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MateriaLab

Report No.: 0394/13/ED/0174C

Quarterly EM&A Report

May - July 2014

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/0174C

Project Proponent:

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

Prepared by: Vincent Chan

Reviewed by: Arthur Cheng

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

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ENVIRON

Ref.: CEDDWKTBEM00_0_0146L.14 30 December 2014

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

By Post and Fax (2419 6218)

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 May to July 2014

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for May to July 2014 (ET's Report. No. 0394/13/ED/0174C) received by e-mail on 24 December 2014.

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 Ms Laraine Chau or the undersigned should you have any queries.

Yours sincerely,
For and on behalf of
ENVIRON Hong Kong Limited

Y. H. Hui
Independent Environmental Checker

c.c.	MMHK	Mr. C M Howley	2827 1823 (by fax)
	MateriaLab	Mr. Colin Yung	2450 6138 (by fax)
	CIW&E	Mr. Lam Wai-hung	2419 6028 (by fax)

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EXECUTIVE SUMMARY

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

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

May 2014	June 2014	July 2014
Dredging at Portion D / Zone 13A in EP (Figure 1).	Dredging at Portion D / Zone 13A in EP (Figure 1).	Dredging at Portion D / Zone 13A in EP (Figure 1).

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, Turbidity, Suspended Solids, NH_3-N (lab) and TIN (in-situ & lab) 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	1	2	1	1	0	0	0	0	0	0	-	-	2	3
	Limit	16	16	21	24	1	0	0	0	0	0	-	-	38	40
SR3	Action	1	1	1	2	0	0	0	0	0	0	-	-	2	3
	Limit	15	16	19	24	0	0	0	0	0	0	-	-	34	40
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	1	0	0	0	0	0	-	-	-	-	0	1	1	1
	Limit	6	8	17	18	0	0	-	-	-	-	29	31	52	57
SR6	Action	2	1	0	0	3	4	0	0	0	0	-	-	5	5
	Limit	26	27	29	30	2	2	0	0	0	0	-	-	57	59
SR7	Action	0	1	0	0	1	5	0	0	0	0	-	-	1	6
	Limit	22	29	29	31	0	0	0	0	0	0	-	-	51	60
SR8	Action	1	0	0	0	0	2	0	0	0	0	-	-	1	2
	Limit	19	21	26	29	1	2	0	0	0	0	-	-	46	52
SR9	Action	1	2	0	0	1	3	-	-	-	-	12	12	14	17
	Limit	10	9	26	26	0	0	-	-	-	-	9	12	45	47
SR10	Action	2	3	0	1	2	3	-	-	-	-	10	8	14	15
	Limit	8	10	21	22	0	0	-	-	-	-	13	18	42	50
SR11	Action	1	1	0	0	1	2	-	-	-	-	12	11	14	14
	Limit	11	11	19	20	0	0	-	-	-	-	7	9	37	40
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

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Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
SR13	Action	3	0	1	2	0	0	-	-	-	-	-	-	4	2
	Limit	18	24	26	28	0	0	-	-	-	-	-	-	44	52
Total	Action	13	11	3	6	8	19	0	0	0	0	34	32	126	
	Limit	151	171	233	252	4	4	0	0	0	0	58	70	943	

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	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR2	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	2	2	0	0	-	-	-	-	2	2
SR3	Action	0	0	-	-	-	-	0	2	0	0	-	-	-	-	0	2
	Limit	0	0	-	-	-	-	2	3	0	0	-	-	-	-	2	3
SR4	Action	0	0	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	-	-	0	0
SR5	Action	0	0	-	-	-	-	0	0	0	0	-	-	0	2	0	2
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	29	32	29	32
SR6	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR9	Action	0	0	-	-	-	-	0	0	0	0	-	-	9	10	9	10
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	7	7	7	7
SR10	Action	0	0	-	-	-	-	0	0	0	0	-	-	5	9	5	9
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	9	8	9	8
SR11	Action	0	0	-	-	-	-	0	0	0	0	-	-	6	6	6	6
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	0	0	0	0	0	0	0	0	0	0	0	-	-	1	0
SR13	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	2	0	0	0	0	20	27	49	
	Limit	1	0	0	0	0	0	4	5	0	0	0	0	47	49	106	

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. Exceedances of DO and Turbidity were recorded at various monitoring stations, detail of exceedance are summarized in **Table III**. However, investigation indicated these exceedances were not related to the Project works.

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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	21	45	0	66
SR5	Action	161	59	-	220
	Limit	651	1374	-	2025
SR9	Action	634	124	-	758
	Limit	175	251	-	426
SR10	Action	646	61	-	707
	Limit	355	708	-	1063
SR11	Action	361	232	-	593
	Limit	506	844	-	1350
SR12	Action	1	0	0	1
	Limit	141	14	0	155
SR13	Action	4	105	-	109
	Limit	197	2194	-	2391
Total	Action	1807	581	0	2388
	Limit	2046	5430	0	7476

iii. Waste Management
There was marine sediment (Type 1 – Open Sea Disposal) disposed to East Sha Chau Pit IVc or Va and South of Brothers CMP1 or CMP2. 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.

iv. Complaints, Notifications of Summons and Successful Prosecutions
No complaint, notification of prosecutions or summons was received in the reporting period.

v. Site Inspections and Audit
The Environmental Team conducted 13 site inspections in the reporting period. No particular observation related to the dredging work was found in the reporting quarter.

During joint party visit on 29th May 2014, it is agreed that rectification measures will be implemented by the Contractor to prevent leakage of dredged mud during transfer from silt curtain cage to the hopper barge. The measures proposed by Contractor include enforcement of daily check of grab dredger, employment of better dredging operation practice like steady transfer of grab bucket, extension of retention time above silt curtain cage, lowering of grab bucket into the hopper barge and close the grab bucket while back transferring to the silt curtain cage.

A suspected leakage of silt curtain was reported on 2nd July, while during site inspection on 3rd July, no leakage was observed during operation. The Contractor reported that investigation revealed the suspected case is due to overflow of surface water from the silt curtain cage. Water quality monitoring showed no project-related exceedance during the period. The Contractor was reminded to monitor the condition of the silt curtain closely, and rectify if any leakage was found.

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Pursuant to Condition 3.4 of the EP, the Contractor has arranged a monitoring brief, on 2nd July, for the dredging works staff about the possibility of locating archaeological objects according to the requirement set out in Section 8.1 of the EM&A Manual. According to the Contractor, plan for monitoring dredged spoil, notification procedure and the relevant records will be provided for agreement prior to the commencement of dredging at the location with identified archaeological potential.

vi. 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.

vii. Construction Activities for the Coming Reporting Period

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

- Dredging at Portion D
- Dredging at Portion A

Future Key Issues include:

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

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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. ENVIRON Hong Kong Ltd. was employed as the Independent Environmental Checker (IEC) in the Project.

1.1.5 China International Water & Electric Corporation Limited (CIW&E) 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 First Quarterly EM&A Report is prepared by MCL. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in 23 April to 22 July 2014.

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,

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

Section 8: Conclusions and Recommendation

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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 (ENVIRON)	Independent Environmental Checker	Mr. YH Hui	3465 2888	3465 2899
Contractor (CIW&E)	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:

- Dredging at Portion D / Zone 13A in EP

Dredging at Portion A / Zone 4A in EP

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

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Table 2-2 Detail Dredging Quantity

Date	Dredged Quantity (bulk, m^3)	Date	Dredged Quantity (bulk, m^3)	Date	Dredged Quantity (bulk, m^3)
	Portion D		Portion D		Portion D
23/4/2014	1500	23/5/2014	0	23/6/2014	3250
24/4/2014	200	24/5/2014	0	24/6/2014	2600
25/4/2014	0	25/5/2014	3250	25/6/2014	2600
26/4/2014	0	26/5/2014	650	26/6/2014	2600
27/4/2014	0	27/5/2014	1300	27/6/2014	3250
28/4/2014	0	28/5/2014	2600	28/6/2014	3250
29/4/2014	0	29/5/2014	2600	29/6/2014	2600
30/4/2014	0	30/5/2014	2600	30/6/2014	3250
1/5/2014	0	31/5/2014	3250	1/7/2014	3250
2/5/2014	0	1/6/2014	2600	2/7/2014	3250
3/5/2014	0	2/6/2014	3250	3/7/2014	3250
4/5/2014	0	3/6/2014	3250	4/7/2014	1300
5/5/2014	0	4/6/2014	3250	5/7/2014	1950
6/5/2014	0	5/6/2014	3250	6/7/2014	3250
7/5/2014	500	6/6/2014	2600	7/7/2014	3250
8/5/2014	1000	7/6/2014	3250	8/7/2014	3250
9/5/2014	0	8/6/2014	3250	9/7/2014	2600
10/5/2014	0	9/6/2014	1950	10/7/2014	3250
11/5/2014	0	10/6/2014	3250	11/7/2014	2600
12/5/2014	0	11/6/2014	2600	12/7/2014	2600
13/5/2014	0	12/6/2014	3250	13/7/2014	2600
14/5/2014	0	13/6/2014	1950	14/7/2014	3250
15/5/2014	0	14/6/2014	650	15/7/2014	2600
16/5/2014	0	15/6/2014	0	16/7/2014	3250
17/5/2014	0	16/6/2014	0	17/7/2014	1300
18/5/2014	0	17/6/2014	0	18/7/2014	0
19/5/2014	0	18/6/2014	3250	19/7/2014	2600
20/5/2014	0	19/6/2014	3250	20/7/2014	1300
21/5/2014	0	20/6/2014	2600	21/7/2014	3250
22/5/2014	0	21/6/2014	2600	22/7/2014	1950
		22/6/2014	650		

Maximum allowable daily dredging rate for Portion D / Zone 13A: 4,000 m^3

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**.

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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.

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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 2**.

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

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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, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Typhoon Signal, Rainstorm Warning and Thunderstorm Warning, were reported. Heavy marine traffic (not associated with the Project) was also 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 Turbidity, DO (S&M), DO (B), Suspended solids, Ammonia (lab) and TIN (in-situ & lab). Number of exceedances recorded in the reporting quarter at each impact station is summarized in **Table 3.6 and 3.7**.

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	1	2	1	1	0	0	0	0	0	0	-	-	2	3
	Limit	16	16	21	24	1	0	0	0	0	0	-	-	38	40
SR3	Action	1	1	1	2	0	0	0	0	0	0	-	-	2	3
	Limit	15	16	19	24	0	0	0	0	0	0	-	-	34	40
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	1	0	0	0	0	0	-	-	-	-	0	1	1	1
	Limit	6	8	17	18	0	0	-	-	-	-	29	31	52	57
SR6	Action	2	1	0	0	3	4	0	0	0	0	-	-	5	5
	Limit	26	27	29	30	2	2	0	0	0	0	-	-	57	59
SR7	Action	0	1	0	0	1	5	0	0	0	0	-	-	1	6
	Limit	22	29	29	31	0	0	0	0	0	0	-	-	51	60
SR8	Action	1	0	0	0	0	2	0	0	0	0	-	-	1	2
	Limit	19	21	26	29	1	2	0	0	0	0	-	-	46	52
SR9	Action	1	2	0	0	1	3	-	-	-	-	12	12	14	17
	Limit	10	9	26	26	0	0	-	-	-	-	9	12	45	47
SR10	Action	2	3	0	1	2	3	-	-	-	-	10	8	14	15
	Limit	8	10	21	22	0	0	-	-	-	-	13	18	42	50
SR11	Action	1	1	0	0	1	2	-	-	-	-	12	11	14	14
	Limit	11	11	19	20	0	0	-	-	-	-	7	9	37	40
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	3	0	1	2	0	0	-	-	-	-	-	-	4	2
	Limit	18	24	26	28	0	0	-	-	-	-	-	-	44	52
Total	Action	13	11	3	6	8	19	0	0	0	0	34	32	126	
	Limit	151	171	233	252	4	4	0	0	0	0	58	70	943	

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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	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR2	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	2	2	0	0	-	-	-	-	2	2
SR3	Action	0	0	-	-	-	-	0	2	0	0	-	-	-	-	0	2
	Limit	0	0	-	-	-	-	2	3	0	0	-	-	-	-	2	3
SR4	Action	0	0	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	-	-	0	0
SR5	Action	0	0	-	-	-	-	0	0	0	0	-	-	0	2	0	2
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	29	32	29	32
SR6	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR9	Action	0	0	-	-	-	-	0	0	0	0	-	-	9	10	9	10
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	7	7	7	7
SR10	Action	0	0	-	-	-	-	0	0	0	0	-	-	5	9	5	9
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	9	8	9	8
SR11	Action	0	0	-	-	-	-	0	0	0	0	-	-	6	6	6	6
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	0	0	0	0	0	0	0	0	0	0	0	-	-	1	0
SR13	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	2	0	0	0	0	20	27	49	
	Limit	1	0	0	0	0	0	4	5	0	0	0	0	47	49	106	

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3.3.4 During the reporting period, 24 AL and 322 LL exceedances were recorded for dissolved oxygen (S&M), 9 AL and 485 LL were recorded for dissolved oxygen (B). 27 AL and 8 LL exceedances for turbidity, 66 AL and 128 LL exceedances for TIN (in-situ), 0 AL and 1 LL exceedances for Total Suspended Solids (lab), 2 AL and 9 LL exceedances for NH3-N (lab) and 47 AL and 96 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.

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

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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 related to the dredging work was found in the reporting quarter.

5.1.2 During joint party visit on 29th May 2014, it is agreed that rectification measures will be implemented by the Contractor to prevent leakage of dredged mud during transfer from silt curtain cage to the hopper barge. The measures proposed by Contractor include enforcement of daily check of grab dredger, employment of better dredging operation practice like steady transfer of grab bucket, extension of retention time above silt curtain cage, lowering of grab bucket into the hopper barge and close the grab bucket while back transferring to the silt curtain cage.

5.1.3 A suspected leakage of silt curtain was reported on 2nd July, while during site inspection on 3rd July, no leakage was observed during operation. The Contractor reported that investigation revealed the suspected case is due to overflow of surface water from the silt curtain cage. Water quality monitoring showed no project-related exceedance during the period. The Contractor was reminded to monitor the condition of the silt curtain closely, and rectify if any leakage was found.

5.1.4 Pursuant to Condition 3.4 of the EP, the Contractor has arranged a monitoring brief, on 2nd July, for the dredging works staff about the possibility of locating archaeological objects according to the requirement set out in Section 8.1 of the EM&A Manual. According to the Contractor, plan for monitoring dredged spoil, notification procedure and the relevant records will be provided for agreement prior to the commencement of dredging at the location with identified archaeological potential.

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. The Contractor should be reminded to keep the mitigation measures implemented effectively, especially the installation and maintenance of silt screen and silt curtain, and to maintain good condition of hopper barge and grab dredger to ensure their intended effects are fully achieved.

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.

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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 Contaminated Mud Disposal Site – CMP1 or CMP2. The details can be referred to the **Table 5.2.**

Table 5-1 Waste Quantities of Dredging Works

Month	Marine Sediment Type	Quantity Generated in this month (m^3)	Cumulative-to-date (m^3)	Disposal / Dumping Ground
May 2014	Type 1 – Open Sea Disposal	3700	3700	East Sha Chau Pit IVc or Va and South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	0	0	NA
	Type 3 – Special Treatment / Disposal	0	0	NA
Jun 2014	Type 1 – Open Sea Disposal	66950	70650	East Sha Chau Pit IVc or Va and South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	0	0	NA
	Type 3 – Special Treatment / Disposal	0	0	NA
July 2014	Type 1 – Open Sea Disposal	80,600	151,250	East Sha Chau Pit IVc or Va and South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	0	0	NA
	Type 3 – Special Treatment / Disposal	0	0	NA

5.5 Review of Action and Limit Level

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5.5.1 Existing Action and Limit Levels for both routine impact monitoring and 24-hr monitoring were derived based on the 4-weeks baseline water quality monitoring data obtained during the dry season in January 2014 prior to the commencement of construction.

5.5.2 Owing to the frequent not project-related exceedances in water quality caused by change of ambient condition or natural fluctuation of water quality in the monitoring site, it is recommended to review the existing Action and Limit Levels.

5.6 Quarterly Review of Constructional Impacts on Water Quality

5.6.1 The construction impact on water quality was assessed by comparing the quarterly mean values with the relevant ambient or baseline mean values. Results showed that the quarterly mean values of DO (S&M), Turbidity (depth averaged), SS (depth averaged), Ammonia (in-situ & lab) and UIA (in-situ & lab) at all clusters of monitoring stations are well below the 1.3 x baseline (0.7 x baseline for DO) value. Cluster stations with higher quarterly impact data are statistically analysed to 1.3 x baseline levels (or 0.7 x baseline levels for DO) or other relevant levels to assess the constructional impacts.

5.6.2 Quarterly mean of cluster 2 stations data of DO (B) is compared to 0.7 x baseline data. Results show the quarterly mean is not significantly different ($p \geq 0.05$) from the mean of baseline data x 0.7. Both flood tide and ebb tide data are used in the comparison.

5.6.3 Quarterly mean of cluster 1 (SR1, SR2, SR3, SR4, SR5 & SR12) and cluster 2 (SR6, SR7, SR8, SR9, SR10 & SR11) stations data of TIN is compared to 1.3 x baseline data. Results show the 1.3 x baseline level is significantly smaller than the quarterly mean. As TIN is not detected at Control stations, quarterly mean of impact station is further compared to the quarterly mean of gradient stations (G2, G3 and G4 are gradient stations in vicinity of cluster 1 stations; G5 and G6 are gradient stations in vicinity of cluster 2 stations). Data from ebb tide are compared for cluster 2 while 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, results show TIN level at gradient is smaller than at the impact stations ($p < 0.05$), indicating the trend is not increasing towards the project area. For cluster 2, at ebb tide, TIN level of gradient (G5 & G6) is not significantly different from that of impact stations (SR9, SR10 & SR11) ($p \geq 0.05$), thus gradient stations G1 at the most upstream location is further compared to those cluster 2 impact stations and results indicated TIN level at that cluster 2 impact stations is significantly smaller than that of G1 ($p < 0.05$), it indicates the background TIN level is high and the contribution from the project is not significant.

5.6.4 Comparison between quarterly mean and 1.3 x baseline mean (0.7 x baseline mean for DO) is given in Table 5.2, while the summary of key statistical analysis is provided in Table 5.3. Details of key statistical analysis results are provided in **Appendix H**.

5.6.5 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

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analysis was not performed for some parameters without exceendances (BOD_5, E.coli and Synthetic Detergent) in the reporting quarter.

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Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		DO (S&M)						DO (B)						Turbidity					
		Baseline	Baseline x 0.7	Average	May - Jul 2014	Average	Smaller than Baseline x 0.7	Baseline	Baseline x 0.7	Average	May - Jul 2014	Average	Smaller than Baseline Level	Baseline	Baseline x 1.3	Average	May - Jul 2014	Average	Larger than Baseline x 1.3
Control (Flood)	C1	6.39	4.47	NA	5.25	NA	no	6.32	4.42	NA	4.36	NA	yes	2.53	3.30	NA	2.23	NA	no
	C2	7.51	5.26		5.77		no	7.31	5.12		4.29		yes	0.99	1.30		2.16		yes
	C3	6.98	4.89		5.84		no	6.89	4.82		4.55		yes	0.50	0.70		0.93		yes
Control (Ebb)	C1	6.41	4.49	NA	5.24	NA	no	6.32	4.42	NA	4.35	NA	yes	1.16	1.50	NA	2.25	NA	yes
	C2	7.27	5.09		5.94		no	7.23	5.06		4.16		yes	1.21	1.60		0.81		no
	C3	7.00	4.90		5.87		no	6.94	4.86		4.65		yes	1.05	1.40		0.85		no
Gradient (Flood)	G1	6.48	4.54	NA	5.46	NA	no	6.37	4.46	NA	4.52	NA	no	1.94	2.50	NA	2.10	NA	no
	G2	6.37	4.46		5.46		no	6.34	4.44		4.76		no	1.73	2.20		1.18		no
	G3	6.30	4.41		5.16		no	6.34	4.44		4.38		yes	1.78	2.30		0.96		no
	G4	5.84	4.09		5.45		no	5.83	4.08		4.35		no	2.29	3.00		1.25		no
	G5	7.73	5.41		6.24		no	7.61	5.33		4.48		yes	3.56	4.60		1.30		no
	G6	7.15	5.01		5.57		no	7.00	4.90		4.39		yes	0.69	0.90		1.12		yes
Gradient (Ebb)	G1	6.44	4.51	NA	5.43	NA	no	6.33	4.43	NA	4.46	NA	no	1.33	1.70	NA	1.99	NA	yes
	G2	6.32	4.42		5.59		no	6.35	4.45		4.98		no	1.00	1.30		0.89		no
	G3	6.48	4.54		5.02		no	6.50	4.55		4.29		yes	1.19	1.50		0.95		no
	G4	5.93	4.15		5.18		no	6.00	4.20		4.23		no	2.03	2.60		1.29		no
	G5	7.74	5.42		6.15		no	7.71	5.40		4.49		yes	0.86	1.10		0.88		no
	G6	7.14	5.00		5.68		no	7.09	4.96		4.52		yes	0.63	0.80		1.02		yes
Cluster 1 (Flood)	SR1	6.79	4.75	4.42	5.68	5.50	no	6.72	4.70	4.38	5.33	4.93	no	3.06	4.00	2.6	1.59	1.29	no
	SR2	6.39	4.47		5.52			6.37	4.46		4.82			1.13	1.50		1.16		
	SR3	6.28	4.40		5.53			6.21	4.35		4.83			1.11	1.40		1.02		
	SR4	6.07	4.25		5.39			6.06	4.24		5.09			2.24	2.90		1.35		
	SR5	6.40	4.48		5.84			6.31	4.42		5.15			1.94	2.50		1.20		
	SR12	5.92	4.14		5.01			5.90	4.13		4.37			2.40	3.10		1.42		
Cluster 1 (Ebb)	SR1	6.64	4.65	4.39	5.77	5.52	no	6.64	4.65	4.37	5.42	4.94	no	2.24	2.90	2.0	1.52	1.32	no
	SR2	6.37	4.46		5.56			6.35	4.45		5.03			1.18	1.50		1.31		
	SR3	6.32	4.42		5.52			6.26	4.38		5.01			1.06	1.40		0.87		
	SR4	5.97	4.18		5.39			5.91	4.14		4.81			1.79	2.30		1.34		
	SR5	6.38	4.47		5.90			6.37	4.46		5.12			1.14	1.50		1.11		
	SR12	5.96	4.17		5.00			5.92	4.14		4.24			1.94	2.50		1.74		
Cluster 2 (Flood)	SR6	6.85	4.80	5.06	5.51	6.17	no	6.85	4.80	5.04	4.82	4.98	yes	1.36	1.80	1.2	1.35	0.98	no
	SR7	6.81	4.77		5.32			6.78	4.75		4.42			1.09	1.40		0.99		
	SR8	7.35	5.15		6.05			7.26	5.08		4.93			0.67	0.90		1.12		
	SR9	7.79	5.45		7.06			7.84	5.49		4.94			1.26	1.60		0.90		
	SR10	7.17	5.02		6.42			7.15	5.01		5.33			0.75	1.00		0.82		
	SR11	7.36	5.15		6.66			7.25	5.08		5.46			0.28	0.40		0.71		
Cluster 2 (Ebb)	SR6	6.80	4.76	5.05	5.50	6.25	no	6.78	4.75	5.01	4.70	4.98	yes	0.97	1.30	0.9	1.10	0.78	no
	SR7	6.74	4.72		6.14			6.80	4.76		4.50			0.73	0.90		0.73		
	SR8	7.27	5.09		6.09			7.20	5.04		4.95			0.53	0.70		0.69		
	SR9	7.82	5.47		6.98			7.75	5.43		5.01			1.02	1.30		0.74		
	SR10	7.30	5.11		6.45			7.16	5.01		5.37			0.30	0.40		0.75		
	SR11	7.34	5.14		6.36			7.25	5.08		5.33			0.38	0.50		0.68		
Cluster 3 (Flood)	SR13	5.78	4.05	4.05	4.91	4.91	no	5.75	4.03	4.03	4.21	4.21	no	7.28	9.50	9.5	1.75	1.75	no
Cluster 3 (Ebb)	SR13	5.76	4.03	4.03	5.00	5.00	no	5.73	4.01	4.01	4.25	4.25	no	4.23	5.50	5.5	1.49	1.49	no

NA: Not Applicable (Control and Gradient stations are compared on individual stations for reference, no clustering was performed previously. Impact stations are compared in clusters of stations.)

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		Ammonia – Insitu						UIA – Insitu						TIN – Insitu					
		Baseline	Baseline x 1.3	Average	May - Jul 2014	Average	Larger than Baseline x 1.3	Baseline	Baseline x 1.3	Average	May - Jul 2014	Average	Larger than Baseline x 1.3	Dry Season Baseline	Baseline x 1.3	Average	May - Jul 2014	Average	Larger than Baseline x 1.3
Control (Flood)	C1	0.23	0.30	NA	0.07	NA	no	0.013	0.017	NA	0.003	NA	no	NA	NA	NA	NA	NA	NA
	C2	0.07	0.09		0.06		no	0.005	0.007		0.003		no	NA	NA		NA		NA
	C3	0.06	0.08		0.05		no	0.004	0.005		0.003		no	NA	NA		NA		NA
Control (Ebb)	C1	0.22	0.29	NA	0.07	NA	no	0.005	0.007	NA	0.004	NA	no	NA	NA	NA	NA	NA	NA
	C2	0.06	0.08		0.05		no	0.001	0.001		0.003		yes	NA	NA		NA		NA
	C3	0.07	0.09		0.04		no	0.001	0.001		0.002		yes	NA	NA		NA		NA
Gradient (Flood)	G1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.42	0.55	NA	1.02	NA	yes
	G2	NA	NA		NA		NA	NA	NA		NA		NA	0.44	0.57		0.89		yes
	G3	NA	NA		NA		NA	NA	NA		NA		NA	0.42	0.55		0.57		yes
	G4	NA	NA		NA		NA	NA	NA		NA		NA	0.56	0.73		0.53		no
	G5	NA	NA		NA		NA	NA	NA		NA		NA	0.26	0.34		0.53		yes
	G6	NA	NA		NA		NA	NA	NA		NA		NA	0.20	0.26		0.43		yes
Gradient (Ebb)	G1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.40	0.52	NA	1.01	NA	yes
	G2	NA	NA		NA		NA	NA	NA		NA		NA	0.38	0.49		0.86		yes
	G3	NA	NA		NA		NA	NA	NA		NA		NA	0.36	0.46		0.57		yes
	G4	NA	NA		NA		NA	NA	NA		NA		NA	0.53	0.69		0.51		no
	G5	NA	NA		NA		NA	NA	NA		NA		NA	0.21	0.27		0.48		yes
	G6	NA	NA		NA		NA	NA	NA		NA		NA	0.21	0.27		0.44		yes
Cluster 1 (Flood)	SR1	0.24	0.31	0.32	0.07	0.07	no	0.015	0.020	0.018	0.003	0.002	no	NA	NA	0.51	NA	1.03	yes
	SR2	0.22	0.29		0.07			0.012	0.016		0.002			NA	NA		NA		
	SR3	0.24	0.31		0.06			0.014	0.018		0.002			NA	NA		NA		
	SR4	0.26	0.34		0.07			0.013	0.017		0.003			NA	NA		NA		
	SR5	NA	NA		NA			NA	NA		NA			0.39	0.51		1.03		
	SR12	0.28	0.36		0.07			0.014	0.018		0.002			NA	NA		NA		
Cluster 1 (Ebb)	SR1	0.22	0.29	0.31	0.07	0.07	no	0.006	0.008	0.008	0.003	0.003	no	NA	NA	0.53	NA	1.07	yes
	SR2	0.22	0.29		0.06			0.006	0.008		0.002			NA	NA		NA		
	SR3	0.22	0.29		0.07			0.006	0.008		0.003			NA	NA		NA		
	SR4	0.25	0.33		0.07			0.007	0.009		0.003			NA	NA		NA		
	SR5	NA	NA		NA			NA	NA		NA			0.41	0.53		1.07		
	SR12	0.27	0.35		0.07			0.007	0.009		0.003			NA	NA		NA		
Cluster 2 (Flood)	SR6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.27	NA	0.43	yes
	SR7	NA	NA		NA			NA	NA		NA			NA	NA		NA		
	SR8	NA	NA		NA			NA	NA		NA			NA	NA		NA		
	SR9	NA	NA		NA			NA	NA		NA			0.20	0.26		0.45		
	SR10	NA	NA		NA			NA	NA		NA			0.22	0.29		0.45		
	SR11	NA	NA		NA			NA	NA		NA			0.20	0.26		0.39		
Cluster 2 (Ebb)	SR6	NA	NA		NA			NA	NA		NA			NA	NA	0.27	NA	0.43	yes
	SR7	NA	NA		NA			NA	NA		NA			NA	NA		NA		
	SR8	NA	NA		NA			NA	NA		NA			NA	NA		NA		
	SR9	NA	NA		NA			NA	NA		NA			0.20	0.26		0.44		
	SR10	NA	NA		NA			NA	NA		NA			0.22	0.29		0.45		
	SR11	NA	NA		NA			NA	NA		NA			0.20	0.26		0.39		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA		NA			NA	NA		NA			NA	NA		NA		

NA: Not Applicable (Control and Gradient stations are compared on individual stations for reference, no clustering was performed previously. Impact stations are compared in clusters of stations.)

