MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, N.T., Hong Kong.
Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

MateriaLab

Report No.: 0394/13/ED/0335A

Quarterly EM&A Report

August 2016 - October 2016

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/0335A

Project Proponent:

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

Prepared by: Wingo So

Reviewed by: Cyrus Lai

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

RAMBOLL ENVIRON

Ref.: CEDDWKTBEM00_0_0295L.16

22 December 2016
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: Ir Chau T C, Felix, Engineer's Representative

Dear Ir Chau,

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 August to October 2016

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for August to October 2016 (ET's Report. No. 0394/13/ED/0335A) received by e-mail on 22 December 2016.

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 Andy 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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Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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EXECUTIVE SUMMARY

i. This is the Tenth Quarterly Environmental Monitoring Audit (EM&A) Report – August 2016 – October 2016 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 July 2016 to 22 October 2016.

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

August 2016	September 2016	October 2016
Site Trial on Dredging works without Silt Curtain Deployment on Portion A (Zone 2C2 and Zone 4A) and Portion E (Zone 13B).	The construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During this period, there is no dredging work under this project.	The construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During this period, there is no dredging work under this project.

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 22 designated monitoring stations namely C1, C2, C3, G1, G2, G3, G4, G5, G6, SR1, SR2, SR3, SR4, SR5, SR6, SR7, SR8, SR9, SR10, SR11, SR12 and SR13 were conducted during the reporting period. Exceedances of DO (S&M), DO (B), TIN (in-situ & lab) and Suspended Solids 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
SR1	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
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	3	3	3	0	0	0	0	0	0	-	-	5	6
SR3	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	2	2	2	0	0	0	0	0	0	-	-	3	4
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	1	1	1
	Limit	7	7	4	4	0	0	-	-	-	-	12	12	23	23
SR6	Action	1	1	2	3	0	0	-	-	-	-	-	-	3	4
	Limit	3	3	2	0	0	0	-	-	-	-	-	-	5	3
SR7	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	5	5	3	1	0	0	-	-	-	-	-	-	8	6
SR8	Action	0	0	1	1	0	0	-	-	-	-	-	-	1	1
	Limit	2	2	1	0	0	0	-	-	-	-	-	-	3	2
SR9	Action	0	0	2	3	0	0	-	-	-	-	5	5	4	5

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Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
	Limit	5	6	2	2	0	0	-	-	-	-	6	6	15	16
SR10	Action	0	0	1	1	0	0	-	-	-	-	4	3	4	3
	Limit	3	2	0	0	0	0	-	-	-	-	2	3	6	5
SR11	Action	0	0	1	0	0	0	-	-	-	-	4	3	4	3
	Limit	3	3	0	1	0	0	-	-	-	-	4	4	6	7
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	2	0	0	0	0	-	-	-	-	-	-	0	2
Total	Action	1	1	7	8	0	0	0	0	0	0	9	8	34	
	Limit	31	35	17	13	0	0	0	0	0	0	26	26	148	

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
SR1	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR2	Action	0	1	-	-	-	-	0	0	0	0	-	-	-	-	0	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	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	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	1	1	1	1
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	12	12	12	12
SR6	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR9	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	5	2	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	6	6	8	8
SR10	Action	0	0	-	-	-	-	-	-	-	-	-	-	4	3	3	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	2	3	3	3
SR11	Action	1	0	-	-	-	-	-	-	-	-	-	-	4	3	4	3
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	4	4	3	3
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	1	1	0	0	0	0	0	0	0	0	0	0	9	8	19	
	Limit	3	3	0	0	0	0	0	0	0	0	0	0	26	26	58	

Among the 22 monitoring stations, supplementary 24-hr water quality monitoring was also conducted at 7 of the stations, which are SR4, SR5, SR9, SR10, SR11, 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**.

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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
SR9	Action	0	0	-	0
	Limit	0	0	-	0
SR10	Action	0	0	-	0
	Limit	0	0	-	0
SR11	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 (Open Sea Disposal) disposed to East Sha Chau CMP Va or South of Brothers CMP 2, Type 1 Open Sea Disposal (Dedicated Site) and Type 2 sediment (Confined Marine Disposal) disposed to East Sha Chau Contaminated Mud Pits CMP Vd. All the Type 3 (Cat. Hf) sediment dredging and disposal was completed on 18 May 2016. No inert or non-inert C&D material related to dredging works and a small amount of general refuse were disposed off site in the reporting period.

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

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

iv. Site Inspections and Audit

The Environmental Team conducted 13 site inspections in the reporting period. No particular observation was recorded in the reporting month.

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

v. 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.

vi. Construction Activities for the Coming Reporting Period

According to Contractor, the construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During present reporting period, there was no dredging work under this project. Routine impact water quality monitoring was suspended according to Clause 2.1.6 of the EM&A Manual and the Proposal for Temporary Suspension of Water Quality Monitoring (0394_13_ED_0326F) which no objection was received from EPD. The temporary suspension of routine impact water quality monitoring was effective from 1 September 2016.

Future Key Issues include:

- Regular inspection on silt curtain deployment
- Implementation of EM&A Programme

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 Tenth 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 July 2016 to 22 October 2016.

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)	Senior Resident Engineer	Ir. Felix Chau	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:

August 2016	September 2016	October 2016
Site Trial on Dredging works without Silt Curtain Deployment on Portion A (Zone 2C2 and Zone 4A) and Portion E (Zone 13B).	The construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During this period, there is no dredging work under this project.	The construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During this period, there is no dredging work under this project.

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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

Table 2-2 Detail Dredging Quantity

Date	Dredged Quantity (in-situ, m^3)				
	Portion A				Portion E
	Zone (Maximum Allowable Daily Dredged Rate)				Max Allowable Daily Dredged Rate=4000
7/23/2016	0	0	0	0	0
7/24/2016	0	0	0	0	0
7/25/2016	2C2: 1077 (2050)	0	0	0	0
7/26/2016	0	0	0	0	0
7/27/2016	0	0	0	0	0
7/28/2016	0	0	0	0	0
7/29/2016	4A: 1077 (3440)	0	0	0	0
7/30/2016	0	0	0	0	0
7/31/2016	0	0	0	0	0
8/1/2016	0	0	0	0	0
8/2/2016	0	0	0	0	0
8/3/2016	0	0	0	0	0
8/4/2016	0	0	0	0	0
8/5/2016	0	0	0	0	1077
8/6/2016	0	0	0	0	0
8/7/2016	0	0	0	0	0
8/8/2016	0	0	0	0	1077
8/9/2016	0	0	0	0	0
8/10/2016	0	0	0	0	0
8/11/2016	0	0	0	0	0
8/12/2016	0	0	0	0	1077
8/13/2016	0	0	0	0	0
8/14/2016	0	0	0	0	0
8/15/2016	0	0	0	0	0
8/16/2016	0	0	0	0	0
8/17/2016	0	0	0	0	0
8/18/2016	0	0	0	0	0
8/19/2016	0	0	0	0	0
8/20/2016	0	0	0	0	0
8/21/2016	0	0	0	0	0
8/22/2016	0	0	0	0	0

Note: Only dredging on silt curtain site trial was carried out during August 2016. Therefore the dredging quantities on 25, 29 July 2016 and 5, 8 and 12 August 2016 were generated by the dredging works of silt curtain site trial. Also no dredging work was carried out in September 2016 and October 2016. Therefore no dredging quantities were recorded.

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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), [2]BOD_5, [2]*E.coli*, [2]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 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 SR1, SR2, SR3, SR4, SR12, C1, C2, C3 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, SR9, SR10, SR11, G1, G2, G3, G4, G5, G6 only;
3. BOD_5, *E.coli* and Synthetic Detergent samples were taken at SR1, SR4, SR12, C1, C2, C3 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)**
SR1	O	O	O	O	O	O		O	O	O	O	O	
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
SR6	O	O	O	O	O			O					
SR7	O	O	O	O	O			O					
SR8	O	O	O	O	O			O					
SR9	O	O	O	O	O		O	O					O
SR10	O	O	O	O	O		O	O					O
SR11	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					
G1	O	O	O	O	O		O	O					O
G2	O	O	O	O	O		O	O					O
G3	O	O	O	O	O		O	O					O
G4	O	O	O	O	O		O	O					O
G5	O	O	O	O	O		O	O					O
G6	O	O	O	O	O		O	O					O
C1	O	O	O	O	O	O		O	O	O	O	O	
C2	O	O	O	O	O	O		O	O	O	O	O	
C3	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 Impact water quality monitoring was conducted at 22 locations, including 13 sensitive receivers (SR1-13), 6 gradient stations (G1-6) and 3 control stations (C1-3). The locations of the stations are also shown in **Figure 3**.

3.2.2 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.

3.3 Results and Observations

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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 reporting period, some adverse weather conditions, including Strong Monsoon Signal, Thunderstorm Warning Signals, Rainstorm Warnings and Tropical Cyclone Warning Signals 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.

3.3.3 Exceedances were recorded for DO (S&M), DO (B), TIN (in-situ & lab) and Suspended Solids. 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
SR1	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
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	3	3	3	0	0	0	0	0	0	-	-	5	6
SR3	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	2	2	2	0	0	0	0	0	0	-	-	3	4
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	1	1	1
	Limit	7	7	4	4	0	0	-	-	-	-	12	12	23	23
SR6	Action	1	1	2	3	0	0	-	-	-	-	-	-	3	4
	Limit	3	3	2	0	0	0	-	-	-	-	-	-	5	3
SR7	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	5	5	3	1	0	0	-	-	-	-	-	-	8	6
SR8	Action	0	0	1	1	0	0	-	-	-	-	-	-	1	1
	Limit	2	2	1	0	0	0	-	-	-	-	-	-	3	2
SR9	Action	0	0	2	3	0	0	-	-	-	-	5	5	4	5
	Limit	5	6	2	2	0	0	-	-	-	-	6	6	15	16
SR10	Action	0	0	1	1	0	0	-	-	-	-	4	3	4	3
	Limit	3	2	0	0	0	0	-	-	-	-	2	3	6	5
SR11	Action	0	0	1	0	0	0	-	-	-	-	4	3	4	3
	Limit	3	3	0	1	0	0	-	-	-	-	4	4	6	7
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	2	0	0	0	0	-	-	-	-	-	-	0	2
Total	Action	1	1	7	8	0	0	0	0	0	0	9	8	34	
	Limit	31	35	17	13	0	0	0	0	0	0	26	26	148	

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
SR1	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR2	Action	0	1	-	-	-	-	0	0	0	0	-	-	-	-	0	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	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	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	1	1	1	1
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	12	12	12	12
SR6	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR9	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	5	2	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	6	6	8	8
SR10	Action	0	0	-	-	-	-	-	-	-	-	-	-	4	3	3	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	2	3	3	3
SR11	Action	1	0	-	-	-	-	-	-	-	-	-	-	4	3	4	3
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	4	4	3	3
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	1	1	0	0	0	0	0	0	0	0	0	0	9	8	19	
	Limit	3	3	0	0	0	0	0	0	0	0	0	0	26	26	58	

3.3.4 During the reporting period, 2 AL and 66 LL exceedances for DO (S&M), 15 AL and 30 LL exceedances for DO (B), 17 AL and 52 LL exceedances for TIN (in-situ), 2 AL and 6 LL exceedances for Total Suspended Solids, and 17 AL and 52 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	
SR9	Cheung Sha Wan, Fish Culture Zone	O	O	O	O	
SR10	Lo Tik Wan, Fish Culture Zone	O	O	O	O	
SR11	Sok Kwu 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 As shown in Table 4.1, the 24 hours water quality monitoring works are performed at SR4, SR5, SR9, SR10, SR11, SR12 and SR13.

4.2.2 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, some adverse weather conditions, including Thunderstorm Warning Signals, Rainstorm Warnings and Tropical Cyclone Warning Signals 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.

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
SR9	Action	0	0	-	0
	Limit	0	0	-	0
SR10	Action	0	0	-	0
	Limit	0	0	-	0
SR11	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 found in the site inspections.

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 were 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 (Open Sea Disposal) disposed to East Sha Chau CMP Va or South of Brothers CMP 2, Type 1 Open Sea Disposal (Dedicated Site) and Type 2 sediment (Confined Marine Disposal) disposed to East Sha Chau Contaminated Mud Pits CMP Vd. All the Type 3 (Cat. Hf) sediment dredging and disposal was completed on 18 May 2016. No inert or non-inert C&D material related to dredging works 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
August 2016	Type 1 – Open Sea Disposal	6300	1683850	East Sha Chau CMP Va or Vd or South of Brothers CMP 2
	Type 2 – Confined Marine Disposal	700	625280	East Sha Chau CMP Vd
	Type 3 – Special Treatment / Disposal	0	1260	NA
September 2016	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	0	625280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
October 2016	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	0	625280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA

Note:
1. All the Type 3 (Cat. Hf) sediment dredging and disposal was completed on 18 May 2016.
2. Only dredging on silt curtain site trial was carried out during August 2016. Therefore the dredging quantities in the reporting period were generated by the dredging works of silt curtain site trial.
3. No marine construction work was carried out and no marine sediment was disposed in September and October 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. Since the routine impact water quality monitoring was temporarily suspended from 1 September 2016 in the reporting period, the quarterly mean was therefore taken from 23 July 2016 to 31 August 2016. Results showed that the mean values of DO (S&M), DO (B), and TSS at all clusters of monitoring stations were below the 1.3 x baseline (higher than 0.7 x baseline for DO) 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 and cluster 2 stations of TIN (in-situ) and TIN (lab) are compared to their 1.3 x baseline data respectively. Result shows the quarterly mean of cluster 1 TIN (in-situ) (at mid flood) is not significantly different from 1.3 x baseline level ($p \geq 0.05$), indicating that the project impact is not significant. For TIN (lab) at cluster 1 and cluster 2 and TIN (in-situ) at cluster 2, results show the 1.3 x baseline level are significantly smaller than the quarterly mean ($p < 0.05$). As TIN is not detected at Control stations, quarterly mean of impact station is further compared to the quarterly mean of gradient stations (G2 and G3 are gradient stations in vicinity of cluster 1 stations; G1 is the most upstream location at the gradient station among all impact stations at ebb tide, thus is used to compare to cluster 2 stations). Data from flood tide are compared for cluster 1 as according to their relative position to the Project (data analysed for relative tide where clustered monitoring stations situate at downstream position and may be subject to project impact, reference made to Figure 3.). For cluster 1, at flood tide, results show TIN (lab) level at gradient (G2 and G3) is significantly smaller than at the impact station (SR5) ($p < 0.05$), indicating the trend is not increasing towards the project area and project impact is not significant. For cluster 2, at ebb tide, TIN (in-situ) and TIN (lab) level of gradient (G1) is not significantly greater than that of impact stations (SR9, SR10 & SR11) ($p < 0.05$), thus indicates the background TIN level is high and the project impact is not significant. The summary of key statistical analysis is provided in Table 5.2. Details of key statistical analysis results are provided in **Appendix H**.

5.6.3 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 exceedances (Turbidity, NH3-N and UIA for both in-situ and lab results, *E.coli*, BOD_5 and Synthetic Detergent) in the reporting quarter.

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		DO (S&M)						DO (B)					
		Wet Season Baseline	Baseline x 0.7	Average	Aug - Oct 2016	Average	Smaller than Baseline x 0.7	Wet Season Baseline	Baseline x 0.7	Average	Aug - Oct 2016	Average	Smaller than Baseline x 0.7
Control (Flood)	C1	6.39	4.47		5.32	NA	no	6.32	4.42		4.67	NA	no
	C2	7.51	5.26	NA	6.27		no	7.31	5.12	NA	5.53		no
	C3	6.98	4.89		6.38		no	6.89	4.82		5.70		no
Control (Ebb)	C1	6.41	4.49		5.28	NA	no	6.32	4.42		4.65	NA	no
	C2	7.27	5.09	NA	6.28		no	7.23	5.06	NA	5.64		no
	C3	7.00	4.90		6.53		no	6.94	4.86		5.91		no
Gradient (Flood)	G1	6.48	4.54		5.46	NA	no	6.37	4.46		4.80	NA	no
	G2	6.37	4.46	NA	5.30		no	6.34	4.44	NA	4.73		no
	G3	6.30	4.41		4.58		no	6.34	4.44		4.14		yes
	G4	5.84	4.09		4.79	NA	no	5.83	4.08		4.11	NA	no
	G5	7.73	5.41	NA	5.89		no	7.61	5.33	NA	5.33		no
	G6	7.15	5.01		6.13		no	7.00	4.90		5.73		no
Gradient (Ebb)	G1	6.44	4.51		5.47	NA	no	6.33	4.43		4.74	NA	no
	G2	6.32	4.42	NA	5.23		no	6.35	4.45	NA	4.71		no
	G3	6.48	4.54		4.55		no	6.50	4.55		4.09		yes
	G4	5.93	4.15		4.83	NA	no	6.00	4.20		4.10	NA	yes
	G5	7.74	5.42	NA	5.86		no	7.71	5.40	NA	5.27		yes
	G6	7.14	5.00		6.08		no	7.09	4.96		5.95		no
Cluster 1 (Flood)	SR1	5.43	3.80		5.35			4.70	3.29		5.12		
	SR2	5.11	3.58		5.33			4.46	3.12		4.80		
	SR3	5.66	3.96	3.74	5.44	5.27	no	4.97	3.48	3.28	4.90	4.86	no
	SR4	5.46	3.82		5.41			4.85	3.40		5.22		
	SR5	5.12	3.58		5.27			4.42	3.09		4.79		
	SR12	5.32	3.72		4.82			4.72	3.30		4.33		
Cluster 1 (Ebb)	SR1	5.32	3.72		5.40			4.65	3.26		5.13		
	SR2	5.10	3.57		5.36			4.45	3.12		4.72		
	SR3	5.69	3.98	3.73	5.28	5.31	no	5.01	3.51	3.27	4.70	4.85	no
	SR4	5.38	3.77		5.62			4.73	3.31		5.36		
	SR5	5.11	3.58		5.26			4.46	3.12		4.85		
	SR12	5.36	3.75		4.92			4.74	3.32		4.33		
Cluster 2 (Flood)	SR6	6.16	4.31		5.73			5.48	3.84		5.36		
	SR7	5.45	3.82		5.36			4.75	3.33		5.05		
	SR8	5.88	4.12	4.31	6.11	5.96	no	5.08	3.56	3.79	5.88	5.50	no
	SR9	7.79	5.45		5.84			7.05	4.94		5.14		
	SR10	5.74	4.02		6.46			5.01	3.51		5.92		
	SR11	5.88	4.12		6.25			5.07	3.55		5.63		
Cluster 2 (Ebb)	SR6	6.12	4.28		5.66			5.43	3.80		5.14		
	SR7	5.39	3.77		5.35			4.76	3.33		4.86		
	SR8	5.82	4.07	4.30	6.08	6.06	no	5.04	3.53	3.77	5.85	5.47	no
	SR9	7.82	5.47		6.01			6.98	4.89		5.26		
	SR10	5.84	4.09		6.56			5.01	3.51		5.91		
	SR11	5.87	4.11		6.70			5.08	3.56		5.80		
Cluster 3 (Flood)	SR13	4.62	3.23	3.23	4.57	4.57	no	4.02	2.81	2.81	4.21	4.21	no
Cluster 3 (Ebb)	SR13	4.61	3.23	3.23	4.70	4.70	no	4.01	2.81	2.81	4.26	4.26	no

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.
- With reference to Review of Action and Limit Levels (0394/13/ED/0175C), the baseline results of DO (S&M) and DO (B) in stations of Cluster 1, Cluster 2 and Cluster 3 in dry season are multiplying the relevant wet/dry season ratio to obtain the wet season baseline values.

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building, Tel : (852)-24508238
1-15 Kwai Fung Crescent, Fax : (852)-24508032
Kwai Fong, N.T., Hong Kong. Email : mcl@fugro.com.hk

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		TIN (In-situ)						TSS						TIN (Lab)					
		Wet Season Baseline	1.3 x Baseline	Average	Aug - Oct 2016	Average	Larger than Baseline x 1.3	Wet Season Baseline	1.3 x Baseline	Average	Aug - Oct 2016	Average	Larger than Baseline x 1.3	Wet Season Baseline	1.3 x Baseline	Average	Aug - Oct 2016	Average	Larger than Baseline x 1.3
Control (Flood)	C1	NA	NA	NA	NA	NA	NA	7	9	NA	5	NA	no	NA	NA	NA	NA	NA	NA
	C2							4	6		3		no						
	C3							4	5		4		no						
Control (Ebb)	C1	NA	NA	NA	NA	NA	NA	6	7	NA	6	NA	no	NA	NA	NA	NA	NA	NA
	C2							5	7		4		no						
	C3							4	5		4		no						
Gradient (Flood)	G1	0.59	0.77	NA	0.68	NA	yes	7	10	NA	6	NA	no	0.42	0.55	NA	0.67	NA	yes
	G2	0.56	0.73		0.65		yes	5	7		4		no	0.39	0.51		0.65		yes
	G3	0.44	0.57		0.44		no	6	8		4		no	0.31	0.40		0.43		yes
	G4	0.69	0.90		0.48		no	8	10		4		no	0.43	0.56		0.47		yes
	G5	0.38	0.49		0.49		yes	6	8		4		no	0.22	0.29		0.49		yes
	G6	0.23	0.30		0.43		yes	4	5		4		no	0.14	0.18		0.42		yes
Gradient (Ebb)	G1	0.57	0.74	NA	0.70	NA	yes	5	7	NA	6	NA	no	0.40	0.52	NA	0.68	NA	yes
	G2	0.48	0.62		0.64		yes	5	7		4		no	0.36	0.47		0.64		yes
	G3	0.37	0.48		0.45		yes	5	7		3		no	0.26	0.34		0.44		yes
	G4	0.66	0.85		0.48		no	7	9		4		no	0.42	0.55		0.47		yes
	G5	0.30	0.39		0.51		yes	5	7		4		no	0.20	0.26		0.49		yes
	G6	0.24	0.31		0.45		yes	4	5		4		no	0.14	0.18		0.42		yes
Cluster 1 (Flood)	SR1	NA	NA	0.64	NA	0.68	yes	7	9	8.67	5	4.50	no	NA	NA	0.48	NA	0.69	yes
	SR2	NA	NA		NA			5	7		5			NA	NA		NA		
	SR3	NA	NA		NA			5	7		4			NA	NA		NA		
	SR4	NA	NA		NA			7	9		4			NA	NA		NA		
	SR5	0.49	0.64		0.68			6	8		4			0.37	0.48		0.69		
	SR12	NA	NA		NA			9	12		5			NA	NA		NA		
Cluster 1 (Ebb)	SR1	NA	NA	0.67	NA	0.67	yes	7	9	7.33	5	4.67	no	NA	NA	0.46	NA	0.68	yes
	SR2	NA	NA		NA			5	7		4			NA	NA		NA		
	SR3	NA	NA		NA			5	6		4			NA	NA		NA		
	SR4	NA	NA		NA			5	7		5			NA	NA		NA		
	SR5	0.52	0.67		0.67			5	6		5			0.35	0.46		0.68		
	SR12	NA	NA		NA			7	9		5			NA	NA		NA		
Cluster 2 (Flood)	SR6	NA	NA	0.35	NA	0.42	yes	5	6	6.17	5	3.83	no	NA	NA	0.20	NA	0.40	yes
	SR7	NA	NA		NA			6	8		4			NA	NA		NA		
	SR8	NA	NA		NA			4	5		4			NA	NA		NA		
	SR9	0.33	0.43		0.48			5	7		4			0.19	0.25		0.47		
	SR10	0.24	0.31		0.38			5	7		3			0.14	0.18		0.36		
	SR11	0.23	0.30		0.39			3	4		3			0.14	0.18		0.37		
Cluster 2 (Ebb)	SR6	NA	NA	0.35	NA	0.40	yes	4	6	5.83	5	4.17	no	NA	NA	0.20	NA	0.39	yes
	SR7	NA	NA		NA			6	8		4			NA	NA		NA		
	SR8	NA	NA		NA			4	5		4			NA	NA		NA		
	SR9	0.34	0.44		0.47			4	6		4			0.19	0.25		0.46		
	SR10	0.24	0.31		0.36			4	5		4			0.13	0.17		0.35		
	SR11	0.23	0.30		0.38			4	5		4			0.13	0.17		0.35		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	16	21	21.00	5	5.00	no	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA	NA	NA	NA	NA	10	14	14.00	5	5.00	no	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 (flood tide) is not significantly different from 1.3 x Baseline mean (flood tide) ($p \geq 0.05$), indicating Project impact is not significant
	Cluster 2	Quarterly Mean at Impact Stations (ebb tide) against 1.3 x Baseline Level (ebb tide) Quarterly Mean at Impact Station (ebb tide) against Upstream Gradient (G1) Mean (ebb tide)	Quarterly mean at Impact Station (ebb tide) is significantly higher than 1.3 x Baseline mean (ebb tide) ($p<0.05$). Impact Mean (ebb tide) is significantly smaller than Upstream Gradient (G1) Mean (ebb tide) ($p<0.05$), indicating the background TIN level is high 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 Stations (flood tide) against Upstream Gradient (G2 and G3) Mean (flood tide)	Quarterly mean at Impact Stations (Flood Tide) is significantly higher than 1.3 x Baseline mean (flood tide) ($p<0.05$). Impact Mean (flood tide) is significantly higher than Upstream Gradient (G2 and G3) Mean (flood tide) ($p<0.05$), indicating the trend is not increasing towards the project area and project impact is not significant.
	Cluster 2	Quarterly Mean at Impact Stations (ebb tide) against 1.3 x Baseline Level (ebb tide) Quarterly Mean at Impact Station (ebb tide) against Upstream Gradient (G1) Mean (ebb tide)	Quarterly mean at Impact Station (ebb tide) is significantly higher than 1.3 x Baseline mean (Ebb tide) ($p<0.05$). Impact Mean (ebb tide) is significantly smaller than Upstream Gradient (G1) Mean (ebb tide) ($p<0.05$), indicating the background TIN level is high and the project impact is not significant.

5.6.4 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 DO (S&M) and DO (B), TIN (in-situ & lab) and SS 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.

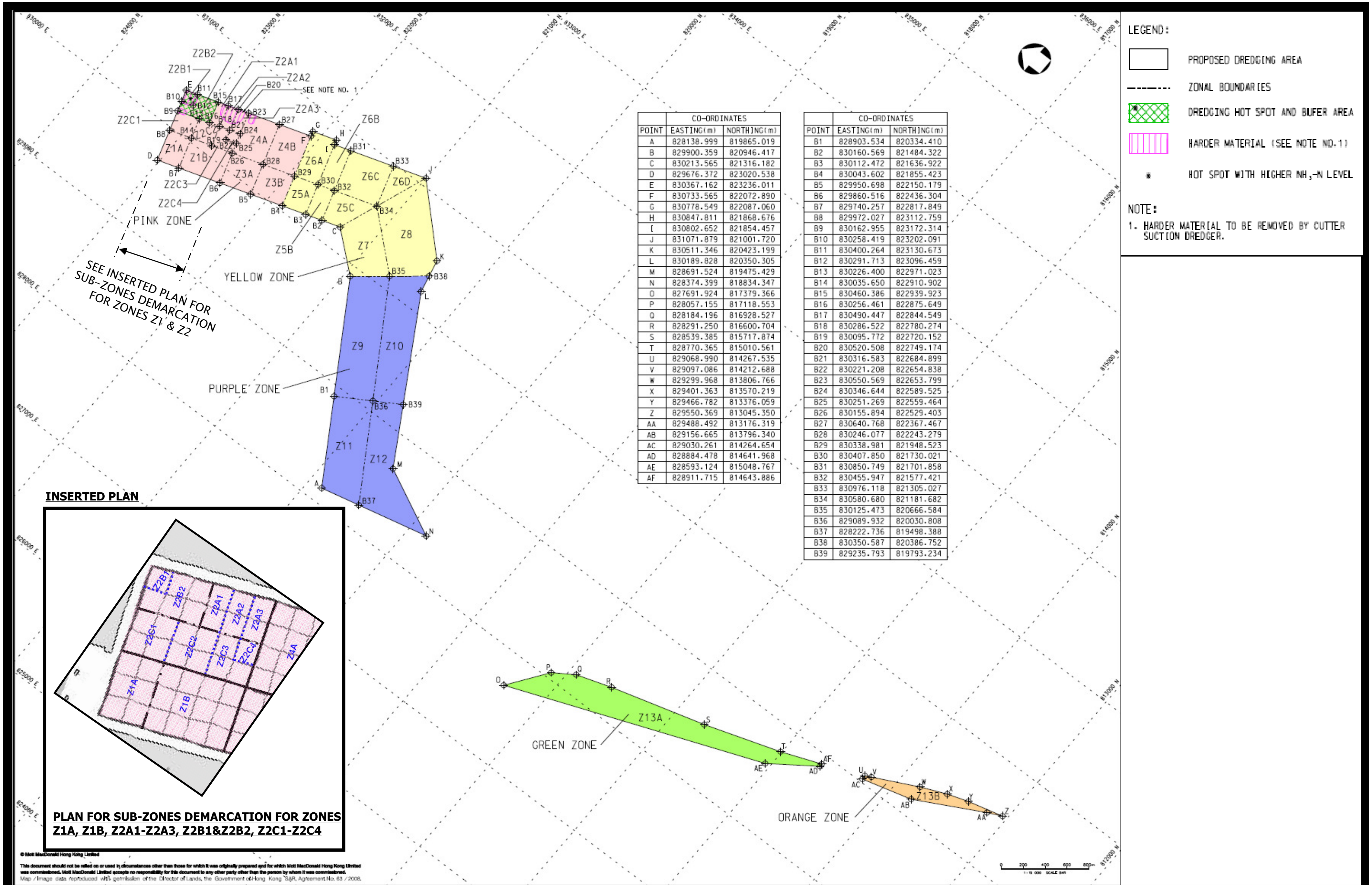
7.1.5 No notification of summons and prosecution was received in the reporting period.

7.1.6 According to the work programme provided by the Contractor, the construction work under this Contract has been temporarily suspended since 13 August 2016. Works will tentatively be resumed in late 2016. During present reporting period, there was no dredging work under this project. Routine impact water quality monitoring was suspended according to Clause 2.1.6 of the EM&A Manual and the Proposal for Temporary Suspension of Water Quality Monitoring (0394_13_ED_0326F) which no objection was received from EPD.

Report No.: 0394/13/ED/0335A

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

Figure 2

Dredging Work Location during the Reporting Period

Sheet 1

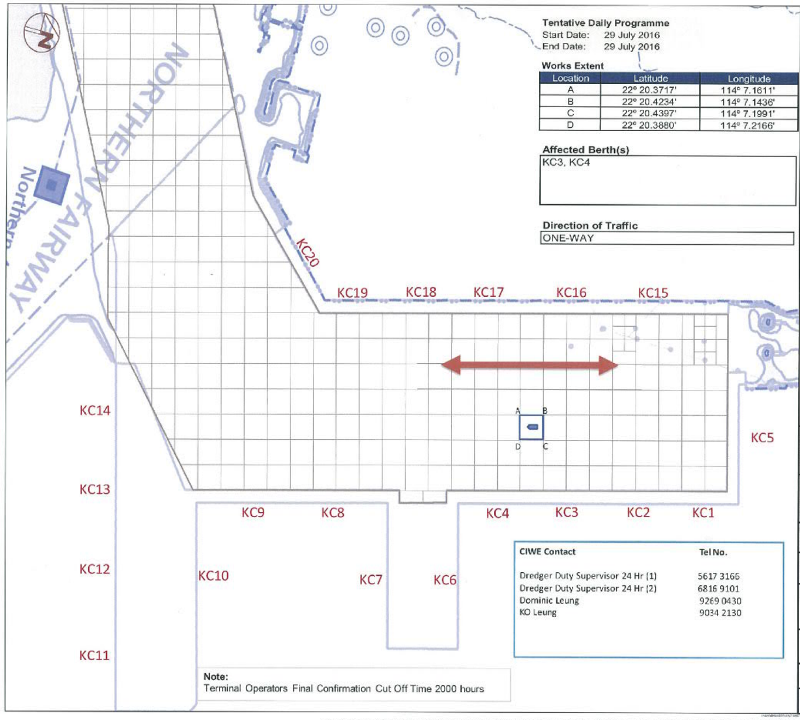
Tentative Daily Programme
Start Date: 29 July 2016
End Date: 29 July 2016

Works Extent

Location	Latitude	Longitude
A	22° 20.3717'	114° 7.1611'
B	22° 20.4234'	114° 7.1436'
C	22° 20.4397'	114° 7.1991'
D	22° 20.3880'	114° 7.2166'

Affected Berth(s)
KC3, KC4

Direction of Traffic
ONE-WAY



CIWE Contact	Tel No.
Dredger Duty Supervisor 24 Hr (1)	5617 3166
Dredger Duty Supervisor 24 Hr (2)	6816 9101
Dominic Leung	9269 0430
KO Leung	9034 2130

Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours

Notes:
MDN Nr. 74 of 2016
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme (1st sheet of 2)
29 July 2016 07:00 ~ 29 July 2016 11:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area

Box No.
C19

CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion AB - Container Basin Daily Programme
CIWE-KTCB-D1443
N.T.S.
A

C:\Users\CV201304\Desktop\WF & AB Working Programe\Portion AB Working Programme\Daily\[ZoneAB 2016-07-28 D1443 for C19..xlsx]Main

Sheet 2

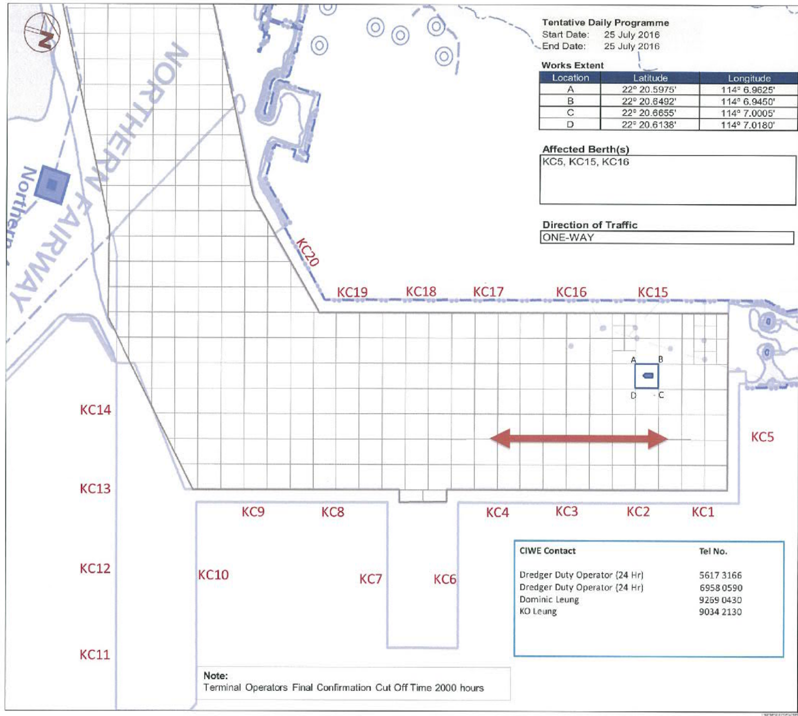
Tentative Daily Programme
Start Date: 25 July 2016
End Date: 25 July 2016

Works Extent

Location	Latitude	Longitude
A	22° 20.5975'	114° 6.9625'
B	22° 20.6492'	114° 6.9450'
C	22° 20.6655'	114° 7.0005'
D	22° 20.6138'	114° 7.0180'

Affected Berth(s)
KC5, KC15, KC16

Direction of Traffic
ONE-WAY



CIWE Contact	Tel No.
Dredger Duty Operator (24 Hr)	5617 3166
Dredger Duty Operator (24 Hr)	6958 0590
Dominic Leung	9269 0430
KO Leung	9034 2130

Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours

Notes:
MDN Nr. 74 of 2016
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme (1st sheet of 2)
25 July 2016 07:00 ~ 25 July 2016 11:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area

Box No.
E24

CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion AB - Container Basin Daily Programme
CIWE-KTCB-D1441
N.T.S.

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Sheet 3

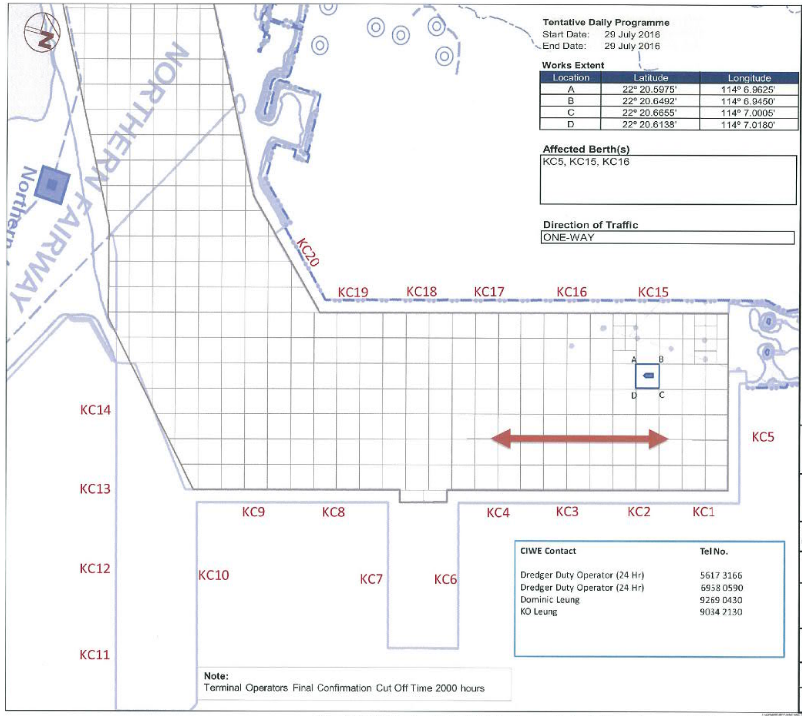
Tentative Daily Programme
Start Date: 29 July 2016
End Date: 29 July 2016

Works Extent

Location	Latitude	Longitude
A	22° 20.5975'	114° 6.9625'
B	22° 20.6492'	114° 6.9450'
C	22° 20.6655'	114° 7.0005'
D	22° 20.6138'	114° 7.0180'

Affected Berth(s)
KC5, KC15, KC16

Direction of Traffic
ONE-WAY



CIWE Contact	Tel No.
Dredger Duty Operator (24 Hr)	5617 3166
Dredger Duty Operator (24 Hr)	6958 0590
Dominic Leung	9269 0430
KO Leung	9034 2130

Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours

Notes:
MDN Nr. 74 of 2016
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme (2nd sheet of 2)
29 July 2016 12:00 ~ 29 July 2016 16:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area

Box No.
E24

CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion AB - Container Basin Daily Programme
CIWE-KTCB-D1444
N.T.S.

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Sheet 4

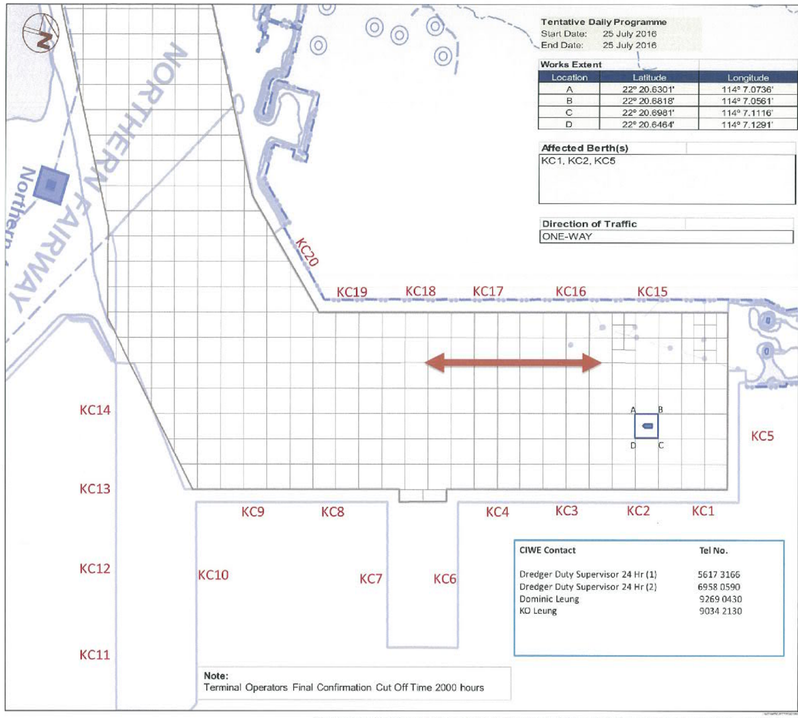
Tentative Daily Programme
Start Date: 25 July 2016
End Date: 25 July 2016

Works Extent

Location	Latitude	Longitude
A	22° 20.6301'	114° 7.0736'
B	22° 20.6818'	114° 7.0561'
C	22° 20.6981'	114° 7.1116'
D	22° 20.6464'	114° 7.1291'

Affected Berth(s)
KC1, KC2, KC5

Direction of Traffic
ONE-WAY



CIWE Contact	Tel No.
Dredger Duty Supervisor 24 Hr (1)	5617 3166
Dredger Duty Supervisor 24 Hr (2)	6958 0590
Dominic Leung	9269 0430
KO Leung	9034 2130

Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours

Notes:
MDN Nr. 74 of 2016
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme: (2nd sheet of 2)
25 July 2016 13:00 ~ 25 July 2016 17:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area

Box No.
C24

CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion AB - Container Basin Daily Programme
CIWE-KTCB-D1442
N.T.S.

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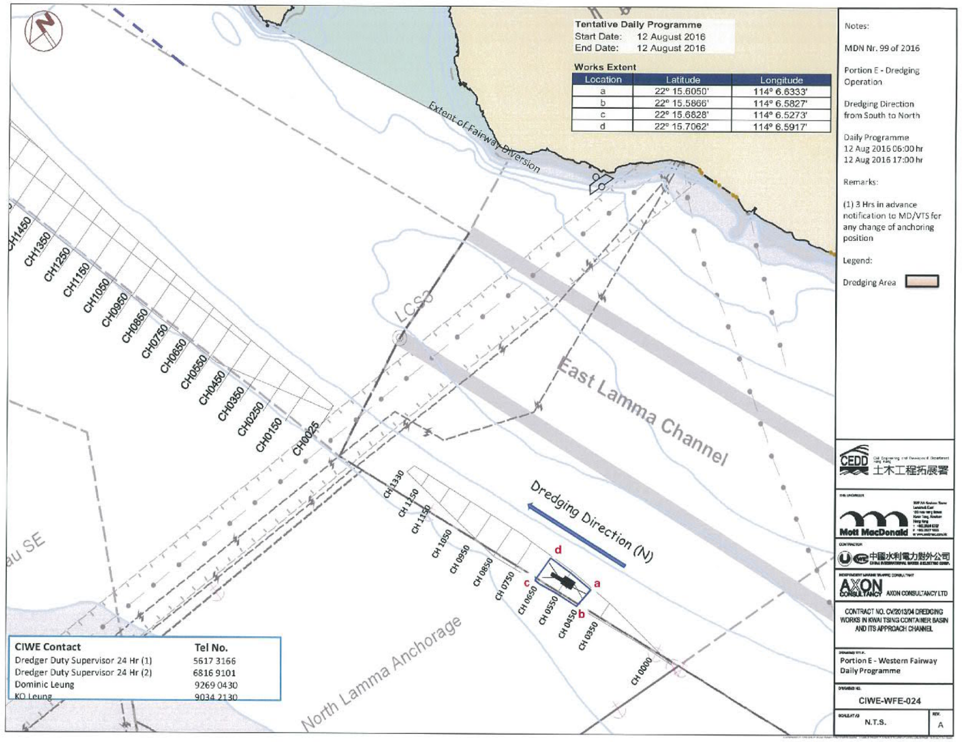
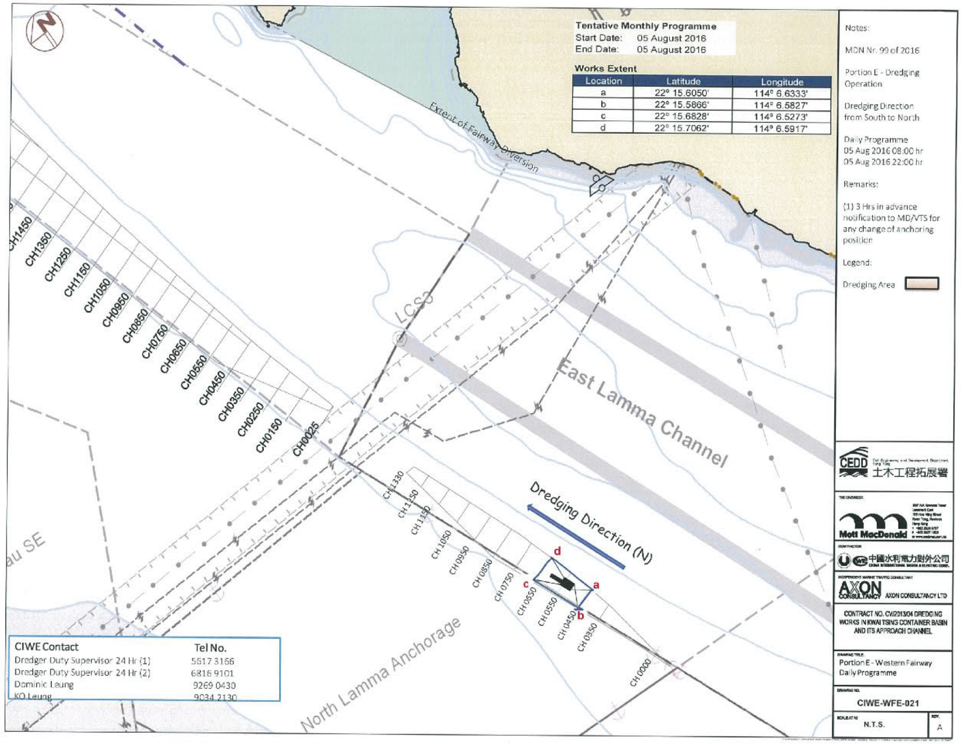
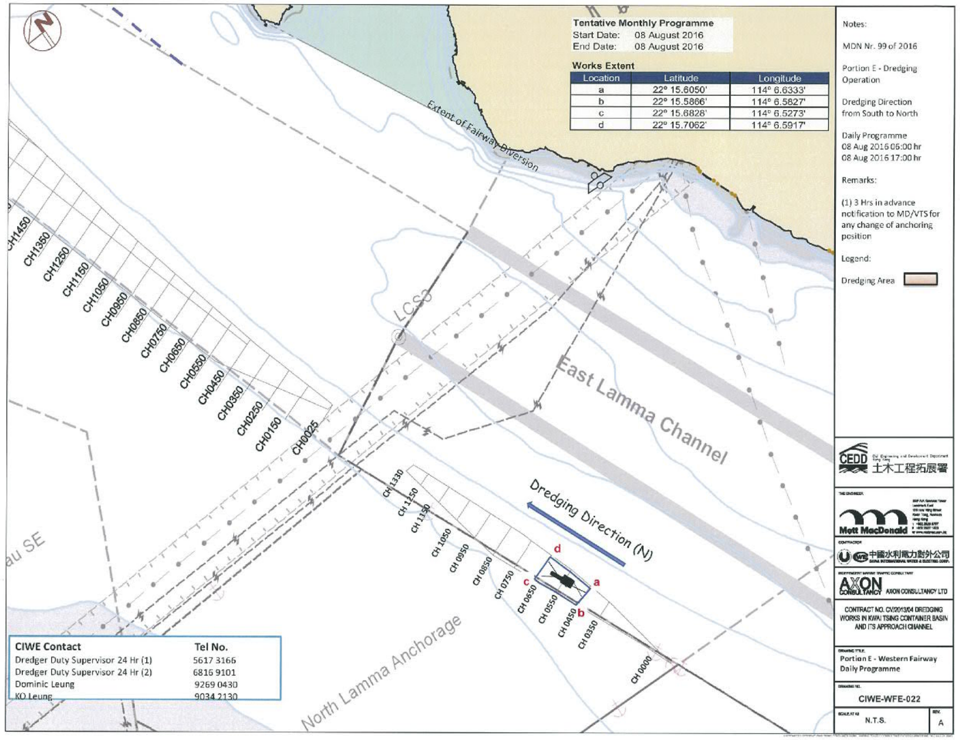

Tentative Daily Programme
Start Date: 12 August 2016
End Date: 12 August 2016
Works Extent
Location | Latitude | Longitude
a | 22° 15.6050' | 114° 6.6333'
b | 22° 15.5866' | 114° 6.5827'
c | 22° 15.6828' | 114° 6.5273'
d | 22° 15.7062' | 114° 6.5917'
Extent of Fairway Diversion
LCSS
East Lamma Channel
Dredging Direction (N)
North Lamma Anchorage
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) | 5617 3166
Dredger Duty Supervisor 24 Hr (2) | 6816 9101
Dominic Leung | 9269 0430
KO Leung | 9034 2130
Notes:
MDN Nr. 99 of 2016
Portion E - Dredging Operation
Dredging Direction from South to North
Daily Programme
12 Aug 2016 06:00 hr
12 Aug 2016 17:00 hr
Remarks:
(1) 3 Hrs in advance notification to MD/VTS for any change of anchoring position
Legend:
Dredging Area
CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion E - Western Fairway Daily Programme
CIWE-WFE-024
N.T.S.
A


Tentative Monthly Programme
Start Date: 05 August 2016
End Date: 05 August 2016
Works Extent
Location | Latitude | Longitude
a | 22° 15.6050' | 114° 6.6333'
b | 22° 15.5866' | 114° 6.5827'
c | 22° 15.6828' | 114° 6.5273'
d | 22° 15.7062' | 114° 6.5917'
Extent of Fairway Diversion
LCSS
East Lamma Channel
Dredging Direction (N)
North Lamma Anchorage
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) | 5617 3166
Dredger Duty Supervisor 24 Hr (2) | 6816 9101
Dominic Leung | 9269 0430
KO Leung | 9034 2130
Notes:
MDN Nr. 99 of 2016
Portion E - Dredging Operation
Dredging Direction from South to North
Daily Programme
05 Aug 2016 08:00 hr
05 Aug 2016 22:00 hr
Remarks:
(1) 3 Hrs in advance notification to MD/VTS for any change of anchoring position
Legend:
Dredging Area
CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion E - Western Fairway Daily Programme
CIWE-WFE-021
N.T.S.
A


Tentative Monthly Programme
Start Date: 08 August 2016
End Date: 08 August 2016
Works Extent
Location | Latitude | Longitude
a | 22° 15.6050' | 114° 6.6333'
b | 22° 15.5866' | 114° 6.5827'
c | 22° 15.6828' | 114° 6.5273'
d | 22° 15.7062' | 114° 6.5917'
Extent of Fairway Diversion
LCSS
East Lamma Channel
Dredging Direction (N)
North Lamma Anchorage
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) | 5617 3166
Dredger Duty Supervisor 24 Hr (2) | 6816 9101
Dominic Leung | 9269 0430
KO Leung | 9034 2130
Notes:
MDN Nr. 99 of 2016
Portion E - Dredging Operation
Dredging Direction from South to North
Daily Programme
08 Aug 2016 05:00 hr
08 Aug 2016 17:00 hr
Remarks:
(1) 3 Hrs in advance notification to MD/VTS for any change of anchoring position
Legend:
Dredging Area
CEDD 土木工程拓展署
Mott MacDonald
中國水利電力對外公司
AXON CONSULTANCY LTD
CONTRACT NO. CV/2013/04 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL
Portion E - Western Fairway Daily Programme
CIWE-WFE-022
N.T.S.
A

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, N.T., Hong Kong.
Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

Figure 3

Locations of Water Quality Monitoring Stations

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

NOTES: (1)

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
- CONTROL STATION
- GRADIENT STATION
- 24-HRS MONITORING STATION
- FISH CULTURE ZONE

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	APR 13	WH	TENDER ADDENDUM NO. 1	SL	CMH
0	APR 13	WH	TENDER DRAWING	SL	CMH

Mott MacDonald

20/F AIA Kowloon Tower
Landmark East
100 How Ming Street
Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
F +852 2827 1823
W www.mottmac.com.hk

Client

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

CEDD

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

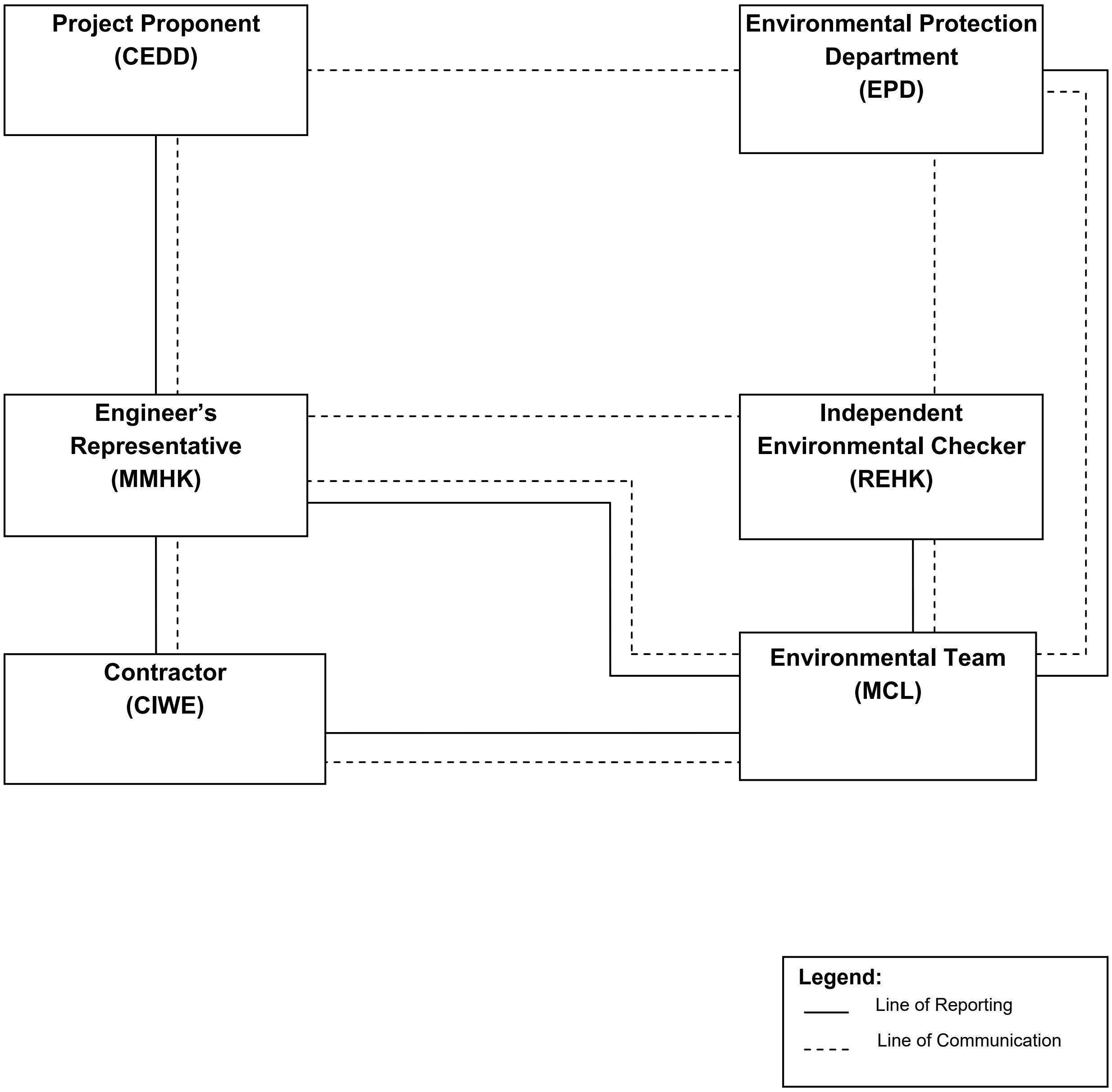
Designed	FC		Eng check	SL	
Drawn	WH		Coordination	TF	
Dwg check	FC		Approved	CMH	
Scale at A1: 1:35000		Status: TEN		Rev: 2	

Drawing Number

MMH/259053/EM/403

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

Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, N.T., Hong Kong.

Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

Appendix B

Construction Programme

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
1	**Contract Period**	**1351 days**	**Fri 30/8/13**	**Thu 11/5/17**			
2	**Contract Commencement Date**	**0 days**	**Fri 30/8/13**	**Fri 30/8/13**		4SS	
3	**Extended Contract Completion Date**	**0 days**	**Mon 9/5/16**	**Mon 9/5/16**		284FF	
4	**Possession of Site**	**0 day**	[illegible]	[illegible]	S,18SS,31SS,41SS		N
5	**Section 1**	**1351 days**	**Fri 30/8/13**	**Thu 11/5/17**			
6	**Submission**	**972 days**	**Fri 30/8/13**	**Wed 27/4/16**			
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	131	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	135	136	N
16	Final report	27 days	Sat 22/3/14	Thu 17/4/14	136	183,185,202	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	139	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	143	144	N
22	Final report	37 days	Tue 10/6/14	Wed 16/7/14	144	187	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		147	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	151	152	N
27	Final report	37 days	Thu 20/11/14	Fri 26/12/14	152	187FS-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		154	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		202	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	162	N
36	Initial report	12 days	Mon 20/1/14	Fri 31/1/14	163	164	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	167	N
39	Initial survey Report	29 days	Mon 27/1/14	Mon 24/2/14	167	168	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		173FS-60 days	N
43	Webbase software and Trial Run	50 days	Fri 27/9/13	Fri 15/11/13	41	173	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		185,178	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		202	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	202	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		185	N
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		183,185	N

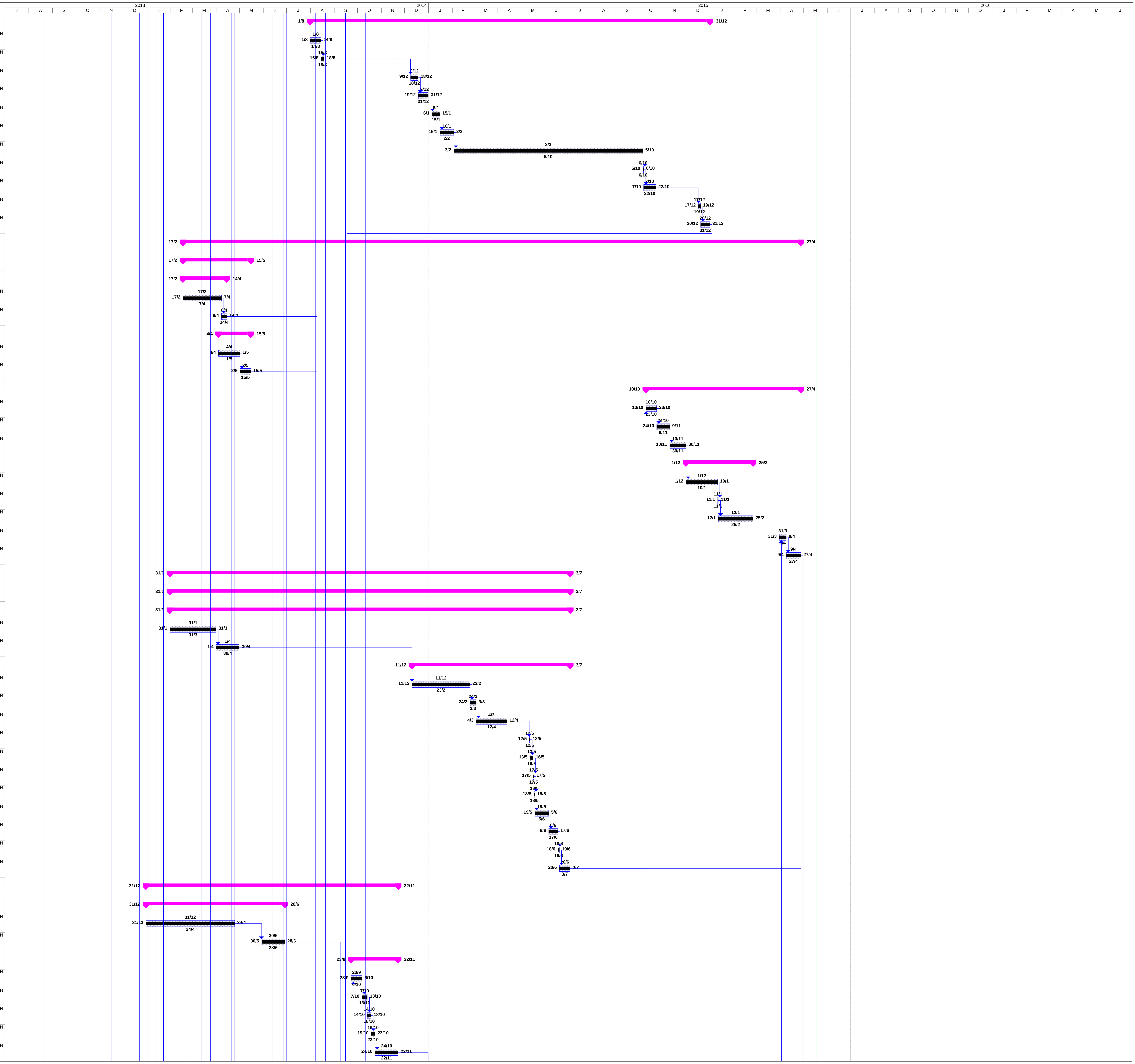
China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

* Subject to availability of working windows

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
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	188	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	183,185,202,187	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	183,187	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	192	N
86	Preparation and submission	9 days	Thu 31/3/16	Fri 8/4/16	192	87	N
87	Approval by EPD	19 days	Sat 9/4/16	Wed 27/4/16	86	193	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	190,79,193	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	195	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	195	111	N
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	196	N



China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

* Subject to availability of working windows

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Bar Top: Late Start, Bar Bottom: Late Finish

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
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	197	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		202	N
124	Noise Permit	95 days	Wed 18/12/13	Sat 22/3/14		202	N
125	Dumping Permit	57 days	Thu 2/1/14	Thu 27/2/14		202	N
126	**Works**	**1323 days**	**Fri 27/9/13**	**Thu 11/5/17**			
127	**Routine Monitoring / Temporary Marine Traffic Management**	**1036 days**	**Fri 27/9/13**	**Thu 28/7/16**			
128	**Environmental Management**	**1022 days**	**Fri 27/9/13**	**Thu 14/7/16**			
129	**Baseline monitoring**	**81 days**	**Tue 31/12/13**	**Fri 21/3/14**			
130	**Monitoring (Location see Drg No. EM/401)**	**81 days**	**Tue 31/12/13**	**Fri 21/3/14**			
131	Mobilization	3 days	Tue 31/12/13	Thu 2/1/14	13	133,135	1
132	**Field works and Lab Test**	**78 days**	**Fri 3/1/14**	**Fri 21/3/14**			
133	Field works	3 days	Fri 3/1/14	Sun 5/1/14	131	135SS+3 days	1
134	**Lab test**	**75 days**	**Mon 6/1/14**	**Fri 21/3/14**			
135	Chemical test	14 days	Mon 6/1/14	Sun 19/1/14	133SS+3 days,131	15	N
136	Biological test	42 days	Sat 8/2/14	Fri 21/3/14	15	16	N
137	**Grab sample (Portions A, B & C)**	**256 days**	**Fri 27/9/13**	**Mon 9/6/14**			
138	Marine Department Notice	45 days	Fri 27/9/13	Sun 10/11/13		139	N
139	Grab sample specialist mobilization	7 days	Mon 10/3/14	Sun 16/3/14	19,138	141	2
140	**Grab sample (field works) and Lab Test**	**85 days**	**Mon 17/3/14**	**Mon 9/6/14**			
141	Field works	3 days	Mon 17/3/14	Wed 19/3/14	139	143	2
142	**Lab test**	**82 days**	**Thu 20/3/14**	**Mon 9/6/14**			
143	Chemical test	14 days	Thu 20/3/14	Wed 2/4/14	141	21	N
144	Biological test	42 days	Tue 29/4/14	Mon 9/6/14	21	22	N
145	**Vibro-coring (Portions A, B & C)**	**127 days**	**Wed 16/7/14**	**Wed 19/11/14**			
146	Marine Department Notice	28 days	Wed 16/7/14	Tue 12/8/14		147	N
147	Vibro-coring specialist mobilization	9 days	Mon 18/8/14	Tue 26/8/14	24,146	149	3
148	**Vibro-coring (field works) and Lab Test**	**85 days**	**Wed 27/8/14**	**Wed 19/11/14**			
149	Field works	3 days	Wed 27/8/14	Fri 29/8/14	147	151	3
150	**Lab test**	**82 days**	**Sat 30/8/14**	**Wed 19/11/14**			
151	Chemical test	14 days	Sat 30/8/14	Fri 12/9/14	149	26	N
152	Biological test	42 days	Thu 9/10/14	Wed 19/11/14	26	27	N
153	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**884 days**	**Wed 12/2/14**	**Thu 14/7/16**			
154	Procurement and delivery	45 days	Wed 12/2/14	Fri 28/3/14	29	155	N
155	Installation	14 days	Sat 29/3/14	Fri 11/4/14	154	156	1
156	Monitoring	812 days	Fri 25/4/14	Thu 14/7/16	155,202	158FF,199FF	1
157	**Impact monitoring (Location see Drg No. EM/401)**	**812 days**	**Fri 25/4/14**	**Thu 14/7/16**			
158	Impact monitoring and report submission	812 days	Fri 25/4/14	Thu 14/7/16	156FF	199FF	1
159	**Survey**	**952 days**	**Fri 20/12/13**	**Thu 28/7/16**			
160	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**938 days**	**Fri 20/12/13**	**Thu 14/7/16**			
161	**Settlement markers**	**938 days**	**Fri 20/12/13**	**Thu 14/7/16**			
162	Installation	14 days	Fri 20/12/13	Thu 2/1/14	35	163	4
163	Initial survey	7 days	Mon 13/1/14	Sun 19/1/14	162	36	4
164	Interim monitoring	812 days	Fri 25/4/14	Thu 14/7/16	168FF,202,36	199FF	4
165	**Hydrographic Survey (Portions A to E)**	**928 days**	**Mon 13/1/14**	**Thu 28/7/16**			
166	**Initial survey**	**14 days**	**Mon 13/1/14**	**Sun 26/1/14**			
167	Field works	14 days	Mon 13/1/14	Sun 26/1/14	38	39	5
168	Interim survey	718 days	Tue 1/7/14	Fri 17/6/16	39	169,164FF	5
169	Final survey	7 days	Fri 15/7/16	[illegible]	98,214,209,206,199	170	5
170	Final survey report	7 days	Fri 22/7/16	Thu 28/7/16	169		N
171	**Temporary Marine Traffic Management (Portions A to E)**	**1005 days**	**Mon 30/9/13**	**Thu 30/6/16**			

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

* Subject to availability of working windows

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Bar Top: Late Start, Bar Bottom: Late Finish

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
172	Organizing meeting for information collection	990 days	Mon 30/9/13	Wed 15/6/16			N
173	Temporary marine traffic management and TMTM meeting	952 days	Fri 22/11/13	Thu 30/6/16	42FS-60 days,43		N
174	**Dredging Works (Portions A to E)**	**964 days**	**Sun 1/12/13**	**Thu 21/7/16**			
175	**Interface with other contractors or utility undertakeings**	**943 days**	**Sun 1/12/13**	**Thu 30/6/16**			
176	Organizing coordination meeting	943 days	Sun 1/12/13	Thu 30/6/16			N
177	**Silt screen (Location see Drg No. EM/401)**	**882 days**	**Fri 21/2/14**	**Thu 21/7/16**			
178	Installation of silt screen	7 days	Fri 21/2/14	Thu 27/2/14	47	179,202	6
179	Maintenance of silt screen	813 days	Thu 24/4/14	Thu 14/7/16	178	180,199FF	6
180	Removal of silt screen	7 days	Fri 15/7/16	Thu 21/7/16	179		6
181	**Dredging Works at Portions A and B**	**710 days**	**Mon 9/6/14**	**Wed 18/5/16**			
182	**General seabed**	**701 days**	**Mon 9/6/14**	**Mon 9/5/16**			
183	Mobilization	42 days	Fri 27/6/14	Thu 7/8/14	74,77,16,57	185	7
184	Fabrication of silt curtain	7 days	Mon 9/6/14	Sun 15/6/14		185	8
185	Pilot test for silt curtain	2 days	Fri 8/8/14	Sat 9/8/	,184,74,16,47,55,57	187	7
186	Monitoring brief for unidentified sonar contacts & masked areas	3 days	Wed 2/7/14	Fri 4/7/14		187	N
187	Dredging works 1 (subject to availability of working windows)	30 days	Sun 10/8/14	Mon	,74,77,22,27FS-139 days	195	7
188	Dredging works 2 (subject to availability of working windows)	595 days	Tue 23/9/14	Mon 9/5/16	195,69	169,199	7
189	**Type 3 Cat Hf Sediment (Portion A)**	**292 days**	**Sat 1/8/15**	**Wed 18/5/16**			
190	Procurement and delivery of Geo-container	112 days	Sat 1/8/15	Fri 20/11/15	104	192	N
191	**Trial dumping operation of Type 2 sediment using geo-containers**	**34 days**	**Fri 26/2/16**	**Wed 30/3/16**			
192	Trial dumping	34 days	Fri 26/2/16	Wed 30/3/16	85,190	193,86	7
193	Dredging works	21 days	Thu 28/4/16	Wed 18/5/16	104,192,87		7
194	**Hot Spot (Portion A)**	**609 days**	**Tue 9/9/14**	**Mon 9/5/16**			
195	Field trial at Zone Z2C	14 days	Tue 9/9/14	Mon 22/9/14	187,108	188,110	7
196	Dredging works at Z2B *	493 days	Thu 1/1/15	Mon 9/5/16	114	169	7
197	Dredging of hard material *	493 days	Thu 1/1/15	Mon 9/5/16	121	169	7
198	Outfall demolition works*	70 days	Tue 1/3/16	Mon 9/5/16		169,199	7
199	Removal of high spots*	66 days	Tue 10/5/16		58FF,164FF,179FF	220FS-14 days,169	7
200	**Dredging Works for Portions C, D and E**	**707 days**	**Fri 18/4/14**	**Thu 24/3/16**			
201	**Dredging Works for Portion D**	**666 days**	**Fri 18/4/14**	**Fri 12/2/16**			
202	Mobilization	7 days	Fri 18/4/14	Tl	,16,52,123,124,125	203,204,156,164	9
203	Pilot test of silt curtain	2 days	Fri 25/4/14	Sat 26/4/14	202	204FF	9
204	Trial dredging	2 days	Fri 25/4/14	Sat 26/4/14	202,203FF	205	9
205	Dredging works	153 days	Sun 27/4/14	Fri 26/9/14	204	208,206	9
206	Removal of high spots	1 day	Fri 12/2/16	Fri 12/2/16	205,209FF	169	9
207	**Dredging Works for Portion E**	**504 days**	**Sat 27/9/14**	**Fri 12/2/16**			
208	Dredging Works	51 days	Sat 27/9/14	Sun 16/11/14	205	209,211,213	9
209	Removal of high spots	1 day	Fri 12/2/16	Fri 12/2/16	208,214SS+20 days	169,206FF	9
210	**Dredging Works for Portion C**	**478 days**	**Wed 3/12/14**	**Thu 24/3/16**			
211	Northern west section	260 days	Wed 3/12/14	Wed 19/8/15	208		7,9
212	Middle section	16 days	Thu 5/11/15	Fri 20/11/15	213FS+4 days	214	7
213	Southern east section	321 days	Mon 15/12/14	Sat 31/10/15	208	212FS+4 days	7,9
214	Removal of high spots	62 days	Sat 23/1/16	Thu 24/3/16	212	169,209SS+20 days	7,9
215	**Marine Ground Investigation Works near KC5 in Portion A**	**74 days**	**Fri 1/4/16**	**Mon 13/6/16**			
216	Mobilization	7 days	Fri 1/4/16	Thu 7/4/16		217	15
217	Drilling*	32 days	Fri 8/4/16	Mon 9/5/16	216	218	15
218	Report	35 days	Tue 10/5/16	Mon 13/6/16	217		N
219	**Remaining Works**	**315 days**	**Fri 1/7/16**	**Thu 11/5/17**			
220	Removal of rock material outside berth KC5 (Details to be confirmed later)*	304 days	Fri 1/7/16	Sun 30/4/17	199FS-14 days		16
221	Dredging works around Tsing Yi Submarine Outfall*	14 days	Fri 28/4/17	Thu 11/5/17	283		7
222	**Section 2**	**1337 days**	**Fri 30/8/13**	**Thu 27/4/17**			
223	**Submission**	**1064 days**	**Wed 11/9/13**	**Tue 9/8/16**			
224	**Preliminaries (Portion F)**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**			
225	**Engineer Principal Accommodation**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**			
226	Preparation and submisssion of location and layout	0 days	Wed 11/9/13	Wed 11/9/13		227	N
227	Approval of location and layout	30 days	Thu 12/9/13	Fri 11/10/13	226	229	N
228	Independent Checking Engineer (ICE)	14 days	Mon 7/10/13	Sun 20/10/13	229FF-1 day		N

China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

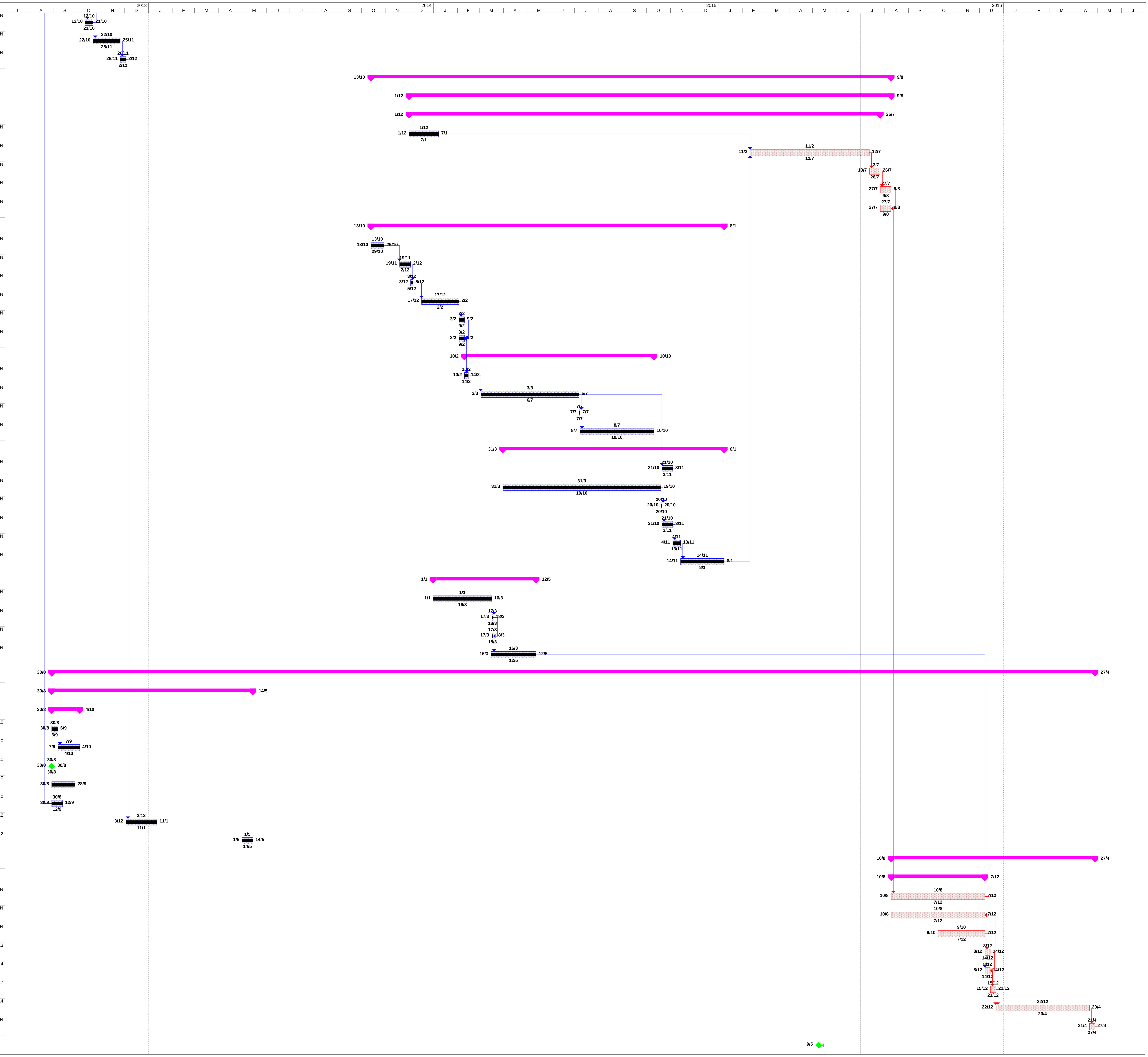
* Subject to availability of working windows

Bar Left: Early Start, Bar Right: Early Finish
Bar Top: Late Start, Bar Bottom: Late Finish

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
GCC Clause 16 Programme (Version 15)

Date: 2 July 2016

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
229	Preparation of calculation	10 days	Sat 12/10/13	Mon 21/10/13	227	230,228FF-1 day	N
230	Comment and resubmission of calculation	35 days	Tue 22/10/13	Mon 25/11/13	229	231	N
231	Approval of calculation	7 days	Tue 26/11/13	Mon 2/12/13	230	272	N
232	**Outfall Modification Works (Location see Drg No. S202)**	**667 days**	**Mon 13/10/14**	**Tue 9/8/16**			
233	**Method statement for modification works**	**618 days**	**Mon 1/12/14**	**Tue 9/8/16**			
234	**Preparation and submission**	**604 days**	**Mon 1/12/14**	**Tue 26/7/16**			
235	Preparation and submission	38 days	Mon 1/12/14	Wed 7/1/15		236	N
236	Awaiting resolving TMTA constraints	153 days	Thu 11/2/16	Tue 12/7/16	235,258	237	N
237	Resubmission	14 days	Wed 13/7/16	Tue 26/7/16	236	238	N
238	Approval by Mott	14 days	Wed 27/7/16	Tue 9/8/16	237	239FF	N
239	Approval by DSD	14 days	Wed 27/7/16	Tue 9/8/16	238FF	276	N
240	**Flow Measurement Survey**	**453 days**	**Mon 13/10/14**	**Fri 8/1/16**			
241	Preparation and submission	17 days	Mon 13/10/14	Wed 29/10/14		242	N
242	Resubmission	14 days	Wed 19/11/14	Tue 2/12/14	241	243	N
243	Further comment by Mott	3 days	Wed 3/12/14	Fri 5/12/14	242	244	N
244	Resubmission	48 days	Wed 17/12/14	Mon 2/2/15	243	245	N
245	Approval by Mott	7 days	Tue 3/2/15	Mon 9/2/15	244	246FF	N
246	Approval by DSD	7 days	Tue 3/2/15	Mon 9/2/15	245FF	248	N
247	**Flow Survey Measurement report**	**243 days**	**Tue 10/2/15**	**Sat 10/10/15**			
248	Analyzing survey data	5 days	Tue 10/2/15	Sat 14/2/15	246	249	N
249	Preparation and submission	126 days	Tue 3/3/15	Mon 6/7/15	248	253,250	N
250	Approval by Mott	1 day	Tue 7/7/15	Tue 7/7/15	249	251	N
251	Approval by DSD	95 days	Wed 8/7/15	Sat 10/10/15	250		N
252	**Engineer's Assessment Report on Flow Measurement Survey**	**284 days**	**Tue 31/3/15**	**Fri 8/1/16**			
253	Assessment calculations	14 days	Wed 21/10/15	Tue 3/11/15	249	257	N
254	Preparation and submission	203 days	Tue 31/3/15	Mon 19/10/15		255	N
255	Further comment by Mott	1 day	Tue 20/10/15	Tue 20/10/15	254	256	N
256	Resubmission	14 days	Wed 21/10/15	Tue 3/11/15	255	257	N
257	Approval by Mott	10 days	Wed 4/11/15	Fri 13/11/15	256,253	258	N
258	Approval by DSD	56 days	Sat 14/11/15	Fri 8/1/16	257	236	N
259	**Video Filming and Dye Test**	**132 days**	**Thu 1/1/15**	**Tue 12/5/15**			
260	Preparation and submission	75 days	Thu 1/1/15	Mon 16/3/15		261,263FS-1 day	N
261	Approval by Mott	2 days	Tue 17/3/15	Wed 18/3/15	260	262FF	N
262	Approval by DSD	2 days	Tue 17/3/15	Wed 18/3/15	261FF		N
263	Using digital camera in lieu of CCTV	58 days	Mon 16/3/15	Tue 12/5/15	260FS-1 day	280	N
264	**Works**	**1337 days**	**Fri 30/8/13**	**Thu 27/4/17**			
265	**Preliminaries (Portion F)**	**258 days**	**Fri 30/8/13**	**Wed 14/5/14**			
266	**Contractor's mobilization**	**36 days**	**Fri 30/8/13**	**Fri 4/10/13**			
267	Site clearance	8 days	Fri 30/8/13	Fri 6/9/13		4SS,268	10
268	Contractor's site office	28 days	Sat 7/9/13	Fri 4/10/13	267		10
269	Security Guard	0 days	Fri 30/8/13	Fri 30/8/13		4SS	11
270	Temporary electricity power supply	30 days	Fri 30/8/13	Sat 28/9/13		4SS	10
271	Engineer's Initial Temporary Accommodation	14 days	Fri 30/8/13	Thu 12/9/13		4SS	10
272	Engineer's Principal Accommodation	40 days	Tue 3/12/13	Sat 11/1/14	231		12
273	Engineer's Car Park	14 days	Thu 1/5/14	Wed 14/5/14			12
274	**Outfall Modification Works (Location see Drg No. S202)**	**261 days**	**Wed 10/8/16**	**Thu 27/4/17**			
275	**Procurement of material**	**120 days**	**Wed 10/8/16**	**Wed 7/12/16**			
276	Non return valves	120 days	Wed 10/8/16	Wed 7/12/16	239	277FF,279	N
277	Flange adaptors	120 days	Wed 10/8/16	Wed 7/12/16	276FF	282,279	N
278	1200mm diameter concret pipes	60 days	Sun 9/10/16	Wed 7/12/16		282,279	N
279	Dye test	7 days	Thu 8/12/16	Wed 14/12/16	278,276,277	280FF	13
280	Video filming	7 days	Thu 8/12/16	Wed 14/12/16	279FF,263	281	14
281	Dredging works	7 days	Thu 15/12/16	Wed 21/12/16	280	282	7
282	Modification works	120 days	Thu 22/12/16	Thu 20/4/17	277,278,281	283	14
283	As-built video submission	7 days	Fri 21/4/17	Thu 27/4/17	282	221	N
284	**Extended Contract Completion Date**	**0 days**	**Mon 9/5/16**	**Mon 9/5/16**	3FF		



China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

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Report No.: 0394/13/ED/0335A

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																				
SR1	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
SR4																				
SR12																				
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
SR9	6.11	6.02#	6.11	6.04+	2.9 or 120%C*	4.8 or 130%C^	9 or 120%C*	18 or 130%C^											0.22	0.29
SR10																				
SR11																				
Gazetted Beach																				
SR2	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
SR3																				
Corals																				
SR6	6.11	6.02#	6.11	6.04+	2.9 or 120%C*	4.8 or 130%C^	9 or 120%C*	18 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SR7																				
SR8																				
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																				
SR1 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
SR9 SR10 SR11	5.00	5.00#	4.41	4.25+	4.0 or 120%C*	8.7 or 130%C^	9 or 120%C*	18 or 130%C^											0.37	0.49
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
Corals																				
SR6 SR7 SR8	5.00	4.82#	4.41	4.25+	4.0 or 120%C*	8.7 or 130%C^	9 or 120%C*	18 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	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)

<table>
<tr><th rowspan="2">Monitoring Station</th><th colspan="2">DO (mg/L)
Surface</th><th colspan="2">Turbidity (NTU)
Surface</th><th colspan="2">Ammonia-N (mg/L)
Surface</th></tr>
<tr><th>AL</th><th>LL</th><th>AL</th><th>LL</th><th>AL</th><th>LL</th></tr>
<tr><td colspan="7">WSD Seawater Intake</td></tr>
<tr><td>SR4</td><td rowspan="2">2</td><td rowspan="2">2</td><td rowspan="2"><10</td><td rowspan="2"><10</td><td rowspan="2"><1</td><td rowspan="2"><1</td></tr>
<tr><td>SR12</td></tr>
<tr><td colspan="7">Fish Culture Zone</td></tr>
<tr><td>SR5</td><td>5.46</td><td>5.39</td><td>6.0</td><td>7.9</td><td rowspan="4">NA</td><td rowspan="4">NA</td></tr>
<tr><td>SR9</td><td rowspan="3">6.12</td><td rowspan="3">5.97</td><td rowspan="3">2.8</td><td rowspan="3">4.7</td></tr>
<tr><td>SR10</td></tr>
<tr><td>SR11</td></tr>
<tr><td colspan="7">EMSD Cooling Water Intake</td></tr>
<tr><td>SR13</td><td>5.28</td><td>5.22</td><td>11.9</td><td>13.3</td><td>NA</td><td>NA</td></tr>
</table>

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)

<table>
<tr><th rowspan="2">Monitoring Station</th><th colspan="2">DO (mg/L)
Surface</th><th colspan="2">Turbidity (NTU)
Surface</th><th colspan="2">Ammonia-N (mg/L)
Surface</th></tr>
<tr><th>AL</th><th>LL</th><th>AL</th><th>LL</th><th>AL</th><th>LL</th></tr>
<tr><td colspan="7">WSD Seawater Intake</td></tr>
<tr><td>SR4</td><td rowspan="2">2</td><td rowspan="2">2</td><td rowspan="2"><10</td><td rowspan="2"><10</td><td rowspan="2"><1</td><td rowspan="2"><1</td></tr>
<tr><td>SR12</td></tr>
<tr><td colspan="7">Fish Culture Zone</td></tr>
<tr><td>SR5</td><td>5.24</td><td>5.13</td><td>9.7</td><td>14.4</td><td rowspan="4">NA</td><td rowspan="4">NA</td></tr>
<tr><td>SR9</td><td rowspan="3">5.13</td><td rowspan="3">5.00#</td><td rowspan="3">5.9</td><td rowspan="3">7.1</td></tr>
<tr><td>SR10</td></tr>
<tr><td>SR11</td></tr>
<tr><td colspan="7">EMSD Cooling Water Intake</td></tr>
<tr><td>SR13</td><td>4.23</td><td>4.17</td><td>11.9</td><td>13.3</td><td>NA</td><td>NA</td></tr>
</table>

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)

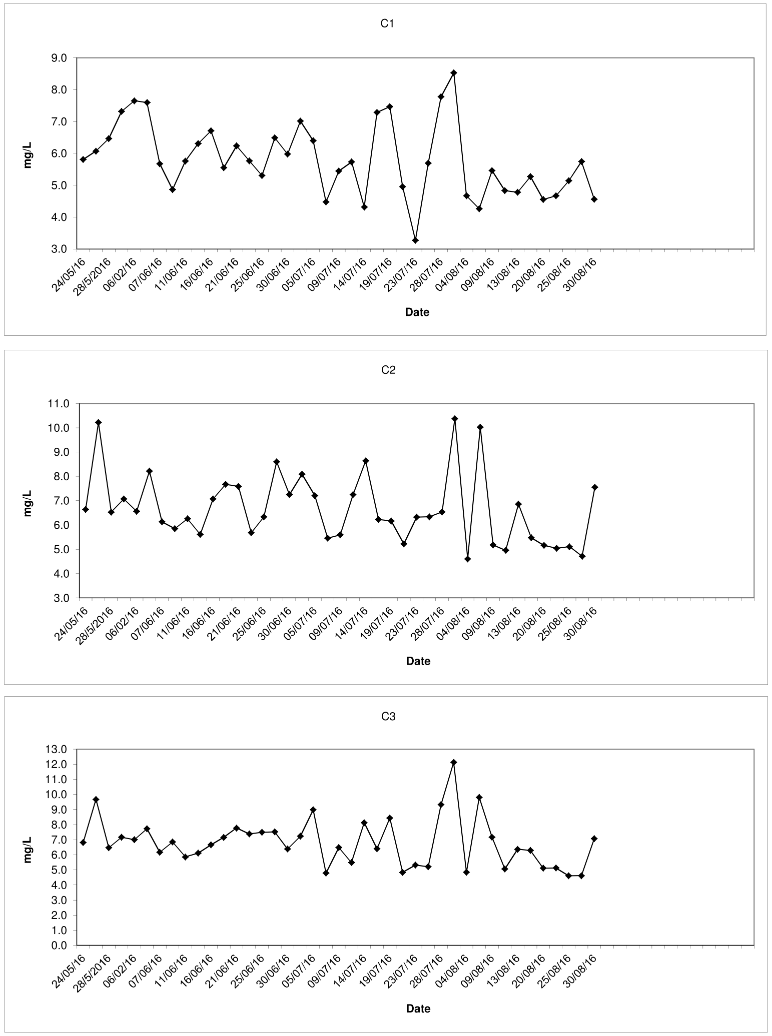
Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and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

Wet Season: April to October

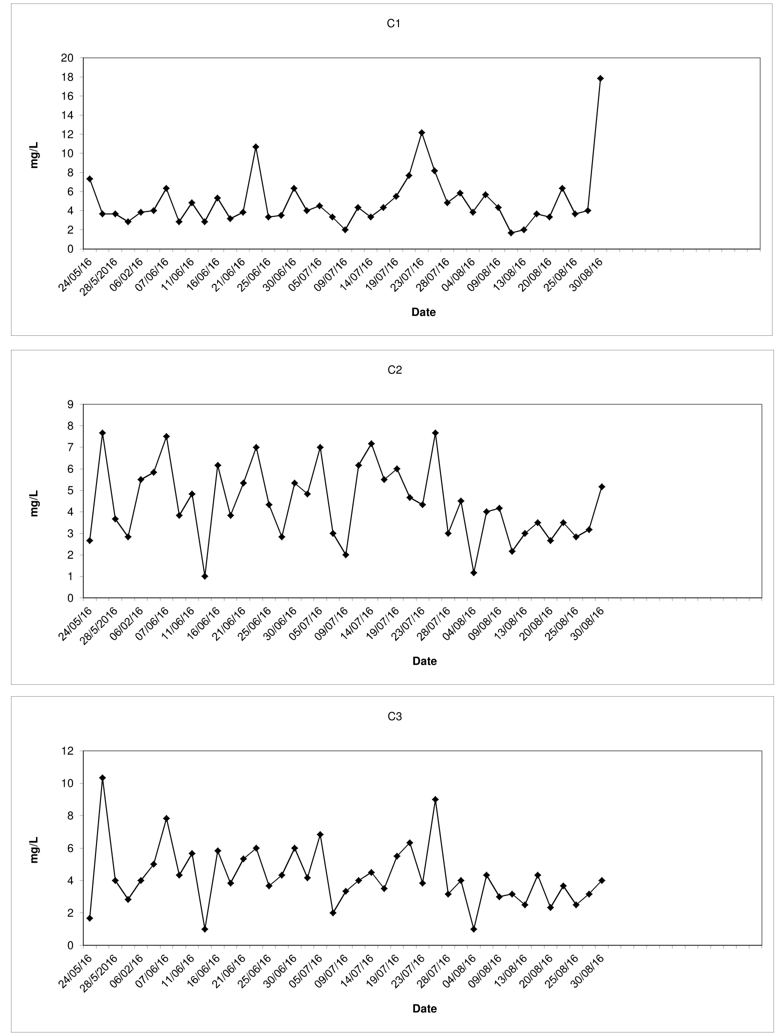
Appendix D

Graphical Presentation – Routine Impact Monitoring Results

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

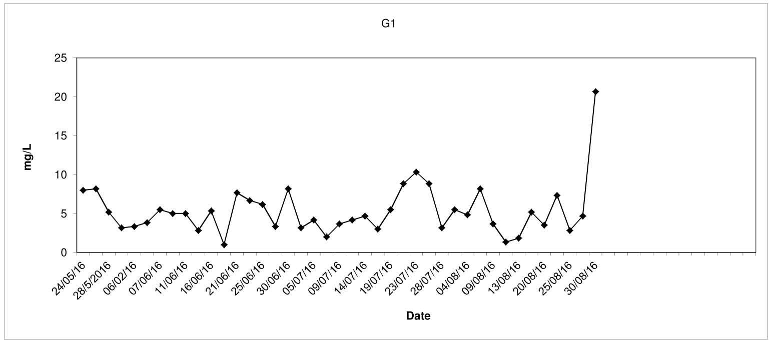


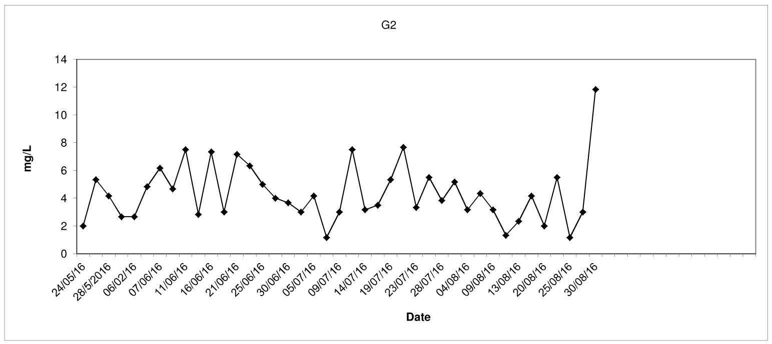
Total Suspended Solids (Depth average) at Mid-Ebb Tide

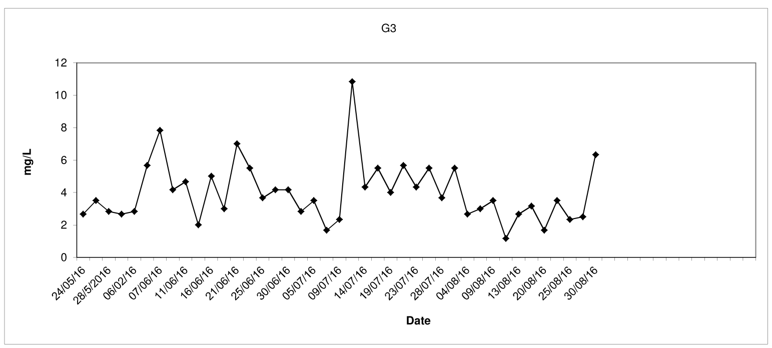


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

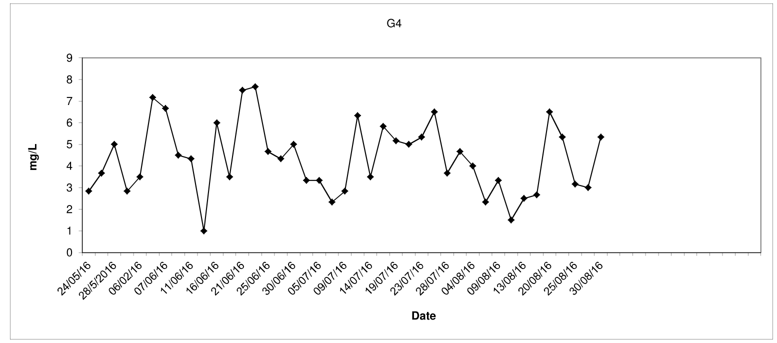
Total Suspended Solids (Depth average) at Mid-Ebb Tide

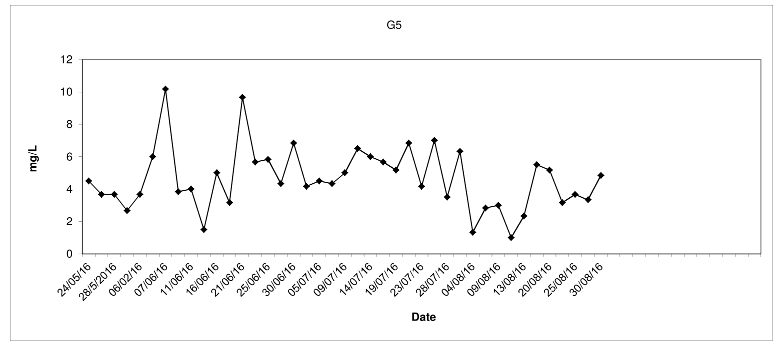


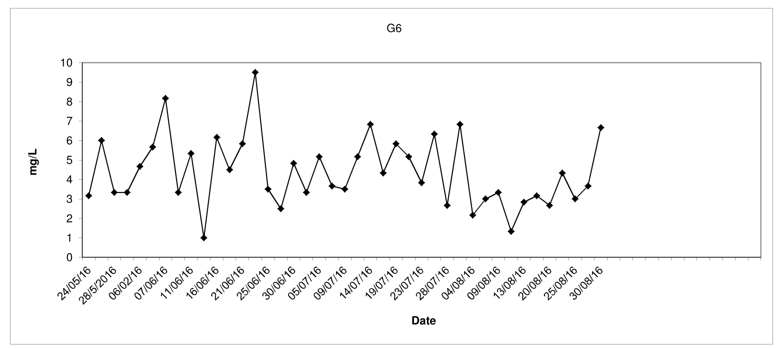




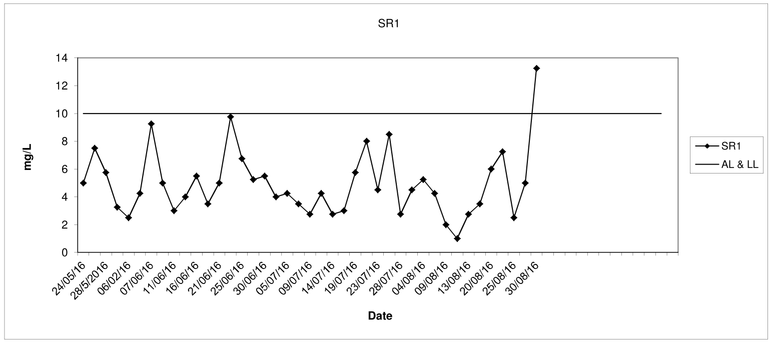
Total Suspended Solids (Depth average) at Mid-Ebb Tide

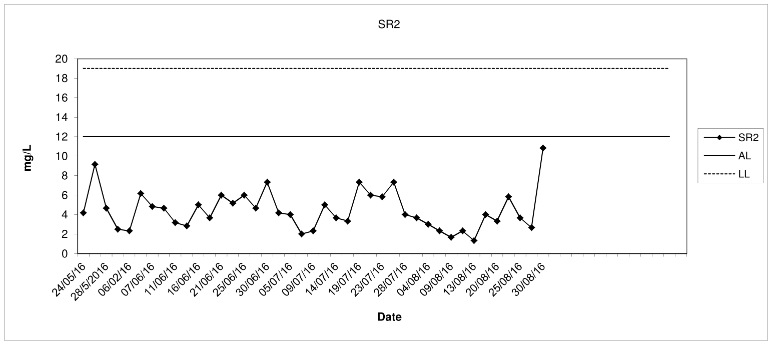


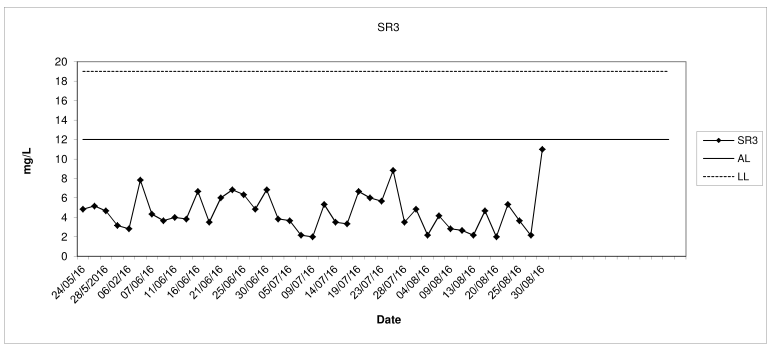




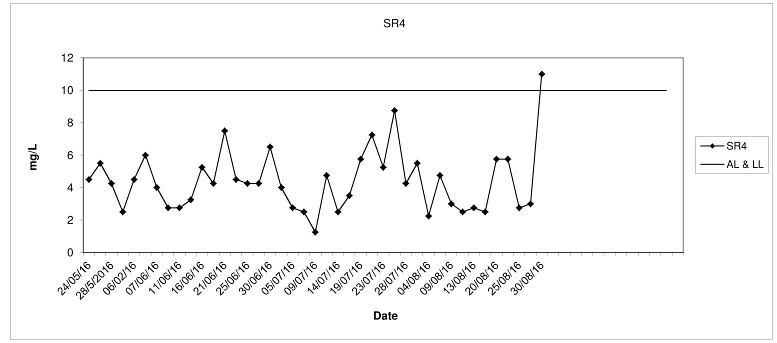
Total Suspended Solids (Depth average) at Mid-Ebb Tide

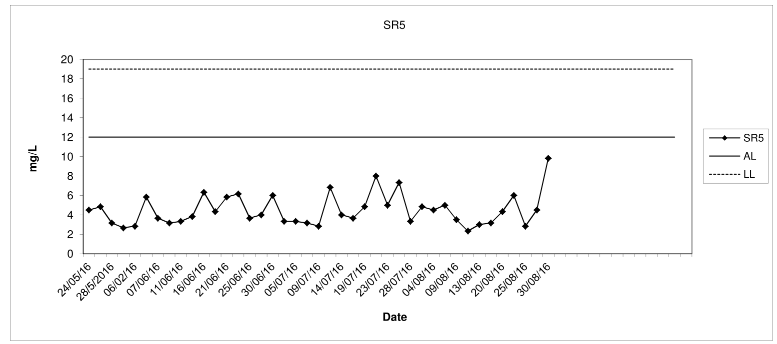


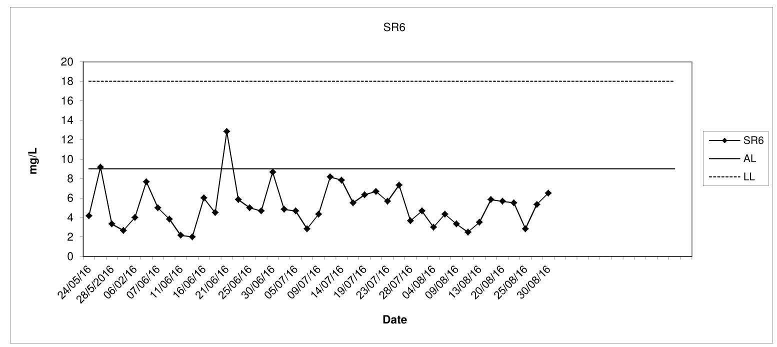




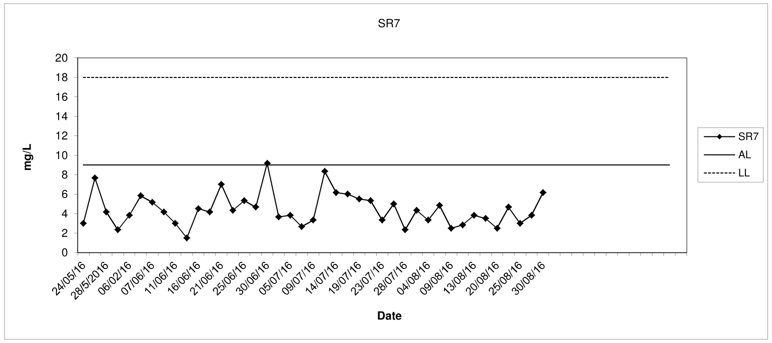
Total Suspended Solids (Depth average) at Mid-Ebb Tide

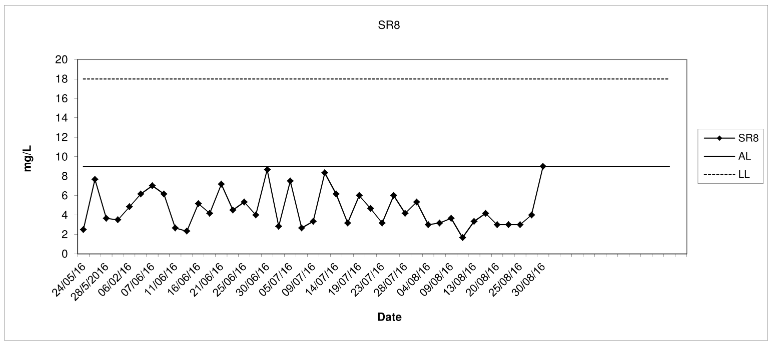


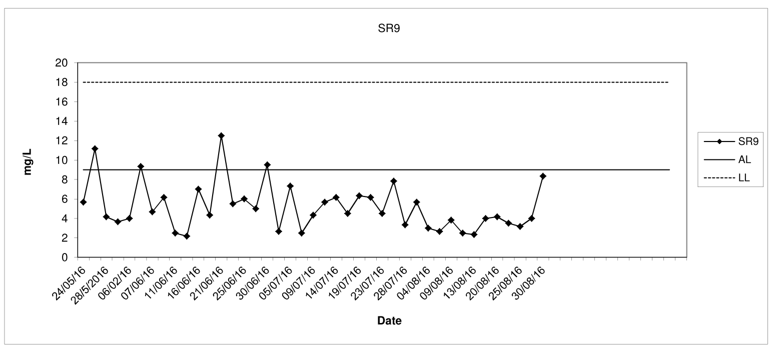




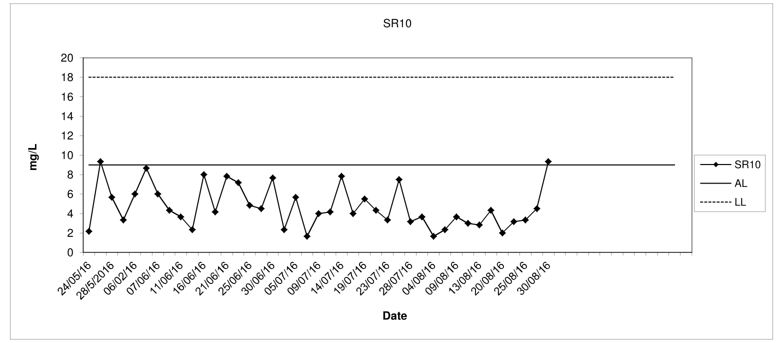
Total Suspended Solids (Depth average) at Mid-Ebb Tide

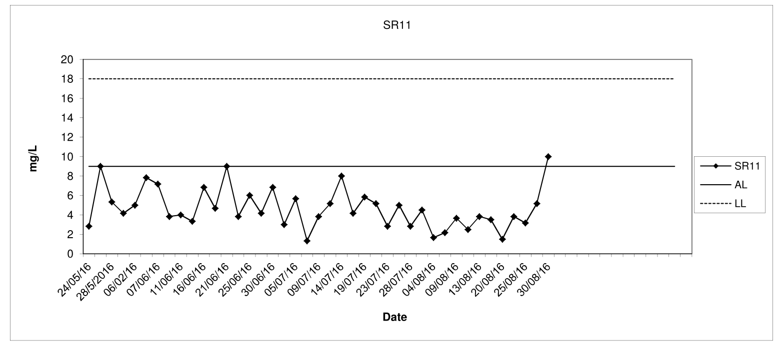


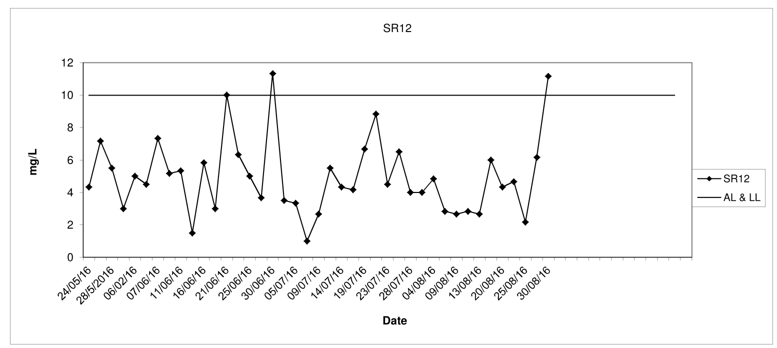




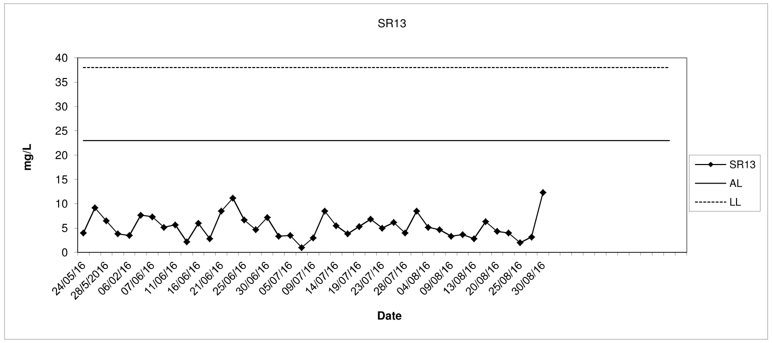
Total Suspended Solids (Depth average) at Mid-Ebb Tide



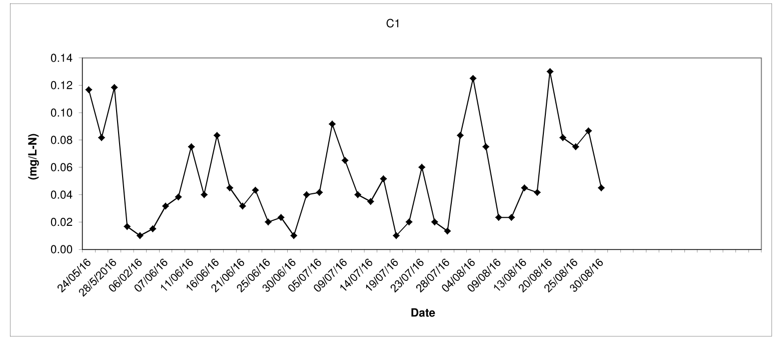


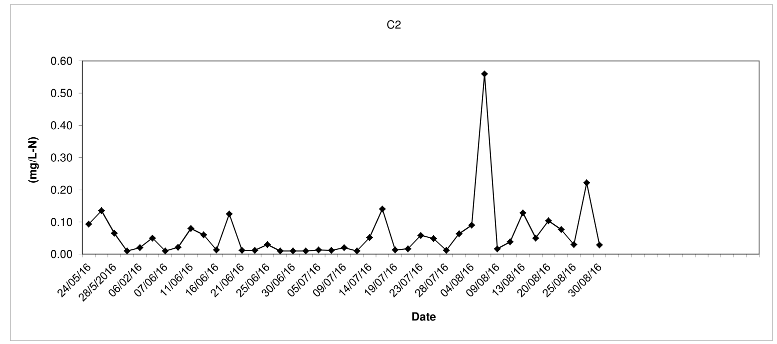


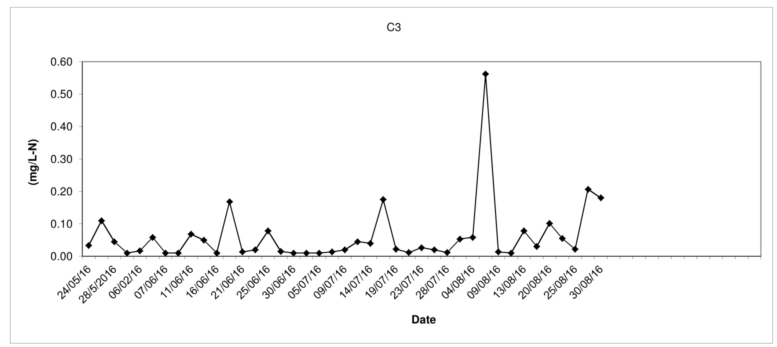
Total Suspended Solids (Depth average) at Mid-Ebb Tide



Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

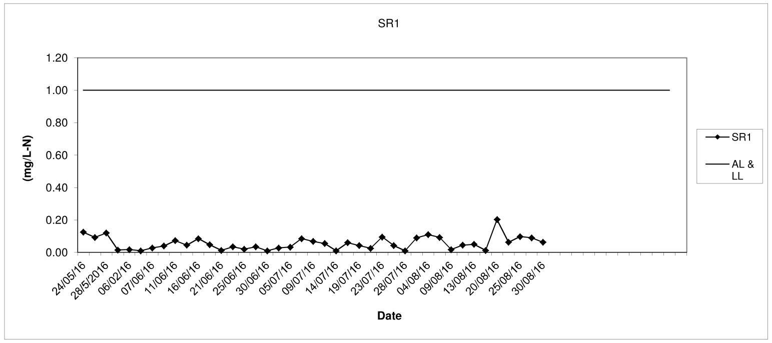


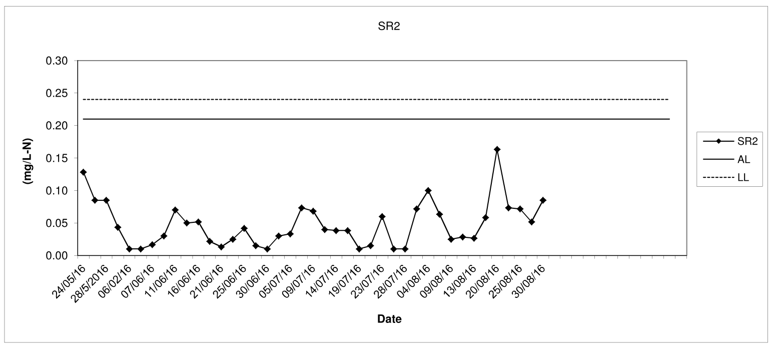


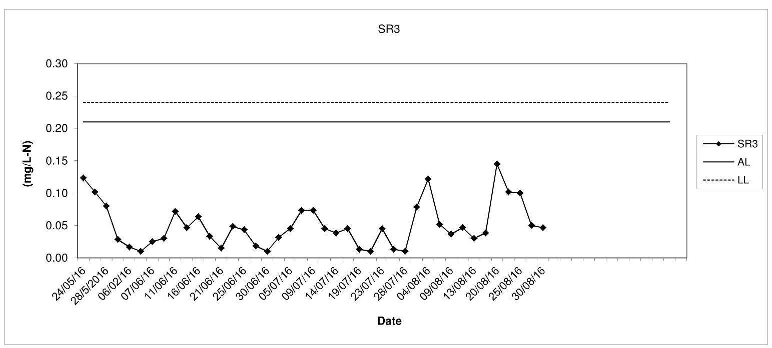


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

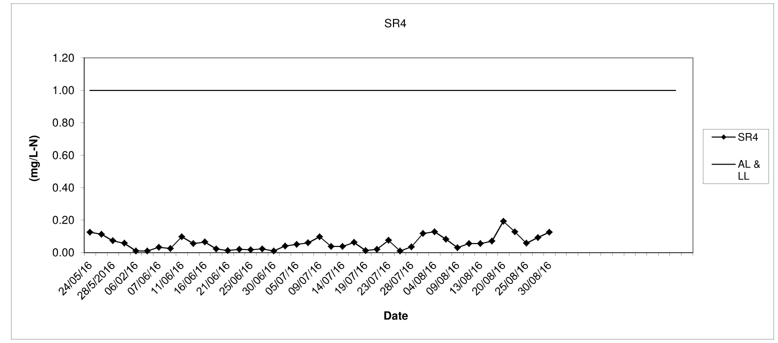
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

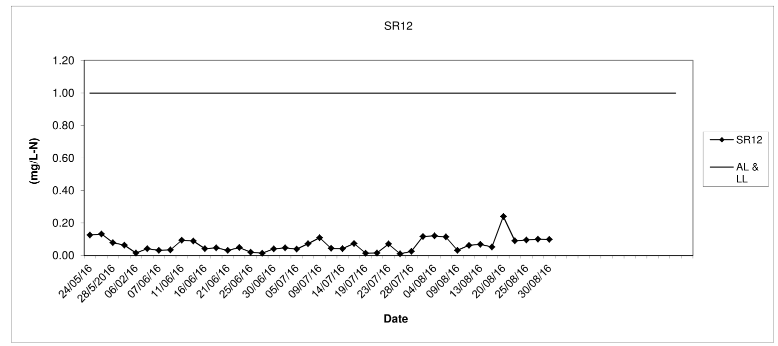






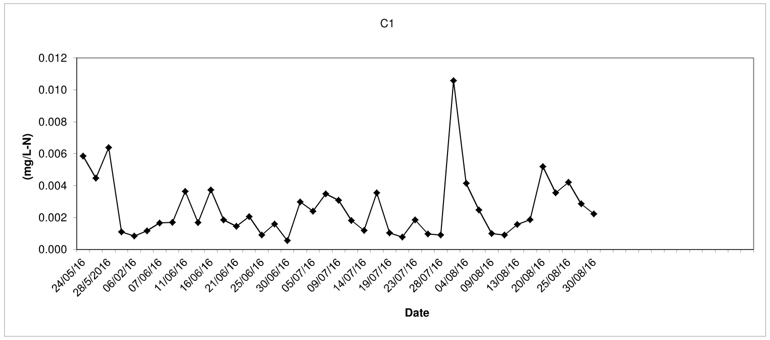
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

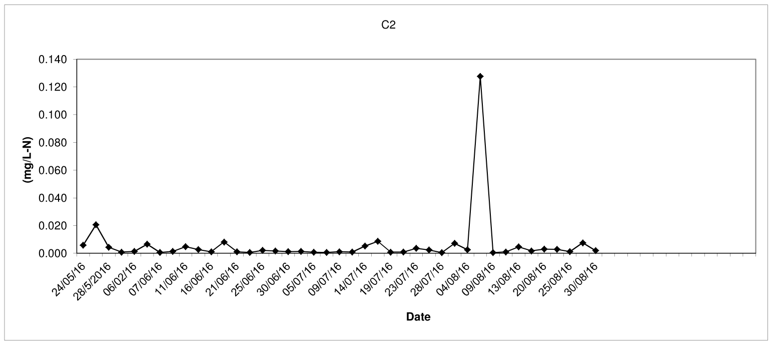


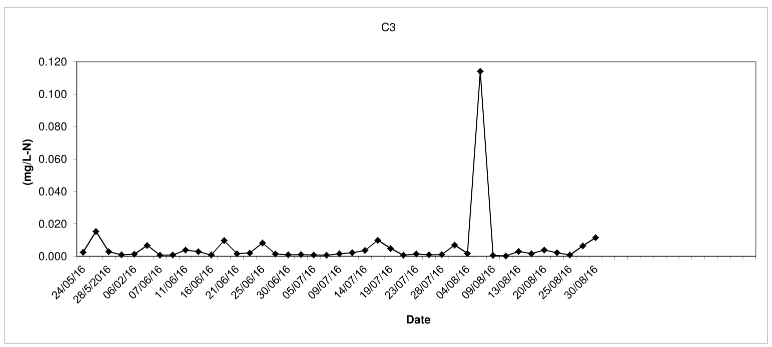


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

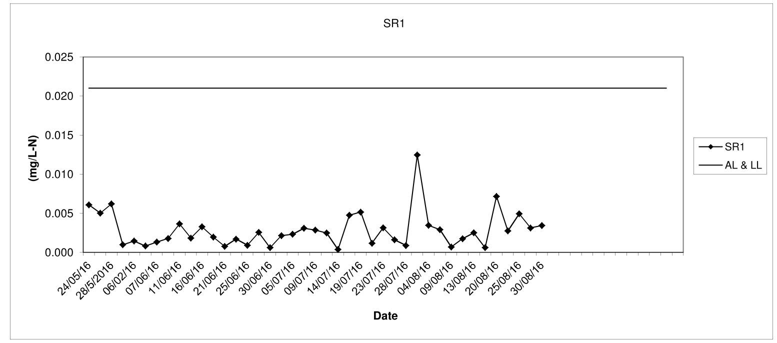
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

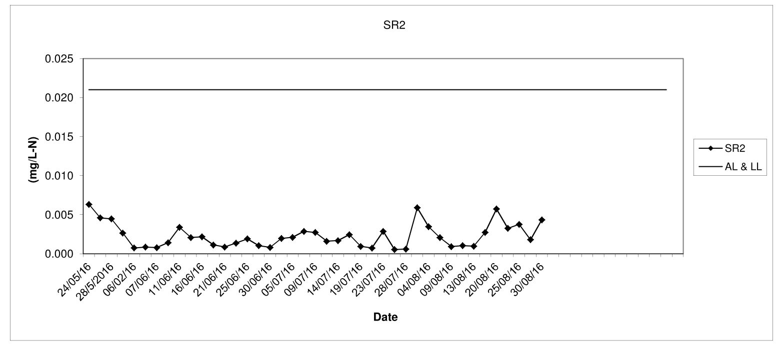


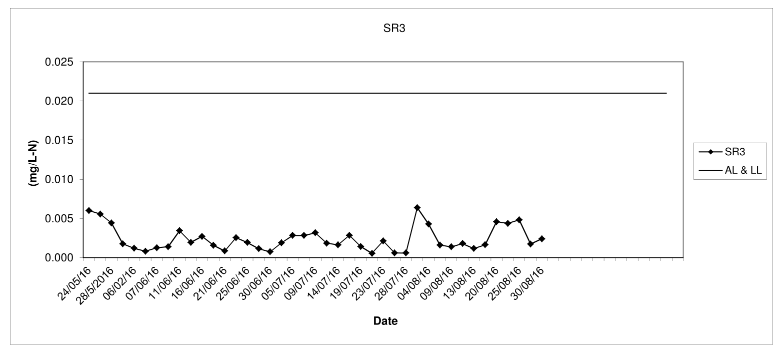




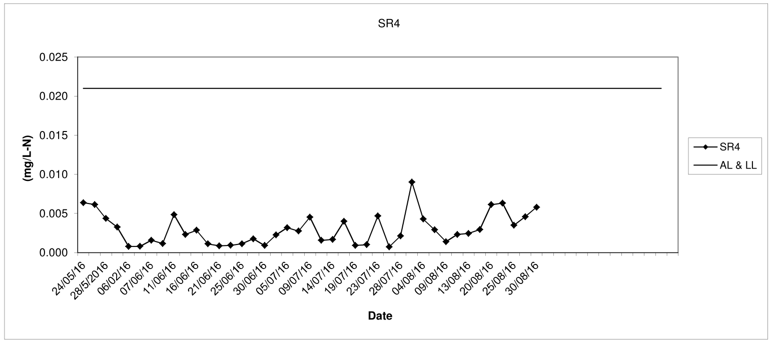
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

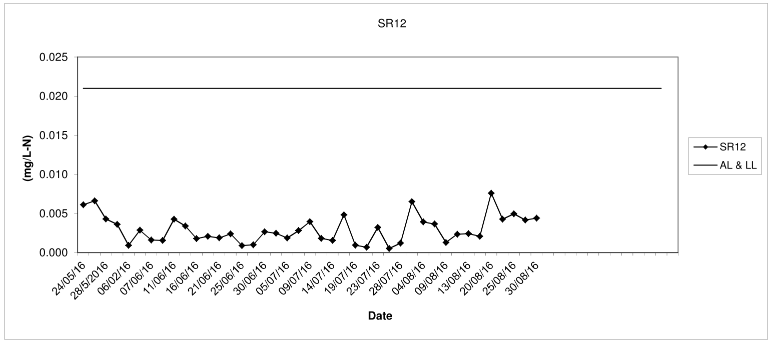




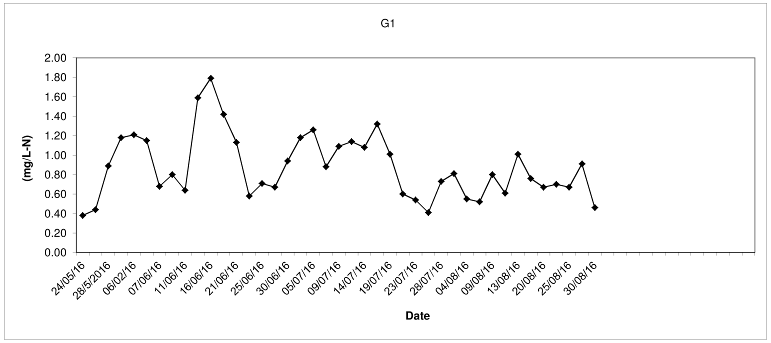


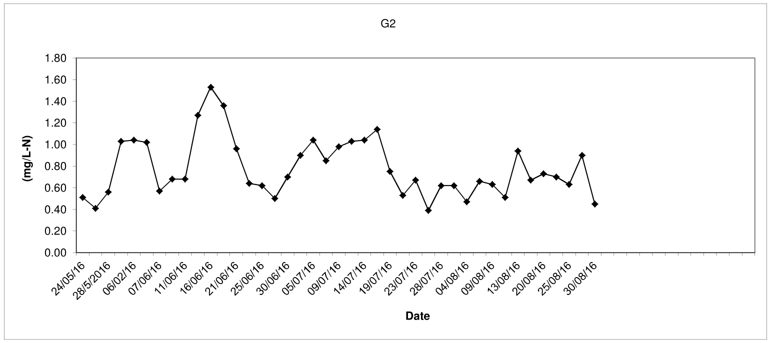
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

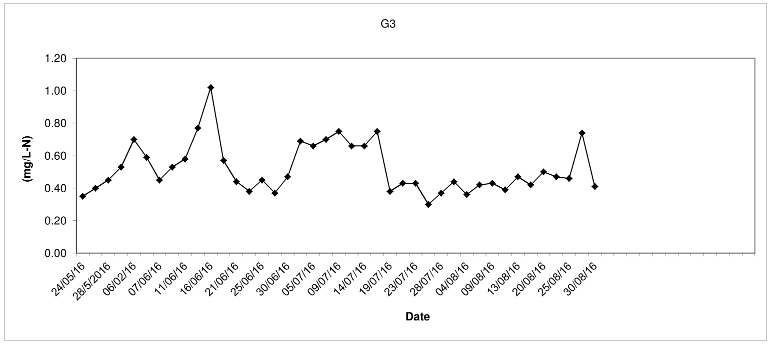




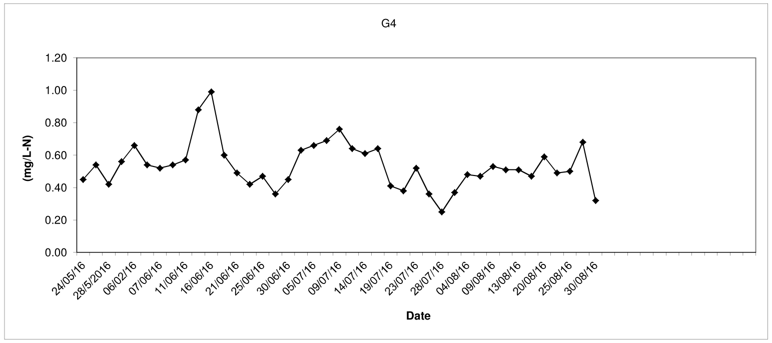
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

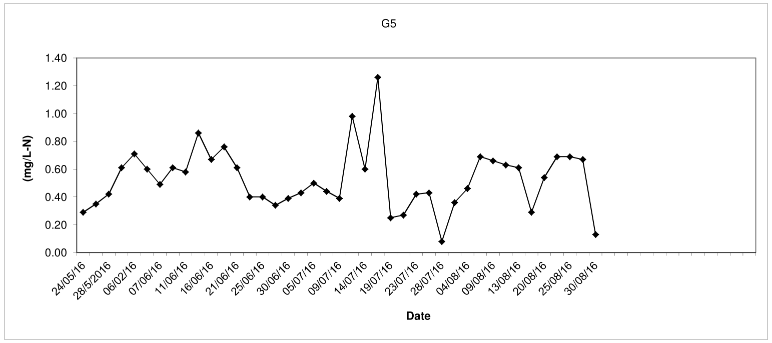


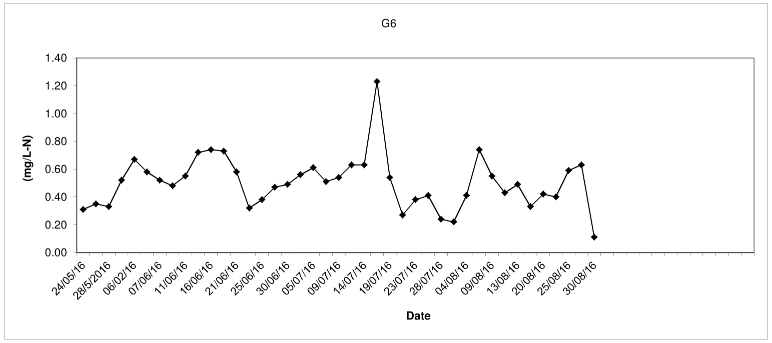




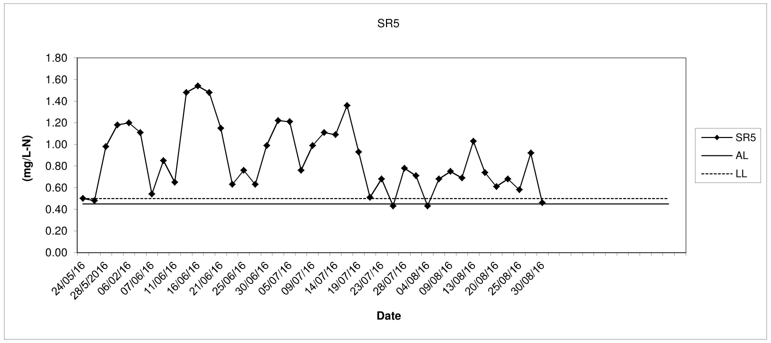
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

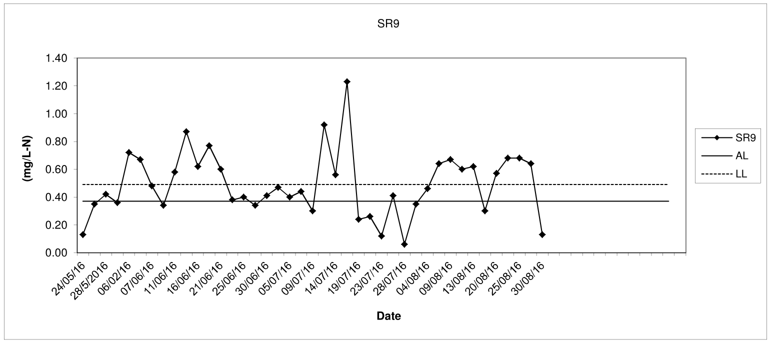


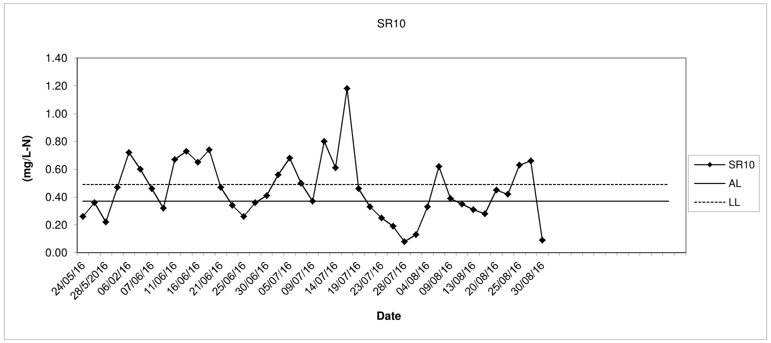




Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

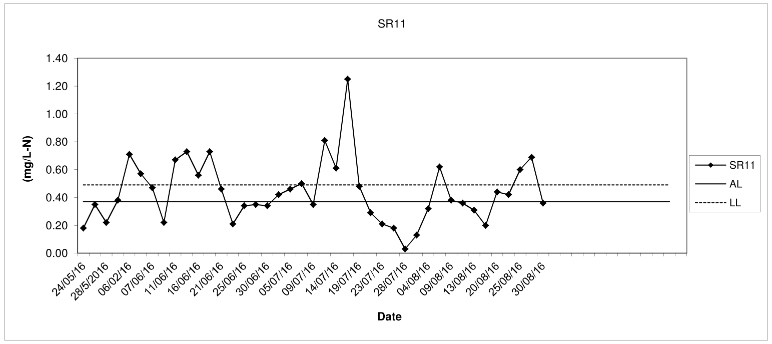




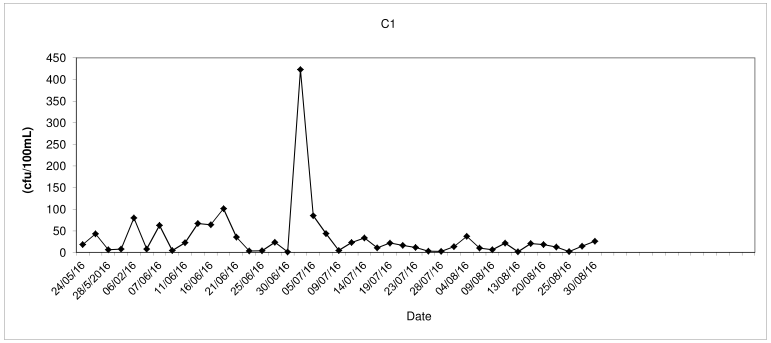


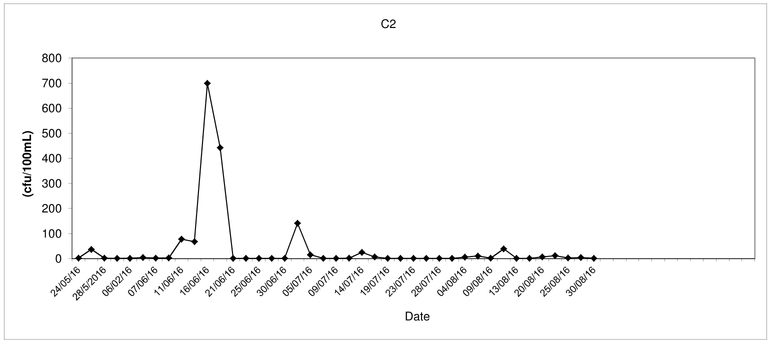
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

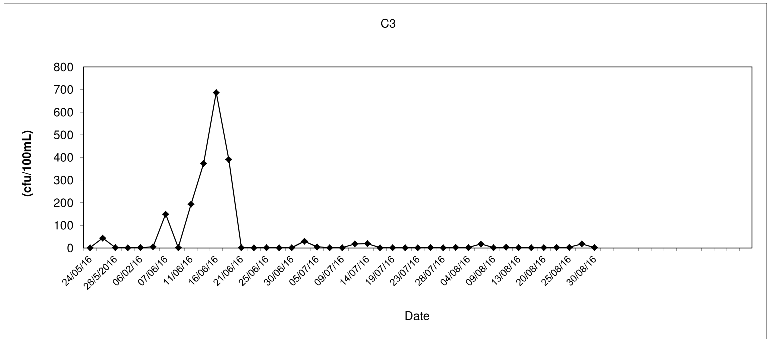
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



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

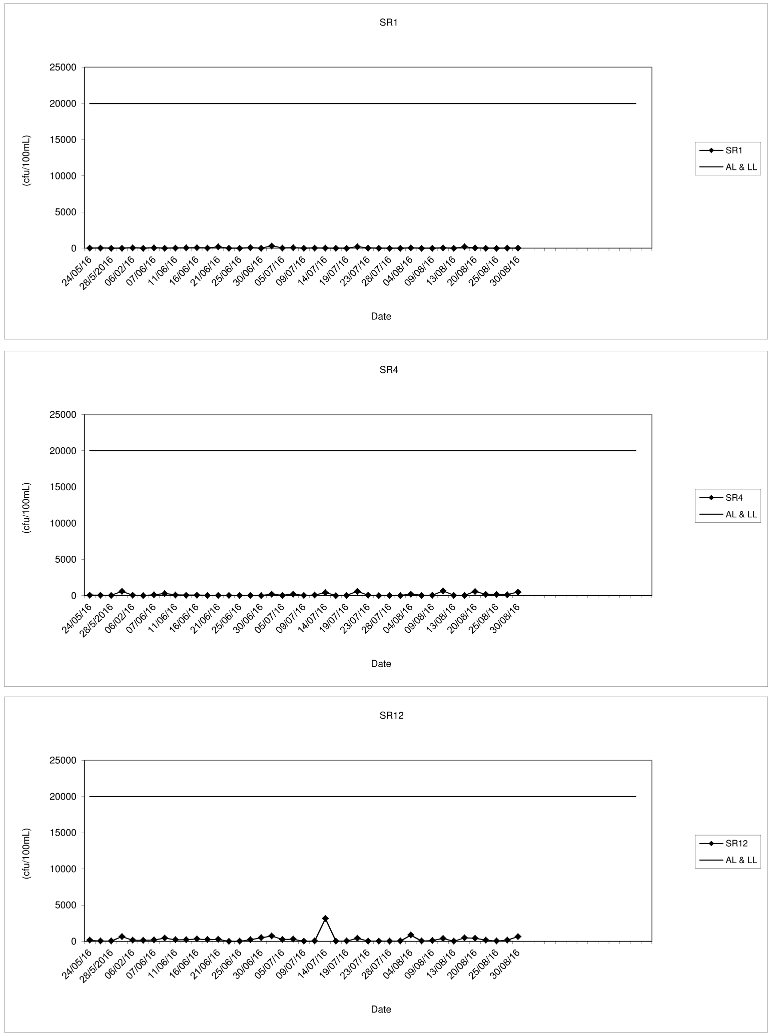




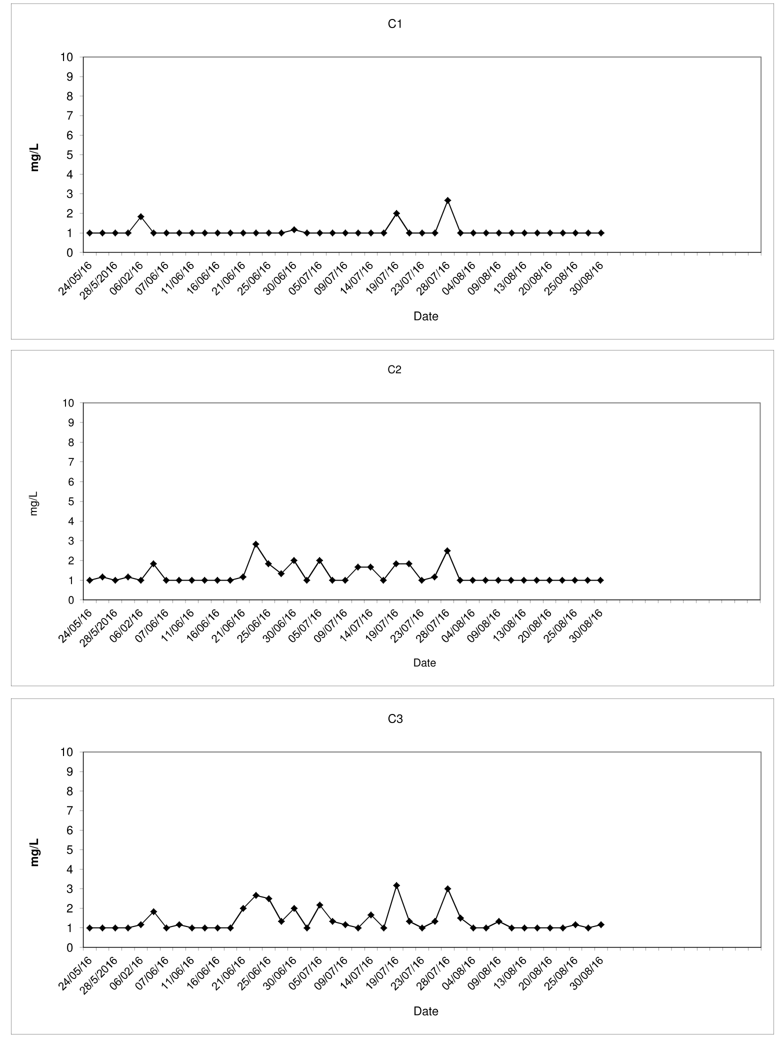


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

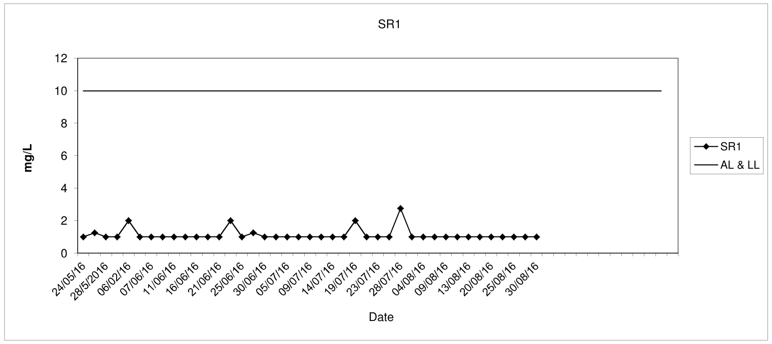
E.coli (Depth average) at Mid-Ebb Tide

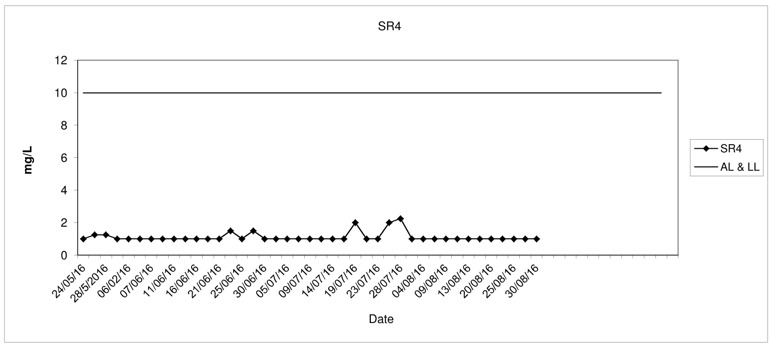


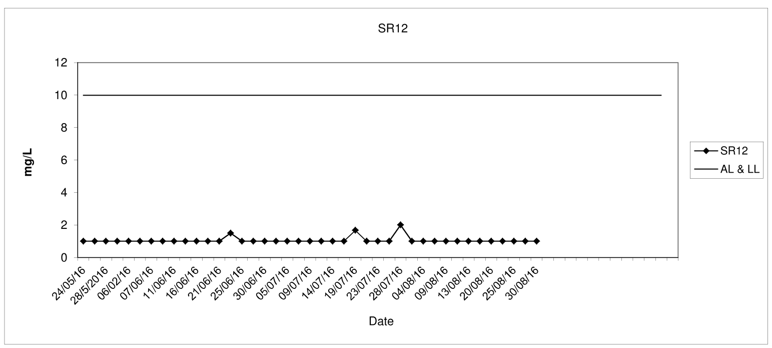
BOD_5 (Depth average) at Mid-Ebb Tide



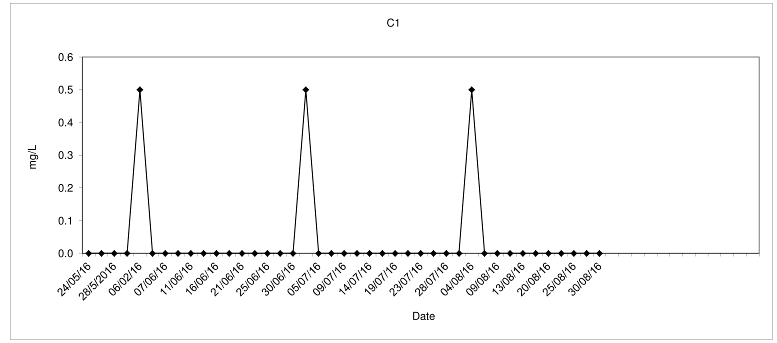
BOD_5 (Depth average) at Mid-Ebb Tide

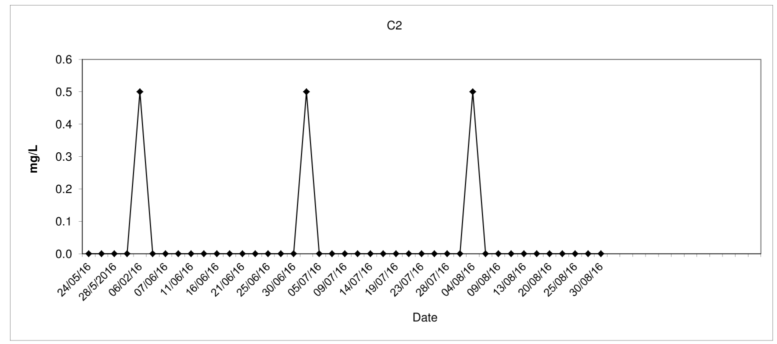


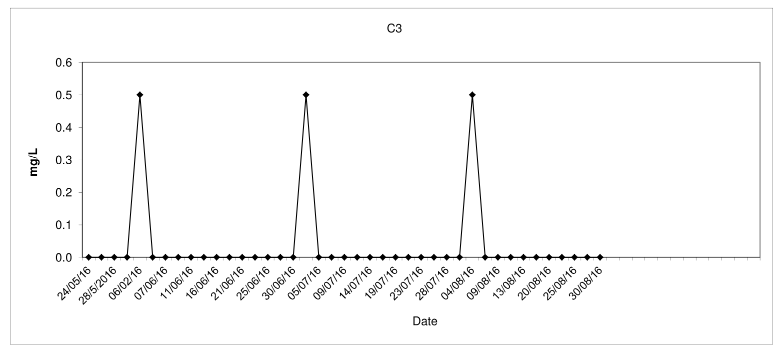




Synthetic Detergent (Depth average) at Mid-Ebb Tide

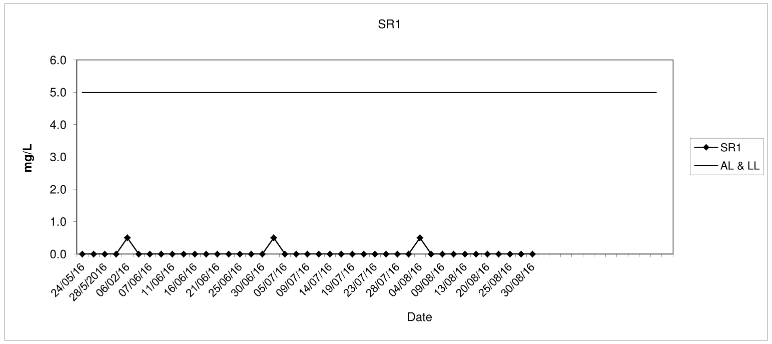


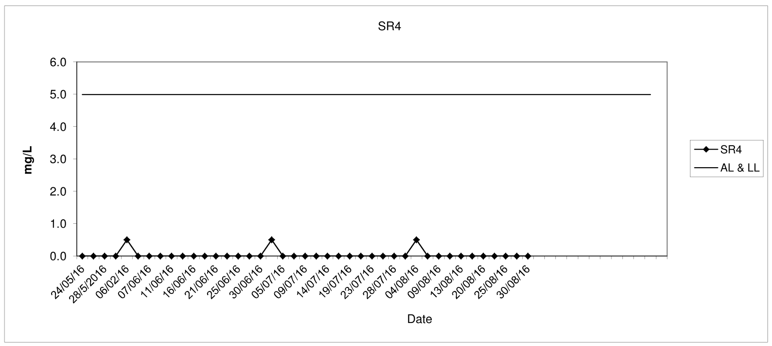


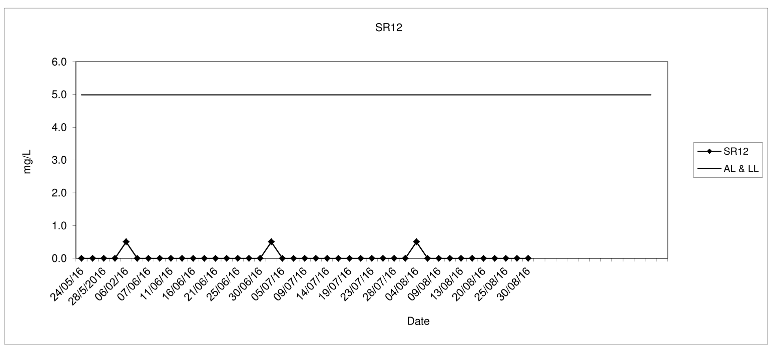


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

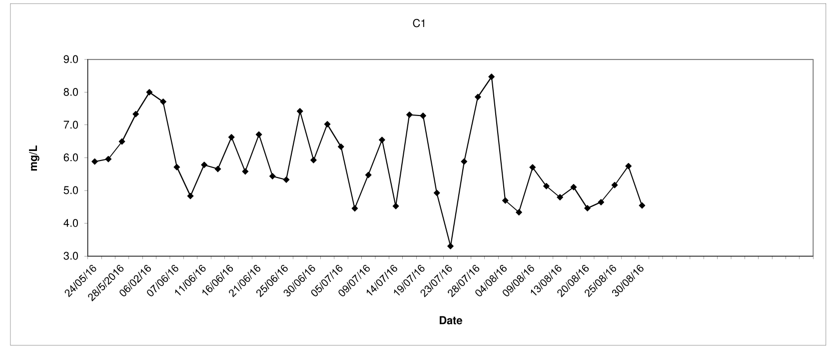
Synthetic Detergent (Depth average) at Mid-Ebb Tide

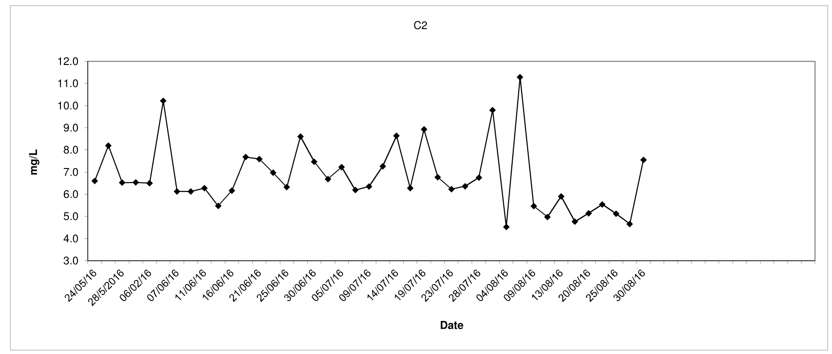


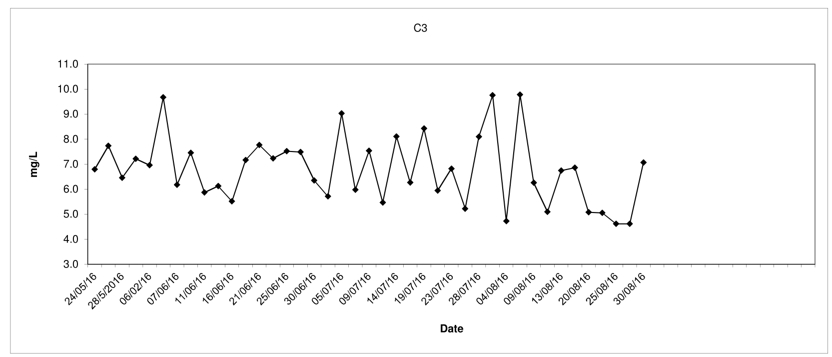




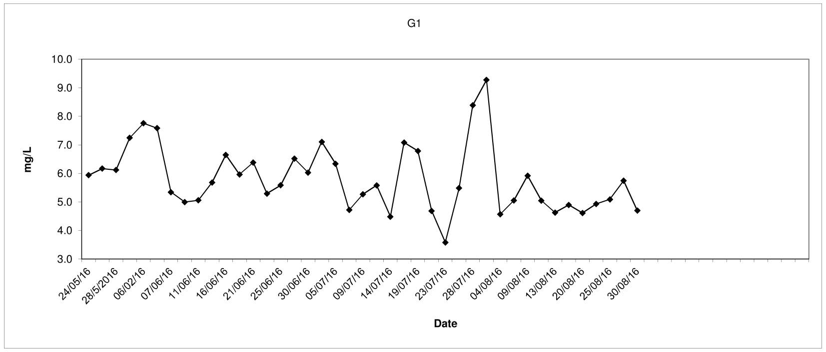
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

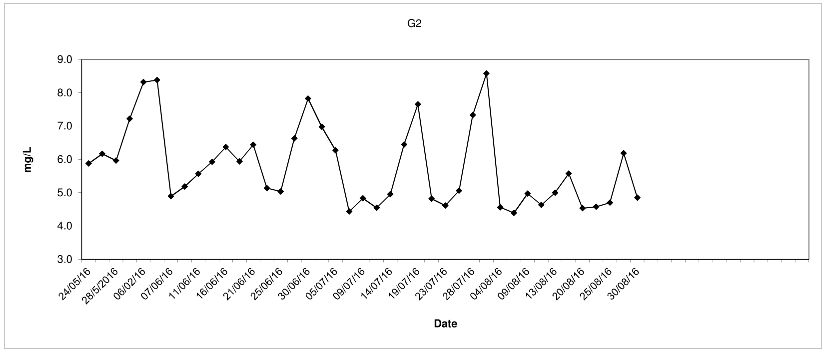


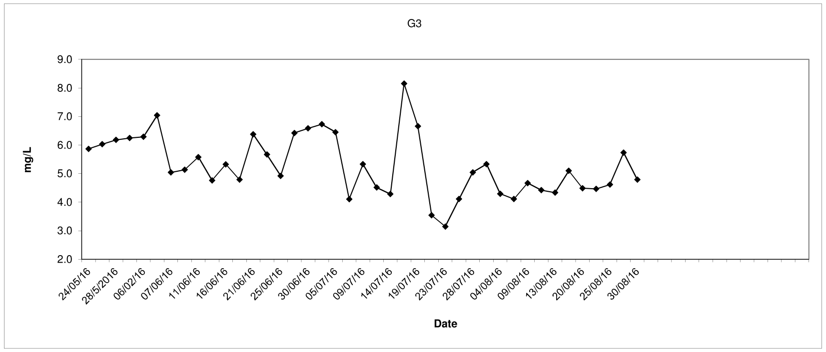




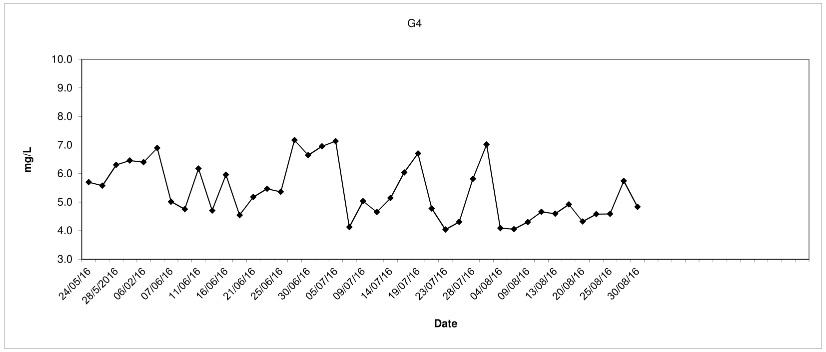
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

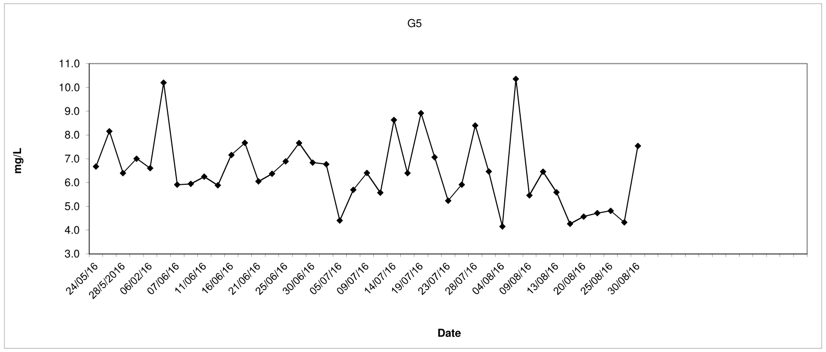


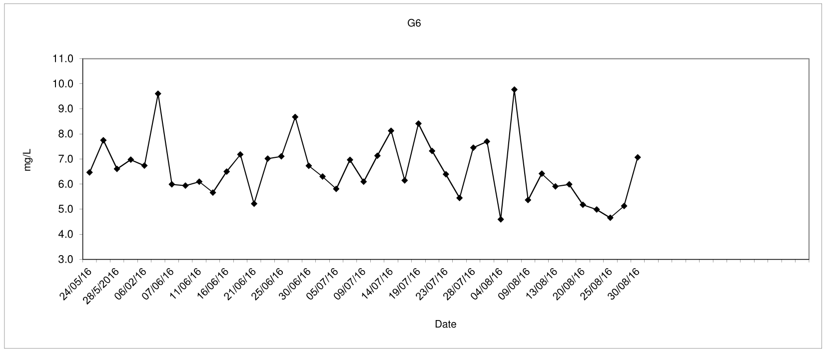




Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

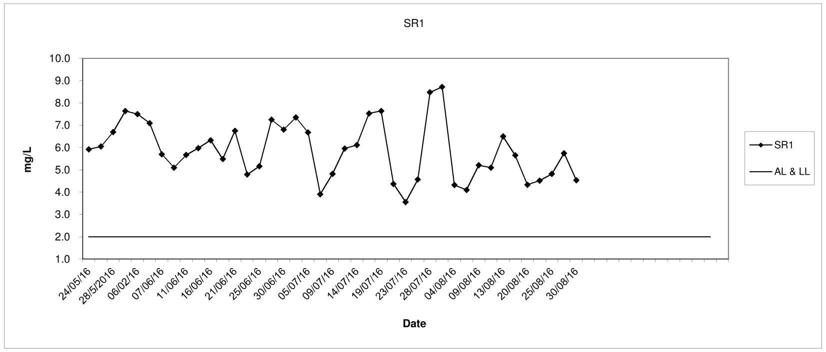


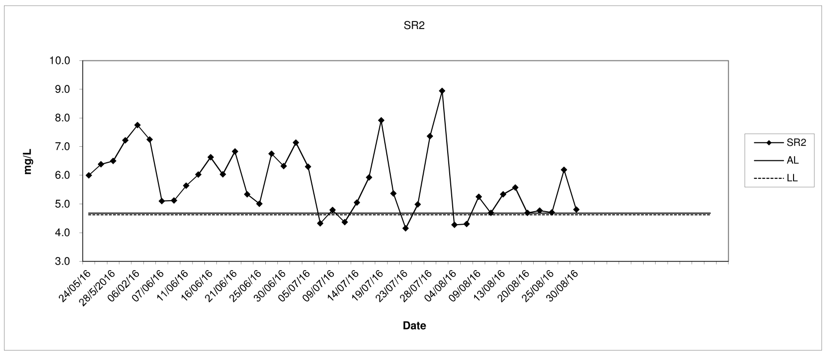


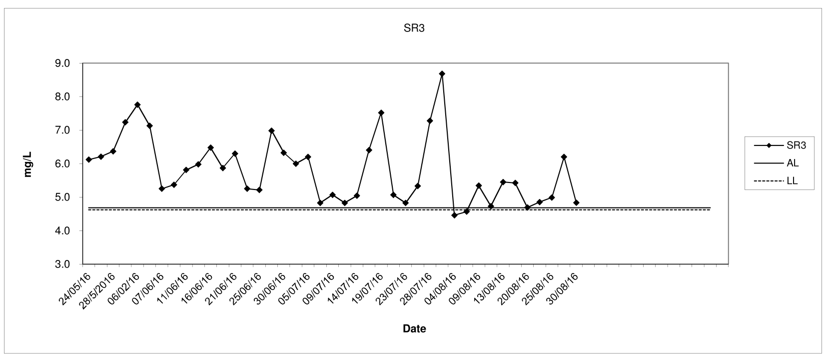


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

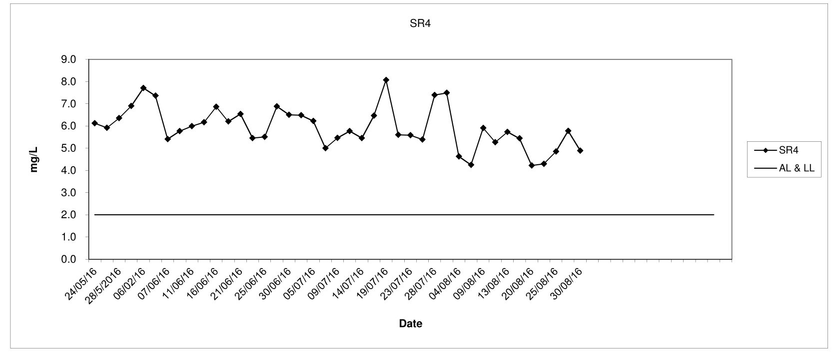
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

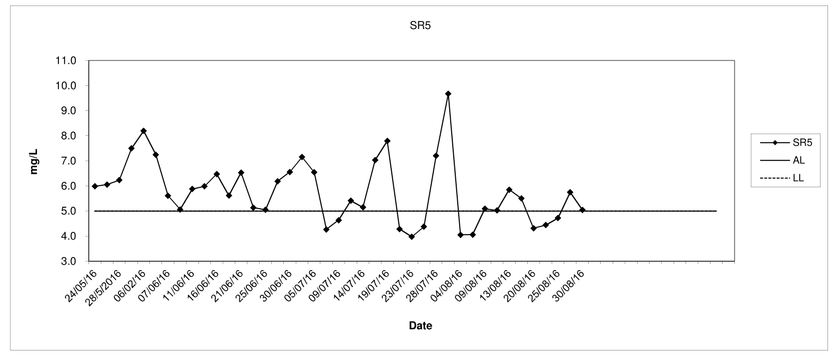


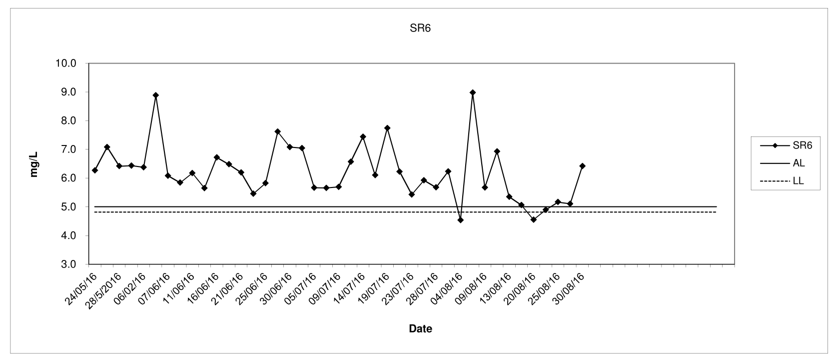




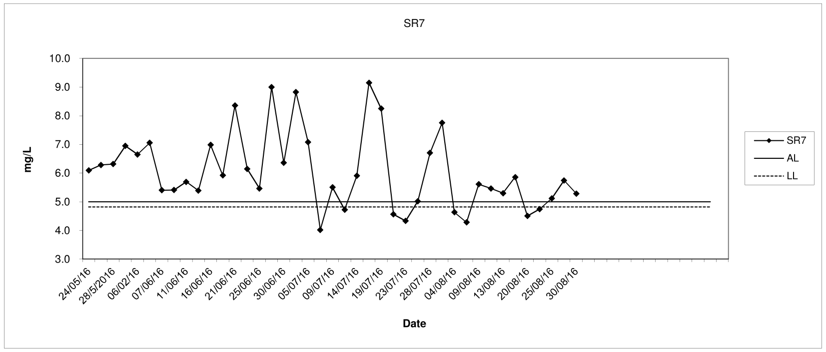
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

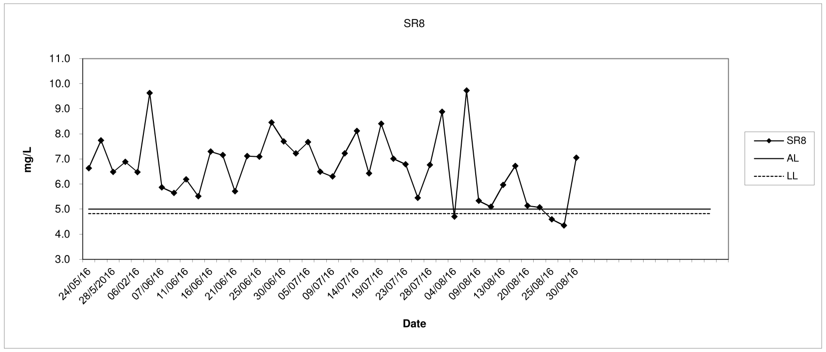


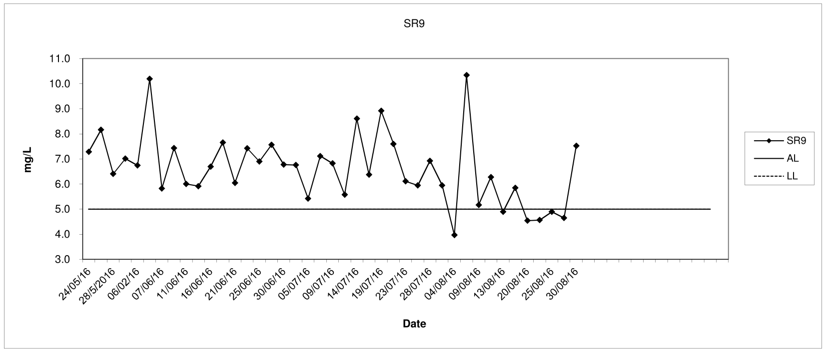




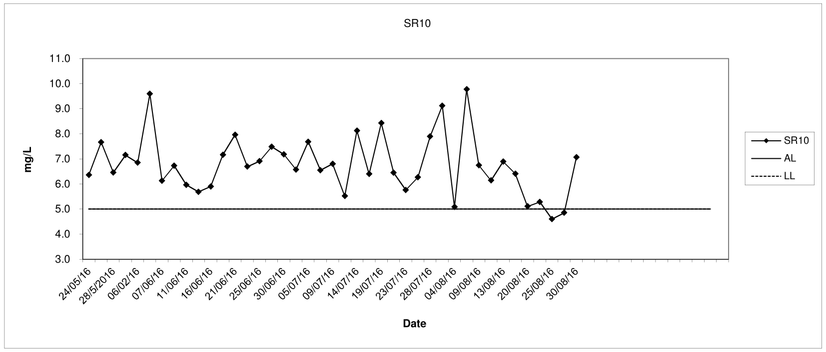
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

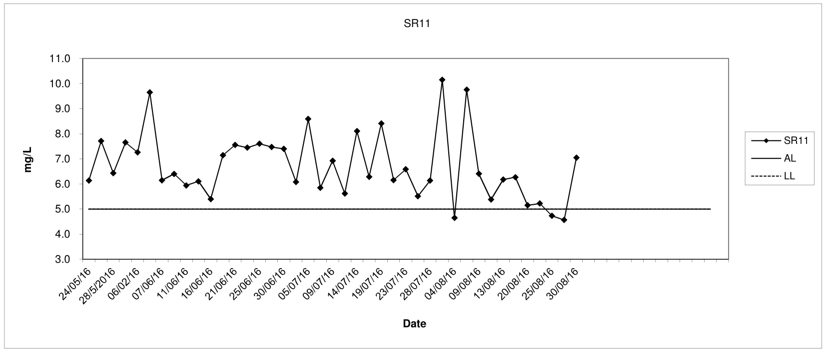


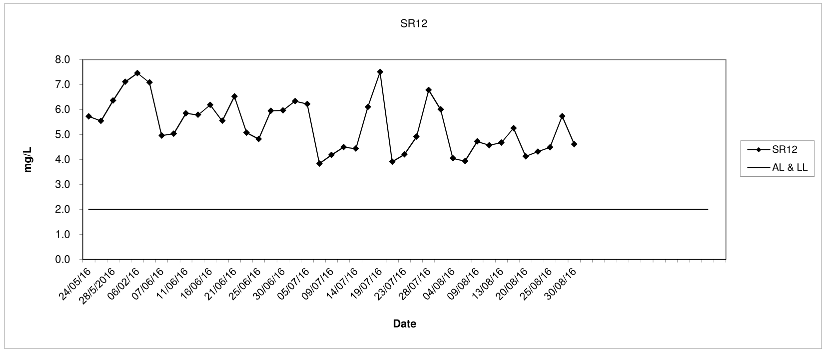




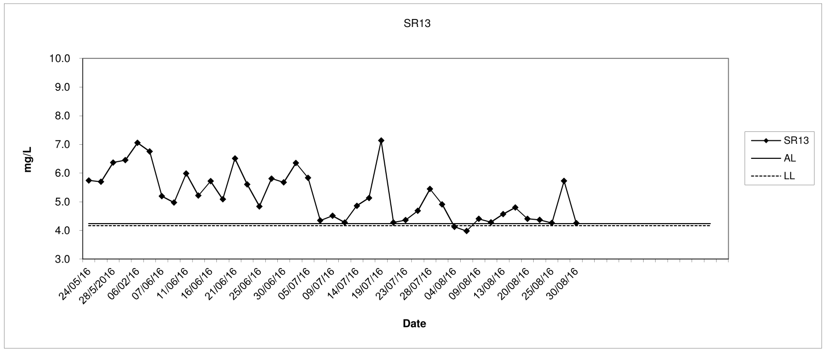
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



