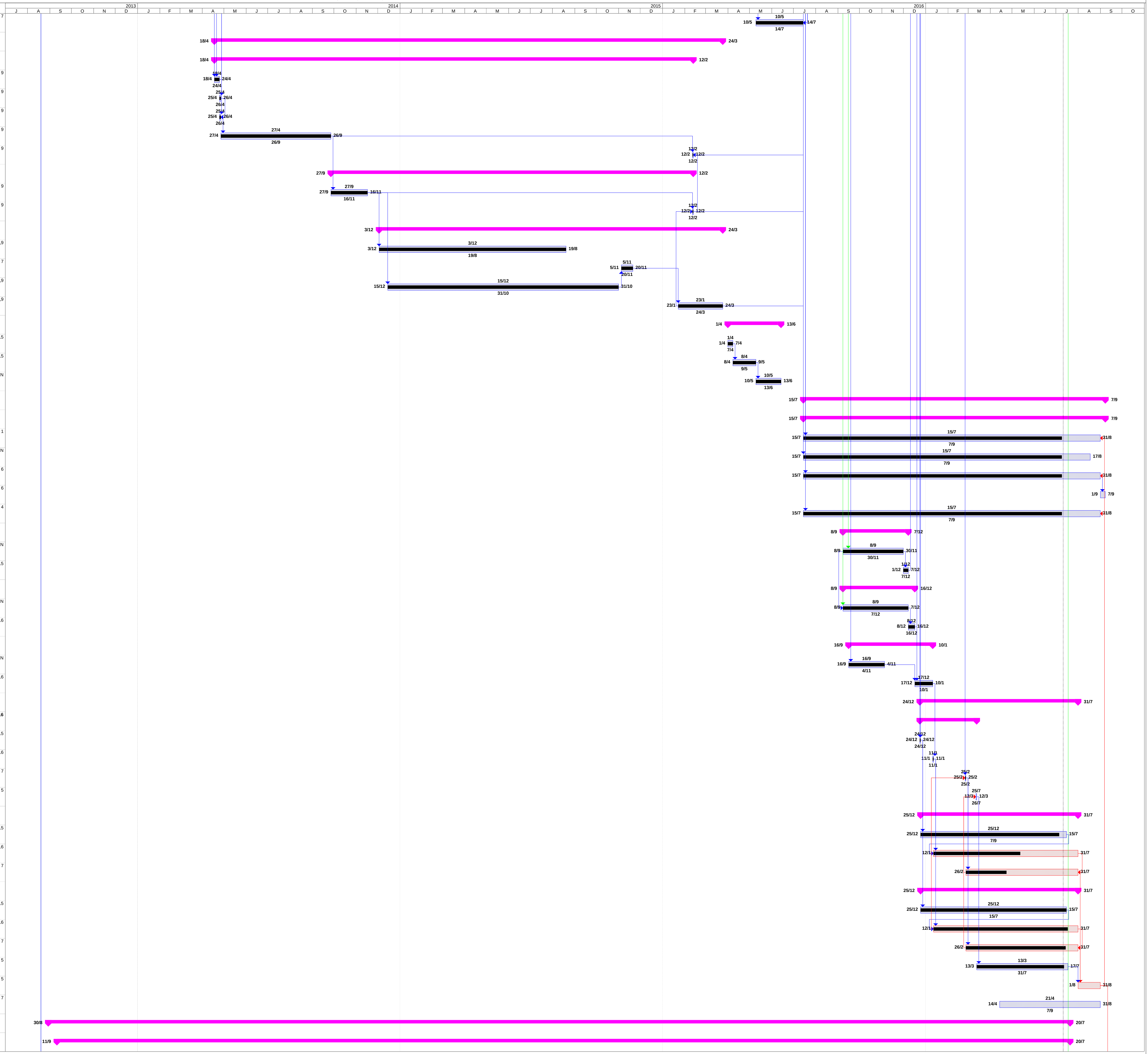
Bar Left: Early Start, Bar Right: Early Finish
Bar Top: Late Start, Bar Bottom: Late Finish

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
221	Removal of high spots*	66 days	Tue 10/5/:		,187FF,202FF	192	7
222	**Dredging Works for Portions C, D and E**	**707 days**	**Fri 18/4/14**	**Thu 24/3/16**			
223	**Dredging Works for Portion D**	**666 days**	**Fri 18/4/14**	**Fri 12/2/16**			
224	Mobililzation	7 days	Fri 18/4/14		2,123,124,125	225,226,179,187	9
225	Pilot test of silt curtain	2 days	Fri 25/4/14	Sat 26/4/14	224	226FF	9
226	Trial dredging	2 days	Fri 25/4/14	Sat 26/4/14	224,225FF	227	9
227	Dredging works	153 days	Sun 27/4/14	Fri 26/9/14	226	230,228	9
228	Removal of high spots	1 day	Fri 12/2/16	Fri 12/2/16	227,231FF	192	9
229	**Dredging Works for Portion E**	**504 days**	**Sat 27/9/14**	**Fri 12/2/16**			
230	Dredging Works	51 days	Sat 27/9/14	Sun 16/11/14	227	231,233,235	9
231	Removal of high spots	1 day	Fri 12/2/16	Fri 12/2/16	?30,236SS+20 days	192,228FF	9
232	**Dredging Works for Portion C**	**478 days**	**Wed 3/12/14**	**Thu 24/3/16**			
233	Norhern west section	260 days	Wed 3/12/14	Wed 19/8/15	230		7,9
234	Middle section	16 days	Thu 5/11/15	Fri 20/11/15	235FS+4 days	236	7
235	Southern east section	321 days	Mon 15/12/14	Sat 31/10/15	230	234FS+4 days	7,9
236	Removal of high spots	62 days	Sat 23/1/16	Thu 24/3/16	234	192,231SS+20 days	7,9
237	**Marine Ground Investigation Works near KC5 in Portion A**	**74 days**	**Fri 1/4/16**	**Mon 13/6/16**			
238	Mobilization	7 days	Fri 1/4/16	Thu 7/4/16		239	15
239	Drilling*	32 days	Fri 8/4/16	Mon 9/5/16	238	240	15
240	Report	35 days	Tue 10/5/16	Mon 13/6/16	239		N
241	**Remaining Works (Portion A)**	**420 days**	**Fri 15/7/16**	**Thu 7/9/17**			
242	**Rock excavation works outside berth KC5**	**420 days**	**Fri 15/7/16**	**Thu 7/9/17**			
243	Water Quality Monitoring Works	413 days	Fri 15/7/16	Thu 31/8/17	179,272FF		1
244	Temporary Marine Traffic Management Works	399 days	Fri 15/7/16	Thu 17/8/17	196		N
245	Silt screen and silt curtain maintenance	413 days	Fri 15/7/16	Thu 31/8/17	202,272FF	246	6
246	Removal of silt screen	7 days	Fri 1/9/17	Thu 7/9/17	245		6
247	Monitoring of settlement markers	413 days	Fri 15/7/16	Thu 31/8/17	187,272FF		4
248	**Drilling Barge**	**91 days**	**Thu 8/9/16**	**Wed 7/12/16**			
249	Modification of Drilling Barge to meet HKMD's requirements	84 days	Thu 8/9/16	Wed 30/11/16	142	252SS,250	N
250	Mobilization of Drilling Barge on site	7 days	Thu 1/12/16	Wed 7/12/16	249	143	15
251	**Backhoe Dredger**	**100 days**	**Thu 8/9/16**	**Fri 16/12/16**			
252	Modification of Backhoe Dredger to meet HKMD's requirements	91 days	Thu 8/9/16	Wed 7/12/16	145,249SS	253	N
253	Mobilization of Backhoe Dredger on site	9 days	Thu 8/12/16	Fri 16/12/16	252	146,256	16
254	**Hydraulic Breaker**	**117 days**	**Fri 16/9/16**	**Tue 10/1/17**			
255	Fabrication and delivery	50 days	Fri 16/9/16	Fri 4/11/16	148	256	N
256	Installation	25 days	Sat 17/12/16	Tue 10/1/17	255,253	260	16
257	**Site Works (Subject to working period provided by MTL)**	**220 days**	**Sat 24/12/16**	**Mon 31/7/17**			
258	**Site Trial**	**79 days**	**Sat 24/12/16**	**Sun 12/3/17**			**16**
259	Drilling Works	1 day	Sat 24/12/16	Sat 24/12/16	136,140,132	268,264	15
260	Breaking Works	1 day	Wed 11/1/17	Wed 11/1/17	256	265,269	16
261	Removal of broken rock material	1 day	Sat 25/2/17	Sat 25/2/17	265SS+15 ays,269SS+15 days,139	266,270	7
262	Hydrographic survey	1 day	Sun 12/3/17	Sun 12/3/17	266SS+14 ays,270SS+14 days	271	5
263	**Northern Area (affecting the operation of KC5)**	**219 days**	**Sun 25/12/16**	**Mon 31/7/17**			
264	Drilling (at least 30 working hours/week)	203 days	Sun 25/12/16	Sat 15/7/17	259	265FS-171 days	15
265	Rock breaking (at least 30 working hours/week)	201 days	Thu 12/1/17	Mon 31/7/17	264FS-171 days,260	261SS+15 days,266FF	16
266	Removal of broken rock material**	156 days	Sun 26/2/17	Mon 31/7/17	261,265FF	272,262SS+14 days	7
267	**Southern Area (no implication to the operation of KC5)**	**219 days**	**Sun 25/12/16**	**Mon 31/7/17**			
268	Drilling (at least 30 working hours/week)	203 days	Sun 25/12/16	Sat 15/7/17	259	269FS-171 days	15
269	Rock breaking (35 to 40 working hours/week)	201 days	Thu 12/1/17	Mon 31/7/17	268FS-171 days,260	261SS+15 days,270FF	16
270	Removal of broken rock material**	156 days	Sun 26/2/17	Mon 31/7/17	261,269FF	272,262SS+14 days	7
271	Interiml hydrographic survey***	127 days	Mon 13/3/17	Mon 17/7/17	262	272	5
272	Final hydrographic survey, removal of high spots and handover	31 days	Tue 1/8/17	Thu 31/8/17	266,270,271	5FF,247FF,328FF	5
273	Remaing Dredging works around Tsing Yi Submarine Outfall*	140 days	Fri 14/4/17	Thu 31/8/17			7
274	**Section 2**	**1421 days**	**Fri 30/8/13**	**Thu 20/7/17**			
275	**Submission**	**1409 days**	**Wed 11/9/13**	**Thu 20/7/17**			



China International Water & Electric Corp.

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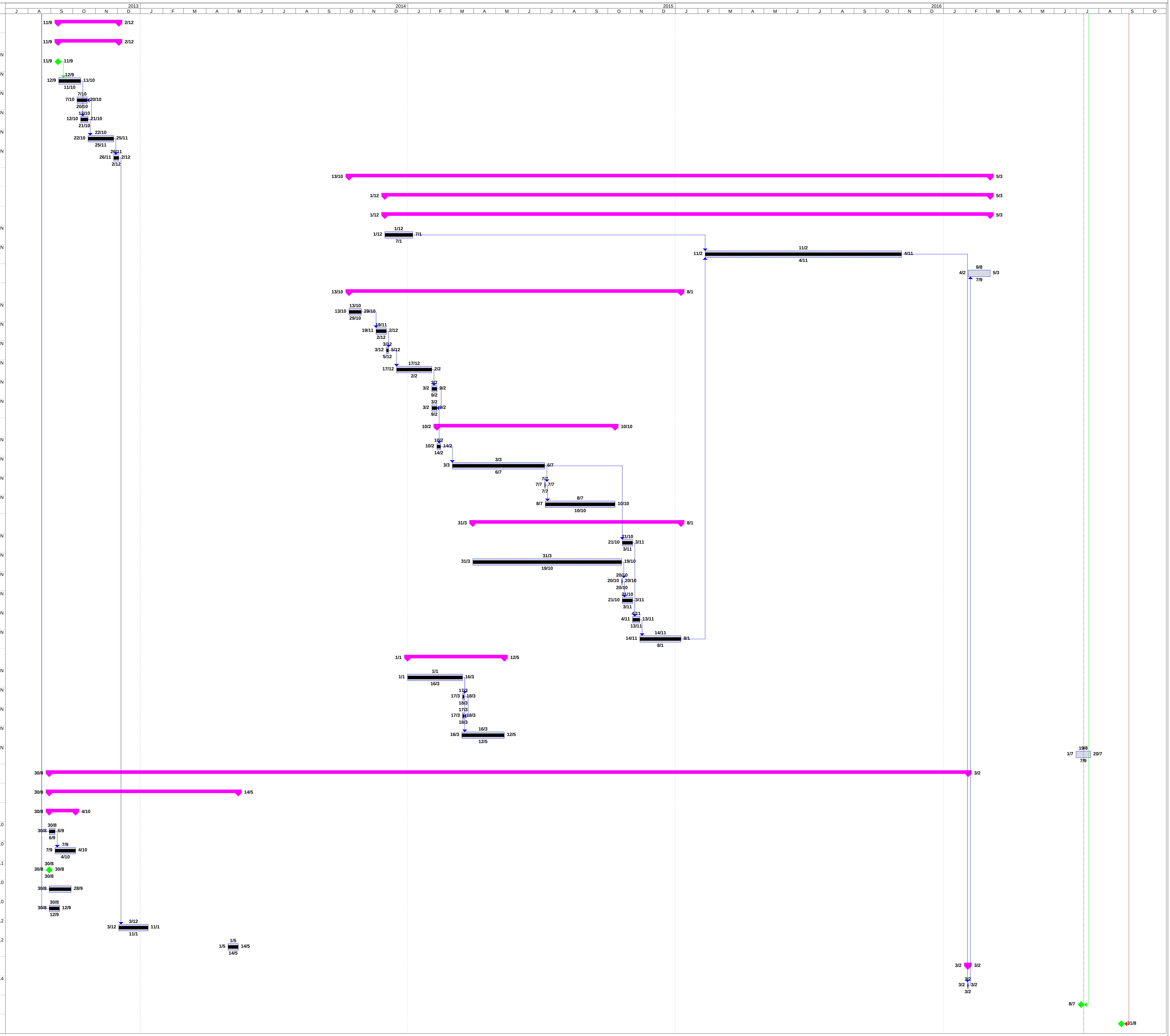
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
276	**Preliminaries (Portion F)**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**			
277	**Engineer Principal Accommodation**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**			
278	Preparation and submisssion of location and layout	0 days	Wed 11/9/13	Wed 11/9/13		279	N
279	Approval of location and layout	30 days	Thu 12/9/13	Fri 11/10/13	278	281	N
280	Independent Checking Engineer (ICE)	14 days	Mon 7/10/13	Sun 20/10/13	281FF-1 day		N
281	Preparation of calculation	10 days	Sat 12/10/13	Mon 21/10/13	279	282,280FF-1 day	N
282	Comment and resubmission of calculation	35 days	Tue 22/10/13	Mon 25/11/13	281	283	N
283	Approval of calculation	7 days	Tue 26/11/13	Mon 2/12/13	282	323	N
284	**Outfall Modification Works (Location see Drg No. S202)**	**875 days**	**Mon 13/10/14**	**Sun 5/3/17**			
285	**Method statement for modification works**	**826 days**	**Mon 1/12/14**	**Sun 5/3/17**			
286	**Preparation and submission**	**826 days**	**Mon 1/12/14**	**Sun 5/3/17**			
287	Preparation and submission	38 days	Mon 1/12/14	Wed 7/1/15		288	N
288	Awaiting resolving TMTA constraints	268 days	Thu 11/2/16	Fri 4/11/16	287,308	326	N
289	Further review diving safety zone with MD and HKPA	30 days	Sat 4/2/17	Sun 5/3/17	326		
290	**Flow Measurement Survey**	**453 days**	**Mon 13/10/14**	**Fri 8/1/16**			
291	Preparation and submission	17 days	Mon 13/10/14	Wed 29/10/14		292	N
292	Resubmission	14 days	Wed 19/11/14	Tue 2/12/14	291	293	N
293	Further comment by Mott	3 days	Wed 3/12/14	Fri 5/12/14	292	294	N
294	Resubmission	48 days	Wed 17/12/14	Mon 2/2/15	293	295	N
295	Approval by Mott	7 days	Tue 3/2/15	Mon 9/2/15	294	296FF	N
296	Approval by DSD	7 days	Tue 3/2/15	Mon 9/2/15	295FF	298	N
297	**Flow Survey Measurement report**	**243 days**	**Tue 10/2/15**	**Sat 10/10/15**			
298	Analyzing survey data	5 days	Tue 10/2/15	Sat 14/2/15	296	299	N
299	Preparation and submission	126 days	Tue 3/3/15	Mon 6/7/15	298	303,300	N
300	Approval by Mott	1 day	Tue 7/7/15	Tue 7/7/15	299	301	N
301	Approval by DSD	95 days	Wed 8/7/15	Sat 10/10/15	300		N
302	**Engineer's Assessment Report on Flow Measurement Survey**	**284 days**	**Tue 31/3/15**	**Fri 8/1/16**			
303	Assessment calculations	14 days	Wed 21/10/15	Tue 3/11/15	299	307	N
304	Preparation and submission	203 days	Tue 31/3/15	Mon 19/10/15		305	N
305	Further comment by Mott	1 day	Tue 20/10/15	Tue 20/10/15	304	306	N
306	Resubmission	14 days	Wed 21/10/15	Tue 3/11/15	305	307	N
307	Approval by Mott	10 days	Wed 4/11/15	Fri 13/11/15	306,303	308	N
308	Approval by DSD	56 days	Sat 14/11/15	Fri 8/1/16	307	288	N
309	**Video Filming and Dye Test**	**132 days**	**Thu 1/1/15**	**Tue 12/5/15**			
310	Preparation and submission	75 days	Thu 1/1/15	Mon 16/3/15		311,313FS-1 day	N
311	Approval by Mott	2 days	Tue 17/3/15	Wed 18/3/15	310	312FF	N
312	Approval by DSD	2 days	Tue 17/3/15	Wed 18/3/15	311FF		N
313	Using digital camera in lieu of CCTV	58 days	Mon 16/3/15	Tue 12/5/15	310FS-1 day		N
314	Deletion of Modification works by the Engineer	20 days	Sat 1/7/17	Thu 20/7/17			N
315	**Works**	**1254 days**	**Fri 30/8/13**	**Fri 3/2/17**			
316	**Preliminaries (Portion F)**	**258 days**	**Fri 30/8/13**	**Wed 14/5/14**			
317	**Contractor's mobilization**	**36 days**	**Fri 30/8/13**	**Fri 4/10/13**			
318	Site clearance	8 days	Fri 30/8/13	Fri 6/9/13		4SS,319	10
319	Contractor's site office	28 days	Sat 7/9/13	Fri 4/10/13	318		10
320	Security Guard	0 days	Fri 30/8/13	Fri 30/8/13		4SS	11
321	Temporary electricity power supply	30 days	Fri 30/8/13	Sat 28/9/13		4SS	10
322	Engineer's Initial Temporary Accommodation	14 days	Fri 30/8/13	Thu 12/9/13		4SS	10
323	Engineer's Principal Accommodation	40 days	Tue 3/12/13	Sat 11/1/14	283		12
324	Engineer's Car Park	14 days	Thu 1/5/14	Wed 14/5/14			12
325	**Outfall Modification Works (Location see Drg No. S202)**	**1 day**	**Fri 3/2/17**	**Fri 3/2/17**			
326	Underwater inspection and underwater filming	1 day	Fri 3/2/17	Fri 3/2/17	288	289	14
327	**Extended Contract Completion Date**	**0 days**	**Sat 8/7/17**	**Sat 8/7/17**	3FF		
328	**Revised Contract Completion Date**	0 days	Thu 31/8/17	Thu 31/8/17	272FF		



China International Water & Electric Corp.

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Appendix C

Action and Limit Levels

Action and Limit Levels for Routine Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5(mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth- averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR4 SR12	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
Fish Culture Zone																				
SR5	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.36	0.39
Gazetted Beach																				
SR2 SR3	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA
EMSD Cooling Water Intake																				
SR13	5.31	5.22#	5.29	5.12+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:
* Or 120% of upstream control station at the same tide of the day
^ Or 130% of upstream control station at the same tide of the day
# According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.
+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data
For DO measurement, non-compliance occurs when monitoring result is lower than the limits;
For TIN, UIA, NH_3-N, SS, BOD_5, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;
AL/LL of TIN and NH_3-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.
Dry Season: November to March

Action and Limit Levels for Routine Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5 (mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth-averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR4 SR12	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
Fish Culture Zone																				
SR5	5.00#	5.00#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.45	0.50
Gazetted Beach																				
SR2 SR3	4.68	4.62#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA
EMSD Cooling Water Intake																				
SR13	4.24	4.17#	3.70	3.58+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:
* Or 120% of upstream control station at the same tide of the day
^ Or 130% of upstream control station at the same tide of the day
# According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (5%ile & 1 %ile determined from wet season baseline data for cluster 1 (4.68mg/L & 4.62mg/L) and cluster 2 (5.00mg/L & 4.82mg/L) are 5mg/L or below, thus 5mg/L was adopted as the AL & LL for the SR in FCZ)
+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data
Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.
For DO measurement, non-compliance occurs when monitoring result is lower than the limits;
For TIN, UIA, NH_3-N, SS, BOD_5, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;
AL/LL of TIN and NH_3-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.
Wet season: April to October

Action and Limit Levels for 24-hr Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4 SR12	2	2	<10	<10	<1	<1
Fish Culture Zone						
SR5	5.46	5.39	6.0	7.9	NA	NA
EMSD Cooling Water Intake						
SR13	5.28	5.22	11.9	13.3	NA	NA

Note: According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.

Dry Season: November to March.

Action and Limit Levels for 24-hr Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4 SR12	2	2	<10	<10	<1	<1
Fish Culture Zone						
SR5	5.24	5.13	9.7	14.4	NA	NA
EMSD Cooling Water Intake						
SR13	4.23	4.17	11.9	13.3	NA	NA

Note: # According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (1 %ile determined from wet season baseline data for cluster 2 (4.78mg/L) is below 5mg/L, thus 5mg/L was adopted as the DO (surface) LL for the SR in FCZ in cluster 2 stations)

Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.

Wet Season: April to October

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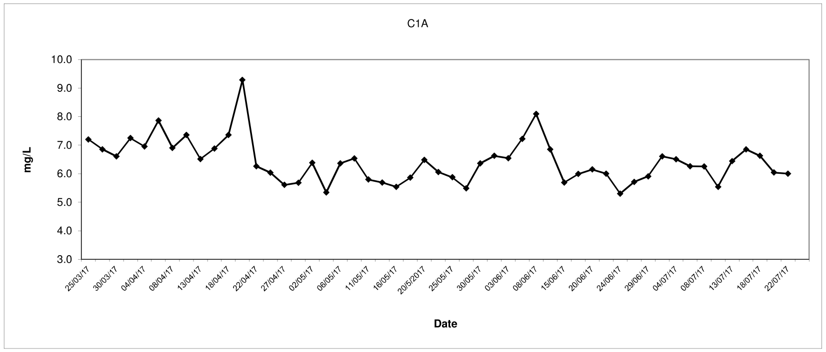
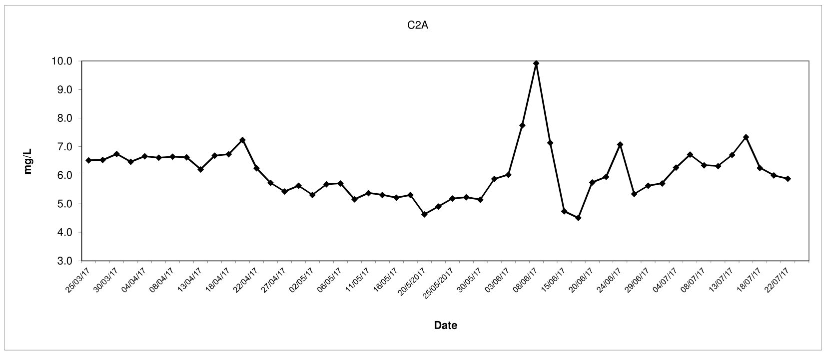
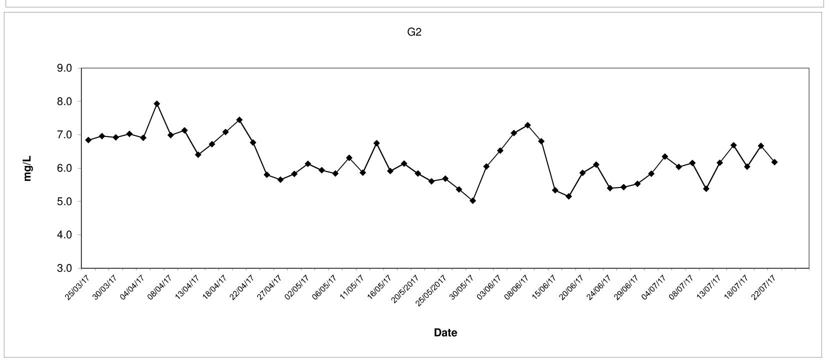
Appendix D

Graphical Presentation – Routine Impact Monitoring Results

Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide







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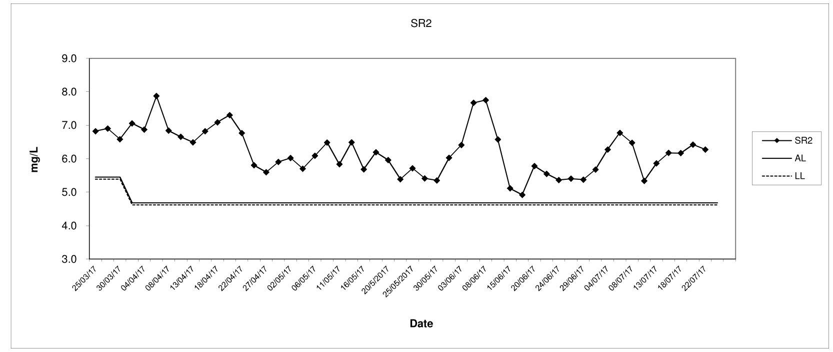
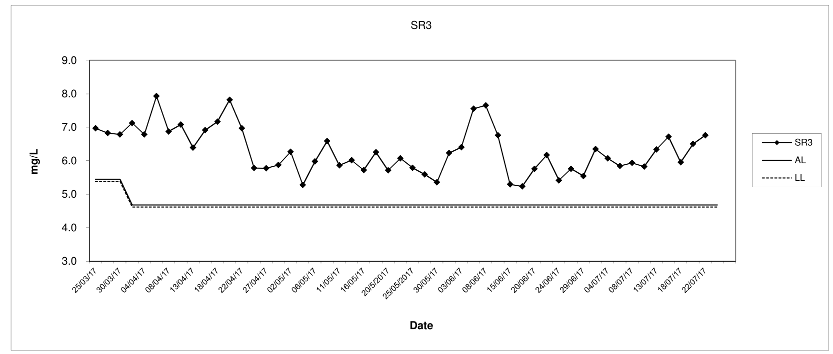
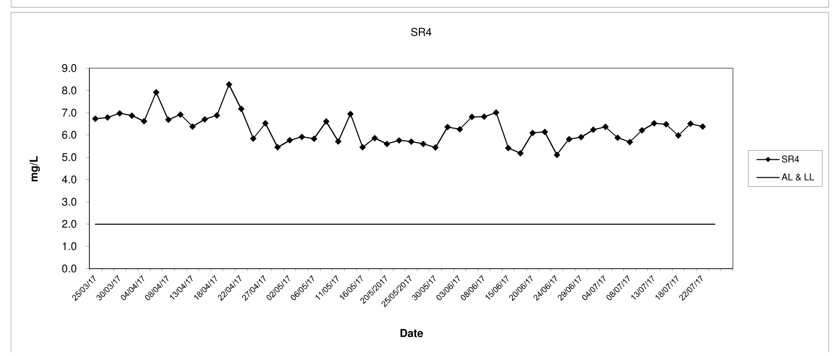
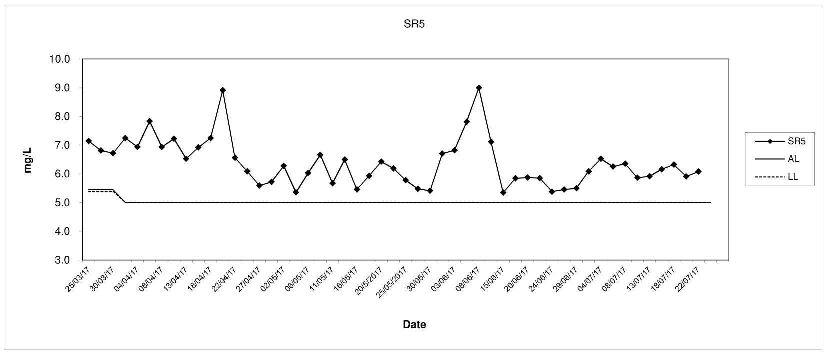
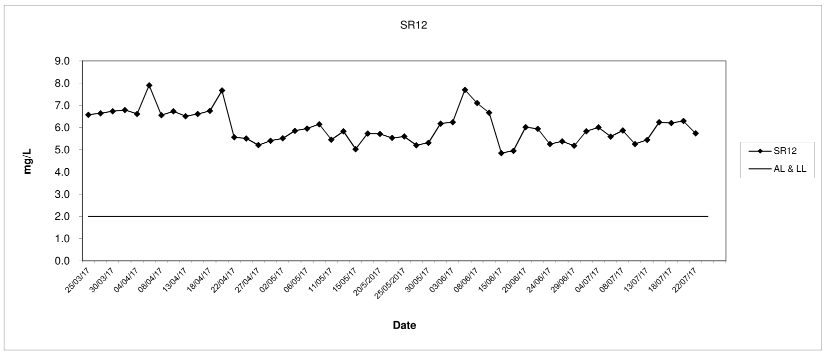