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		TSS						Ammonia – lab						UIA – lab					
		Baseline	1.3 x Baseline	Average	May - Jul 2014	Average	Larger than Baseline x 1.3	Baseline	1.3 x Baseline	Average	May - Jul 2014	Average	Larger than Baseline x 1.3	Baseline	1.3 x Baseline	Average	May - Jul 2014	Average	Larger than Baseline x 1.3
Control (Flood)	C1	7	9	NA	4	NA	no	0.11	0.14	NA	0.11	NA	no	0.006	0.008	NA	0.004	NA	no
	C2	4	6		4		no	0.02	0.03		0.08		yes	0.001	0.001		0.003		yes
	C3	4	5		4		no	0.02	0.03		0.04		yes	0.001	0.001		0.002		yes
Control (Ebb)	C1	6	7	NA	4	NA	no	0.10	0.13	NA	0.11	NA	yes	0.005	0.007	NA	0.004	NA	no
	C2	5	7		3		no	0.02	0.03		0.06		yes	0.001	0.001		0.003		yes
	C3	4	5		3		no	0.02	0.03		0.04		yes	0.001	0.001		0.002		yes
Gradient (Flood)	G1	7	10	NA	4	NA	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	G2	5	7		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G3	6	8		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G4	8	10		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G5	6	8		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G6	4	5		4		no	NA	NA		NA		NA	NA	NA		NA		NA
Gradient (Ebb)	G1	5	7	NA	4	NA	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	G2	5	7		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G3	5	7		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G4	7	9		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G5	5	7		4		no	NA	NA		NA		NA	NA	NA		NA		NA
	G6	4	5		3		no	NA	NA		NA		NA	NA	NA		NA		NA
Cluster 1 (Flood)	SR1	7	9	8.67	4	4.00	no	0.09	0.12	0.16	0.11	0.11	no	0.005	0.007	0.008	0.004	0.004	no
	SR2	5	7		4			0.12	0.16		0.11			0.006	0.008		0.004		
	SR3	5	7		4			0.12	0.16		0.12			0.006	0.008		0.004		
	SR4	7	9		4			0.13	0.17		0.11			0.006	0.008		0.004		
	SR5	6	8		4			NA	NA		NA			NA	NA				
	SR12	9	12		4			0.15	0.20		0.12			0.007	0.009		0.004		
Cluster 1 (Ebb)	SR1	7	9	7.33	4	4.00	no	0.11	0.14	0.17	0.12	0.11	no	0.006	0.008	0.008	0.004	0.004	no
	SR2	5	7		4			0.12	0.16		0.10			0.006	0.008		0.004		
	SR3	5	6		4			0.12	0.16		0.10			0.006	0.008		0.004		
	SR4	5	7		4			0.14	0.18		0.11			0.007	0.009		0.004		
	SR5	5	6		4			NA	NA		NA			NA	NA		NA		
	SR12	7	9		4			0.15	0.20		0.10			0.007	0.009		0.004		
Cluster 2 (Flood)	SR6	5	6	6.17	4	3.83	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	SR7	6	8		4			NA	NA		NA			NA	NA		NA		
	SR8	4	5		4			NA	NA		NA			NA	NA		NA		
	SR9	5	7		4			NA	NA		NA			NA	NA		NA		
	SR10	5	7		4			NA	NA		NA			NA	NA		NA		
	SR11	3	4		3			NA	NA		NA			NA	NA		NA		
Cluster 2 (Ebb)	SR6	4	6	5.83	4	3.50	no	NA	NA		NA			NA	NA		NA		
	SR7	6	8		4			NA	NA		NA			NA	NA		NA		
	SR8	4	5		3			NA	NA		NA			NA	NA		NA		
	SR9	4	6		3			NA	NA		NA			NA	NA		NA		
	SR10	4	5		3			NA	NA		NA			NA	NA		NA		
	SR11	4	5		4			NA	NA		NA			NA	NA		NA		
Cluster 3 (Flood)	SR13	16	21	21.00	5	5.00	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	10	14	14.00	4	4.00	no	NA	NA		NA			NA	NA		NA		

NA: Not Applicable (Control and Gradient stations are compared on individual stations for reference, no clustering was performed previously. Impact stations are compared in clusters of stations.)

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		TIN – lab					
		Dry Season Baseline	1.3 x Baseline	Average	May - Jul 2014	Average	Larger than Baseline x 1.3
Control (Flood)	C1	NA	NA	NA	NA	NA	NA
	C2	NA	NA		NA		NA
	C3	NA	NA		NA		NA
Control (Ebb)	C1	NA	NA	NA	NA	NA	NA
	C2	NA	NA		NA		NA
	C3	NA	NA		NA		NA
Gradient (Flood)	G1	0.30	0.39	NA	1.00	NA	yes
	G2	0.31	0.40		0.86		yes
	G3	0.30	0.39		0.61		yes
	G4	0.35	0.46		0.54		yes
	G5	0.15	0.20		0.45		yes
	G6	0.12	0.16		0.39		yes
Gradient (Ebb)	G1	0.28	0.36	NA	1.00	NA	yes
	G2	0.28	0.36		0.79		yes
	G3	0.24	0.31		0.58		yes
	G4	0.34	0.44		0.53		yes
	G5	0.13	0.17		0.47		yes
	G6	0.13	0.17		0.35		yes
Cluster 1 (Flood)	SR1	NA	NA	0.38	NA	0.92	yes
	SR2	NA	NA		NA		
	SR3	NA	NA		NA		
	SR4	NA	NA		NA		
	SR5	0.29	0.38		0.92		
	SR12	NA	NA		NA		
Cluster 1 (Ebb)	SR1	NA	NA	0.36	NA	0.93	yes
	SR2	NA	NA		NA		
	SR3	NA	NA		NA		
	SR4	NA	NA		NA		
	SR5	0.28	0.36		0.93		
	SR12	NA	NA		NA		
Cluster 2 (Flood)	SR6	NA	NA	0.16	NA	0.36	yes
	SR7	NA	NA		NA		
	SR8	NA	NA		NA		
	SR9	0.11	0.14		0.39		
	SR10	0.13	0.17		0.37		
	SR11	0.12	0.16		0.31		
Cluster 2 (Ebb)	SR6	NA	NA	0.14	NA	0.34	yes
	SR7	NA	NA		NA		
	SR8	NA	NA		NA		
	SR9	0.11	0.14		0.38		
	SR10	0.11	0.14		0.34		
	SR11	0.11	0.14		0.29		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA		NA		

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Table 5-3 Summary of Statistical Analysis

Parameter	Cluster	Compared against	Results and Conclusions
DO	Cluster 2	Quarterly Mean at Impact Stations against 0.7 x Baseline Level	Quarterly mean is not significantly different from 0.7 x Baseline mean ($p \geq 0.05$), and Project impact is not significant
TIN	Cluster 1	Quarterly Mean at Impact Stations against 1.3 x Baseline Level Quarterly Mean at Impact Stations against Quarterly Mean at Gradient Stations	Quarterly mean is significantly higher than 1.3 x Baseline mean ($p<0.05$). Gradient Mean is significantly smaller than Impact Mean, meaning Project impact is not significant
TIN	Cluster 2	Quarterly Mean at Impact Stations against 1.3 x Baseline Level Quarterly Mean at Impact Stations against Upstream Gradient Station	Quarterly mean is significantly higher than 1.3 x Baseline mean ($p<0.05$). Impact Mean is significantly smaller than the Upstream Gradient Mean, indicating background TIN level is high, and Project impact is not significant

5.6.6 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.

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6. 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 7.1, 7.2 and 7.3**.

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 Month	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 Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

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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 Numerous action and limit level exceedances of turbidity, dissolved oxygen, TIN, ammonia and suspended solids were recorded in the routine impact monitoring in the reporting quarter. Numerous exceedances were also recorded in 24-hr monitoring. Investigation found that the exceedances were not project related. The action and limit level should be reviewed to reduce the false alarm generated.

7.1.3 Environmental site inspections were carried out weekly in the reporting period, no non-compliance from the site audits was observed.

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 month.

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Figure 1

Project General Layout

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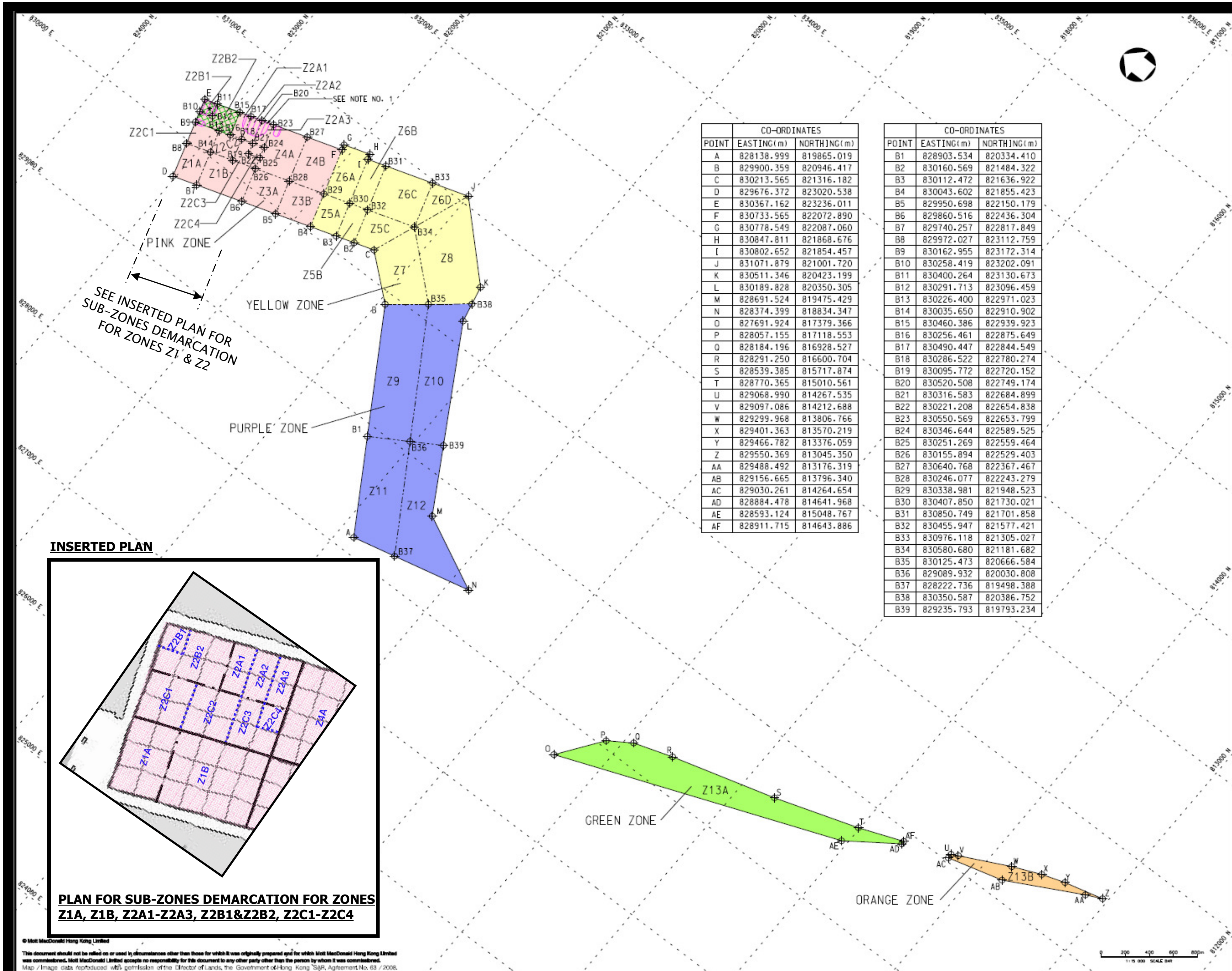

	CO-ORDINATES	
POINT	EASTING(m)	NORTHING(m)
A	828138.999	819865.019
B	829900.359	820946.417
C	830213.565	821316.182
D	829676.372	823020.538
E	830367.162	823236.011
F	830733.565	822072.890
G	830778.549	822087.060
H	830847.811	821868.676
I	830802.652	821854.457
J	831071.879	821001.720
K	830511.346	820423.199
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

LEGEND:

PROPOSED DREDGING AREA

ZONAL BOUNDARIES

DREDGING HOT SPOT AND BUFER AREA

HARDER MATERIAL (SEE NOTE NO.1)

HOT SPOT WITH HIGHER NH_3-N LEVEL

NOTE:

1. HARDER MATERIAL TO BE REMOVED BY CUTTER SUCTION DREDGER.

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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

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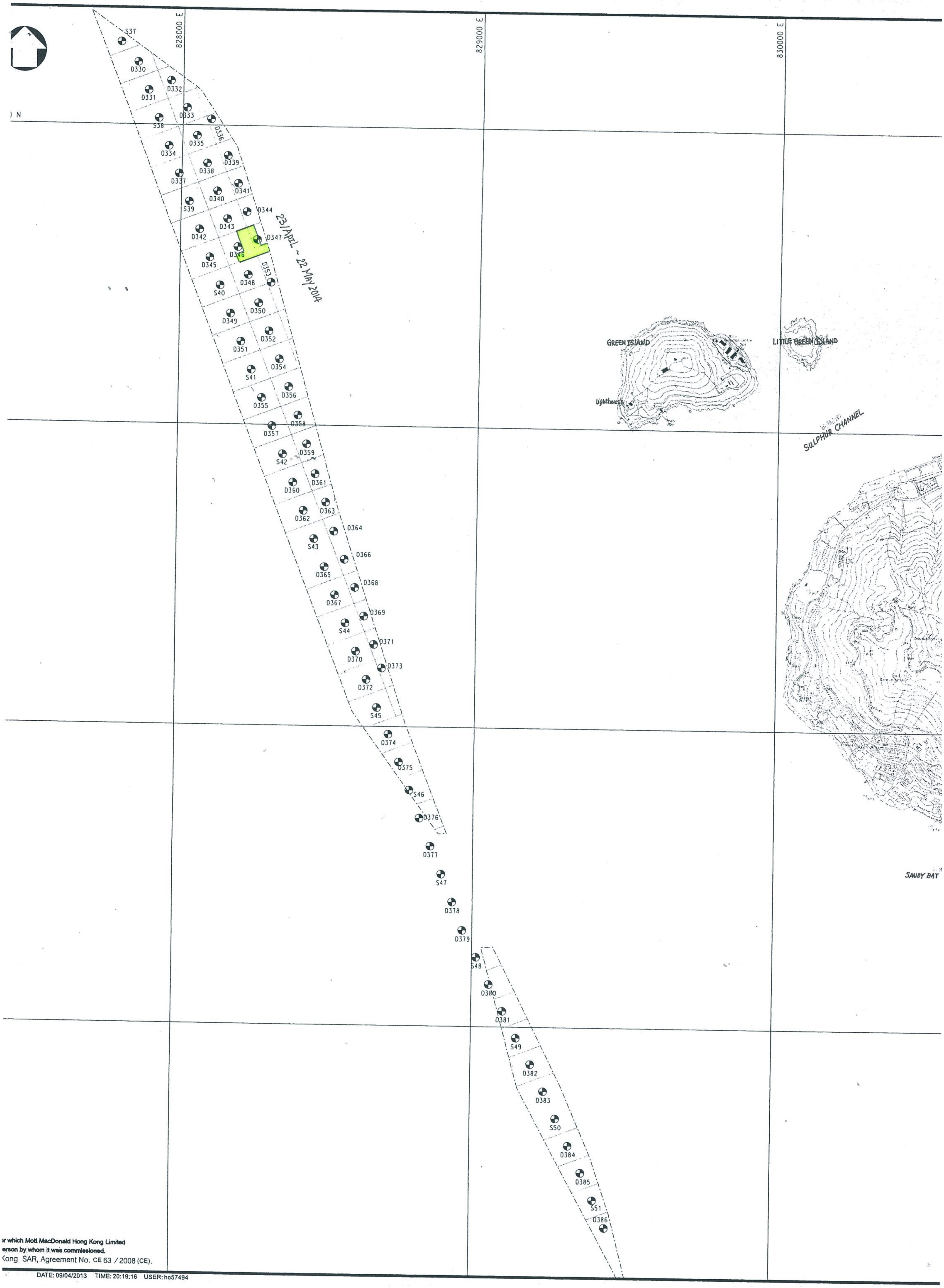

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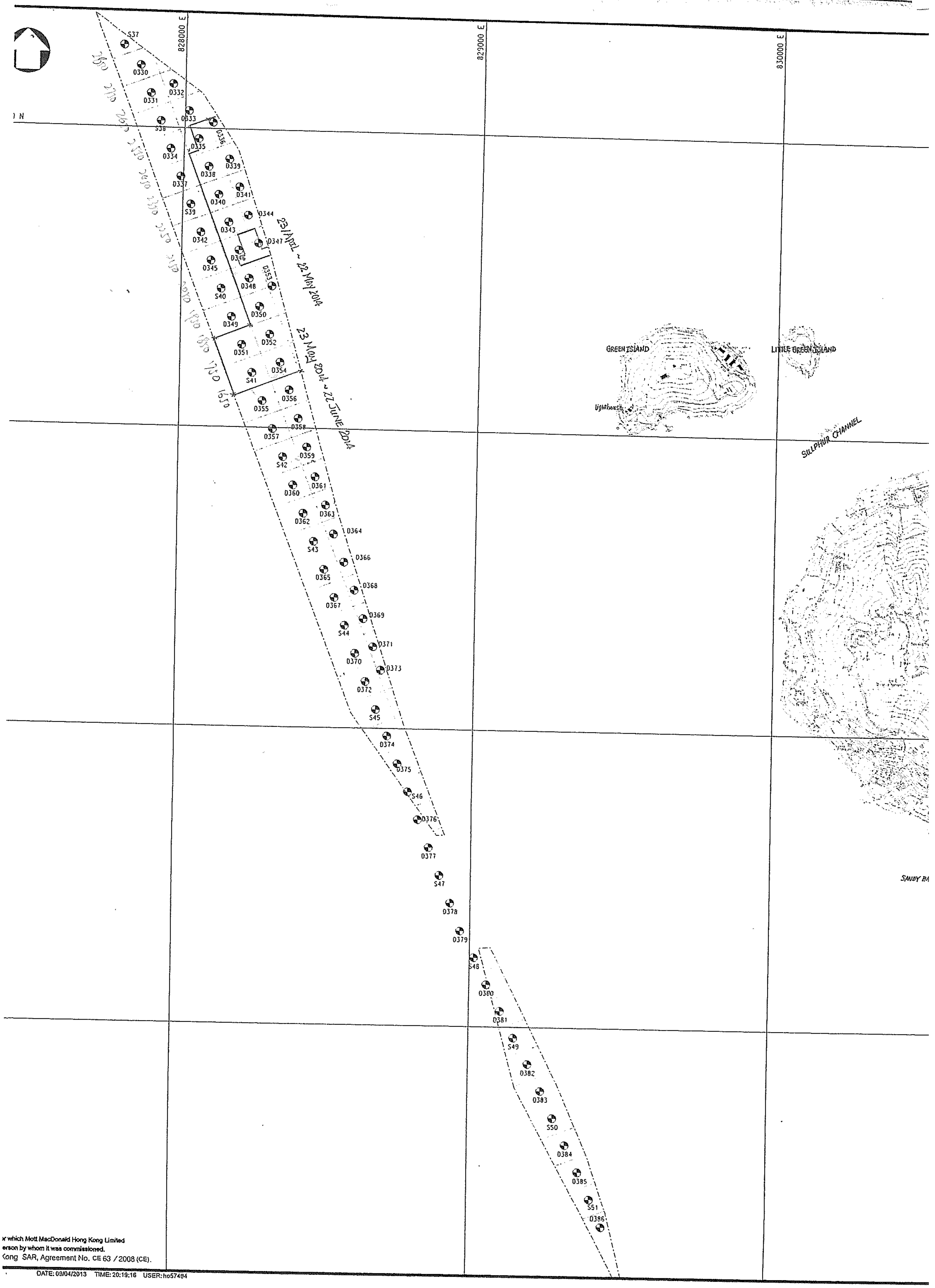

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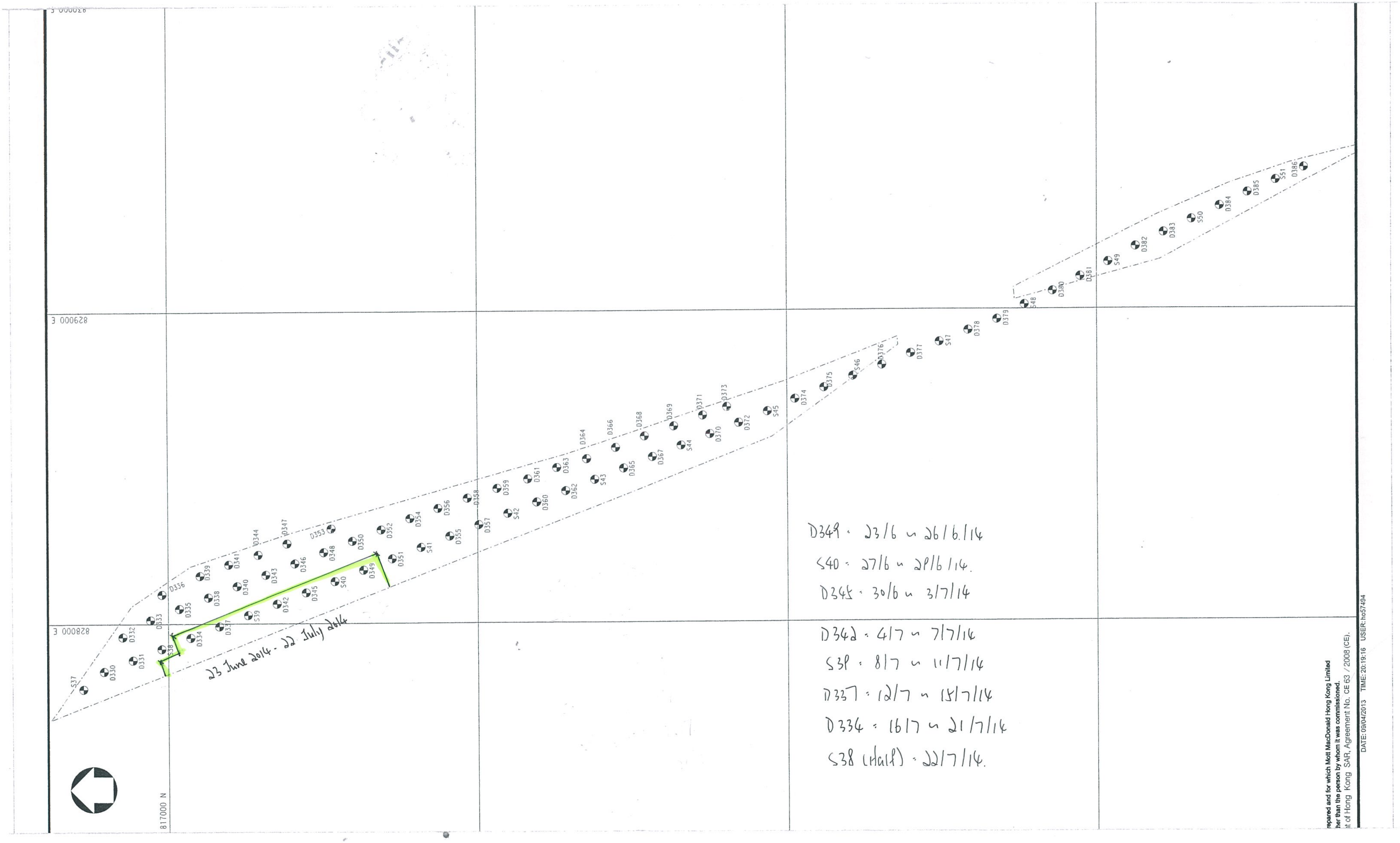
23 June 2014 - 22 July 2014
D349 : 23/6 ~ 26/6/14
S40 : 27/6 ~ 28/6/14.
D345 : 30/6 ~ 3/7/14
D342 : 4/7 ~ 7/7/14
S39 : 8/7 ~ 11/7/14
D337 : 12/7 ~ 15/7/14
D334 : 16/7 ~ 21/7/14
S38 (Half) : 22/7/14.
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Figure 3

Locations of Water Quality Monitoring Stations

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

LEGEND:

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

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

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

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Client

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

Project

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

Title

PROVISIONAL LOCATION OF WATER QUALITY MONITORING STATIONS

Designed	FC		Eng check	SL	
Drawn	WH		Coordination	TF	
Dwg check	FC		Approved	CMH	

Scale at A1	Status	Rev
1:35000	TEN	2

Drawing Number

MMH/259053/EM/403

Appendix A

Project Organization Chart

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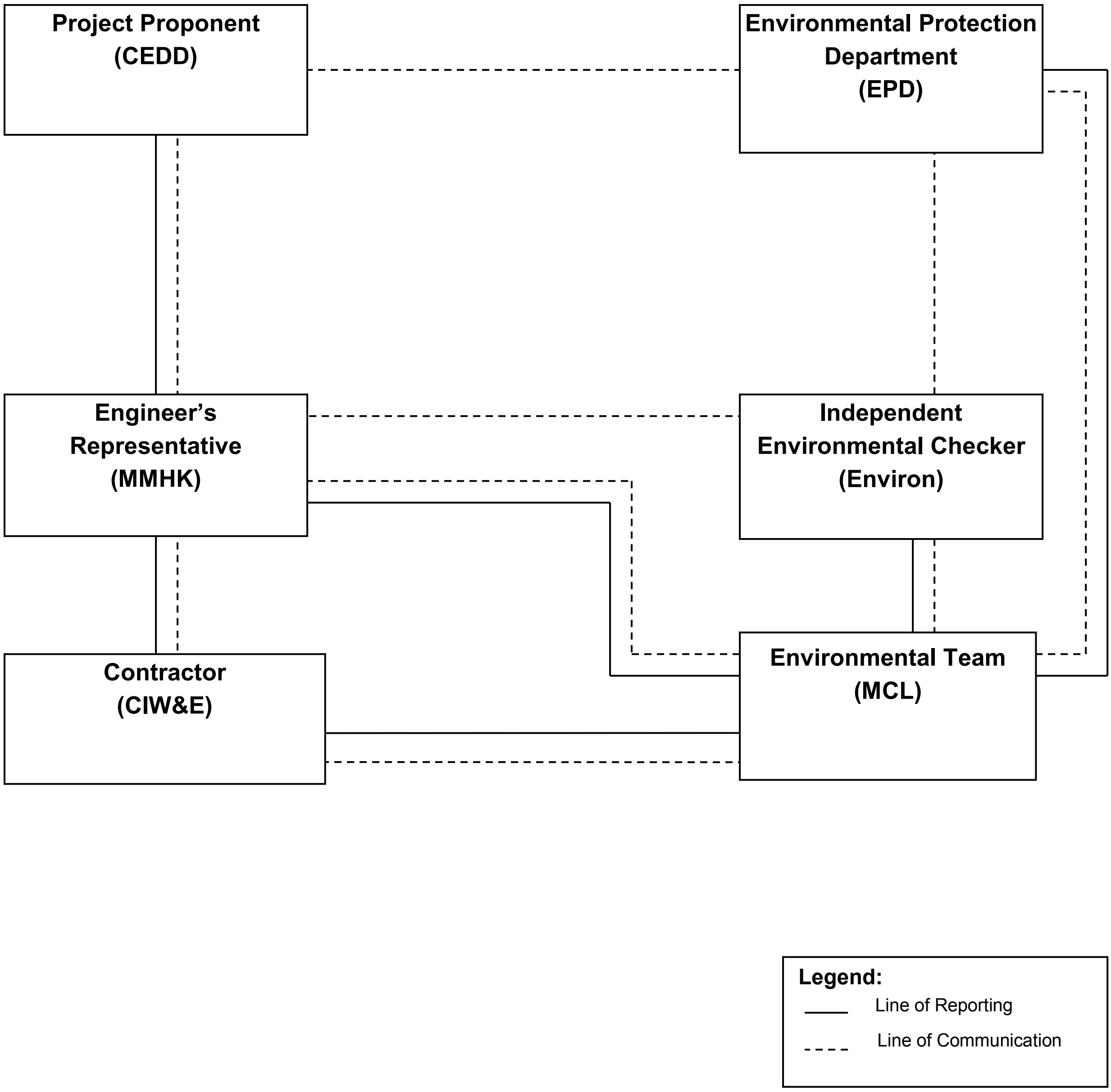


Project Proponent (CEDD)
Environmental Protection Department (EPD)
Engineer's Representative (MMHK)
Independent Environmental Checker (Environ)
Contractor (CIW&E)
Environmental Team (MCL)
Legend:
Line of Reporting
Line of Communication

Appendix B

Construction Programme

The copyright of this document is owned by MateriaLab Consultants Ltd. It may not be reproduced except with prior written approval from the Company.