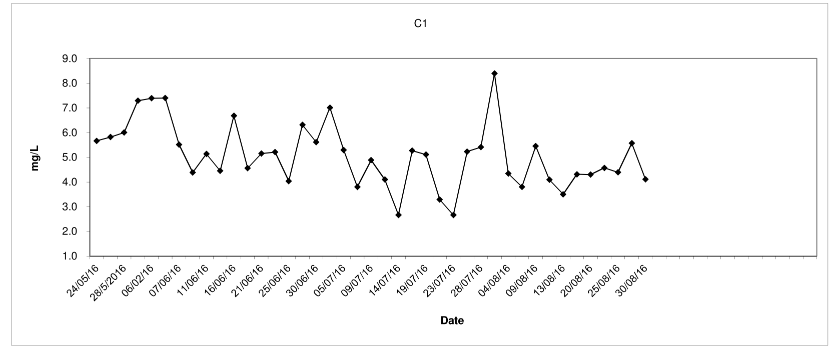


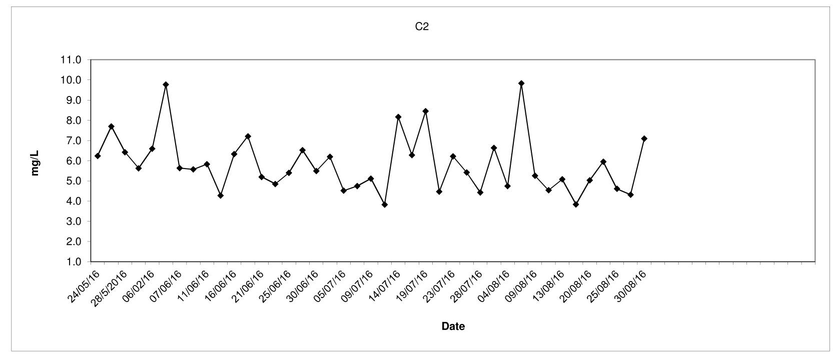


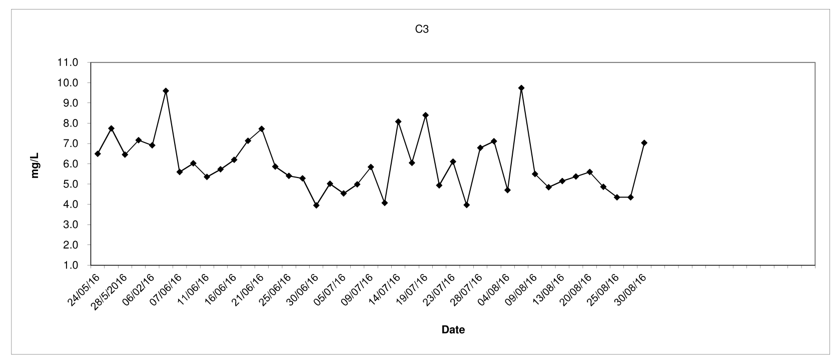
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



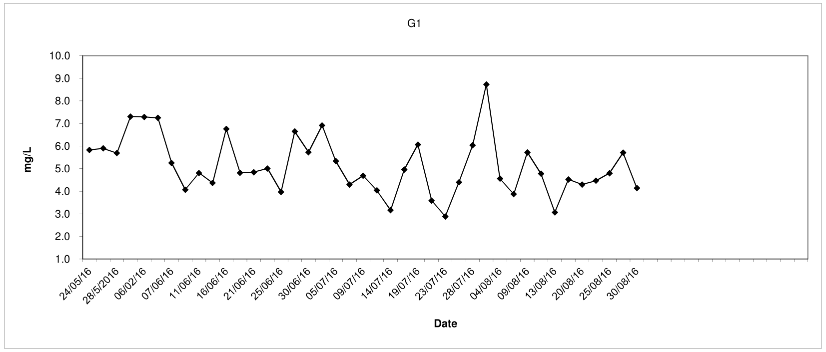
Dissolved Oxygen (Bottom) at Mid-Flood Tide

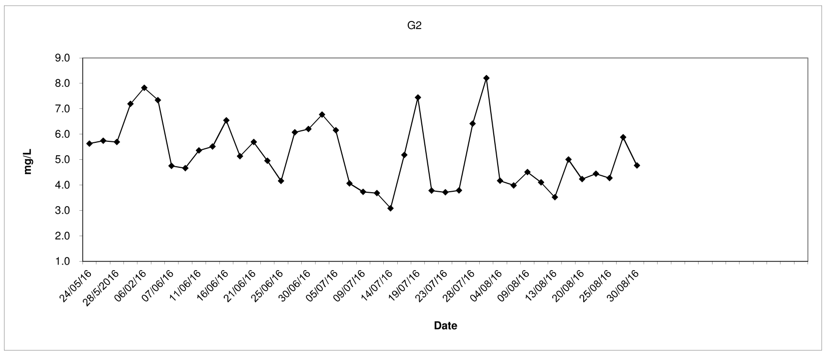


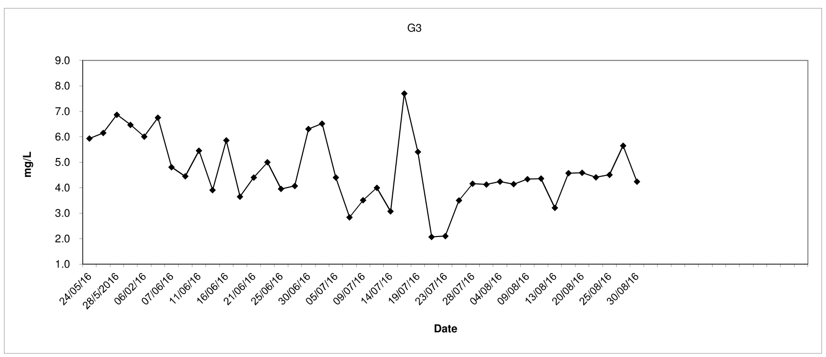




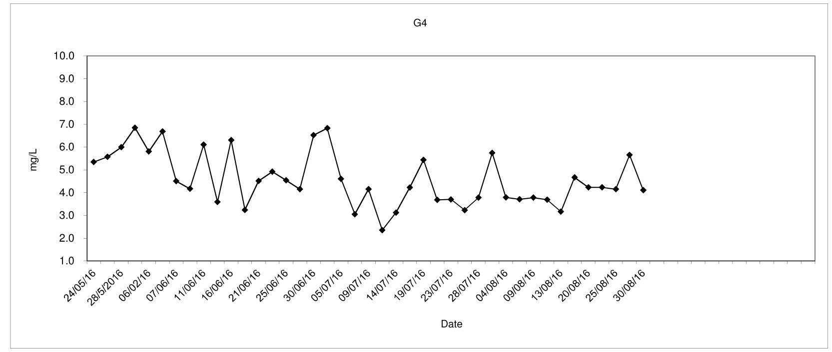
Dissolved Oxygen (Bottom) at Mid-Flood Tide

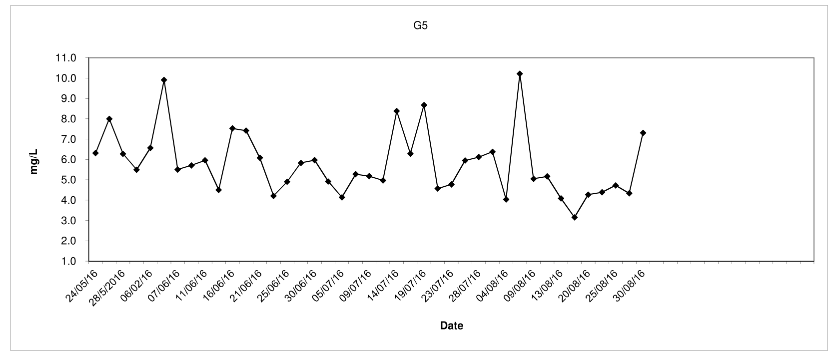


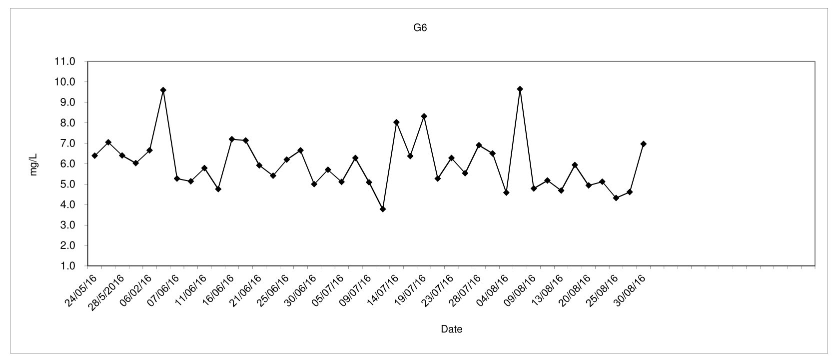




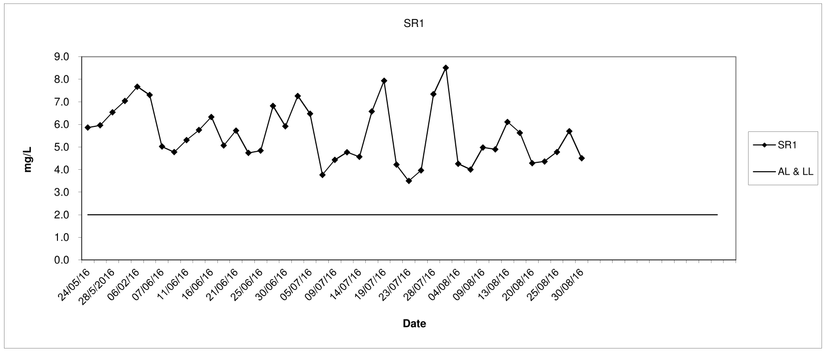
Dissolved Oxygen (Bottom) at Mid-Flood Tide

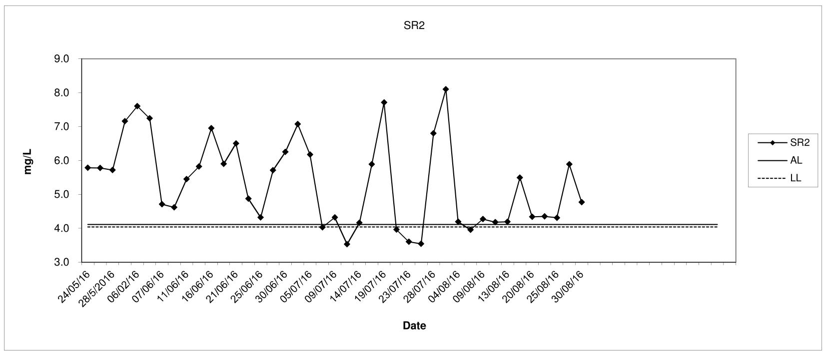


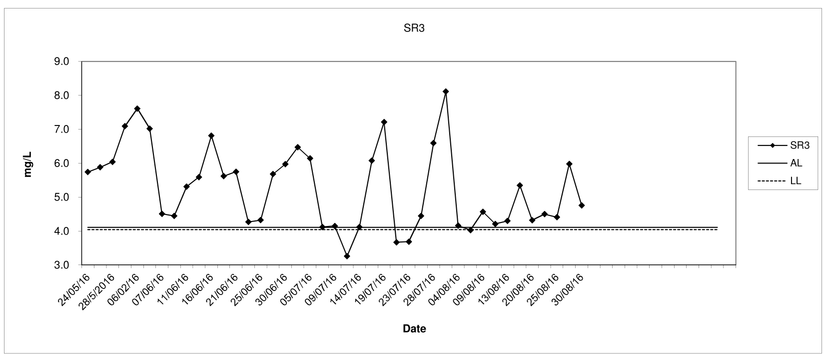




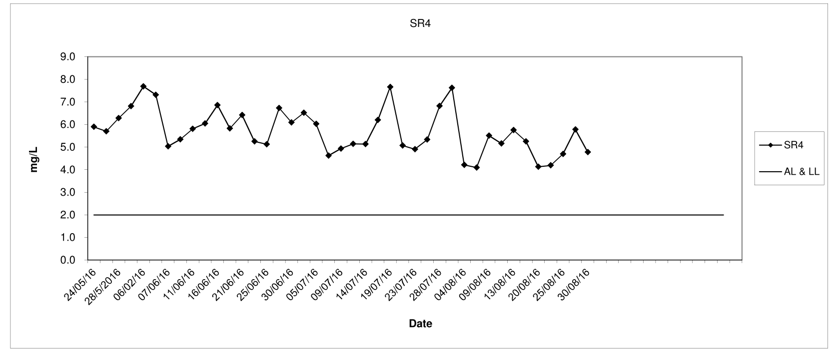
Dissolved Oxygen (Bottom) at Mid-Flood Tide

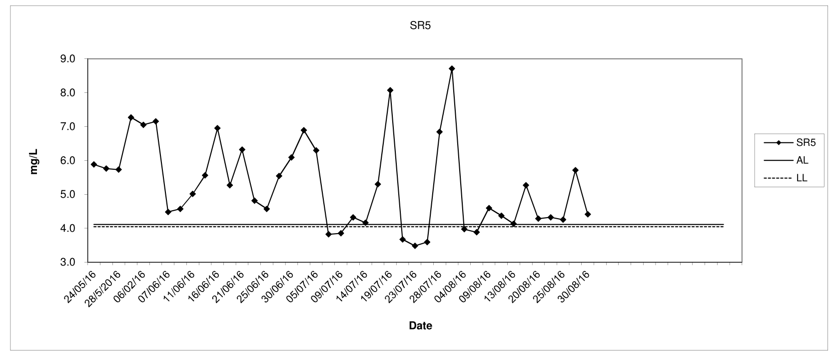


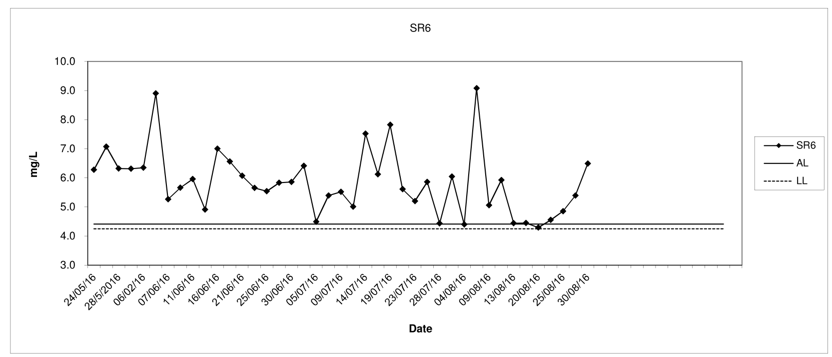




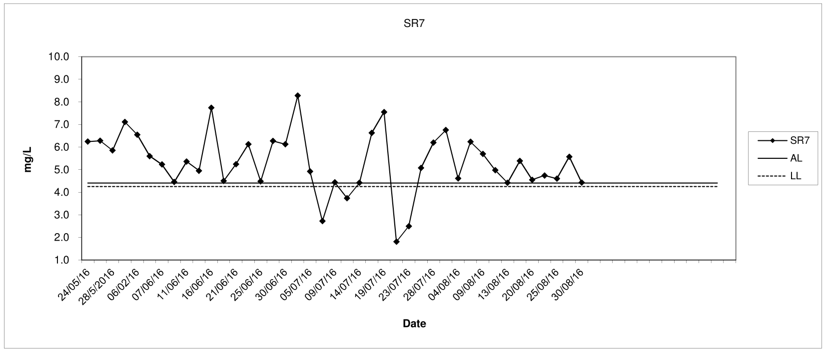
Dissolved Oxygen (Bottom) at Mid-Flood Tide

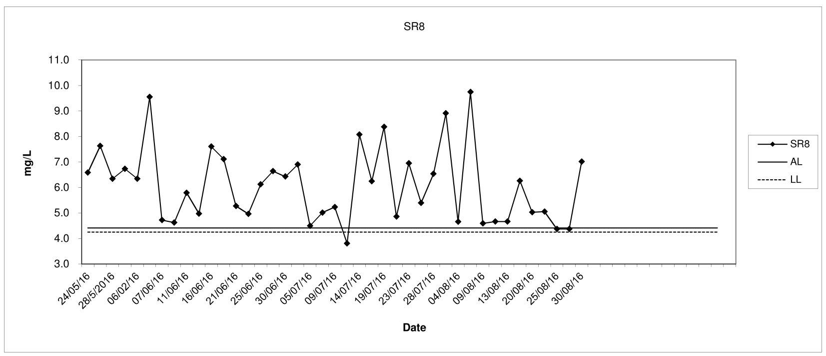


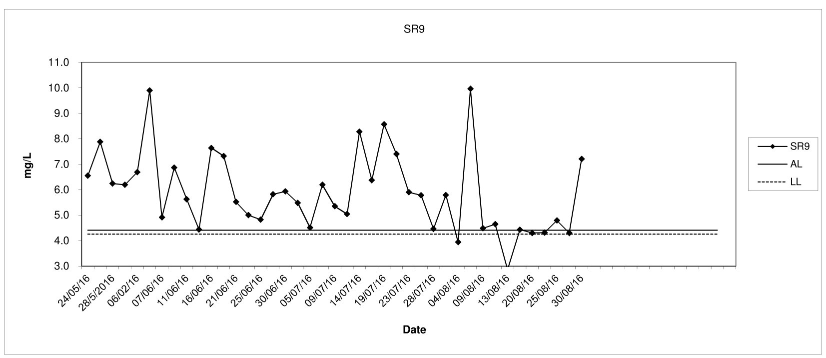




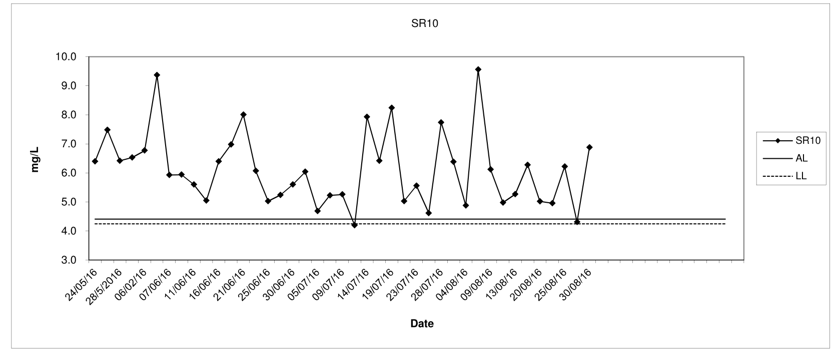
Dissolved Oxygen (Bottom) at Mid-Flood Tide

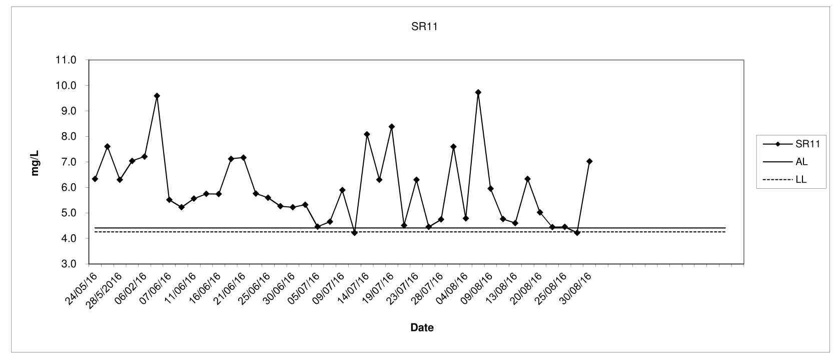


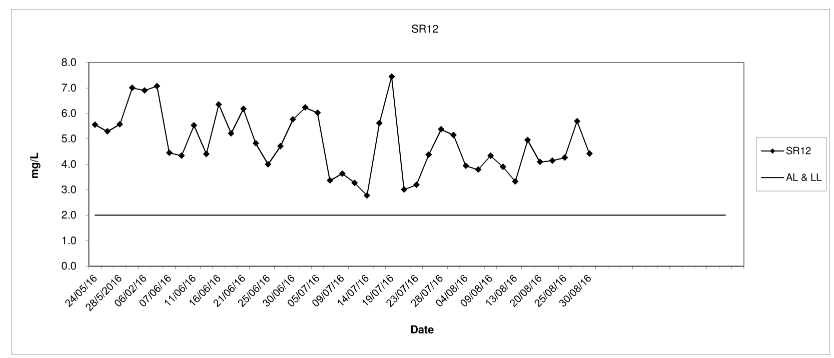




Dissolved Oxygen (Bottom) at Mid-Flood Tide

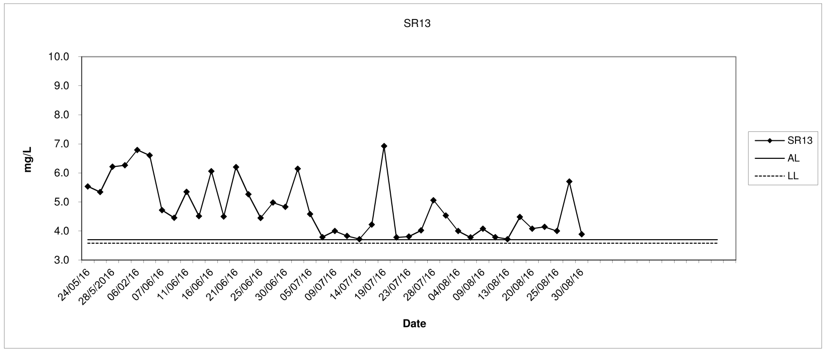




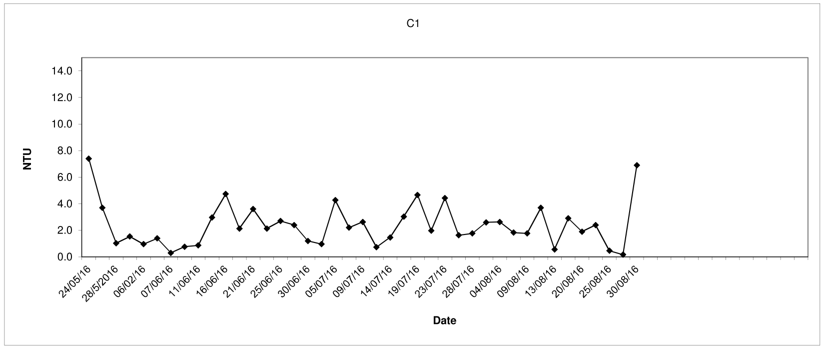


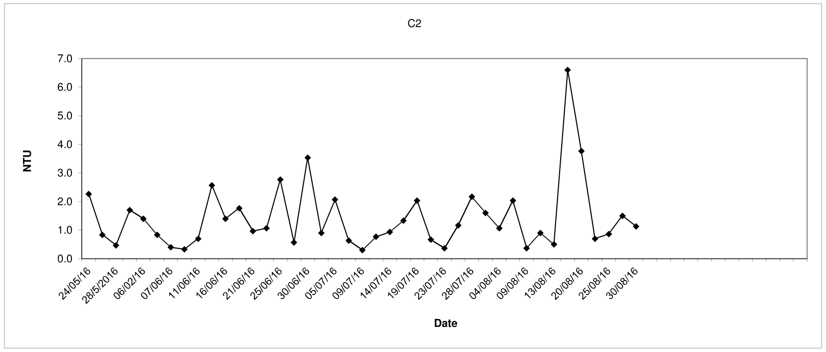
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

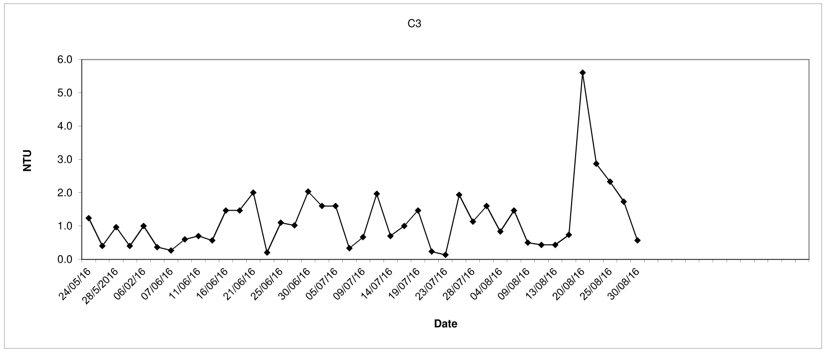
Dissolved Oxygen (Bottom) at Mid-Flood Tide



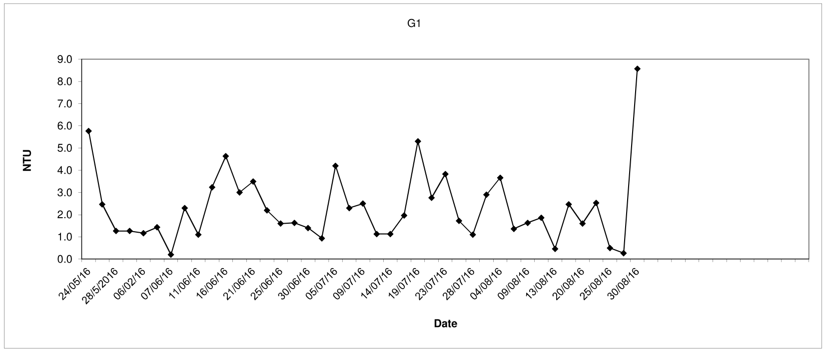
Turbidity (Depth average) at Mid-Flood Tide

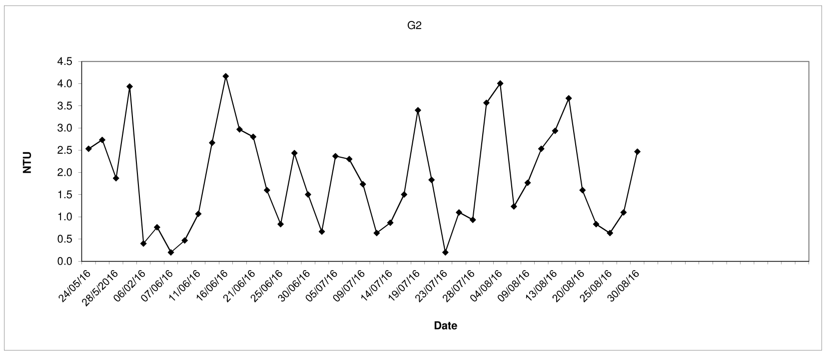


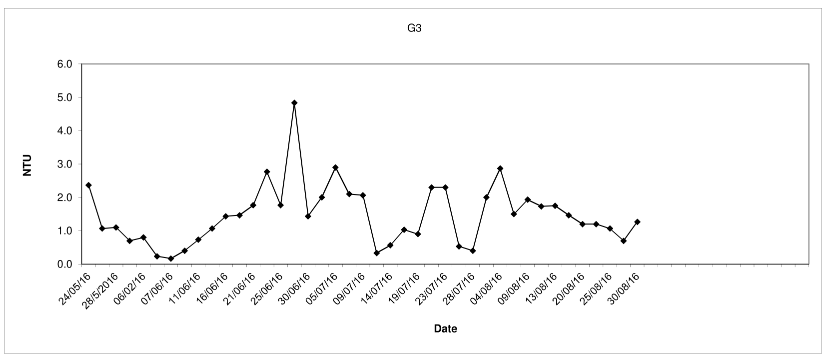




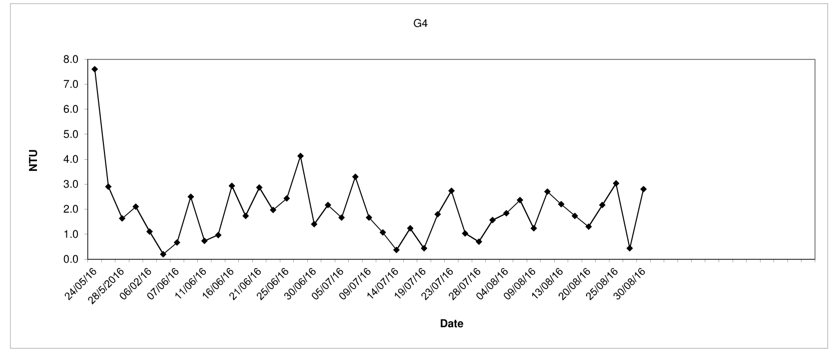
Turbidity (Depth average) at Mid-Flood Tide

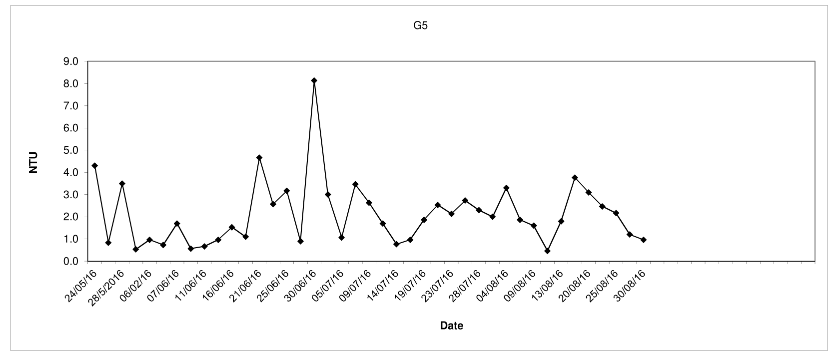


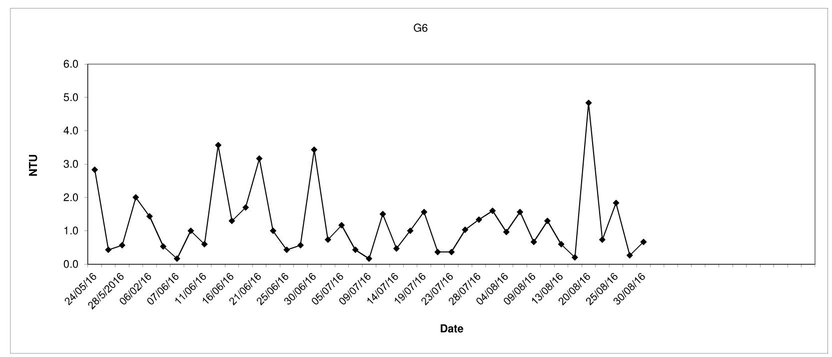




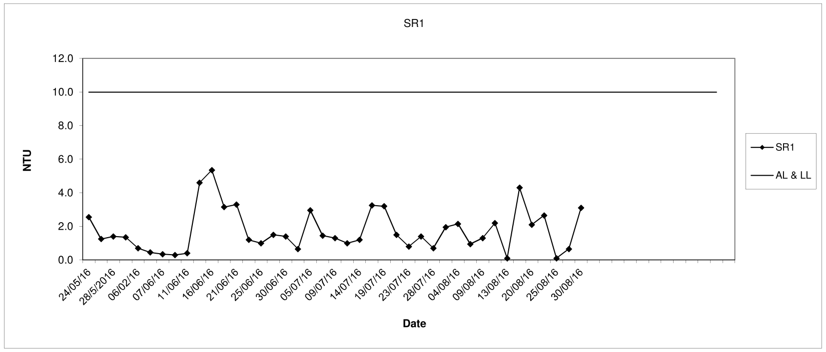
Turbidity (Depth average) at Mid-Flood Tide

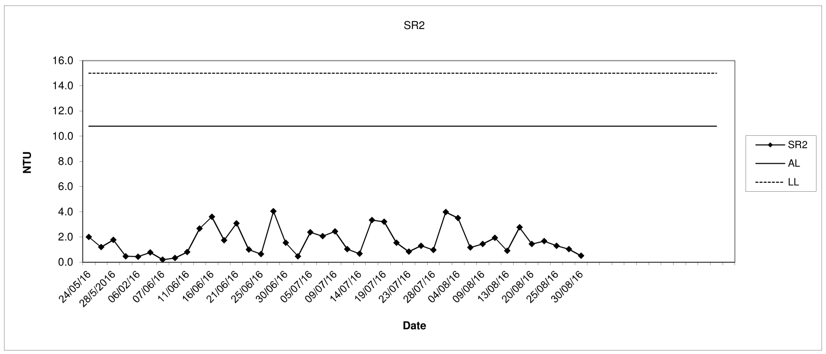


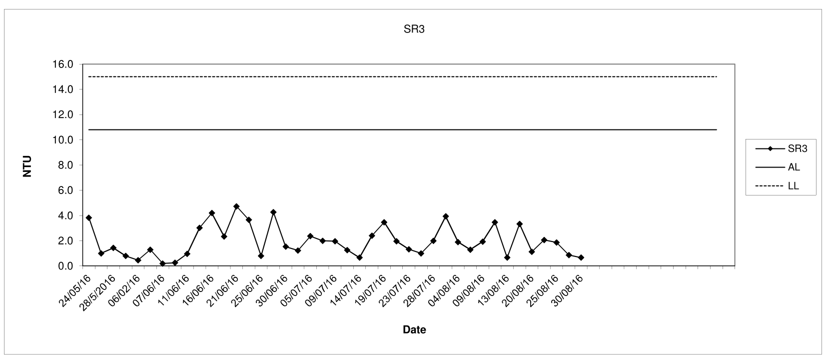




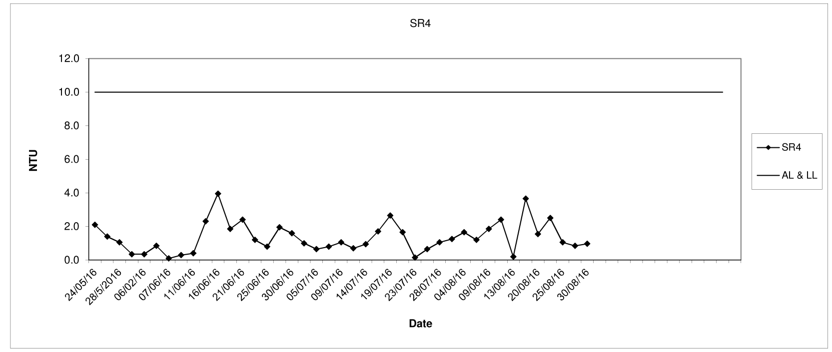
Turbidity (Depth average) at Mid-Flood Tide

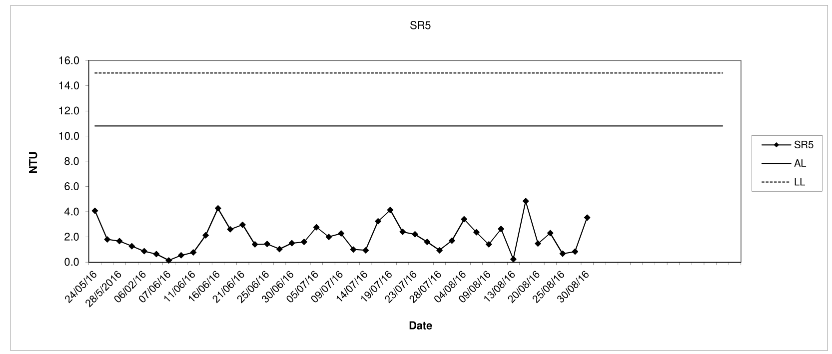


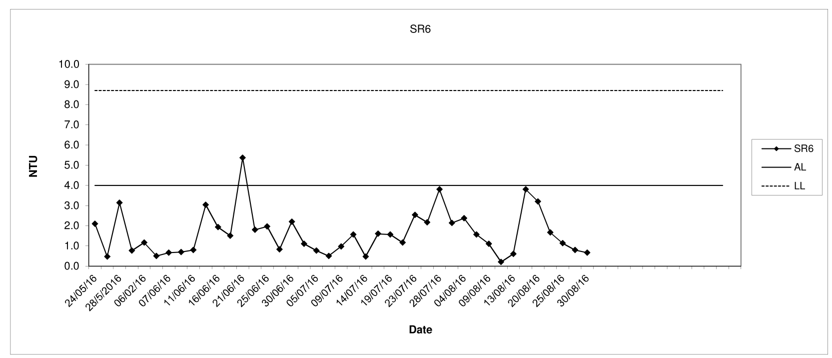




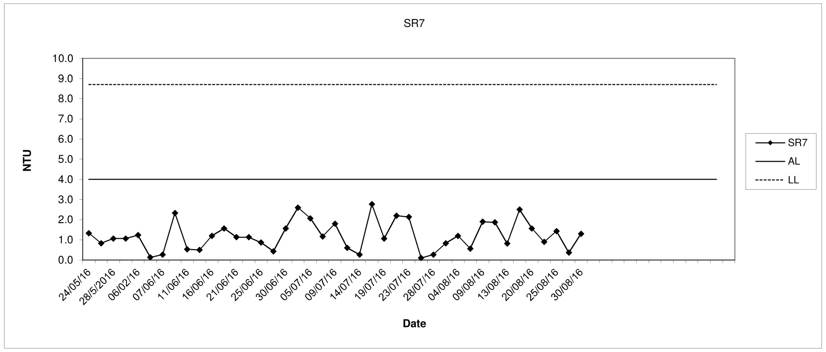
Turbidity (Depth average) at Mid-Flood Tide

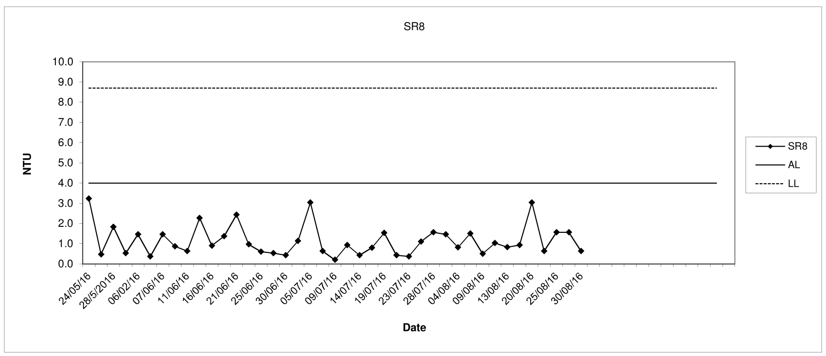


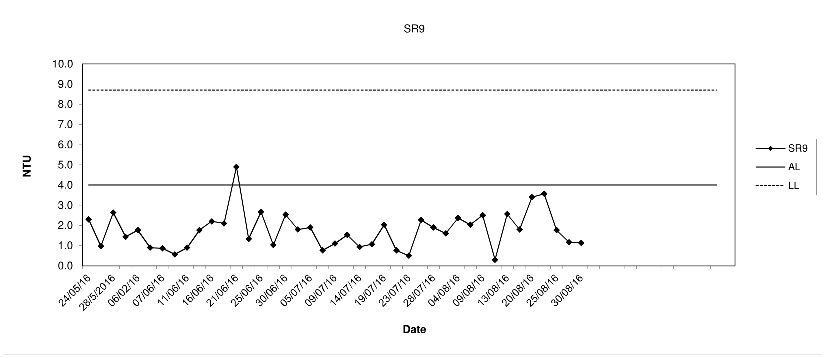




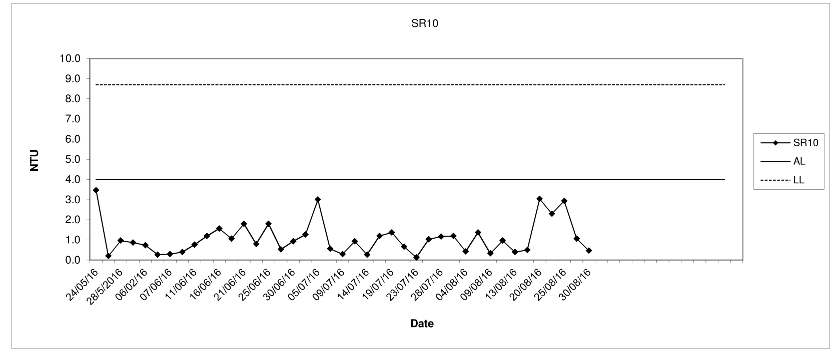
Turbidity (Depth average) at Mid-Flood Tide

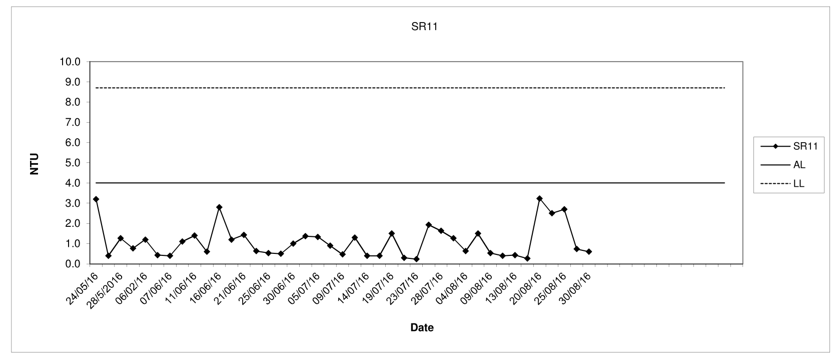


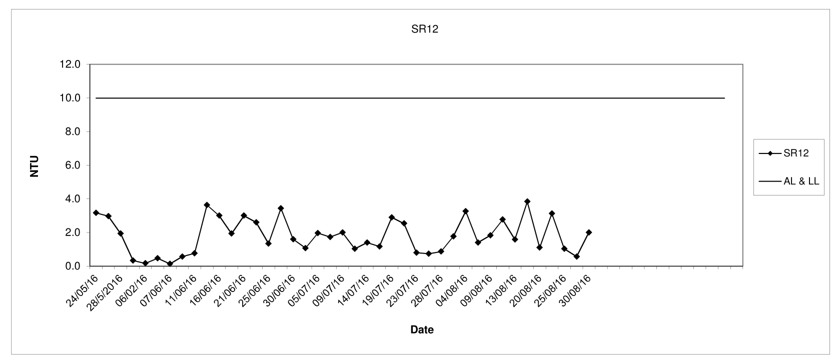




Turbidity (Depth average) at Mid-Flood Tide

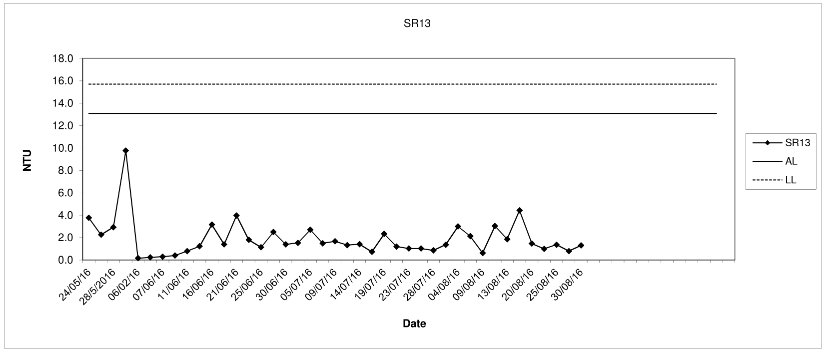




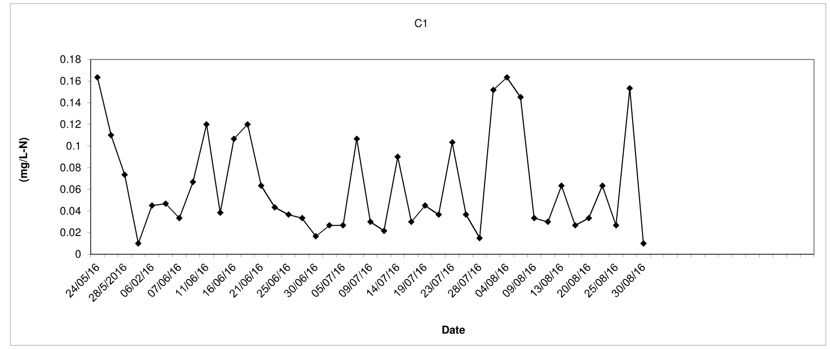


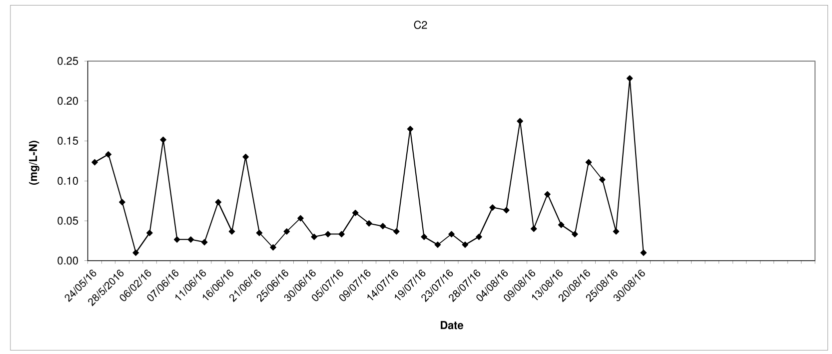
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

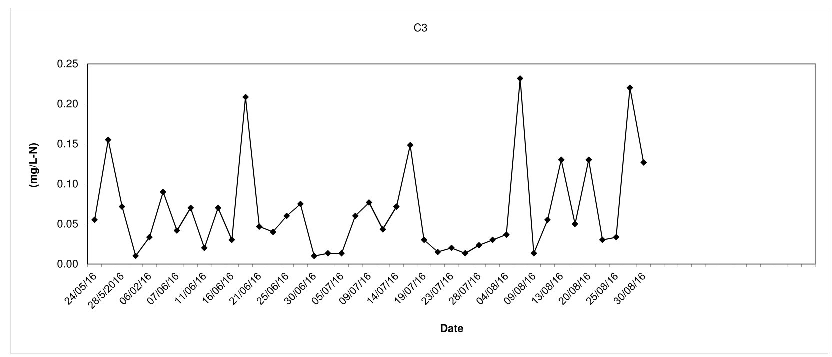
Turbidity (Depth average) at Mid-Flood Tide



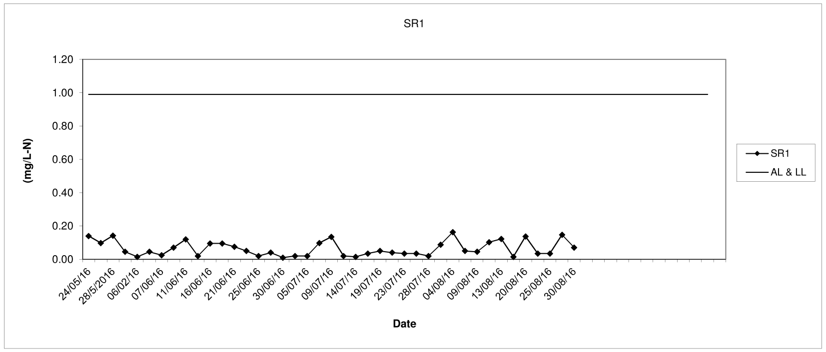
In-situ Ammonia (Depth average) at Mid-Flood Tide

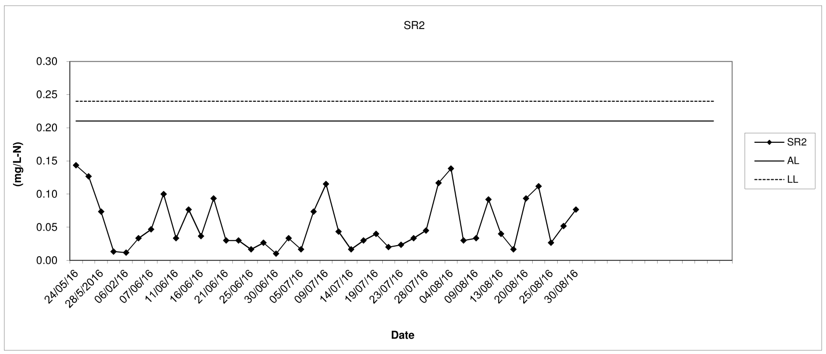


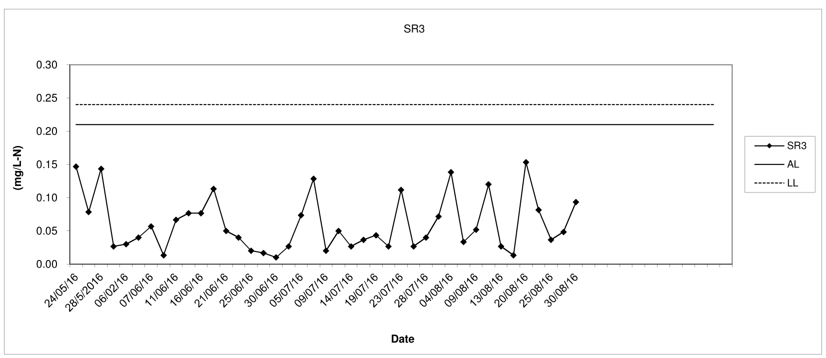




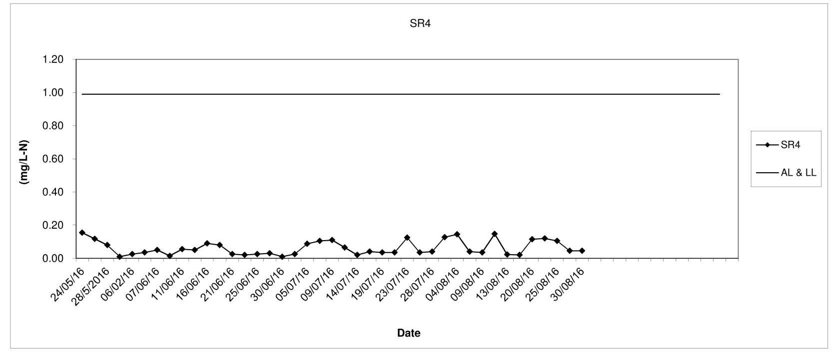
In-situ Ammonia (Depth average) at Mid-Flood Tide

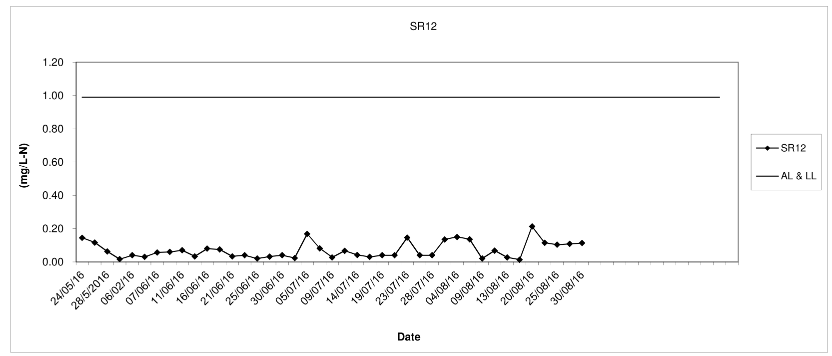




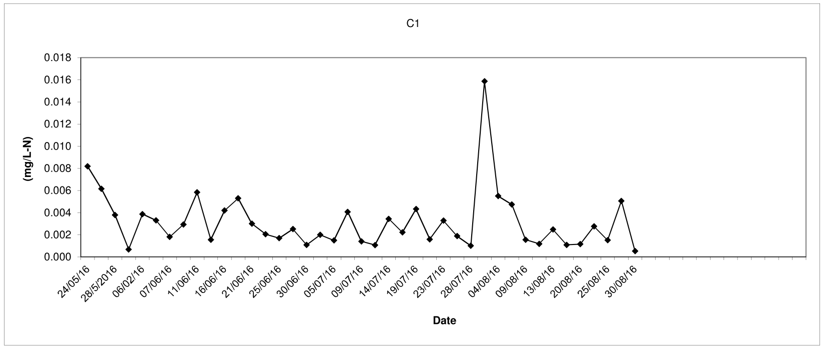


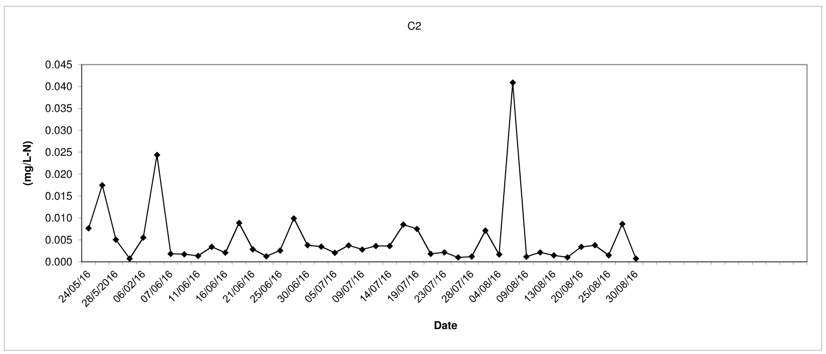
In-situ Ammonia (Depth average) at Mid-Flood Tide

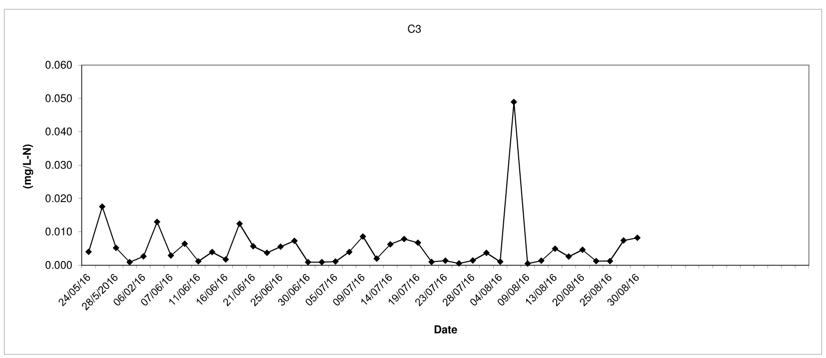




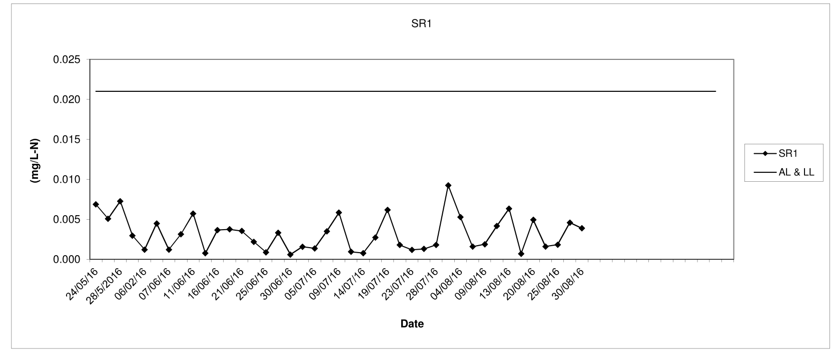
In-situ UIA (Depth average) at Mid-Flood Tide