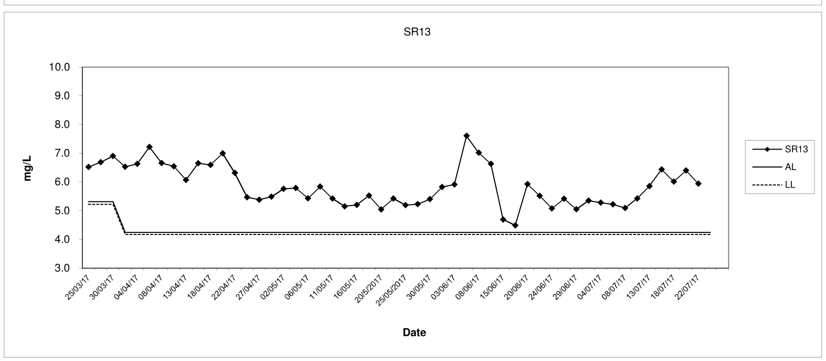




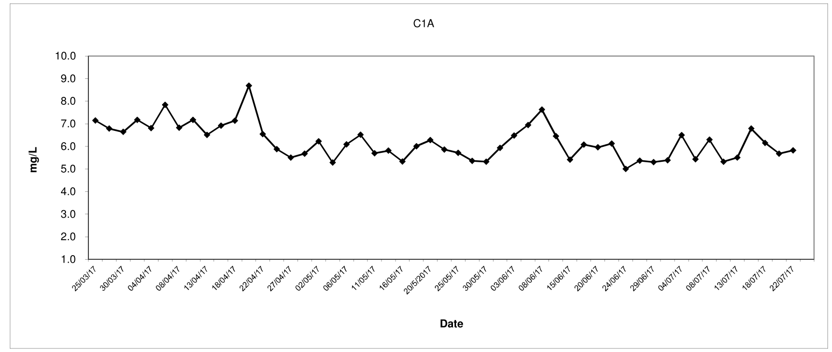
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

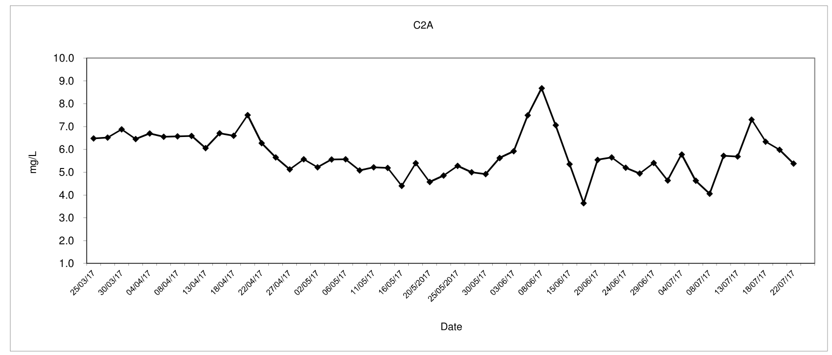


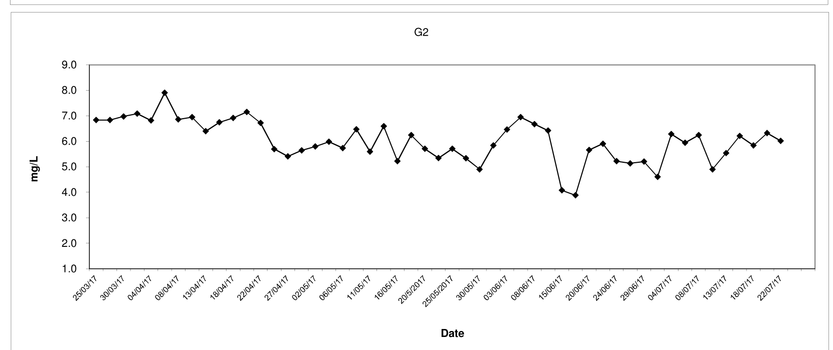




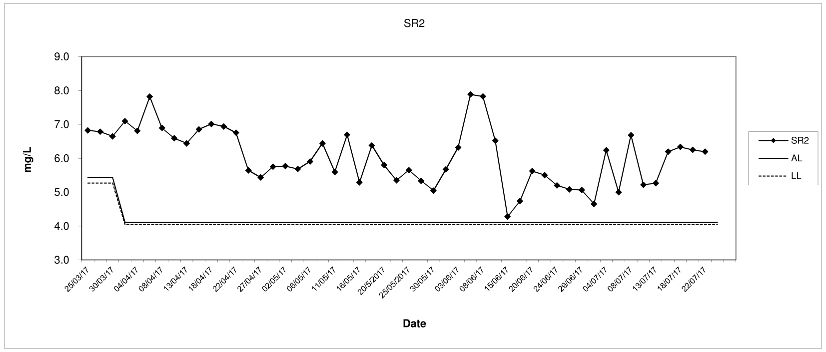
Dissolved Oxygen (Bottom) at Mid-Flood Tide

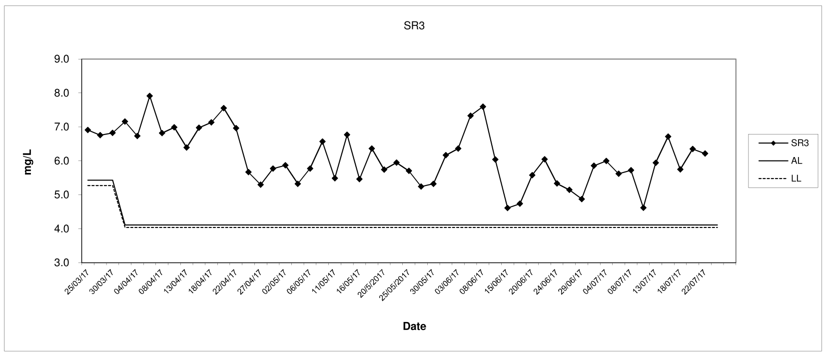


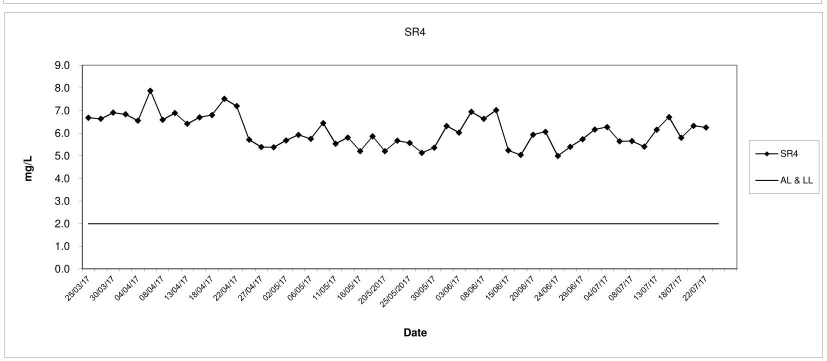




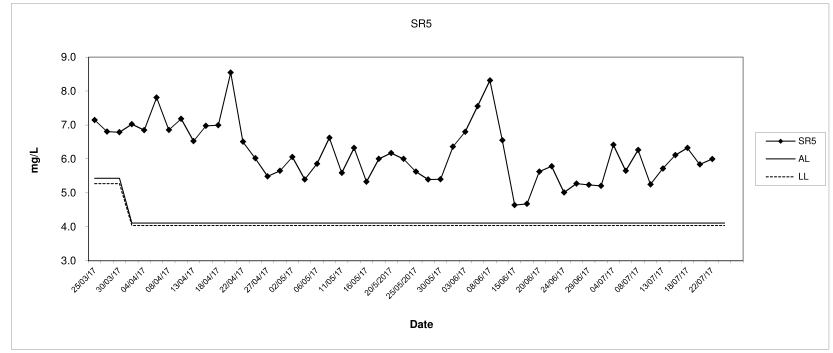
Dissolved Oxygen (Bottom) at Mid-Flood Tide

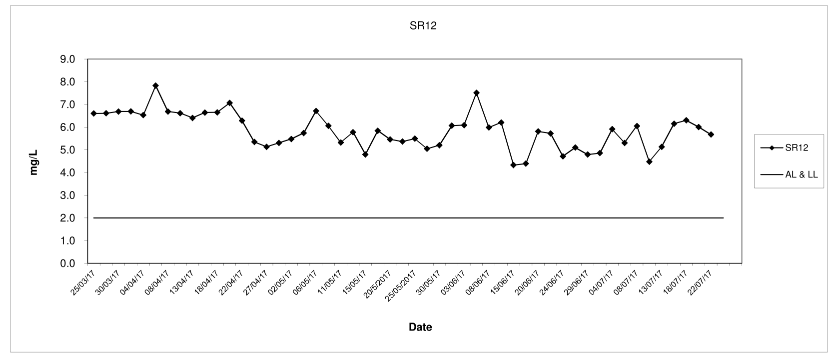


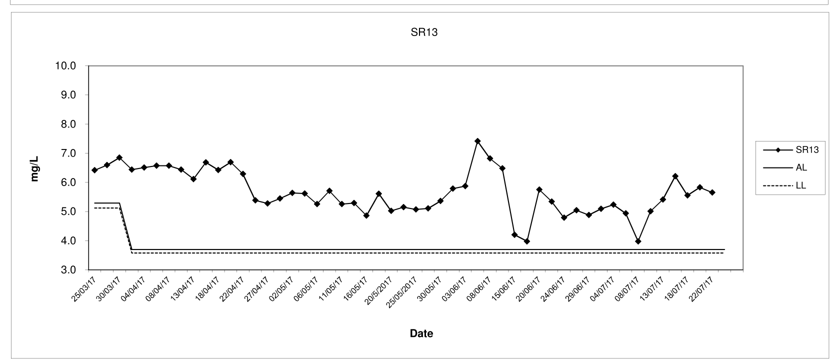




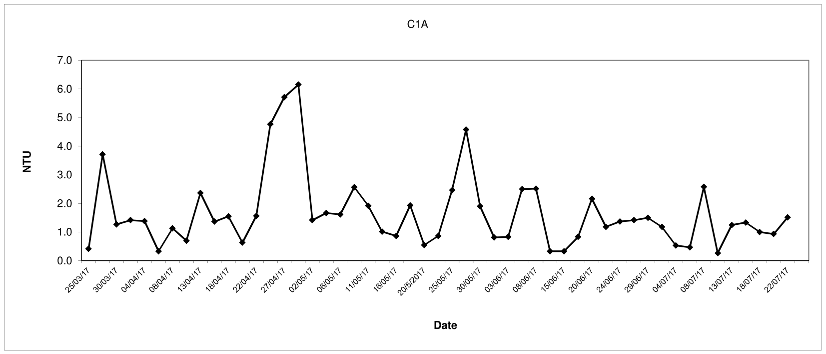
Dissolved Oxygen (Bottom) at Mid-Flood Tide

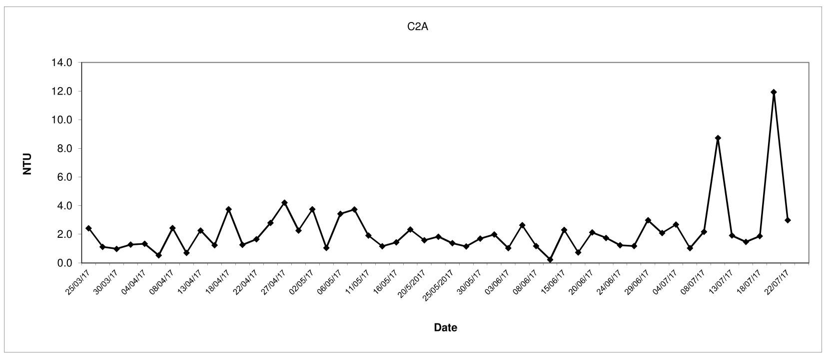


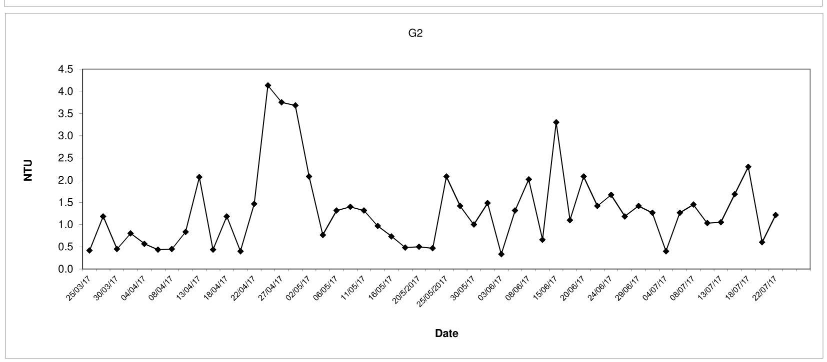




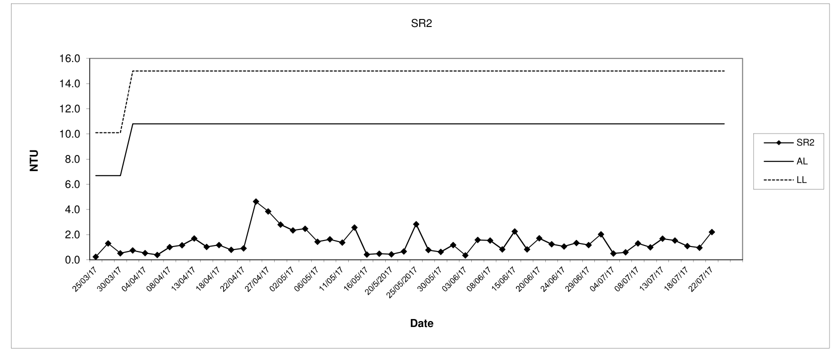
Turbidity (Depth average) at Mid-Flood Tide

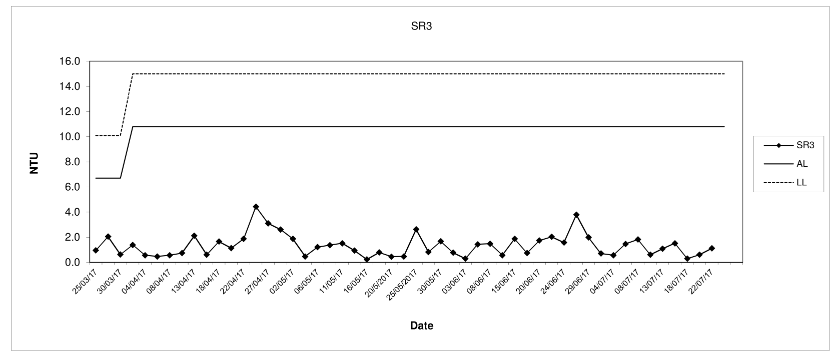


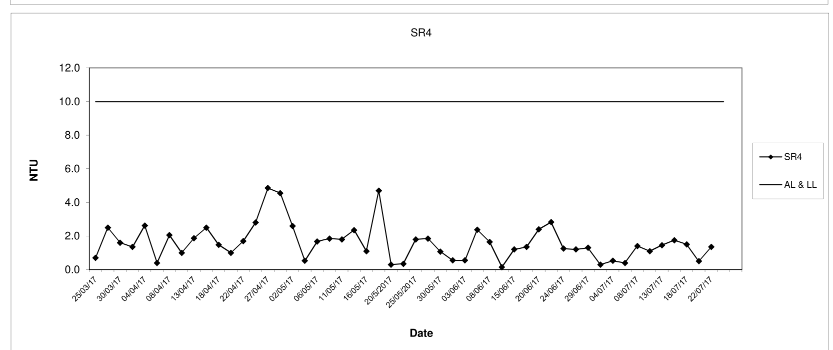




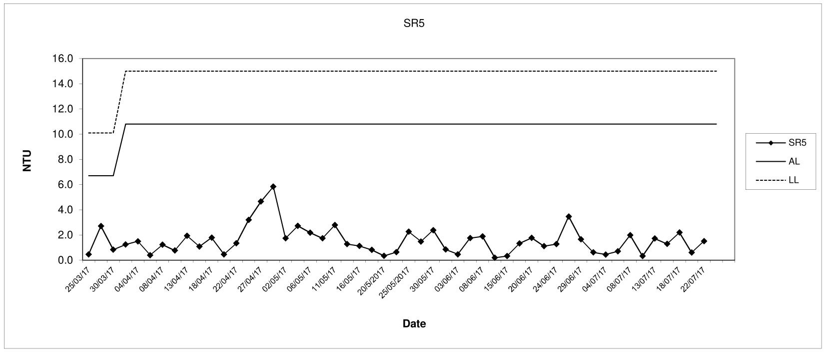
Turbidity (Depth average) at Mid-Flood Tide

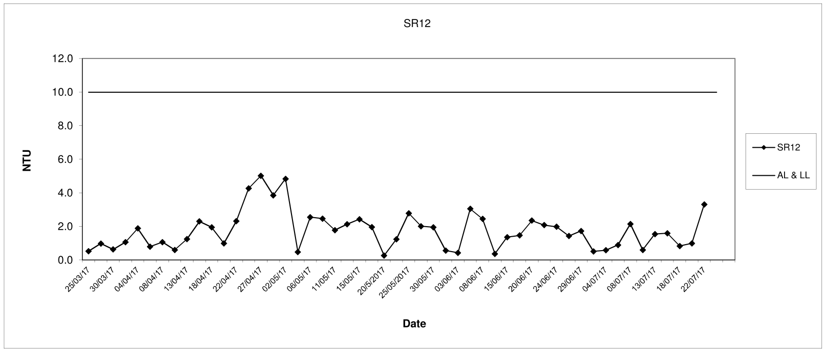


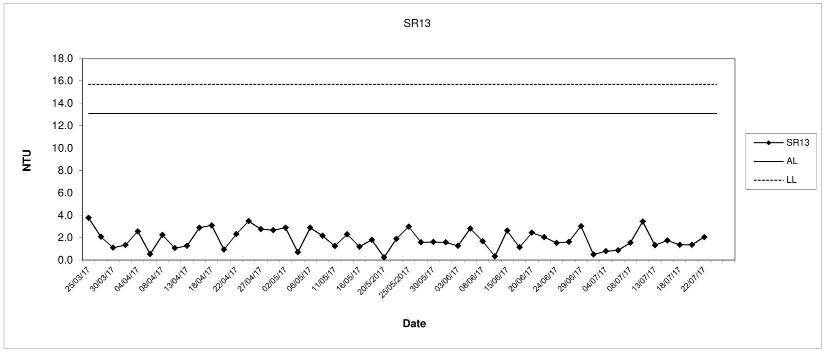




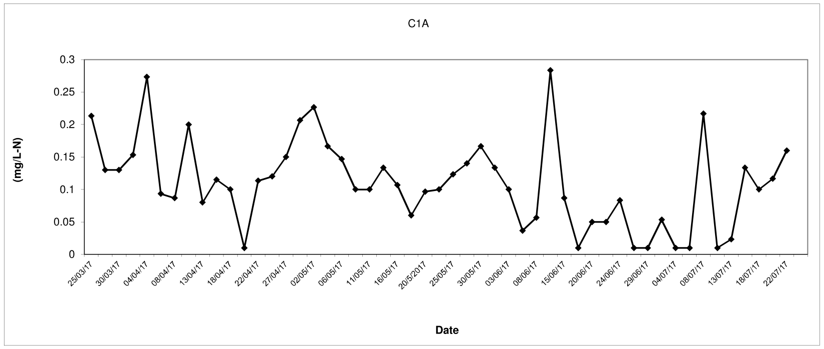
Turbidity (Depth average) at Mid-Flood Tide

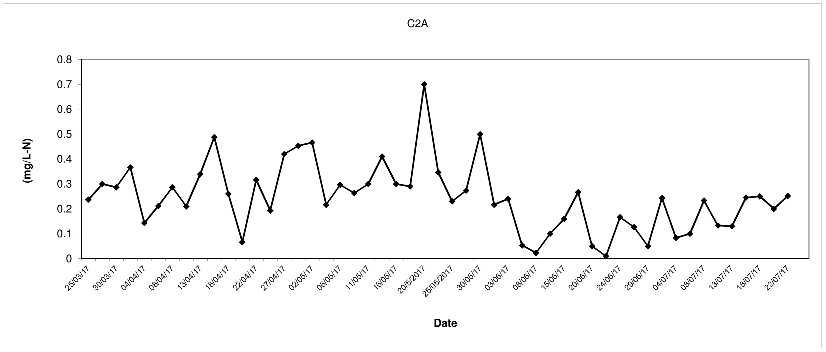


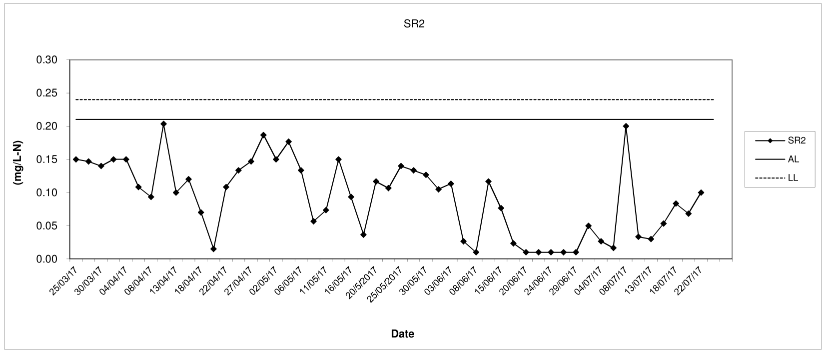




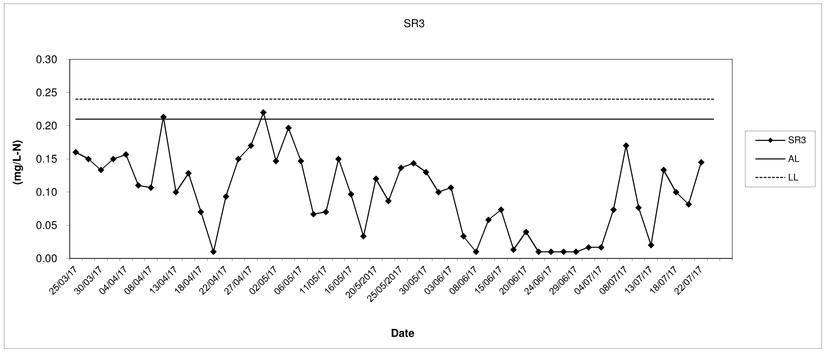
In-situ Ammonia (Depth average) at Mid-Flood Tide

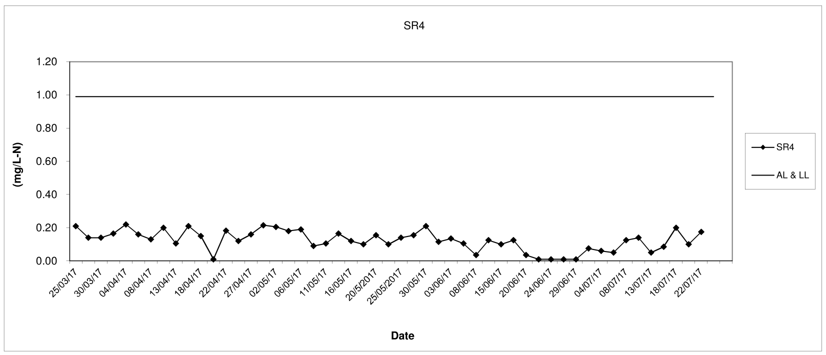


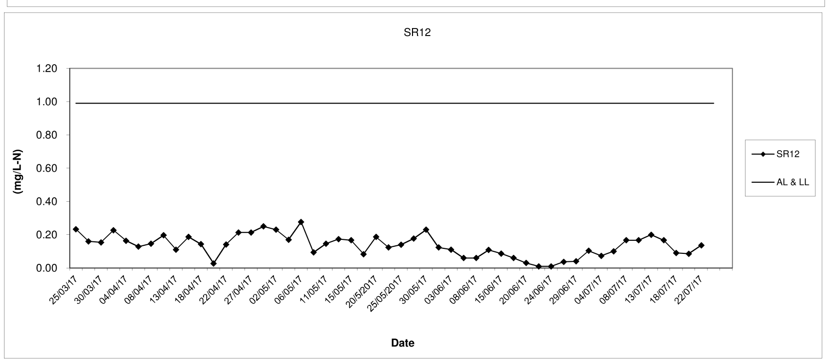




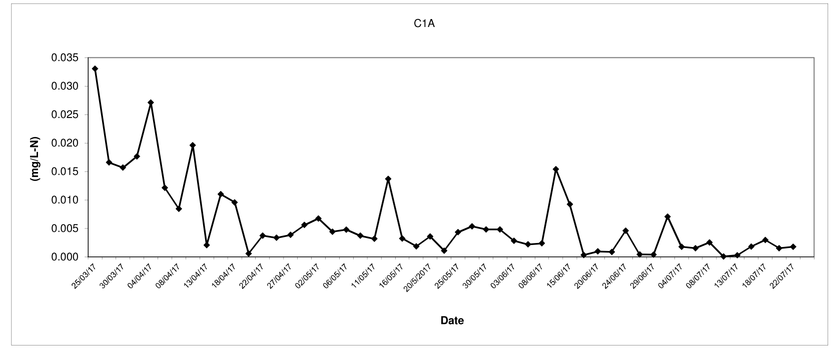
In-situ Ammonia (Depth average) at Mid-Flood Tide

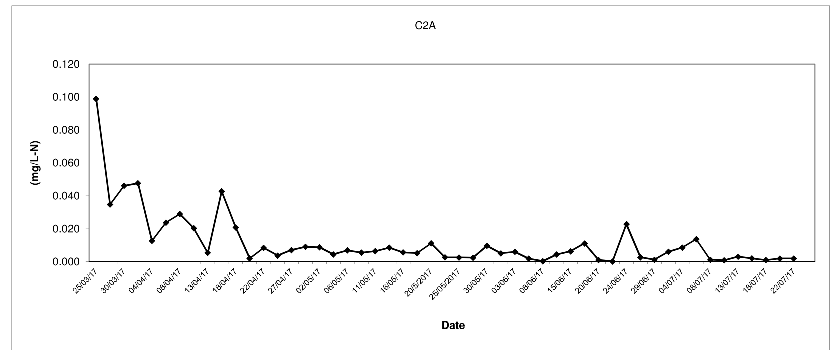


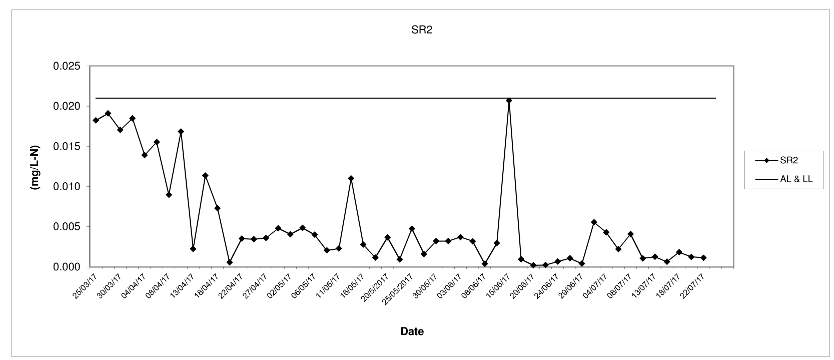




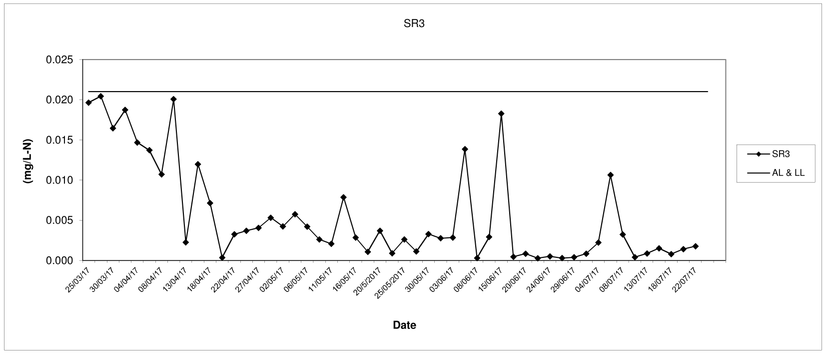
In-situ UIA (Depth average) at Mid-Flood Tide