ID	Task Name	Duration	Start	Finish
1	**Contract Period**	836 days	Fri 30/8/13	Sun 13/12/15
2	**Contract Commencement Date**	0 days	Fri 30/8/13	Fri 30/8/13
3	**Section 1**	836 days	Fri 30/8/13	Sun 13/12/15
4	**Submission**	422 days	Fri 30/8/13	Sat 25/10/14
5	**Environmental Management**	321 days	Fri 30/8/13	Wed 16/7/14
6	**Baseline monitoring**	231 days	Fri 30/8/13	Thu 17/4/14
7	**ETL and relevant site personal**	30 days	Fri 30/8/13	Sat 28/9/13
8	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
9	Comment and approval	15 days	Sat 14/9/13	Sat 28/9/13
10	**Test Lab**	30 days	Fri 30/8/13	Sat 28/9/13
11	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
12	Comment and approval	15 days	Sat 14/9/13	Sat 28/9/13
13	**Monitoring (Location see Drg No. EM/401)**	201 days	Sun 29/9/13	Thu 17/4/14
14	**Plan**	93 days	Sun 29/9/13	Mon 30/12/13
15	Preparation and submission to Mott and IEC	21 days	Sun 29/9/13	Sat 19/10/13
16	Comment and resubmission	30 days	Sun 20/10/13	Mon 18/11/13
17	Approval by Mott and ICE	35 days	Tue 19/11/13	Mon 23/12/13
18	Approval by EPD	7 days	Tue 24/12/13	Mon 30/12/13
19	**Report**	50 days	Thu 27/2/14	Thu 17/4/14
20	Preparation of report	5 days	Thu 27/2/14	Mon 3/3/14
21	Approval by Mott and IEC	35 days	Tue 4/3/14	Mon 7/4/14
22	Approval by EPD	10 days	Tue 8/4/14	Thu 17/4/14
23	**Grab sample (Portions A, B & C)**	321 days	Fri 30/8/13	Wed 16/7/14
24	**Grab sample specialist**	30 days	Fri 30/8/13	Sat 28/9/13
25	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
26	Comment and approval by Mott	15 days	Sat 14/9/13	Sat 28/9/13
27	**Sediment testing and sampling plan**	162 days	Sun 29/9/13	Sun 9/3/14
28	Preparion and submission	7 days	Sun 29/9/13	Sat 5/10/13
29	Approval by Mott	15 days	Sun 6/10/13	Sun 20/10/13
30	Approval by EPD	140 days	Mon 21/10/13	Sun 9/3/14
31	**Sediment report**	37 days	Tue 10/6/14	Wed 16/7/14
32	Preparation of report	7 days	Tue 10/6/14	Mon 16/6/14
33	Approval by Mott	15 days	Tue 17/6/14	Tue 1/7/14
34	Approval by EPD	15 days	Wed 2/7/14	Wed 16/7/14
35	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	79 days	Mon 25/11/13	Tue 11/2/14
36	**Instrumentation**	79 days	Mon 25/11/13	Tue 11/2/14
37	Preparation and submission	60 days	Mon 25/11/13	Thu 23/1/14
38	Approval by Mott and IEC	5 days	Fri 24/1/14	Tue 28/1/14
39	Approval by EPD	14 days	Wed 29/1/14	Tue 11/2/14
40	**Survey**	171 days	Sat 7/9/13	Mon 24/2/14
41	**Surveyor**	35 days	Sat 7/9/13	Fri 11/10/13
42	Preparation and submission	15 days	Sat 7/9/13	Sat 21/9/13
43	Approval by Mott	20 days	Sun 22/9/13	Fri 11/10/13
44	**Geophysicist**	35 days	Sun 3/11/13	Sat 7/12/13
45	Prepararion and submission	7 days	Sun 3/11/13	Sat 9/11/13
46	Approval by Mott	7 days	Sun 10/11/13	Sat 16/11/13
47	Approval by Marine Department	21 days	Sun 17/11/13	Sat 7/12/13
48	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	67 days	Tue 26/11/13	Fri 31/1/14
49	**Settlement markers**	67 days	Tue 26/11/13	Fri 31/1/14
50	**Method Statement for Installation and Monitoring**	24 days	Tue 26/11/13	Thu 19/12/13
51	Preparation and submission	10 days	Tue 26/11/13	Thu 5/12/13
52	Approval by Mott	14 days	Fri 6/12/13	Thu 19/12/13
53	**Initial report**	12 days	Mon 20/1/14	Fri 31/1/14
54	Preparation and submission	5 days	Mon 20/1/14	Fri 24/1/14

China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 6)

Date: 4 July 2014

ID	Task Name	Duration	Start	Finish
55	Approval by Mott	7 days	Sat 25/1/14	Fri 31/1/14
56	**Hydrographic Survey (Portions A to E)**	**124 days**	**Thu 24/10/13**	**Mon 24/2/14**
57	**Method Statement**	**36 days**	**Thu 24/10/13**	**Thu 28/11/13**
58	Preparation and submission	15 days	Thu 24/10/13	Thu 7/11/13
59	Approval by Mott	21 days	Fri 8/11/13	Thu 28/11/13
60	**Initial survey**	**29 days**	**Mon 27/1/14**	**Mon 24/2/14**
61	**Report**	**29 days**	**Mon 27/1/14**	**Mon 24/2/14**
62	Preparation and submission	7 days	Mon 27/1/14	Sun 2/2/14
63	Approval by Mott	7 days	Mon 3/2/14	Sun 9/2/14
64	Approval by Marine Department	15 days	Mon 10/2/14	Mon 24/2/14
65	**Temporary Marine Traffic Management (Portions A to E)**	**78 days**	**Fri 30/8/13**	**Fri 15/11/13**
66	**Consultant, Risk Manager and Marine Traffic Engineer**	**28 days**	**Fri 30/8/13**	**Thu 26/9/13**
67	Preparation and submission	14 days	Fri 30/8/13	Thu 12/9/13
68	Approval by Mott	14 days	Fri 13/9/13	Thu 26/9/13
69	**Webbase software and Trial Run**	**50 days**	**Fri 27/9/13**	**Fri 15/11/13**
70	Preparation and submission of methodology	7 days	Fri 27/9/13	Thu 3/10/13
71	Comment recevied by Mott	0 days	Thu 3/10/13	Thu 3/10/13
72	Rectification	5 days	Fri 4/10/13	Tue 8/10/13
73	Final submission	0 days	Sat 9/11/13	Sat 9/11/13
74	Approval by Mott	7 days	Sat 9/11/13	Fri 15/11/13
75	**Dredging Works (Portions A to E)**	**332 days**	**Thu 28/11/13**	**Sat 25/10/14**
76	**Silt screen (Location see Drg No. EM/401)**	**108 days**	**Fri 6/12/13**	**Sun 23/3/14**
77	**Method statement**	**108 days**	**Fri 6/12/13**	**Sun 23/3/14**
78	Preparation and submission	80 days	Fri 6/12/13	Sun 23/2/14
79	Approval by Mott	14 days	Mon 24/2/14	Sun 9/3/14
80	Approval by IEC	14 days	Mon 24/2/14	Sun 9/3/14
81	Approval by WSD	14 days	Mon 10/3/14	Sun 23/3/14
82	Approval by EMSD	14 days	Mon 10/3/14	Sun 23/3/14
83	Approval by EPD	14 days	Mon 10/3/14	Sun 23/3/14
84	**Dredging method statement and silt curtain deployment plan**	**118 days**	**Thu 28/11/13**	**Tue 25/3/14**
85	Preparation and submission	50 days	Thu 28/11/13	Thu 16/1/14
86	Approval by Mott	40 days	Fri 17/1/14	Tue 25/2/14
87	Approval by IEC	14 days	Wed 26/2/14	Tue 11/3/14
88	Approval by EPD	14 days	Wed 12/3/14	Tue 25/3/14
89	**Dredging Works at Portions A and B**	**307 days**	**Mon 23/12/13**	**Sat 25/10/14**
90	**General seabed (Hot Spot and hard materials)**	**210 days**	**Mon 23/12/13**	**Sun 20/7/14**
91	**Marine Notice approval by Marine Departemnt**	**170 days**	**Sat 1/2/14**	**Sun 20/7/14**
92	Preparation and submission	90 days	Sat 1/2/14	Thu 1/5/14
93	Approval by MD	80 days	Fri 2/5/14	Sun 20/7/14
94	**Noise Permit**	**95 days**	**Mon 23/12/13**	**Thu 27/3/14**
95	Preparation and submission	75 days	Mon 23/12/13	Fri 7/3/14
96	Approval by EPD	20 days	Sat 8/3/14	Thu 27/3/14
97	**Dumping Permit**	**100 days**	**Mon 17/2/14**	**Tue 27/5/14**
98	Preparation and submission	70 days	Mon 17/2/14	Sun 27/4/14
99	Approval by EPD	30 days	Mon 28/4/14	Tue 27/5/14
100	**Type 3 Cat Hf Sediment (Portion A)**	**135 days**	**Fri 31/1/14**	**Sat 14/6/14**
101	**Method statement for disposal**	**135 days**	**Fri 31/1/14**	**Sat 14/6/14**
102	Preparation and submission	60 days	Fri 31/1/14	Mon 31/3/14
103	Approval by Mott and IEC	30 days	Tue 1/4/14	Wed 30/4/14
104	Approval by EPD	45 days	Thu 1/5/14	Sat 14/6/14
105	**Hot Spot (Portion A)**	**299 days**	**Tue 31/12/13**	**Sat 25/10/14**
106	**Proposal for field trial at Zone Z2C**	**180 days**	**Tue 31/12/13**	**Sat 28/6/14**
107	Preparation and submission	150 days	Tue 31/12/13	Thu 29/5/14
108	Approval by Mott	30 days	Fri 30/5/14	Sat 28/6/14
109	**Method statement for dredging works at Zone Z2B**	**51 days**	**Fri 5/9/14**	**Sat 25/10/14**
110	Preparation and submission	14 days	Fri 5/9/14	Thu 18/9/14
111	Approval by Mott	7 days	Fri 19/9/14	Thu 25/9/14
112	Approval by EPD	30 days	Fri 26/9/14	Sat 25/10/14
113	**Dredging Works at Portions C, D and E**	**116 days**	**Mon 2/12/13**	**Thu 27/3/14**

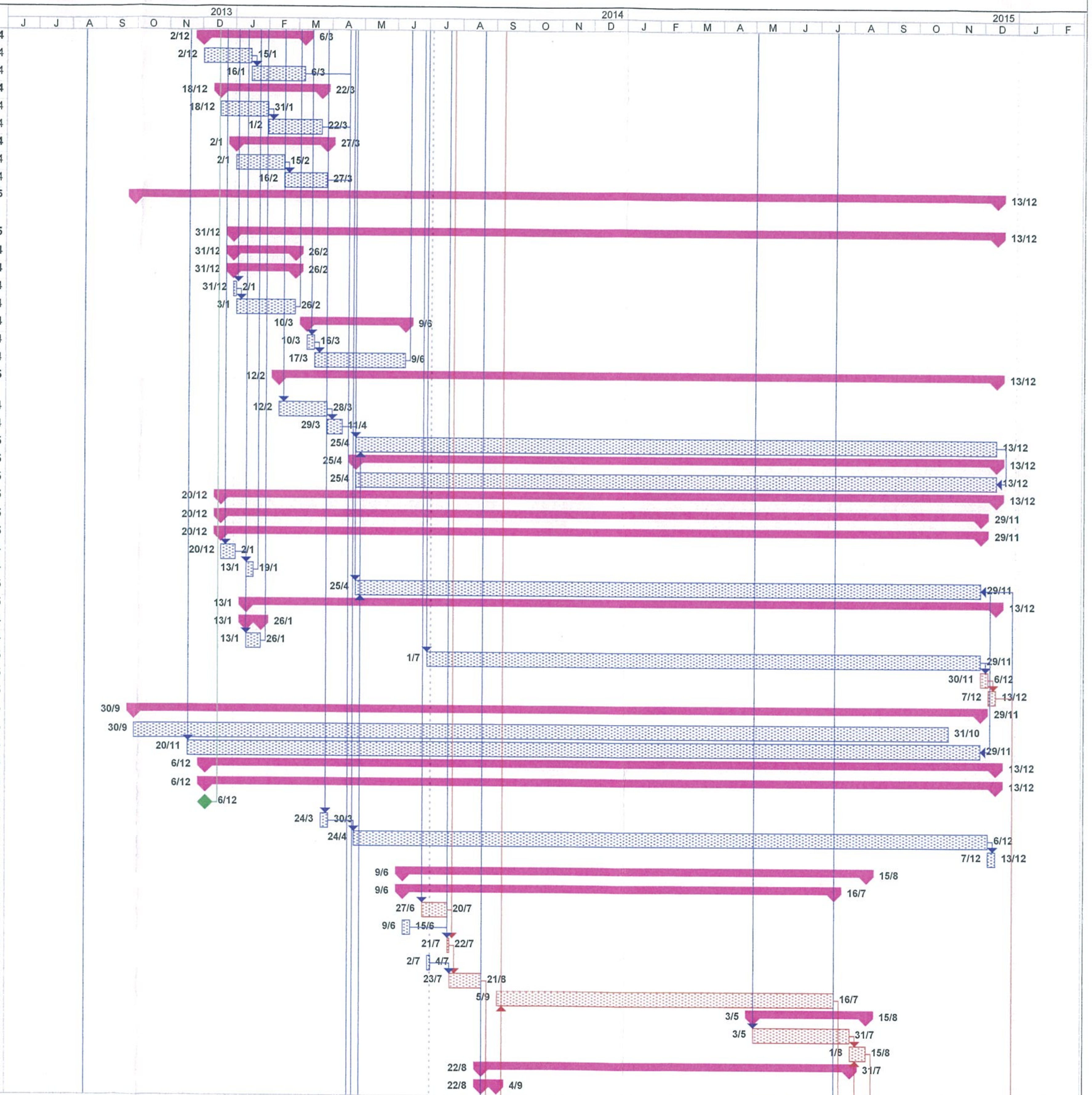
China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 6)

Date: 4 July 2014

ID	Task Name	Duration	Start	Finish
114	**Marine Notice approval by Marine Departemnt**	**95 days**	**Mon 2/12/13**	**Thu 6/3/14**
115	Preparation and submission	45 days	Mon 2/12/13	Wed 15/1/14
116	Approval by MD	50 days	Thu 16/1/14	Thu 6/3/14
117	**Noise Permit**	**95 days**	**Wed 18/12/13**	**Sat 22/3/14**
118	Preparation and submission	45 days	Wed 18/12/13	Fri 31/1/14
119	Approval by EPD	50 days	Sat 1/2/14	Sat 22/3/14
120	**Dumping Permit**	**85 days**	**Thu 2/1/14**	**Thu 27/3/14**
121	Preparation and submission	45 days	Thu 2/1/14	Sat 15/2/14
122	Approval by EPD	40 days	Sun 16/2/14	Thu 27/3/14
123	**Works**	**805 days**	**Mon 30/9/13**	**Sun 13/12/15**
124	**Environmental Management**	**713 days**	**Tue 31/12/13**	**Sun 13/12/15**
125	**Baseline monitoring**	**58 days**	**Tue 31/12/13**	**Wed 26/2/14**
126	**Monitoring (Location see Drg No. EM/401)**	**58 days**	**Tue 31/12/13**	**Wed 26/2/14**
127	Mobilization	3 days	Tue 31/12/13	Thu 2/1/14
128	Field works and Lab Test	55 days	Fri 3/1/14	Wed 26/2/14
129	**Grab sample (Portions A, B & C)**	**92 days**	**Mon 10/3/14**	**Mon 9/6/14**
130	Grab sample specialist mobilization	7 days	Mon 10/3/14	Sun 16/3/14
131	Grab sample (field works) and Lab Test	85 days	Mon 17/3/14	Mon 9/6/14
132	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**670 days**	**Wed 12/2/14**	**Sun 13/12/15**
133	Procurement and delivery	45 days	Wed 12/2/14	Fri 28/3/14
134	Installation	14 days	Sat 29/3/14	Fri 11/4/14
135	Monitoring	598 days	Fri 25/4/14	Sun 13/12/15
136	**Impact monitoring (Location see Drg No. EM/401)**	**598 days**	**Fri 25/4/14**	**Sun 13/12/15**
137	Impact monitoring and report submission	598 days	Fri 25/4/14	Sun 13/12/15
138	**Survey**	**724 days**	**Fri 20/12/13**	**Sun 13/12/15**
139	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**710 days**	**Fri 20/12/13**	**Sun 29/11/15**
140	**Settlement markers**	**710 days**	**Fri 20/12/13**	**Sun 29/11/15**
141	Installation	14 days	Fri 20/12/13	Thu 2/1/14
142	Initial survey	7 days	Mon 13/1/14	Sun 19/1/14
143	Interim monitoring	584 days	Fri 25/4/14	Sun 29/11/15
144	**Hydrographic Survey (Portions A to E)**	**700 days**	**Mon 13/1/14**	**Sun 13/12/15**
145	**Initial survey**	**14 days**	**Mon 13/1/14**	**Sun 26/1/14**
146	Field works	14 days	Mon 13/1/14	Sun 26/1/14
147	Interim survey	517 days	Tue 1/7/14	Sun 29/11/15
148	Final survey	7 days	Mon 30/11/15	Sun 6/12/15
149	Final survey report	7 days	Mon 7/12/15	Sun 13/12/15
150	**Temporary Marine Traffic Management (Portions A to E)**	**791 days**	**Mon 30/9/13**	**Sun 29/11/15**
151	Organizing meeting for information collection	762 days	Mon 30/9/13	Sat 31/10/15
152	Temporary marine traffic management and TMTM meeting	740 days	Wed 20/11/13	Sun 29/11/15
153	**Dredging Works (Portions A to E)**	**738 days**	**Fri 6/12/13**	**Sun 13/12/15**
154	**Silt screen (Location see Drg No. EM/401)**	**738 days**	**Fri 6/12/13**	**Sun 13/12/15**
155	Receiving of as-built record of water intake from WSD/EMSD	0 days	Fri 6/12/13	Fri 6/12/13
156	Installation of silt screen	7 days	Mon 24/3/14	Sun 30/3/14
157	Maintenance of silt screen	592 days	Thu 24/4/14	Sun 6/12/15
158	Removal of silt screen	7 days	Mon 7/12/15	Sun 13/12/15
159	**Dredging Works at Portions A and B**	**433 days**	**Mon 9/6/14**	**Sat 15/8/15**
160	**General seabed (Hot Spot and hard materials)**	**403 days**	**Mon 9/6/14**	**Thu 16/7/15**
161	Mobilization	24 days	Fri 27/6/14	Sun 20/7/14
162	Fabrication of silt curtain	7 days	Mon 9/6/14	Sun 15/6/14
163	Pilot test for silt curtain	2 days	Mon 21/7/14	Tue 22/7/14
164	Monitoring brief for unidentified sonar contacts & masked areas	3 days	Wed 2/7/14	Fri 4/7/14
165	Dredging works 1 (subject to availability of working windows)	30 days	Wed 23/7/14	Thu 21/8/14
166	Dredging works 2 (subject to availability of working windows)	315 days	Fri 5/9/14	Thu 16/7/15
167	**Type 3 Cat Hf Sediment (Portion A)**	**105 days**	**Sun 3/5/15**	**Sat 15/8/15**
168	Procurement and delivery of Geo-container	90 days	Sun 3/5/15	Fri 31/7/15
169	Dredging works	15 days	Sat 1/8/15	Sat 15/8/15
170	**Hot Spot (Portion A)**	**344 days**	**Fri 22/8/14**	**Fri 31/7/15**
171	**Proposal for field trial at Zone Z2C**	**14 days**	**Fri 22/8/14**	**Thu 4/9/14**



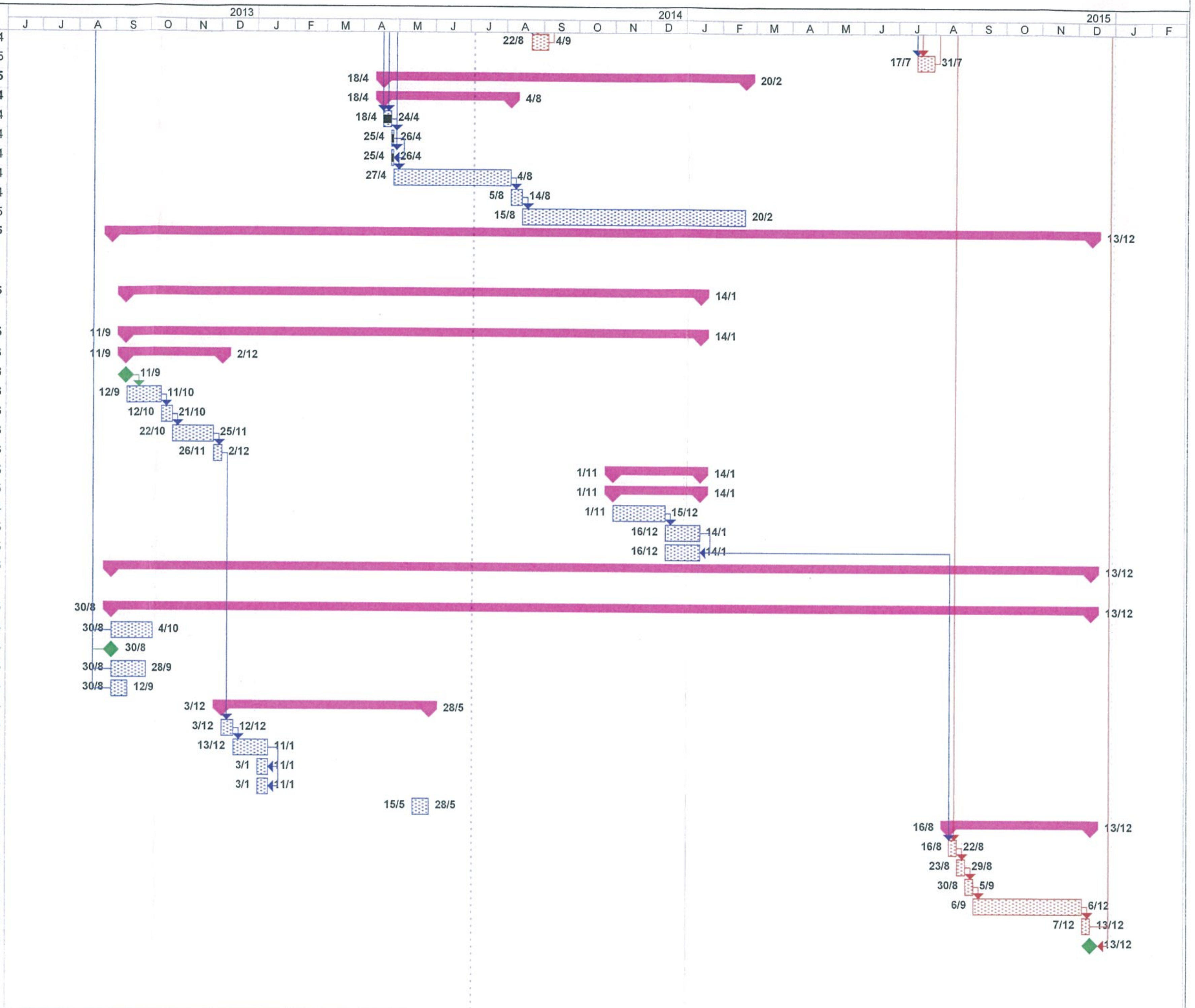
China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 6)

Date: 4 July 2014

ID	Task Name	Duration	Start	Finish
172	Field trial at Zone Z2C	14 days	Fri 22/8/14	Thu 4/9/14
173	Dredging works	15 days	Fri 17/7/15	Fri 31/7/15
174	**Dredging Works for Portions C, D and E**	**309 days**	**Fri 18/4/14**	**Fri 20/2/15**
175	**Dredging Works for Portion D**	**109 days**	**Fri 18/4/14**	**Mon 4/8/14**
176	Mobililzation	7 days	Fri 18/4/14	Thu 24/4/14
177	Pilot test of silt curtain	2 days	Fri 25/4/14	Sat 26/4/14
178	Trial dredging	2 days	Fri 25/4/14	Sat 26/4/14
179	Dredging works	100 days	Sun 27/4/14	Mon 4/8/14
180	Dredging Works for Portion E	10 days	Tue 5/8/14	Thu 14/8/14
181	Dredging Works for Portion C	190 days	Fri 15/8/14	Fri 20/2/15
182	**Section 2**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
183	**Submission**	**491 days**	**Wed 11/9/13**	**Wed 14/1/15**
184	**Preliminaries (Portion F)**	**491 days**	**Wed 11/9/13**	**Wed 14/1/15**
185	**Engineer Principal Accommodation**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**
186	Preparation and submisssion of location and layout	0 days	Wed 11/9/13	Wed 11/9/13
187	Approval of location and layout	30 days	Thu 12/9/13	Fri 11/10/13
188	Preparation of calculation	10 days	Sat 12/10/13	Mon 21/10/13
189	Comment and resubmission of calculation	35 days	Tue 22/10/13	Mon 25/11/13
190	Approval of calculation	7 days	Tue 26/11/13	Mon 2/12/13
191	**Outfall Modification Works (Location see Drg No. S202)**	**75 days**	**Sat 1/11/14**	**Wed 14/1/15**
192	**Method statement**	**75 days**	**Sat 1/11/14**	**Wed 14/1/15**
193	Preparation and submission	45 days	Sat 1/11/14	Mon 15/12/14
194	Approval by Mott	30 days	Tue 16/12/14	Wed 14/1/15
195	Approval by DSD	30 days	Tue 16/12/14	Wed 14/1/15
196	**Works**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
197	**Preliminaries (Portion F)**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
198	Contractor's mobilization	36 days	Fri 30/8/13	Fri 4/10/13
199	Security Guard	0 days	Fri 30/8/13	Fri 30/8/13
200	Temporary electricity power supply	30 days	Fri 30/8/13	Sat 28/9/13
201	Engineer's Initial Temporary Accommodation	14 days	Fri 30/8/13	Thu 12/9/13
202	**Engineer Principal Accommodation**	**177 days**	**Tue 3/12/13**	**Wed 28/5/14**
203	Material ordering and delivery	10 days	Tue 3/12/13	Thu 12/12/13
204	Construction	30 days	Fri 13/12/13	Sat 11/1/14
205	Computer installation	9 days	Fri 3/1/14	Sat 11/1/14
206	Furniture and office equipment	9 days	Fri 3/1/14	Sat 11/1/14
207	Car Park	14 days	Thu 15/5/14	Wed 28/5/14
208	**Outfall Modification Works (Location see Drg No. S202)**	**120 days**	**Sun 16/8/15**	**Sun 13/12/15**
209	Dye test	7 days	Sun 16/8/15	Sat 22/8/15
210	Video filming	7 days	Sun 23/8/15	Sat 29/8/15
211	Dredging works	7 days	Sun 30/8/15	Sat 5/9/15
212	Modification works	92 days	Sun 6/9/15	Sun 6/12/15
213	As-built video submission	7 days	Mon 7/12/15	Sun 13/12/15
214	**Contract Completion Date**	**0 days**	**Sun 13/12/15**	**Sun 13/12/15**



China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

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Appendix C

Action and Limit Levels

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Action and Limit Levels for Routine Water Quality Montioring

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth Averaged		Suspended Solids (mg/L) Depth-averaged		BOD_5(mg/L) Depth-averaged		*E.coli* (CFU /100mL) Depth-averaged		NH_3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth-averaged		Wet Season TIN (mg/L) Depth Averaged		Dry Season 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	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	NA	NA
Fish Culture Zone																						
SR5	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.45	0.50	0.36	0.39
SR9 SR10 SR11	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^											0.37	0.49	0.22	0.29
Gazetted Beach																						
SR2 SR3	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA	NA	NA
Corals																						
SR6 SR7 SR8	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	NA	NA
EMSD Cooling Water Intake																						
SR13	5.31	5.22#	5.29	5.12+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Action and Limit Levels for 24-hr Water Quality Monitoring

<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>
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MATERIALAB CONSULTANTS LIMITED
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5 Lok Yi Street, Tel : (852)-24508238
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Tai Lam, Tuen Mun, N.T., Hong Kong. Email : mcl@fugro.com.hk

Appendix D

Graphical Presentation – Routine Impact Monitoring Results

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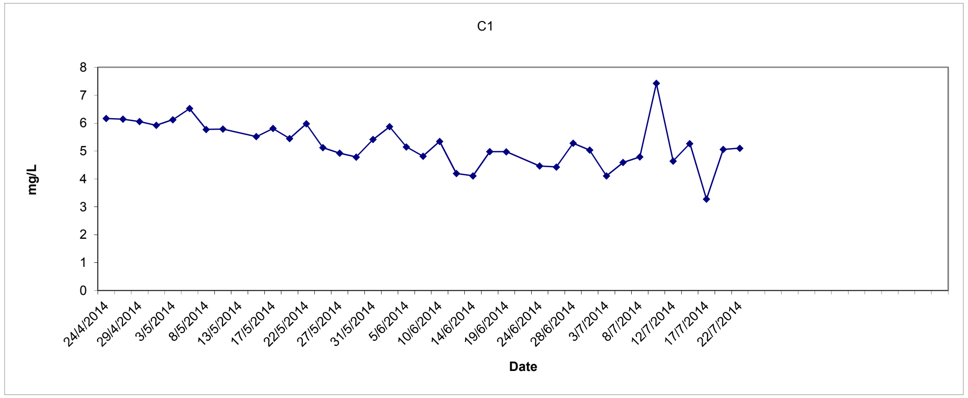
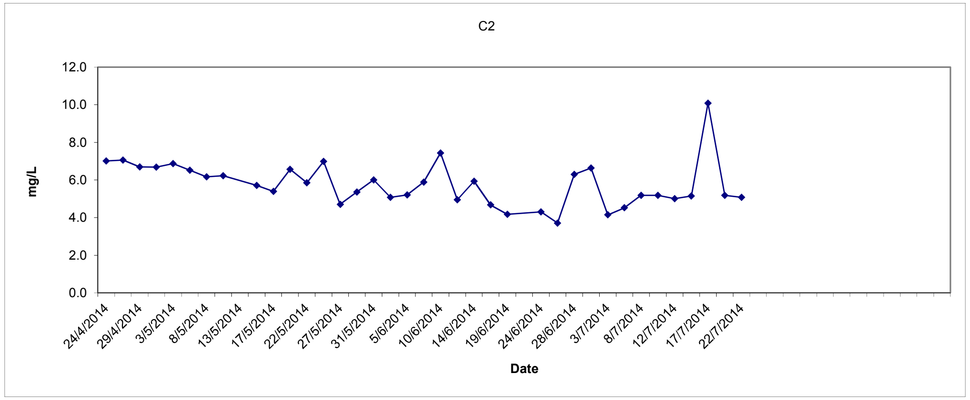
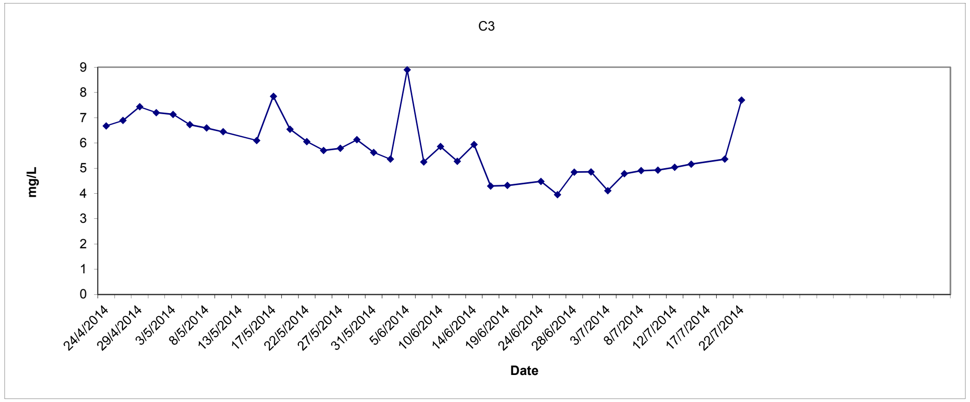
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide