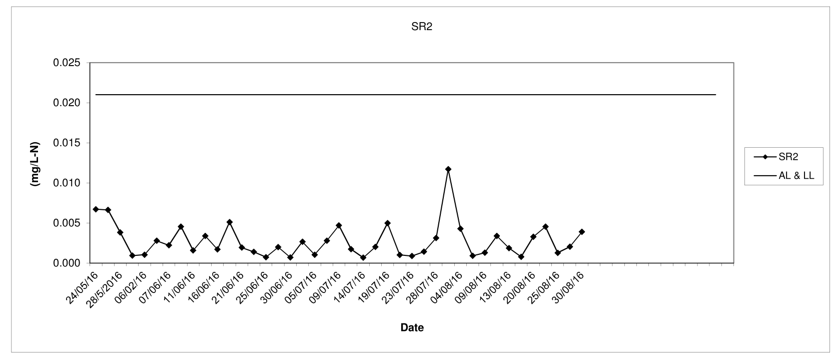


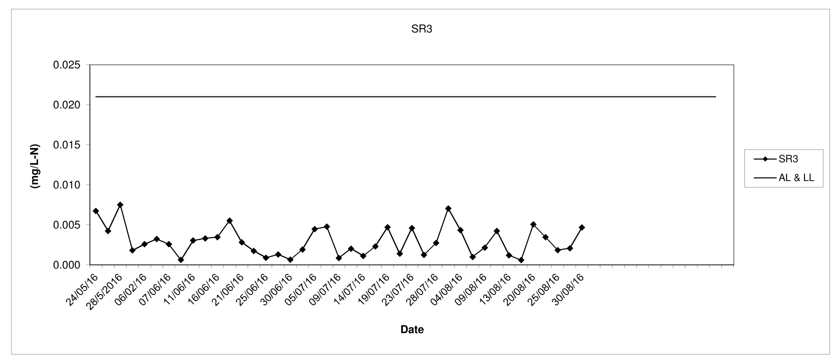




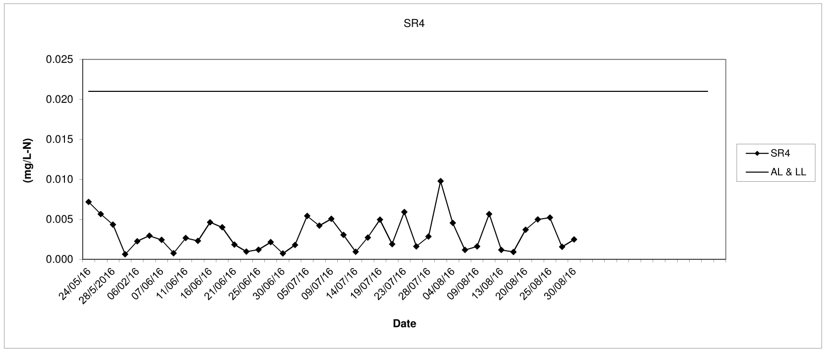
In-situ UIA (Depth average) at Mid-Flood Tide

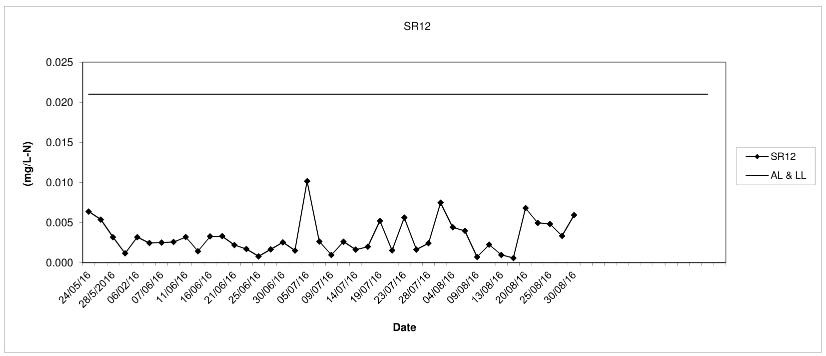




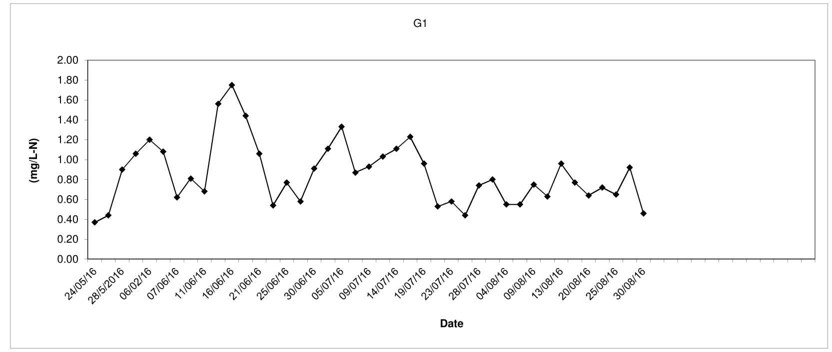


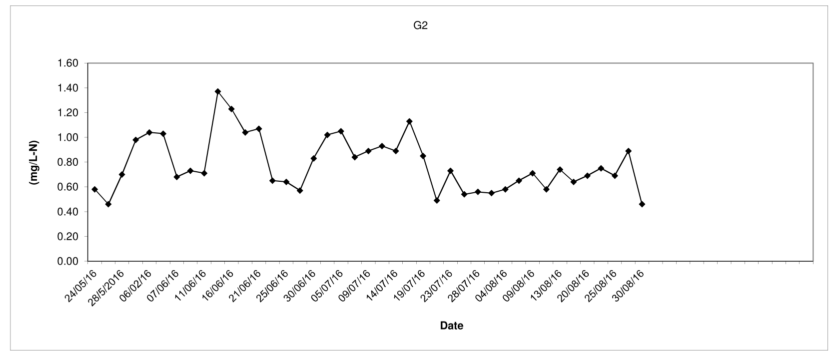
In-situ UIA (Depth average) at Mid-Flood Tide

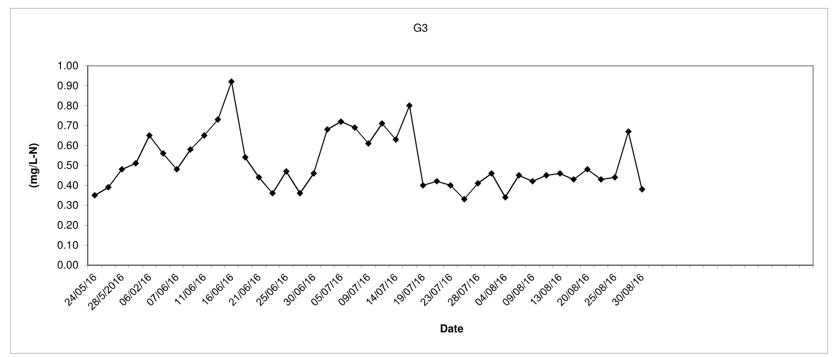




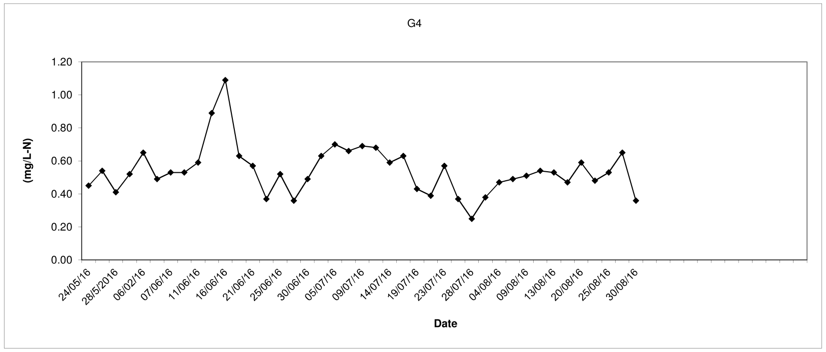
In-situ TIN (Depth average) at Mid-Flood Tide

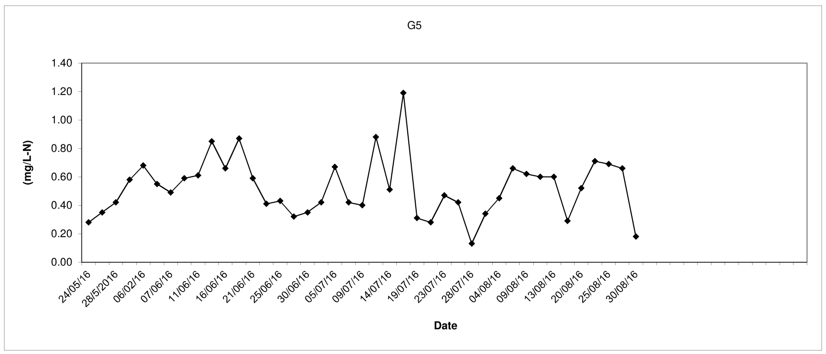


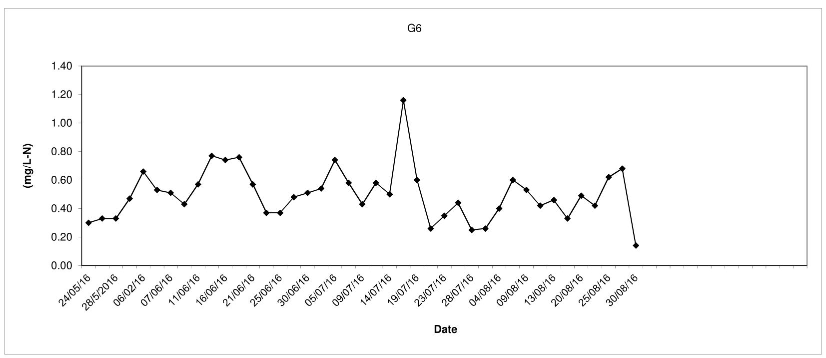




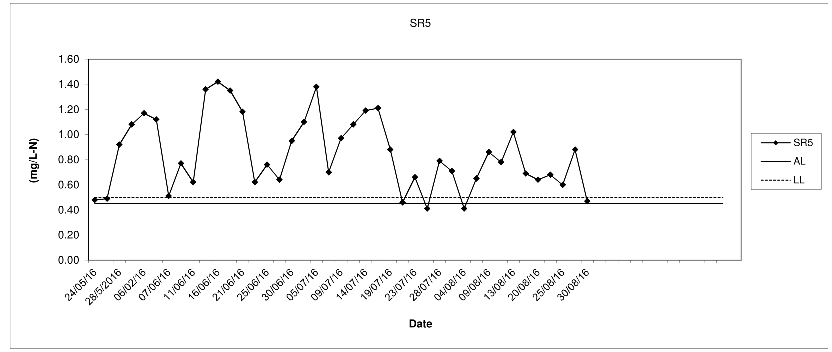
In-situ TIN (Depth average) at Mid-Flood Tide

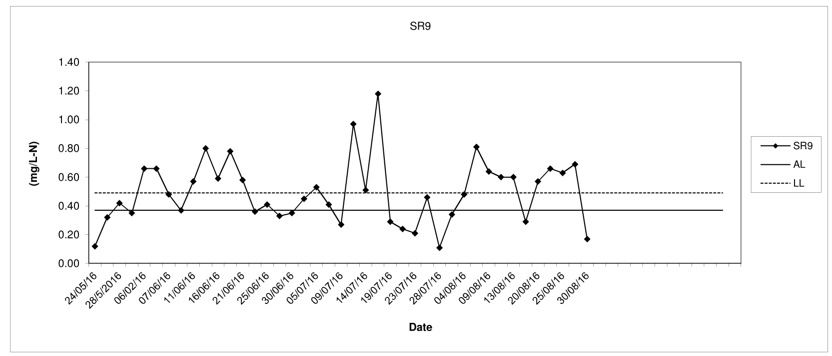


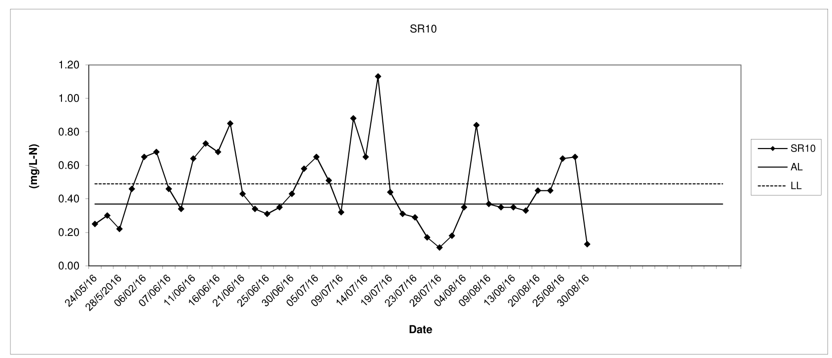




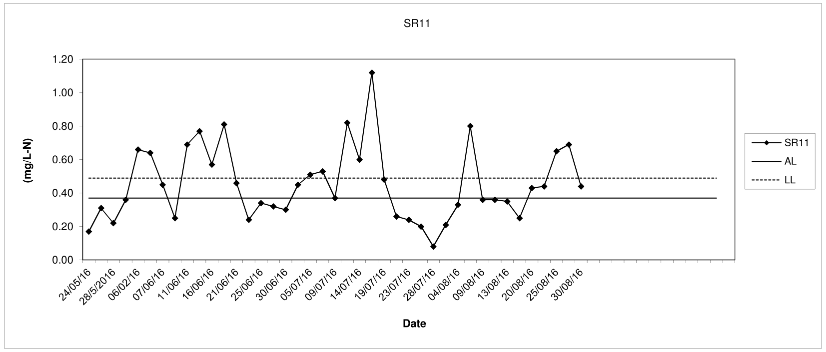
In-situ TIN (Depth average) at Mid-Flood Tide



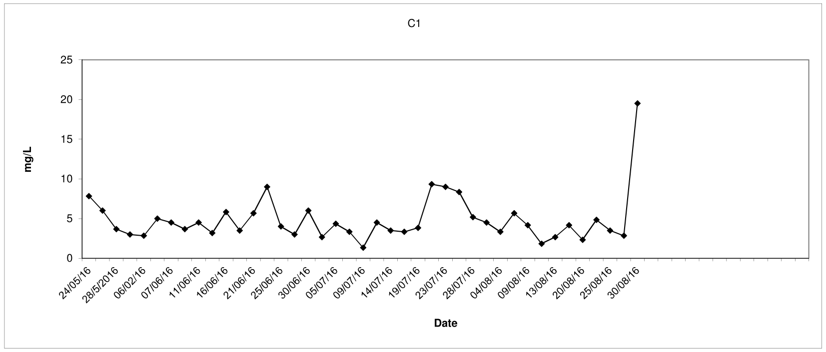


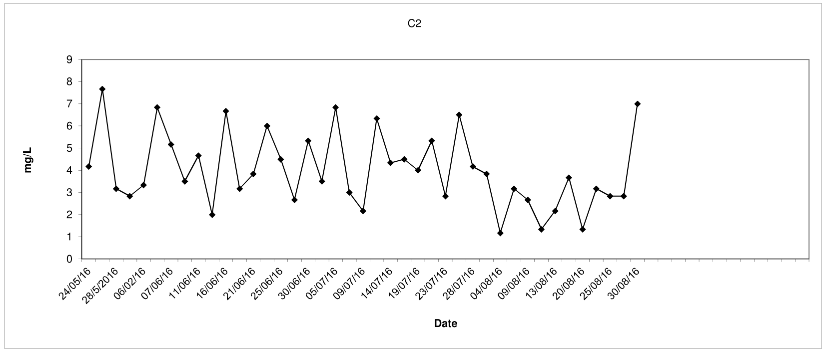


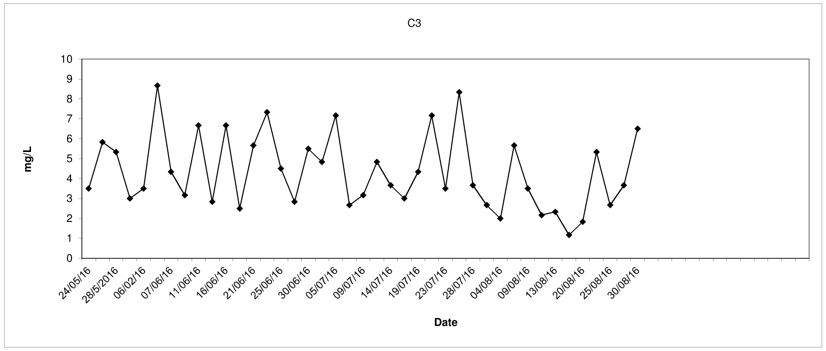
In-situ TIN (Depth average) at Mid-Flood Tide



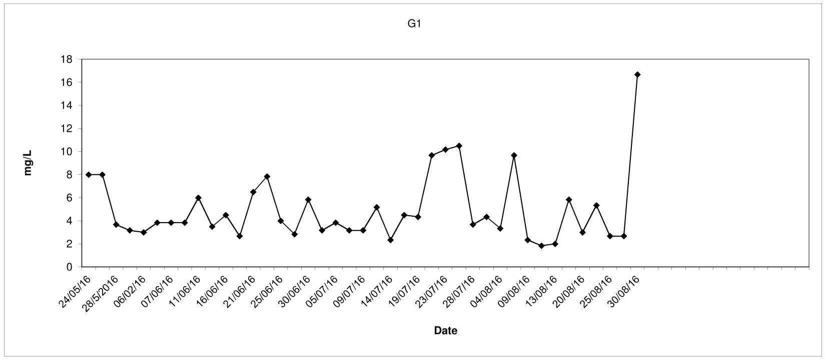
Total Suspended Solids (Depth average) at Mid-Flood Tide

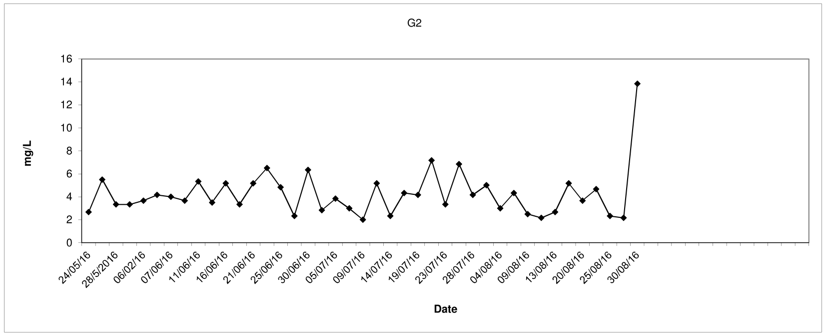


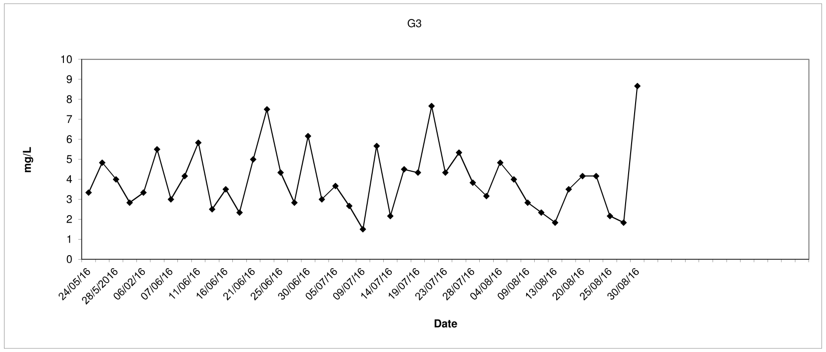




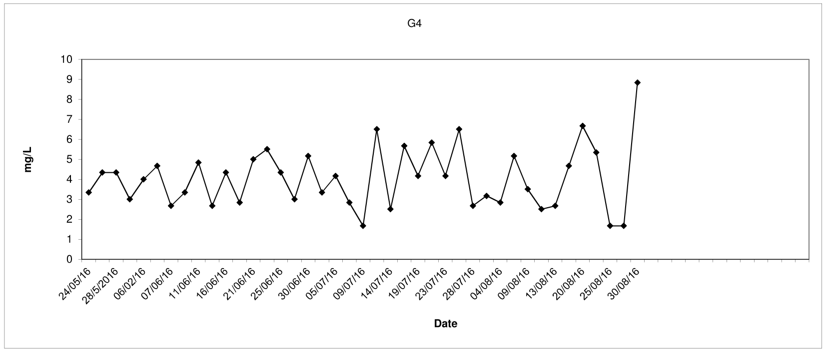
Total Suspended Solids (Depth average) at Mid-Flood Tide

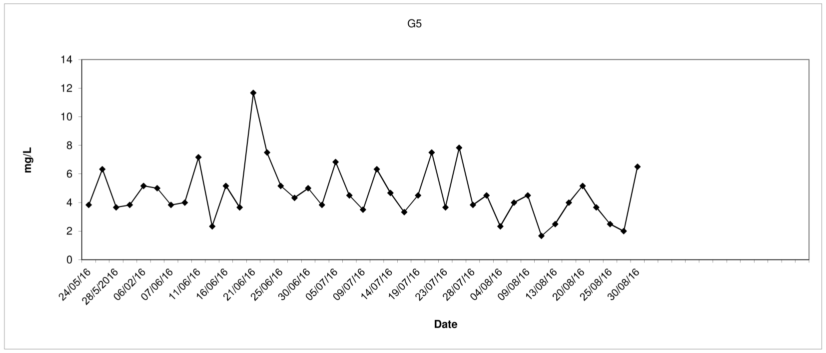


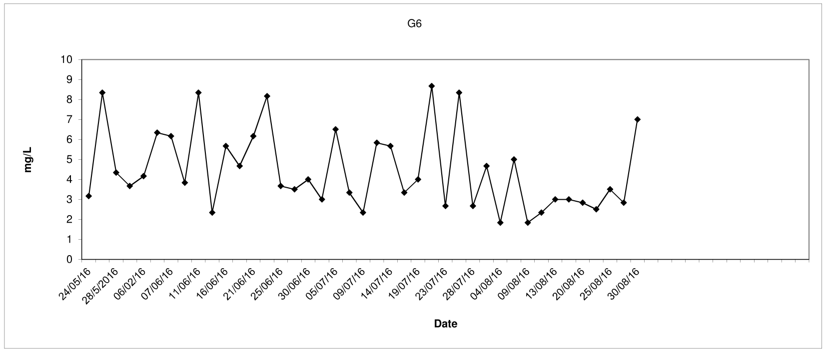




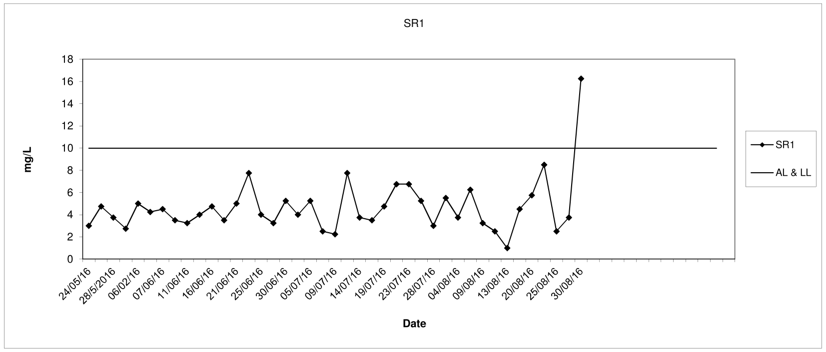
Total Suspended Solids (Depth average) at Mid-Flood Tide

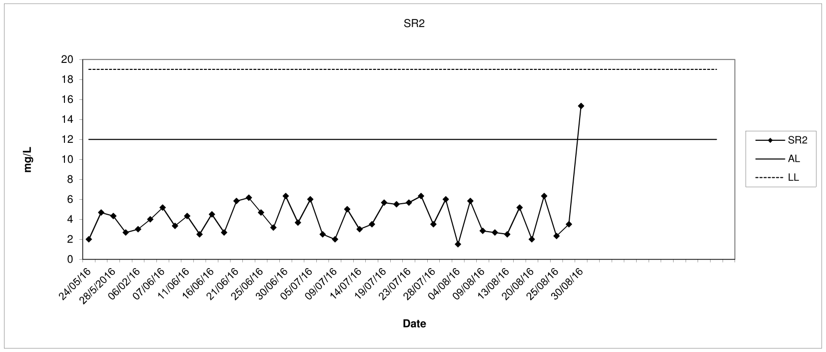


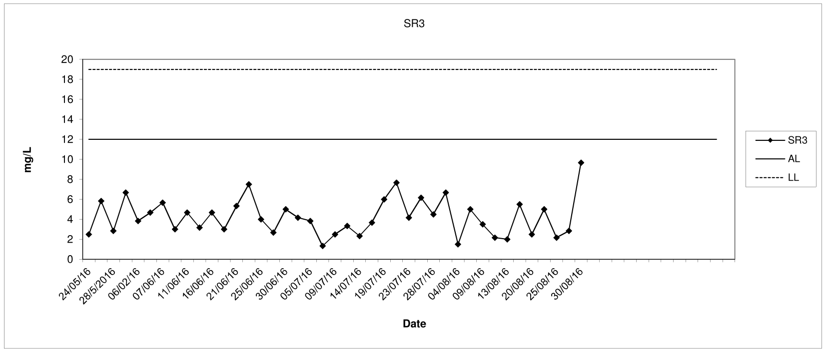




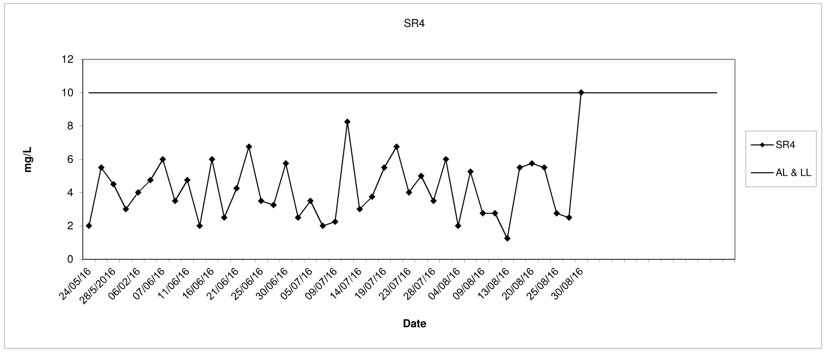
Total Suspended Solids (Depth average) at Mid-Flood Tide

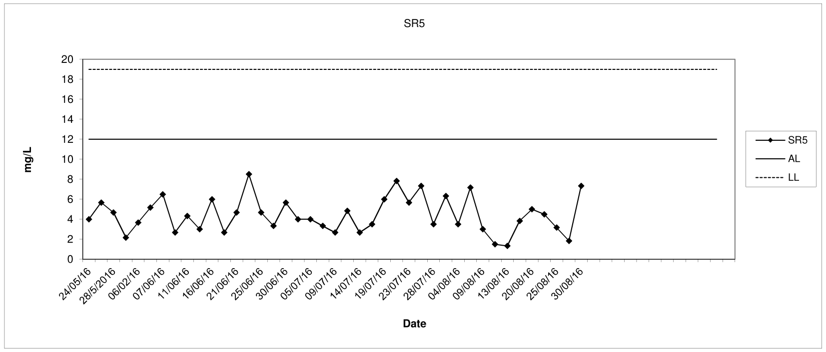


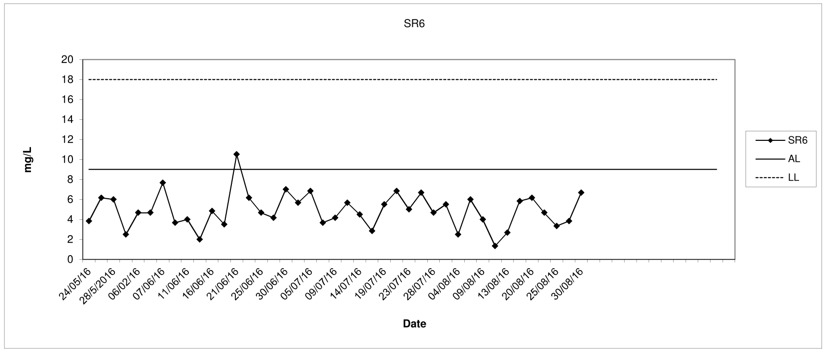




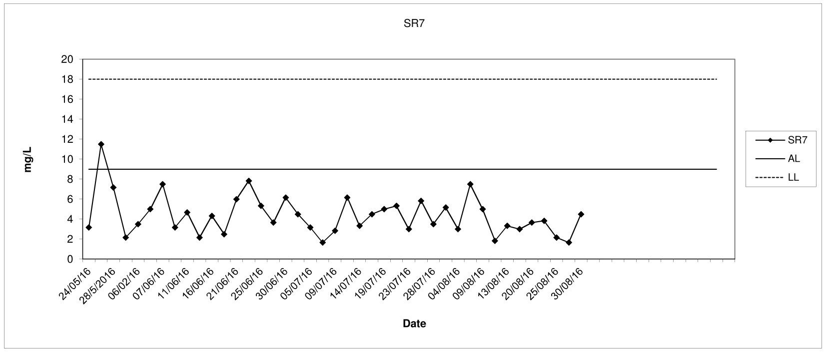
Total Suspended Solids (Depth average) at Mid-Flood Tide

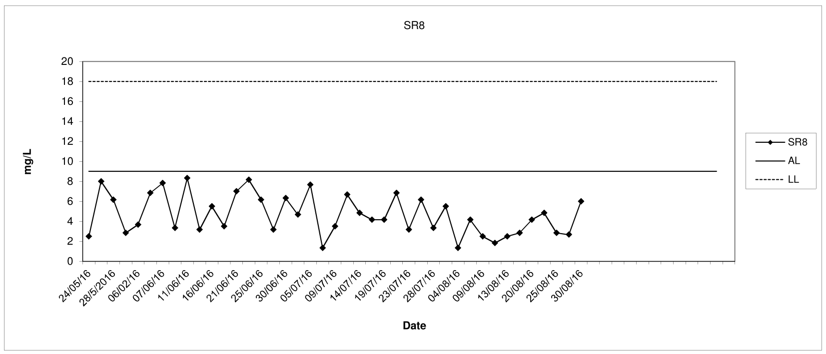


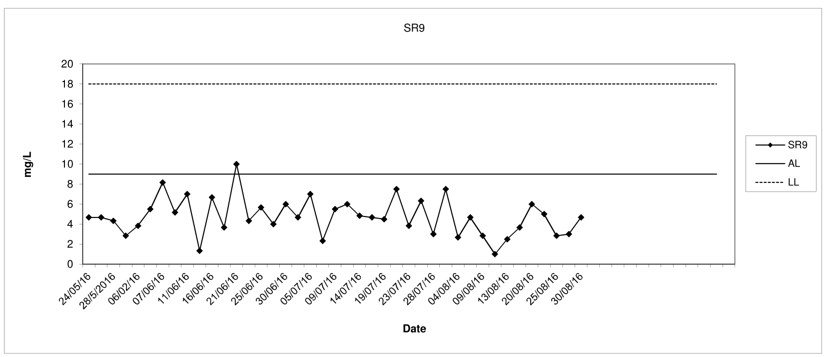




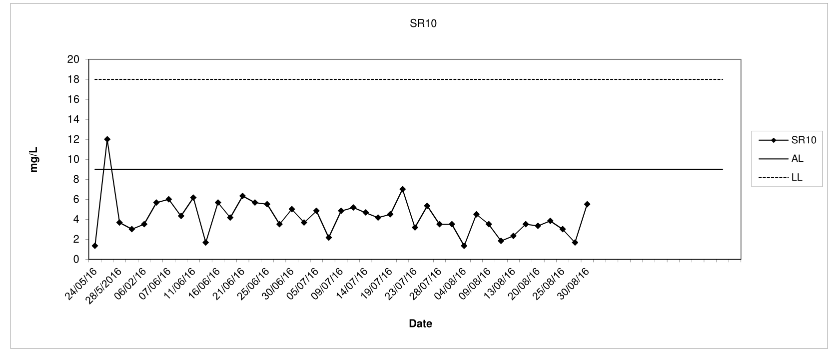
Total Suspended Solids (Depth average) at Mid-Flood Tide

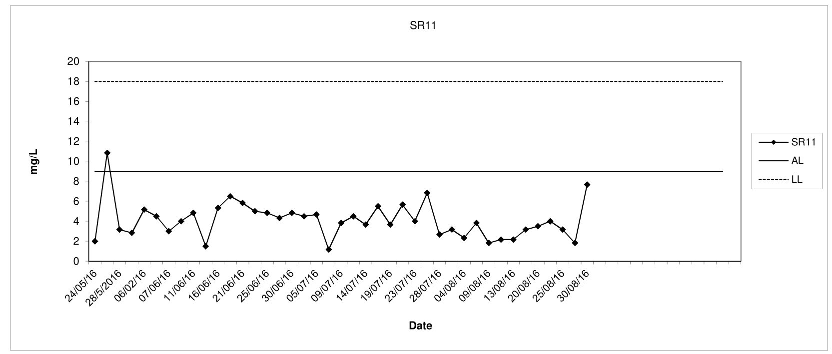


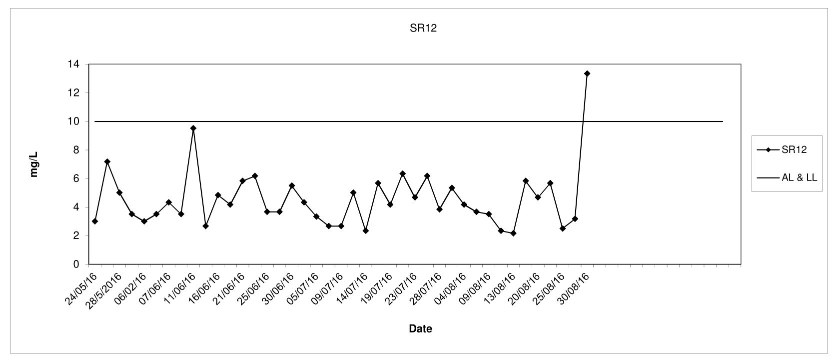




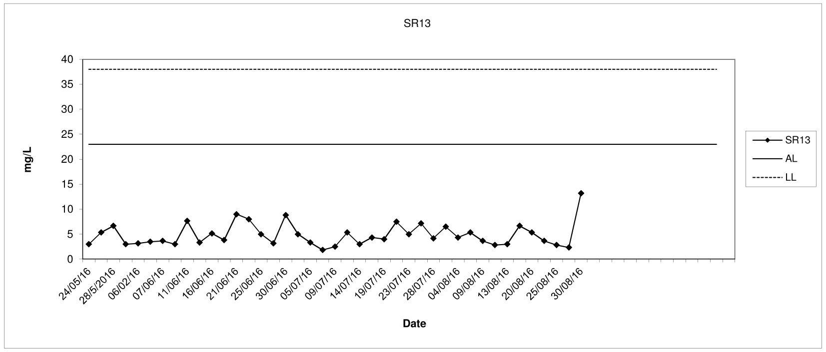
Total Suspended Solids (Depth average) at Mid-Flood Tide



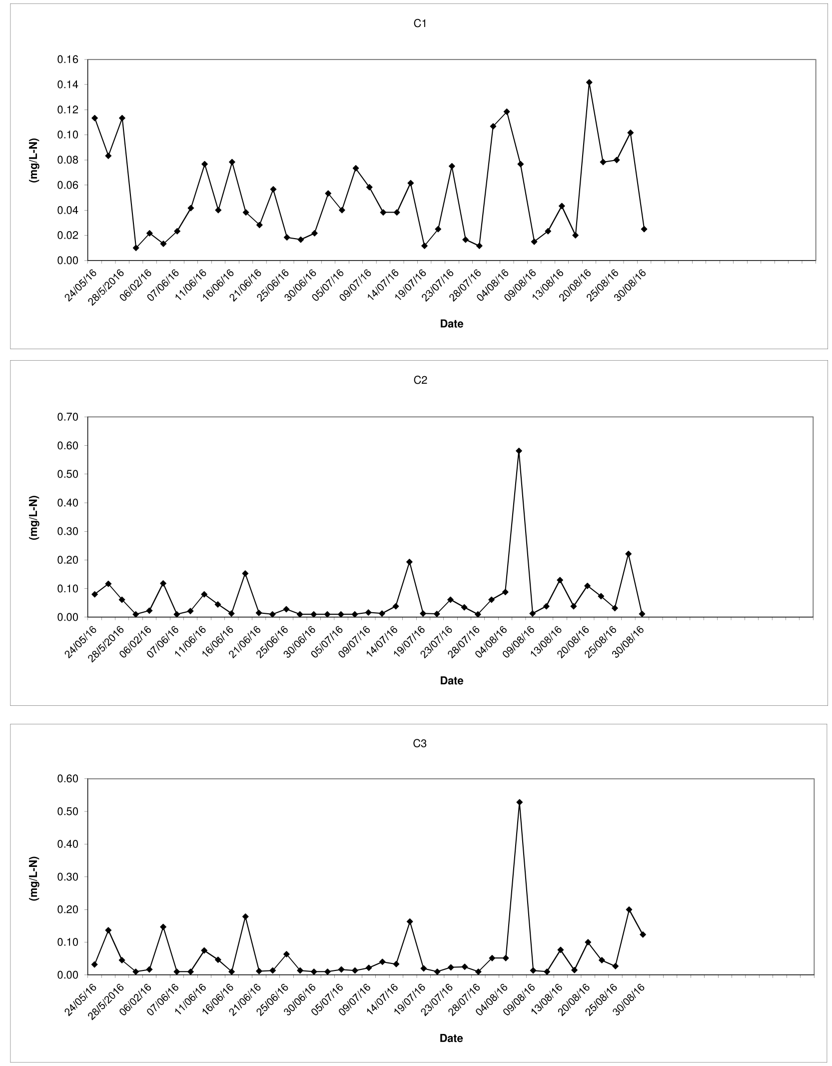




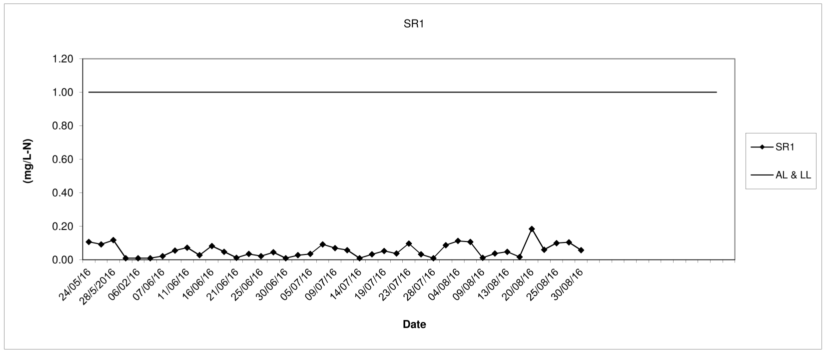
Total Suspended Solids (Depth average) at Mid-Flood Tide

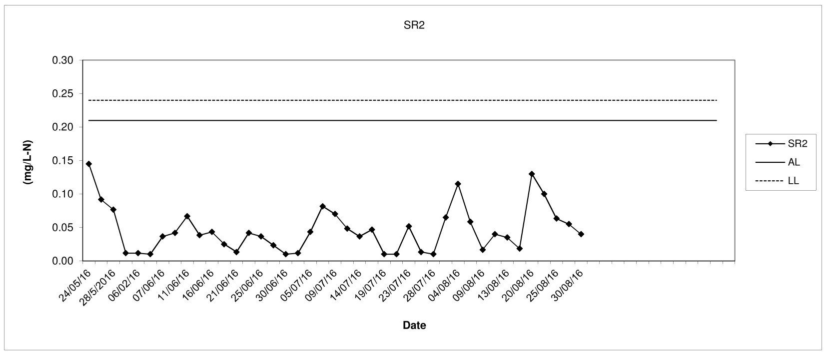


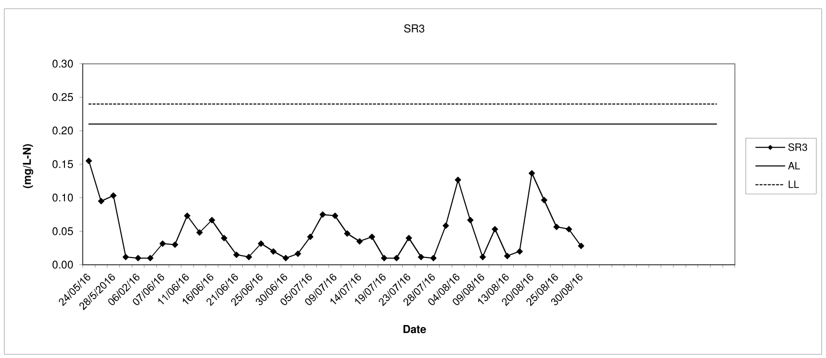
Ammonia Nitrogen (Depth average) at Mid-Flood Tide



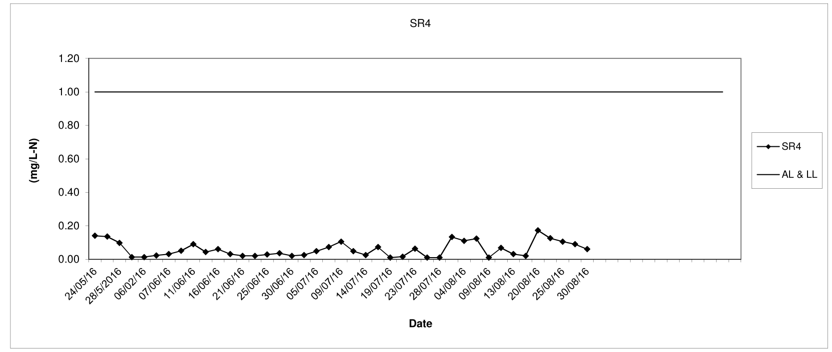
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

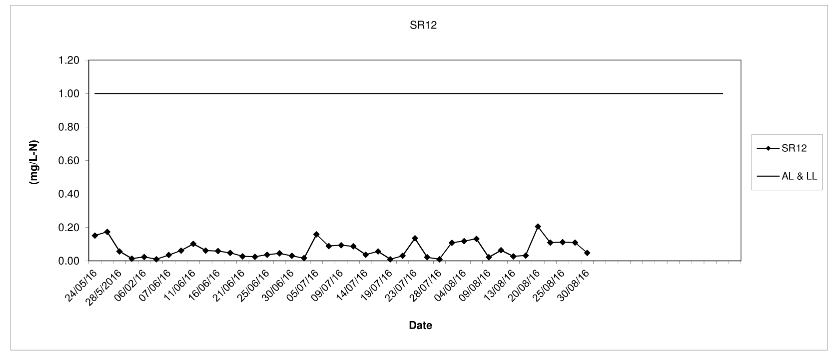




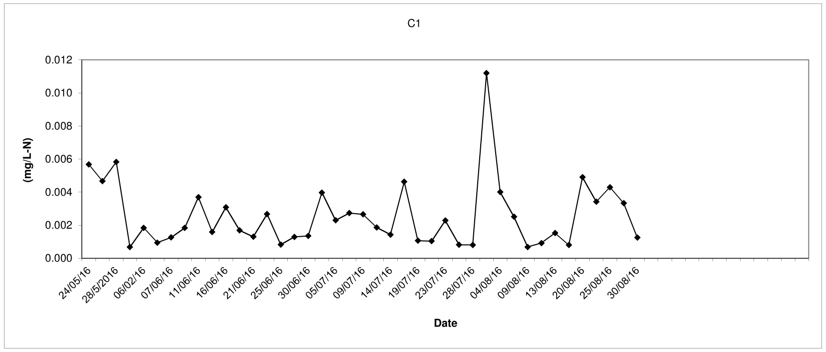


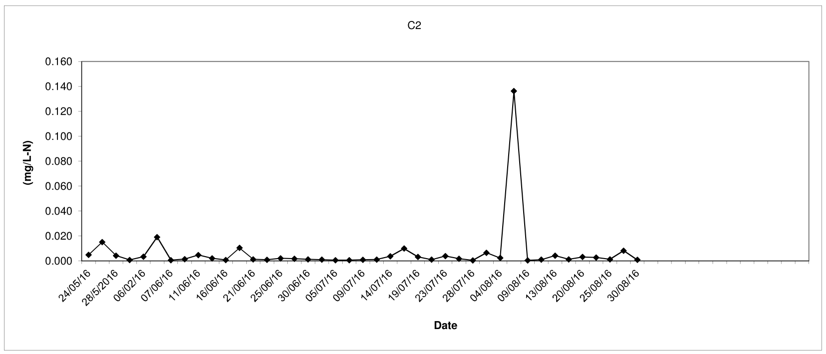
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

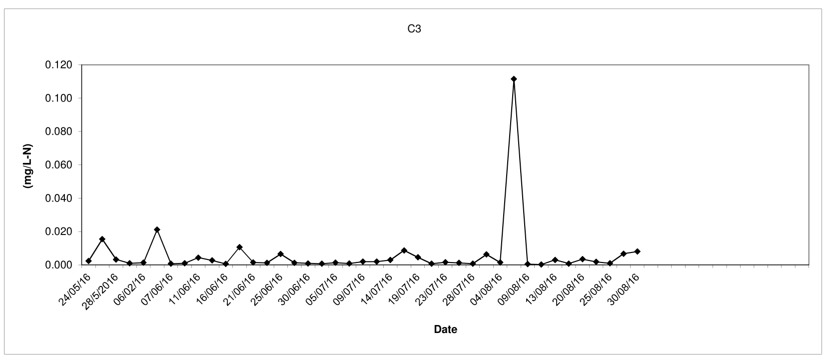




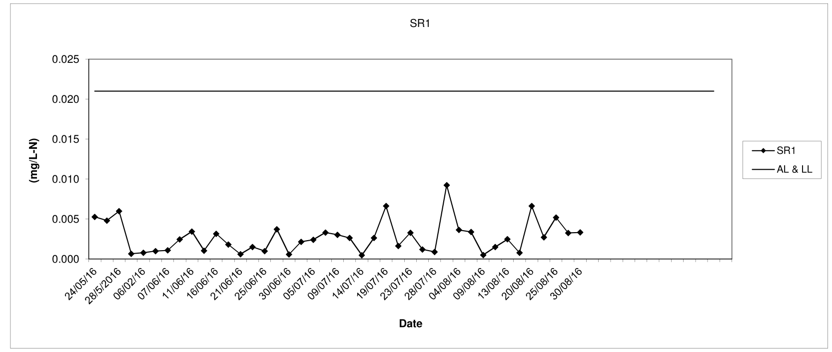
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

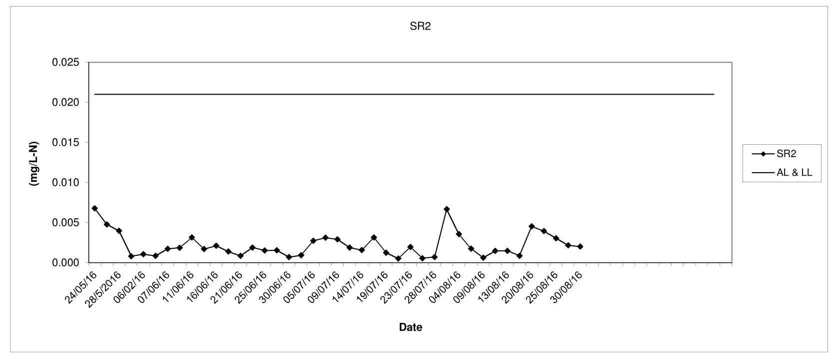


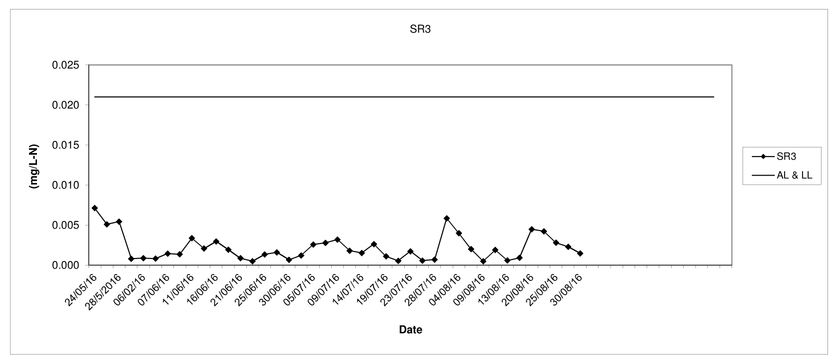




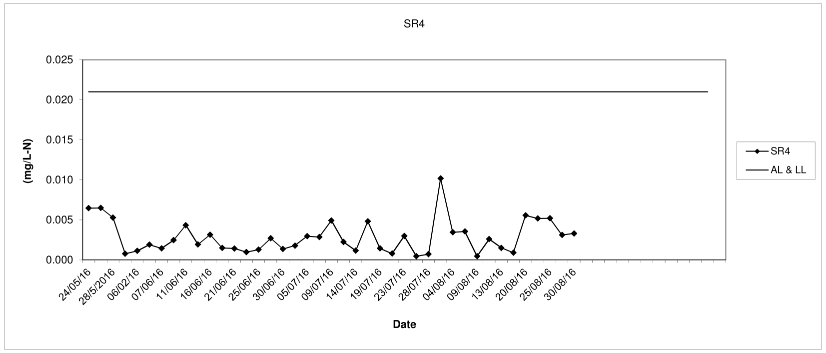
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

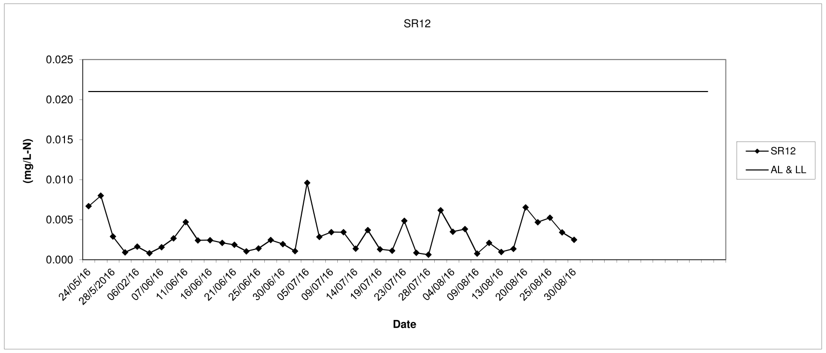




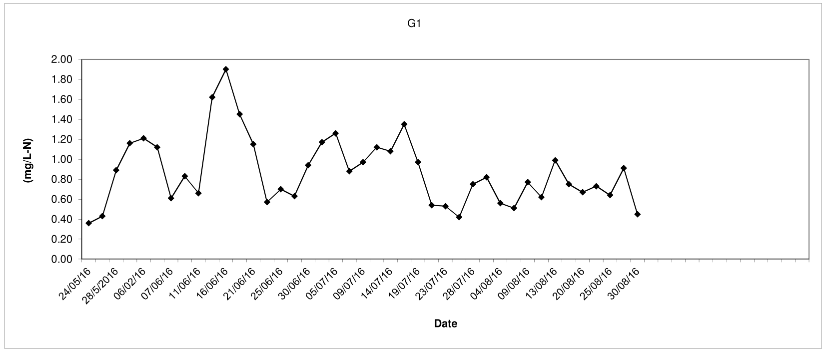


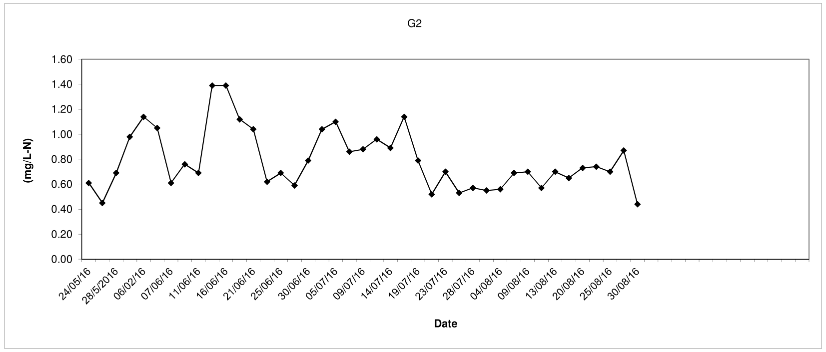
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

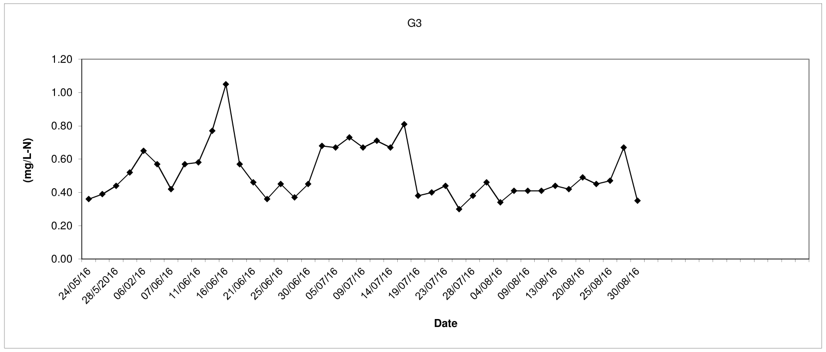




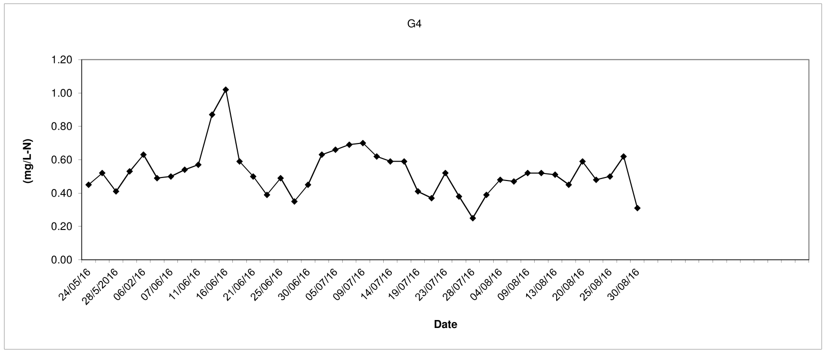
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

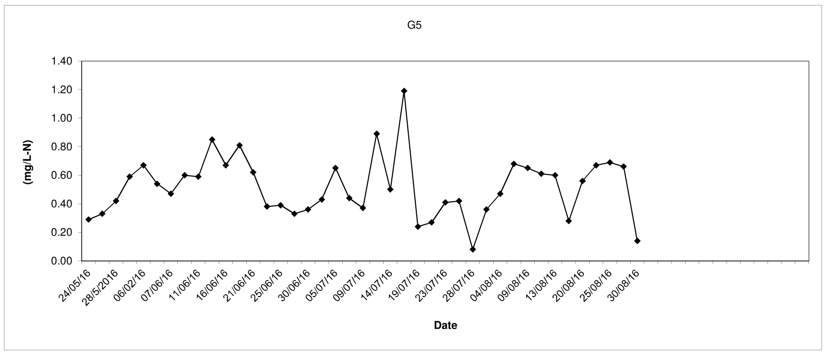


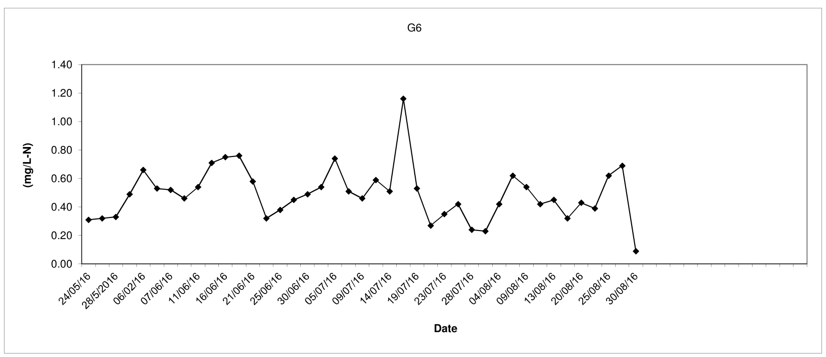




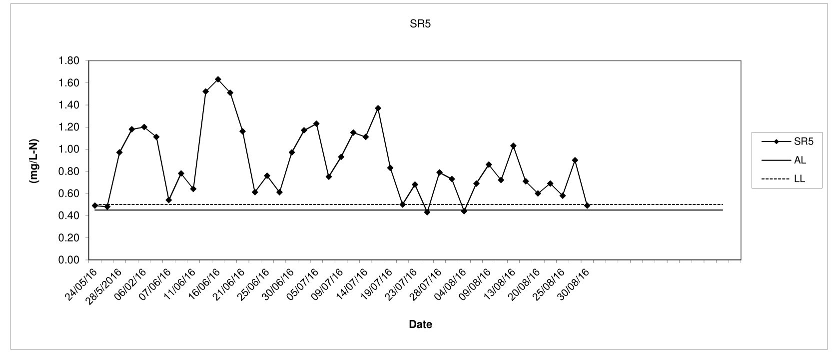
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