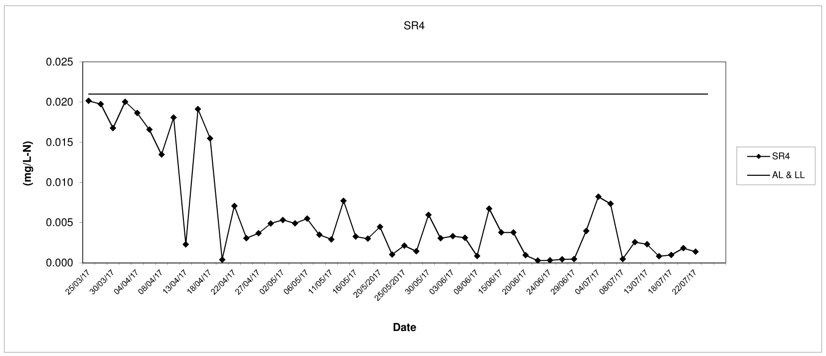


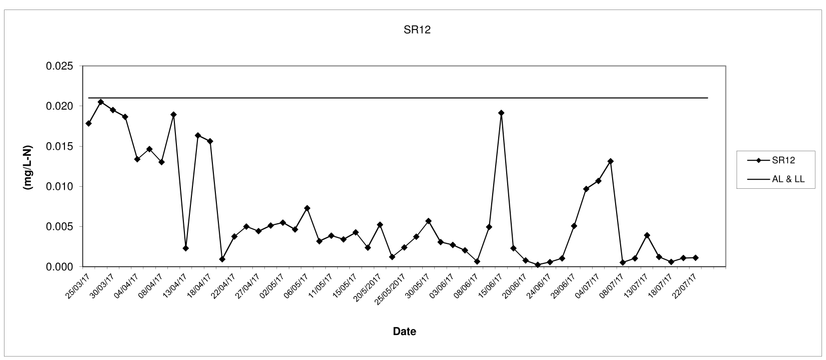




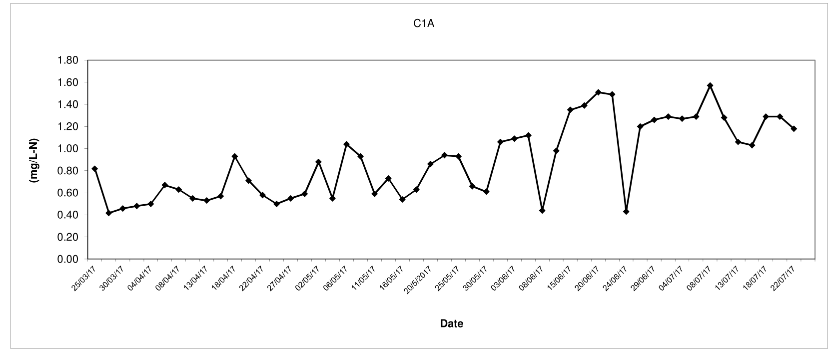
In-situ UIA (Depth average) at Mid-Flood Tide

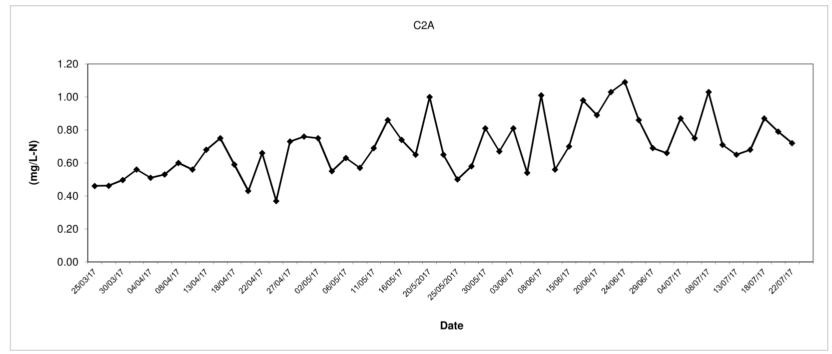


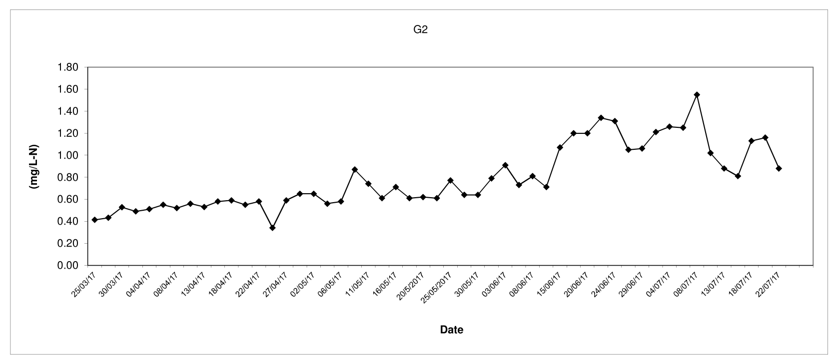




In-situ TIN (Depth average) at Mid-Flood Tide

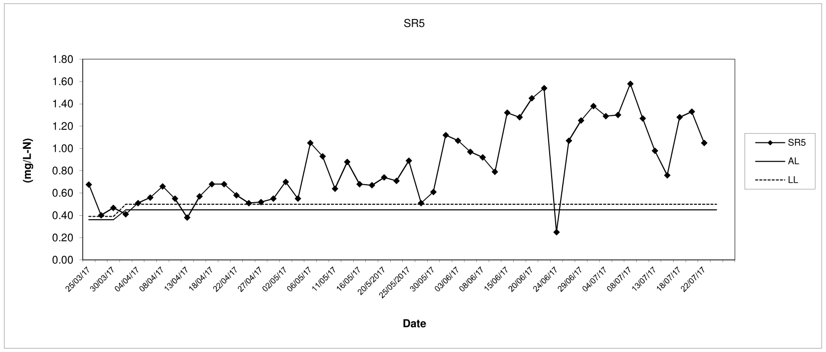




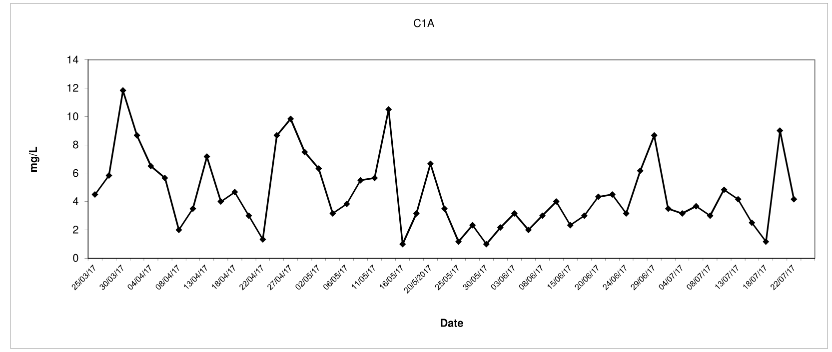


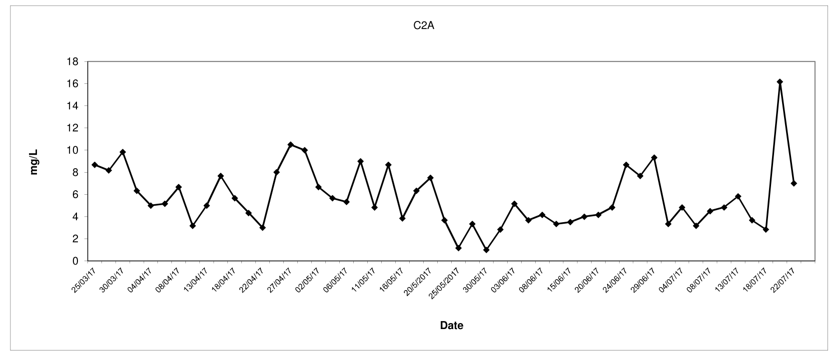
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

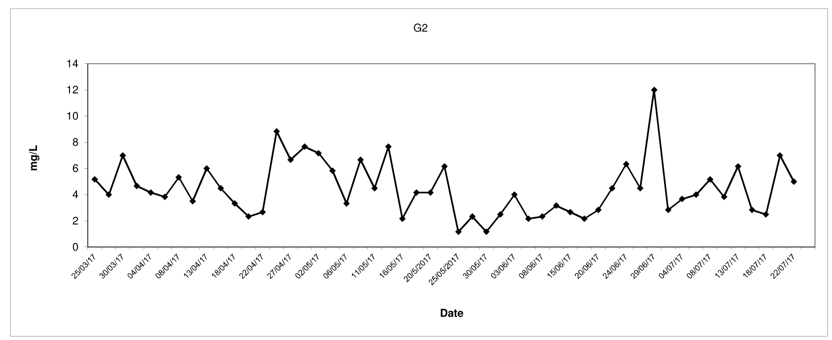
In-situ TIN (Depth average) at Mid-Flood Tide



Total Suspended Solids (Depth average) at Mid-Flood Tide

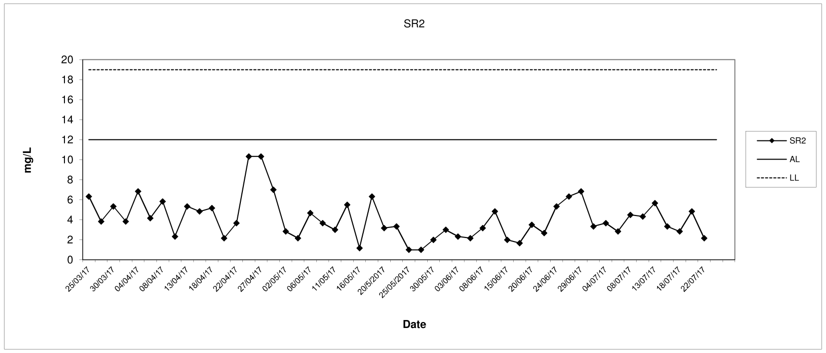


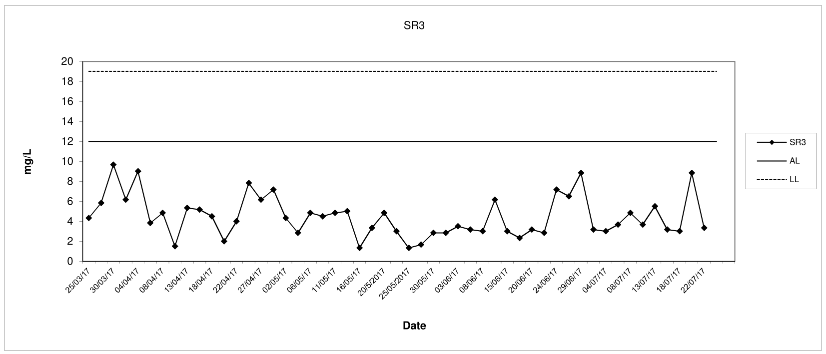


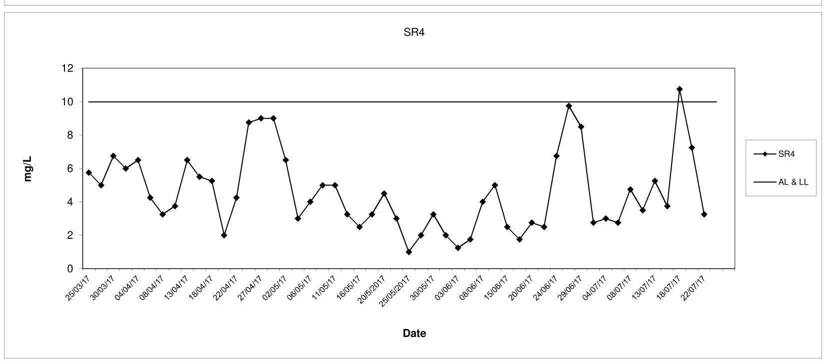


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

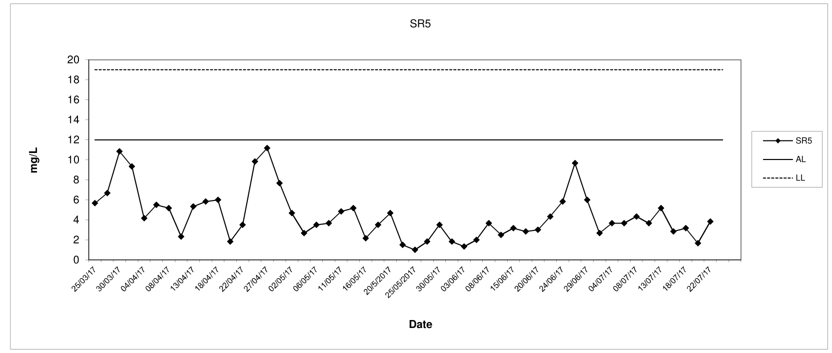
Total Suspended Solids (Depth average) at Mid-Flood Tide

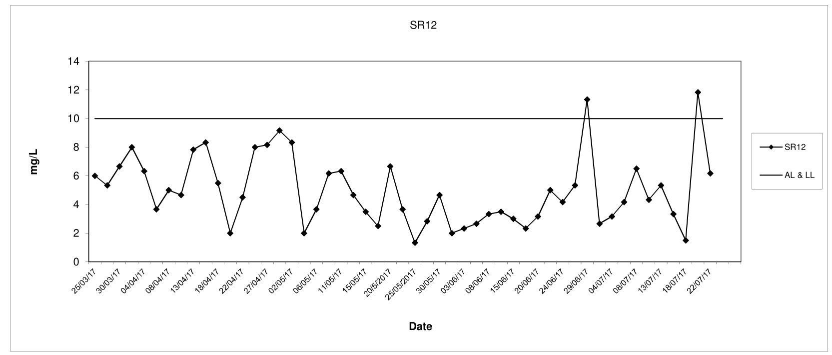


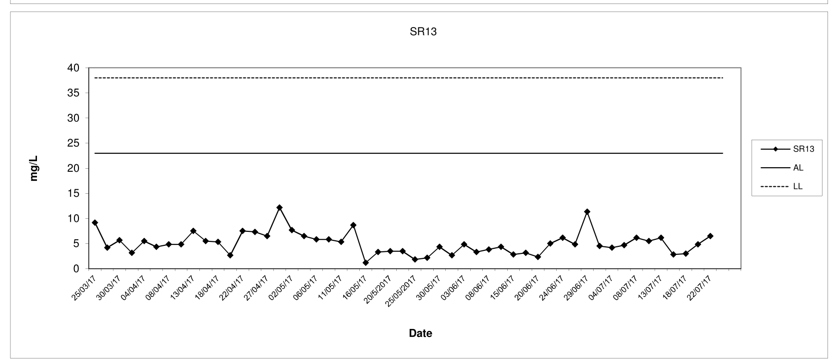




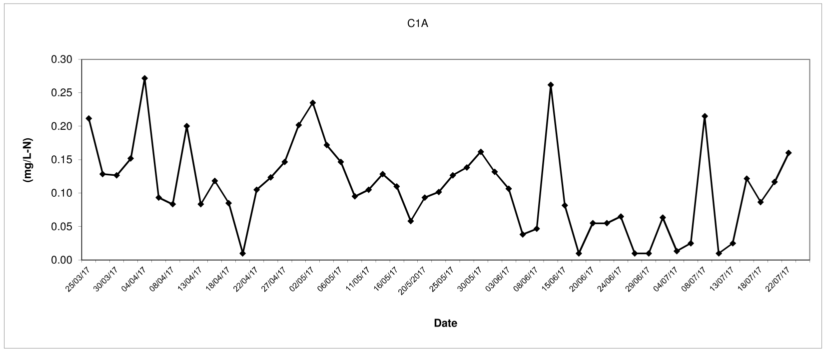
Total Suspended Solids (Depth average) at Mid-Flood Tide

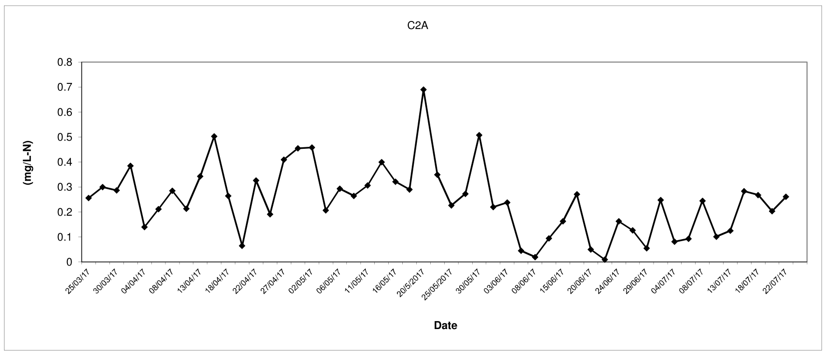


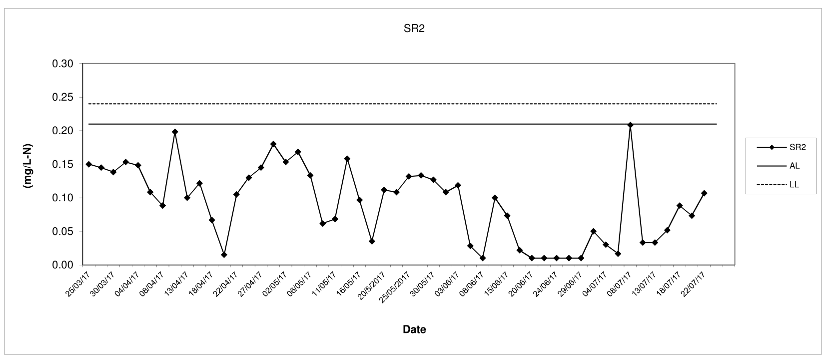




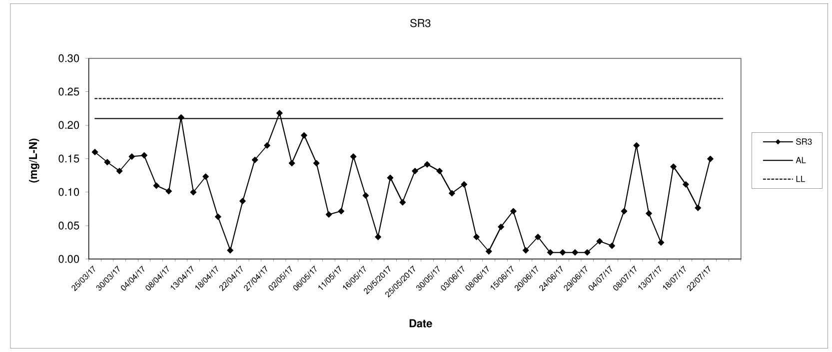
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

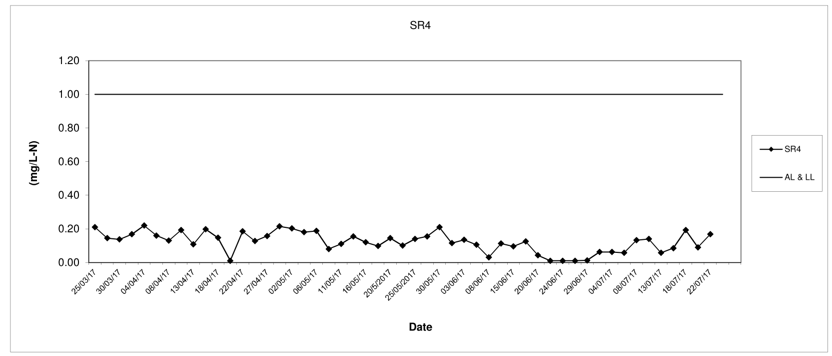


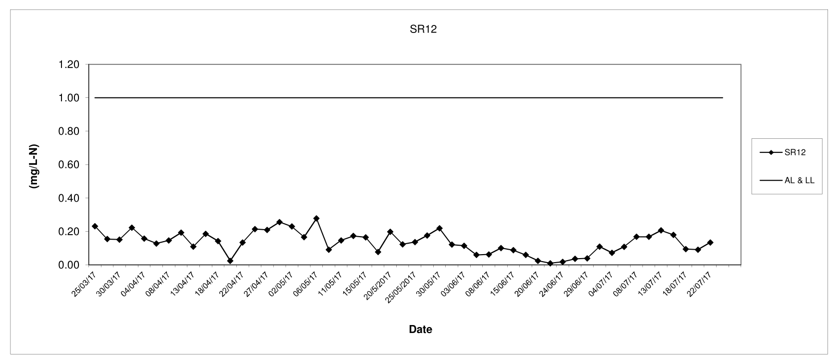




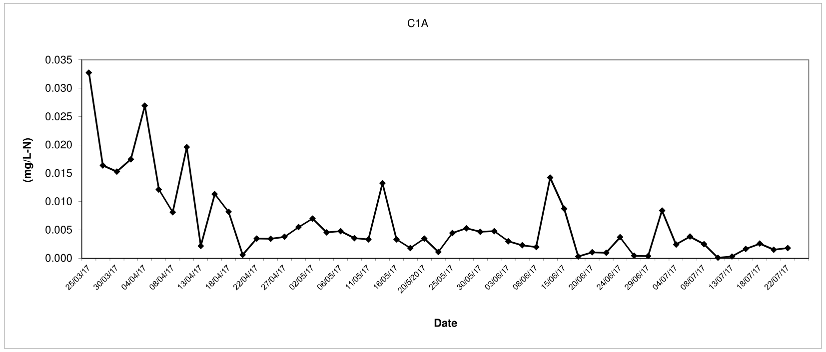
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

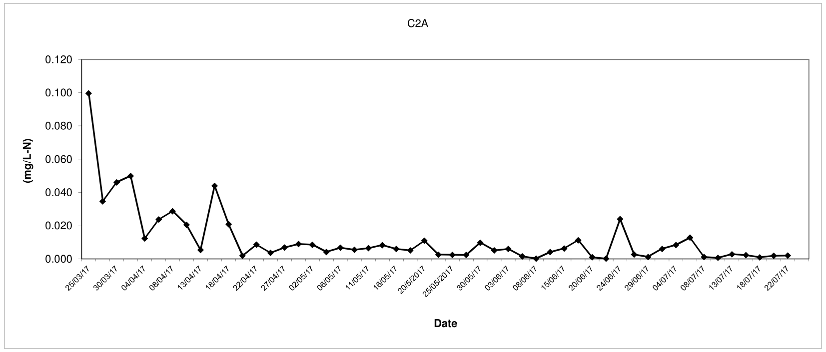


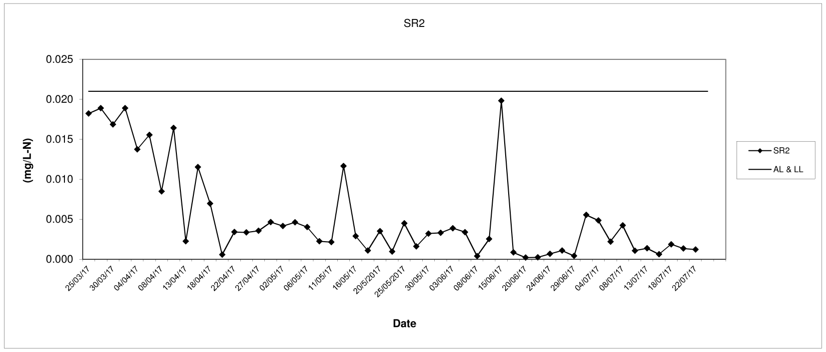




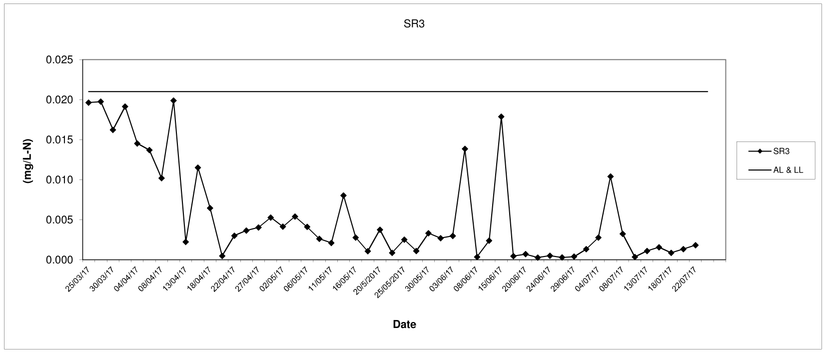
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

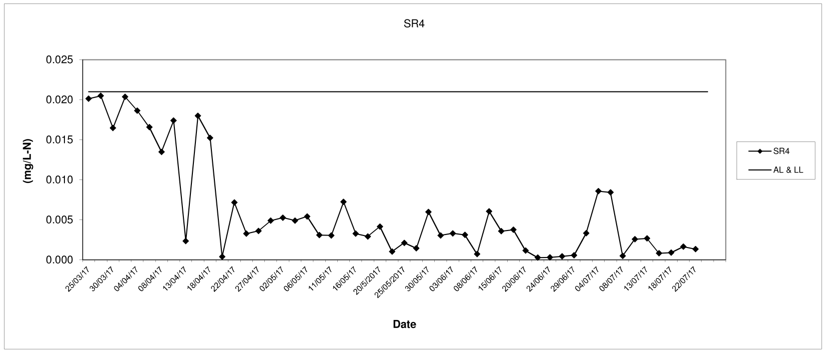


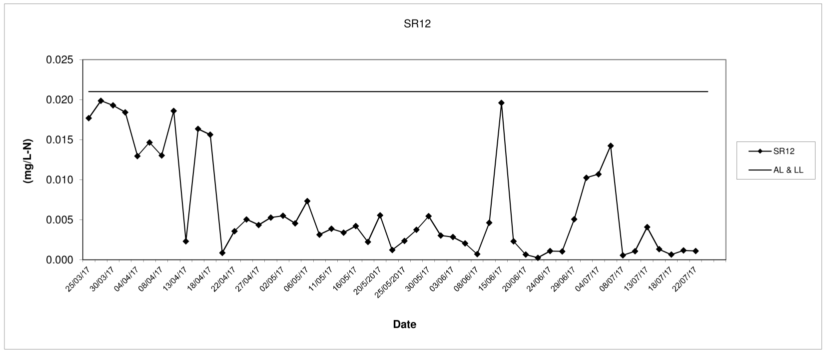




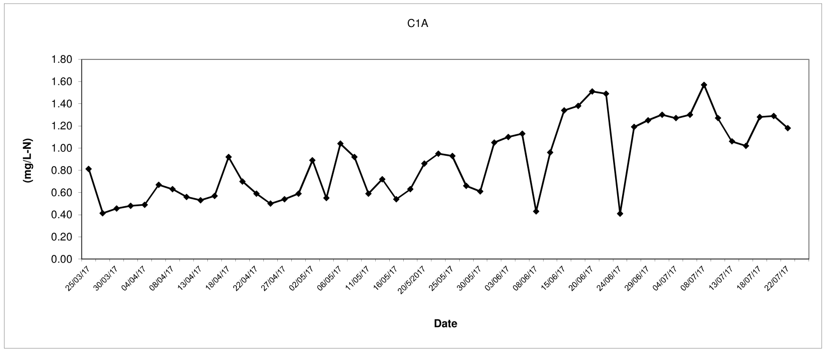
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