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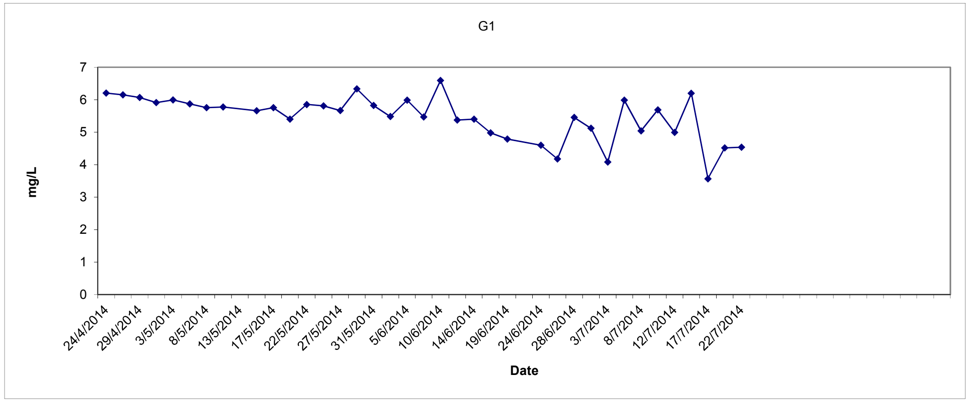

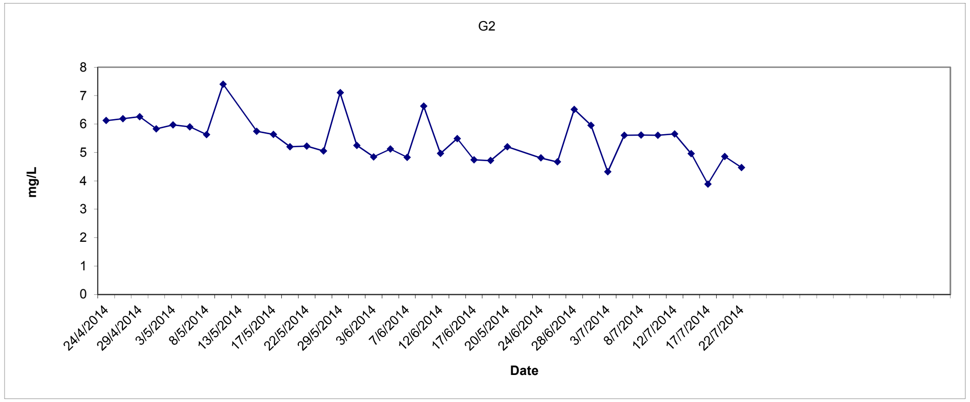

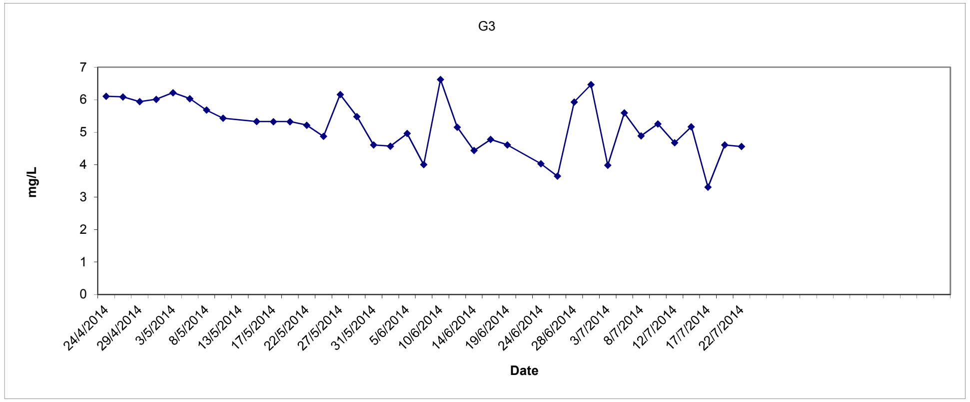

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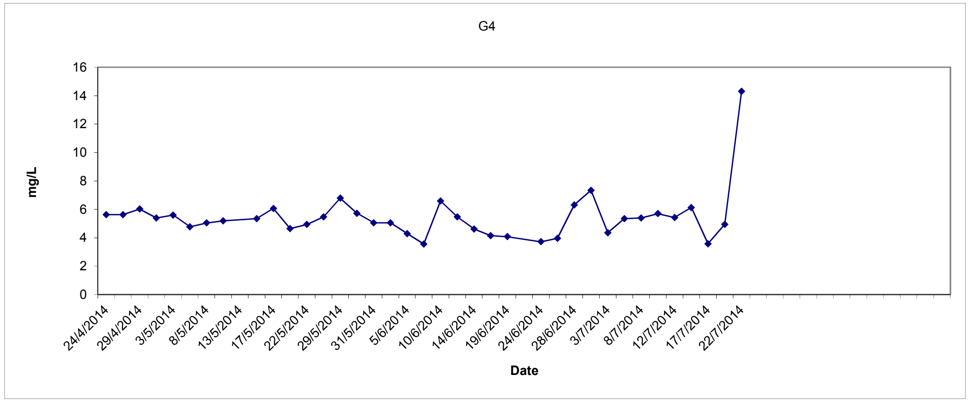

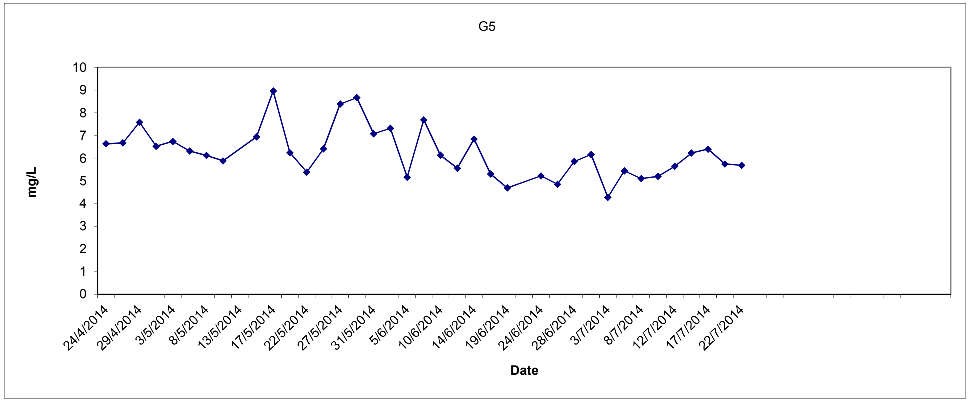

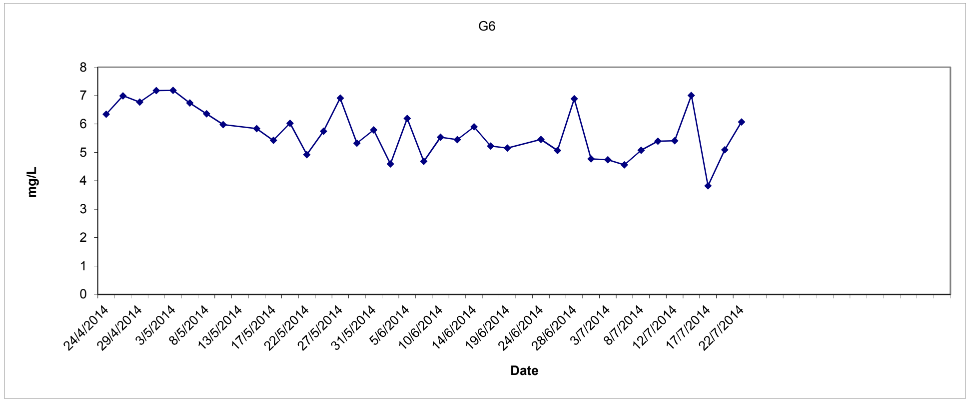

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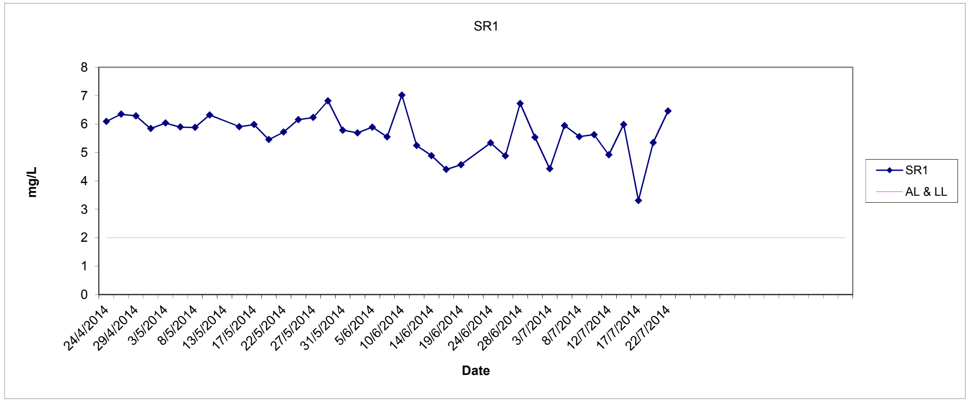

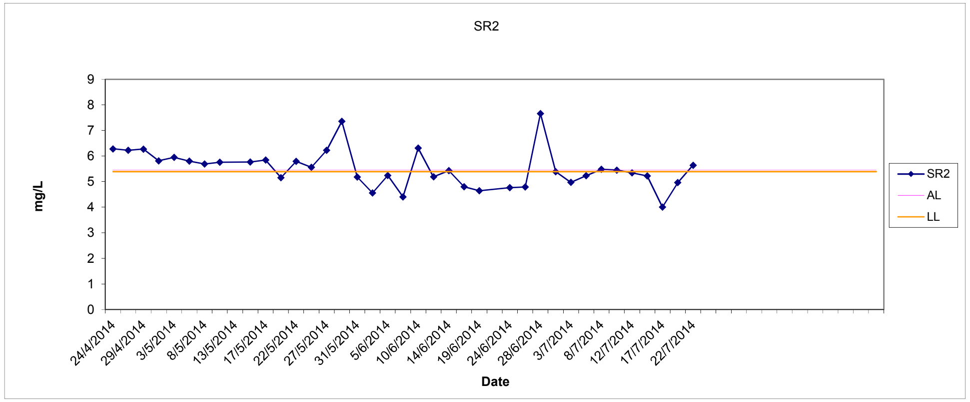

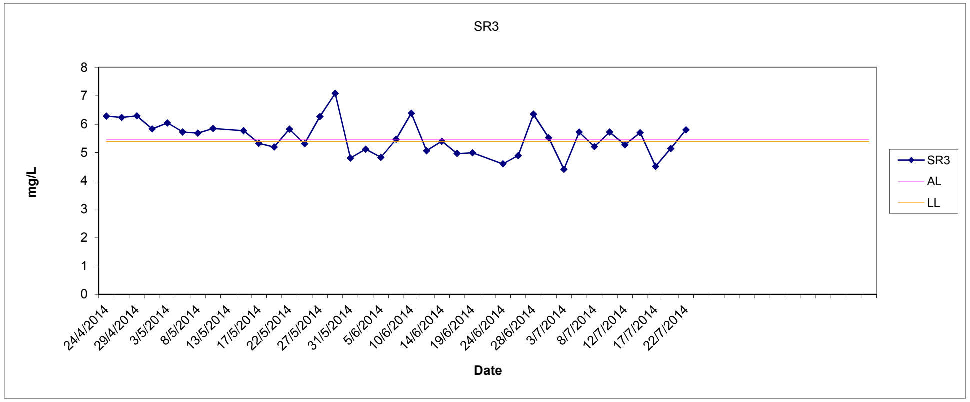

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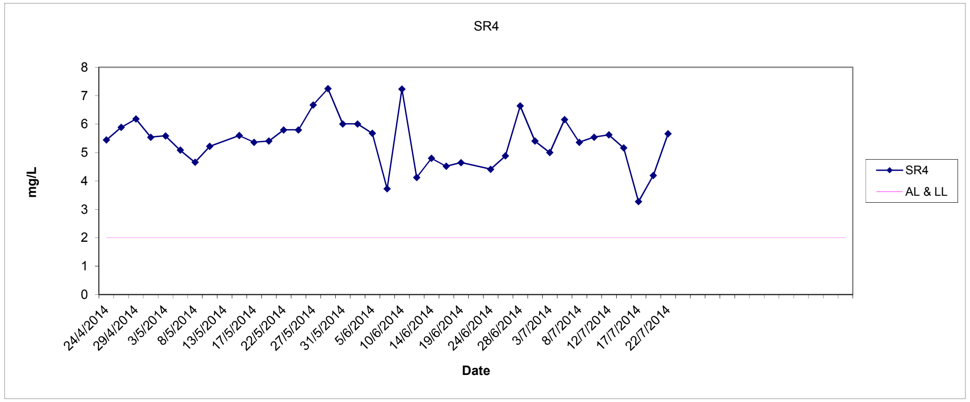

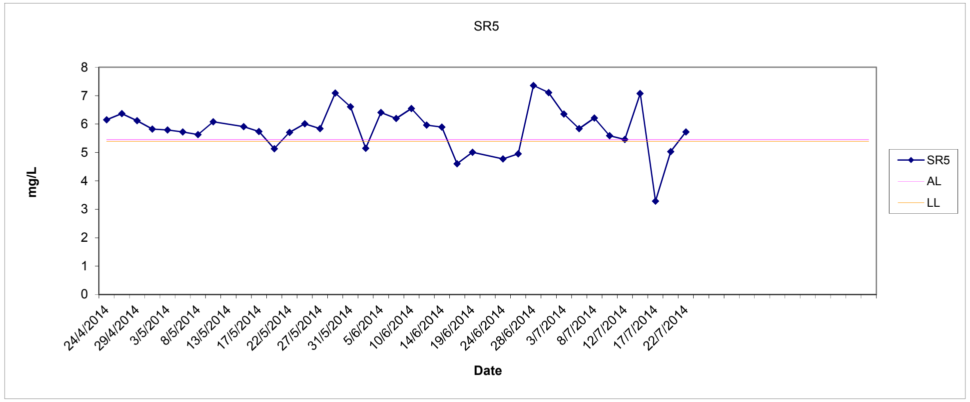

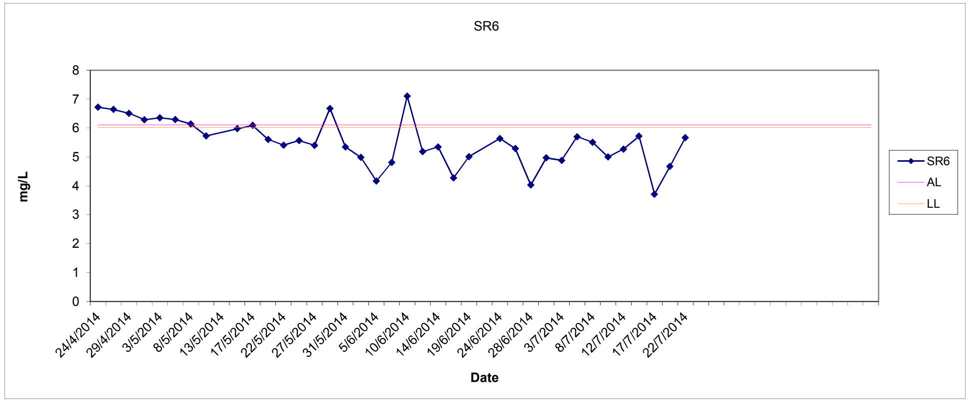

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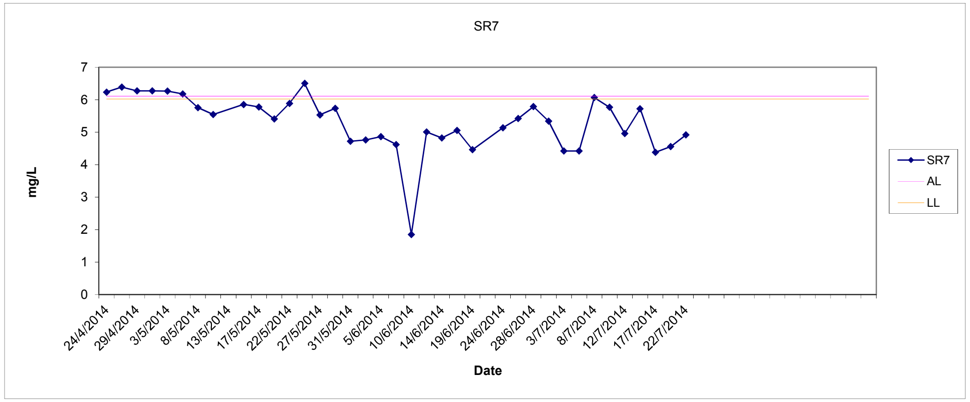

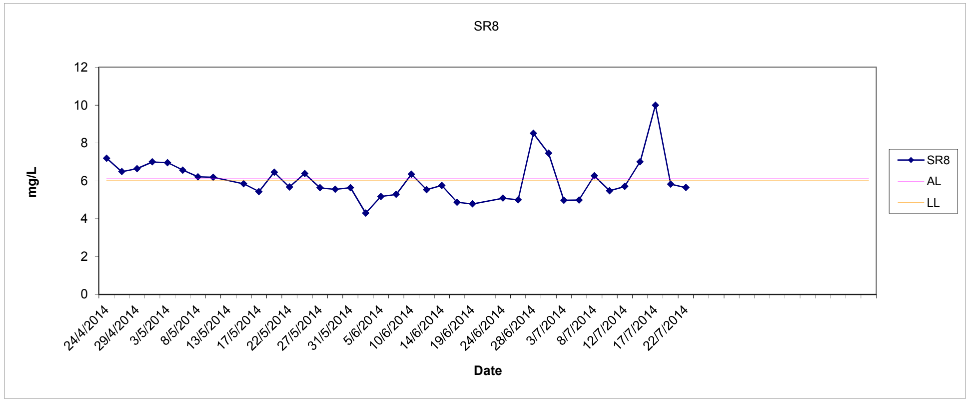

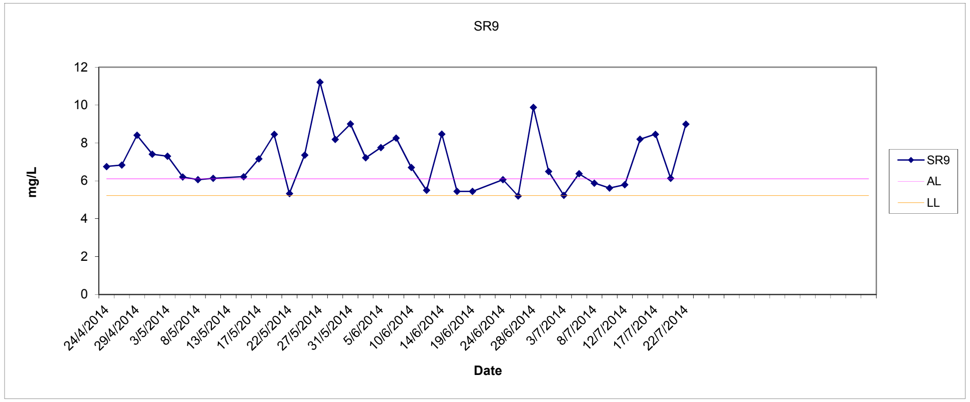

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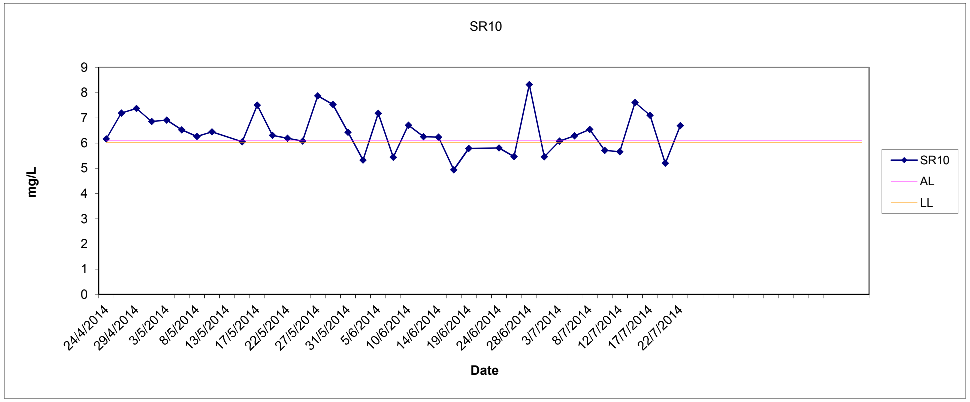

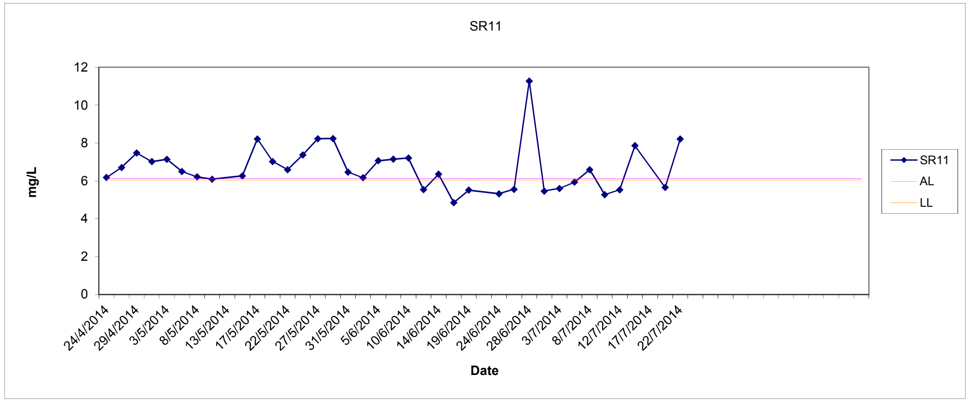

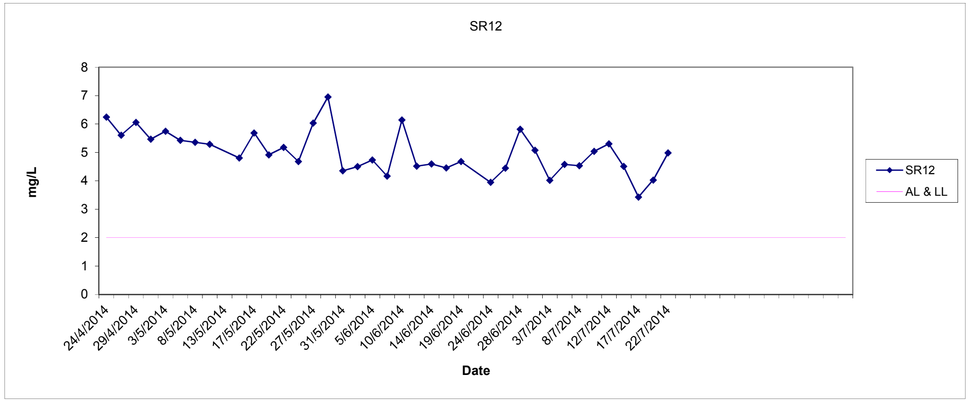

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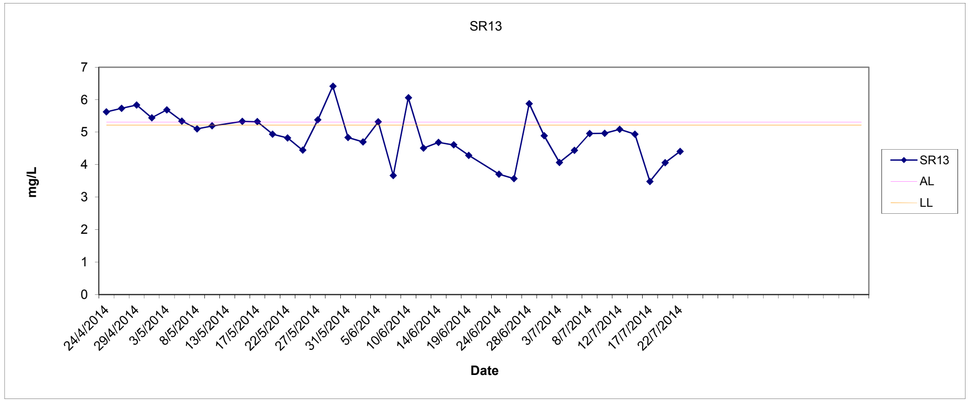
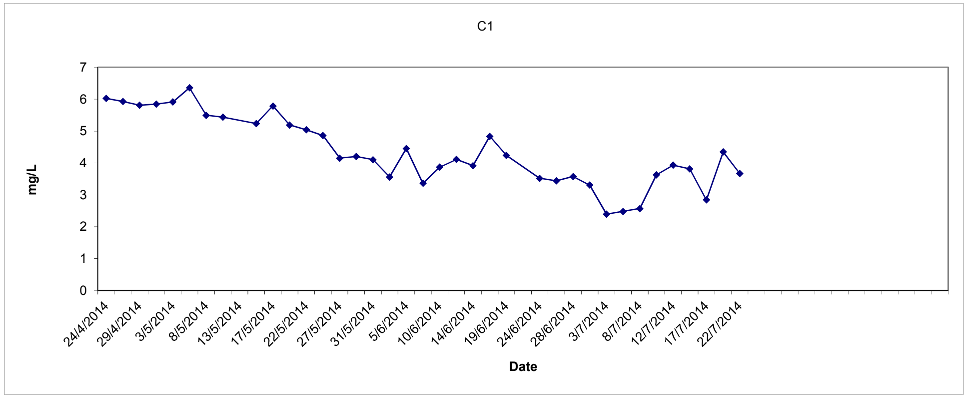
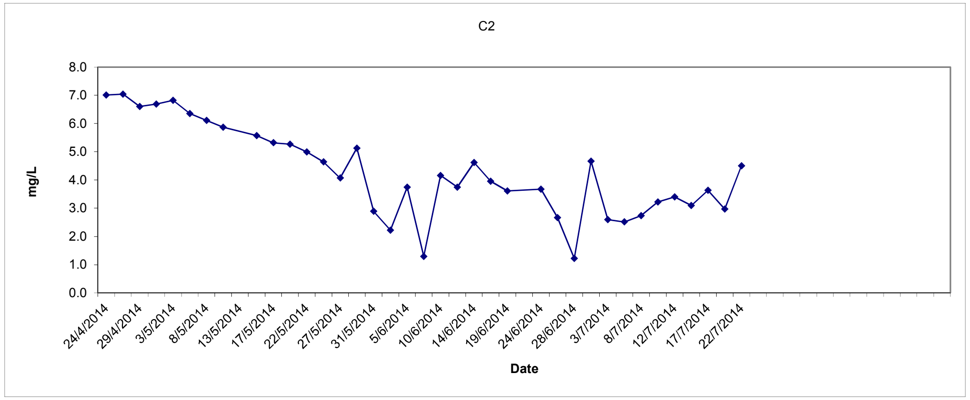
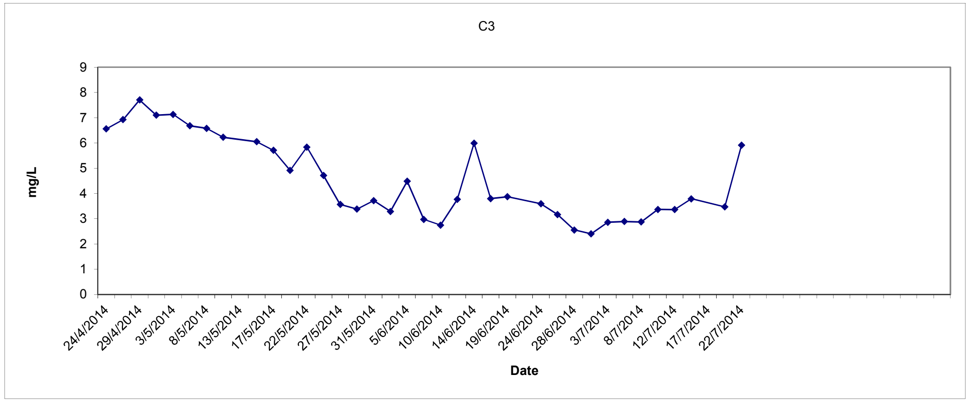


Dissolved Oxygen (Bottom) at Mid-Flood Tide







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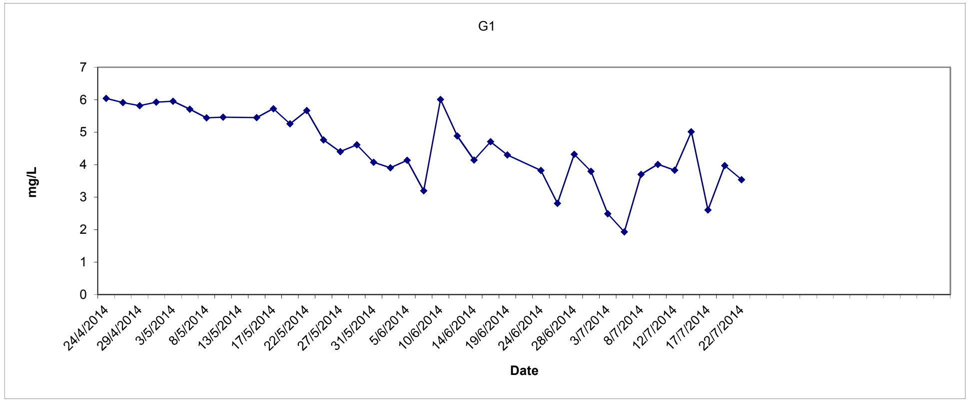