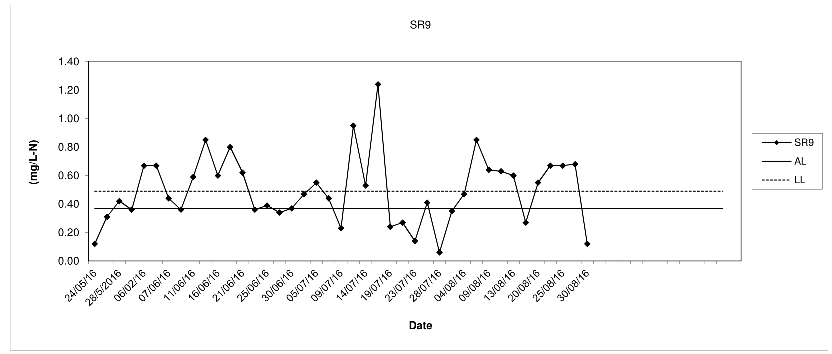


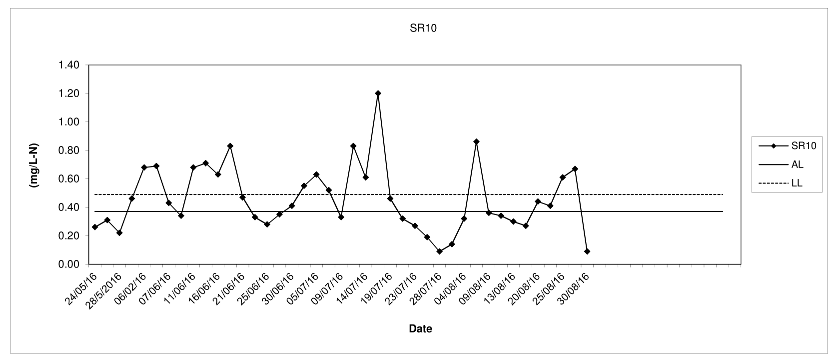




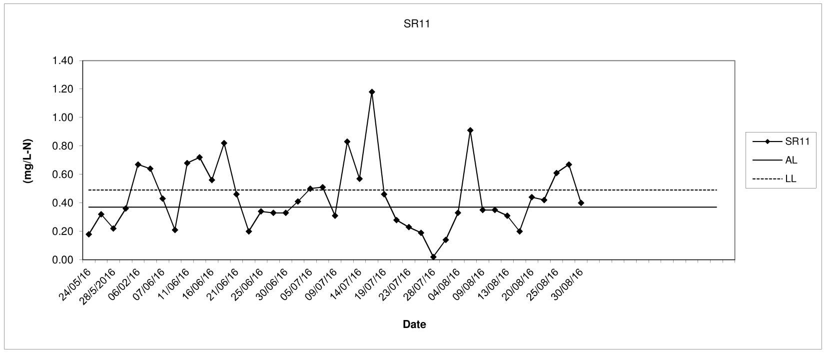
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



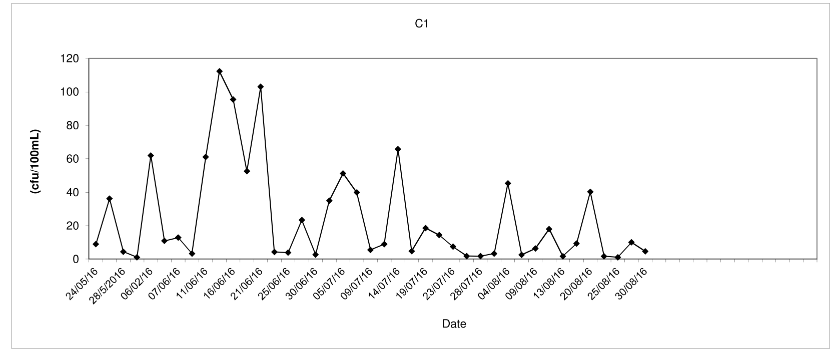


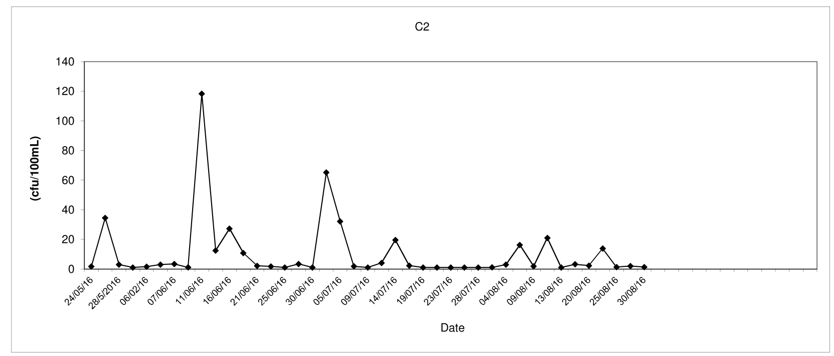


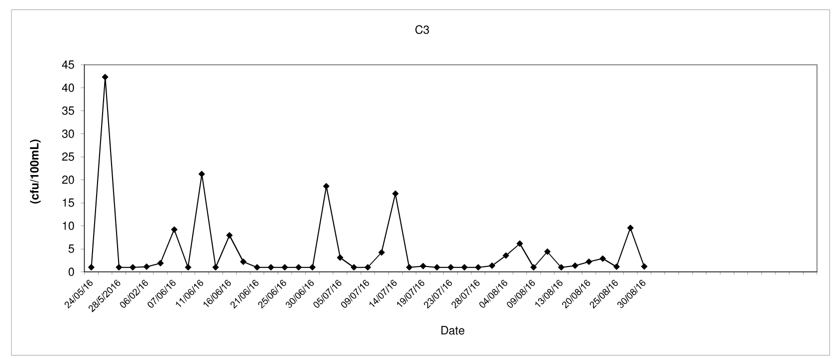
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



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

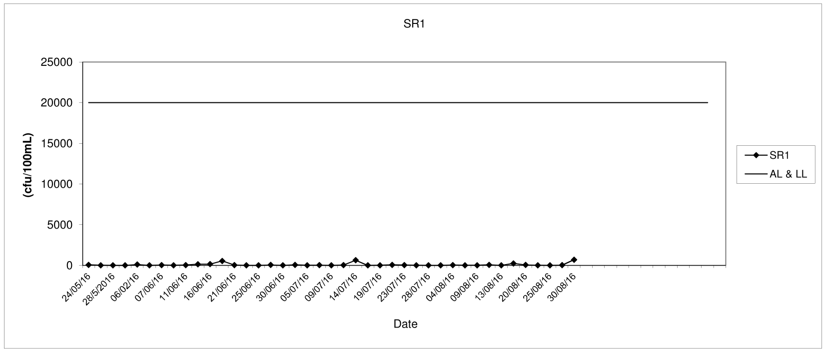


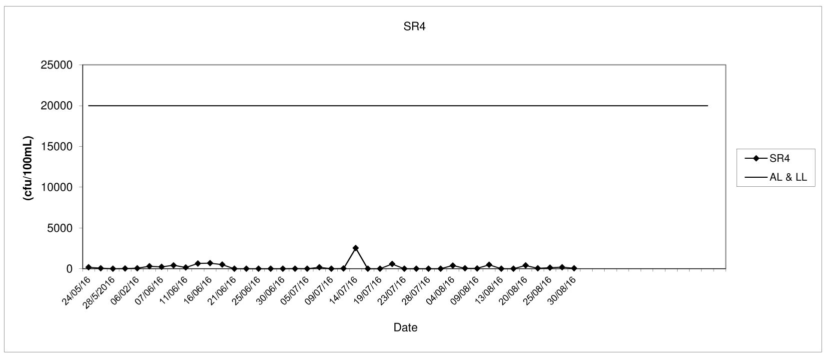


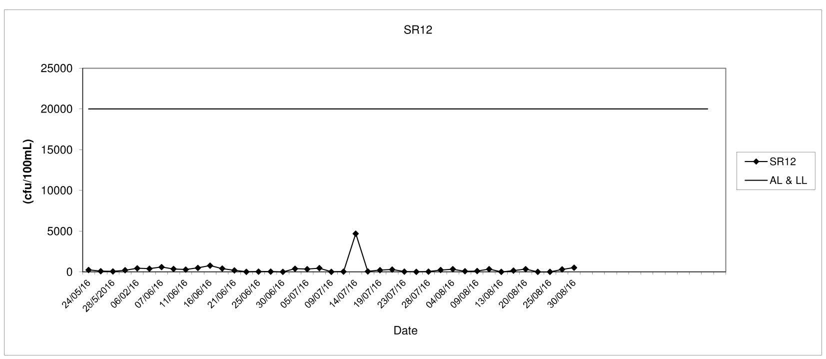


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

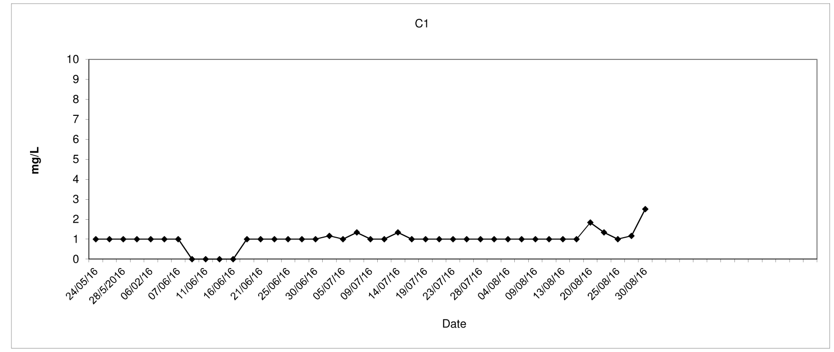
***E.coli* (Depth average) at Mid-Flood Tide**

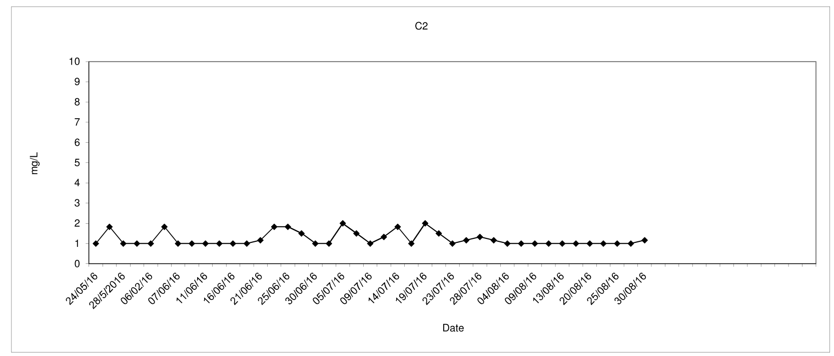


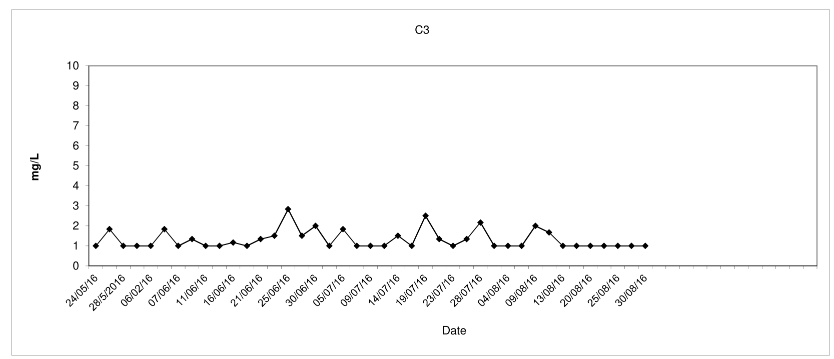




BOD_5 (Depth average) at Mid-Flood Tide

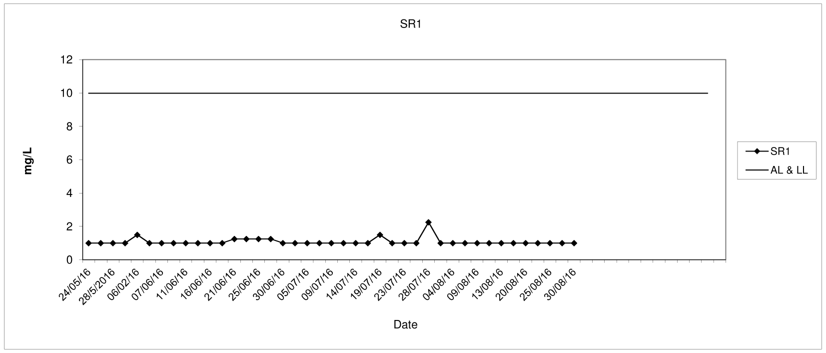


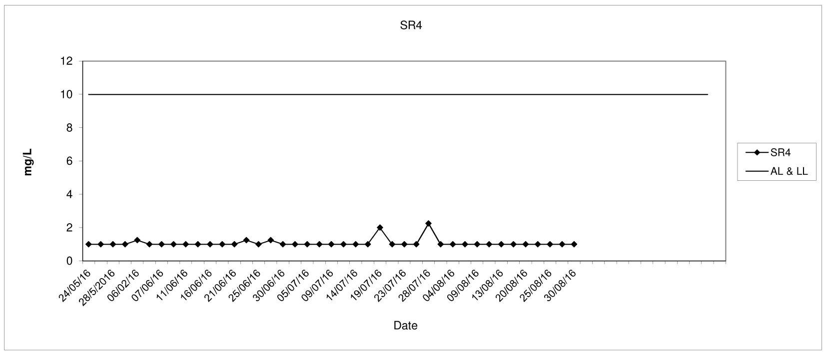


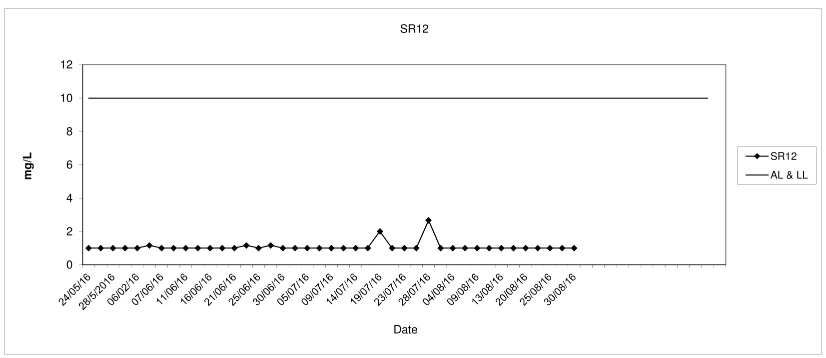


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

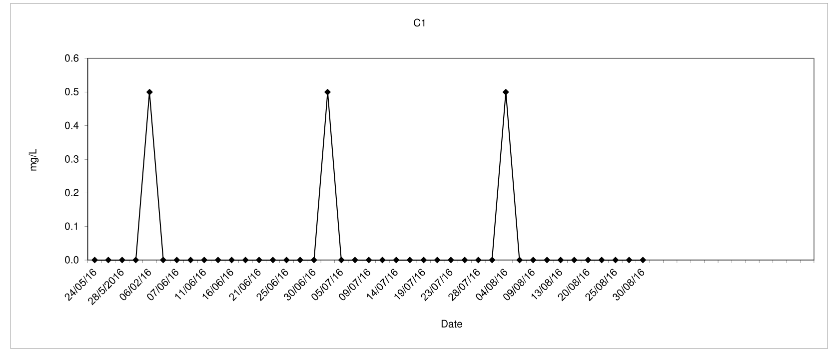
BOD$_5$ (Depth average) at Mid-Flood Tide

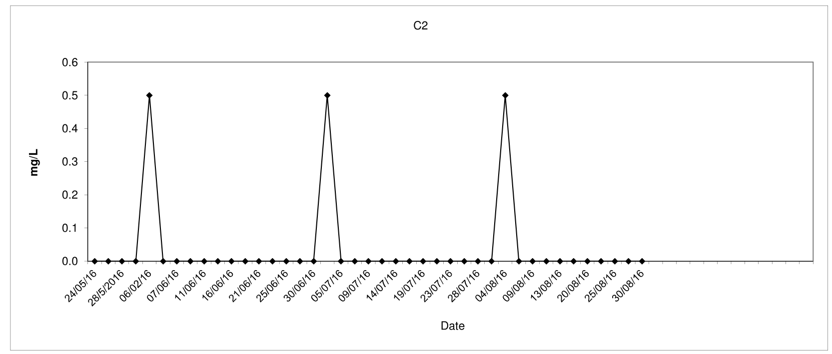


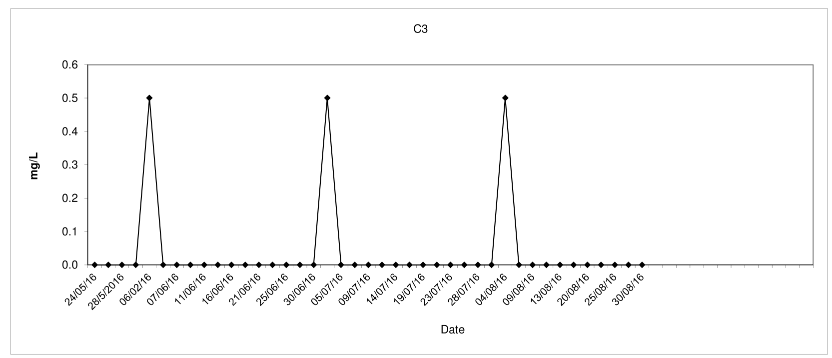




Synthetic Detergent (Depth average) at Mid-Flood Tide

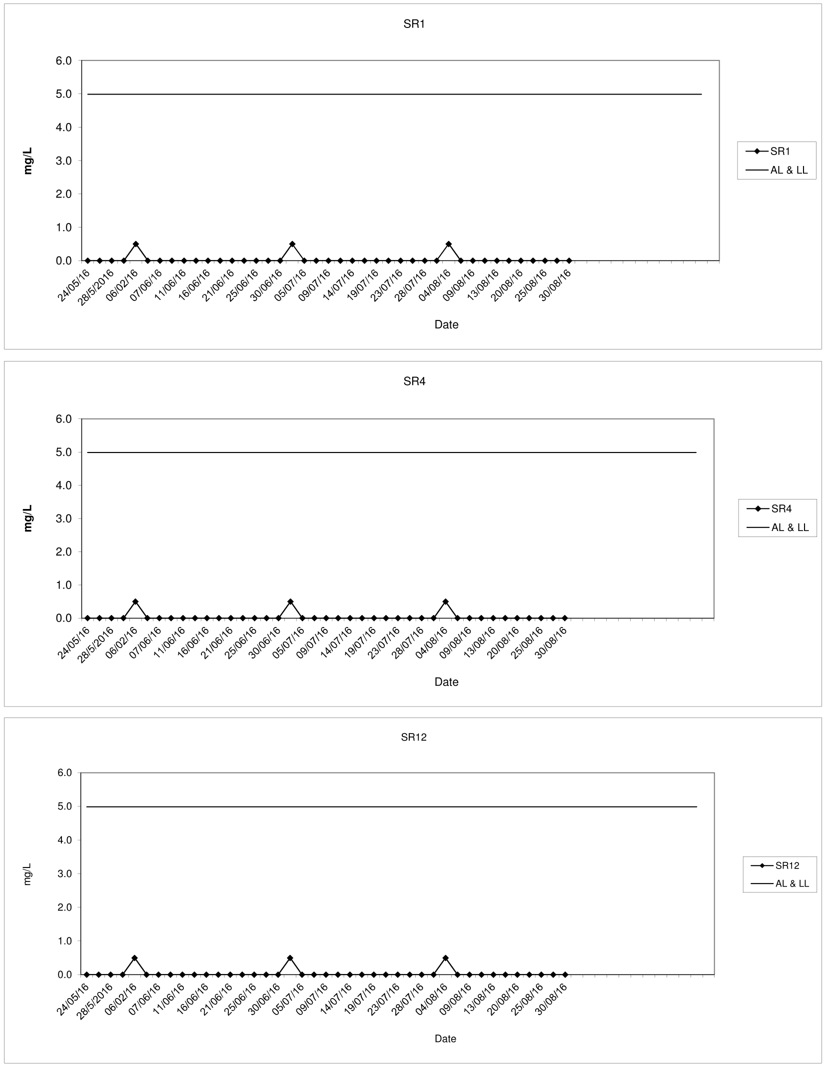




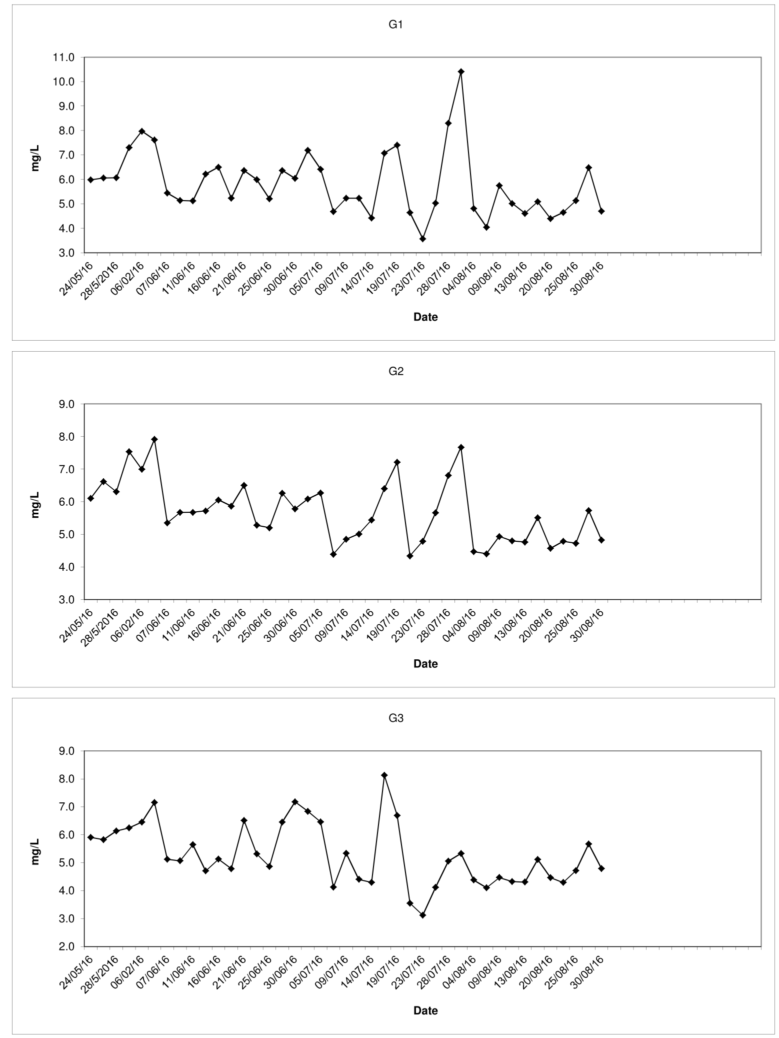


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

Synthetic Detergent (Depth average) at Mid-Flood Tide

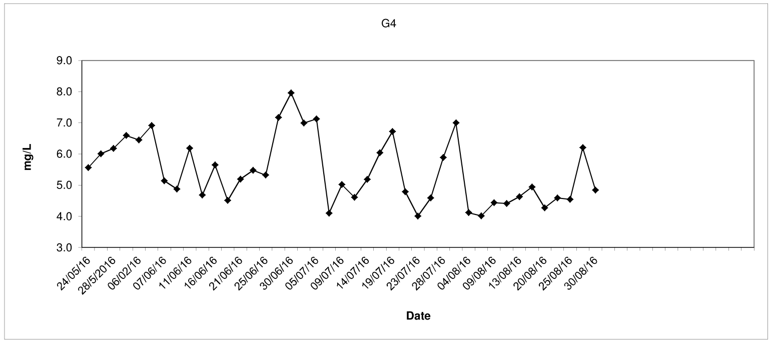


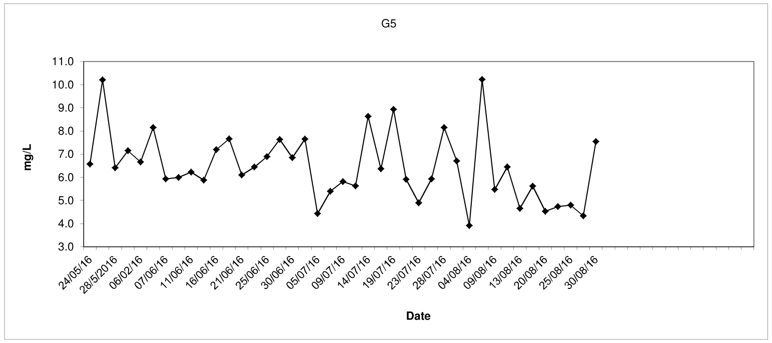
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

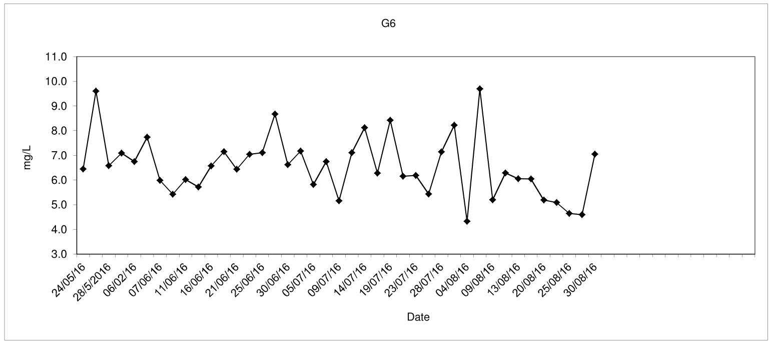


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

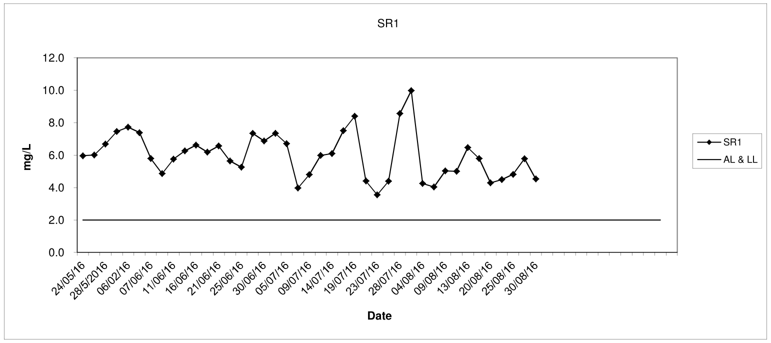
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

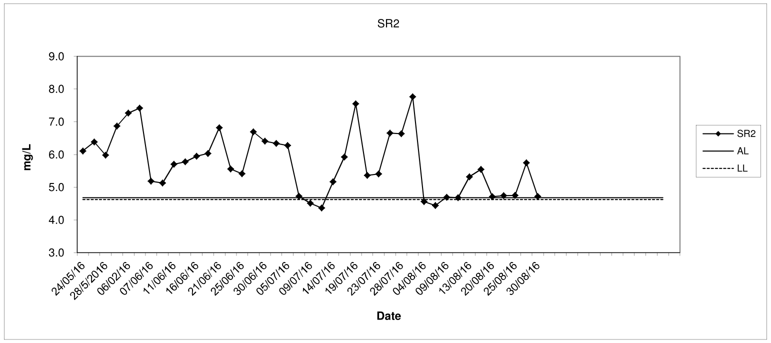


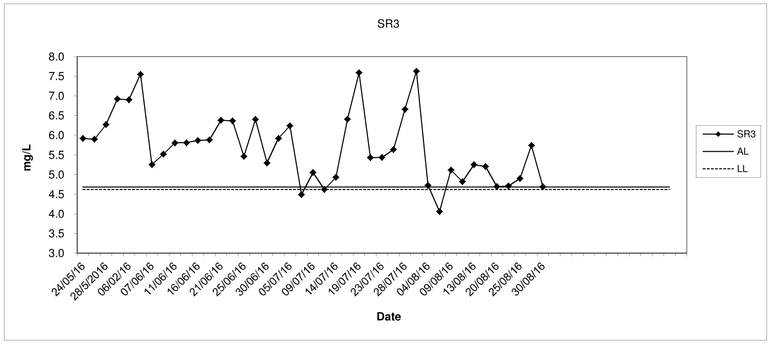




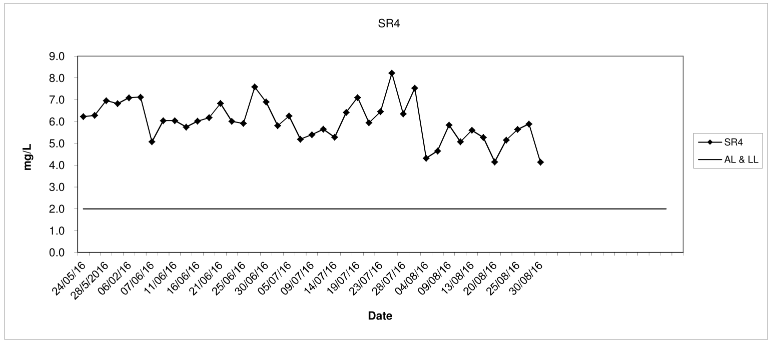
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

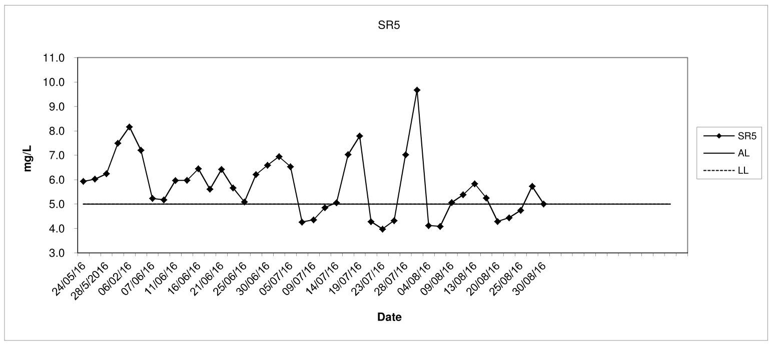


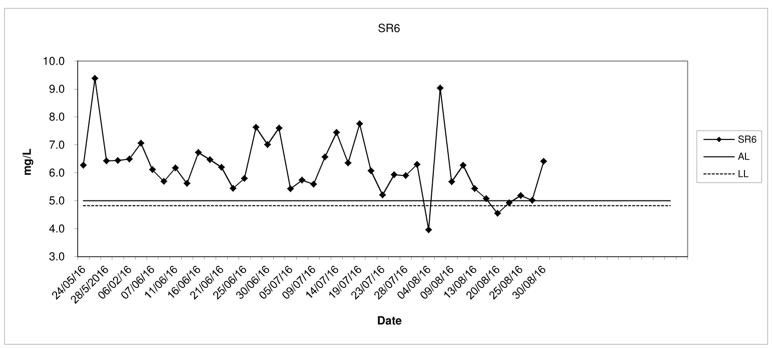




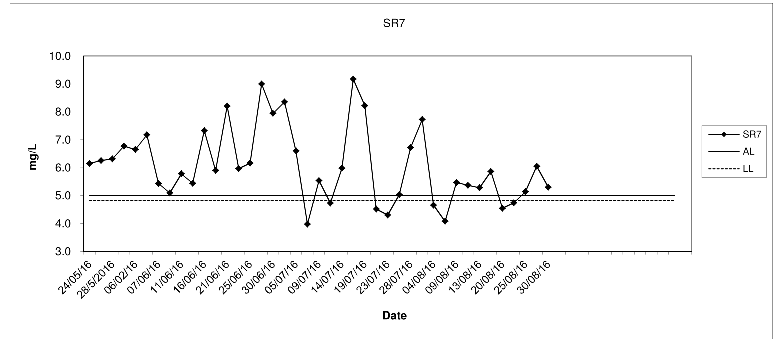
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

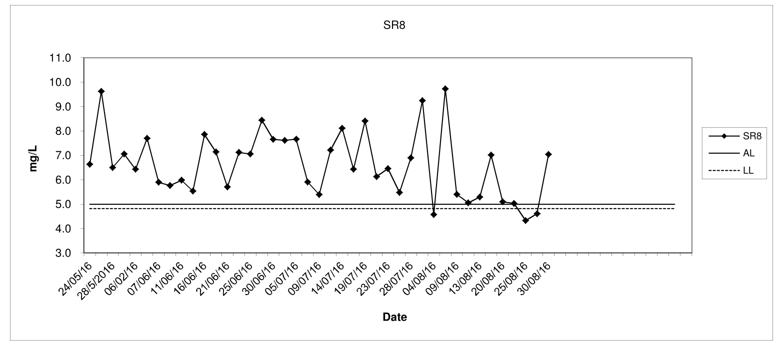


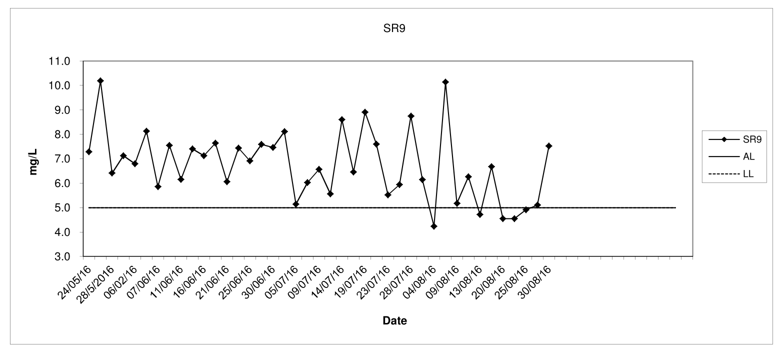




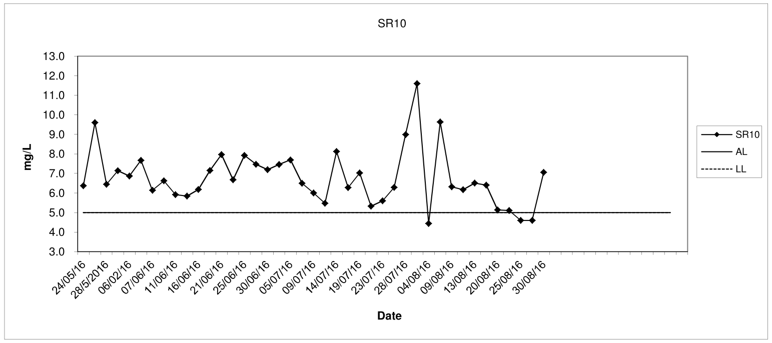
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

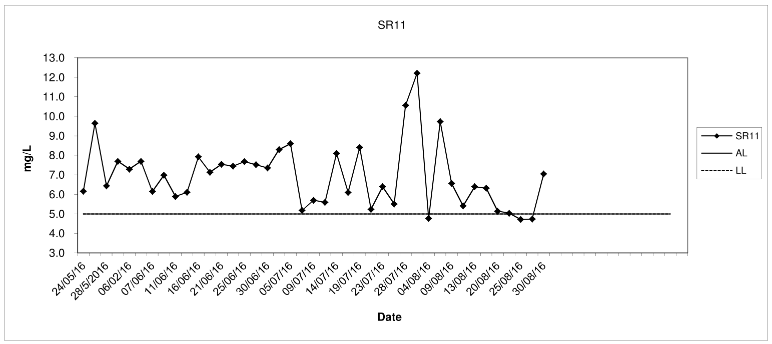


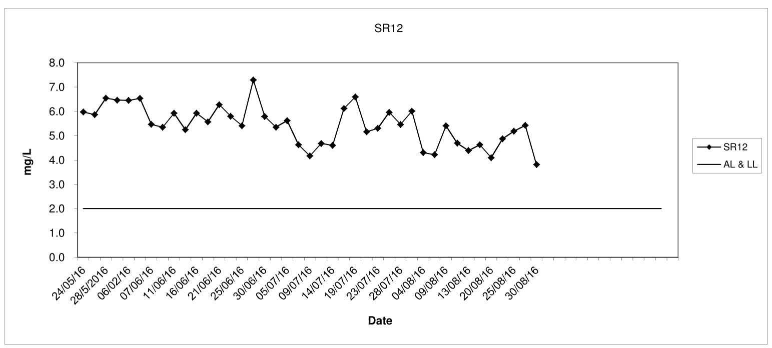




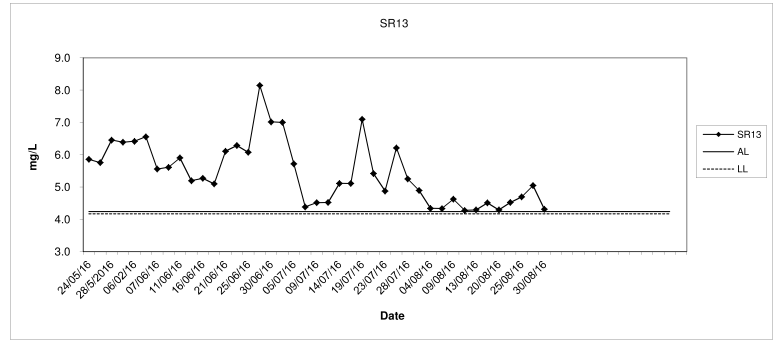
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



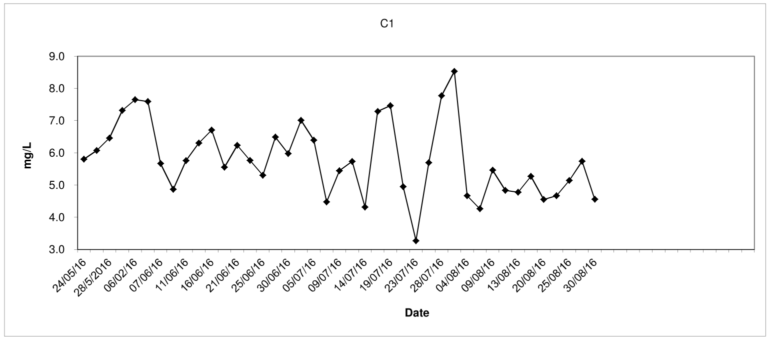


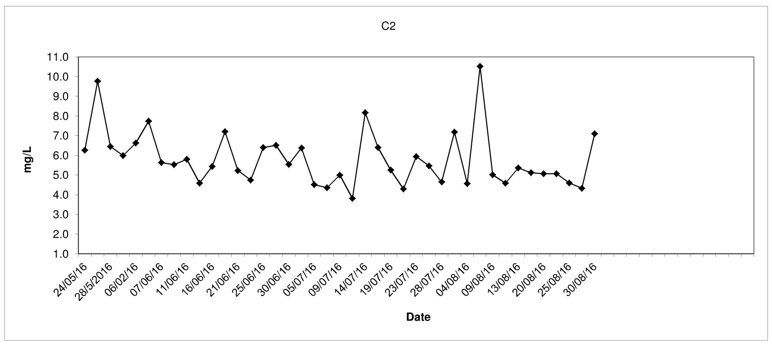


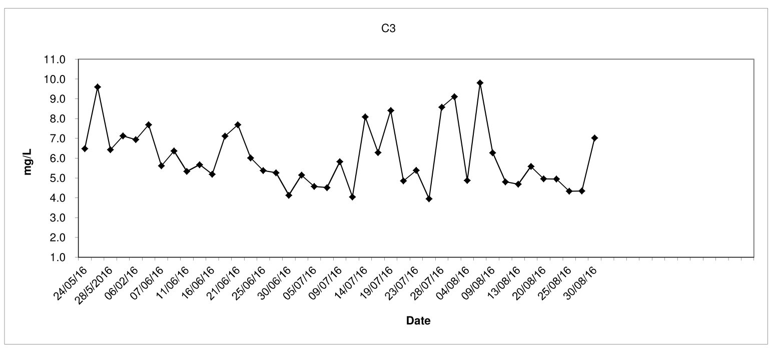
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



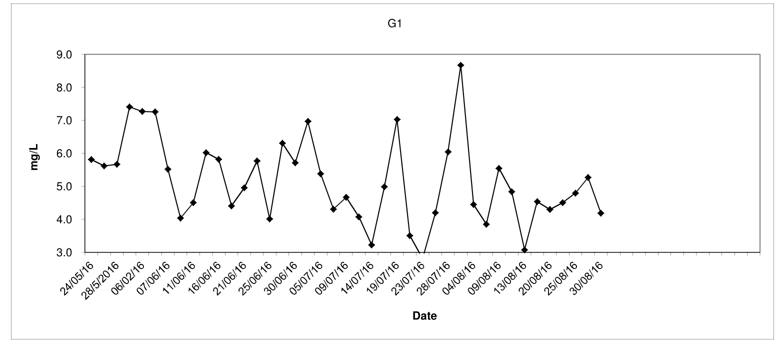
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

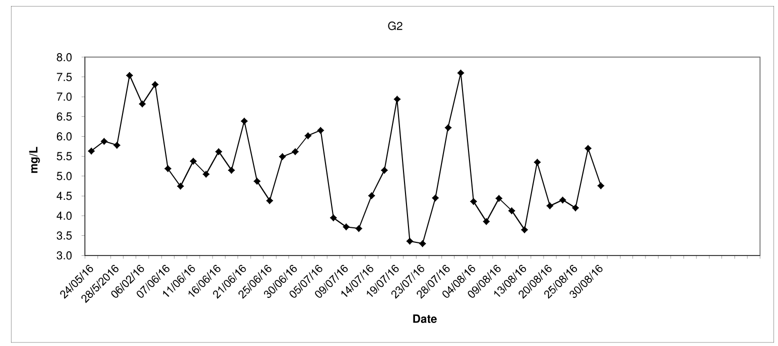


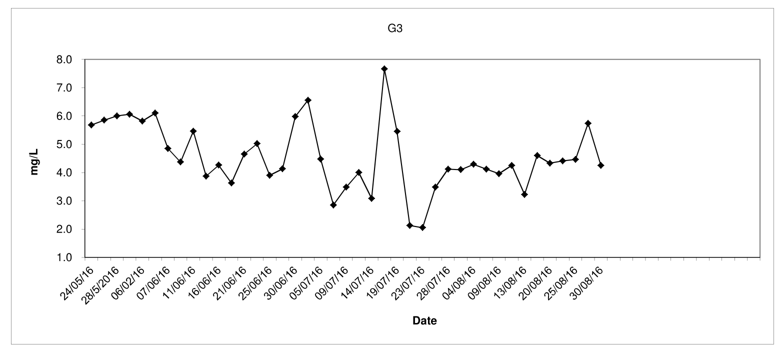




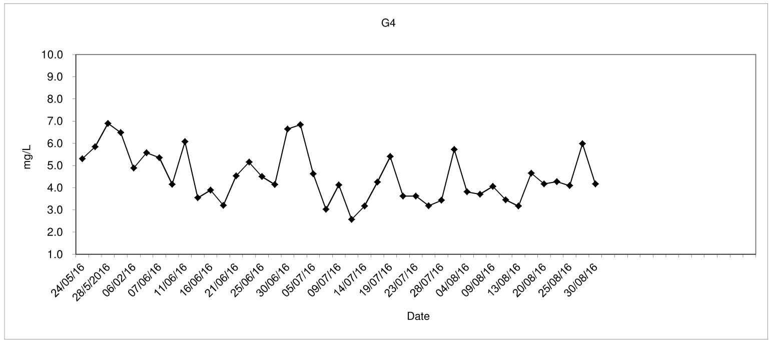
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

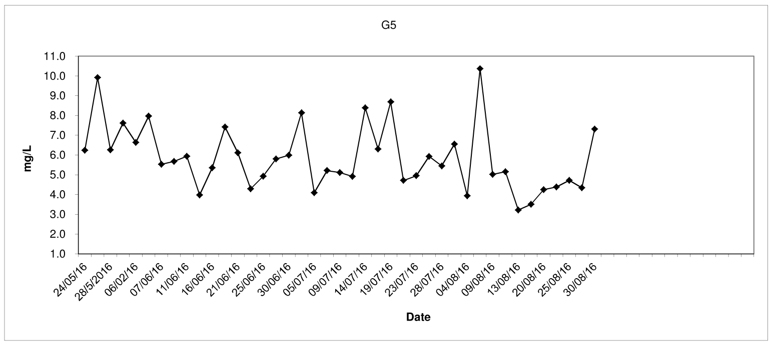


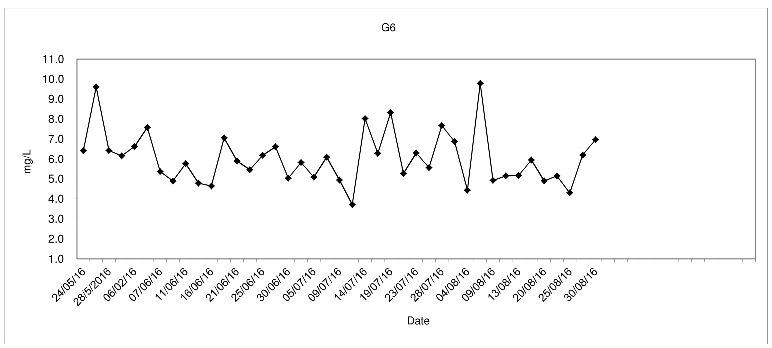




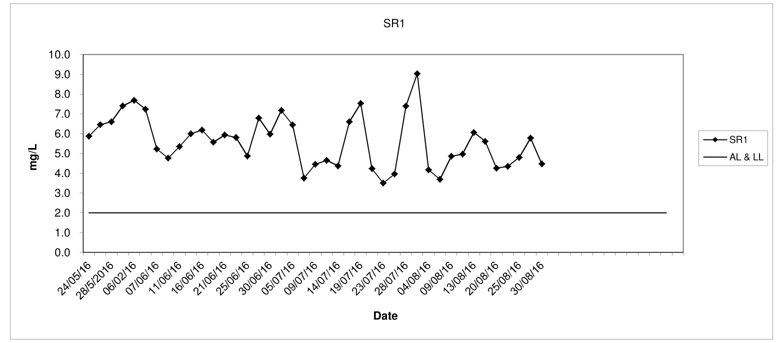
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

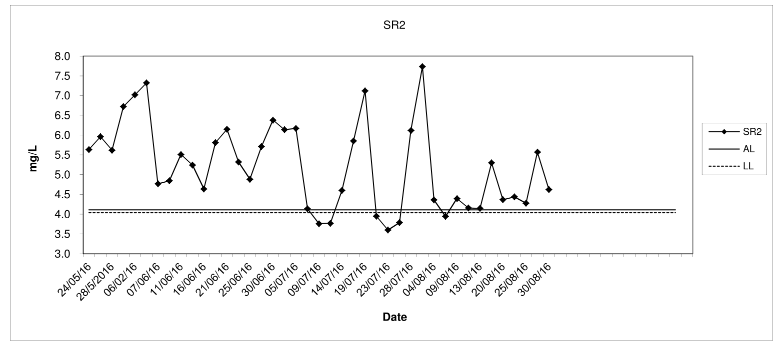


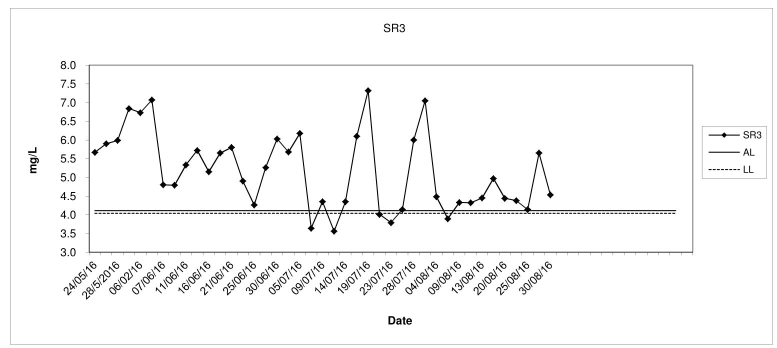




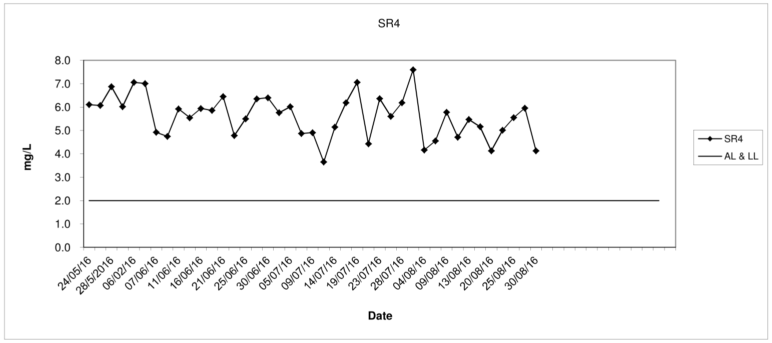
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

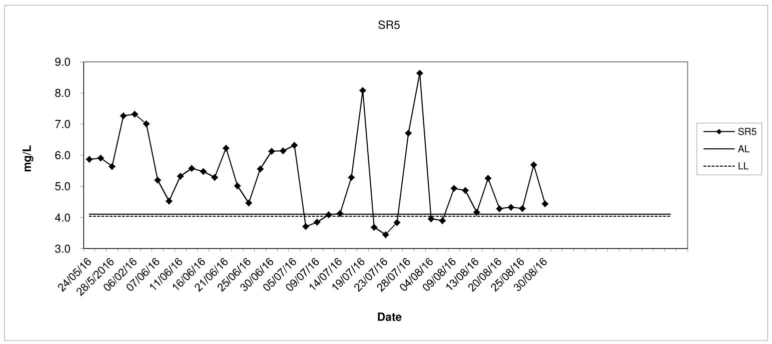


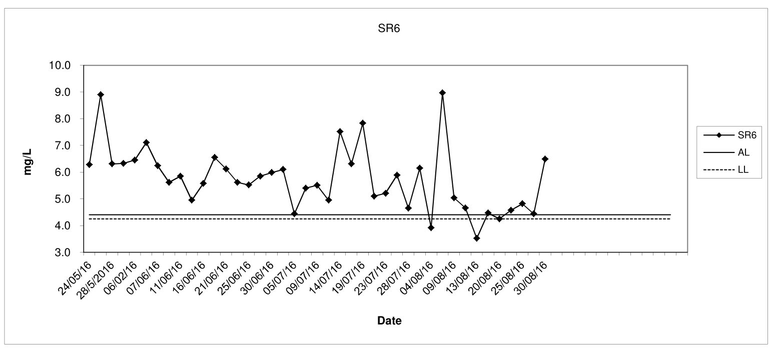




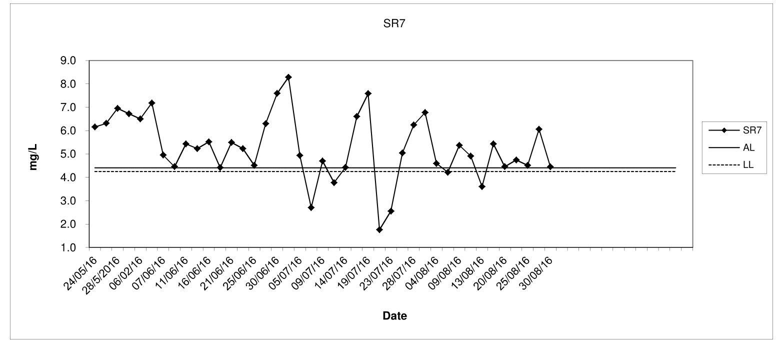
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

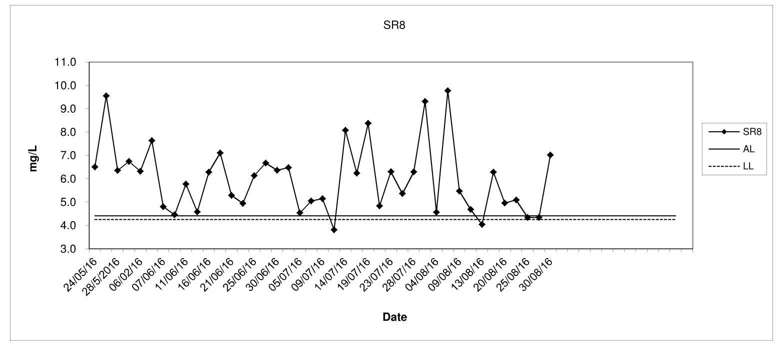


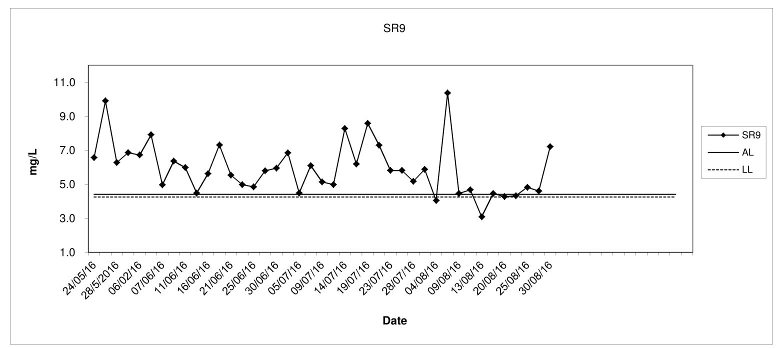




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

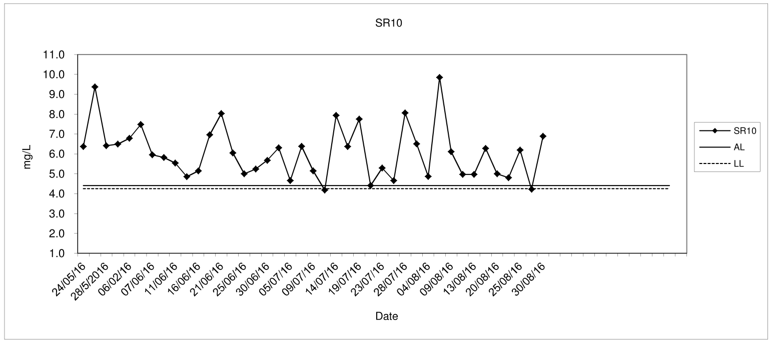


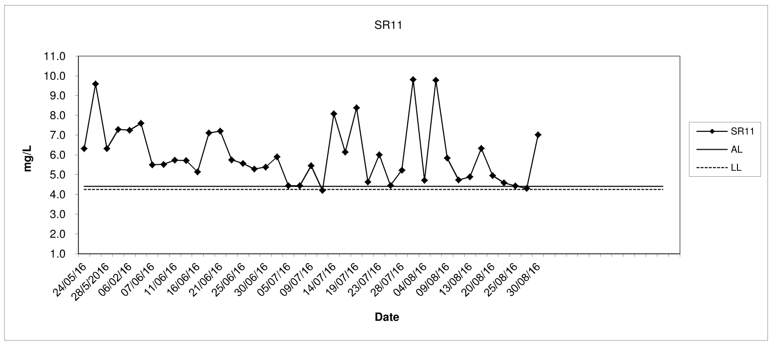


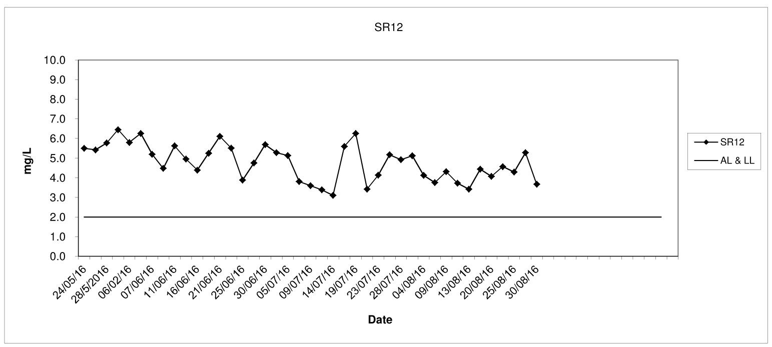


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

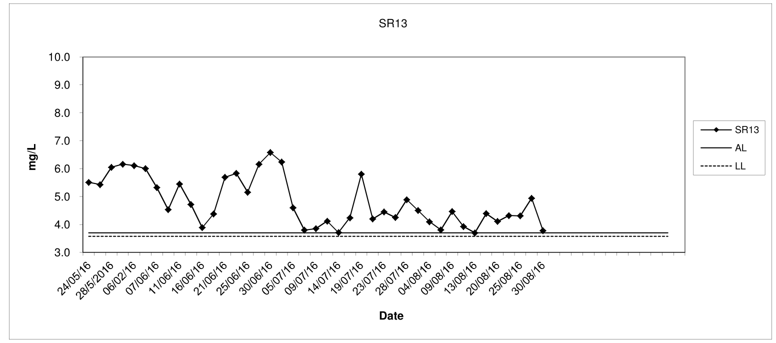
Dissolved Oxygen (Bottom) at Mid-Ebb Tide