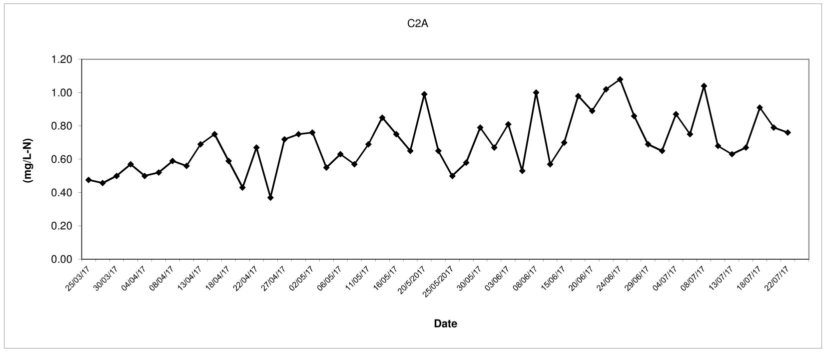


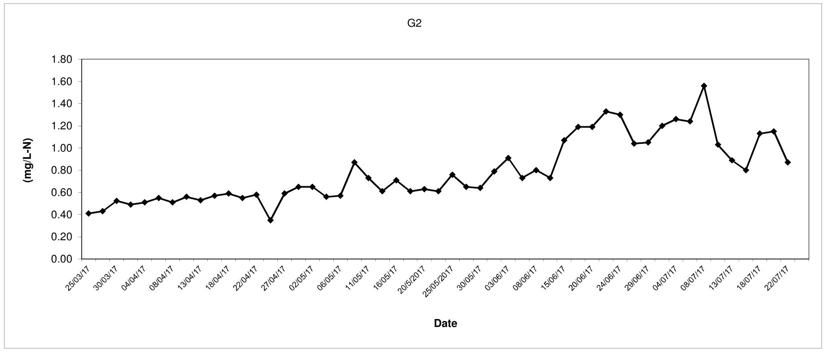




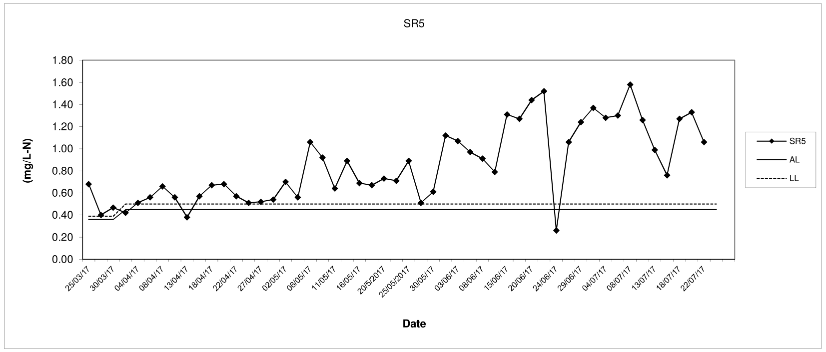
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



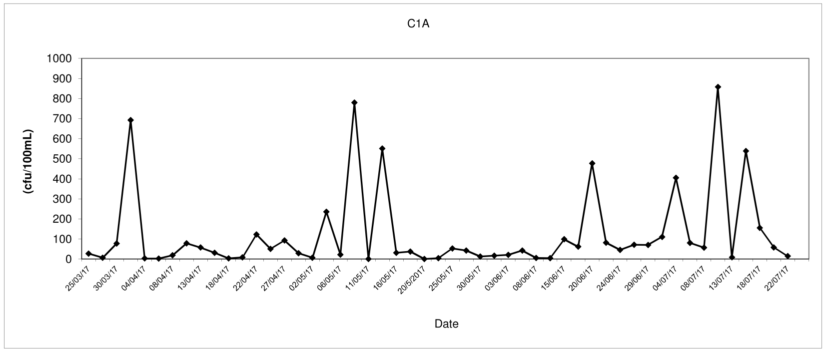


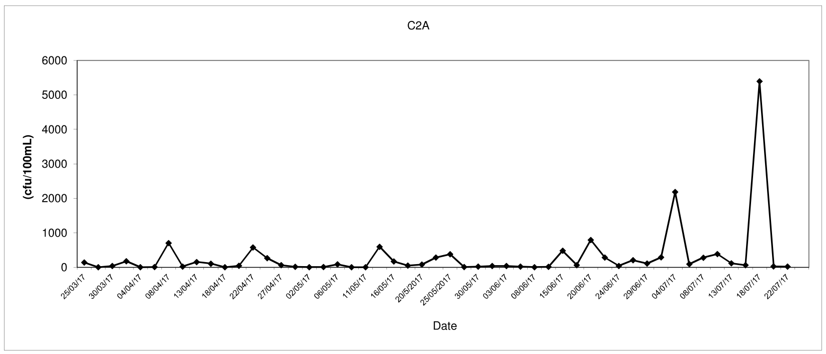


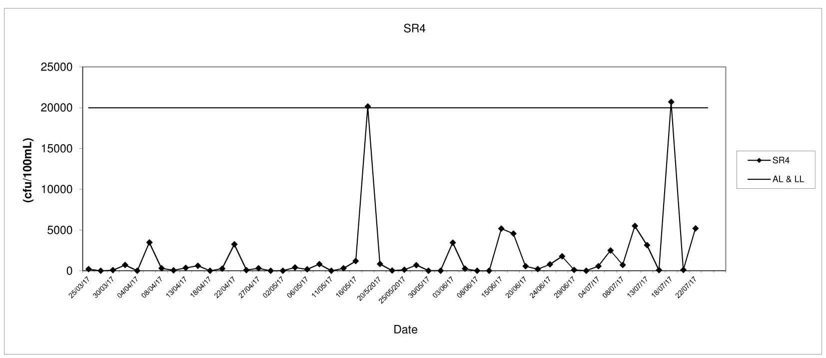
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



***E.coli* (Depth average) at Mid-Flood Tide**

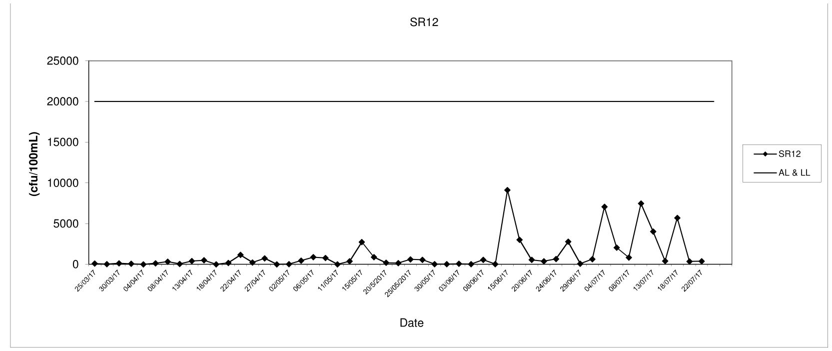




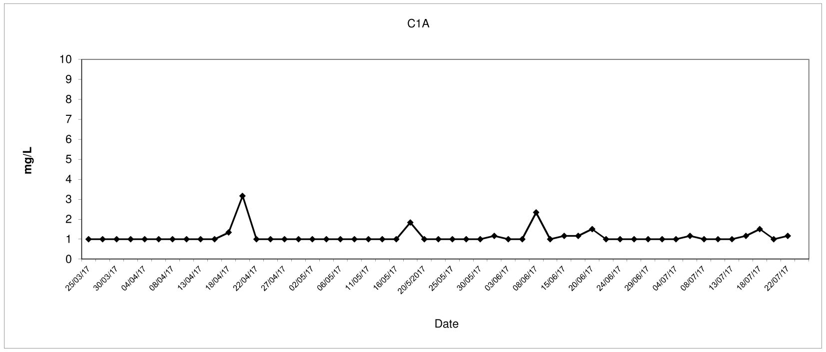


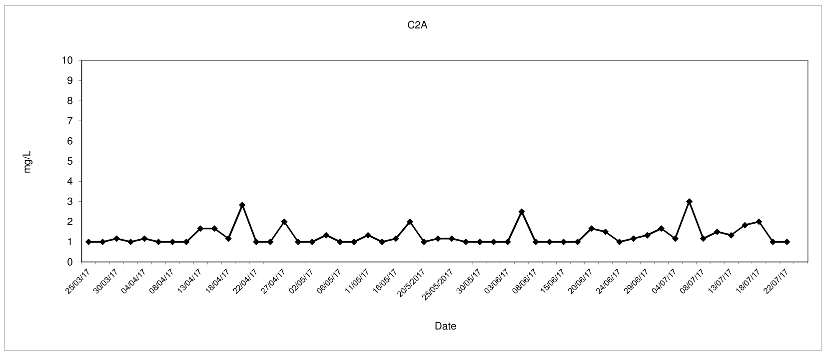
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

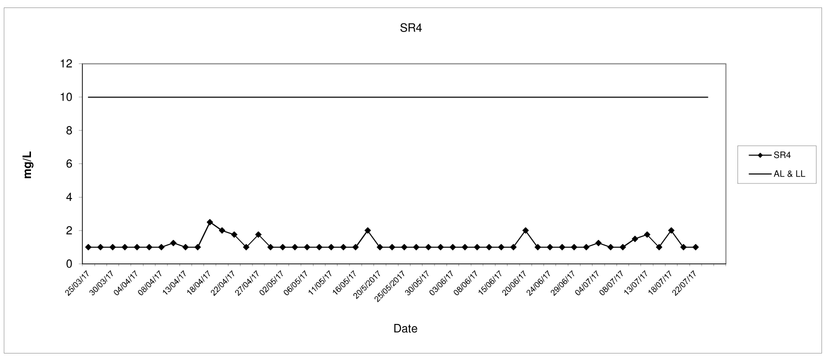
***E.coli* (Depth average) at Mid-Flood Tide**



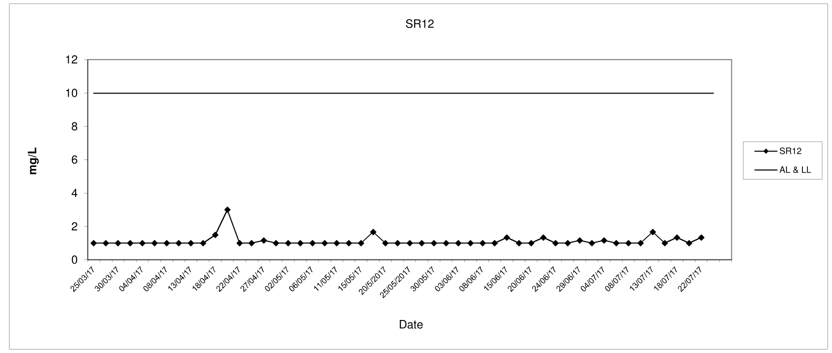
BOD$_5$ (Depth average) at Mid-Flood Tide



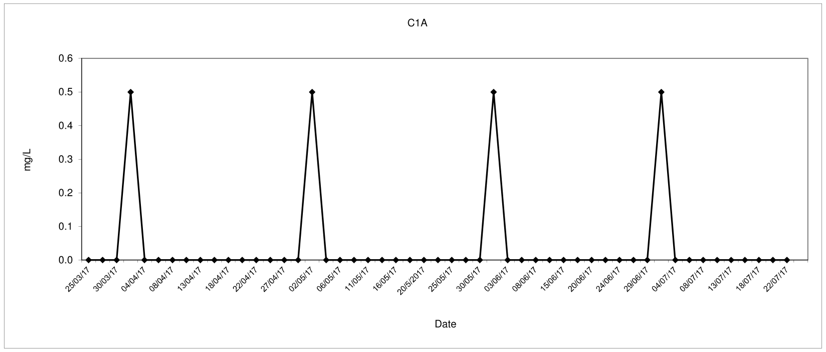


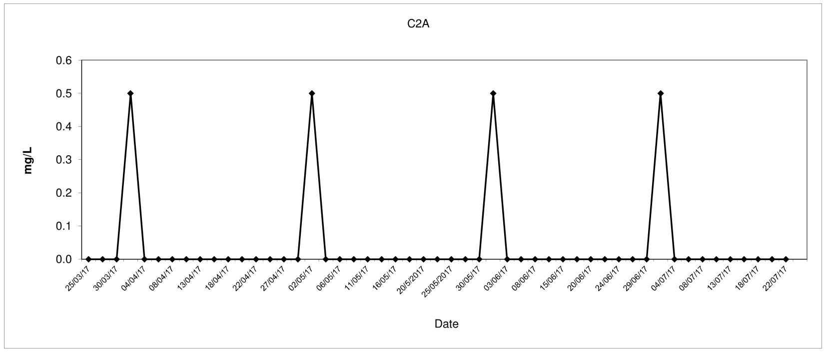


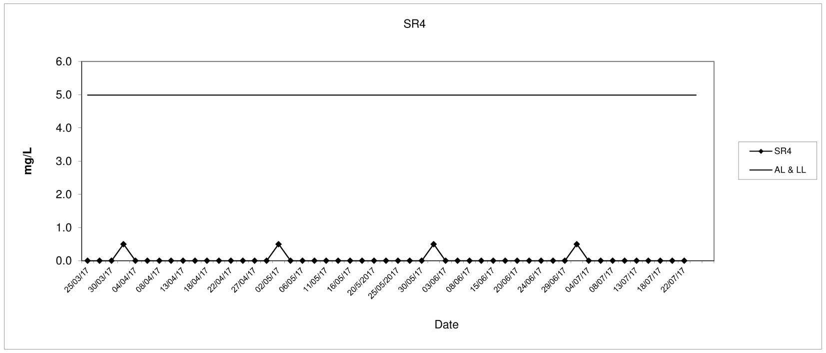
BOD$_5$ (Depth average) at Mid-Flood Tide



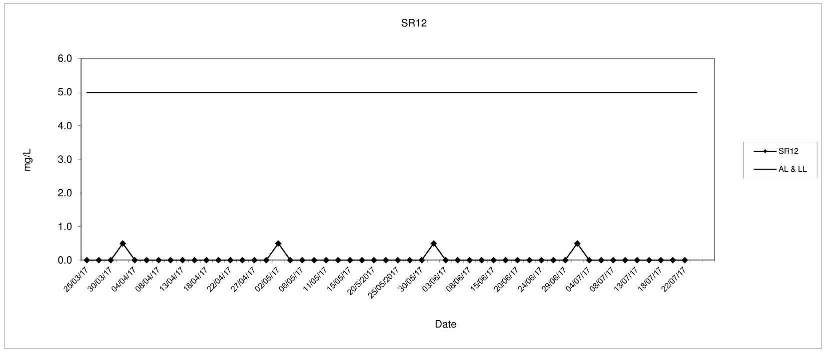
Synthetic Detergent (Depth average) at Mid-Flood Tide



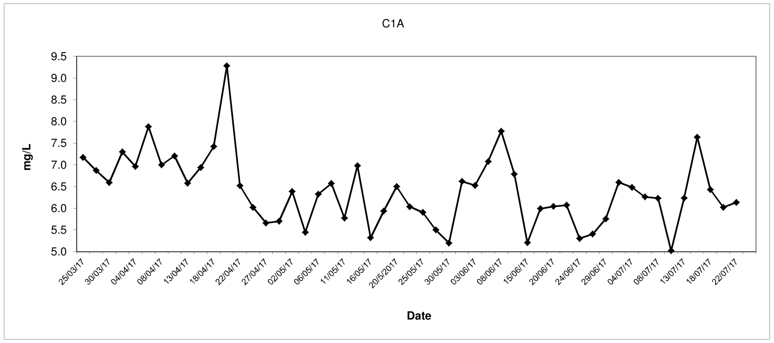


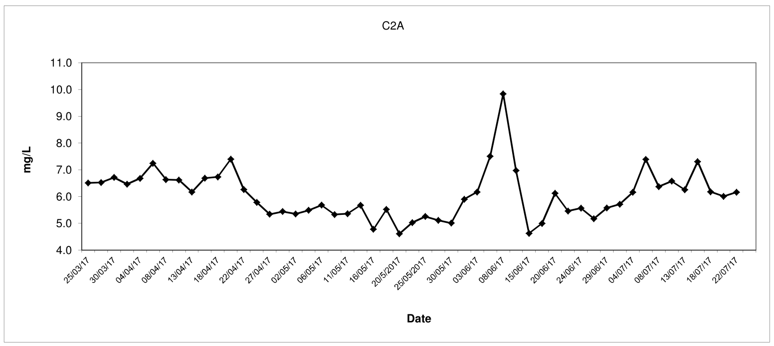


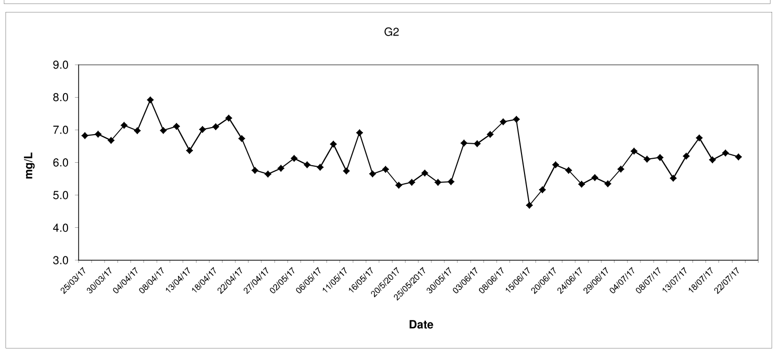
Synthetic Detergent (Depth average) at Mid-Flood Tide



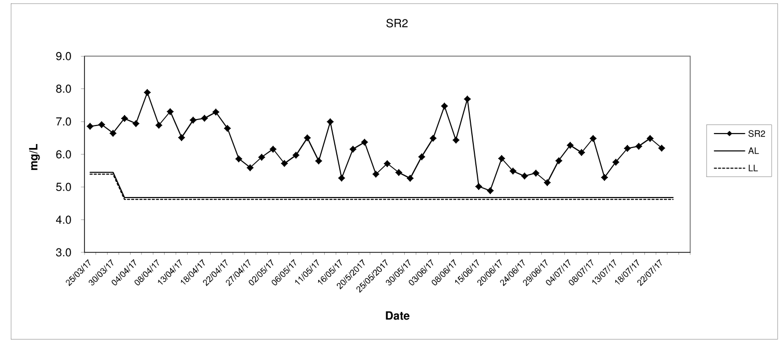
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

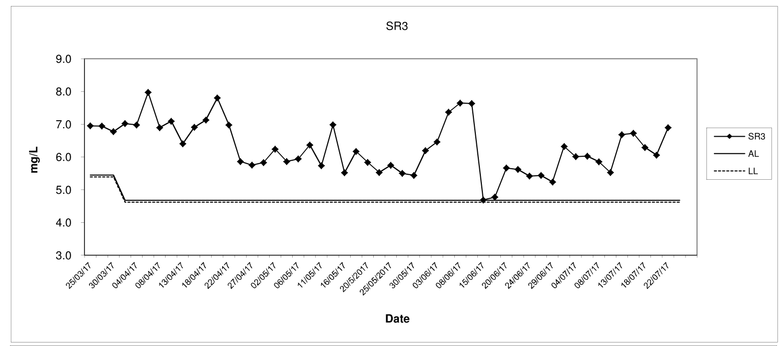


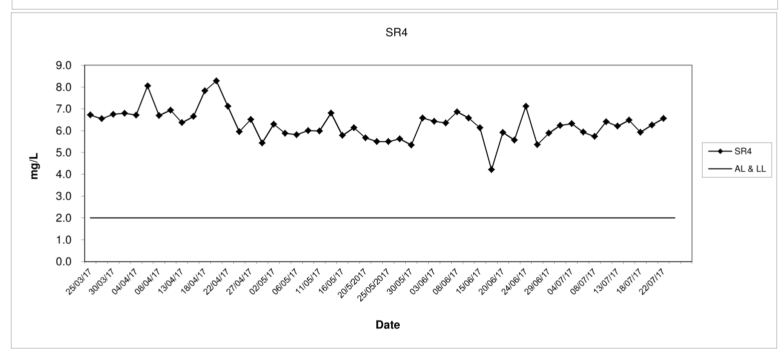




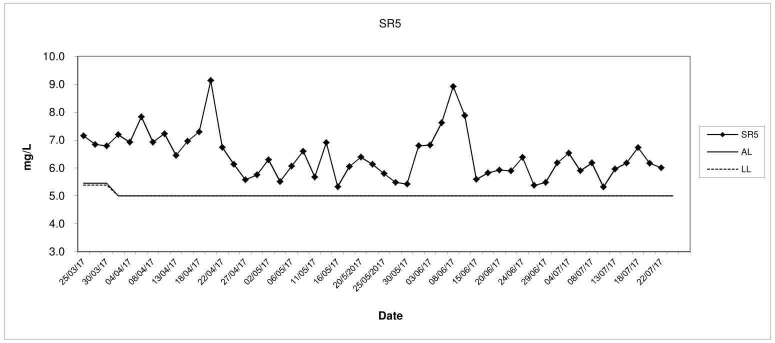
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

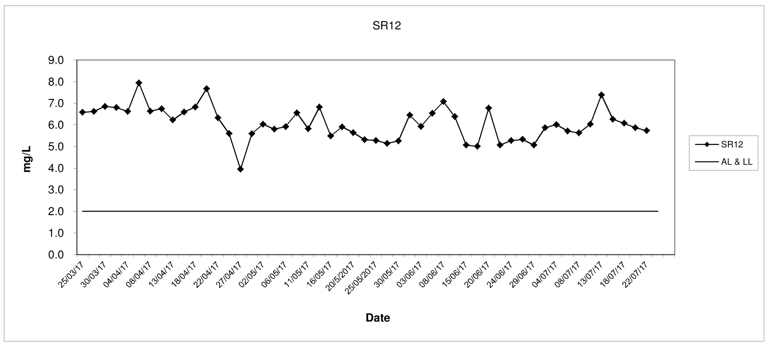


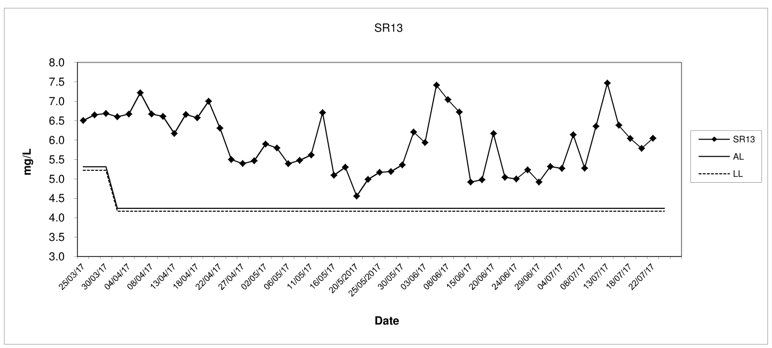




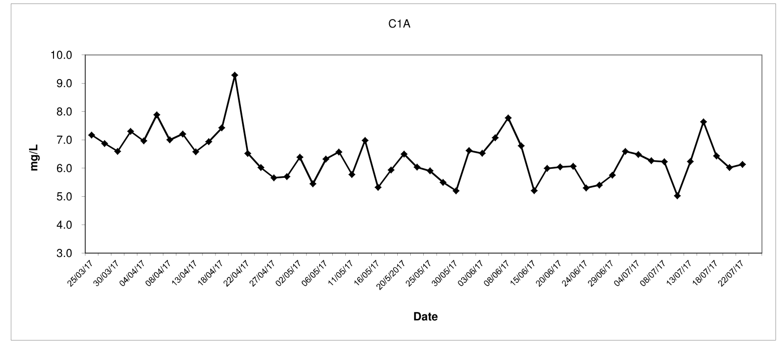
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

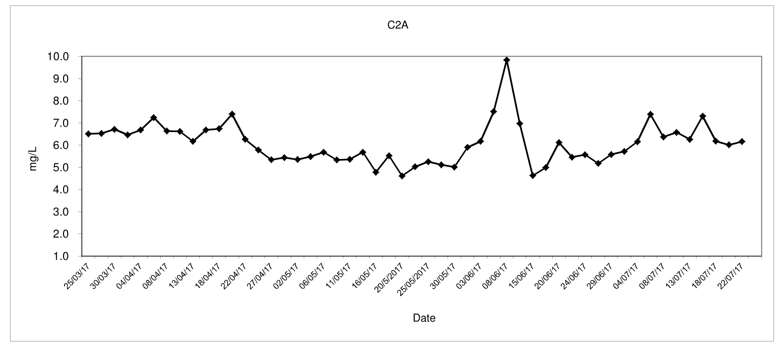


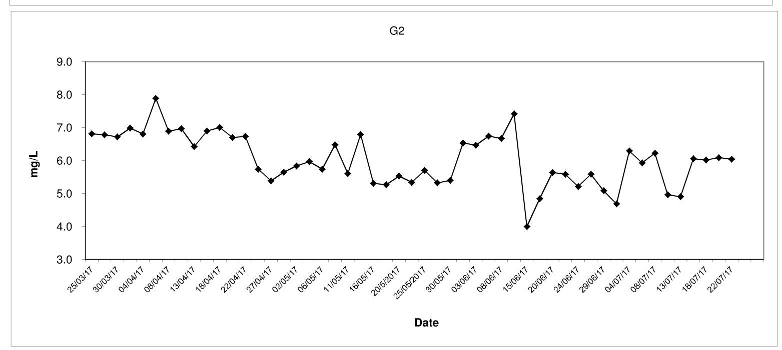




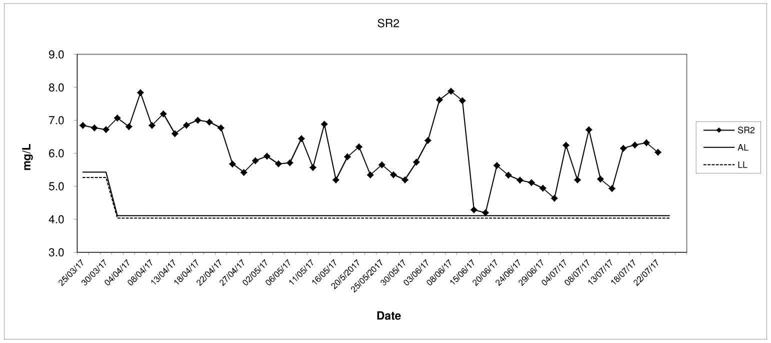
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

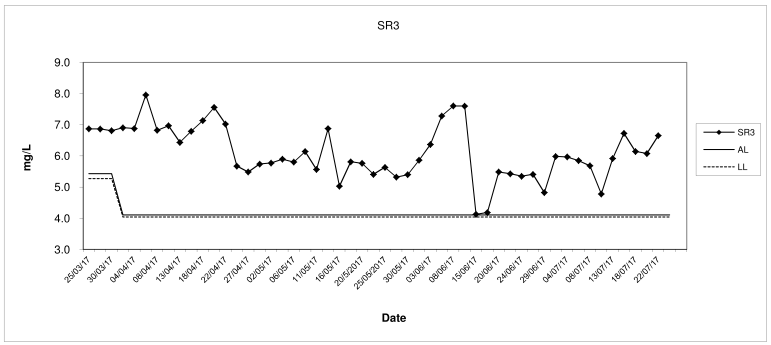


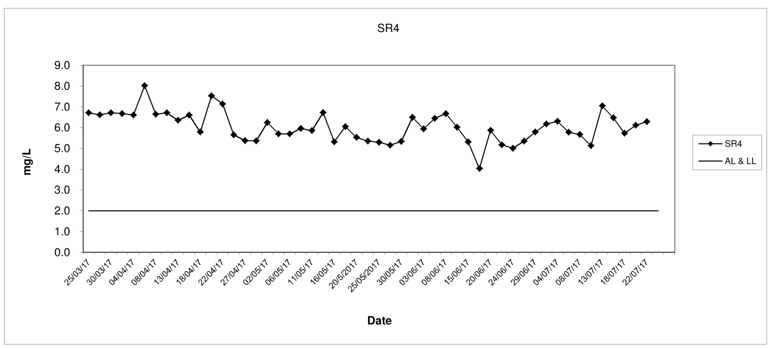




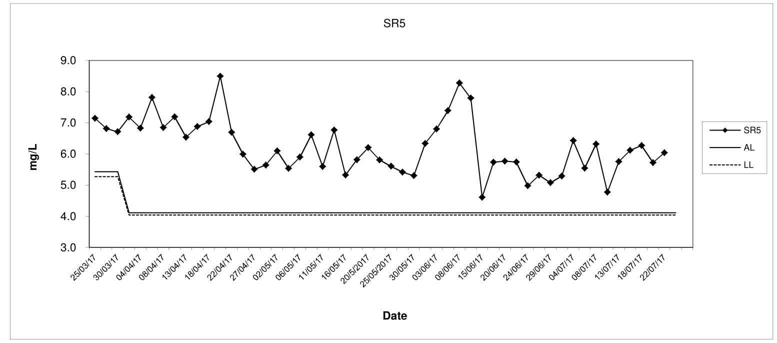
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