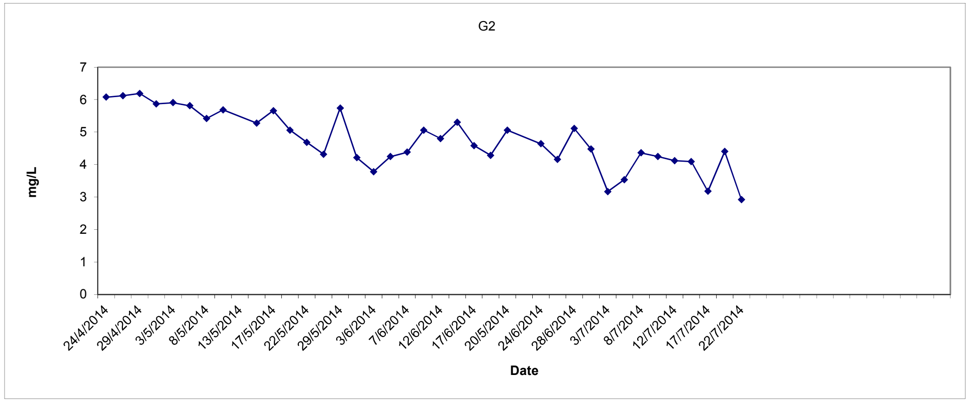

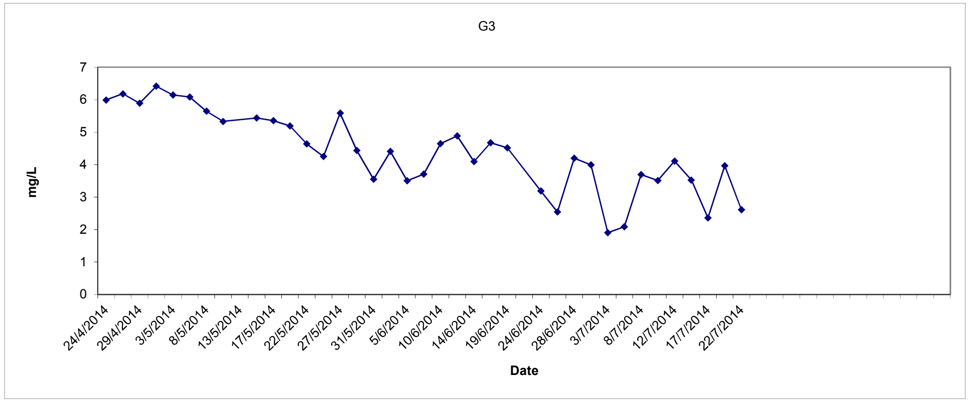

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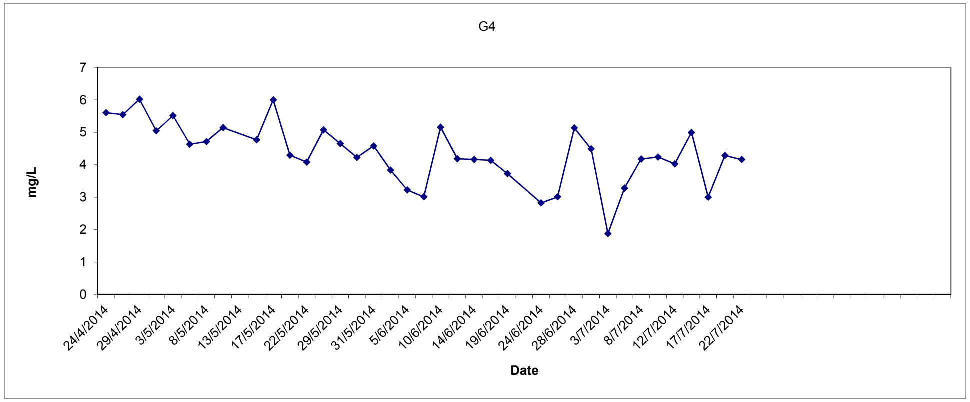

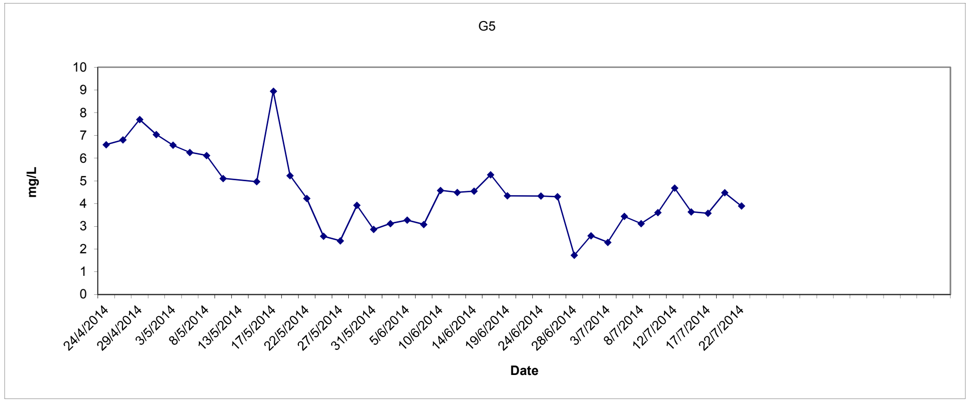

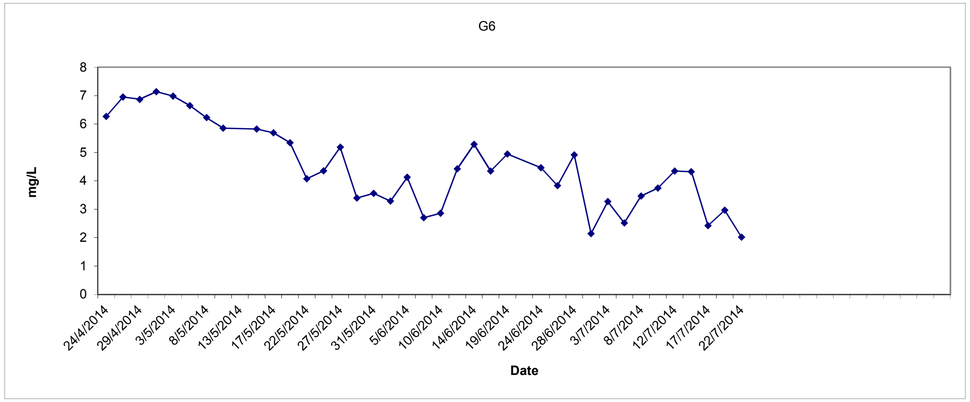

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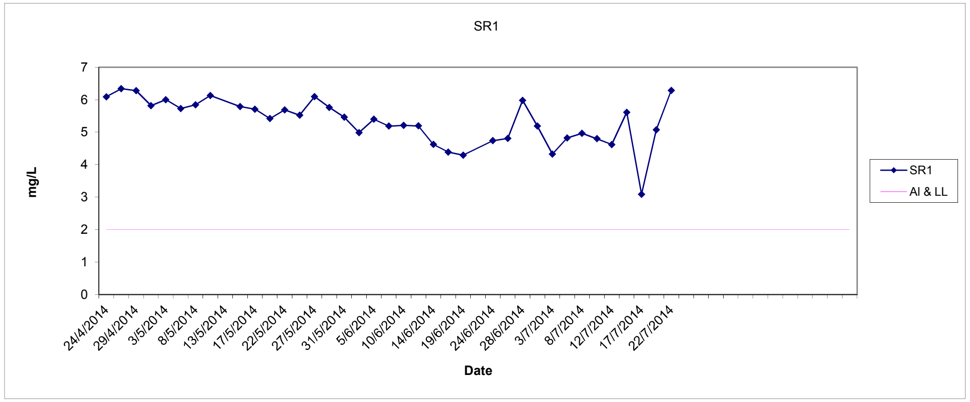
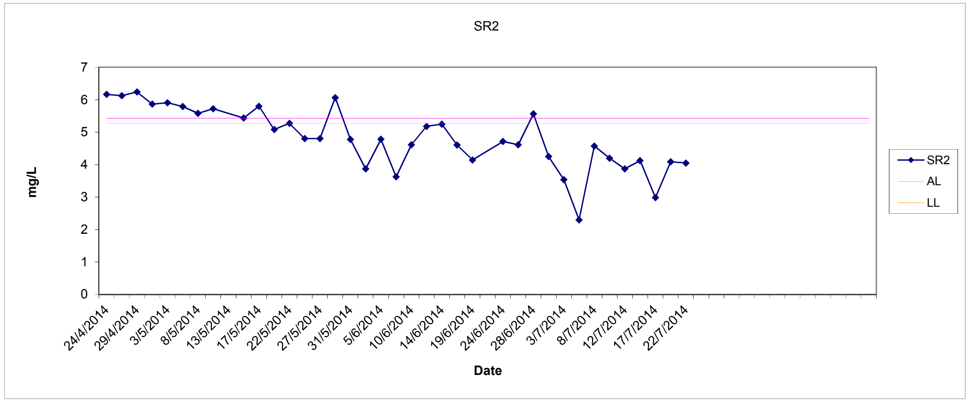
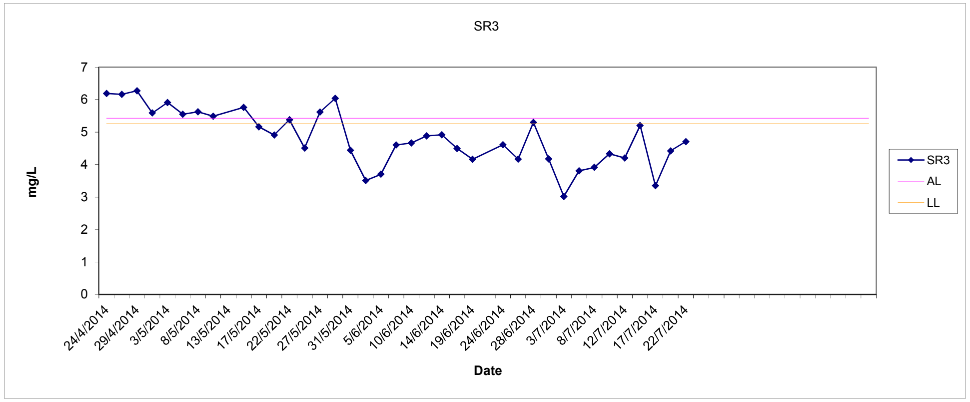
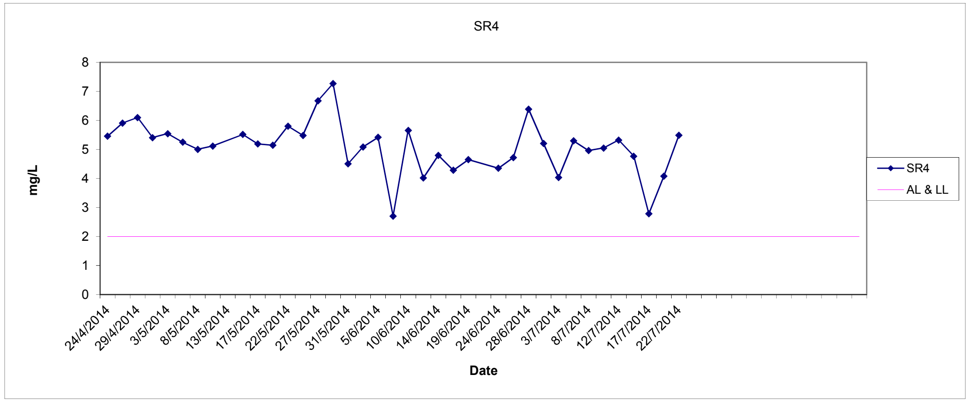
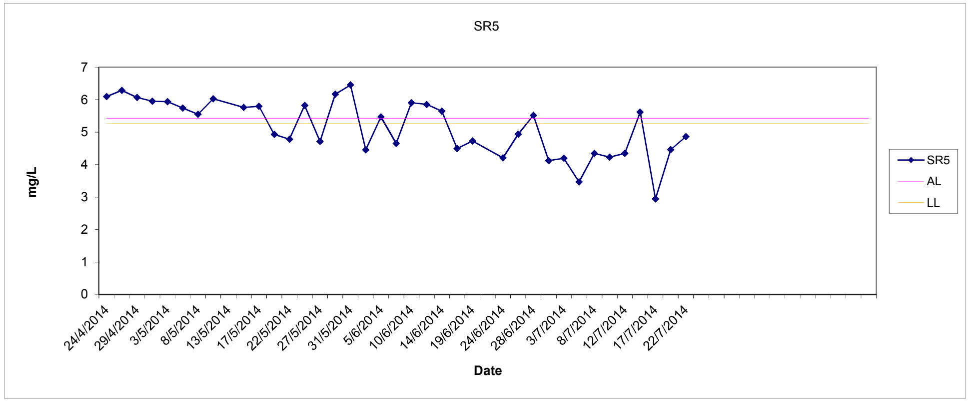


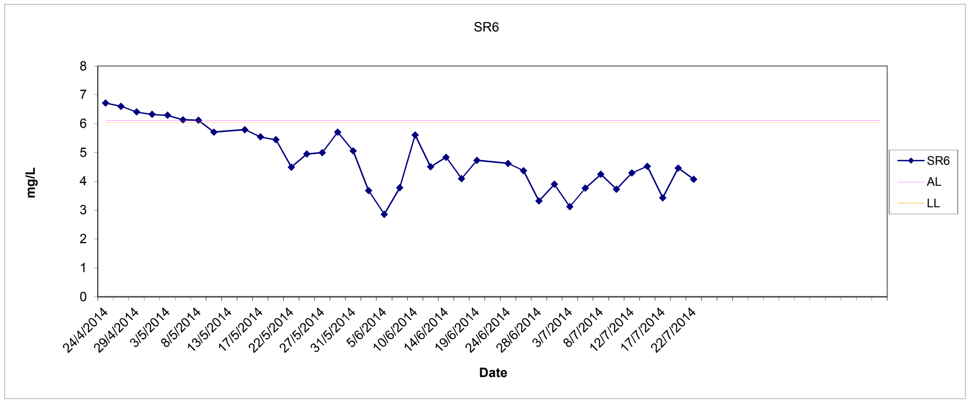




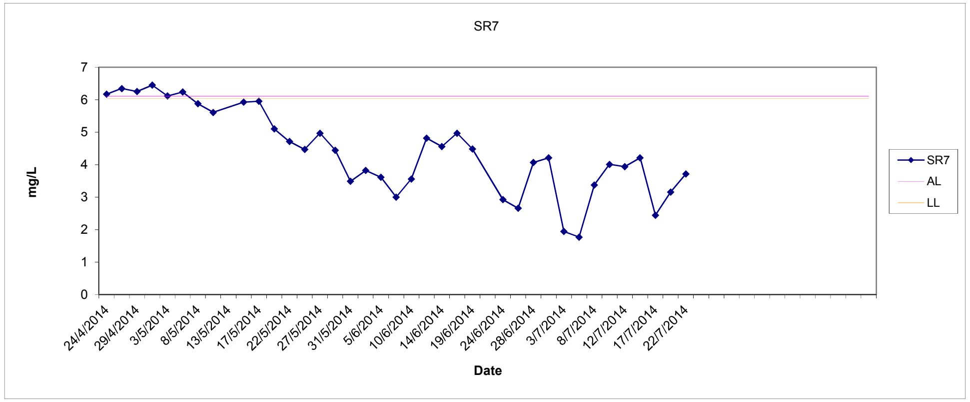
Dissolved Oxygen (Bottom) at Mid-Flood Tide

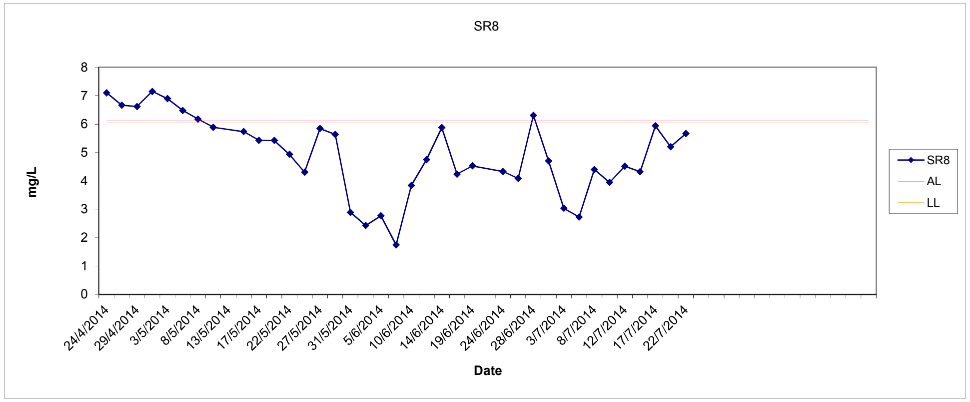


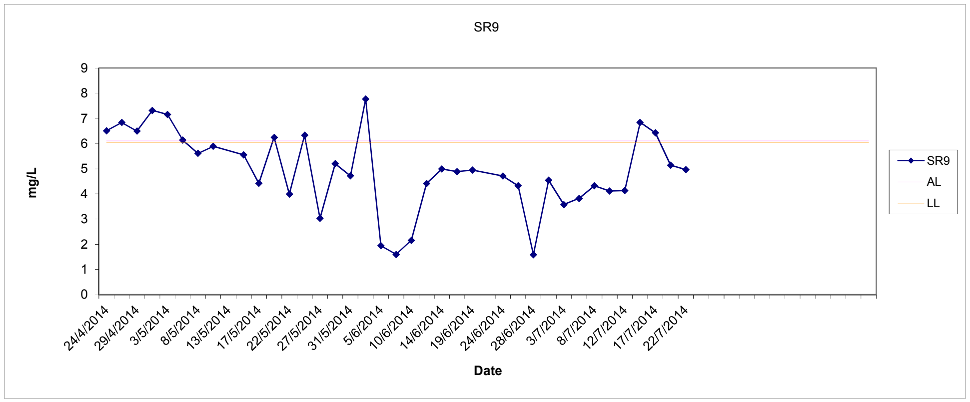




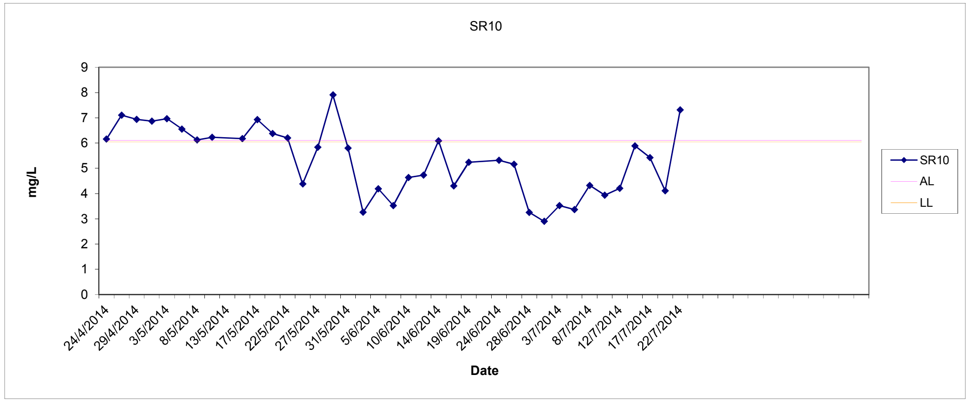
Dissolved Oxygen (Bottom) at Mid-Flood Tide

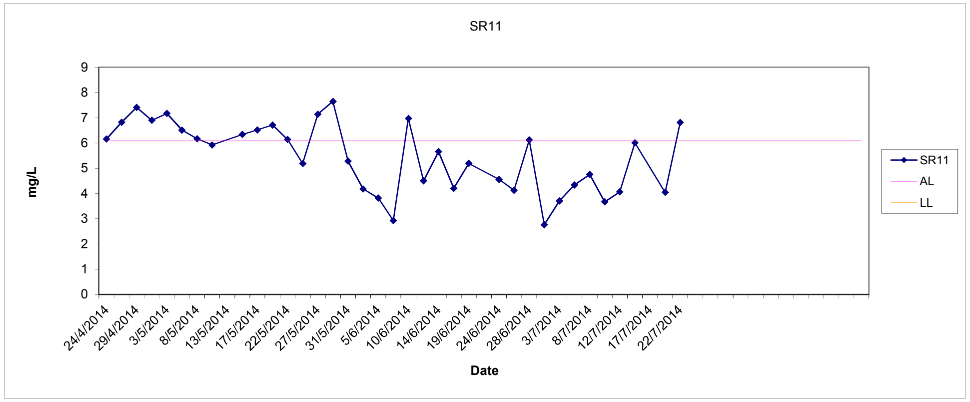


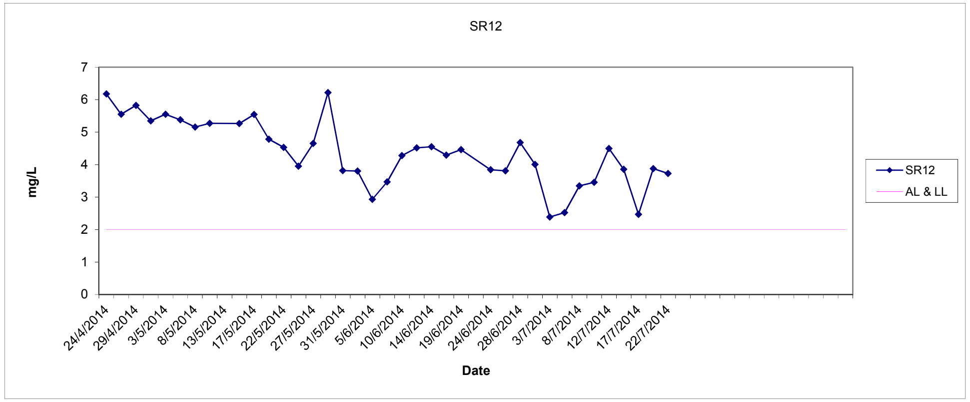




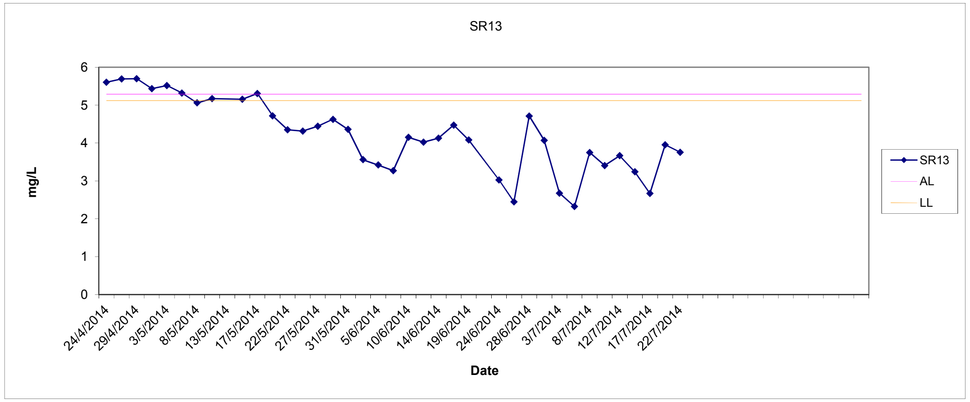
Dissolved Oxygen (Bottom) at Mid-Flood Tide



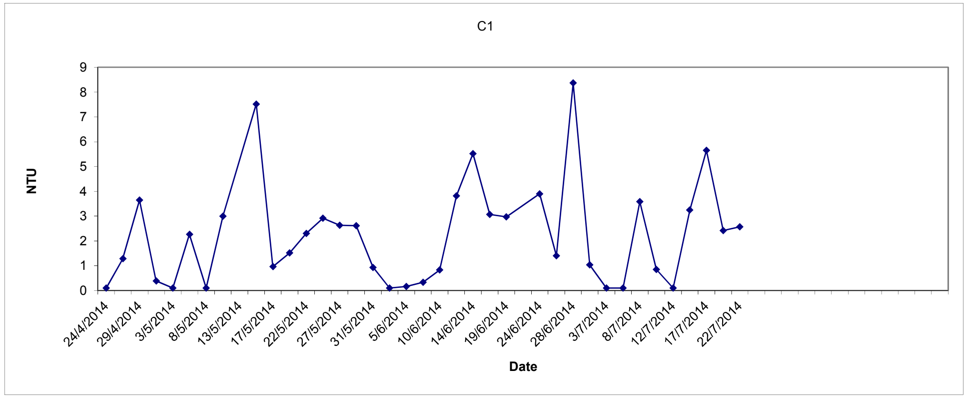


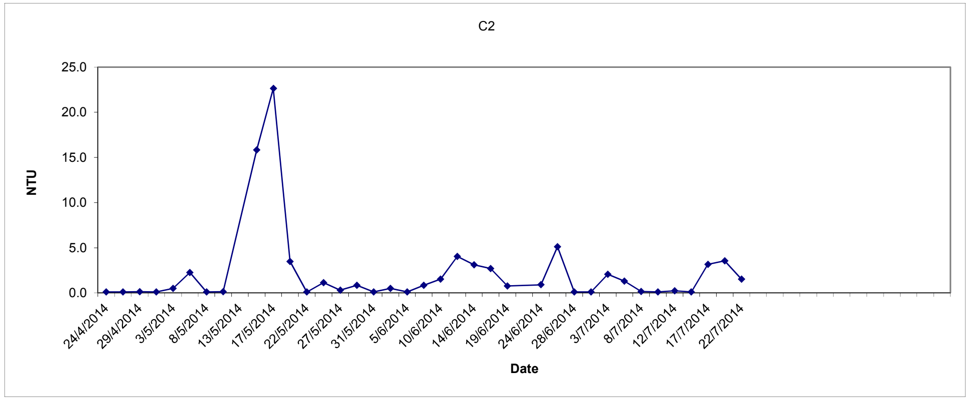


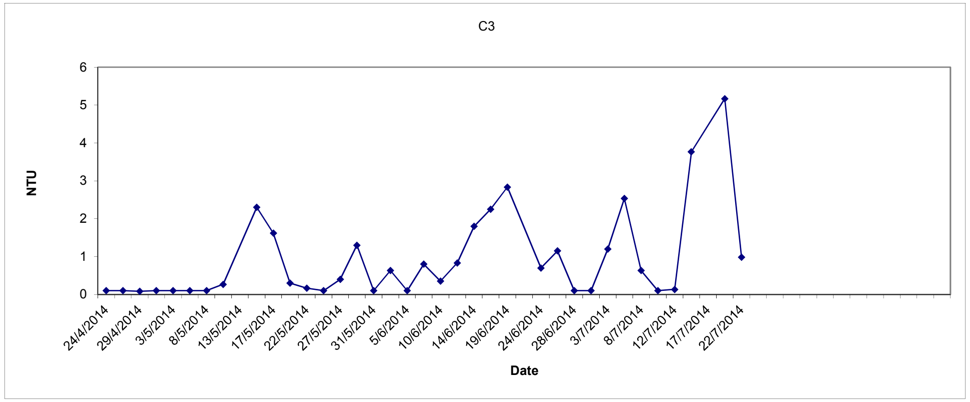
Dissolved Oxygen (Bottom) at Mid-Flood Tide



Turbidity (Depth average) at Mid-Flood Tide







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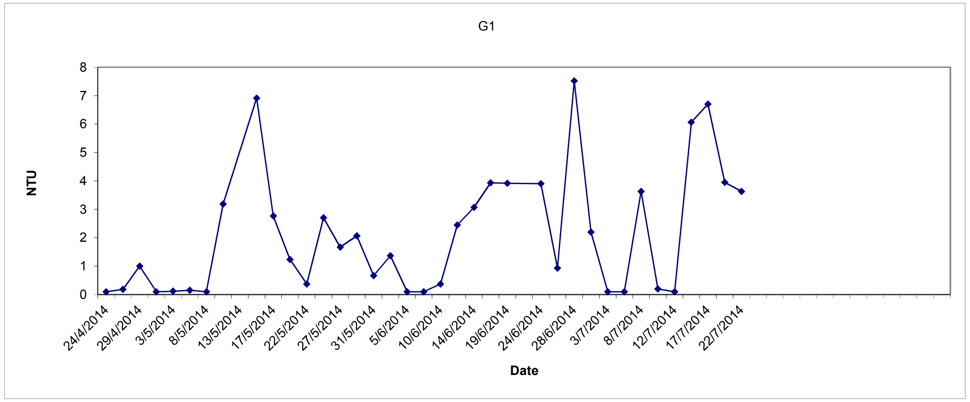