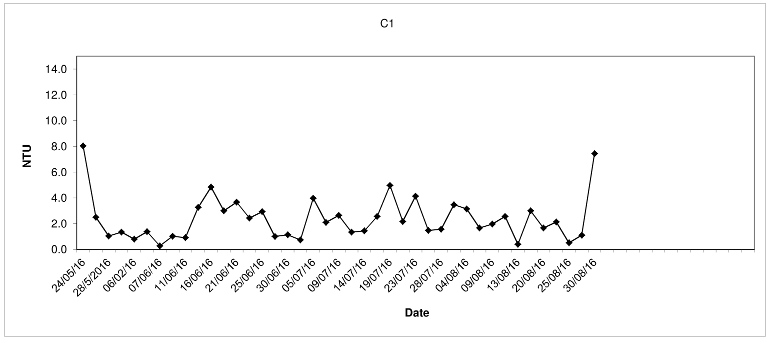


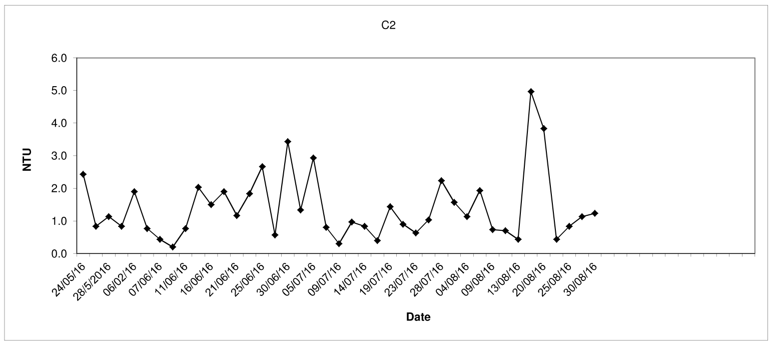
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

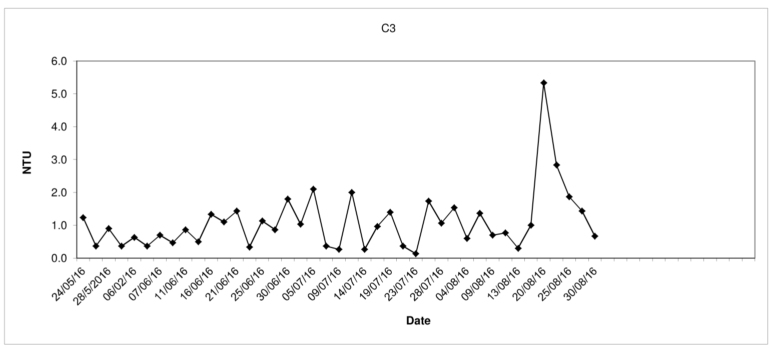


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

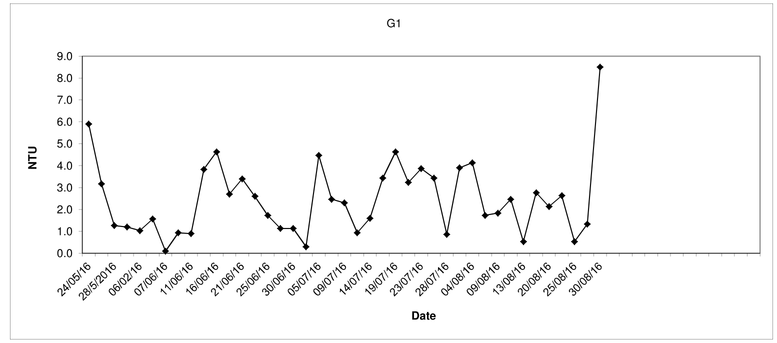
Turbidity (Depth average) at Mid-Ebb Tide

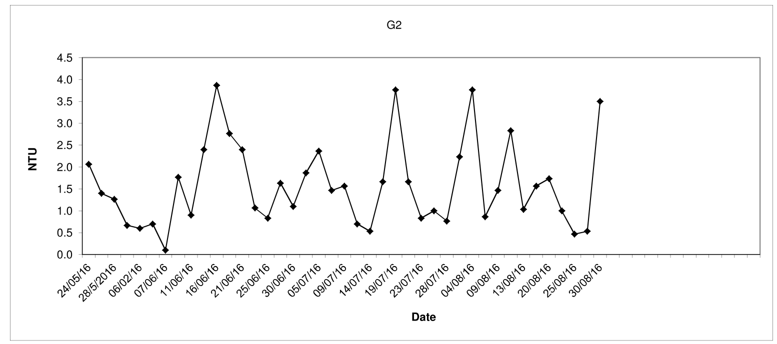


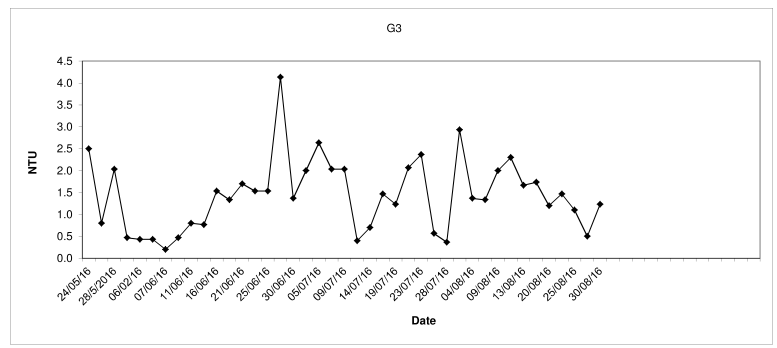




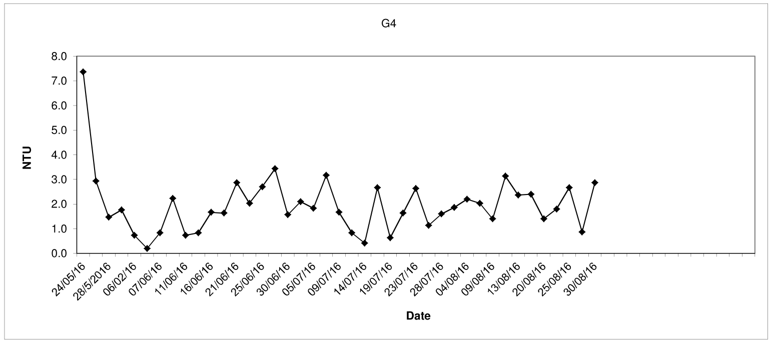
Turbidity (Depth average) at Mid-Ebb Tide

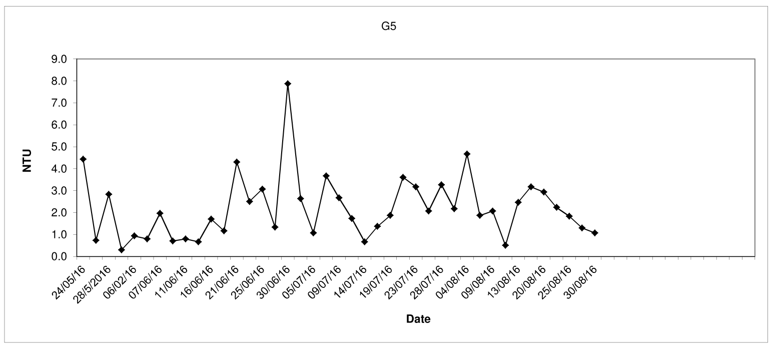


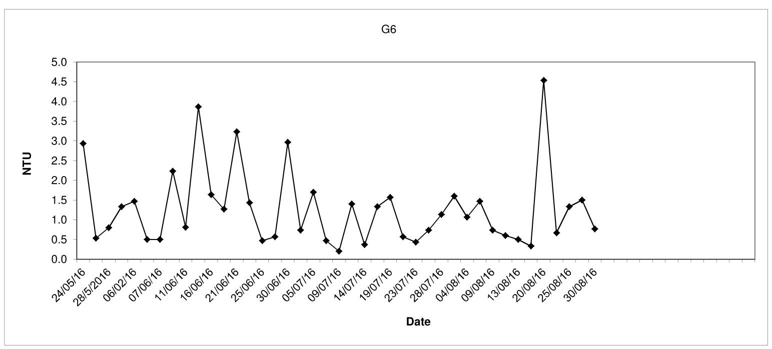




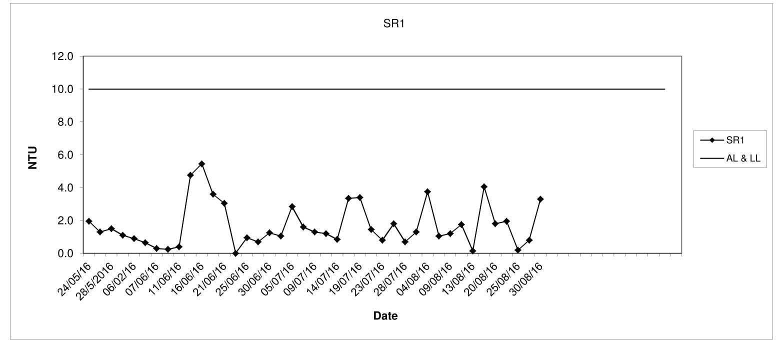
Turbidity (Depth average) at Mid-Ebb Tide

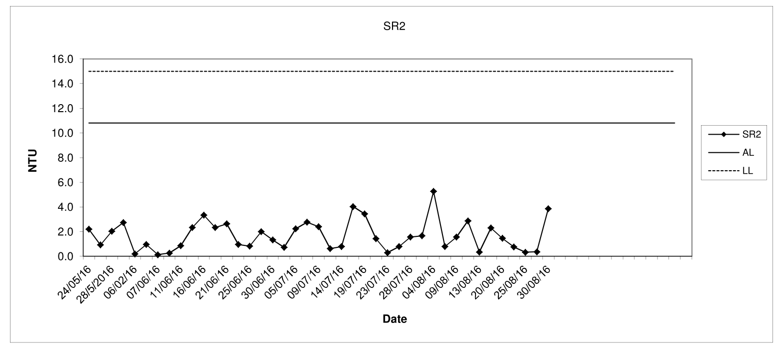


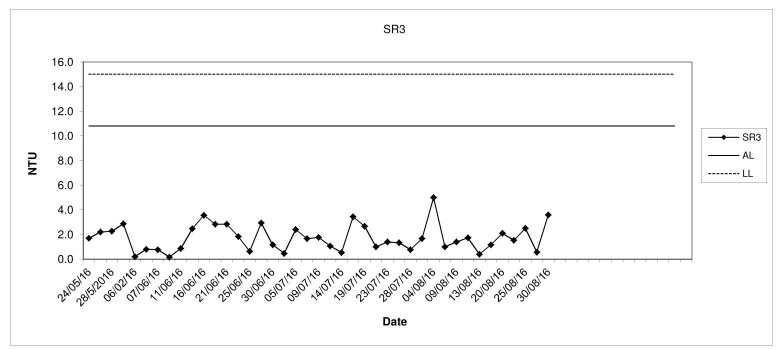




Turbidity (Depth average) at Mid-Ebb Tide

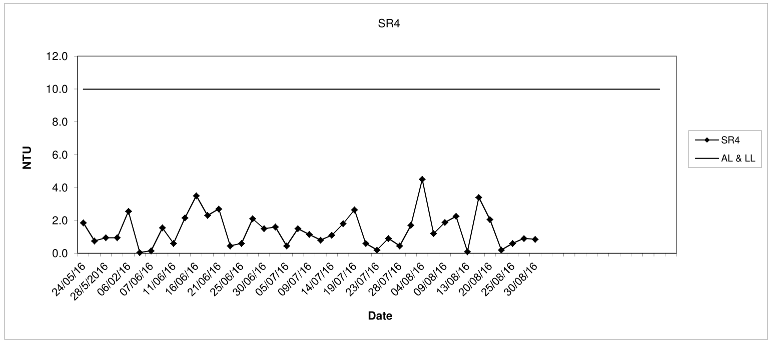


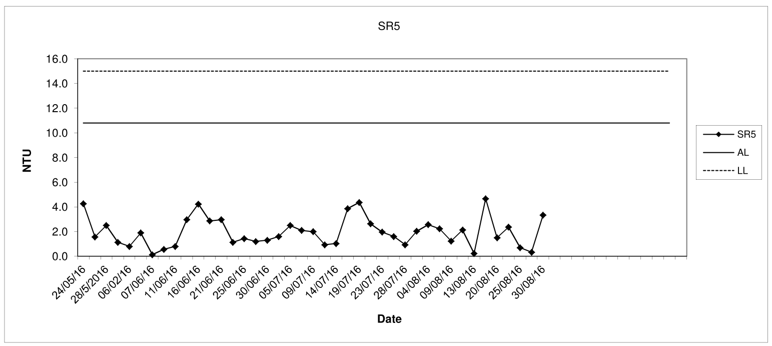


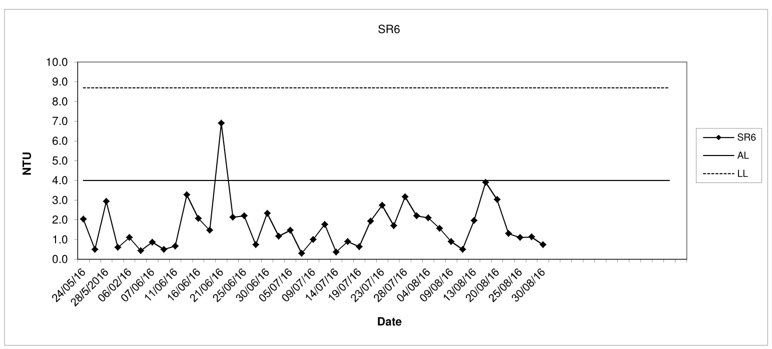


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

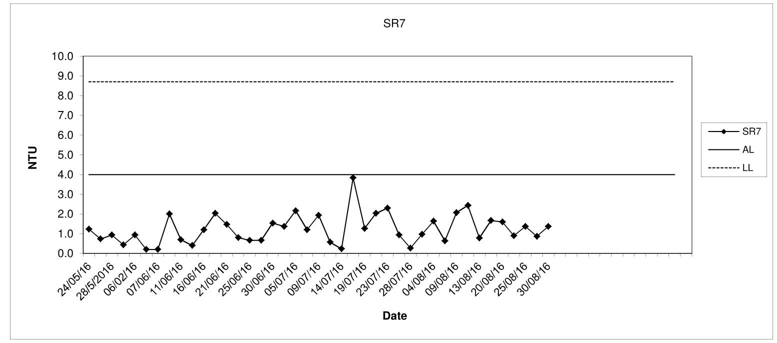
Turbidity (Depth average) at Mid-Ebb Tide

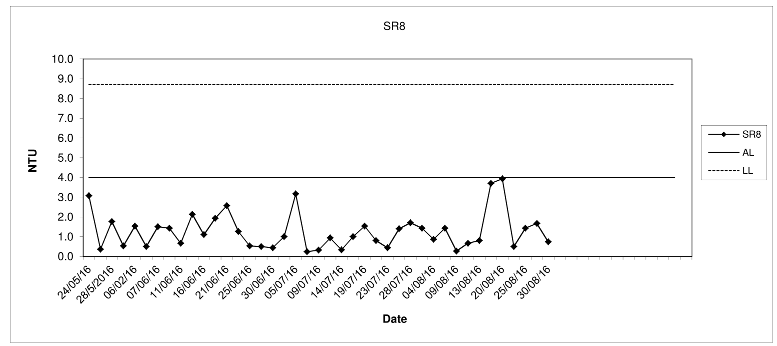


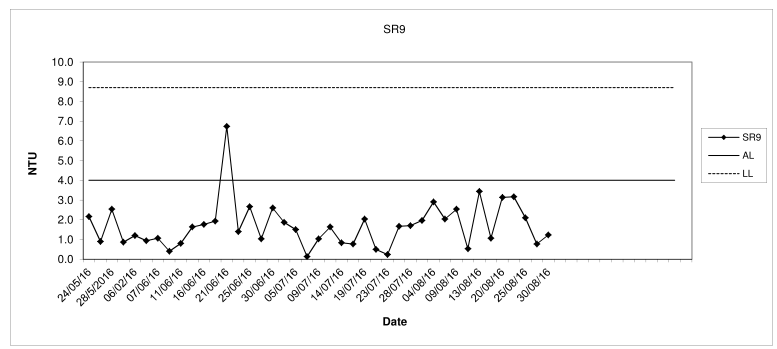




Turbidity (Depth average) at Mid-Ebb Tide

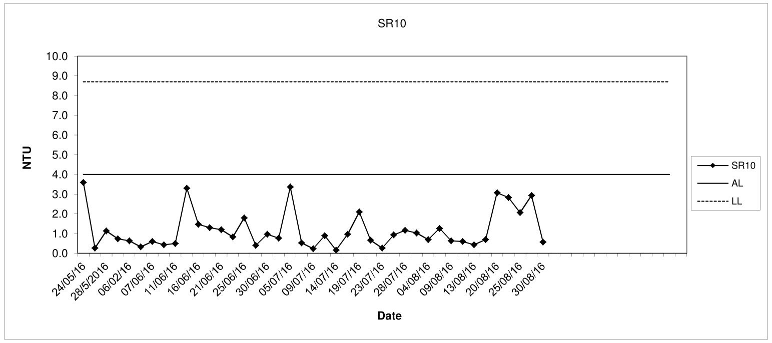


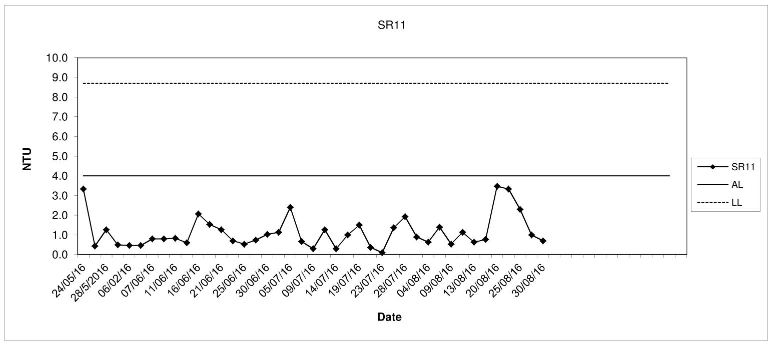


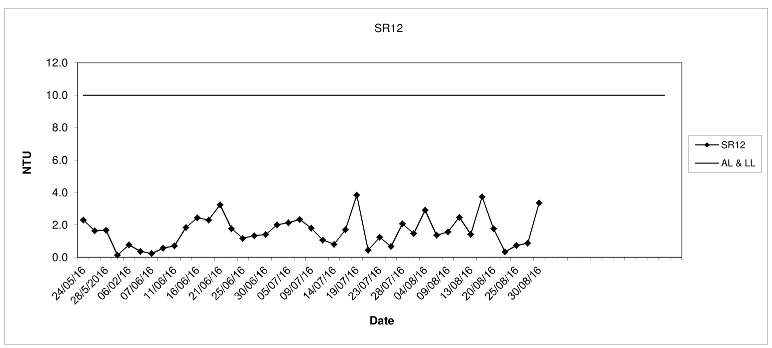


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

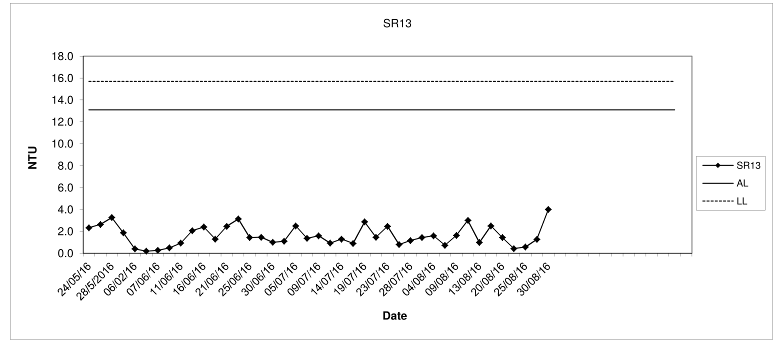
Turbidity (Depth average) at Mid-Ebb Tide



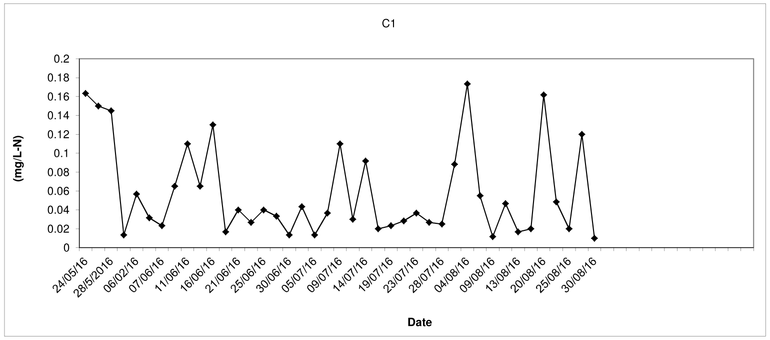


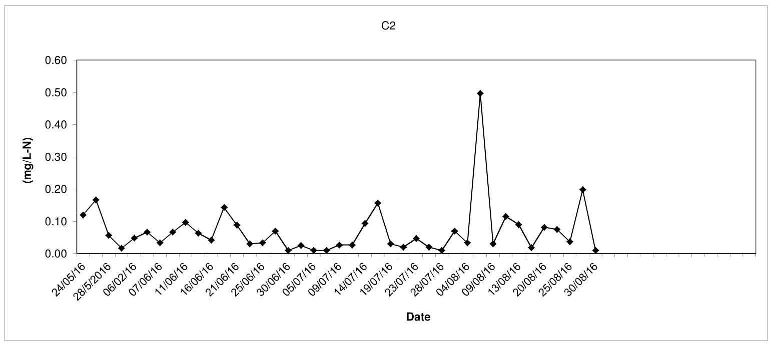


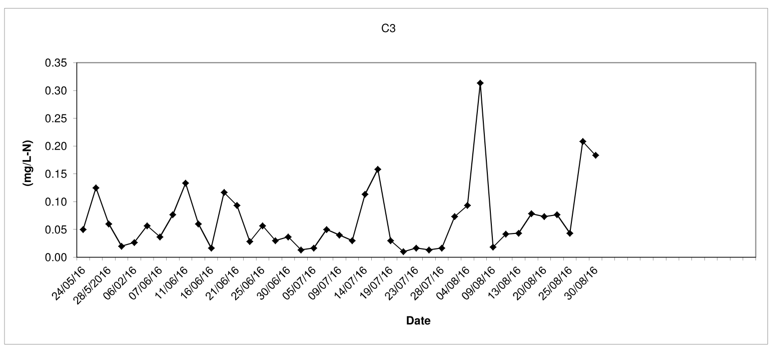
Turbidity (Depth average) at Mid-Ebb Tide



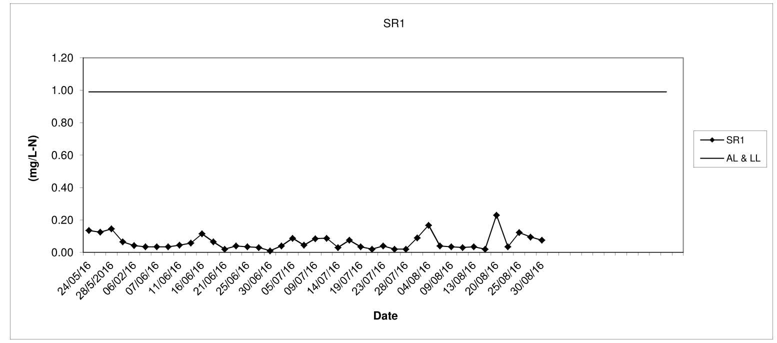
In-situ Ammonia (Depth average) at Mid-Ebb Tide

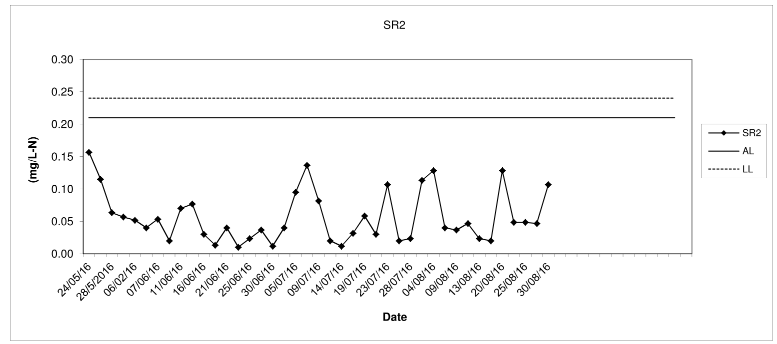


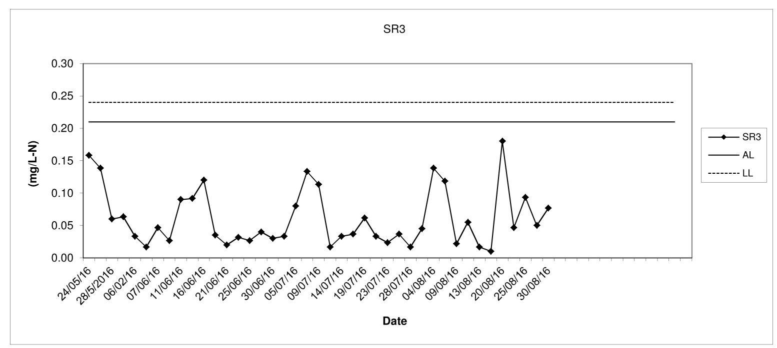




In-situ Ammonia (Depth average) at Mid-Ebb Tide

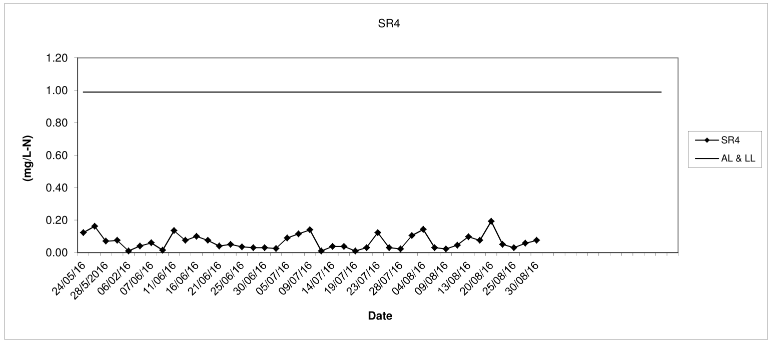


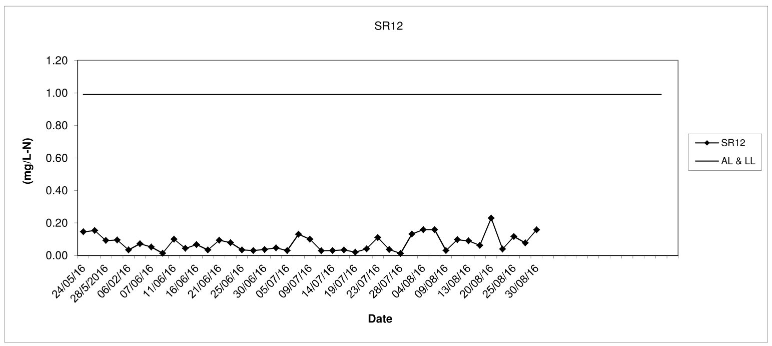




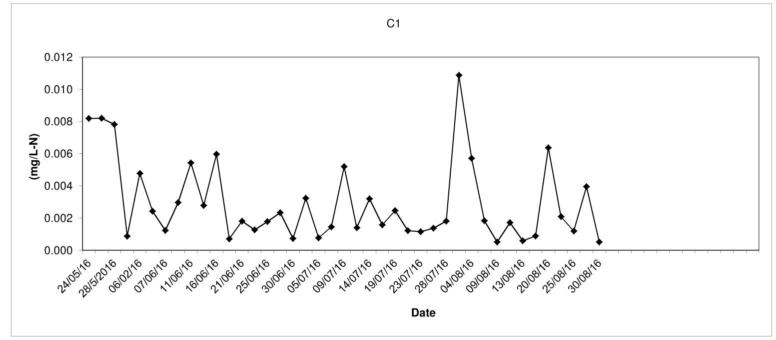
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

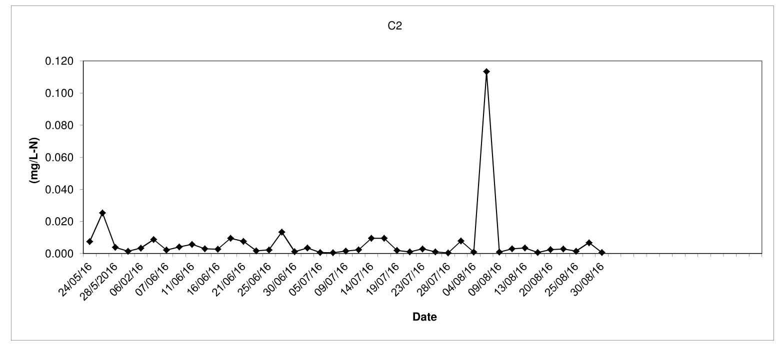
In-situ Ammonia (Depth average) at Mid-Ebb Tide

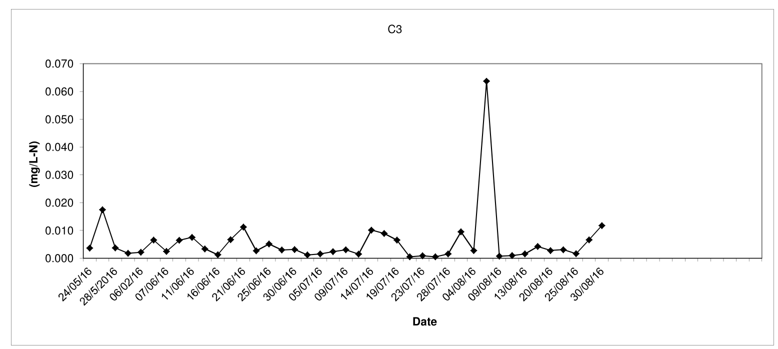




In-situ UIA (Depth average) at Mid-Ebb Tide

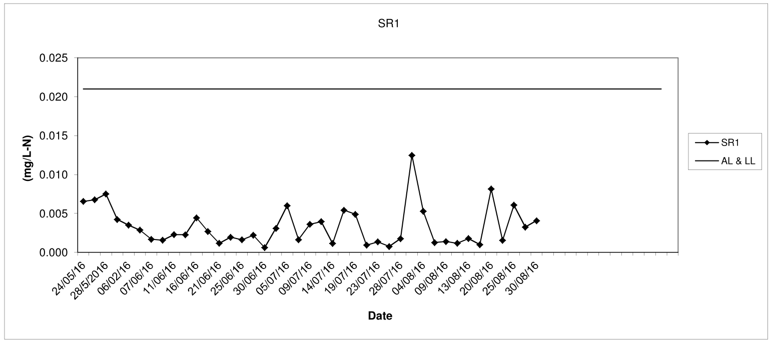


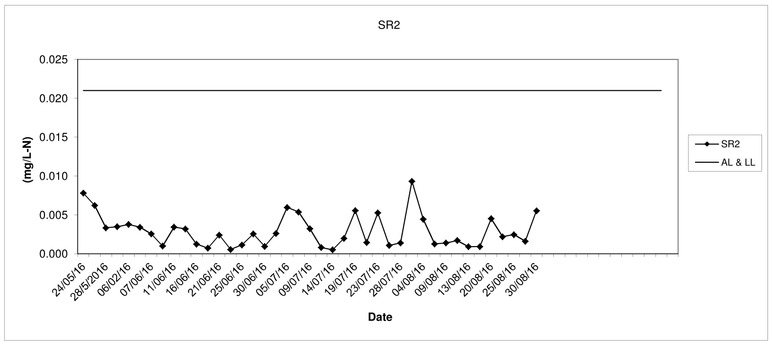


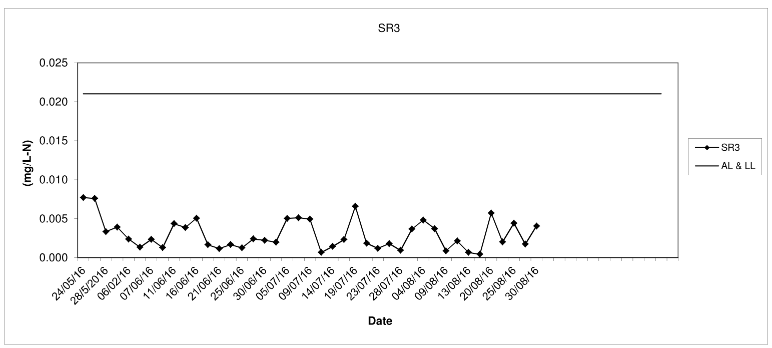


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

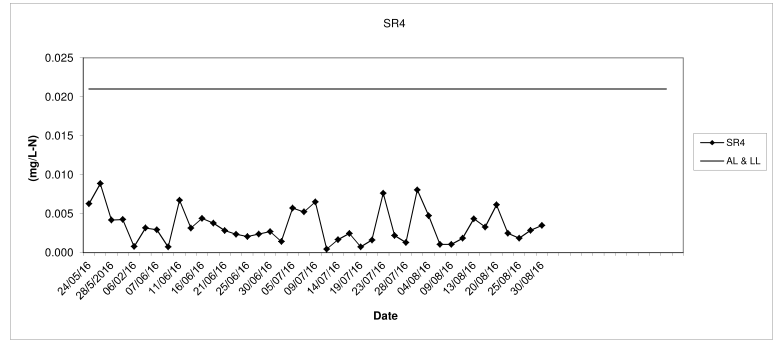
In-situ UIA (Depth average) at Mid-Ebb Tide

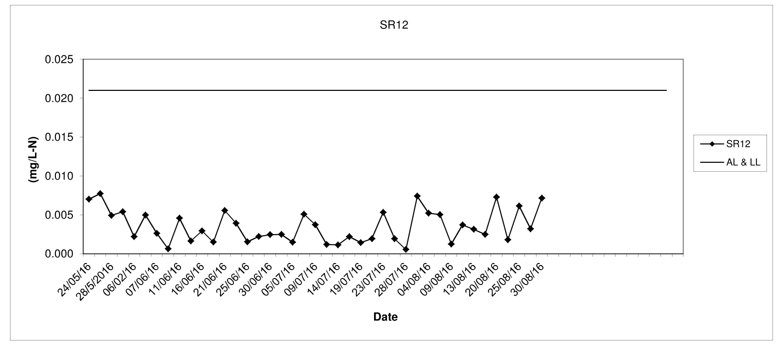






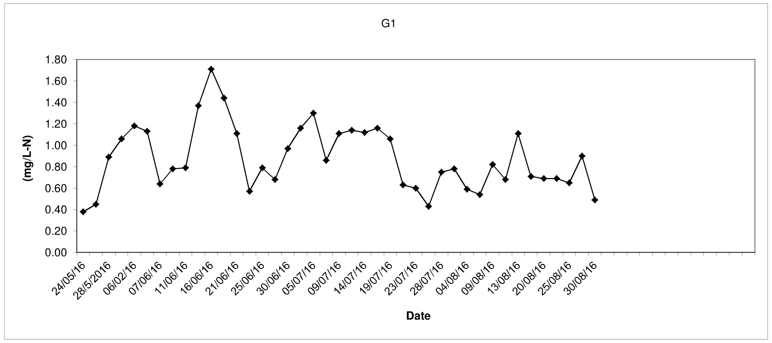
In-situ UIA (Depth average) at Mid-Ebb Tide

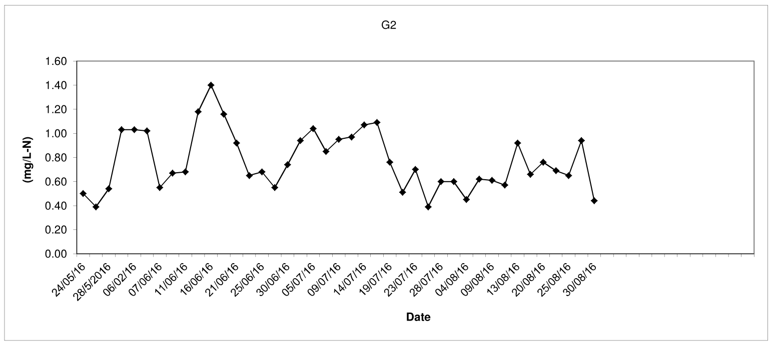


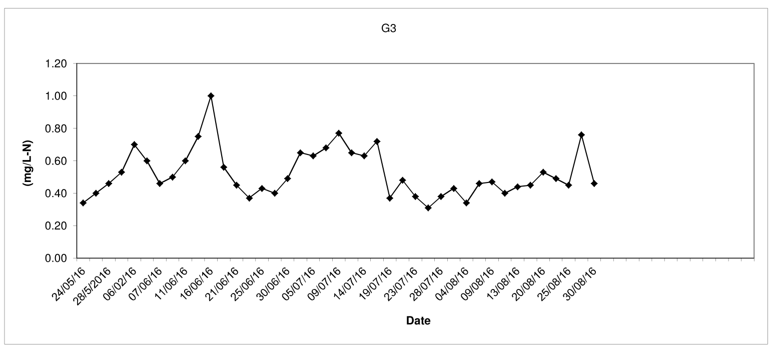


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

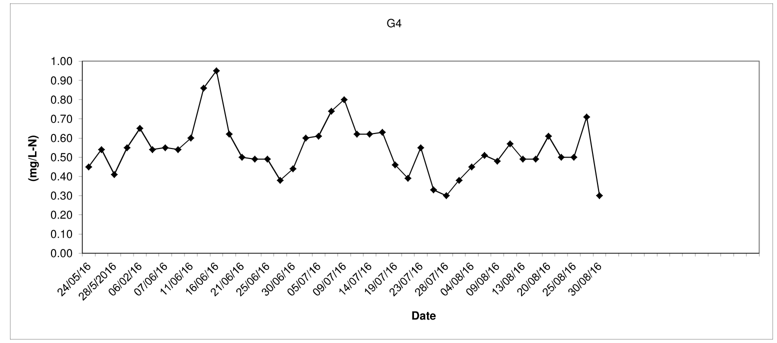
In-situ TIN (Depth average) at Mid-Ebb Tide

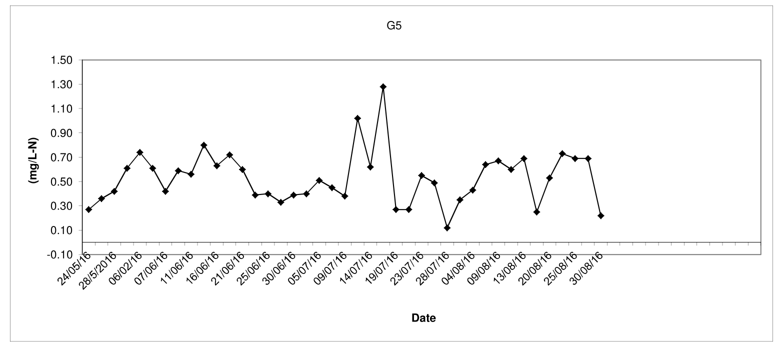


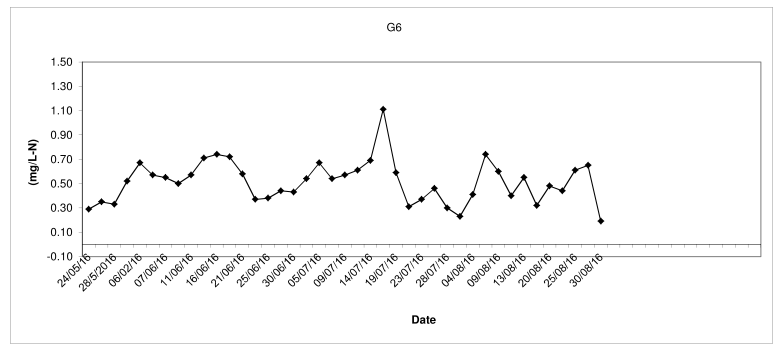




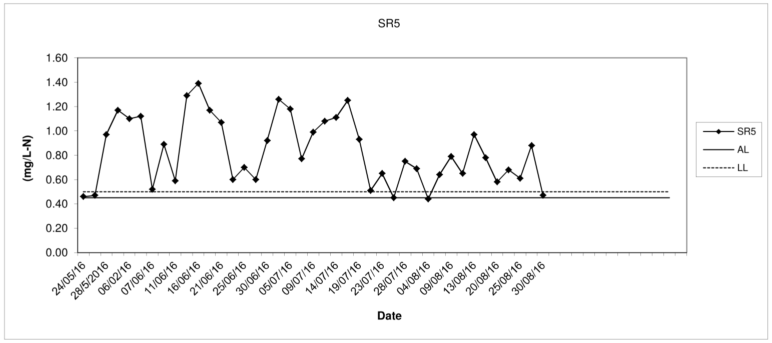
In-situ TIN (Depth average) at Mid-Ebb Tide

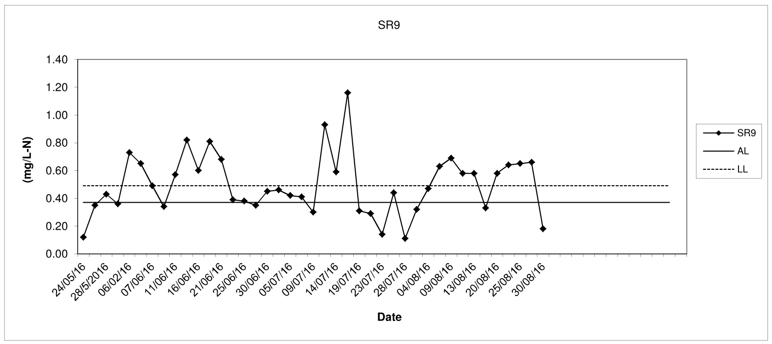


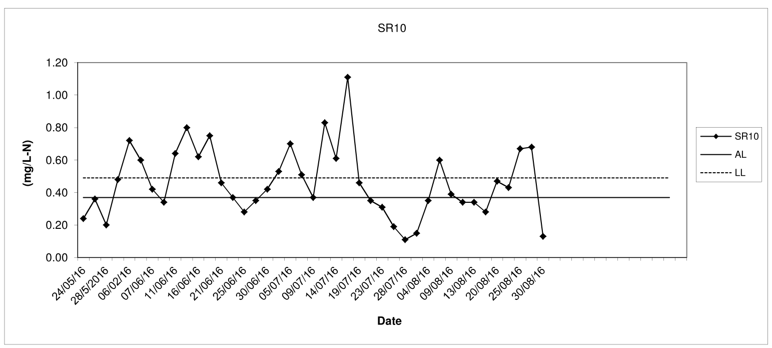




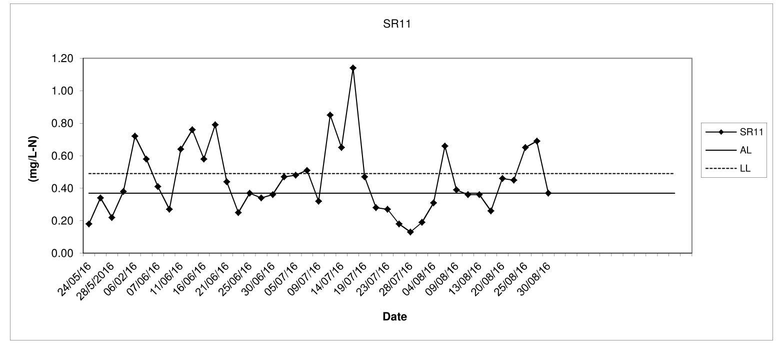
In-situ TIN (Depth average) at Mid-Ebb Tide







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

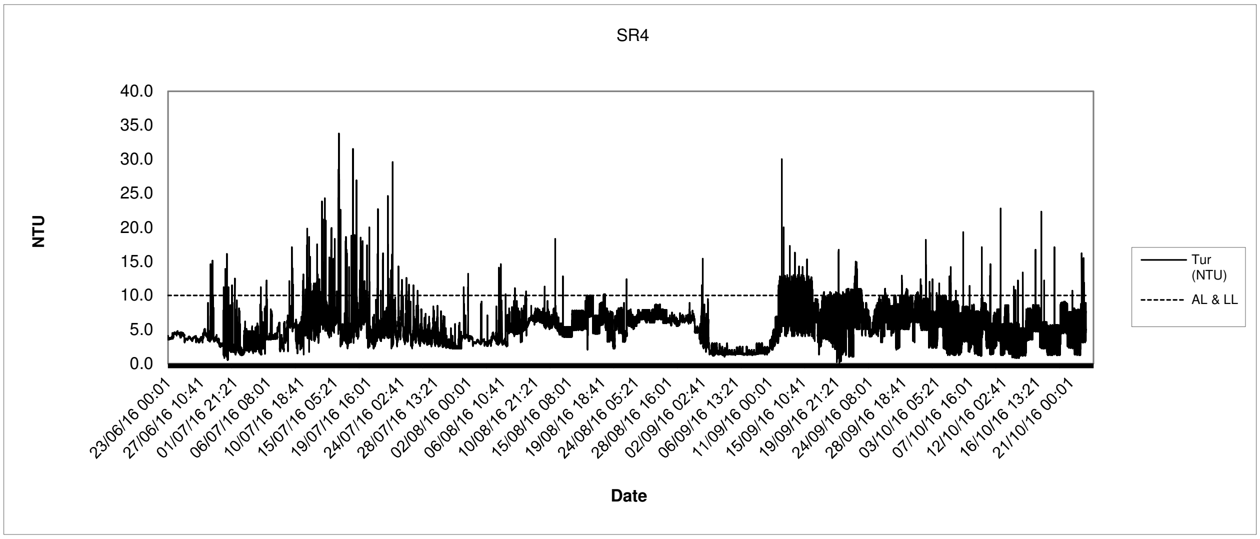


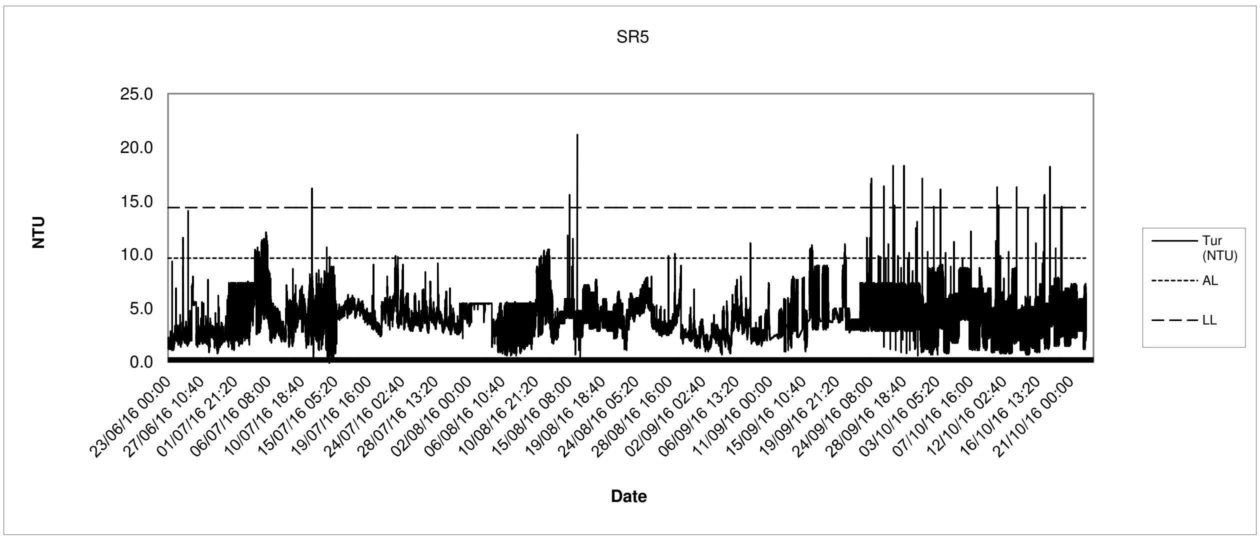
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

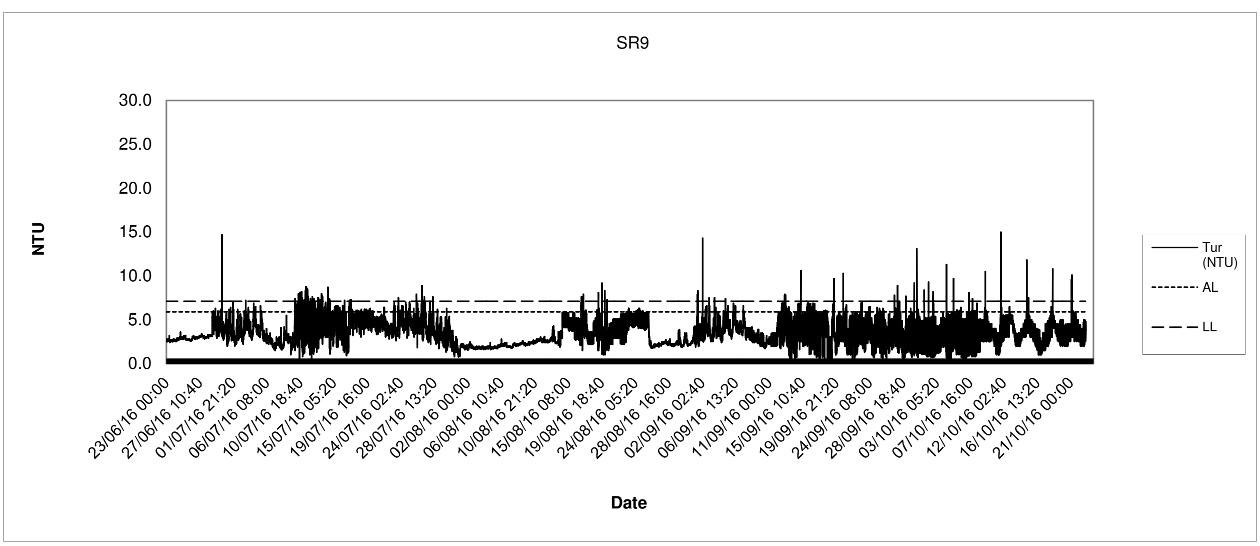
Appendix E

Graphical Presentation – 24-hr Monitoring Results

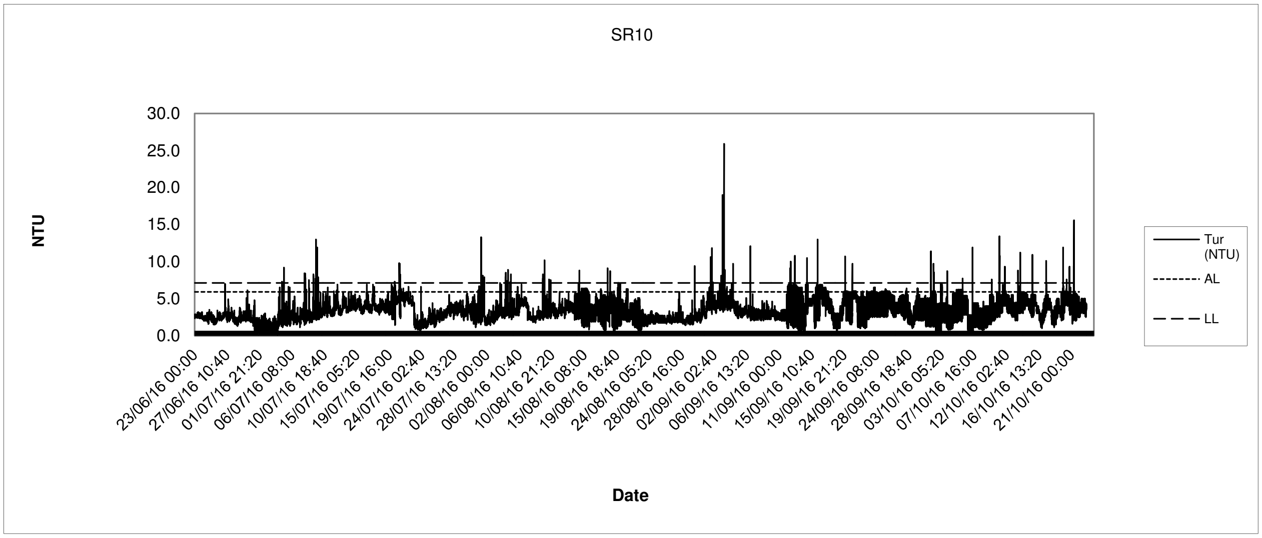
Turbidity
24-hr Water Quality Monitoring