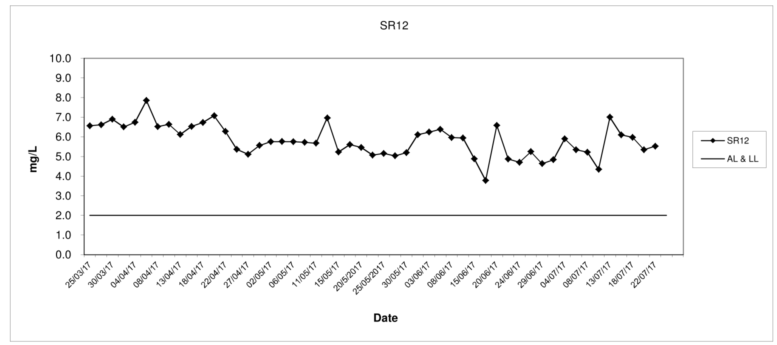


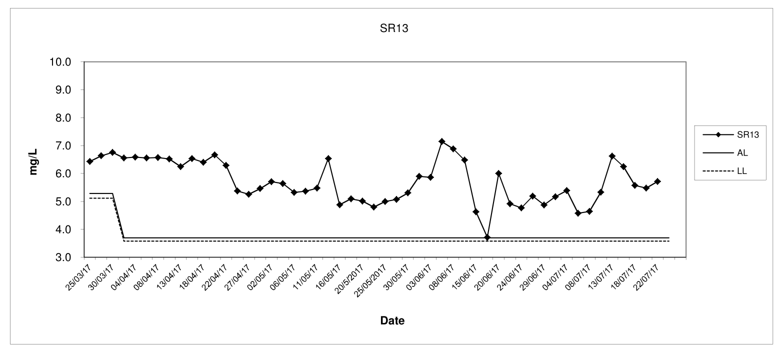




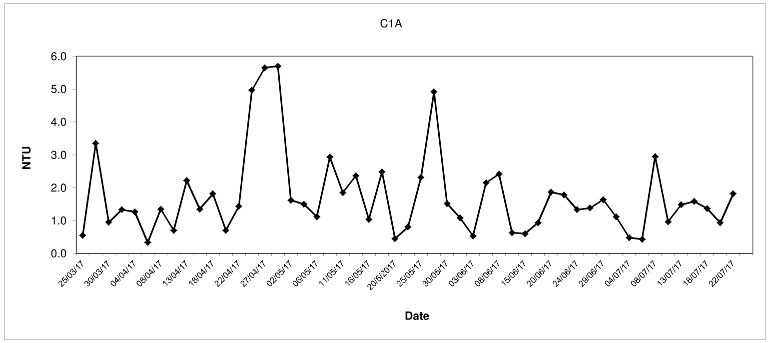
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

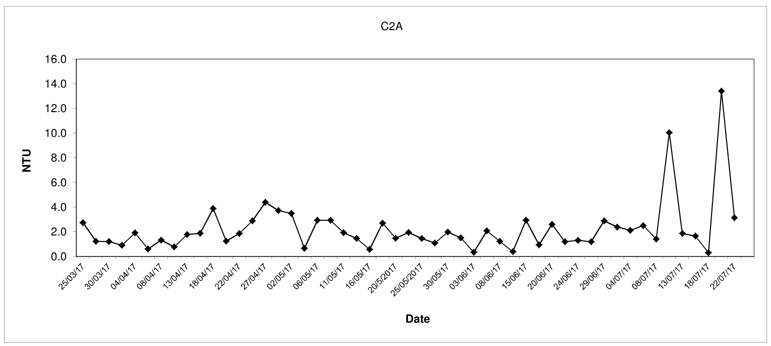


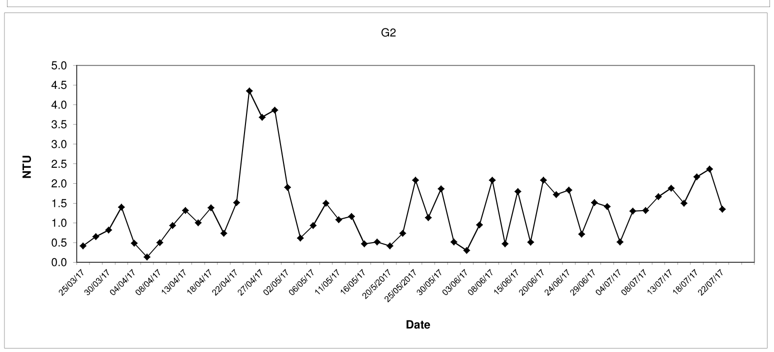




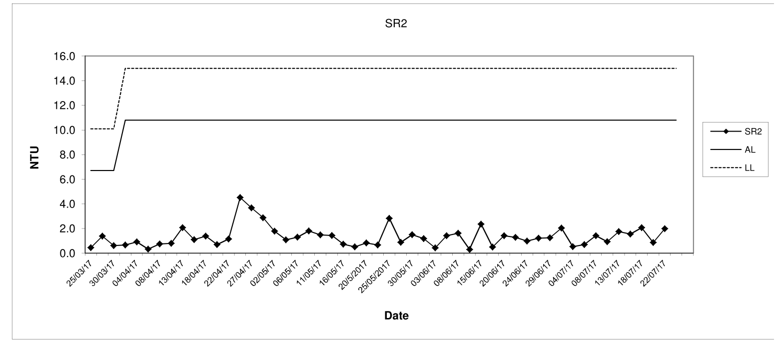
Turbidity (Depth average) at Mid-Ebb Tide

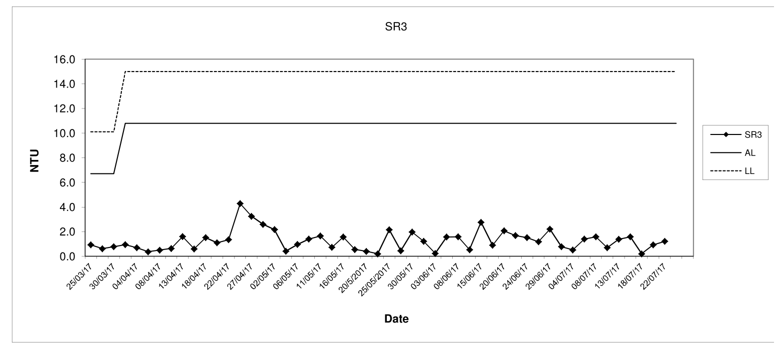


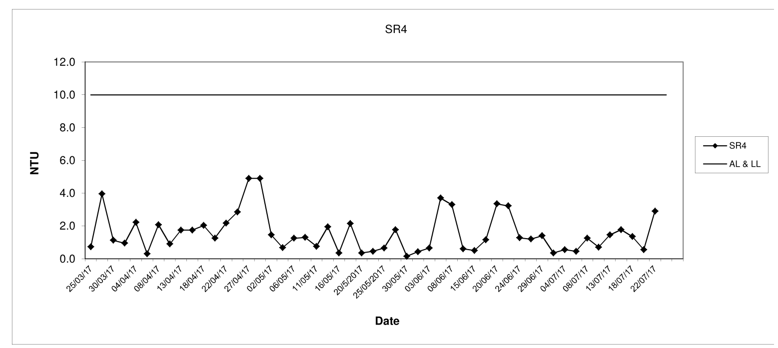




Turbidity (Depth average) at Mid-Ebb Tide

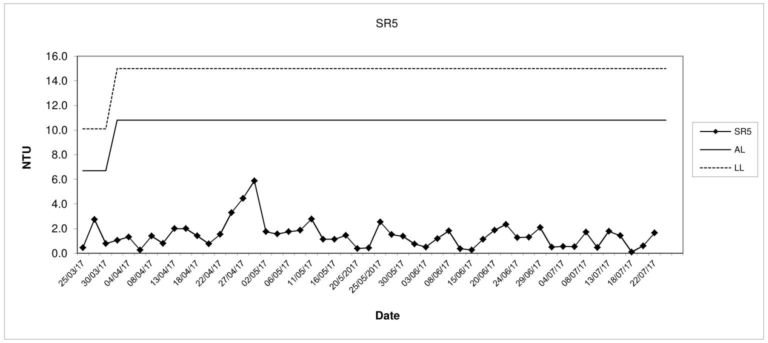


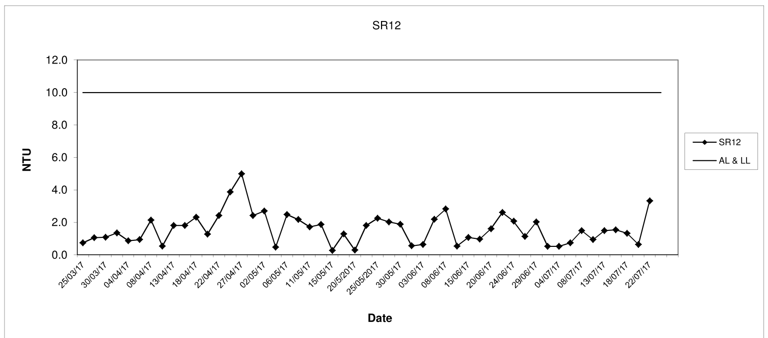


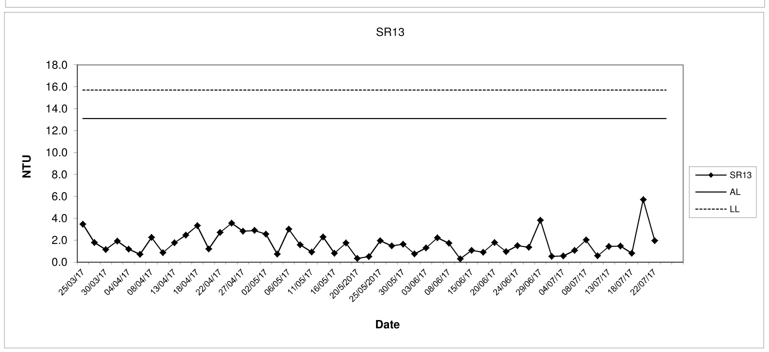


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

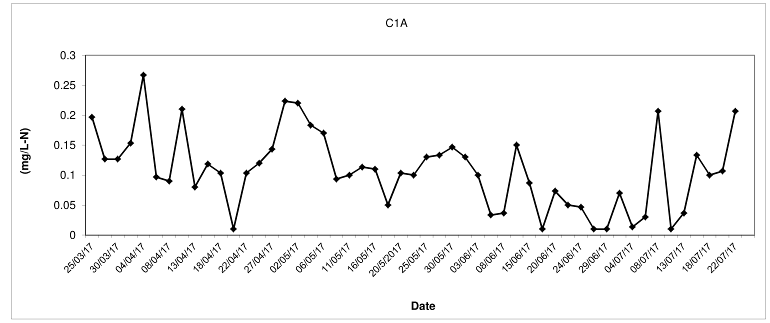
Turbidity (Depth average) at Mid-Ebb Tide

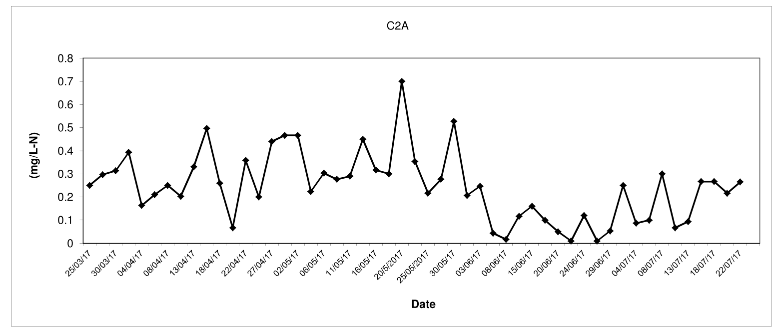


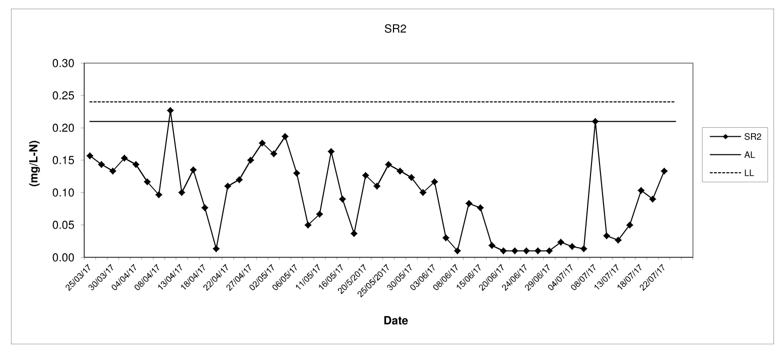




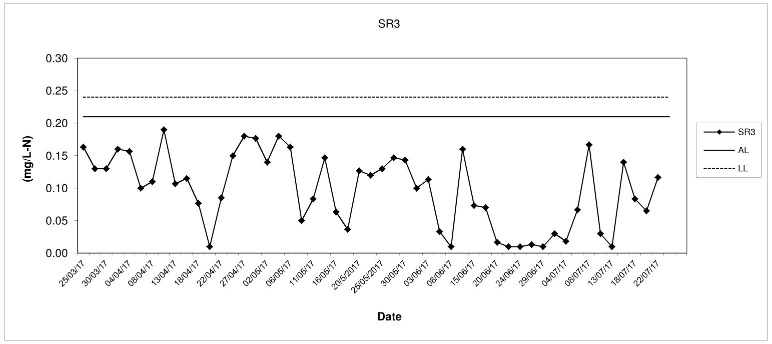
In-situ Ammonia (Depth average) at Mid-Ebb Tide

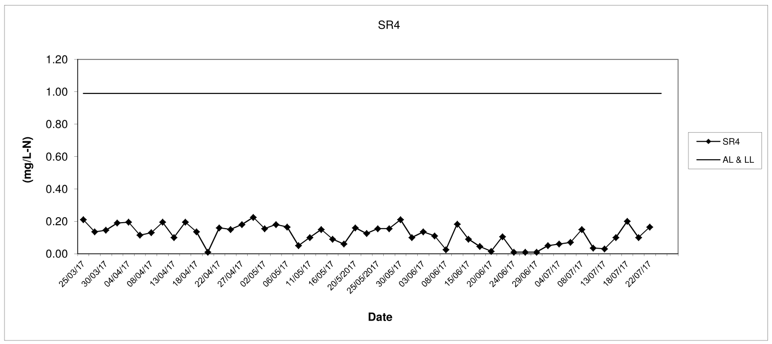


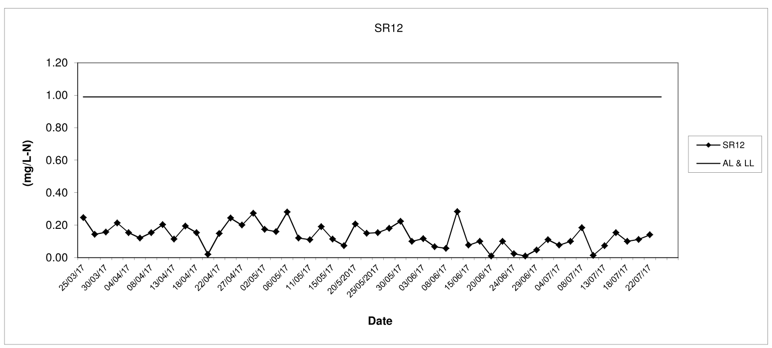




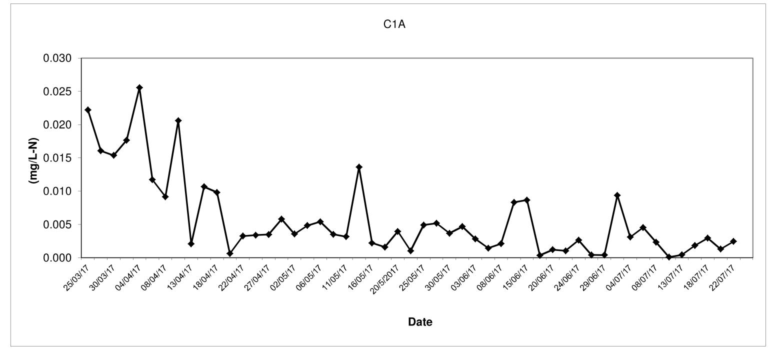
In-situ Ammonia (Depth average) at Mid-Ebb Tide

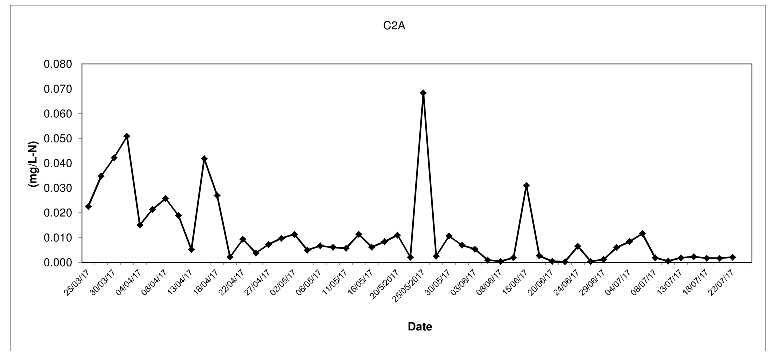


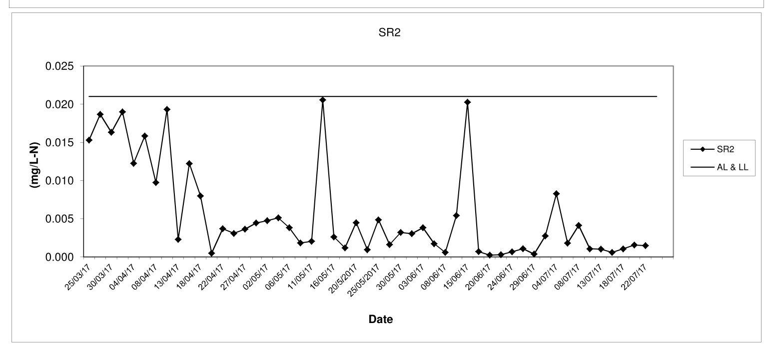




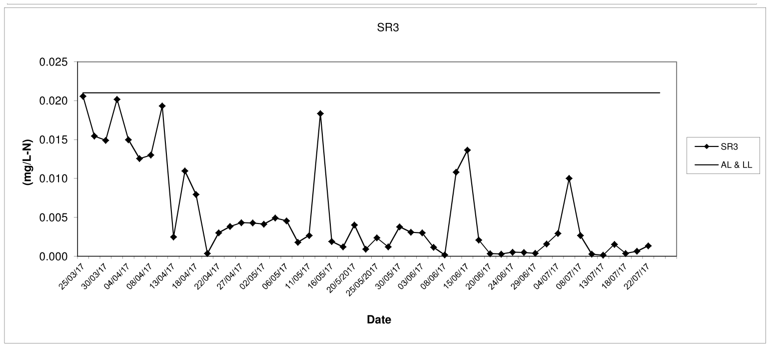
In-situ UIA (Depth average) at Mid-Ebb Tide

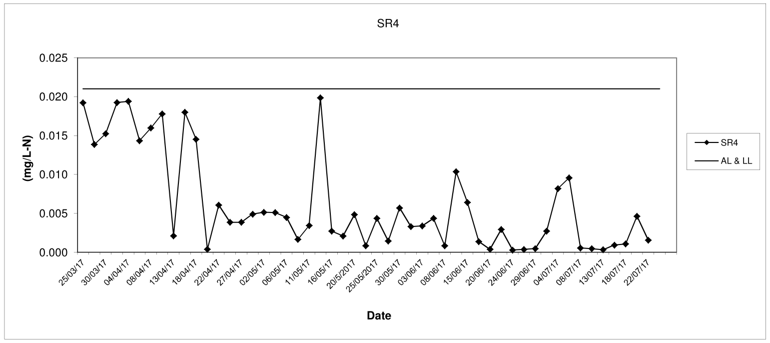


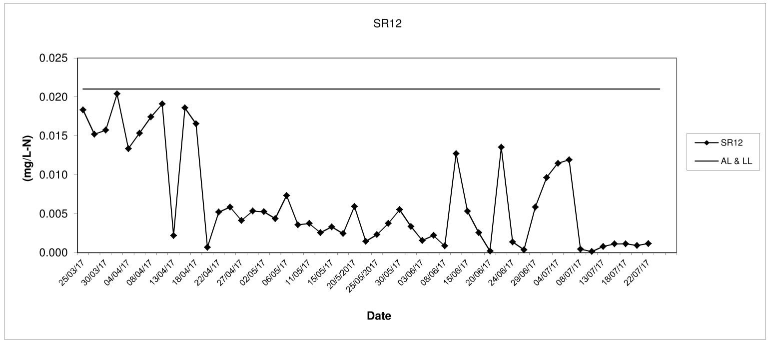




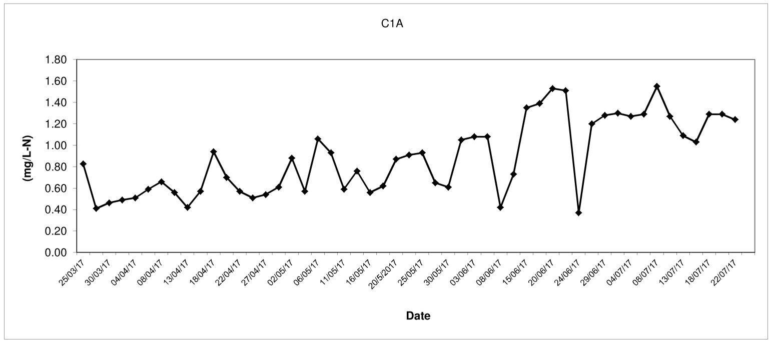
In-situ UIA (Depth average) at Mid-Ebb Tide

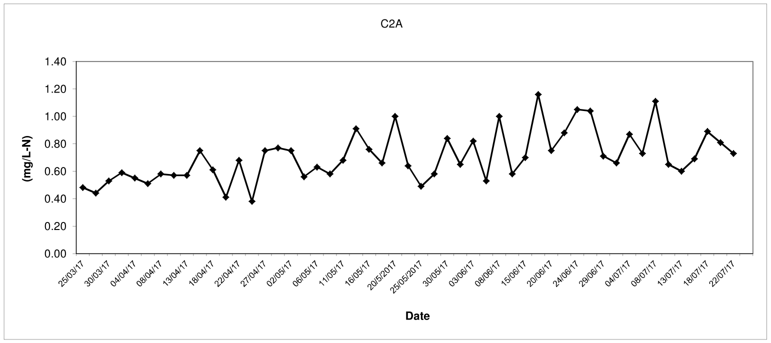


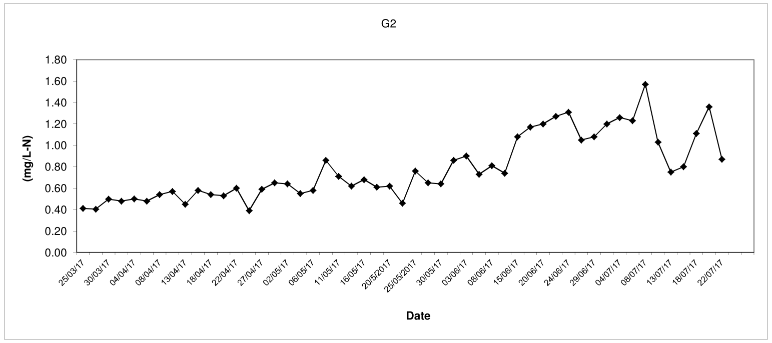




In-situ TIN (Depth average) at Mid-Ebb Tide

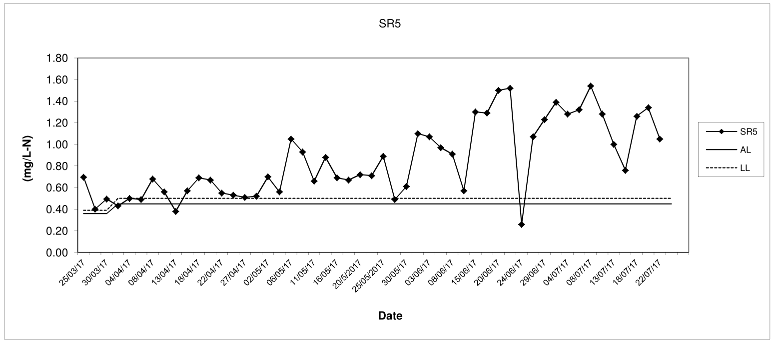




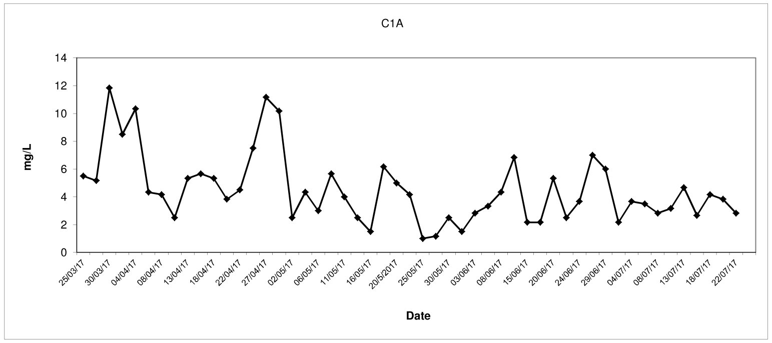


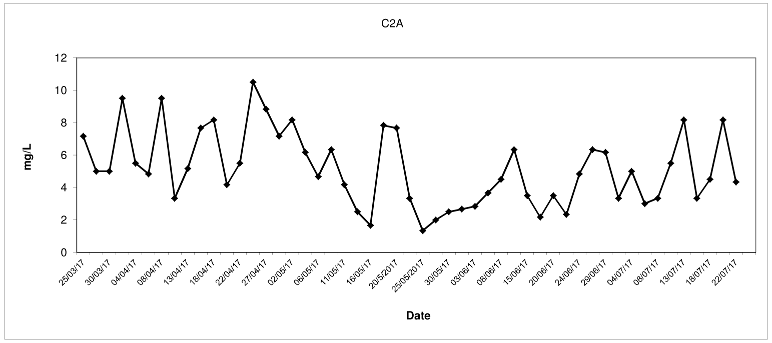
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

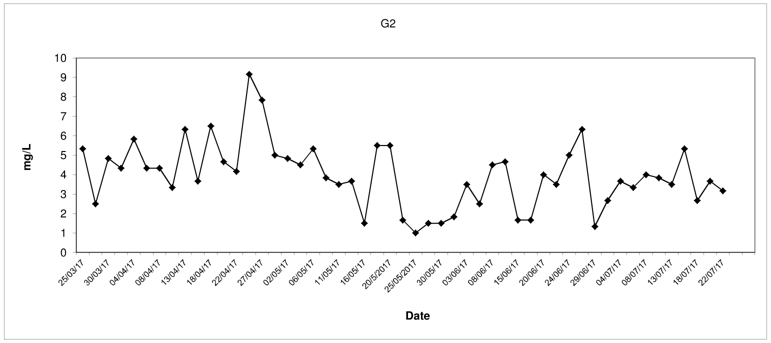
In-situ TIN (Depth average) at Mid-Ebb Tide



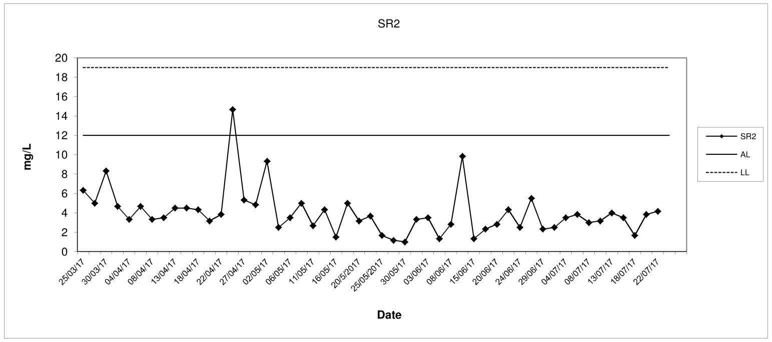
Total Suspended Solids (Depth average) at Mid-Ebb Tide