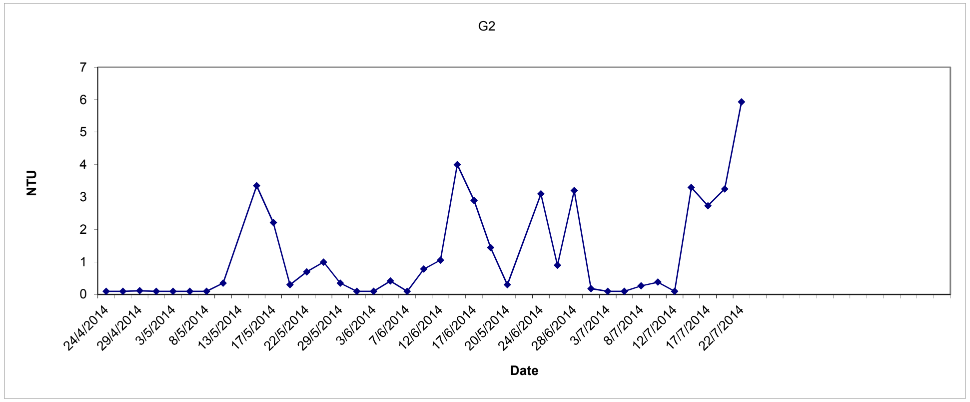

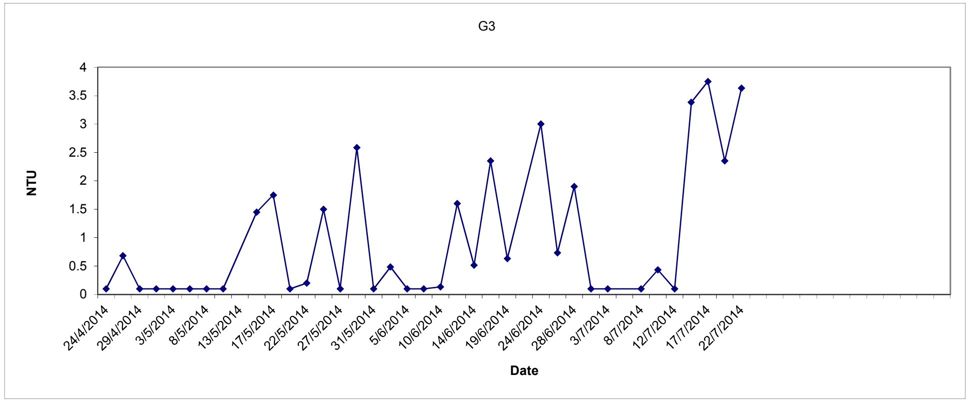

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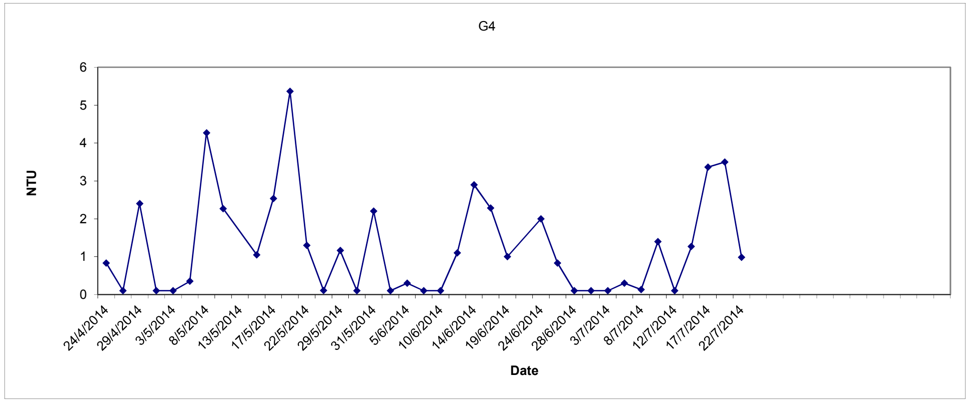

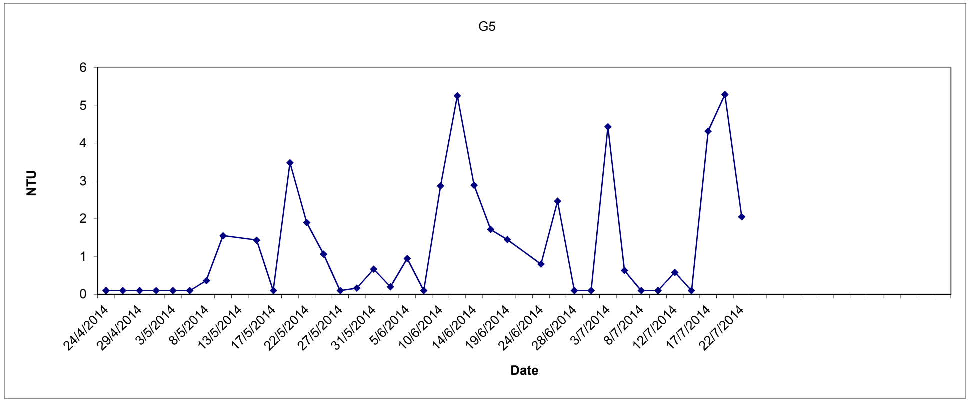

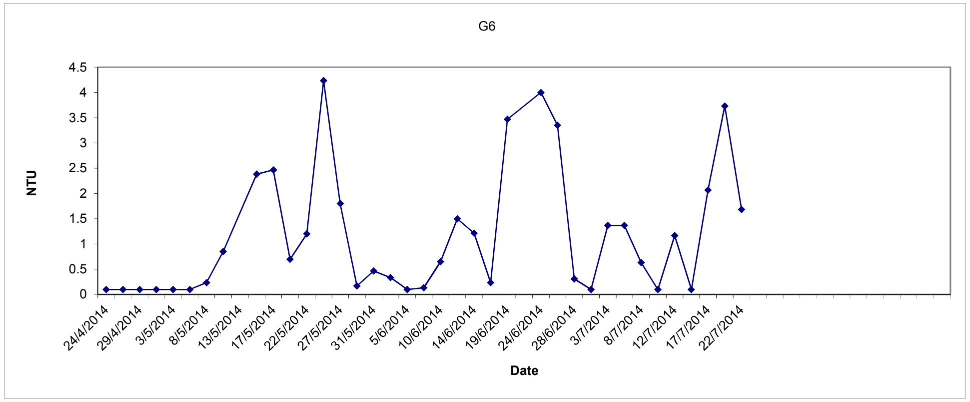

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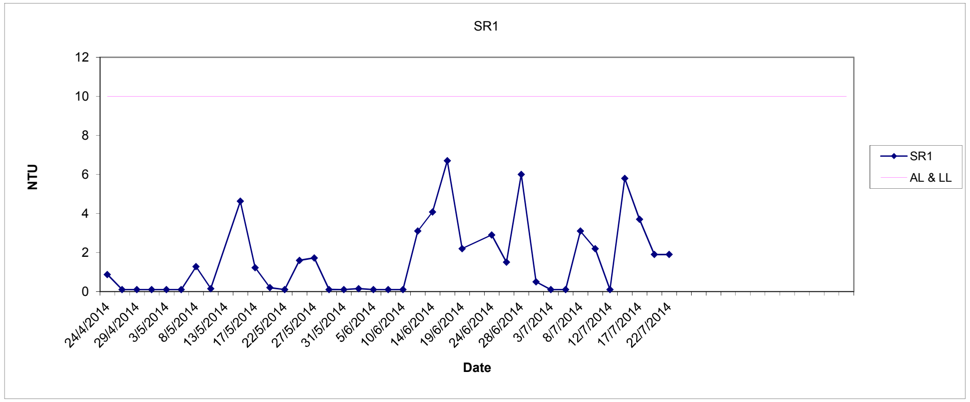

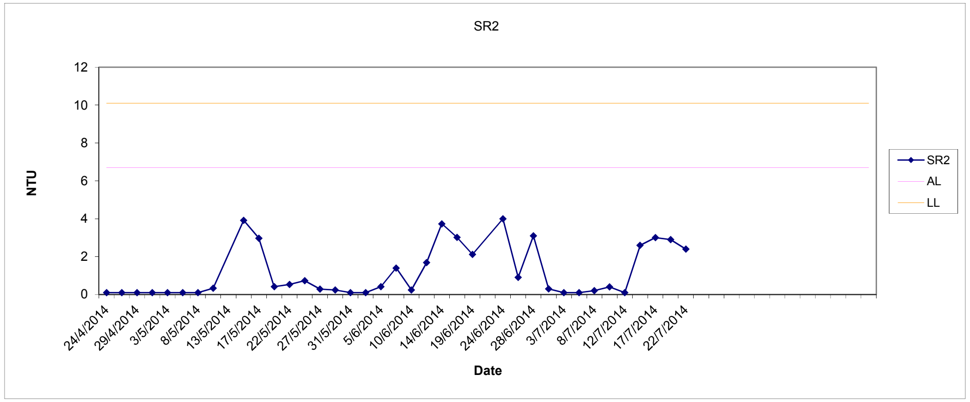

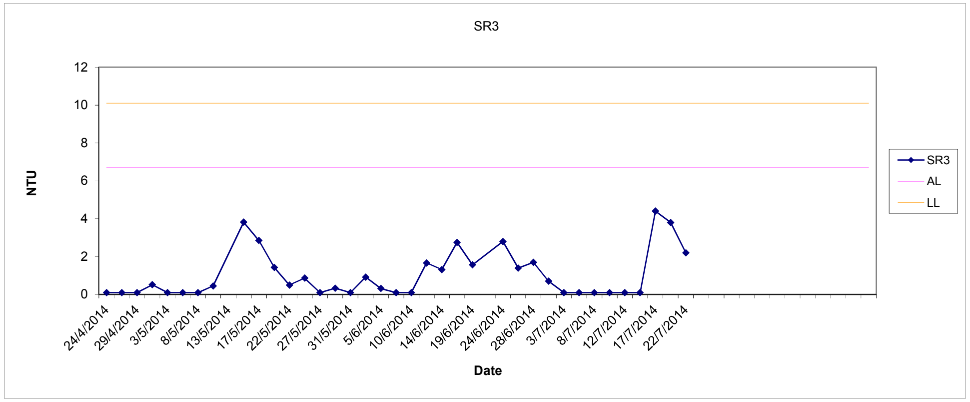

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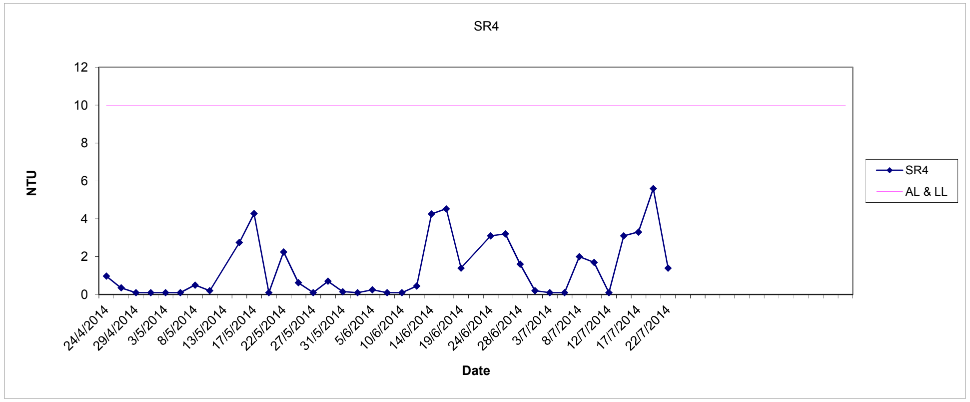
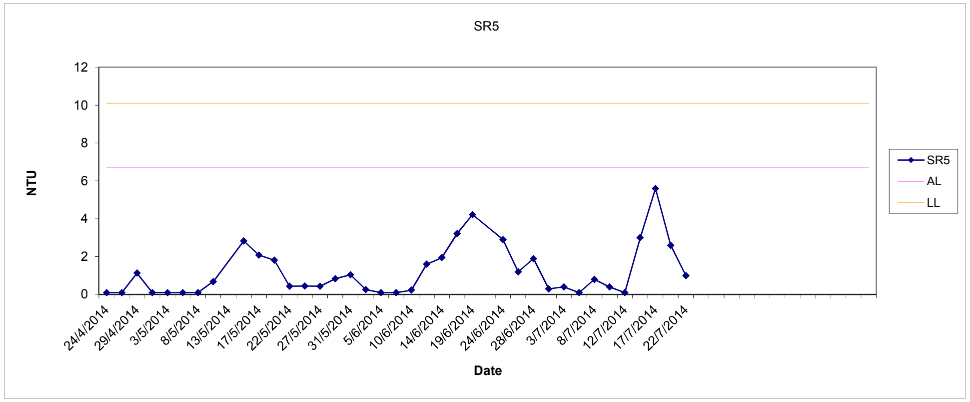
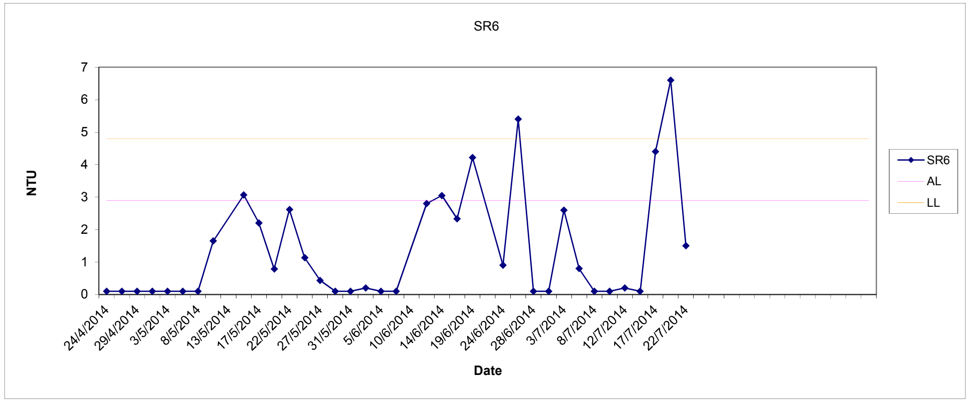
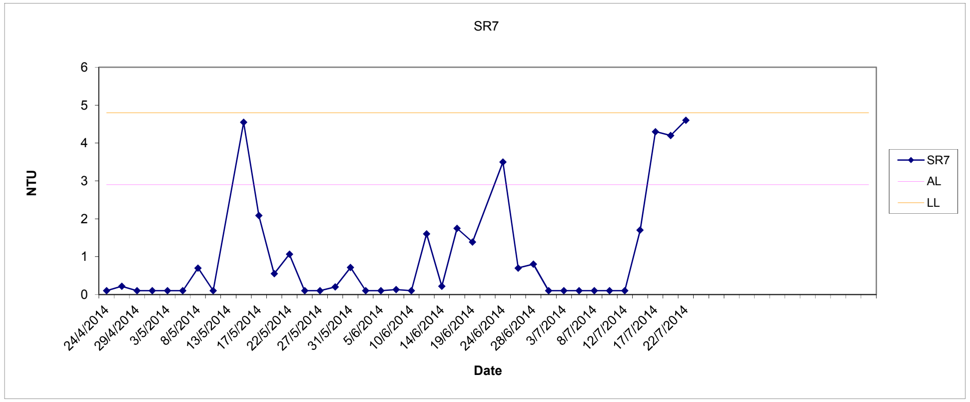
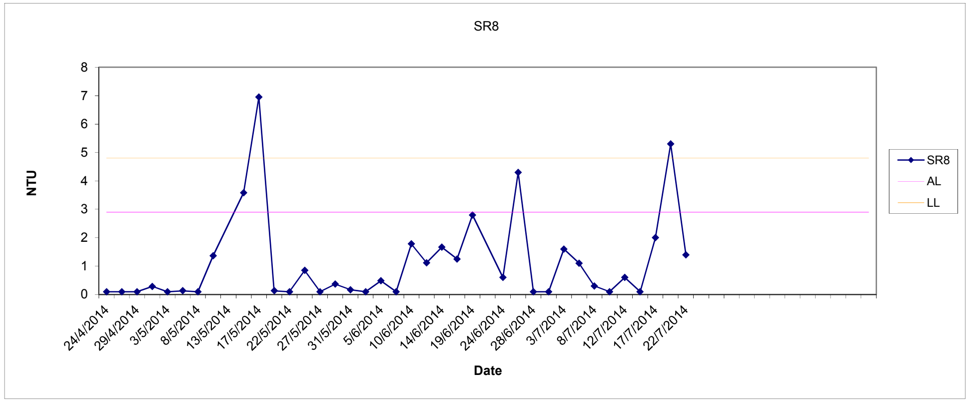


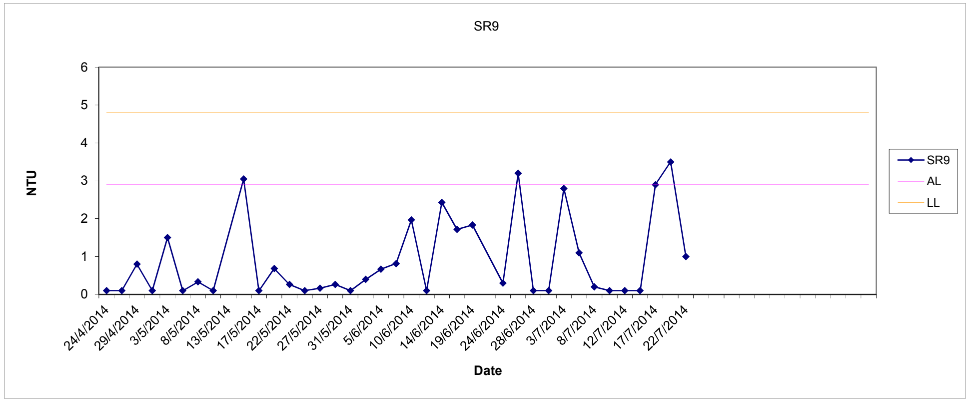




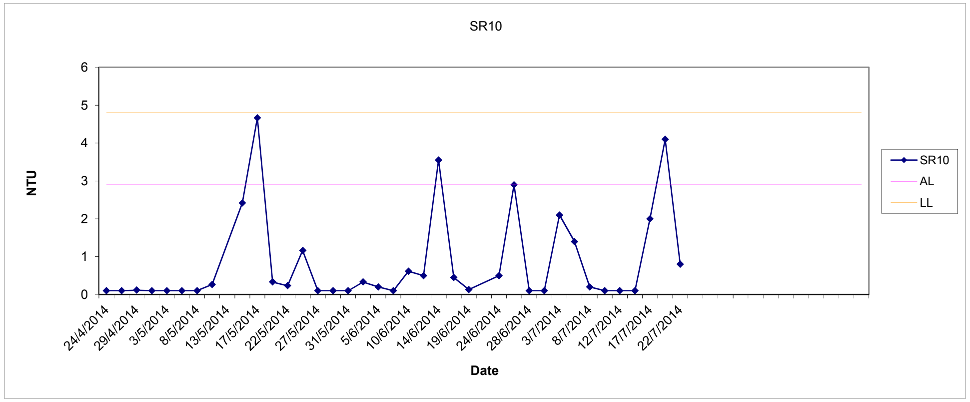
Turbidity (Depth average) at Mid-Flood Tide

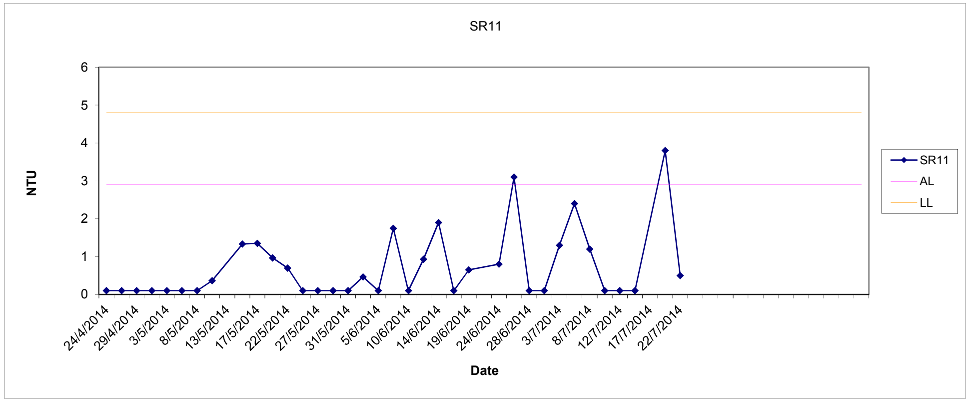


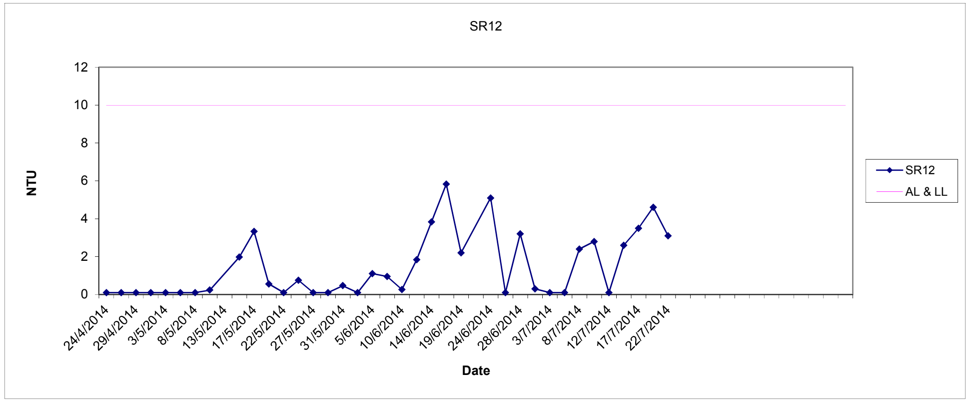




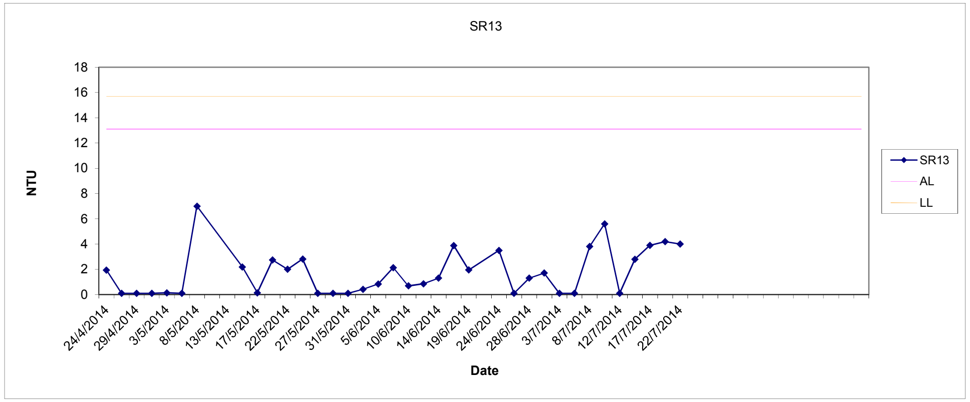
Turbidity (Depth average) at Mid-Flood Tide



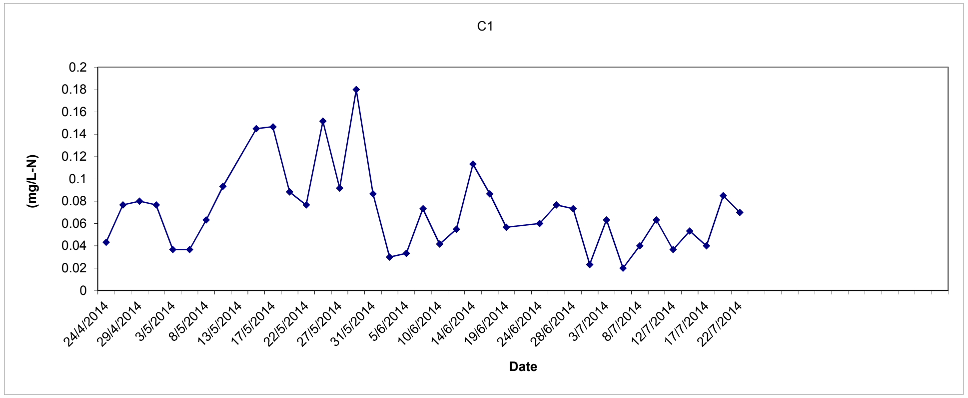


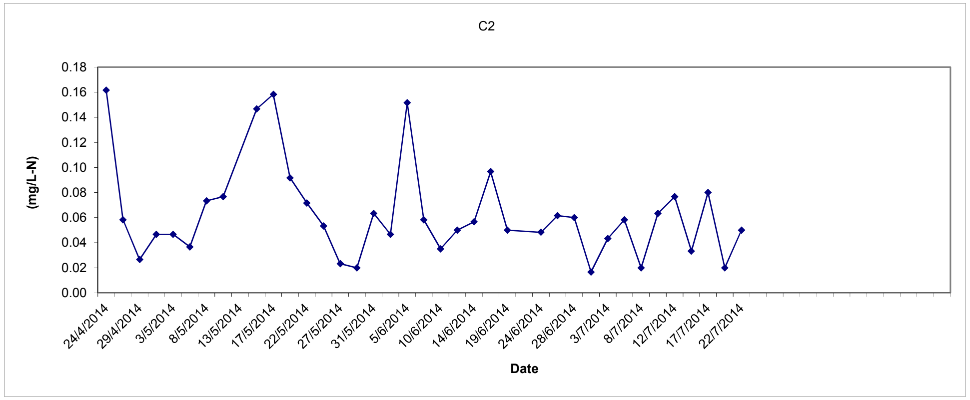


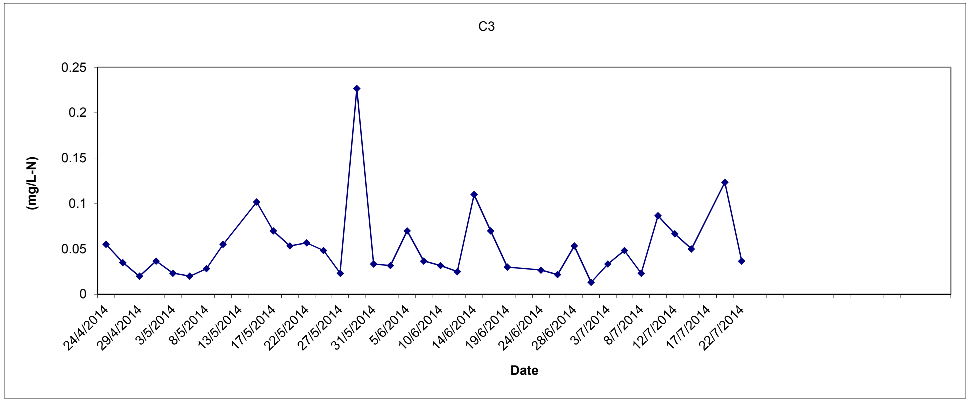
Turbidity (Depth average) at Mid-Flood Tide



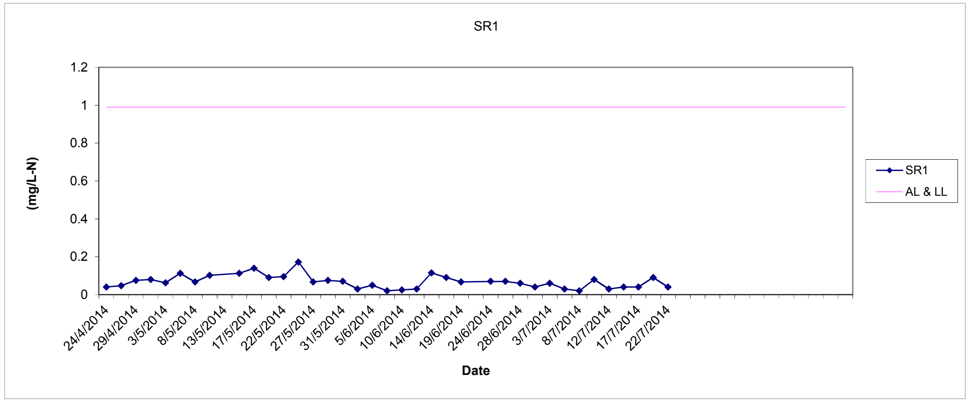
In-situ Ammonia (Depth average) at Mid-Flood Tide

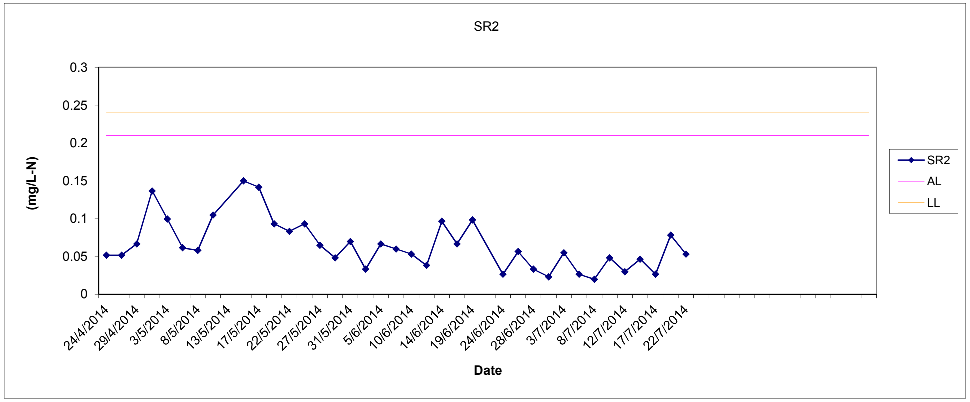


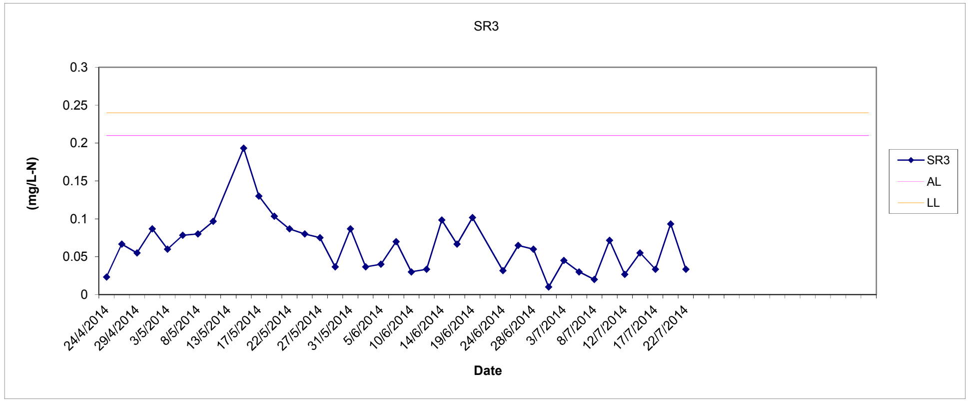




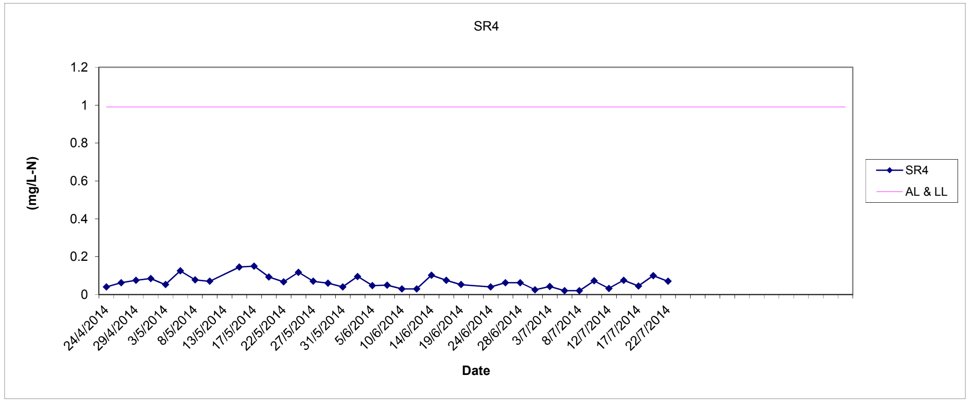
In-situ Ammonia (Depth average) at Mid-Flood Tide