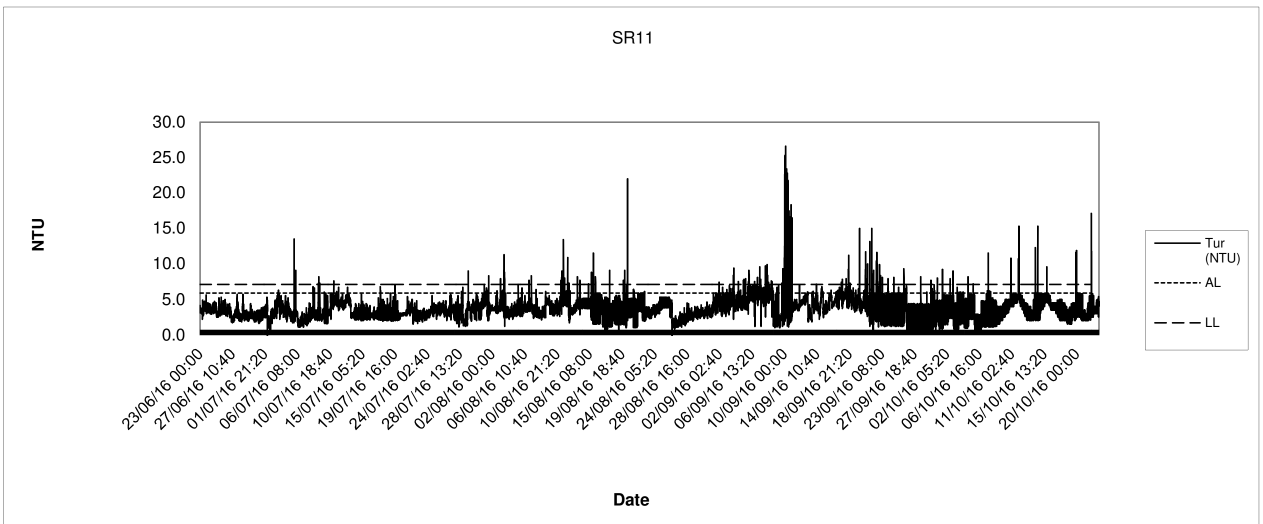


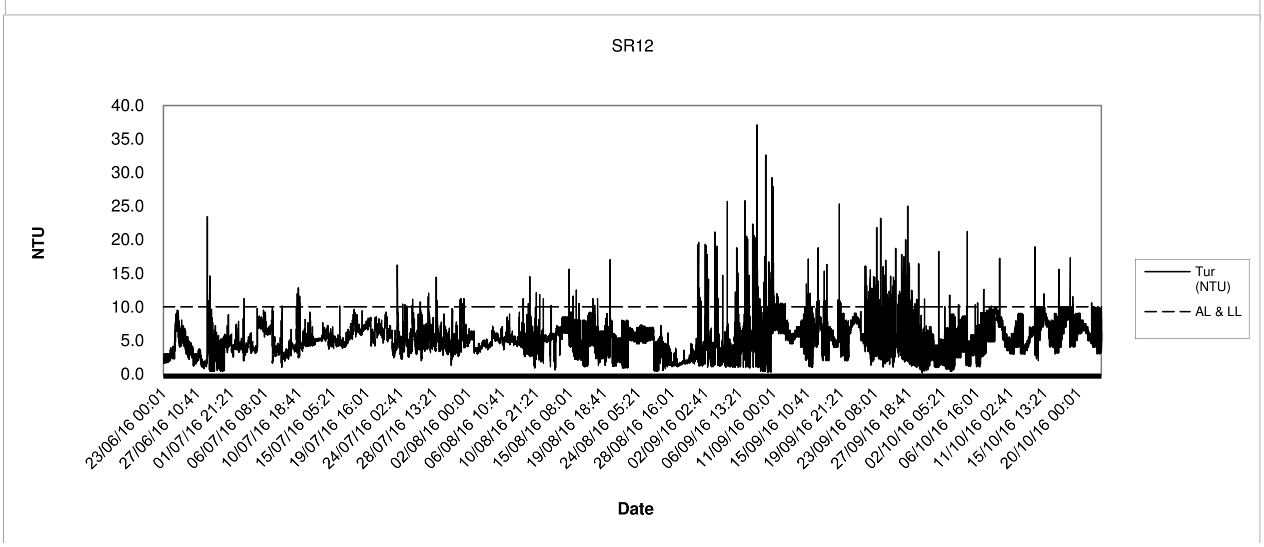




Turbidity
24-hr Water Quality Monitoring







Turbidity
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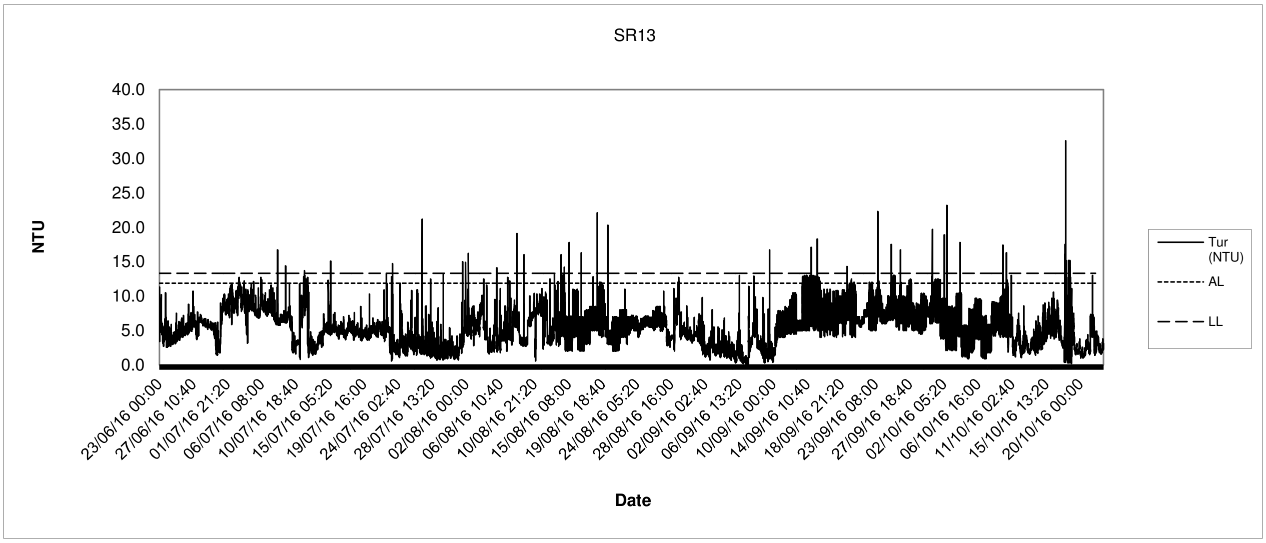
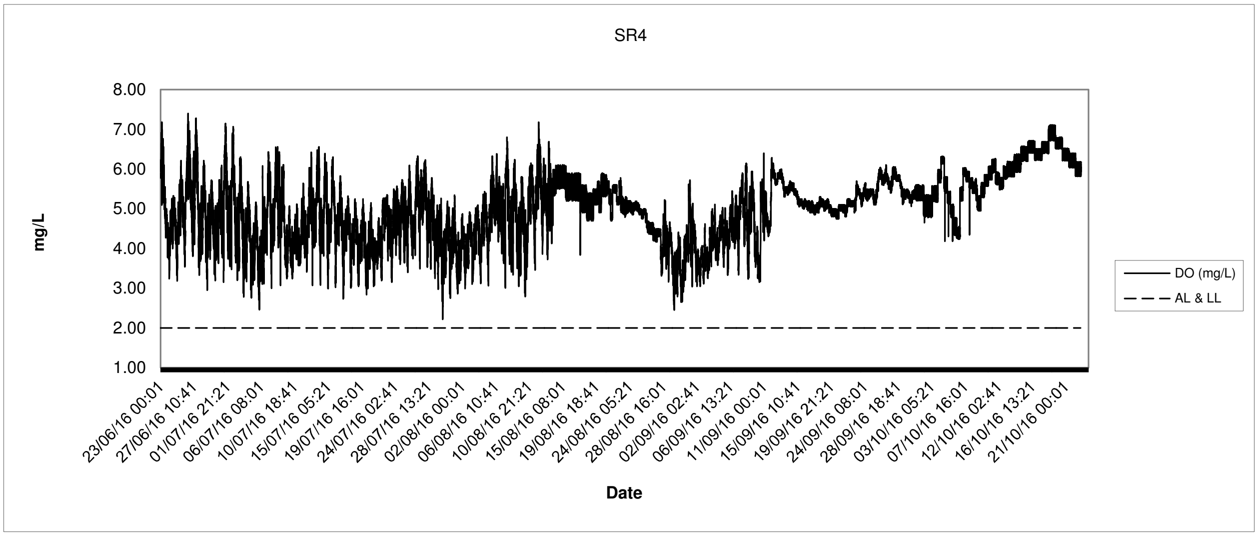
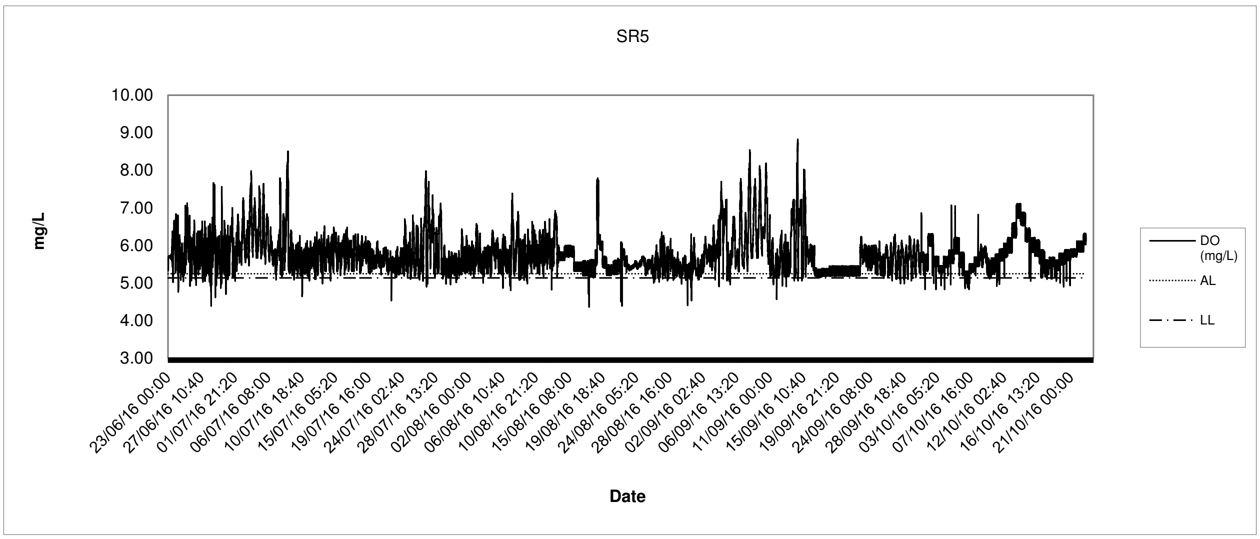
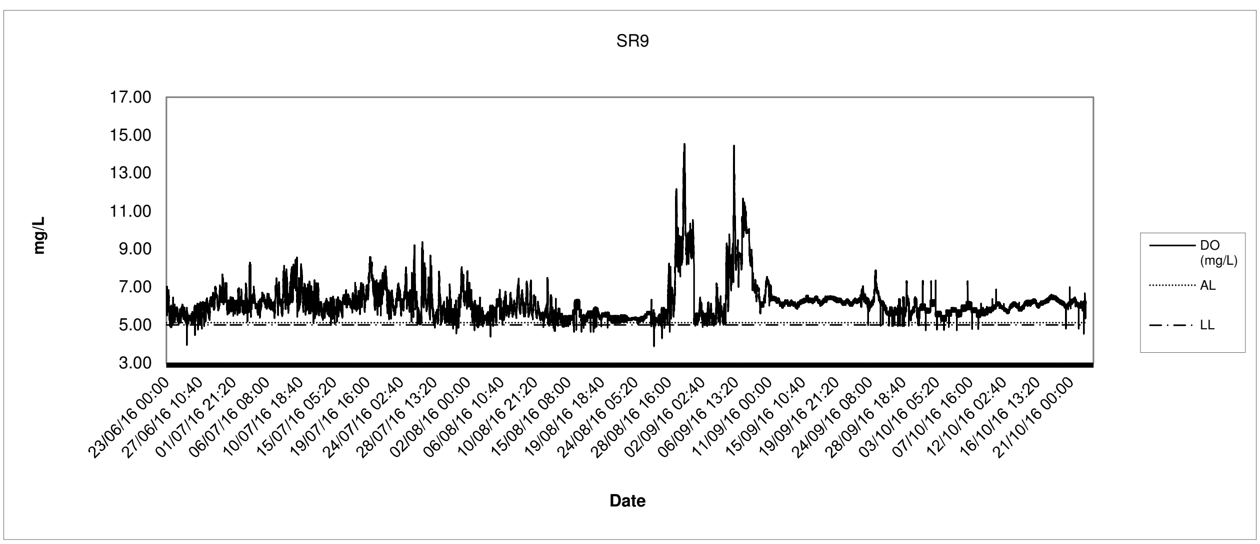


Dissolved Oxygen
24-hr Water Quality Monitoring







Dissolved Oxygen
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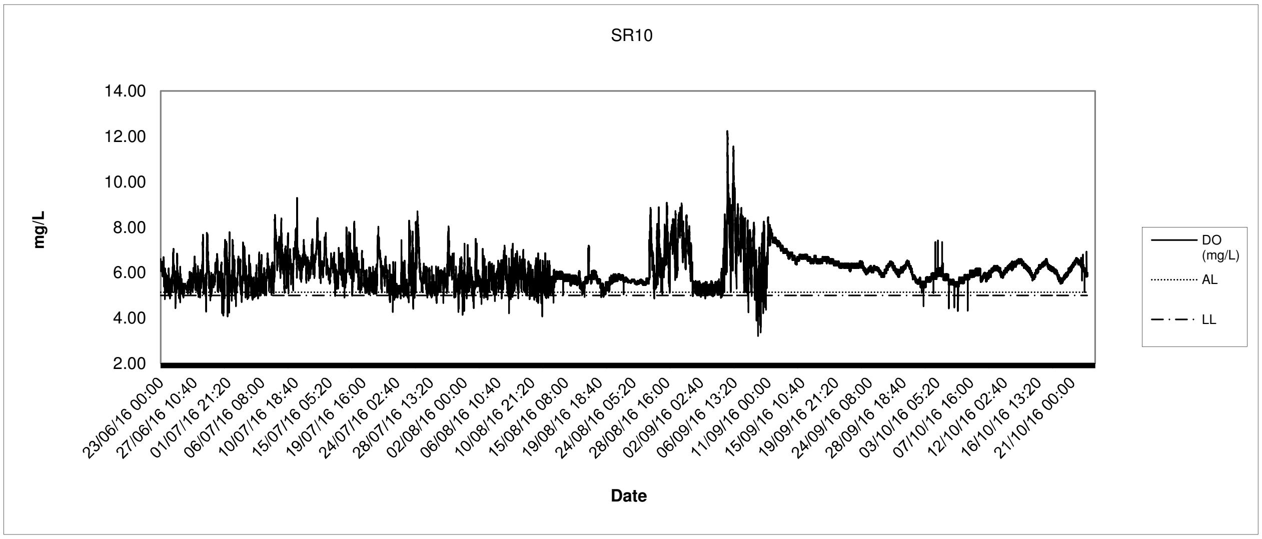
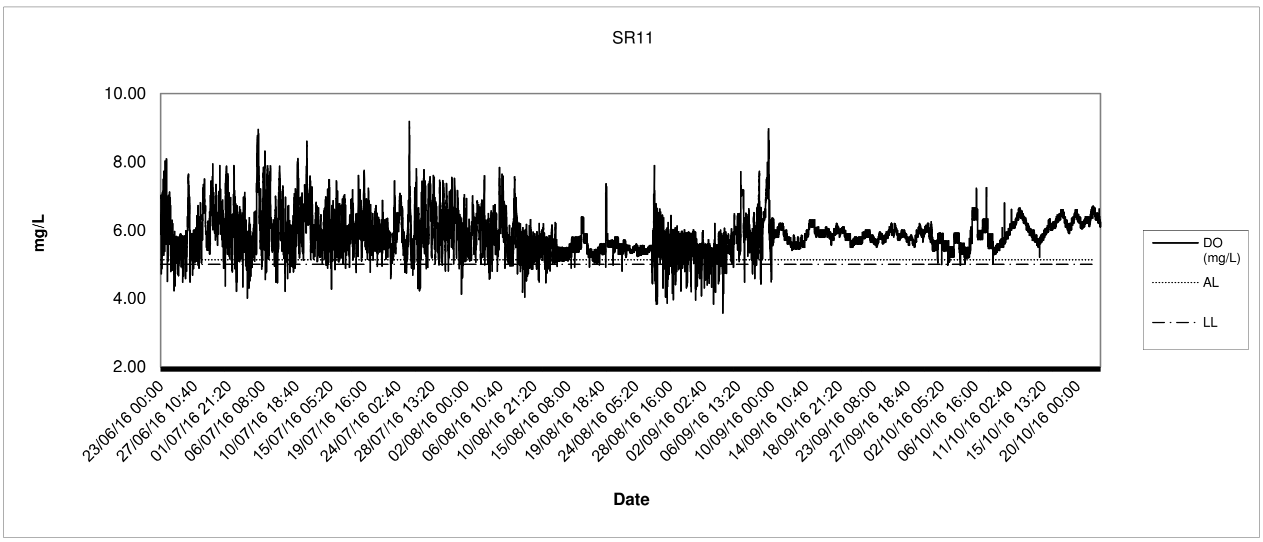
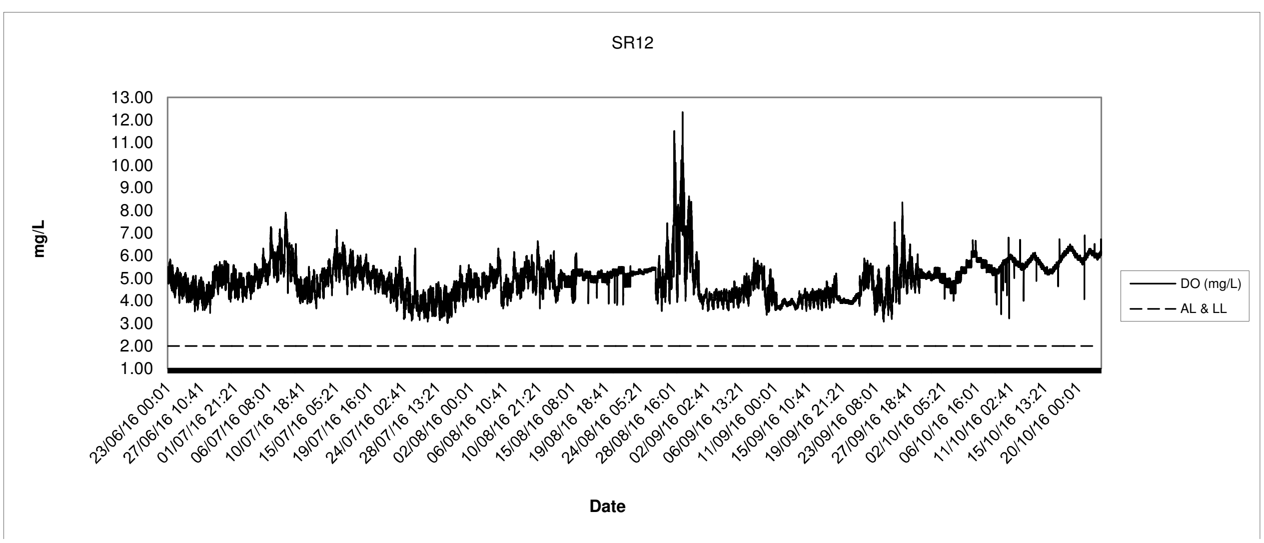
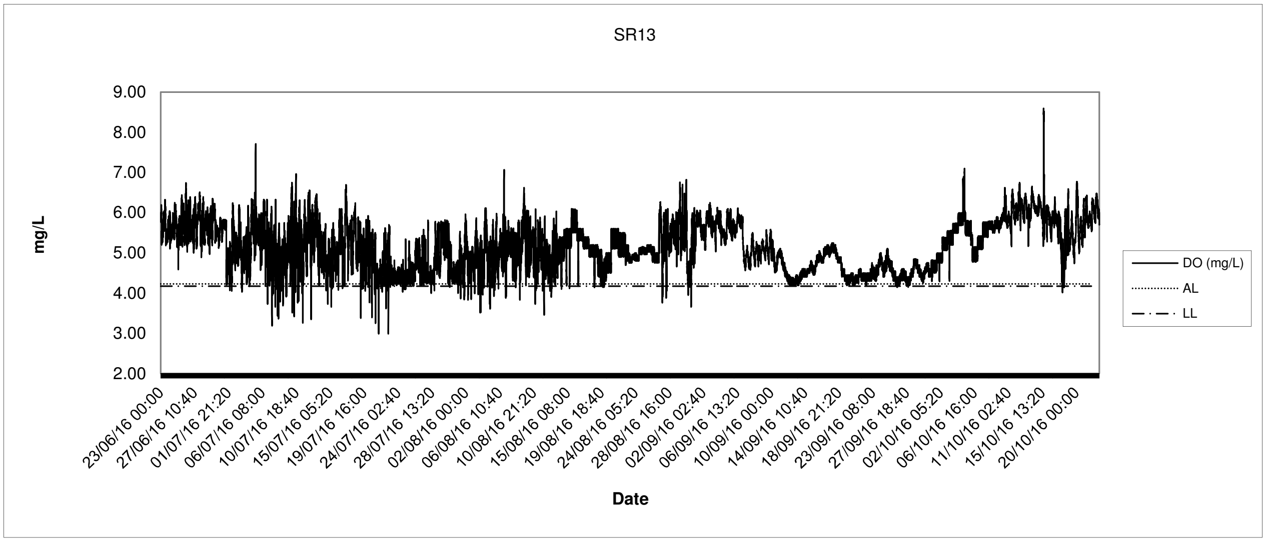


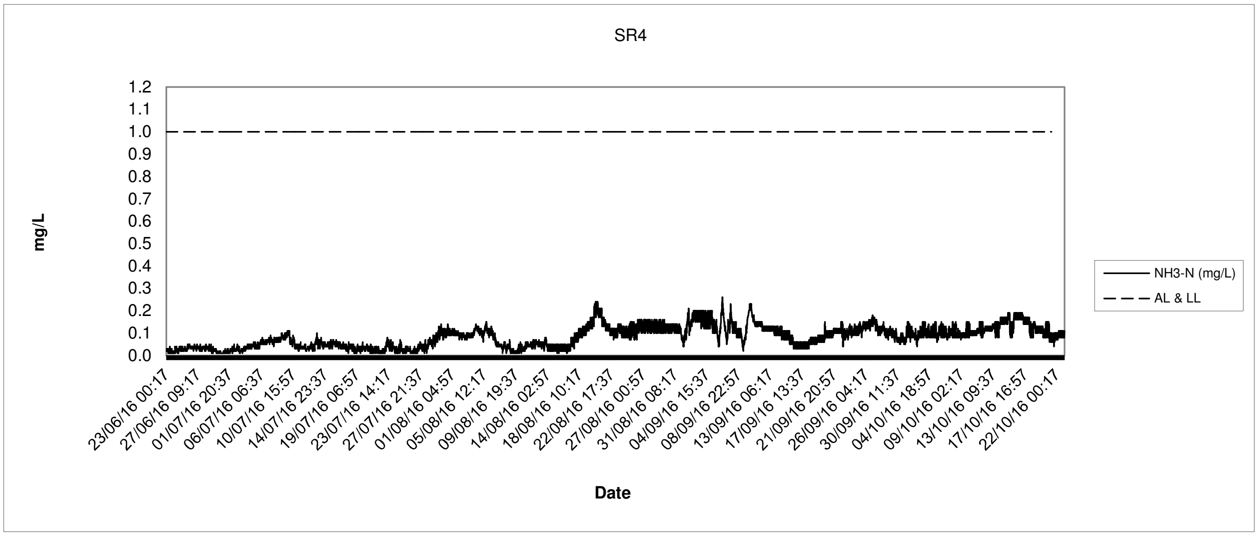


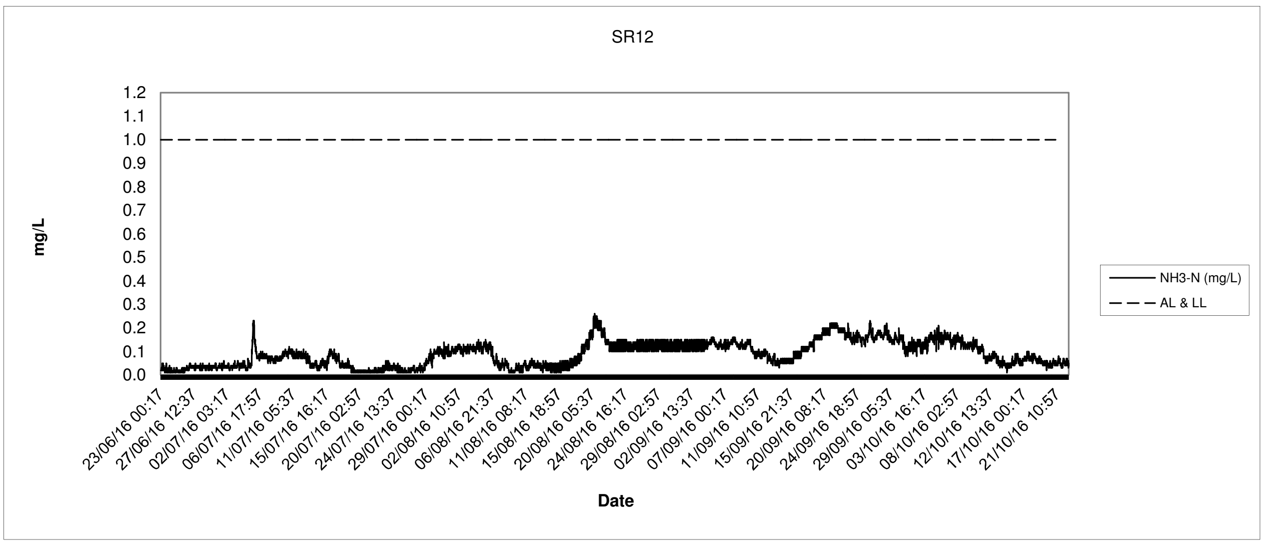


Dissolved Oxygen
24-hr Water Quality Monitoring



Ammonia-N
24-hr Water Quality Monitoring





Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, N.T., Hong Kong.
Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

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		Use of Silt Screens	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		Use of Silt Curtains	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.					NA-no dredging works in such area
		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.					Implemented
		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 day during both dry and wet seasons as shown in EP-426/2011/A.					NA-no dredging works in such area
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel –					NA-no dredging

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
			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.					works in such area
		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-no dredging works in such area
		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.					Implemented
		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 isolated with dredging works to be carried out towards the end of construction programme.					NA-no dredging works in such area
		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.					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
			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.					
		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**					
			Good Site Practices	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
			General Refuse	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
			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					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 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.					
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 operation staff at the dredging site. Emergency plans and procedures should be prepared and drills should be performed periodically.					Implemented
		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	Contractor	Locations of	During	

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
9.5	8		<u>Monitoring Brief</u>	marine archaeological impact during dredging activities		the 20 unidentified sonar contacts and masked areas	Construction works	
		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		<u>Good Site Practices</u>	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		<u>Dust Control</u>	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
			<u>Odour</u>		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

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent,
Kwai Fong, N.T., Hong Kong.
Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com.hk

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 _2016__ (year)

Month/Year	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	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/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Feb/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Mar/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Apr/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
May/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jun/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jul/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Aug/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Sep/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Oct/2016	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Nov/2016										
Dec/2016										
Total	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.10

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	-	0.2	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020																				
2021																				
Grand Total	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	30	-	0.603	-

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 (2014-2016)

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			
January	126,750	47,580	nil
February	153,770	12,440	nil
March	101,370	65,870	nil
April	173,760	29,840	nil
May	99,550	29,180	nil
June	49,460	9,360	nil
July	30,680	5,180	nil
August	36,960	21,520	nil
September	49,270	32,500	nil
October	41,200	27,550	nil
November	34,490	34,120	nil
December	41,300	57,230	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
Total	1,683,850	625,280	1,260

MATERIALAB CONSULTANTS LIMITED
Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
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Appendix H

Quarterly Assessment of Construction Impact

Cluster 1 TIN(Insitu)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (Insitu) (mg/L) data			
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 (Insitu) (mg/L) data			
SR5	7/23/2016	Mid-Flood	0.66
SR5	7/26/2016	Mid-Flood	0.41
SR5	7/28/2016	Mid-Flood	0.79
SR5	7/30/2016	Mid-Flood	0.71
SR5	8/4/2016	Mid-Flood	0.41
SR5	8/6/2016	Mid-Flood	0.65
SR5	8/9/2016	Mid-Flood	0.86
SR5	8/11/2016	Mid-Flood	0.78
SR5	8/13/2016	Mid-Flood	1.02
SR5	8/16/2016	Mid-Flood	0.69
SR5	8/20/2016	Mid-Flood	0.64
SR5	8/23/2016	Mid-Flood	0.68
SR5	8/25/2016	Mid-Flood	0.60
SR5	8/27/2016	Mid-Flood	0.88
SR5	8/30/2016	Mid-Flood	0.47

Baseline (insitu) x 1.3		Impact (insitu)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	15
Number of Distinct Observations	12	Number of Distinct Observations	14
Minimum	0.477	Minimum	0.41
Maximum	0.883	Maximum	1.02
Mean of Raw Data	0.643	Mean of Raw Data	0.683
Standard Deviation of Raw Data	0.127	Standard Deviation of Raw Data	0.171
Kstar	22.19	Kstar	12.88
Mean of Log Transformed Data	-0.458	Mean of Log Transformed Data	-0.412
Standard Deviation of Log Transformed Data	0.191	Standard Deviation of Log Transformed Data	0.266
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.968	Correlation Coefficient R	0.982
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	0.881
Approximate Shapiro Wilk P Value	0.407	Approximate Shapiro Wilk P Value	0.718
Lilliefors Test Statistic	0.186	Lilliefors Test Statistic	0.133
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.229
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 (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

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

Raw Statistics

	Site	Background
Number of Valid Observations	15	12
Number of Distinct Observations	14	12
Minimum	0.41	0.477
Maximum	1.02	0.883
Mean	0.683	0.643
Median	0.68	0.614
SD	0.171	0.127
SE of Mean	0.0442	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)	25	0.672	1.708	0.254
Satterthwaite (Unequal Variance)	24.9	6.95E-01	1.708	0.247

Pooled SD 0.153
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

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
14	11	1.822	0.322

Conclusion with Alpha = 0.05
* Two variances appear to be equal

Cluster 2 TIN(In-situ)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (Insitu) (mg/L)			
SR9	1/4/2014	Mid-Ebb	0.09
SR9	1/7/2014	Mid-Ebb	0.46
SR9	1/9/2014	Mid-Ebb	0.35
SR9	1/11/2014	Mid-Ebb	0.40
SR9	1/14/2014	Mid-Ebb	0.34
SR9	1/16/2014	Mid-Ebb	0.40
SR9	1/18/2014	Mid-Ebb	0.24
SR9	1/21/2014	Mid-Ebb	0.28
SR9	1/23/2014	Mid-Ebb	0.17
SR9	1/25/2014	Mid-Ebb	0.20
SR9	1/27/2014	Mid-Ebb	0.11
SR9	1/29/2014	Mid-Ebb	0.14
SR10	1/4/2014	Mid-Ebb	0.26
SR10	1/7/2014	Mid-Ebb	0.49
SR10	1/9/2014	Mid-Ebb	0.30
SR10	1/11/2014	Mid-Ebb	0.32
SR10	1/14/2014	Mid-Ebb	0.29
SR10	1/16/2014	Mid-Ebb	0.30
SR10	1/18/2014	Mid-Ebb	0.29
SR10	1/21/2014	Mid-Ebb	0.29
SR10	1/23/2014	Mid-Ebb	0.20
SR10	1/25/2014	Mid-Ebb	0.29
SR10	1/27/2014	Mid-Ebb	0.15
SR10	1/29/2014	Mid-Ebb	0.20
SR11	1/4/2014	Mid-Ebb	0.23
SR11	1/7/2014	Mid-Ebb	0.51
SR11	1/9/2014	Mid-Ebb	0.26
SR11	1/11/2014	Mid-Ebb	0.33
SR11	1/14/2014	Mid-Ebb	0.26
SR11	1/16/2014	Mid-Ebb	0.26
SR11	1/18/2014	Mid-Ebb	0.26
SR11	1/21/2014	Mid-Ebb	0.23
SR11	1/23/2014	Mid-Ebb	0.17
SR11	1/25/2014	Mid-Ebb	0.23
SR11	1/27/2014	Mid-Ebb	0.14
SR11	1/29/2014	Mid-Ebb	0.20

Impact TIN (Insitu) (mg/L)			
SR9	7/23/2016	Mid-Ebb	0.14
SR9	7/26/2016	Mid-Ebb	0.44
SR9	7/28/2016	Mid-Ebb	0.11
SR9	7/30/2016	Mid-Ebb	0.32
SR9	8/4/2016	Mid-Ebb	0.47
SR9	8/6/2016	Mid-Ebb	0.63
SR9	8/9/2016	Mid-Ebb	0.69
SR9	8/11/2016	Mid-Ebb	0.58
SR9	8/13/2016	Mid-Ebb	0.58
SR9	8/16/2016	Mid-Ebb	0.33
SR9	8/20/2016	Mid-Ebb	0.58
SR9	8/23/2016	Mid-Ebb	0.64
SR9	8/25/2016	Mid-Ebb	0.65
SR9	8/27/2016	Mid-Ebb	0.66
SR9	8/30/2016	Mid-Ebb	0.18
SR10	7/23/2016	Mid-Ebb	0.31
SR10	7/26/2016	Mid-Ebb	0.19
SR10	7/28/2016	Mid-Ebb	0.11
SR10	7/30/2016	Mid-Ebb	0.15
SR10	8/4/2016	Mid-Ebb	0.35
SR10	8/6/2016	Mid-Ebb	0.60
SR10	8/9/2016	Mid-Ebb	0.39
SR10	8/11/2016	Mid-Ebb	0.34
SR10	8/13/2016	Mid-Ebb	0.34
SR10	8/16/2016	Mid-Ebb	0.28
SR10	8/20/2016	Mid-Ebb	0.47
SR10	8/23/2016	Mid-Ebb	0.43
SR10	8/25/2016	Mid-Ebb	0.67
SR10	8/27/2016	Mid-Ebb	0.68
SR10	8/30/2016	Mid-Ebb	0.13
SR11	7/23/2016	Mid-Ebb	0.27
SR11	7/26/2016	Mid-Ebb	0.18
SR11	7/28/2016	Mid-Ebb	0.13
SR11	7/30/2016	Mid-Ebb	0.19
SR11	8/4/2016	Mid-Ebb	0.31
SR11	8/6/2016	Mid-Ebb	0.66
SR11	8/9/2016	Mid-Ebb	0.39
SR11	8/11/2016	Mid-Ebb	0.36
SR11	8/13/2016	Mid-Ebb	0.36
SR11	8/16/2016	Mid-Ebb	0.26
SR11	8/20/2016	Mid-Ebb	0.46
SR11	8/23/2016	Mid-Ebb	0.45
SR11	8/25/2016	Mid-Ebb	0.65
SR11	8/27/2016	Mid-Ebb	0.69
SR11	8/30/2016	Mid-Ebb	0.37

Cluster 2 TIN(In-situ)
1.3 x Baseline vs Impact

Baseline (Insitu) x 1.3		Impact (Insitu)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	45
Number of Distinct Observations	35	Number of Distinct Observations	31
Minimum	0.0867	Minimum	0.11
Maximum	0.506	Maximum	0.69
Mean of Raw Data	0.268	Mean of Raw Data	0.404
Standard Deviation of Raw Data	0.0995	Standard Deviation of Raw Data	0.189
Kstar	6.577	Kstar	3.68
Mean of Log Transformed Data	-1.39	Mean of Log Transformed Data	-1.04
Standard Deviation of Log Transformed Data	0.397	Standard Deviation of Log Transformed Data	0.557
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.982	Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.959	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical (0.95) Value	0.935	Shapiro Wilk Critical (0.95) Value	0.945
Approximate Shapiro Wilk P Value	2.58E-01	Approximate Shapiro Wilk P Value	0.00246
Lilliefors Test Statistic	0.123	Lilliefors Test Statistic	0.136
Lilliefors Critical (0.95) Value	0.148	Lilliefors Critical (0.95) Value	0.132
Data appear Normal at (0.05) Significance Level		Data not Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test 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 (Insitu)
Background Data: Baseline (Insitu) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	45	36
Number of Distinct Observations	31	35
Minimum	0.11	0.0867
Maximum	0.69	0.506
Mean	0.404	0.268
Median	0.37	0.26
SD	0.189	0.0995
SE of Mean	0.0281	0.0166

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2197
WMW Test U-Stat	3.341
WMW Critical Value (0.050)	1.645
P-Value	4.18E-04

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Cluster 2 TIN(insitu)
G1 vs Impact

G1 TIN (insitu) (mg/L)			
G1	7/23/2016	Mid-Ebb	0.60
G1	7/26/2016	Mid-Ebb	0.43
G1	7/28/2016	Mid-Ebb	0.75
G1	7/30/2016	Mid-Ebb	0.78
G1	8/4/2016	Mid-Ebb	0.59
G1	8/6/2016	Mid-Ebb	0.54
G1	8/9/2016	Mid-Ebb	0.82
G1	8/11/2016	Mid-Ebb	0.68
G1	8/13/2016	Mid-Ebb	1.11
G1	8/16/2016	Mid-Ebb	0.71
G1	8/20/2016	Mid-Ebb	0.69
G1	8/23/2016	Mid-Ebb	0.69
G1	8/25/2016	Mid-Ebb	0.65
G1	8/27/2016	Mid-Ebb	0.90
G1	8/30/2016	Mid-Ebb	0.49

Impact TIN (Insitu) (mg/L)			
SR9	7/23/2016	Mid-Ebb	0.14
SR9	7/26/2016	Mid-Ebb	0.44
SR9	7/28/2016	Mid-Ebb	0.11
SR9	7/30/2016	Mid-Ebb	0.32
SR9	8/4/2016	Mid-Ebb	0.47
SR9	8/6/2016	Mid-Ebb	0.63
SR9	8/9/2016	Mid-Ebb	0.69
SR9	8/11/2016	Mid-Ebb	0.58
SR9	8/13/2016	Mid-Ebb	0.58
SR9	8/16/2016	Mid-Ebb	0.33
SR9	8/20/2016	Mid-Ebb	0.58
SR9	8/23/2016	Mid-Ebb	0.64
SR9	8/25/2016	Mid-Ebb	0.65
SR9	8/27/2016	Mid-Ebb	0.66
SR9	8/30/2016	Mid-Ebb	0.18
SR10	7/23/2016	Mid-Ebb	0.31
SR10	7/26/2016	Mid-Ebb	0.19
SR10	7/28/2016	Mid-Ebb	0.11
SR10	7/30/2016	Mid-Ebb	0.15
SR10	8/4/2016	Mid-Ebb	0.35
SR10	8/6/2016	Mid-Ebb	0.60
SR10	8/9/2016	Mid-Ebb	0.39
SR10	8/11/2016	Mid-Ebb	0.34
SR10	8/13/2016	Mid-Ebb	0.34
SR10	8/16/2016	Mid-Ebb	0.28
SR10	8/20/2016	Mid-Ebb	0.47
SR10	8/23/2016	Mid-Ebb	0.43
SR10	8/25/2016	Mid-Ebb	0.67
SR10	8/27/2016	Mid-Ebb	0.68
SR10	8/30/2016	Mid-Ebb	0.13
SR11	7/23/2016	Mid-Ebb	0.27
SR11	7/26/2016	Mid-Ebb	0.18
SR11	7/28/2016	Mid-Ebb	0.13
SR11	7/30/2016	Mid-Ebb	0.19
SR11	8/4/2016	Mid-Ebb	0.31
SR11	8/6/2016	Mid-Ebb	0.66
SR11	8/9/2016	Mid-Ebb	0.39
SR11	8/11/2016	Mid-Ebb	0.36
SR11	8/13/2016	Mid-Ebb	0.36
SR11	8/16/2016	Mid-Ebb	0.26
SR11	8/20/2016	Mid-Ebb	0.46
SR11	8/23/2016	Mid-Ebb	0.45
SR11	8/25/2016	Mid-Ebb	0.65
SR11	8/27/2016	Mid-Ebb	0.69
SR11	8/30/2016	Mid-Ebb	0.37

Cluster 2 TIN(insitu)
G1 vs Impact

Impact (Insitu)		G1 (Insitu)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	45	Number of Valid Observations	15
Number of Distinct Observations	31	Number of Distinct Observations	14
Minimum	0.11	Minimum	0.43
Maximum	0.69	Maximum	1.11
Mean of Raw Data	0.404	Mean of Raw Data	0.695
Standard Deviation of Raw Data	0.189	Standard Deviation of Raw Data	0.169
Kstar	3.68	Kstar	15.25
Mean of Log Transformed Data	-1.04	Mean of Log Transformed Data	-0.39
Standard Deviation of Log Transformed Data	0.557	Standard Deviation of Log Transformed Data	0.238
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.971	Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.945	Shapiro Wilk Critical (0.95) Value	0.881
Approximate Shapiro Wilk P Value	0.00246	Approximate Shapiro Wilk P Value	0.521
Lilliefors Test Statistic	0.136	Lilliefors Test Statistic	0.132
Lilliefors Critical (0.95) Value	0.132	Lilliefors Critical (0.95) Value	0.229
Data not Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test 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 (Insitu)
Background Data: G1 (Insitu)

Raw Statistics

	Site	Background
Number of Valid Observations	45	15
Number of Distinct Observations	31	14
Minimum	0.11	0.43
Maximum	0.69	1.11
Mean	0.404	0.695
Median	0.37	0.69
SD	0.189	0.169
SE of Mean	0.0281	0.0436

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1116
WMW Test U-Stat	-4.396
WMW Critical Value (0.050)	1.645
P-Value	5.51E-06

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value < alpha (0.05)

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (lab) (mg/L) data			
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) data			
SR5	7/23/2016	Mid-Flood	0.68
SR5	7/26/2016	Mid-Flood	0.43
SR5	7/28/2016	Mid-Flood	0.79
SR5	7/30/2016	Mid-Flood	0.73
SR5	8/4/2016	Mid-Flood	0.44
SR5	8/6/2016	Mid-Flood	0.69
SR5	8/9/2016	Mid-Flood	0.86
SR5	8/11/2016	Mid-Flood	0.72
SR5	8/13/2016	Mid-Flood	1.03
SR5	8/16/2016	Mid-Flood	0.71
SR5	8/20/2016	Mid-Flood	0.60
SR5	8/23/2016	Mid-Flood	0.69
SR5	8/25/2016	Mid-Flood	0.58
SR5	8/27/2016	Mid-Flood	0.90
SR5	8/30/2016	Mid-Flood	0.49

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

Baseline (Lab) x 1.3		Impact (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	15
Number of Distinct Observations	12	Number of Distinct Observations	14
Minimum	0.324	Minimum	0.43
Maximum	0.661	Maximum	1.03
Mean of Raw Data	0.482	Mean of Raw Data	0.689
Standard Deviation of Raw Data	0.0971	Standard Deviation of Raw Data	0.167
Kstar	19.61	Kstar	14.15
Mean of Log Transformed Data	-0.749	Mean of Log Transformed Data	-0.401
Standard Deviation of Log Transformed Data	0.208	Standard Deviation of Log Transformed Data	0.251
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.994	Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.881
Approximate Shapiro Wilk P Value	0.993	Approximate Shapiro Wilk P Value	0.759
Lilliefors Test Statistic	0.108	Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.229
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 (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

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

Raw Statistics

Number of Valid Observations	Site	Background
Number of Distinct Observations	15	12
Minimum	14	12
Maximum	0.43	0.324
Mean	1.03	0.661
Median	0.689	0.482
SD	0.69	0.48
SE of Mean	0.167	0.0971
	0.0432	0.028

Site vs Background Two-Sample t-Test

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

Method	DF	t-Test	Critical	
Pooled (Equal Variance)	25	Value	t (0.050)	P-Value
Satterthwaite (Unequal Variance)	23.1	3.799	1.708	0
Pooled SD 0.141		4.02E+00	1.714	0

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

Test of Equality of Variances

Numerator DF	Denominator DF		
14	11	F-Test Value	P-Value
Conclusion with Alpha = 0.05		2.968	0.077

* Two variances appear to be equal

Cluster 1 TIN(lab)
Gradient vs Impact

Gradient TIN (lab) (mg/L) data			
G2	7/23/2016	Mid-Flood	0.70
G2	7/26/2016	Mid-Flood	0.53
G2	7/28/2016	Mid-Flood	0.57
G2	7/30/2016	Mid-Flood	0.55
G2	8/4/2016	Mid-Flood	0.56
G2	8/6/2016	Mid-Flood	0.69
G2	8/9/2016	Mid-Flood	0.70
G2	8/11/2016	Mid-Flood	0.57
G2	8/13/2016	Mid-Flood	0.70
G2	8/16/2016	Mid-Flood	0.65
G2	8/20/2016	Mid-Flood	0.73
G2	8/23/2016	Mid-Flood	0.74
G2	8/25/2016	Mid-Flood	0.70
G2	8/27/2016	Mid-Flood	0.87
G2	8/30/2016	Mid-Flood	0.44
G3	7/23/2016	Mid-Flood	0.44
G3	7/26/2016	Mid-Flood	0.30
G3	7/28/2016	Mid-Flood	0.38
G3	7/30/2016	Mid-Flood	0.46
G3	8/4/2016	Mid-Flood	0.34
G3	8/6/2016	Mid-Flood	0.41
G3	8/9/2016	Mid-Flood	0.41
G3	8/11/2016	Mid-Flood	0.41
G3	8/13/2016	Mid-Flood	0.44
G3	8/16/2016	Mid-Flood	0.42
G3	8/20/2016	Mid-Flood	0.49
G3	8/23/2016	Mid-Flood	0.45
G3	8/25/2016	Mid-Flood	0.47
G3	8/27/2016	Mid-Flood	0.67
G3	8/30/2016	Mid-Flood	0.35

Impact TIN (lab) (mg/L) data			
SR5	7/23/2016	Mid-Flood	0.68
SR5	7/26/2016	Mid-Flood	0.43
SR5	7/28/2016	Mid-Flood	0.79
SR5	7/30/2016	Mid-Flood	0.73
SR5	8/4/2016	Mid-Flood	0.44
SR5	8/6/2016	Mid-Flood	0.69
SR5	8/9/2016	Mid-Flood	0.86
SR5	8/11/2016	Mid-Flood	0.72
SR5	8/13/2016	Mid-Flood	1.03
SR5	8/16/2016	Mid-Flood	0.71
SR5	8/20/2016	Mid-Flood	0.60
SR5	8/23/2016	Mid-Flood	0.69
SR5	8/25/2016	Mid-Flood	0.58
SR5	8/27/2016	Mid-Flood	0.90
SR5	8/30/2016	Mid-Flood	0.49

Gradient (Lab)		Impact (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	30	Number of Valid Observations	15
Number of Distinct Observations	22	Number of Distinct Observations	14
Minimum	0.3	Minimum	0.43
Maximum	0.87	Maximum	1.03
Mean of Raw Data	0.538	Mean of Raw Data	0.689
Standard Deviation of Raw Data	0.146	Standard Deviation of Raw Data	0.167
Kstar	12.75	Kstar	14.15
Mean of Log Transformed Data	-0.656	Mean of Log Transformed Data	-0.401
Standard Deviation of Log Transformed Data	0.273	Standard Deviation of Log Transformed Data	0.251
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.974	Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.95) Value	0.927	Shapiro Wilk Critical (0.95) Value	8.81E-01
Approximate Shapiro Wilk P Value	0.116	Approximate Shapiro Wilk P Value	0.759
Lilliefors Test Statistic	0.146	Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.162	Lilliefors Critical (0.95) Value	0.229
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 (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

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

Raw Statistics

	Site	Background
Number of Valid Observations	15	30
Number of Distinct Observations	14	22
Minimum	0.43	0.3
Maximum	1.03	0.87
Mean	0.689	0.538
Median	0.69	0.51
SD	0.167	0.146
SE of Mean	0.0432	0.0266

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)	43	3.12E+00	1.681	0.002
Satterthwaite (Unequal Variance)	24.9	2.982	1.708	0.003

Pooled SD 0.153
Conclusion with Alpha = 0.050
* Student t (Pooled) Test: Reject H0, Conclude Site > Background
* Satterthwaite Test: Reject H0, Conclude Site > Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
14	29	1.315	0.516

Conclusion with Alpha = 0.05
* Two variances appear to be equal

Cluster 2 TIN(Lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L)			
SR9	7/23/2016	Mid-Ebb	0.10
SR9	7/26/2016	Mid-Ebb	0.16
SR9	7/28/2016	Mid-Ebb	0.38
SR9	7/30/2016	Mid-Ebb	0.40
SR9	8/4/2016	Mid-Ebb	0.23
SR9	8/6/2016	Mid-Ebb	0.22
SR9	8/9/2016	Mid-Ebb	0.13
SR9	8/11/2016	Mid-Ebb	0.04
SR9	8/13/2016	Mid-Ebb	0.03
SR9	8/16/2016	Mid-Ebb	0.03
SR9	8/20/2016	Mid-Ebb	0.03
SR9	8/23/2016	Mid-Ebb	0.03
SR10	8/25/2016	Mid-Ebb	0.19
SR10	8/27/2016	Mid-Ebb	0.20
SR10	8/30/2016	Mid-Ebb	0.20
SR10	1/11/2014	Mid-Ebb	0.21
SR10	1/14/2014	Mid-Ebb	0.14
SR10	1/16/2014	Mid-Ebb	0.13
SR10	1/18/2014	Mid-Ebb	0.13
SR10	1/21/2014	Mid-Ebb	0.12
SR10	1/23/2014	Mid-Ebb	0.15
SR10	1/25/2014	Mid-Ebb	0.08
SR10	1/27/2014	Mid-Ebb	0.09
SR10	1/29/2014	Mid-Ebb	0.12
SR11	1/4/2014	Mid-Ebb	0.18
SR11	1/7/2014	Mid-Ebb	0.17
SR11	1/9/2014	Mid-Ebb	0.19
SR11	1/11/2014	Mid-Ebb	0.21
SR11	1/14/2014	Mid-Ebb	0.14
SR11	1/16/2014	Mid-Ebb	0.12
SR11	1/18/2014	Mid-Ebb	0.10
SR11	1/21/2014	Mid-Ebb	0.12
SR11	1/23/2014	Mid-Ebb	0.18
SR11	1/25/2014	Mid-Ebb	0.12
SR11	1/27/2014	Mid-Ebb	0.07
SR11	1/29/2014	Mid-Ebb	0.09

Impact TIN (lab) (mg/L)			
SR9	7/23/2016	Mid-Ebb	0.12
SR9	7/26/2016	Mid-Ebb	0.41
SR9	7/28/2016	Mid-Ebb	0.06
SR9	7/30/2016	Mid-Ebb	0.35
SR9	8/4/2016	Mid-Ebb	0.46
SR9	8/6/2016	Mid-Ebb	0.64
SR9	8/9/2016	Mid-Ebb	0.67
SR9	8/11/2016	Mid-Ebb	0.60
SR9	8/13/2016	Mid-Ebb	0.62
SR9	8/16/2016	Mid-Ebb	0.30
SR9	8/20/2016	Mid-Ebb	0.57
SR9	8/23/2016	Mid-Ebb	0.68
SR9	8/25/2016	Mid-Ebb	0.68
SR9	8/27/2016	Mid-Ebb	0.64
SR9	8/30/2016	Mid-Ebb	0.13
SR10	7/23/2016	Mid-Ebb	0.25
SR10	7/26/2016	Mid-Ebb	0.19
SR10	7/28/2016	Mid-Ebb	0.08
SR10	7/30/2016	Mid-Ebb	0.13
SR10	8/4/2016	Mid-Ebb	0.33
SR10	8/6/2016	Mid-Ebb	0.62
SR10	8/9/2016	Mid-Ebb	0.39
SR10	8/11/2016	Mid-Ebb	0.35
SR10	8/13/2016	Mid-Ebb	0.31
SR10	8/16/2016	Mid-Ebb	0.28
SR10	8/20/2016	Mid-Ebb	0.45
SR10	8/23/2016	Mid-Ebb	0.42
SR10	8/25/2016	Mid-Ebb	0.63
SR10	8/27/2016	Mid-Ebb	0.66
SR10	8/30/2016	Mid-Ebb	0.09
SR11	7/23/2016	Mid-Ebb	0.21
SR11	7/26/2016	Mid-Ebb	0.18
SR11	7/28/2016	Mid-Ebb	0.03
SR11	7/30/2016	Mid-Ebb	0.13
SR11	8/4/2016	Mid-Ebb	0.32
SR11	8/6/2016	Mid-Ebb	0.62
SR11	8/9/2016	Mid-Ebb	0.38
SR11	8/11/2016	Mid-Ebb	0.36
SR11	8/13/2016	Mid-Ebb	0.31
SR11	8/16/2016	Mid-Ebb	0.20
SR11	8/20/2016	Mid-Ebb	0.44
SR11	8/23/2016	Mid-Ebb	0.42
SR11	8/25/2016	Mid-Ebb	0.60
SR11	8/27/2016	Mid-Ebb	0.69
SR11	8/30/2016	Mid-Ebb	0.36

Baseline (Lab) x 1.3		Impact (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	45
Number of Distinct Observations	31	Number of Distinct Observations	34
Minimum	0.026	Minimum	0.03
Maximum	0.396	Maximum	0.69
Mean of Raw Data	0.145	Mean of Raw Data	0.386
Standard Deviation of Raw Data	0.0824	Standard Deviation of Raw Data	0.202
Kstar	2.637	Kstar	2.483
Mean of Log Transformed Data	-2.115	Mean of Log Transformed Data	-1.153
Standard Deviation of Log Transformed Data	0.68	Standard Deviation of Log Transformed Data	0.734
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.947	Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.9	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical (0.95) Value	0.935	Shapiro Wilk Critical (0.95) Value	9.45E-01
Approximate Shapiro Wilk P Value	3.19E-03	Approximate Shapiro Wilk P Value	0.00572
Lilliefors Test Statistic	0.114	Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.148	Lilliefors Critical (0.95) Value	0.132
Data not Normal at (0.05) Significance Level		Data not Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test 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	45	36
Number of Distinct Observations	34	31
Minimum	0.03	0.026
Maximum	0.69	0.396
Mean	0.386	0.145
Median	0.36	0.133
SD	0.202	0.0824
SE of Mean	0.0302	0.0137

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2397
WMW Test U-Stat	5.237
WMW Critical Value (0.050)	1.65E+00
P-Value	8.16E-08

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Cluster 2 TIN(Lab)
G1 vs Impact

G1 TIN (lab) (mg/L)			
G1	7/23/2016	Mid-Ebb	0.54
G1	7/26/2016	Mid-Ebb	0.41
G1	7/28/2016	Mid-Ebb	0.73
G1	7/30/2016	Mid-Ebb	0.81
G1	8/4/2016	Mid-Ebb	0.55
G1	8/6/2016	Mid-Ebb	0.52
G1	8/9/2016	Mid-Ebb	0.80
G1	8/11/2016	Mid-Ebb	0.61
G1	8/13/2016	Mid-Ebb	1.01
G1	8/16/2016	Mid-Ebb	0.76
G1	8/20/2016	Mid-Ebb	0.67
G1	8/23/2016	Mid-Ebb	0.70
G1	8/25/2016	Mid-Ebb	0.67
G1	8/27/2016	Mid-Ebb	0.91
G1	8/30/2016	Mid-Ebb	0.46

Impact TIN (lab) (mg/L)			
SR9	7/23/2016	Mid-Ebb	0.12
SR9	7/26/2016	Mid-Ebb	0.41
SR9	7/28/2016	Mid-Ebb	0.06
SR9	7/30/2016	Mid-Ebb	0.35
SR9	8/4/2016	Mid-Ebb	0.46
SR9	8/6/2016	Mid-Ebb	0.64
SR9	8/9/2016	Mid-Ebb	0.67
SR9	8/11/2016	Mid-Ebb	0.60
SR9	8/13/2016	Mid-Ebb	0.62
SR9	8/16/2016	Mid-Ebb	0.30
SR9	8/20/2016	Mid-Ebb	0.57
SR9	8/23/2016	Mid-Ebb	0.68
SR9	8/25/2016	Mid-Ebb	0.68
SR9	8/27/2016	Mid-Ebb	0.64
SR9	8/30/2016	Mid-Ebb	0.13
SR10	7/23/2016	Mid-Ebb	0.25
SR10	7/26/2016	Mid-Ebb	0.19
SR10	7/28/2016	Mid-Ebb	0.08
SR10	7/30/2016	Mid-Ebb	0.13
SR10	8/4/2016	Mid-Ebb	0.33
SR10	8/6/2016	Mid-Ebb	0.62
SR10	8/9/2016	Mid-Ebb	0.39
SR10	8/11/2016	Mid-Ebb	0.35
SR10	8/13/2016	Mid-Ebb	0.31
SR10	8/16/2016	Mid-Ebb	0.28
SR10	8/20/2016	Mid-Ebb	0.45
SR10	8/23/2016	Mid-Ebb	0.42
SR10	8/25/2016	Mid-Ebb	0.63
SR10	8/27/2016	Mid-Ebb	0.66
SR10	8/30/2016	Mid-Ebb	0.09
SR11	7/23/2016	Mid-Ebb	0.21
SR11	7/26/2016	Mid-Ebb	0.18
SR11	7/28/2016	Mid-Ebb	0.03
SR11	7/30/2016	Mid-Ebb	0.13
SR11	8/4/2016	Mid-Ebb	0.32
SR11	8/6/2016	Mid-Ebb	0.62
SR11	8/9/2016	Mid-Ebb	0.38
SR11	8/11/2016	Mid-Ebb	0.36
SR11	8/13/2016	Mid-Ebb	0.31
SR11	8/16/2016	Mid-Ebb	0.20
SR11	8/20/2016	Mid-Ebb	0.44
SR11	8/23/2016	Mid-Ebb	0.42
SR11	8/25/2016	Mid-Ebb	0.60
SR11	8/27/2016	Mid-Ebb	0.69
SR11	8/30/2016	Mid-Ebb	0.36

Impact (Lab)		G1 (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	45	Number of Valid Observations	15
Number of Distinct Observations	34	Number of Distinct Observations	14
Minimum	0.03	Minimum	0.41
Maximum	0.69	Maximum	1.01
Mean of Raw Data	0.386	Mean of Raw Data	0.677
Standard Deviation of Raw Data	0.202	Standard Deviation of Raw Data	0.167
Kstar	2.483	Kstar	13.91
Mean of Log Transformed Data	-1.153	Mean of Log Transformed Data	-0.42
Standard Deviation of Log Transformed Data	0.734	Standard Deviation of Log Transformed Data	0.252
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.974	Correlation Coefficient R	0.993
Shapiro Wilk Test Statistic	0.922	Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical (0.95) Value	9.45E-01	Shapiro Wilk Critical (0.95) Value	0.881
Approximate Shapiro Wilk P Value	0.00572	Approximate Shapiro Wilk P Value	0.974
Lilliefors Test Statistic	0.144	Lilliefors Test Statistic	0.109
Lilliefors Critical (0.95) Value	0.132	Lilliefors Critical (0.95) Value	0.229
Data not Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test 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: G1 (Lab)

Raw Statistics

	Site	Background
Number of Valid Observations	45	15
Number of Distinct Observations	34	14
Minimum	0.03	0.41
Maximum	0.69	1.01
Mean	0.386	0.677
Median	0.36	0.67
SD	0.202	0.167
SE of Mean	0.0302	0.0431

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1129
WMW Test U-Stat	-4.165
WMW Critical Value (0.050)	1.65E+00
P-Value	1.55E-05

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value < alpha (0.05)