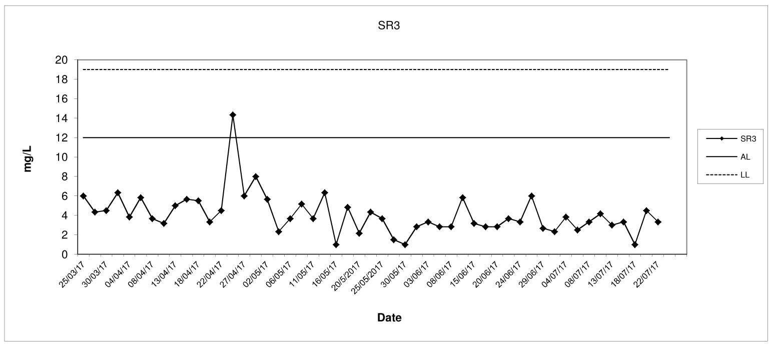


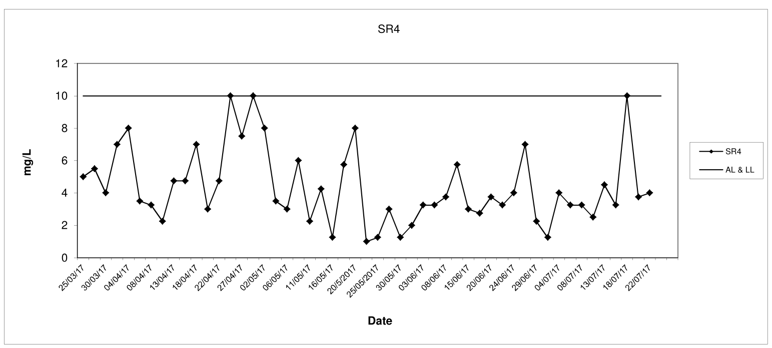




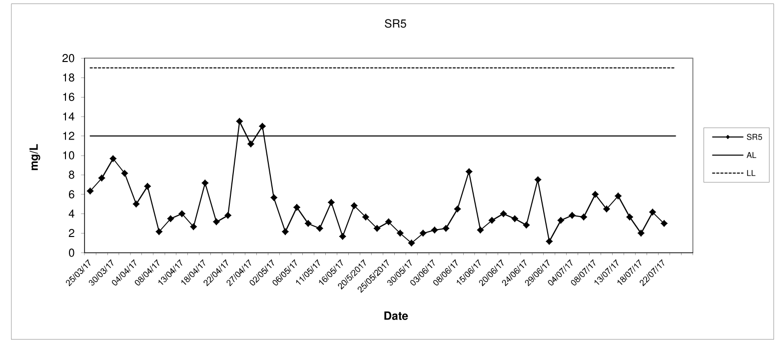
Total Suspended Solids (Depth average) at Mid-Ebb Tide

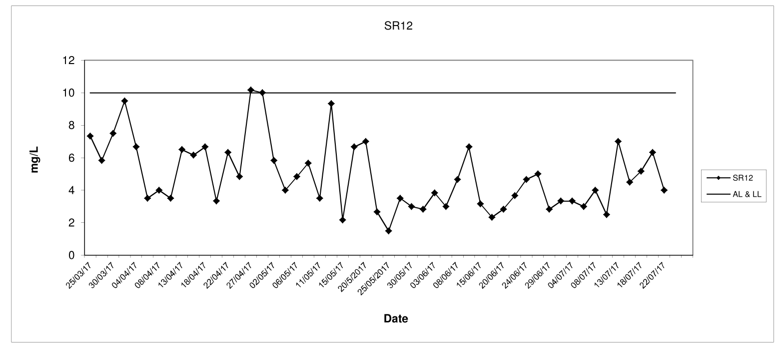


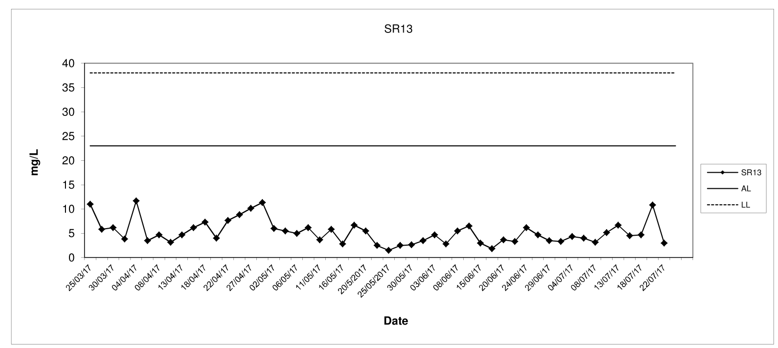




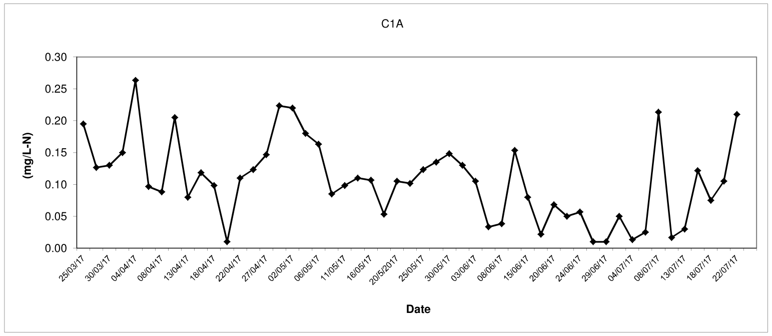
Total Suspended Solids (Depth average) at Mid-Ebb Tide

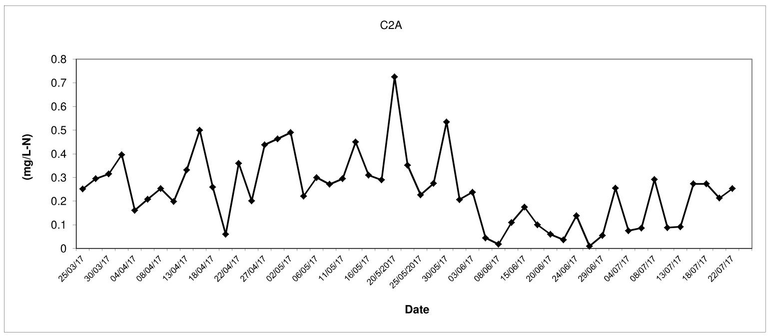


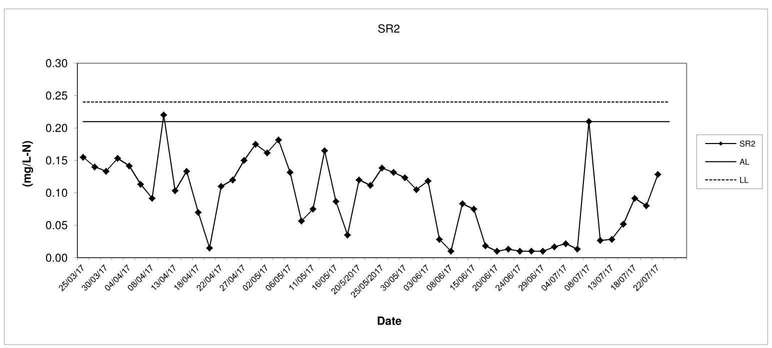




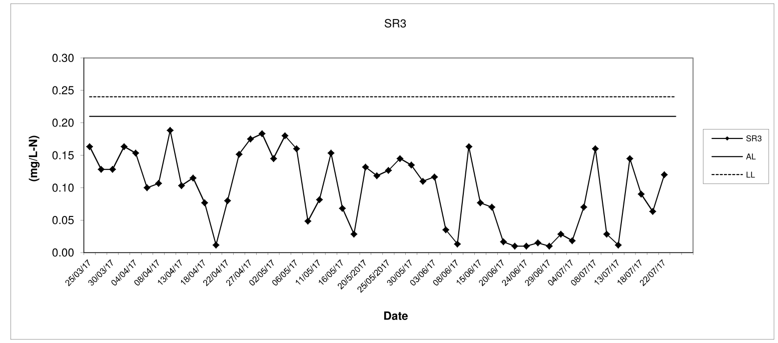
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

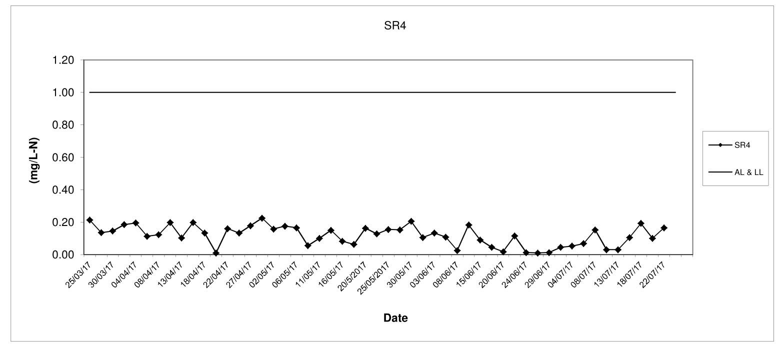


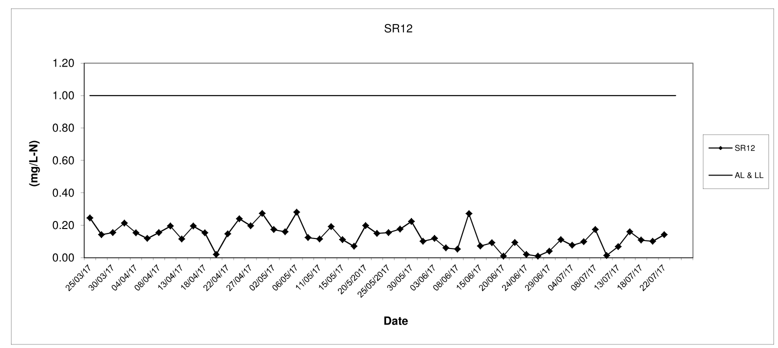




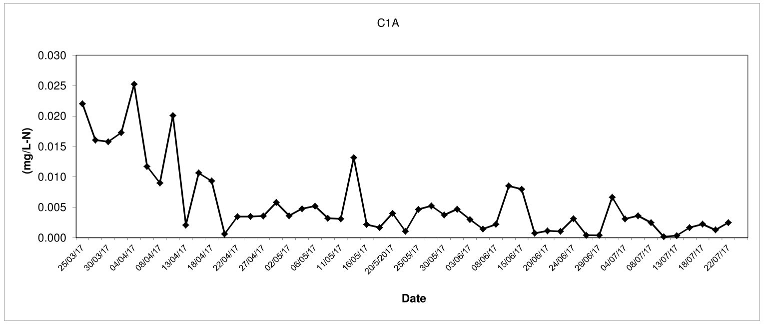
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

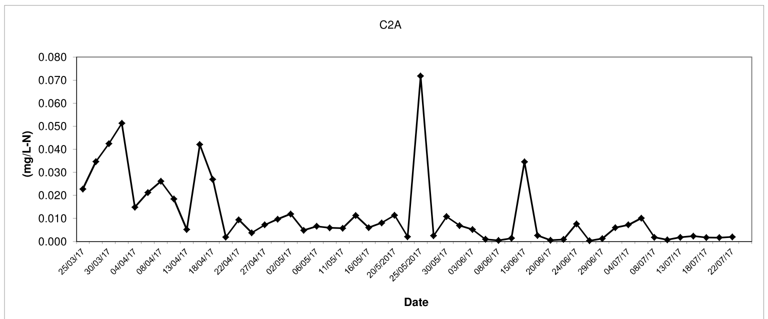


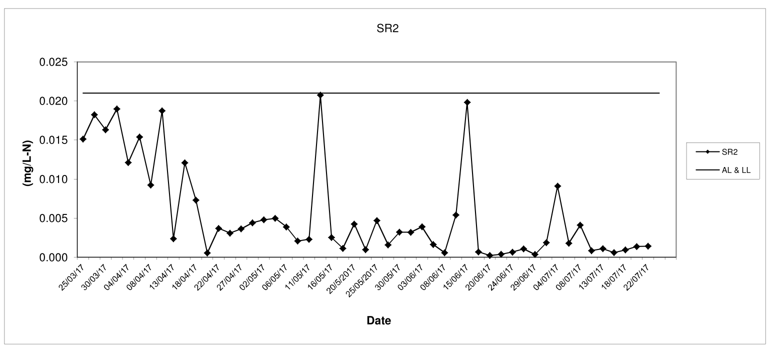




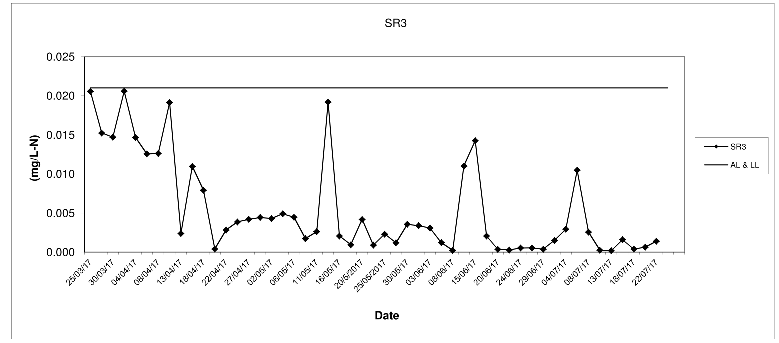
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

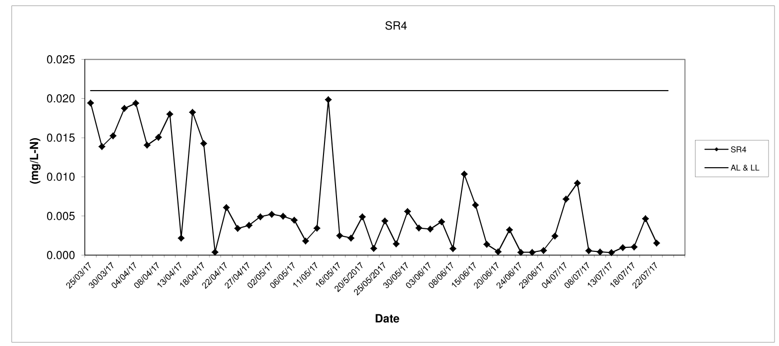


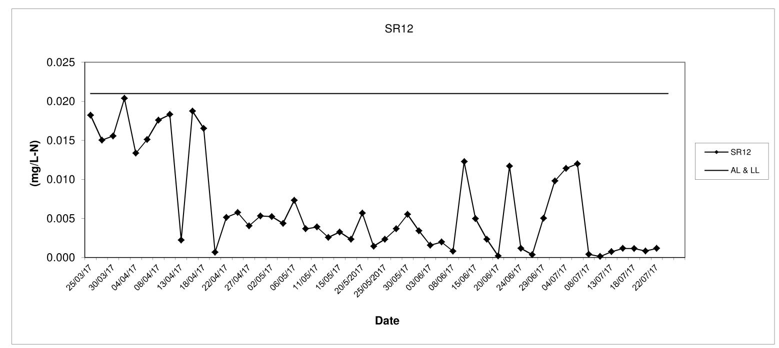




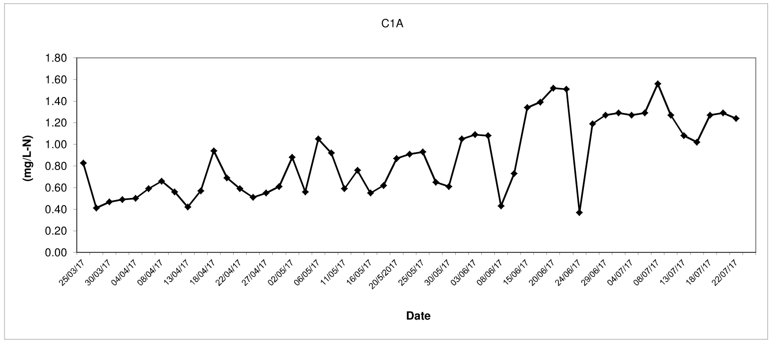
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

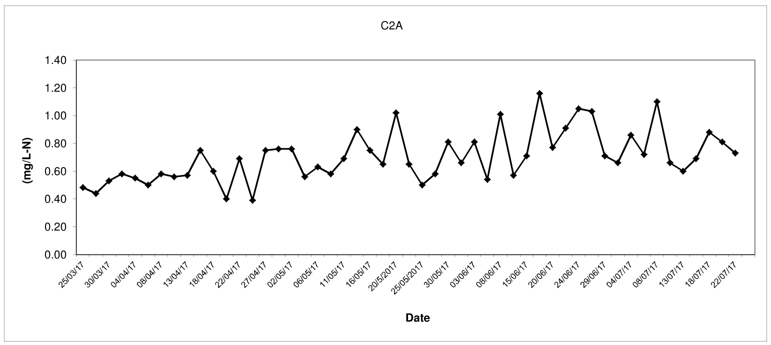


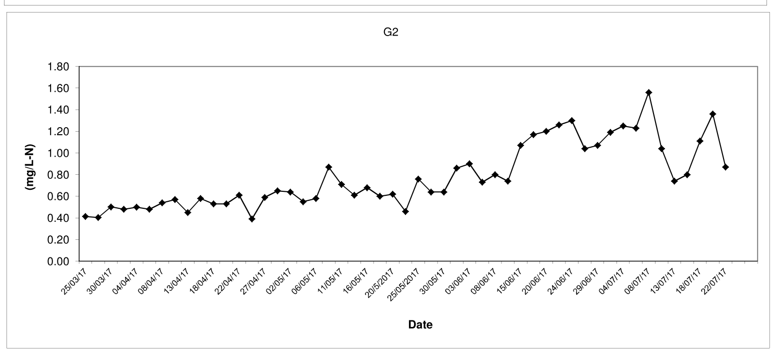




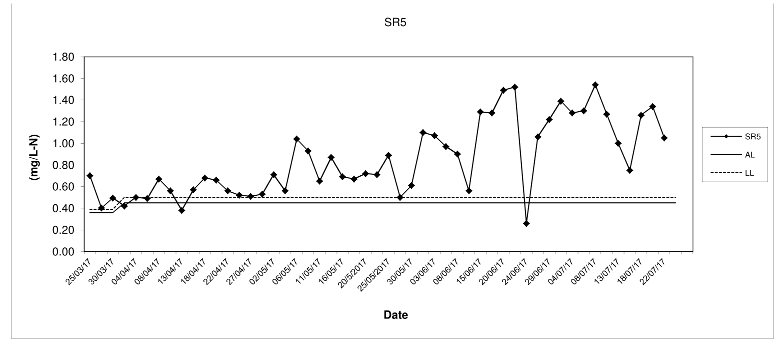
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide





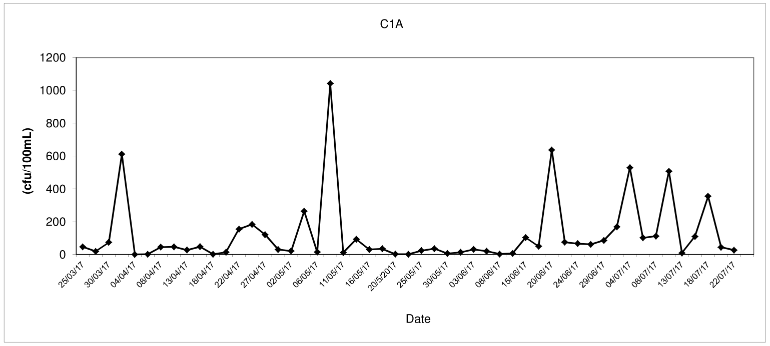


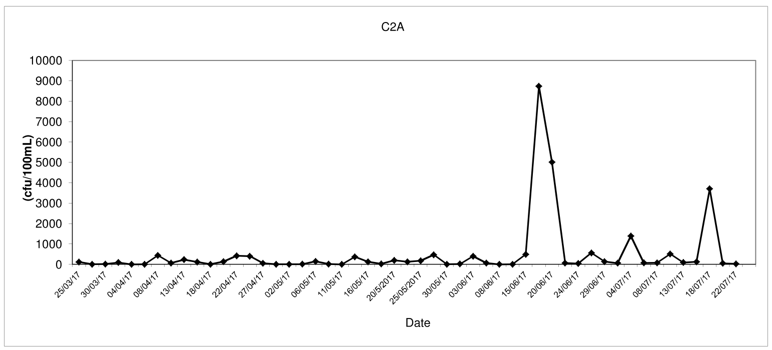
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

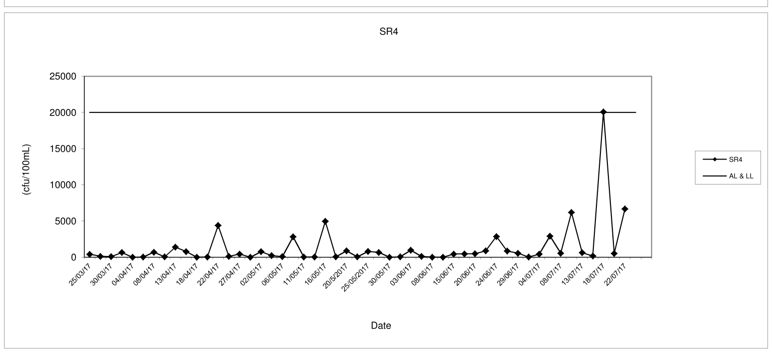


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

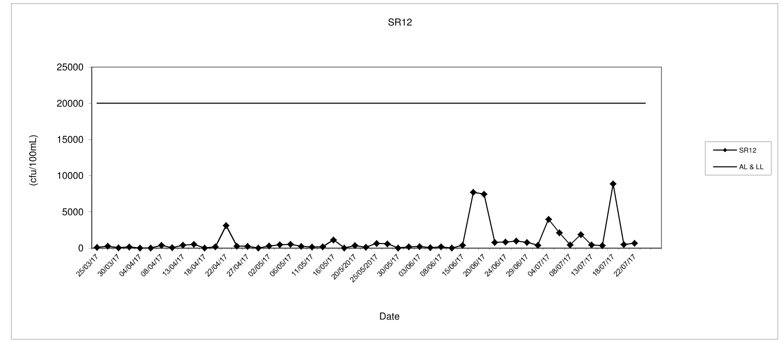
E.coli (Depth average) at Mid-Ebb Tide



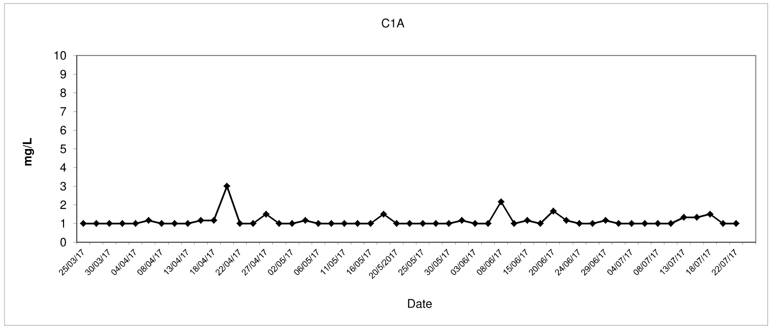


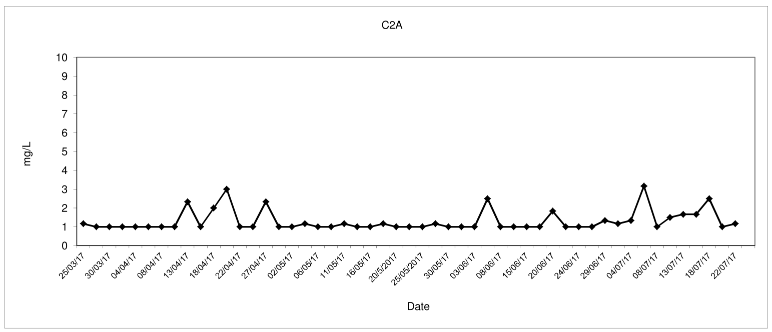


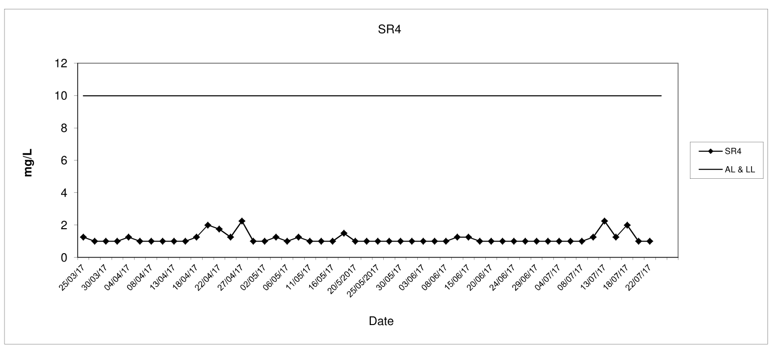
E.coli (Depth average) at Mid-Ebb Tide



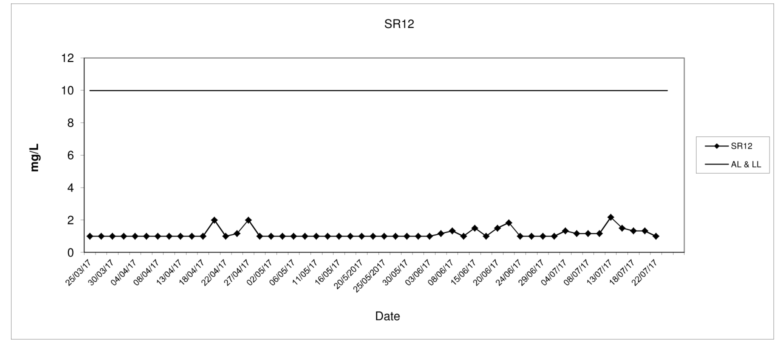
BOD$_5$ (Depth average) at Mid-Ebb Tide



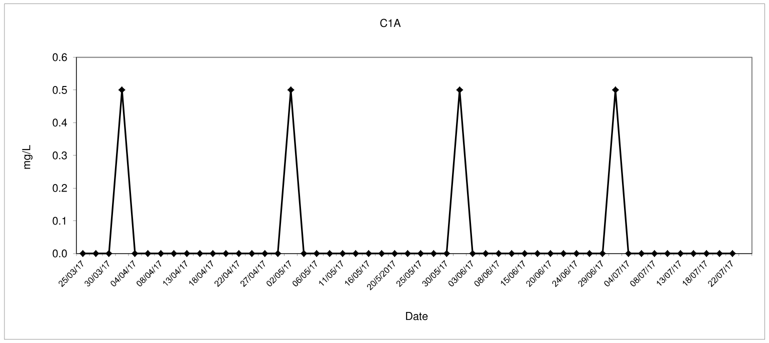


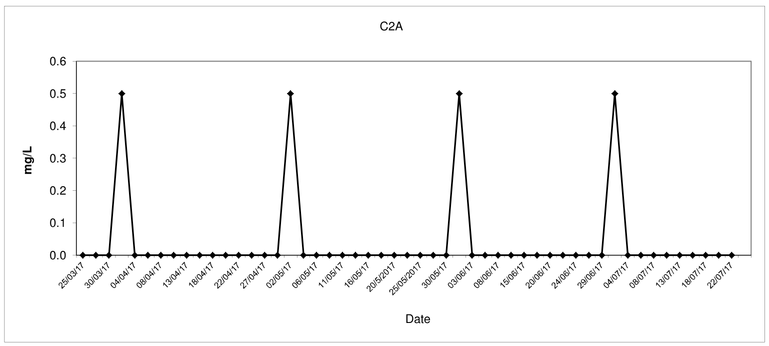


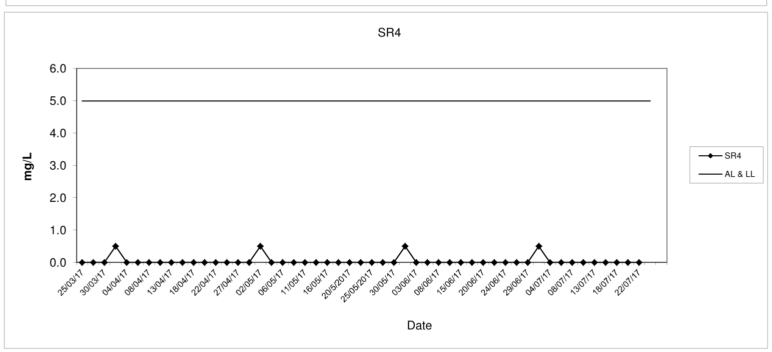
BOD$_5$ (Depth average) at Mid-Ebb Tide



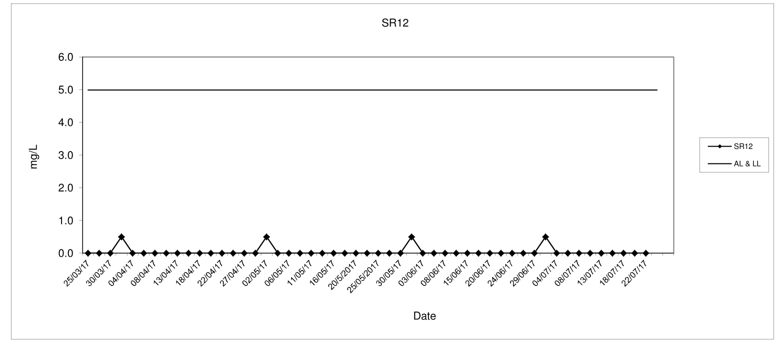
Synthetic Detergent (Depth average) at Mid-Ebb Tide