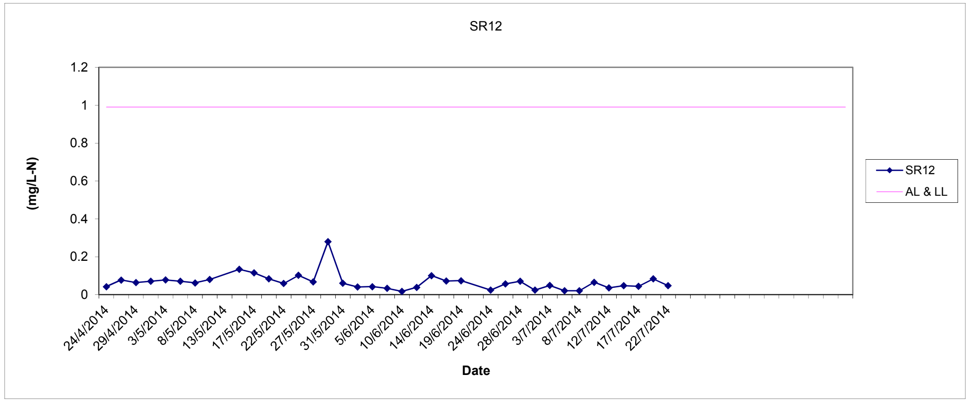




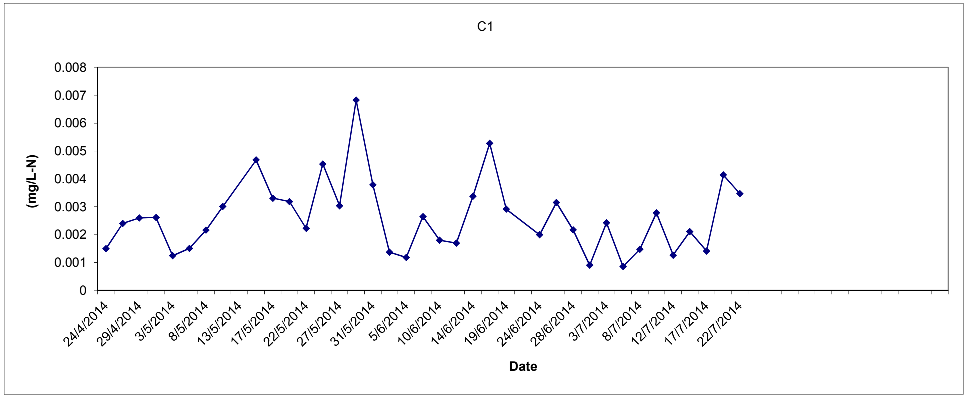


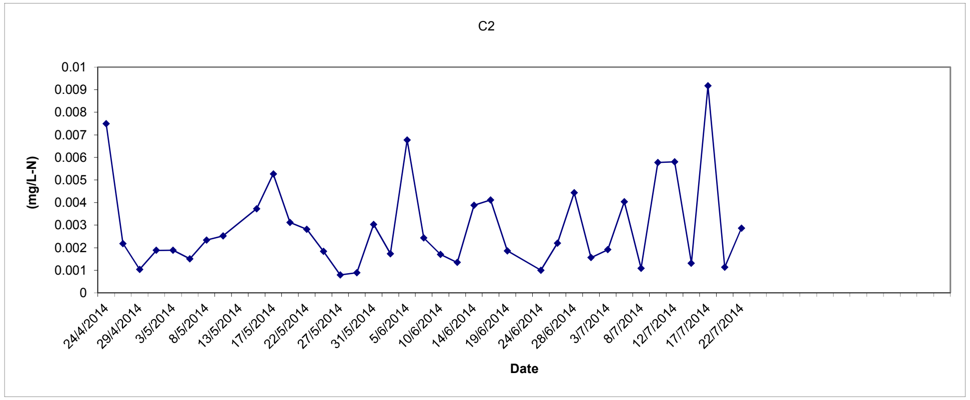
In-situ Ammonia (Depth average) at Mid-Flood Tide

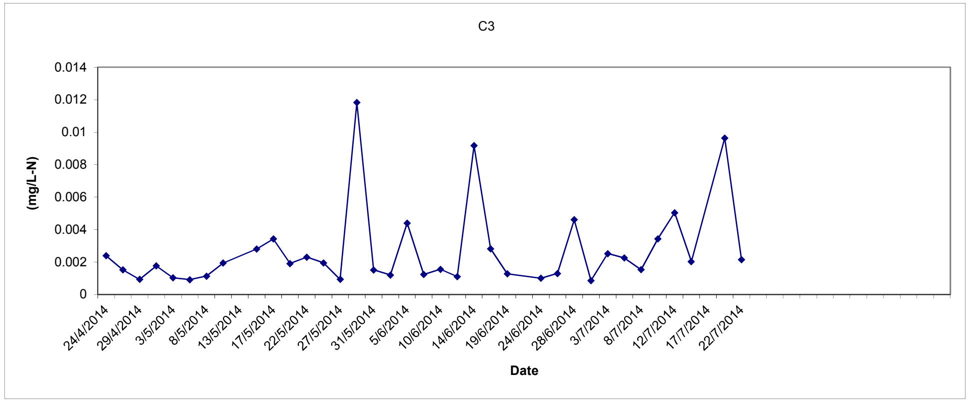




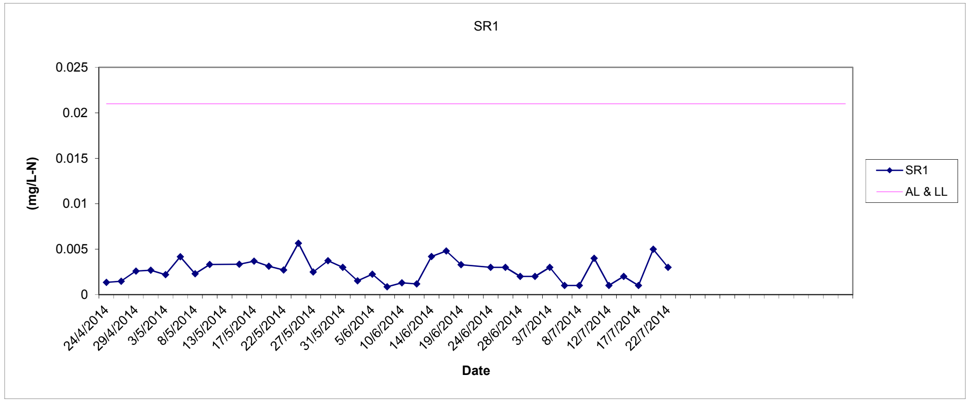
In-situ UIA (Depth average) at Mid-Flood Tide

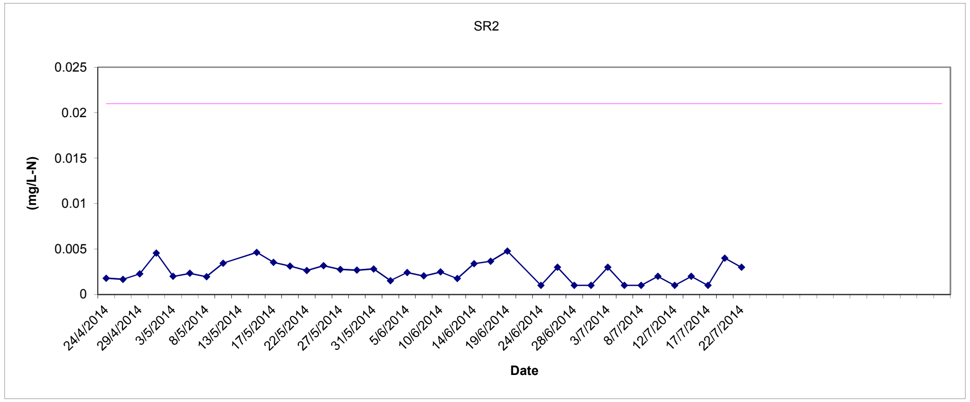


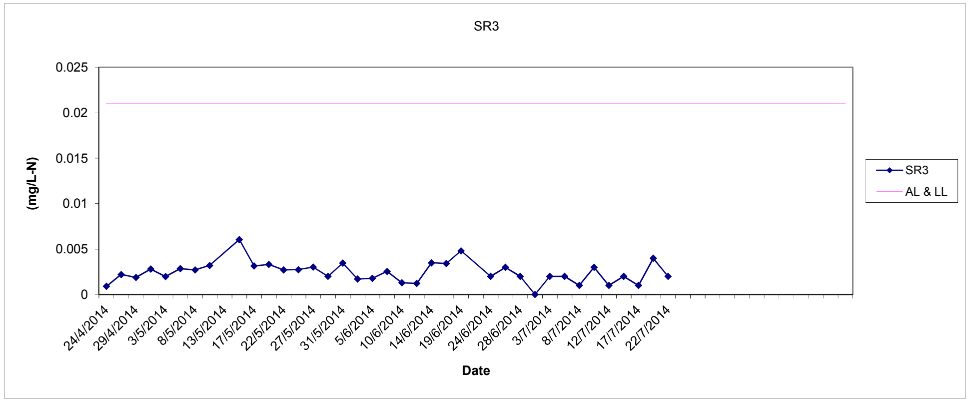




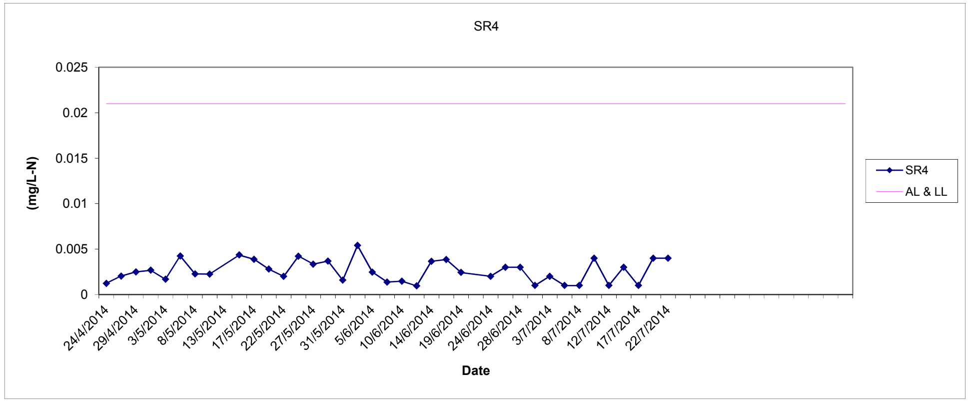
In-situ UIA (Depth average) at Mid-Flood Tide

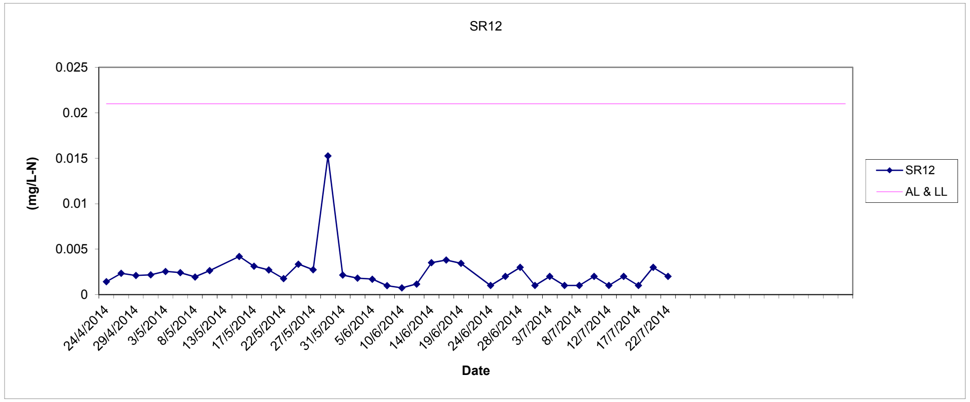




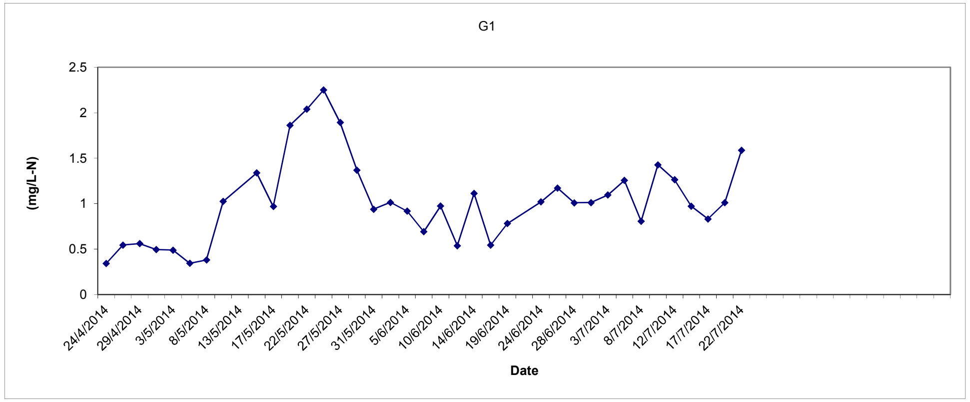


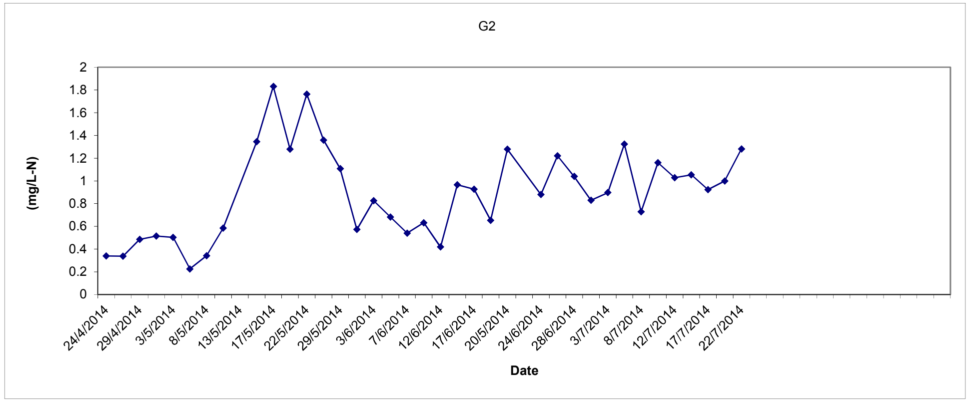
In-situ UIA (Depth average) at Mid-Flood Tide

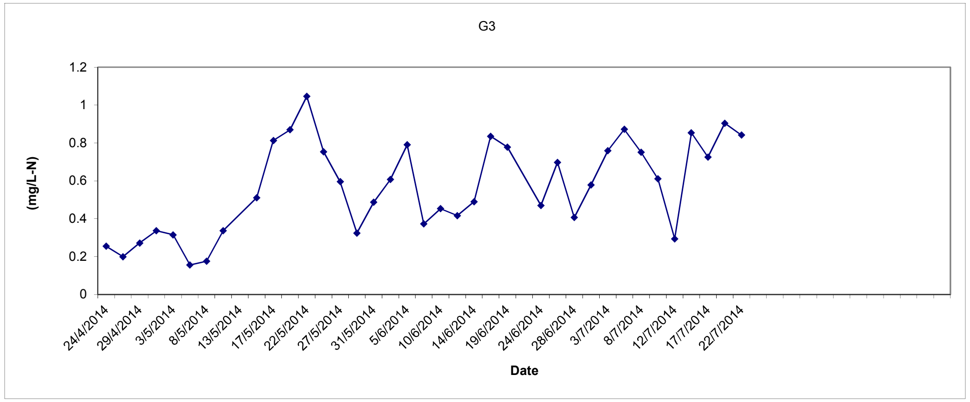




In-situ TIN (Depth average) at Mid-Flood Tide







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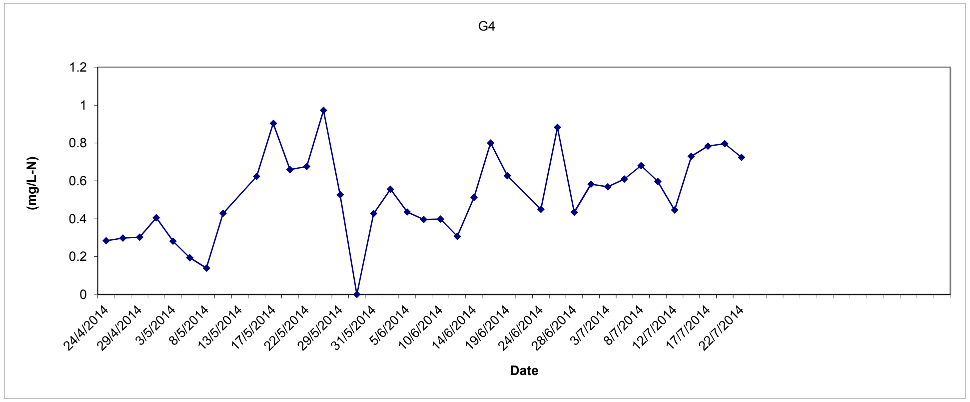
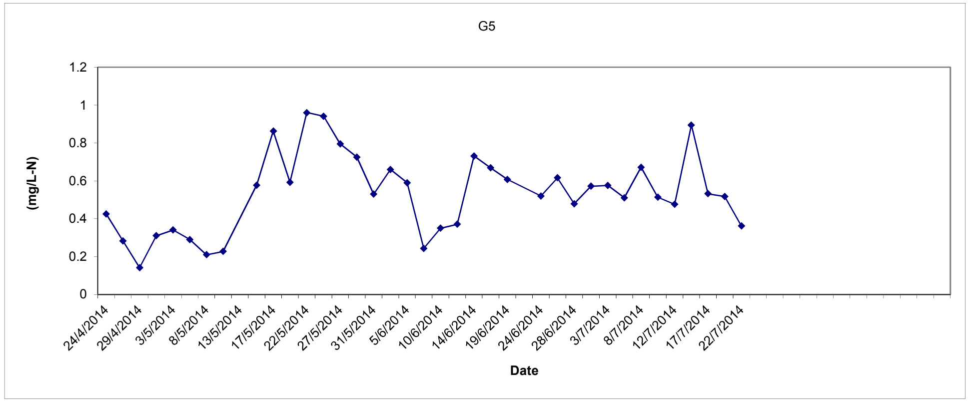
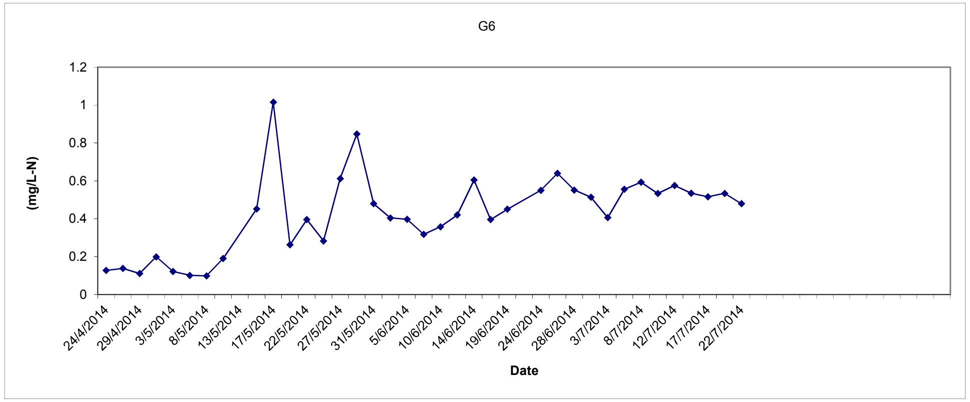
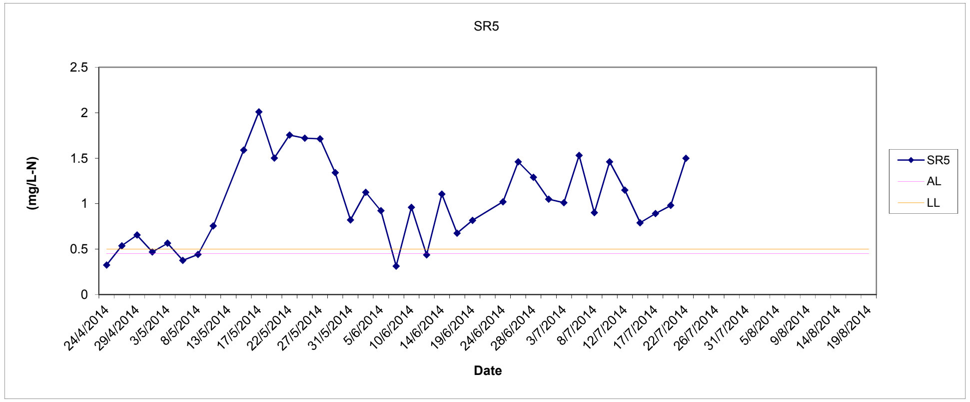
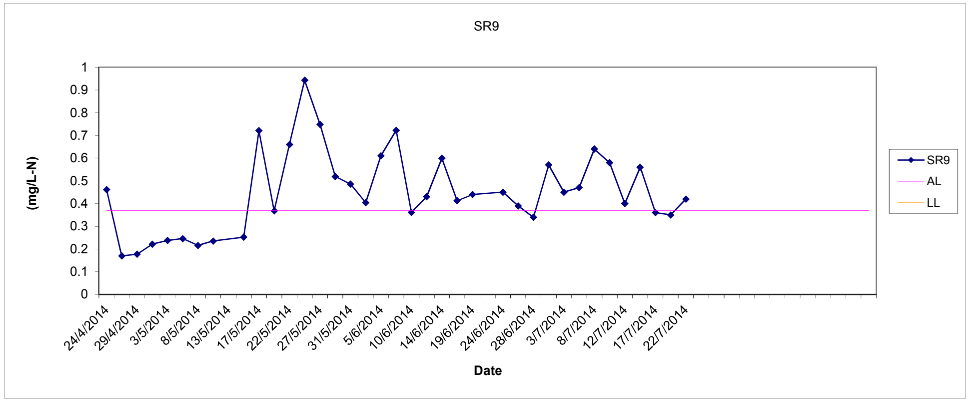


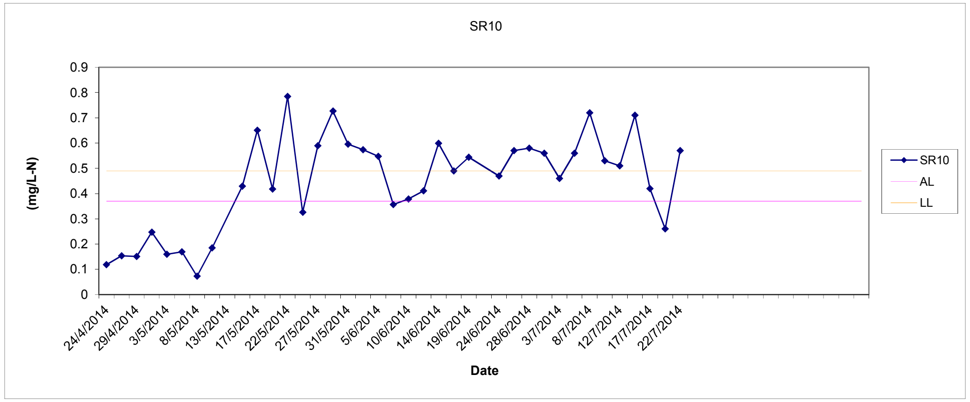




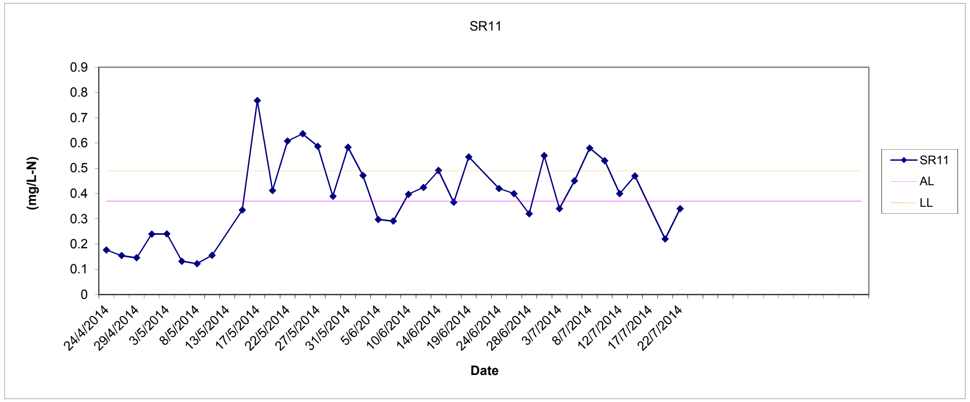
In-situ TIN (Depth average) at Mid-Flood Tide



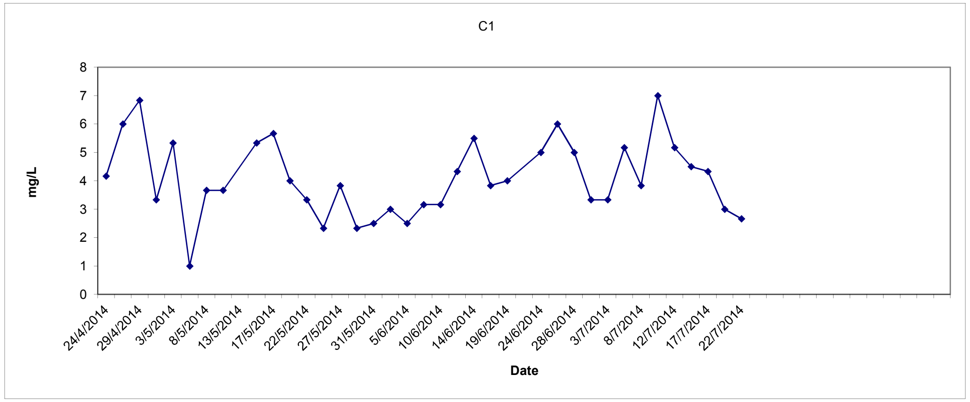


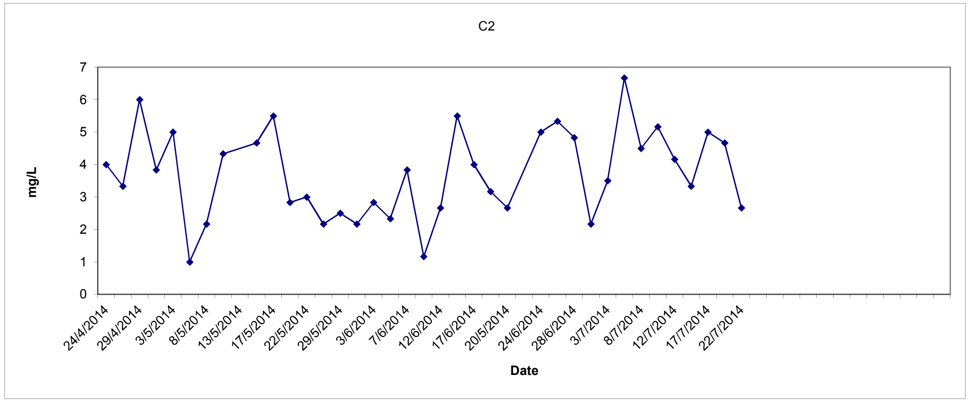


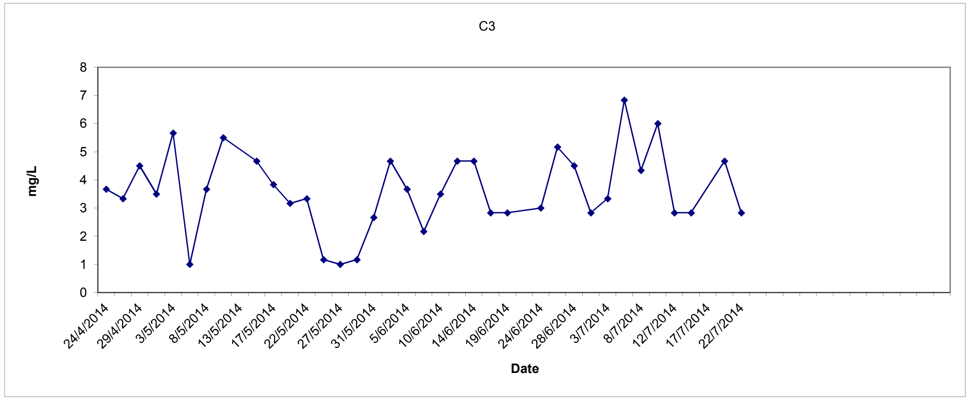
In-situ TIN (Depth average) at Mid-Flood Tide



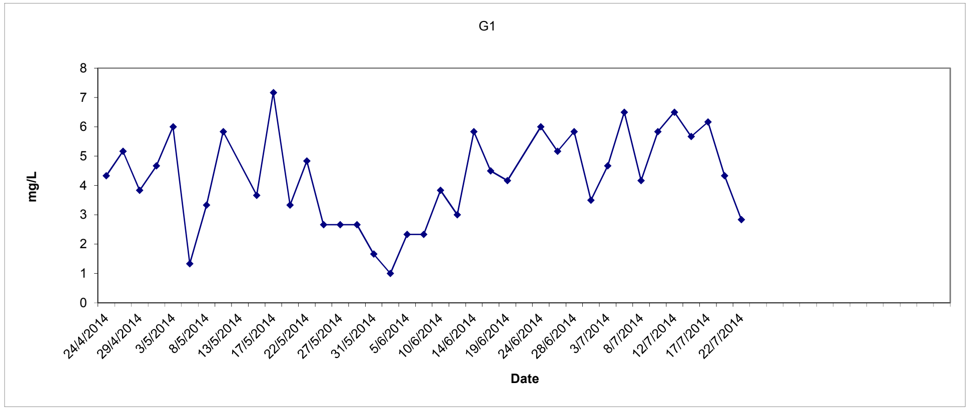
Total Suspended Solids (Depth average) at Mid-Flood Tide