Synthetic Detergent (Depth average) at Mid-Ebb Tide



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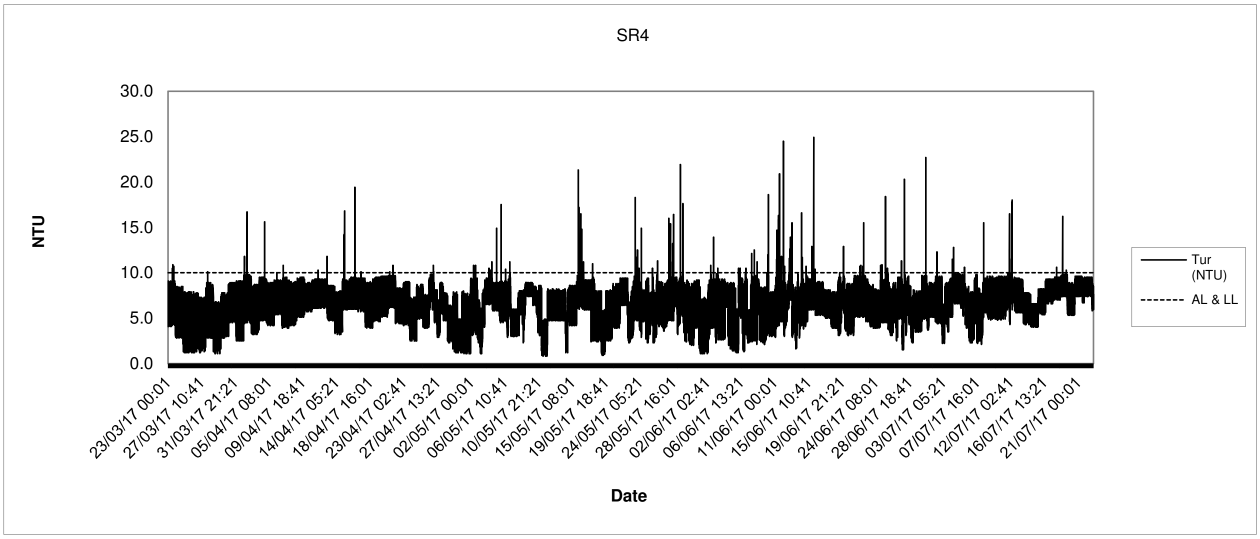
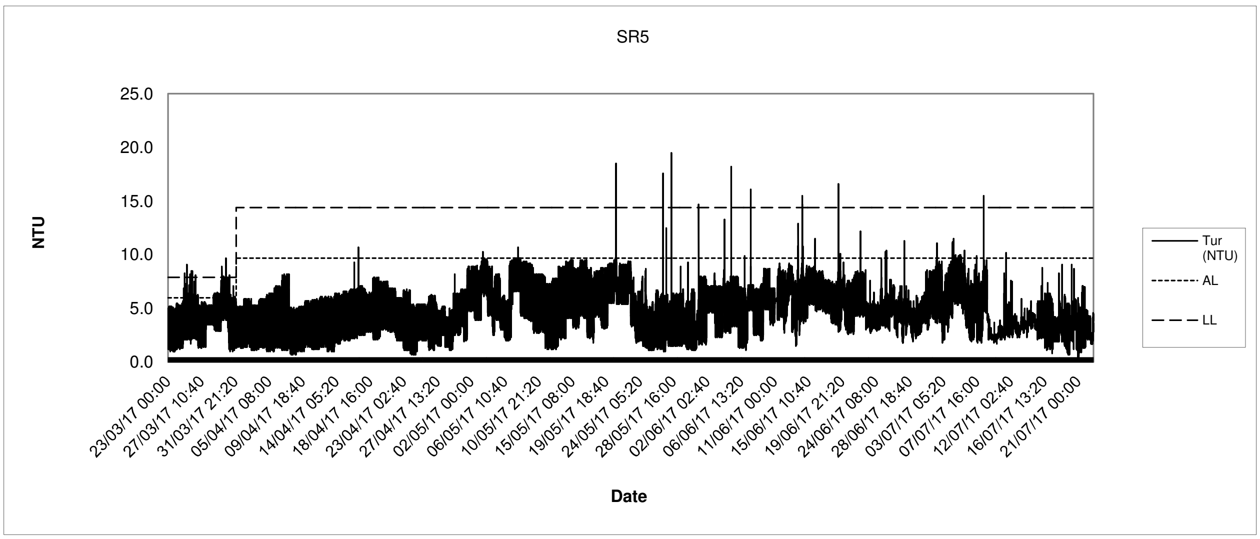
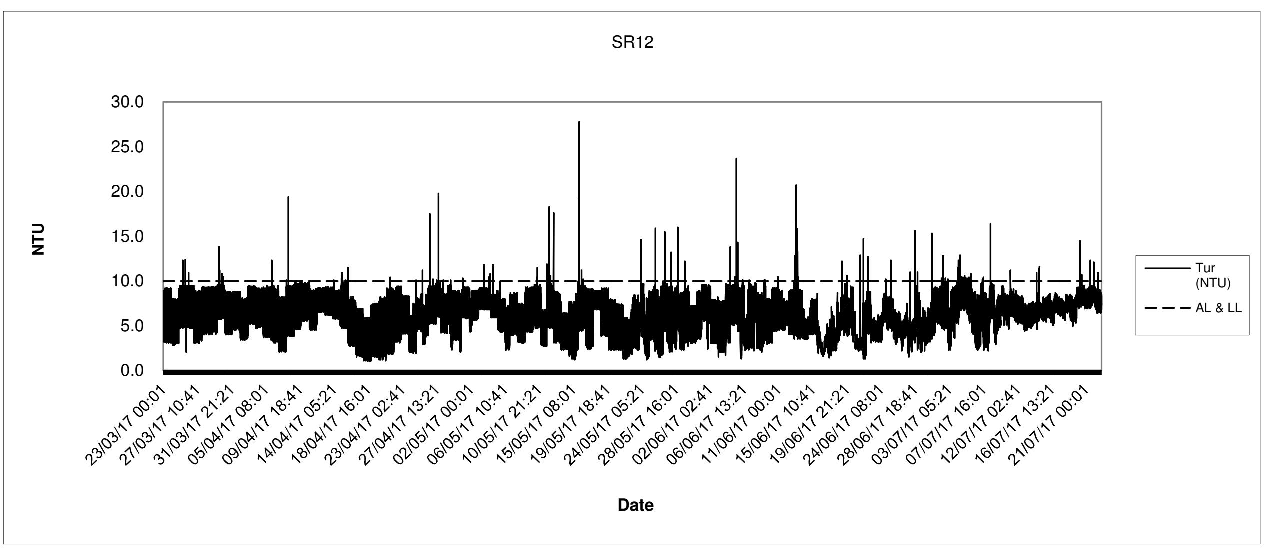
Appendix E

Graphical Presentation – 24-hr Monitoring Results

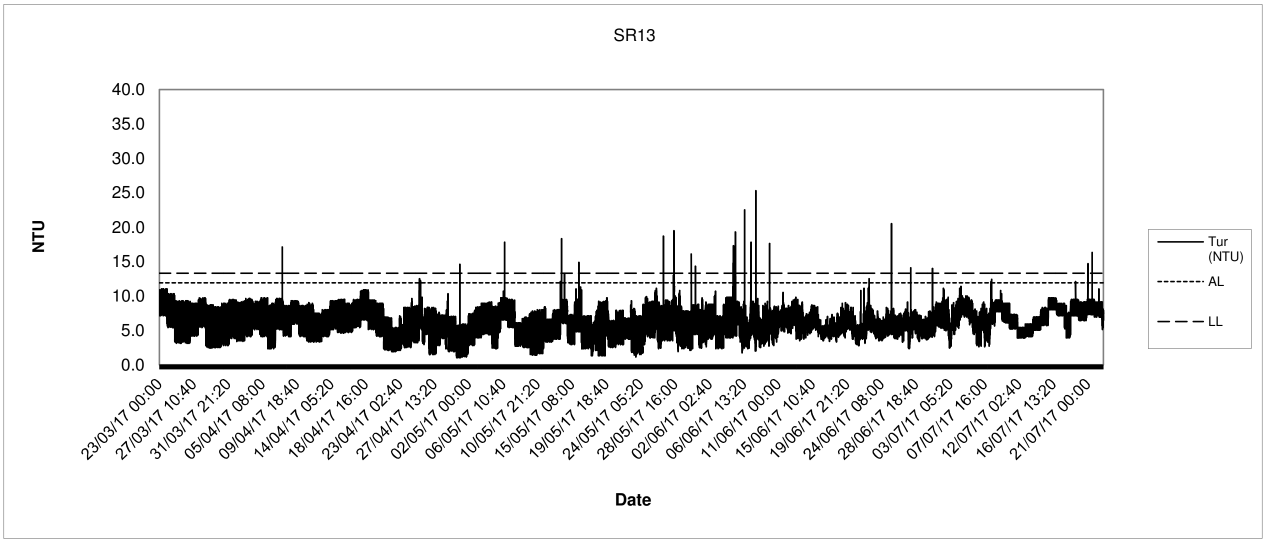
Turbidity
24-hr Water Quality Monitoring



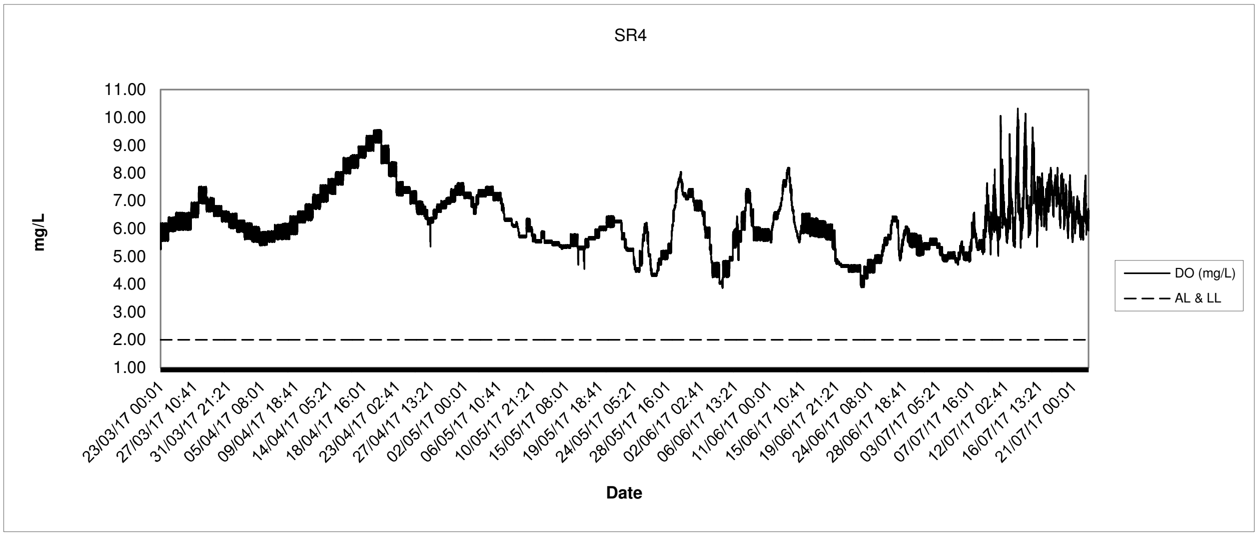


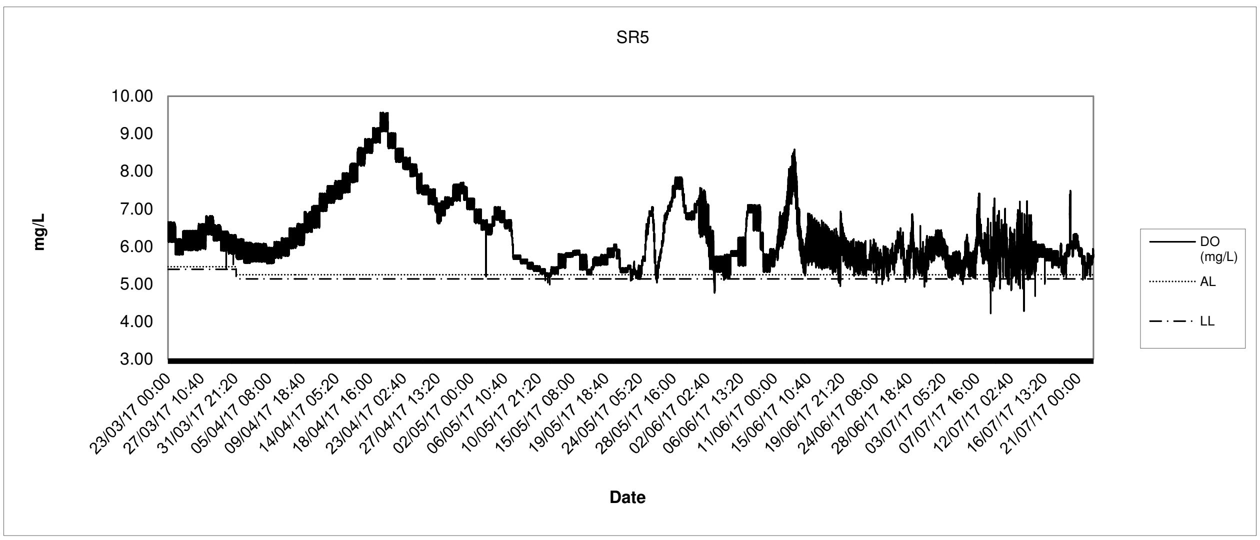


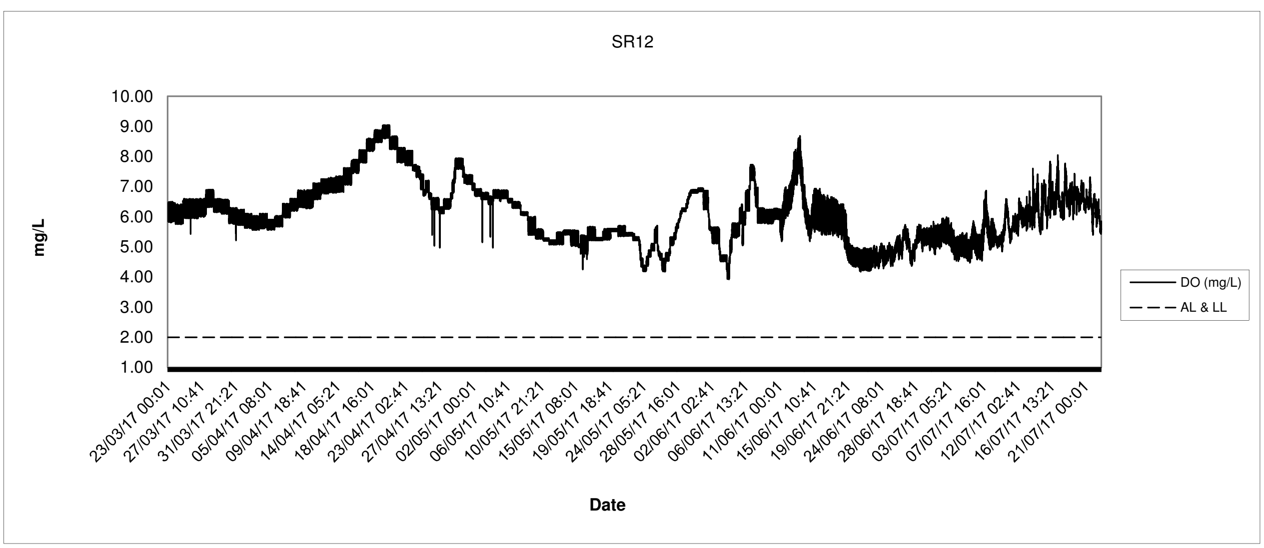
Turbidity
24-hr Water Quality Monitoring



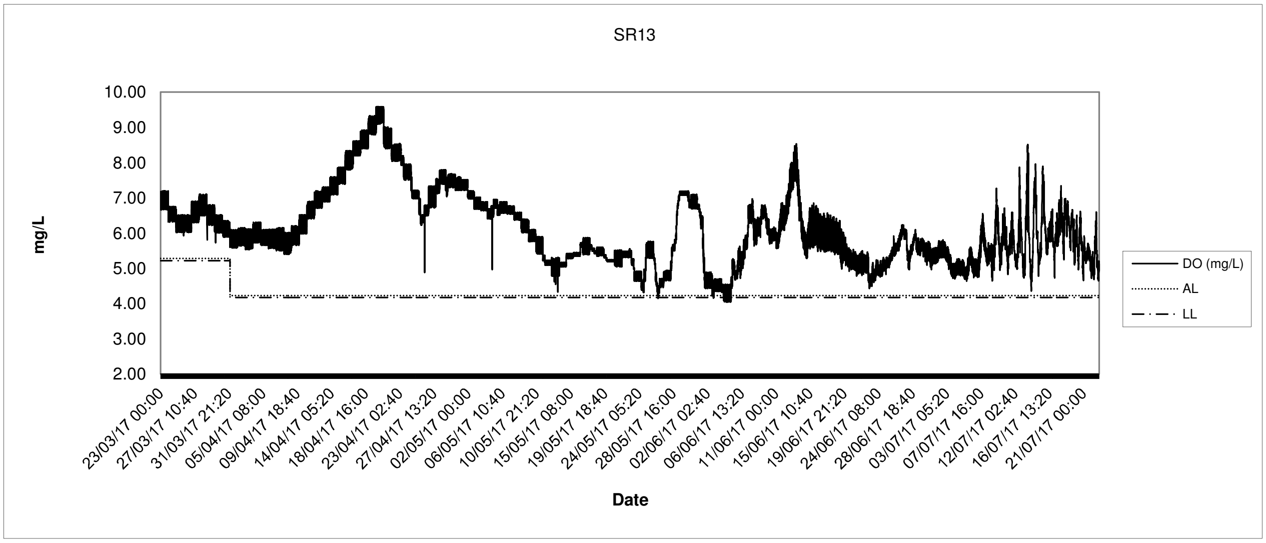
Dissolved Oxygen
24-hr Water Quality Monitoring



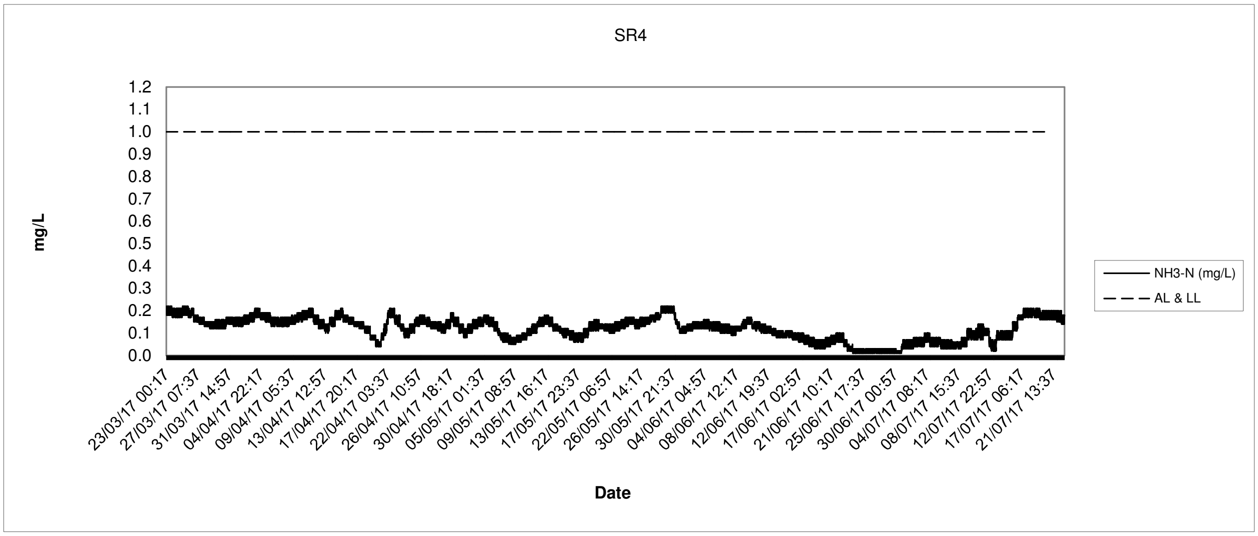


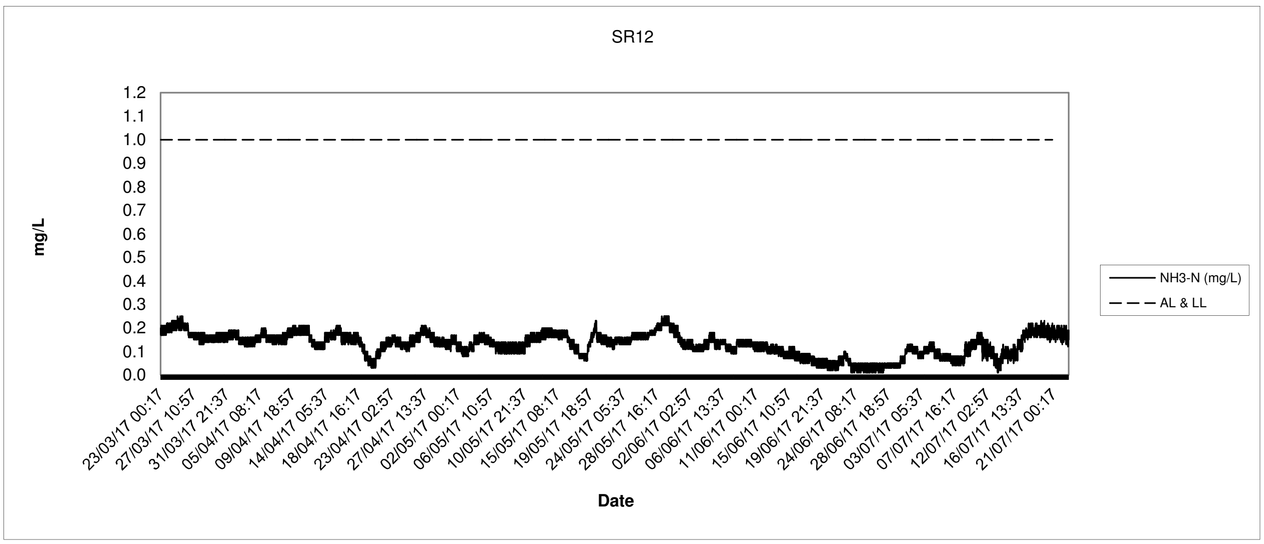


Dissolved Oxygen
24-hr Water Quality Monitoring



Ammonia-N
24-hr Water Quality Monitoring





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Appendix F

Environmental Mitigation Implementation Schedule

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
		A	Water Quality					
3.8	2.9		<u>Use of Silt Screens</u>	Minimize the effect of potential increase in SS levels at the seawater intakes	Contractor	WSD8, WSD9 and EMSD1	Construction Phase	
		A1	Silt Screens shall be installed at the flushing water intakes WSRs WSD1, WSD8~~, WSD9~~ and EMSD1 to minimise the effect of potential increase in SS levels at the seawater intakes.					Implemented
3.8	2.9		<u>Use of Silt Curtains</u>	Minimize the release of suspended soil from the dredging area	Contractor	Construction Work Sites	Construction Phase	
		A2	To minimize the potential SS impact from dredging, deployment of silt curtains around the grab dredgers is recommended; and Before commencement of dredging works, the holder of the Environmental Permit shall submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval.					Implemented
3.10	2.9	A3	Water Quality Monitoring Program	Perform water quality monitoring at sensitive receivers during construction phase	ET	Monitoring Locations as stated in Table 2.1 of the EM&A Manual	Construction Phase	
			Water quality monitoring shall be carried out in accordance with Section 2 of the Environmental Monitoring and Audit (EM&A) Manual. Event and Action Plan (EAP) for water quality shall be followed in case of any exceedance in action and limit level.					Implemented
3.8 (EP Ref 3)	-		Dredging Operation	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A4	Only two types of dredgers are allowed for this Project: (a) grab dredger with closed grab, and (b) ~~cutter suction dredger~~ spud pole grab dredger.					Implemented
		A5	The speed of any construction vessels shall not exceed 10 knots when passing through the area of the Project.					Implemented
		A6	No more than ~~three~~ two grab dredgers with closed grab ~~(or one cutter suction dredger with two closed grab dredgers)~~ shall be operated within the Project Area at any one time for the Project.					Implemented
		A7	Only one closed grab dredger ~~or one cutter suction dredger~~ shall be operated in Zone 2B and during which no other closed grab dredger shall be allowed in other zones within the Project Area.					Implemented
		A8	No more than one grab dredger with closed grab ~~(or one cutter suction dredger)~~ shall be operated within each of the five main zones at any one time for the ~~Project in which the cutter suction dredger shall only be operated in Zones 2 and 4 with maximum dredging rate of 700 m³ in 30 minutes in any given hour (max. 8,400 m³/day, based on a 12-hour operation per day)~~.					Implemented
		A9	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 1 to 2 (subzones Z1A, Z1B, Z2A, Z2B and Z2C) shall follow the Dredging Plan for the Hotspot, as shown in EP-426/2011/A.					Implemented
		A10	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 3 to 4 (subzones Z3A to Z4B) shall not exceed 1,600 m³ per day during dry season or 3,440 m³ per day during wet season as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A11	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 6 (subzones Z5A, Z5B and Z6A) shall not exceed 4,000 m³ per					NA-Dredging works

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			day during both dry and wet seasons as shown in EP-426/2011/A.					substantially completed
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 8 (subzones Z5C, Z6B, Z6C, Z6D, Z7 and Z8) shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A13	The maximum dredging rate for closed grab dredger at Northern Fairway – Zones 9 to 12 shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A14	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13A shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A15	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13B shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A16	~~The dredging pump of cutter suction dredger shall be operated during cutting to reduce the sediment loss to water body.~~					NA-no CSD employed
		A17	Project dredging works within Zone 1 to 6 (including sub-zones) of the Container Basin shall not be carried out at the same time with Terminal Operator's maintenance dredging activities.					NA-No Terminal Operator's maintenance dredging carried out
		A18	~~Cutter suction dredger is only to be deployed for the removal of harder material during daytime only (07:00 to 19:00) in Zone 2 (including subzones) of the Container Basin.~~					NA-no CSD employed
		A19	In case of rainstorm warning in effect during dredging works, the dredged material on barge shall be covered properly before transportation to disposal site.					Implemented
		A20	In case of exceedance of SS and NH3-N at the Tsing Yi WSD flushing intake due to dredging operation is evidenced, the Contractor shall propose mitigation measures not limited to reducing dredging rate. If exceedance persists, the Contractor shall propose not to undertake dredging operation in close proximity to the Tsing Yi flushing water intake during flood tide. The Contractor shall liaise with the ETL, IEC, ER, EPD and WSD for the proposed mitigation measures.					NA-no exceedance due to dredging operation
		A21	If further mitigation measures are required due to continuous exceedance of SS and NH_3-N, consideration shall then be given to dredge only on the state of the tide which would avoid migration of SS towards the WSD and EMSD intakes.					NA-no exceedance due to dredging operation
		A22	Dredging sub-zone Z2B where high NH_3-N in sediment is found shall be					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			isolated with dredging works to be carried out towards the end of construction programme.					
		A23	Administrative control in terms of dredging rate adjustment in controlling the release of contaminants shall be employed as mitigation measures.					Implemented
		A24	Field trials shall be carried out to propose the most effective dredging process and rate to control the release of ammoniacal nitrogen and UIA into the water column and achieve compliance at the WSD1 seawater intake (NH_3-N) and at the beaches for UIA. Capital dredging works in dredging sub-zone Z2B (Figure 1.2h refers) should not therefore be carried out until the proposed method and rate are confirmed.					Implemented
		A25	Detailed dredging plan shall be prepared providing details of individual dredging subzones and dredging rate taking into account of the field trial results.					Implemented
3.8	-		Other Good Site Practices for Dredging	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A26	All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.					Implemented
		A27	The speed of all Contractor's vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments.					Implemented
		A28	All barges / dredgers used should be fitted with tight fitting seals to their bottom openings to prevent leakage of material.					Implemented
		A29	Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds.					Implemented
		A30	No overflow of dredged mud should be allowed. Barges or hopper should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.					Implemented
		B	**Waste Management**					
			<u>Good Site Practices</u>	Minimize potential adverse effect arising from the handling of dredged material	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B1	Obtain the profile of different sediment categories and careful planning of sediment removal.					Implemented
		B2	Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.					Implemented
		B3	Training of site personnel in proper waste management and chemical handling procedures.					Implemented
		B4	Provision of sufficient waste disposal points and regular collection of waste.					Implemented
		B5	Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting sediment material is not anticipated.					Implemented
		B6	Use well maintained PME on site.					Implemented
			<u>General Refuse</u>	Minimize the adverse effect arising from the handling of site general refuse	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B7	General refuse should be stored in enclosed bins. A reputable waste collector should be employed by the contractor to remove general refuse from the site.					Implemented

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			Chemical Waste	Minimize the adverse effect arising from the handling of site chemical waste	Contractor	Construction Work Site	Construction Phase	
4.5	3.3	B8	If chemical wastes are produced at the construction site, the Contractor shall be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals should be stored separately. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					Implemented
4.5	3.3		Marine Dredged Sediment	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality	Contractor	Construction Work Site	Construction Phase	
		B9	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality.					Implemented
		B10	Bottom opening of barges will be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved.					Implemented
		B11	Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the EPD.					Implemented
		B12	Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.					Implemented
		B13	Sediment Quality Report shall be prepared and submit to EPD under DASO.					Implemented
		B14	If disposal of Type 3 sediment is identified, agreement with EPD shall be reached regarding the treatment of sediment before disposal.					NA – no type 3 material disposed
		B15	Project works shall not be carried out before obtaining confirmation from MFC on disposal option.					Implemented
		B16	Follow strictly all conditions stipulated in the dumping permit.					Implemented
		C	**Marine Ecology**	Review and assess the potential adverse effect on marine ecology	Contractor	Construction Work Sites	Construction Phase	
5.7	4.1	C1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to marine ecology due to dredging operation.					Implemented
		D	**Fisheries**	Review and assess the potential adverse effect on fisheries	Contractor	Construction Work Sites	Construction Phase	
6.7	5.1	D1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to fisheries due to dredging operation.					Implemented
		E	**Hazard to Life**		Contractor	Construction Work Sites (General)	Construction Phase	
7.8.2	6.2	E1	Sound communication channel shall be established with the oil companies, Marine Department, and Fire Services Department for effective notification and emergency evacuation in case of accidents.					Implemented
		E2	Proper safety and emergency training shall be given to the relevant					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			operation staff at the dredging site. Emergency plans and procedures should be prepared and drills should be performed periodically.					
		F	**Landscape Visual and Glare**	Minimize landscape and visual impacts during construction phase	Contractor	Construction activities' area	Throughout design, construction phase	
8.9 Table 8-3 & 8-6	7.2	F1	Visa shields to the lights of dredgers shall be provided.					Implemented
		F2	The light source shall not point directly to any VSRs.					Implemented
		F3	Lights shall be switched off if they are not in use.					Implemented
		G	**Cultural Heritage**	Minimize potential marine archaeological impact during dredging activities	Contractor	Locations of the 20 unidentified sonar contacts and masked areas	During Construction works	
9.5	8		Monitoring Brief					
		G1	A monitoring brief shall be conducted during the dredging. It shall only be required during dredging at the locations of the 20 unidentified sonar contacts and masked areas and does not need to cover all of the dredging activities. Dredging staff should be briefed about the possibility of locating archaeological objects and a marine archaeologist shall be available to monitor the dredged spoil and provide advice. If material indicative of archaeological remains is retrieved, the AMO should be contacted as soon as possible.					NA- no archaeological deposit was found during reporting period.
		H	**Noise**					
10.8	9		Good Site Practices	Control and minimize the generation of undue noise nuisance	Contractor	Construction Work Sites (Along the alignment of dredging	Construction Phase	
		H1	Only well-maintained plant shall be operated on-site and plant should be serviced regularly during the construction program.					Implemented
		H2	Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.					Implemented
		H3	Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from nearby NSRs.					Implemented
		H4	If dredging is to be carried out during restricted hours, work locations close to NSRs shall be avoided.					Implemented
		I	**Construction Dust**					
11.7	10		Dust Control	Good site practice to control dust and odour impact to the nearby sensitive receivers	Contractor	Construction Work Sites (General)	Construction Phase	
		I1	Requirements of the Air Pollution Control (Construction Dust) Regulation, where relevant, shall be adhered to during the construction period.					Implemented
			Odour		Contractor	Construction Work Sites (General)	Construction Phase	
		I2	To minimize potential odour emissions, if dredged sediment is anticipated to be placed on barge for more than a day the load shall be properly covered as far as practicable to minimise the exposed area and potential odour.					NA-no work in such condition
		I3	If dredged sediment is found to be malodorous it shall be removed from site as soon as possible within one hour after the barge being filled up.					NA-no work in such condition

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Appendix G

Waste Generation in Reporting Period

Name of Department : Civil Engineering and Development Department
Contract No. : CV/2013/04

Monthly Summary Waste Flow Table for _2017__ (year)

Year	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
2017	Total Quantity Generated	Broken Concrete (see Note 4)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
Jan	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Feb	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Mar	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Apr	nil	nil	nil	nil	nil	nil	nil	nil	4.8	0.01
May	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jun	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jul	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Aug										
Sep										
Oct										
Nov										
Dec										
Total	nil	nil	nil	nil	nil	nil	nil	nil	4.8	0.07

Notes:
(1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(3) Broken concrete for recycling into aggregates

Yearly Summary Waste Flow Table

Year	Estimated Annual Quantities of Inert C&D Materials (in '000m3)										Estimated Annual of C&D Wastes									
	Total Quantity Generated		Broken Concrete (see Note 3)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Metals		Paper/cardboard packaging		Plastics (see Note 2)		Chemical Waste		Others, e.g. general refuse	
	(a)		(b)		(c)		(d)		(a-b-c-d)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 m3)	
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.
2013	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.003	0.01
2014	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2	0.16
2015	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	13	14.4	0.2	0.12
2016	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	17	Nil	0.2	0.12
2017	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	10	-	0.15	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020																				
2021																				
Grand Total	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	40	14.4	0.753	0.41

Notes:

(1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material

(3) Broken concrete for recycling into aggregates.

Monthly Summary of Sediment Disposal (2014-2017)

Marine Sediment Type	Type 1 – Open Sea Disposal	Type 2 – Confined Marine Disposal	Type 3 – Special Treatment / Disposal
Month	Monthly Quantity (m^3)	Monthly Quantity (m^3)	Monthly Quantity (m^3)
2014			
Jan-Dec	549,430	99,660	nil
2015			
Jan-Dec	938,560	372,370	nil
2016			
January	12,580	22,290	nil
February	47,980	30,300	nil
March	34,550	20,070	nil
April	31,040	14,540	nil
May	23,960	20,490	1,260
June	29,950	26,820	nil
July	9,500	18,040	nil
August	6,300	700	nil
September	nil	nil	nil
October	nil	nil	nil
November	nil	nil	nil
December	nil	nil	nil
2017			
January	nil	nil	nil
February	nil	nil	nil
March	nil	nil	nil
April	nil	3,000	nil
May	nil	5,000	nil
June	nil	2,000	nil
July	500	6,500	nil
Total	1,684,350	641,280	1,260

Appendix H

Quarterly Assessment of Construction Impact

Cluster 1 TIN(In-situ)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L)			
SR5	1/4/2014	Mid-Flood	0.48
SR5	1/7/2014	Mid-Flood	0.61
SR5	1/9/2014	Mid-Flood	0.64
SR5	1/11/2014	Mid-Flood	0.83
SR5	1/14/2014	Mid-Flood	0.68
SR5	1/16/2014	Mid-Flood	0.55
SR5	1/18/2014	Mid-Flood	0.56
SR5	1/21/2014	Mid-Flood	0.50
SR5	1/23/2014	Mid-Flood	0.61
SR5	1/25/2014	Mid-Flood	0.88
SR5	1/27/2014	Mid-Flood	0.77
SR5	1/29/2014	Mid-Flood	0.61

Impact TIN (lab) (mg/L)			
SR5	4/25/2017	Mid-Flood	0.51
SR5	4/27/2017	Mid-Flood	0.52
SR5	4/29/2017	Mid-Flood	0.55
SR5	5/2/2017	Mid-Flood	0.70
SR5	5/4/2017	Mid-Flood	0.55
SR5	5/6/2017	Mid-Flood	1.05
SR5	5/9/2017	Mid-Flood	0.93
SR5	5/11/2017	Mid-Flood	0.64
SR5	5/13/2017	Mid-Flood	0.88
SR5	5/16/2017	Mid-Flood	0.68
SR5	5/18/2017	Mid-Flood	0.67
SR5	20/5/2017	Mid-Flood	0.74
SR5	23/5/2017	Mid-Flood	0.71
SR5	25/05/2017	Mid-Flood	0.89
SR5	5/27/2017	Mid-Flood	0.51
SR5	5/30/2017	Mid-Flood	0.61
SR5	6/1/2017	Mid-Flood	1.12
SR5	6/3/2017	Mid-Flood	1.07
SR5	6/6/2017	Mid-Flood	0.97
SR5	6/8/2017	Mid-Flood	0.92
SR5	6/10/2017	Mid-Flood	0.79
SR5	6/15/2017	Mid-Flood	1.32
SR5	6/17/2017	Mid-Flood	1.28
SR5	6/20/2017	Mid-Flood	1.45
SR5	6/22/2017	Mid-Flood	1.54
SR5	6/24/2017	Mid-Flood	0.25
SR5	6/27/2017	Mid-Flood	1.07
SR5	6/29/2017	Mid-Flood	1.25
SR5	7/1/2017	Mid-Flood	1.38
SR5	7/4/2017	Mid-Flood	1.29
SR5	7/6/2017	Mid-Flood	1.30
SR5	7/8/2017	Mid-Flood	1.58
SR5	7/11/2017	Mid-Flood	1.27
SR5	7/13/2017	Mid-Flood	0.98
SR5	7/15/2017	Mid-Flood	0.76
SR5	7/18/2017	Mid-Flood	1.28
SR5	7/20/2017	Mid-Flood	1.33
SR5	7/22/2017	Mid-Flood	1.05

Cluster 1 TIN(In-situ)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (In-situ)		Impact TIN (In-situ)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	38
Number of Distinct Observations	12	Number of Distinct Observations	33
Minimum	0.477	Minimum	0.25
Maximum	0.883	Maximum	1.58
Mean of Raw Data	0.643	Mean of Raw Data	0.958
Standard Deviation of Raw Data	0.127	Standard Deviation of Raw Data	0.336
Kstar	22.19	Kstar	6.744
Mean of Log Transformed Data	-0.458	Mean of Log Transformed Data	-0.113
Standard Deviation of Log Transformed Data	0.191	Standard Deviation of Log Transformed Data	0.4
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.968	Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.93	Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.407	Approximate Shapiro Wilk P Value	0.295
Lilliefors Test Statistic	0.186	Lilliefors Test Statistic	0.124
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (In-situ)
Background Data: Baseline (In-situ) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	38	12
Number of Distinct Observations	33	12
Minimum	0.25	0.477
Maximum	1.58	0.883
Mean	0.958	0.643
Median	0.95	0.614
SD	0.336	0.127
SE of Mean	0.0544	0.0366

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	48	3.154	1.677	0.001
Satterthwaite (Unequal Variance)	46.2	4.789	1.679	0

Pooled SD 0.301
Conclusion with Alpha = 0.050
* Student t (Pooled) Test: Reject H0, Conclude Site > Background
* Satterthwaite Test: Reject H0, Conclude Site > Background

Cluster 1 TIN(In-situ)
Gradient Station G2 vs Impact

Upstream Gradient TIN (In-situ) (mg/L)			
G2	4/25/2017	Mid-Flood	0.34
G2	4/27/2017	Mid-Flood	0.59
G2	4/29/2017	Mid-Flood	0.65
G2	5/2/2017	Mid-Flood	0.65
G2	5/4/2017	Mid-Flood	0.56
G2	5/6/2017	Mid-Flood	0.58
G2	5/9/2017	Mid-Flood	0.87
G2	5/11/2017	Mid-Flood	0.74
G2	5/13/2017	Mid-Flood	0.61
G2	5/16/2017	Mid-Flood	0.71
G2	5/18/2017	Mid-Flood	0.61
G2	20/5/2017	Mid-Flood	0.62
G2	23/5/2017	Mid-Flood	0.61
G2	25/05/2017	Mid-Flood	0.77
G2	5/27/2017	Mid-Flood	0.64
G2	5/30/2017	Mid-Flood	0.64
G2	6/1/2017	Mid-Flood	0.79
G2	6/3/2017	Mid-Flood	0.91
G2	6/6/2017	Mid-Flood	0.73
G2	6/8/2017	Mid-Flood	0.81
G2	6/10/2017	Mid-Flood	0.71
G2	6/15/2017	Mid-Flood	1.07
G2	6/17/2017	Mid-Flood	1.20
G2	6/20/2017	Mid-Flood	1.20
G2	6/22/2017	Mid-Flood	1.34
G2	6/24/2017	Mid-Flood	1.31
G2	6/27/2017	Mid-Flood	1.05
G2	6/29/2017	Mid-Flood	1.06
G2	7/1/2017	Mid-Flood	1.21
G2	7/4/2017	Mid-Flood	1.26
G2	7/6/2017	Mid-Flood	1.25
G2	7/8/2017	Mid-Flood	1.55
G2	7/11/2017	Mid-Flood	1.02
G2	7/13/2017	Mid-Flood	0.88
G2	7/15/2017	Mid-Flood	0.81
G2	7/18/2017	Mid-Flood	1.13
G2	7/20/2017	Mid-Flood	1.16
G2	7/22/2017	Mid-Flood	0.88

Impact TIN (In-situ) (mg/L)			
SR5	4/25/2017	Mid-Flood	0.51
SR5	4/27/2017	Mid-Flood	0.52
SR5	4/29/2017	Mid-Flood	0.55
SR5	5/2/2017	Mid-Flood	0.70
SR5	5/4/2017	Mid-Flood	0.55
SR5	5/6/2017	Mid-Flood	1.05
SR5	5/9/2017	Mid-Flood	0.93
SR5	5/11/2017	Mid-Flood	0.64
SR5	5/13/2017	Mid-Flood	0.88
SR5	5/16/2017	Mid-Flood	0.68
SR5	5/18/2017	Mid-Flood	0.67
SR5	20/5/2017	Mid-Flood	0.74
SR5	23/5/2017	Mid-Flood	0.71
SR5	25/05/2017	Mid-Flood	0.89
SR5	5/27/2017	Mid-Flood	0.51
SR5	5/30/2017	Mid-Flood	0.61
SR5	6/1/2017	Mid-Flood	1.12
SR5	6/3/2017	Mid-Flood	1.07
SR5	6/6/2017	Mid-Flood	0.97
SR5	6/8/2017	Mid-Flood	0.92
SR5	6/10/2017	Mid-Flood	0.79
SR5	6/15/2017	Mid-Flood	1.32
SR5	6/17/2017	Mid-Flood	1.28
SR5	6/20/2017	Mid-Flood	1.45
SR5	6/22/2017	Mid-Flood	1.54
SR5	6/24/2017	Mid-Flood	0.25
SR5	6/27/2017	Mid-Flood	1.07
SR5	6/29/2017	Mid-Flood	1.25
SR5	7/1/2017	Mid-Flood	1.38
SR5	7/4/2017	Mid-Flood	1.29
SR5	7/6/2017	Mid-Flood	1.30
SR5	7/8/2017	Mid-Flood	1.58
SR5	7/11/2017	Mid-Flood	1.27
SR5	7/13/2017	Mid-Flood	0.98
SR5	7/15/2017	Mid-Flood	0.76
SR5	7/18/2017	Mid-Flood	1.28
SR5	7/20/2017	Mid-Flood	1.33
SR5	7/22/2017	Mid-Flood	1.05

Cluster 1 TIN(In-situ)
Gradient Station G2 vs Impact

Impact TIN (In-situ)		Upstream Gradient TIN (In-situ)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	38	Number of Valid Observations	38
Number of Distinct Observations	33	Number of Distinct Observations	30
Minimum	0.25	Minimum	0.34
Maximum	1.58	Maximum	1.55
Mean of Raw Data	0.958	Mean of Raw Data	0.882
Standard Deviation of Raw Data	0.336	Standard Deviation of Raw Data	0.28
Kstar	6.744	Kstar	9.321
Mean of Log Transformed Data	-0.113	Mean of Log Transformed Data	-0.176
Standard Deviation of Log Transformed Data	0.4	Standard Deviation of Log Transformed Data	0.326
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.987	Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.962	Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.938	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.295	Approximate Shapiro Wilk P Value	0.087
Lilliefors Test Statistic	0.124	Lilliefors Test Statistic	0.128
Lilliefors Critical (0.95) Value	0.144	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (In-situ)
Background Data: G2 (In-situ)

Raw Statistics

	Site	Background
Number of Valid Observations	38	38
Number of Distinct Observations	33	30
Minimum	0.25	0.34
Maximum	1.58	1.55
Mean	0.958	0.882
Median	0.95	0.81
SD	0.336	0.28
SE of Mean	0.0544	0.0455

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	74	1.065	1.666	0.145
Satterthwaite (Unequal Variance)	71.7	1.065	1.666	0.145

Pooled SD 0.309
Conclusion with Alpha = 0.050
* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L)			
SR5	1/4/2014	Mid-Flood	0.48
SR5	1/7/2014	Mid-Flood	0.52
SR5	1/9/2014	Mid-Flood	0.48
SR5	1/11/2014	Mid-Flood	0.53
SR5	1/14/2014	Mid-Flood	0.35
SR5	1/16/2014	Mid-Flood	0.43
SR5	1/18/2014	Mid-Flood	0.59
SR5	1/21/2014	Mid-Flood	0.32
SR5	1/23/2014	Mid-Flood	0.55
SR5	1/25/2014	Mid-Flood	0.47
SR5	1/27/2014	Mid-Flood	0.40
SR5	1/29/2014	Mid-Flood	0.66

Impact TIN (lab) (mg/L)			
SR5	4/25/2017	Mid-Flood	0.51
SR5	4/27/2017	Mid-Flood	0.52
SR5	4/29/2017	Mid-Flood	0.54
SR5	5/2/2017	Mid-Flood	0.70
SR5	5/4/2017	Mid-Flood	0.56
SR5	5/6/2017	Mid-Flood	1.06
SR5	5/9/2017	Mid-Flood	0.92
SR5	5/11/2017	Mid-Flood	0.64
SR5	5/13/2017	Mid-Flood	0.89
SR5	5/16/2017	Mid-Flood	0.69
SR5	5/18/2017	Mid-Flood	0.67
SR5	20/5/2017	Mid-Flood	0.73
SR5	23/5/2017	Mid-Flood	0.71
SR5	25/05/2017	Mid-Flood	0.89
SR5	5/27/2017	Mid-Flood	0.51
SR5	5/30/2017	Mid-Flood	0.61
SR5	6/1/2017	Mid-Flood	1.12
SR5	6/3/2017	Mid-Flood	1.07
SR5	6/6/2017	Mid-Flood	0.97
SR5	6/8/2017	Mid-Flood	0.91
SR5	6/10/2017	Mid-Flood	0.79
SR5	6/15/2017	Mid-Flood	1.31
SR5	6/17/2017	Mid-Flood	1.27
SR5	6/20/2017	Mid-Flood	1.44
SR5	6/22/2017	Mid-Flood	1.52
SR5	6/24/2017	Mid-Flood	0.26
SR5	6/27/2017	Mid-Flood	1.06
SR5	6/29/2017	Mid-Flood	1.24
SR5	7/1/2017	Mid-Flood	1.37
SR5	7/4/2017	Mid-Flood	1.28
SR5	7/6/2017	Mid-Flood	1.30
SR5	7/8/2017	Mid-Flood	1.58
SR5	7/11/2017	Mid-Flood	1.26
SR5	7/13/2017	Mid-Flood	0.99
SR5	7/15/2017	Mid-Flood	0.76
SR5	7/18/2017	Mid-Flood	1.27
SR5	7/20/2017	Mid-Flood	1.33
SR5	7/22/2017	Mid-Flood	1.06

Baseline x 1.3 TIN (lab)		Impact TIN (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	38
Number of Distinct Observations	12	Number of Distinct Observations	33
Minimum	0.324	Minimum	0.26
Maximum	0.661	Maximum	1.58
Mean of Raw Data	0.482	Mean of Raw Data	0.956
Standard Deviation of Raw Data	0.0971	Standard Deviation of Raw Data	0.332
Kstar	19.61	Kstar	6.892
Mean of Log Transformed Data	-0.749	Mean of Log Transformed Data	-0.114
Standard Deviation of Log Transformed Data	0.208	Standard Deviation of Log Transformed Data	0.395
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.994	Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.993	Approximate Shapiro Wilk P Value	0.316
Lilliefors Test Statistic	0.108	Lilliefors Test Statistic	0.12
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (Lab)
Background Data: Baseline (Lab) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	38	12
Number of Distinct Observations	33	12
Minimum	0.26	0.324
Maximum	1.58	0.661
Mean	0.956	0.482
Median	0.945	0.48
SD	0.332	0.0971
SE of Mean	0.0538	0.028

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	48	4.845	1.677	0
Satterthwaite (Unequal Variance)	47.9	7.799	1.677	0

Pooled SD 0.295
Conclusion with Alpha = 0.050
* Student t (Pooled) Test: Reject H0, Conclude Site > Background
* Satterthwaite Test: Reject H0, Conclude Site > Background

Cluster 1 TIN(Lab)
Gradient Station G2 vs Impact

Upstream Gradient TIN (lab) (mg/L)				Impact TIN (lab) (mg/L)			
G2	4/25/2017	Mid-Flood	0.35	SR5	4/25/2017	Mid-Flood	0.51
G2	4/27/2017	Mid-Flood	0.59	SR5	4/27/2017	Mid-Flood	0.52
G2	4/29/2017	Mid-Flood	0.65	SR5	4/29/2017	Mid-Flood	0.54
G2	5/2/2017	Mid-Flood	0.65	SR5	5/2/2017	Mid-Flood	0.70
G2	5/4/2017	Mid-Flood	0.56	SR5	5/4/2017	Mid-Flood	0.56
G2	5/6/2017	Mid-Flood	0.57	SR5	5/6/2017	Mid-Flood	1.06
G2	5/9/2017	Mid-Flood	0.87	SR5	5/9/2017	Mid-Flood	0.92
G2	5/11/2017	Mid-Flood	0.73	SR5	5/11/2017	Mid-Flood	0.64
G2	5/13/2017	Mid-Flood	0.61	SR5	5/13/2017	Mid-Flood	0.89
G2	5/16/2017	Mid-Flood	0.71	SR5	5/16/2017	Mid-Flood	0.69
G2	5/18/2017	Mid-Flood	0.61	SR5	5/18/2017	Mid-Flood	0.67
G2	20/5/2017	Mid-Flood	0.63	SR5	20/5/2017	Mid-Flood	0.73
G2	23/5/2017	Mid-Flood	0.61	SR5	23/5/2017	Mid-Flood	0.71
G2	25/05/2017	Mid-Flood	0.76	SR5	25/05/2017	Mid-Flood	0.89
G2	5/27/2017	Mid-Flood	0.65	SR5	5/27/2017	Mid-Flood	0.51
G2	5/30/2017	Mid-Flood	0.64	SR5	5/30/2017	Mid-Flood	0.61
G2	6/1/2017	Mid-Flood	0.79	SR5	6/1/2017	Mid-Flood	1.12
G2	6/3/2017	Mid-Flood	0.91	SR5	6/3/2017	Mid-Flood	1.07
G2	6/6/2017	Mid-Flood	0.73	SR5	6/6/2017	Mid-Flood	0.97
G2	6/8/2017	Mid-Flood	0.80	SR5	6/8/2017	Mid-Flood	0.91
G2	6/10/2017	Mid-Flood	0.73	SR5	6/10/2017	Mid-Flood	0.79
G2	6/15/2017	Mid-Flood	1.07	SR5	6/15/2017	Mid-Flood	1.31
G2	6/17/2017	Mid-Flood	1.19	SR5	6/17/2017	Mid-Flood	1.27
G2	6/20/2017	Mid-Flood	1.19	SR5	6/20/2017	Mid-Flood	1.44
G2	6/22/2017	Mid-Flood	1.33	SR5	6/22/2017	Mid-Flood	1.52
G2	6/24/2017	Mid-Flood	1.30	SR5	6/24/2017	Mid-Flood	0.26
G2	6/27/2017	Mid-Flood	1.04	SR5	6/27/2017	Mid-Flood	1.06
G2	6/29/2017	Mid-Flood	1.05	SR5	6/29/2017	Mid-Flood	1.24
G2	7/1/2017	Mid-Flood	1.20	SR5	7/1/2017	Mid-Flood	1.37
G2	7/4/2017	Mid-Flood	1.26	SR5	7/4/2017	Mid-Flood	1.28
G2	7/6/2017	Mid-Flood	1.24	SR5	7/6/2017	Mid-Flood	1.30
G2	7/8/2017	Mid-Flood	1.56	SR5	7/8/2017	Mid-Flood	1.58
G2	7/11/2017	Mid-Flood	1.03	SR5	7/11/2017	Mid-Flood	1.26
G2	7/13/2017	Mid-Flood	0.89	SR5	7/13/2017	Mid-Flood	0.99
G2	7/15/2017	Mid-Flood	0.80	SR5	7/15/2017	Mid-Flood	0.76
G2	7/18/2017	Mid-Flood	1.13	SR5	7/18/2017	Mid-Flood	1.27
G2	7/20/2017	Mid-Flood	1.15	SR5	7/20/2017	Mid-Flood	1.33
G2	7/22/2017	Mid-Flood	0.87	SR5	7/22/2017	Mid-Flood	1.06

Impact TIN (Lab)		Upstream Gradient TIN (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	38	Number of Valid Observations	38
Number of Distinct Observations	33	Number of Distinct Observations	29
Minimum	0.26	Minimum	0.35
Maximum	1.58	Maximum	1.56
Mean of Raw Data	0.956	Mean of Raw Data	0.88
Standard Deviation of Raw Data	0.332	Standard Deviation of Raw Data	0.278
Kstar	6.892	Kstar	9.511
Mean of Log Transformed Data	-0.114	Mean of Log Transformed Data	-0.177
Standard Deviation of Log Transformed Data	0.395	Standard Deviation of Log Transformed Data	0.322
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.987	Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.938	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.316	Approximate Shapiro Wilk P Value	0.0926
Lilliefors Test Statistic	0.12	Lilliefors Test Statistic	0.14
Lilliefors Critical (0.95) Value	0.144	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (Lab)
Background Data: G2 (Lab)

Raw Statistics

	Site	Background
Number of Valid Observations	38	38
Number of Distinct Observations	33	29
Minimum	0.26	0.35
Maximum	1.58	1.56
Mean	0.956	0.88
Median	0.945	0.8
SD	0.332	0.278
SE of Mean	0.0538	0.045

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	74	1.072	1.666	0.144
Satterthwaite (Unequal Variance)	71.8	1.072	1.666	0.144

Pooled SD 0.306

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background