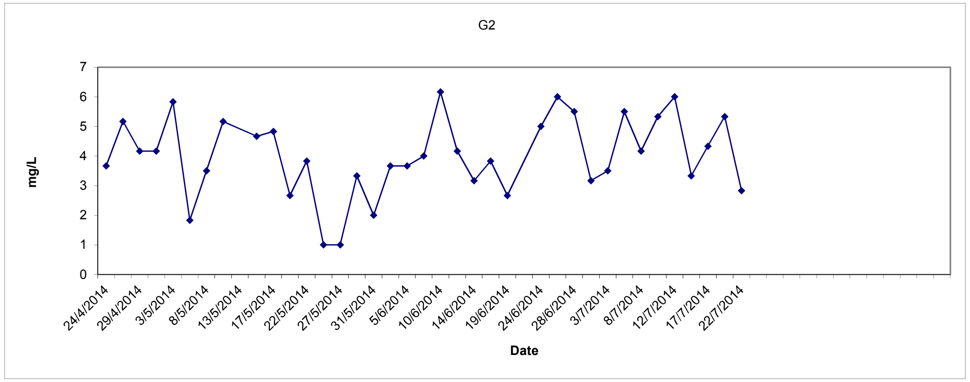


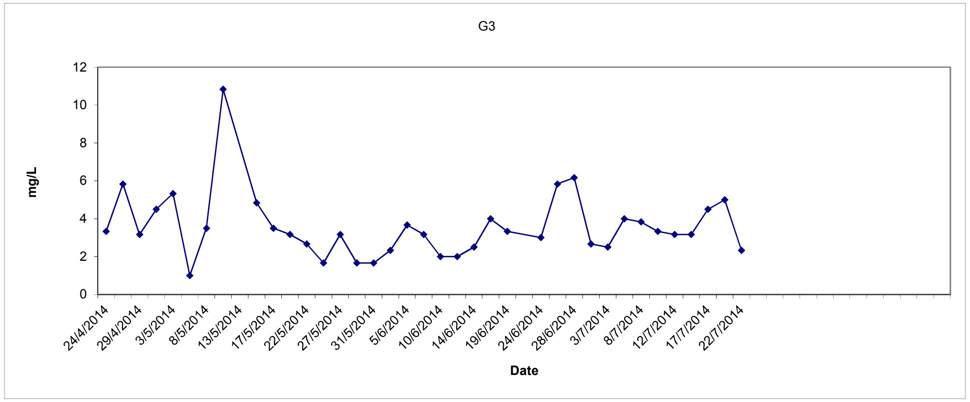




Total Suspended Solids (Depth average) at Mid-Flood Tide







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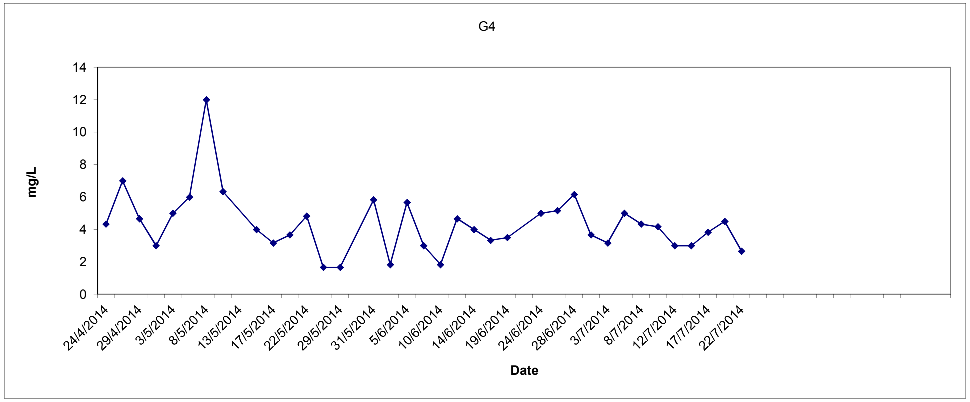
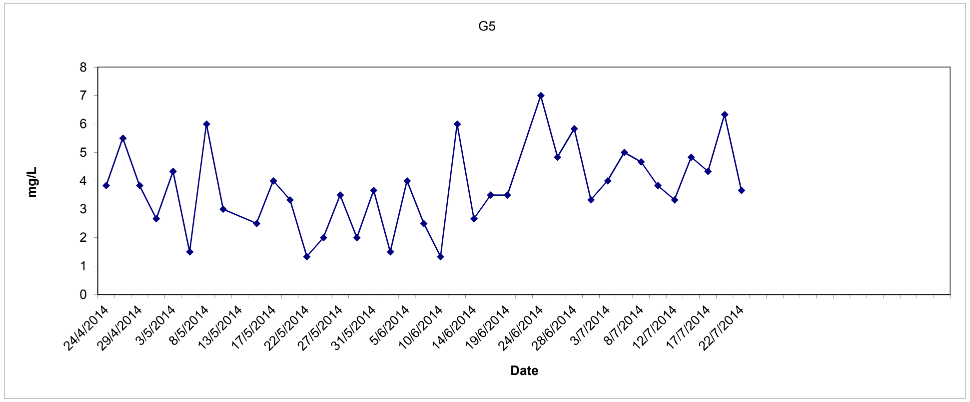
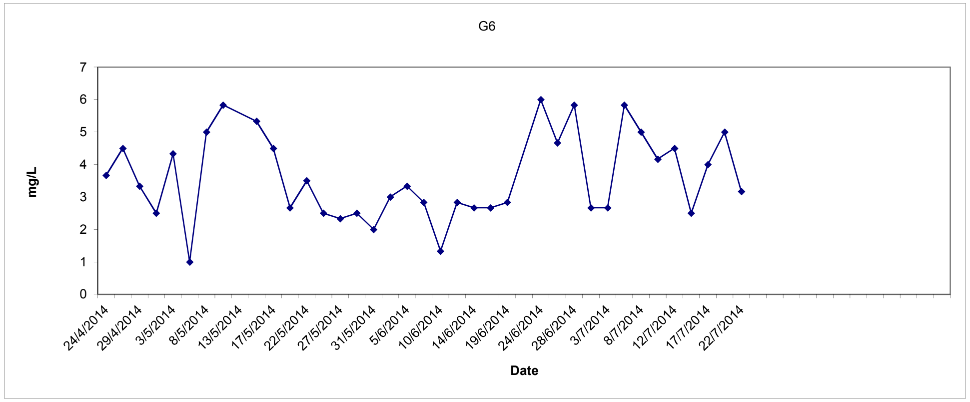
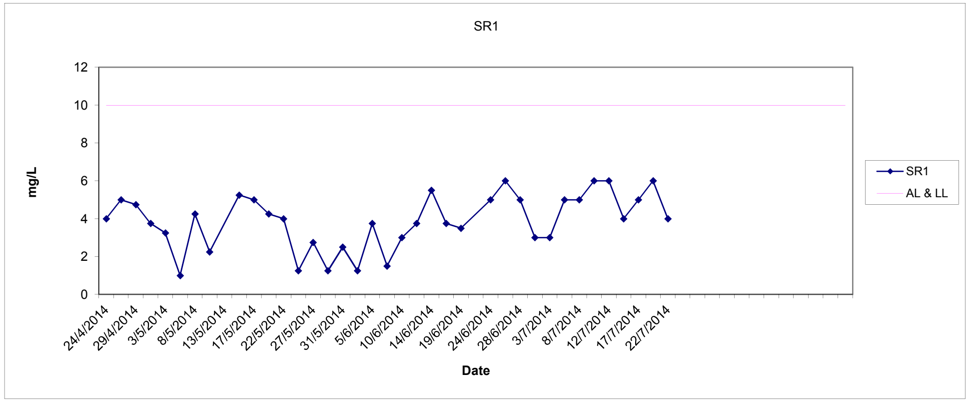
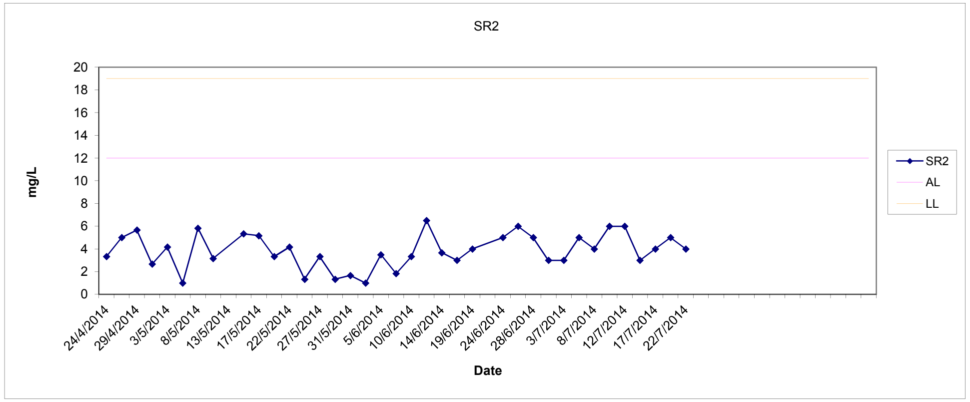


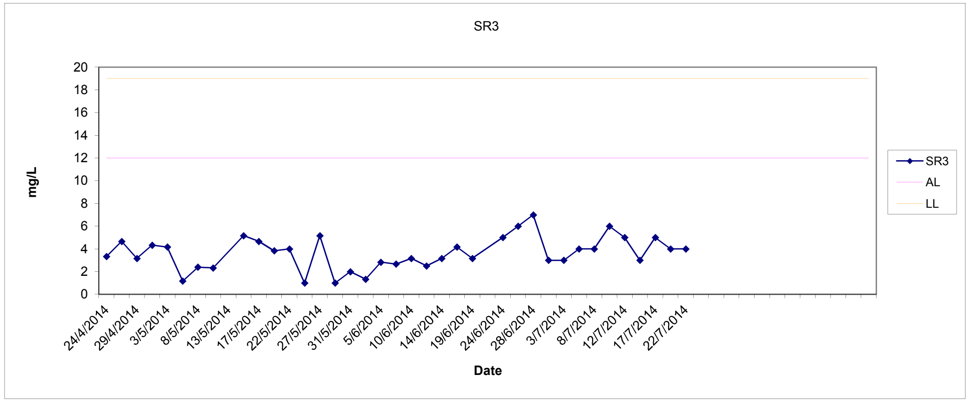




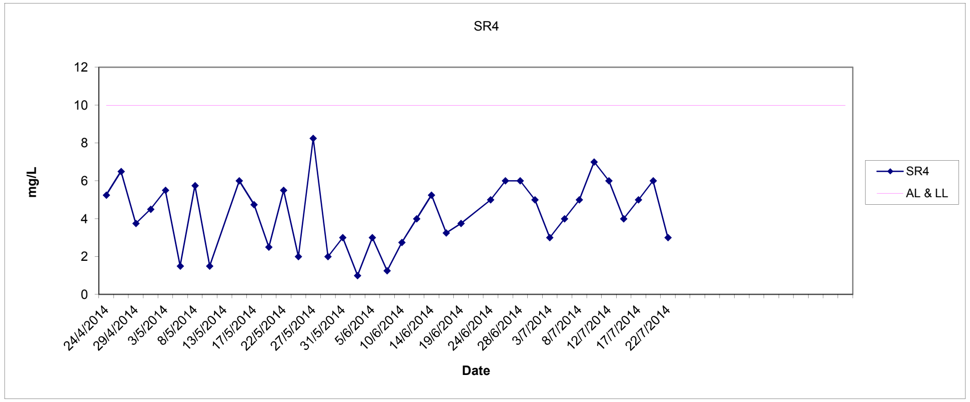
Total Suspended Solids (Depth average) at Mid-Flood Tide

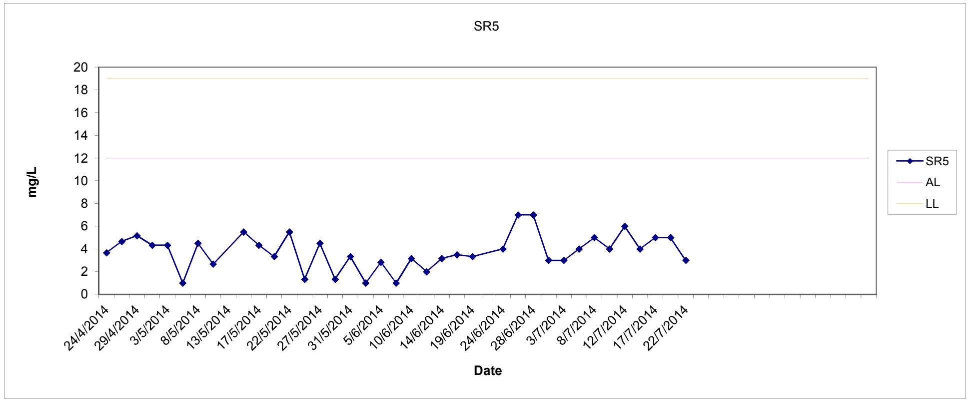


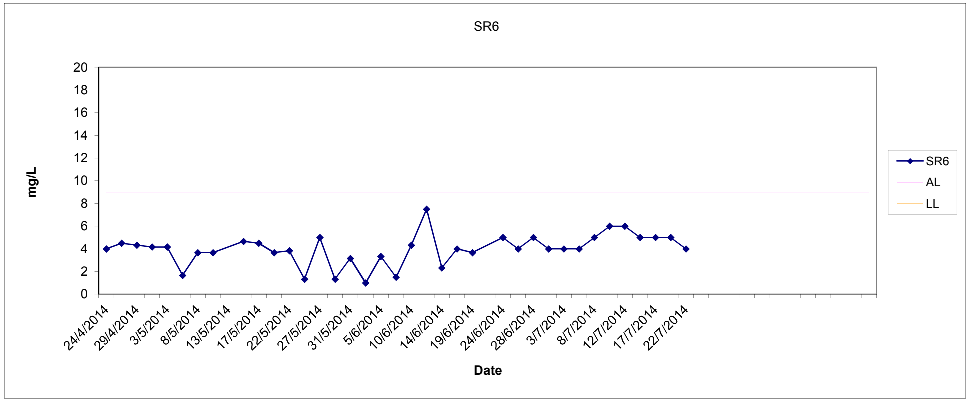




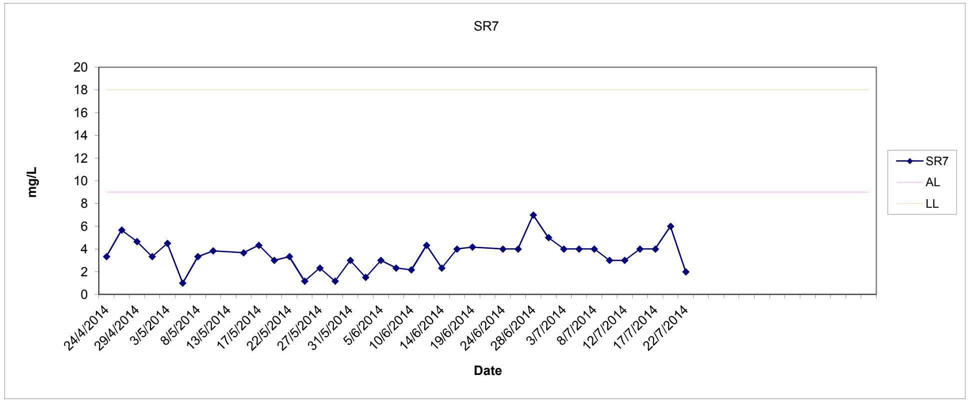
Total Suspended Solids (Depth average) at Mid-Flood Tide

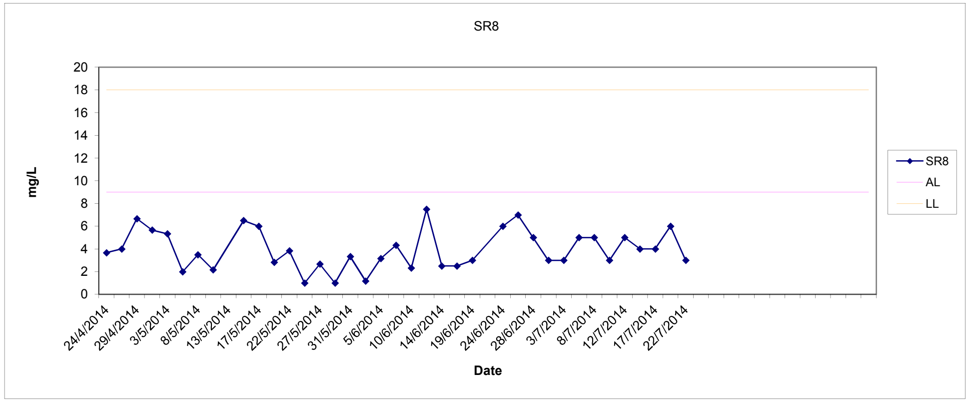


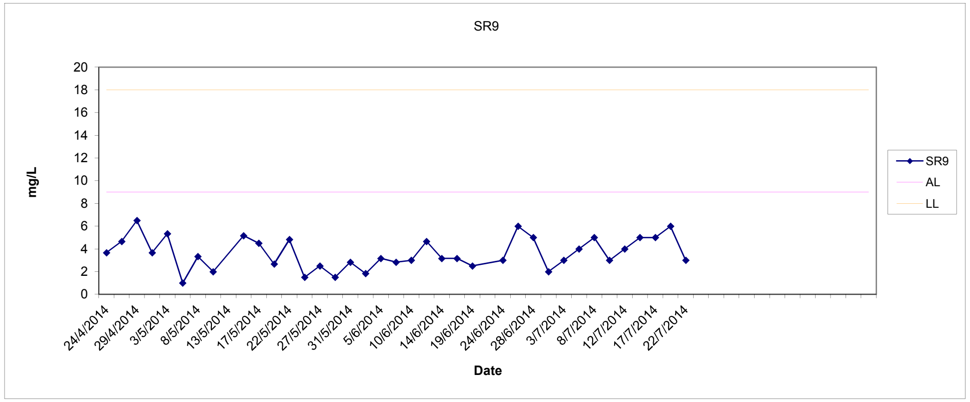




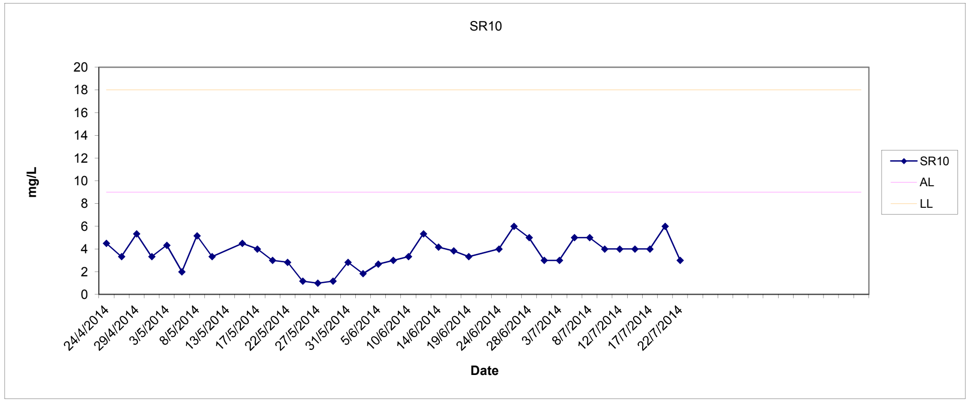
Total Suspended Solids (Depth average) at Mid-Flood Tide

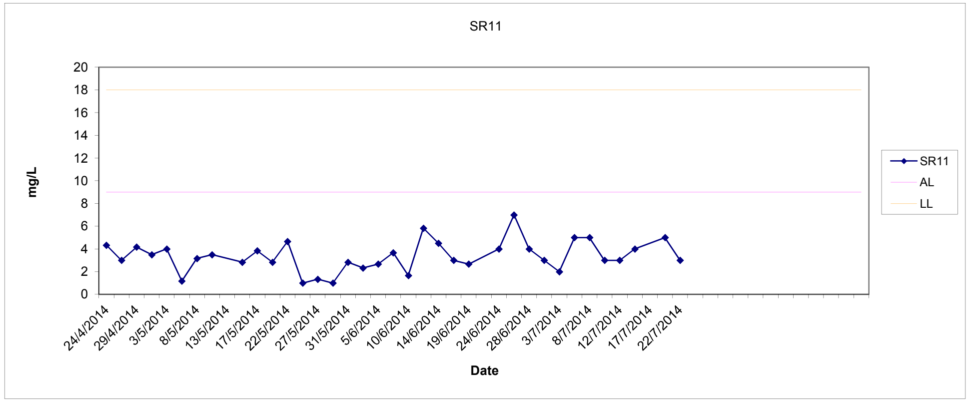


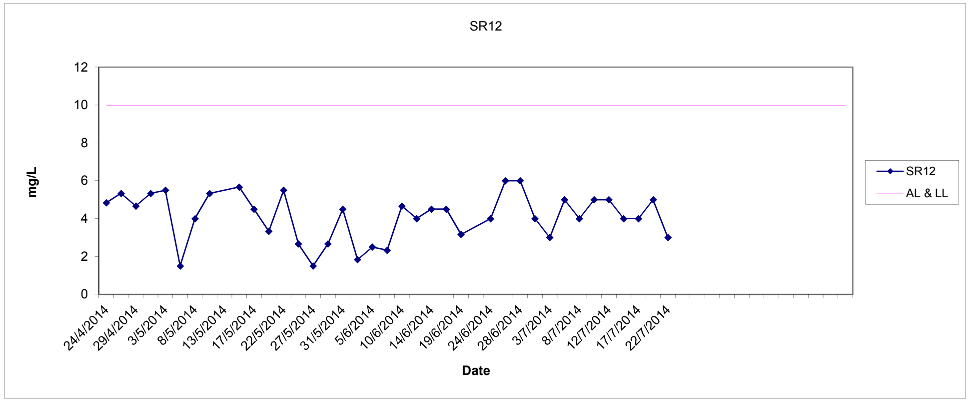




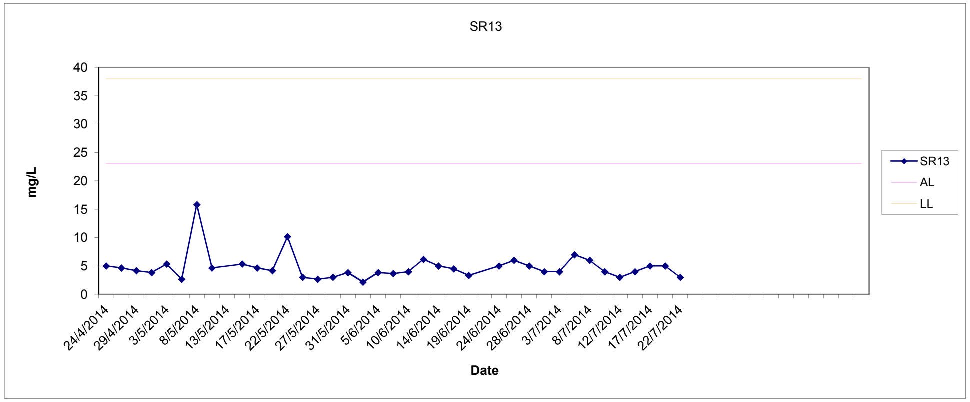
Total Suspended Solids (Depth average) at Mid-Flood Tide



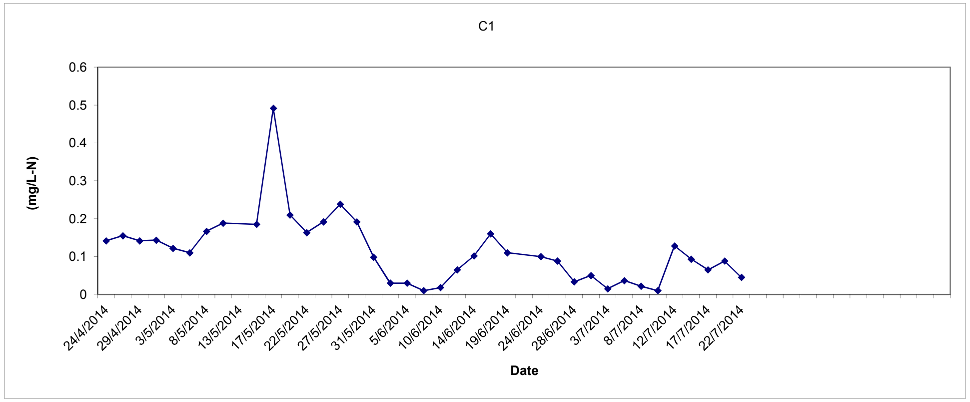


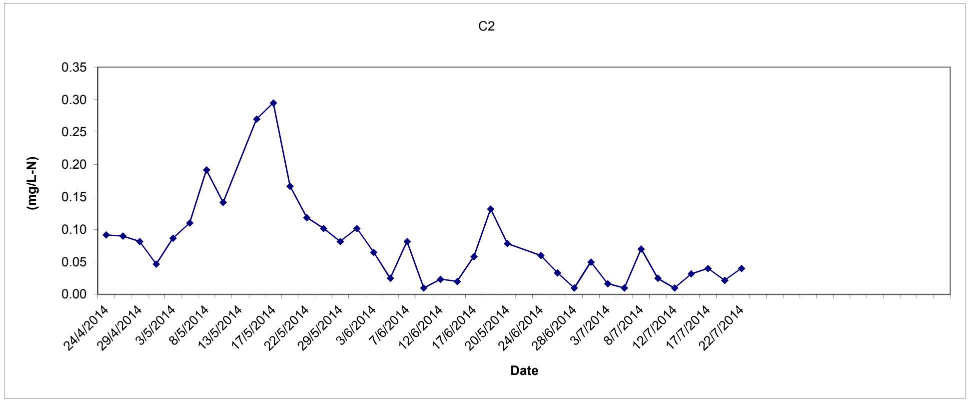


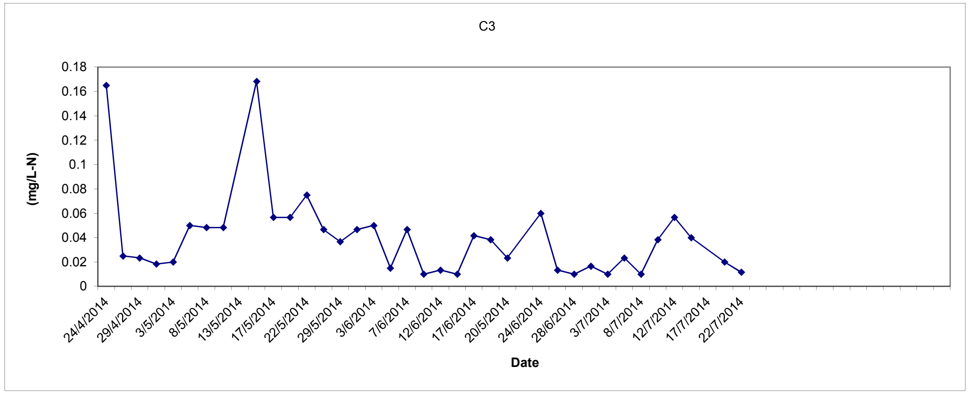
Total Suspended Solids (Depth average) at Mid-Flood Tide



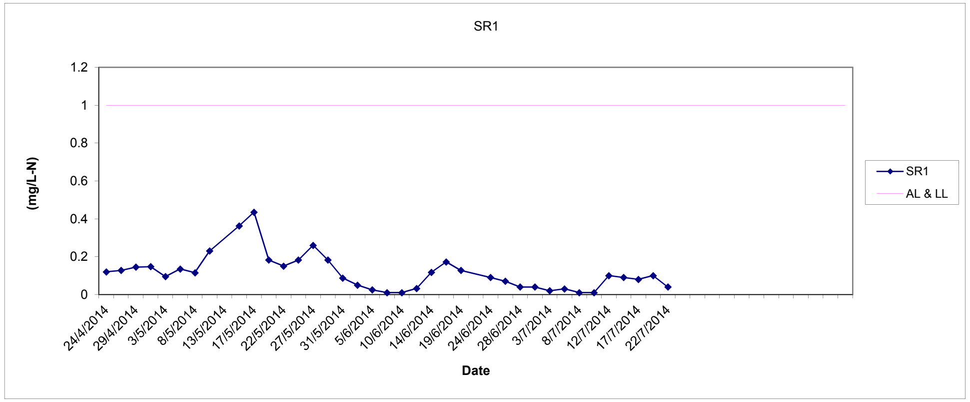
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

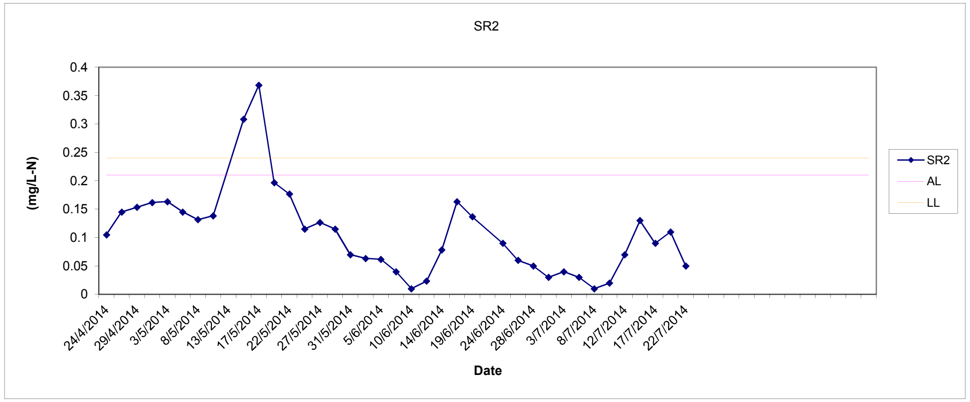


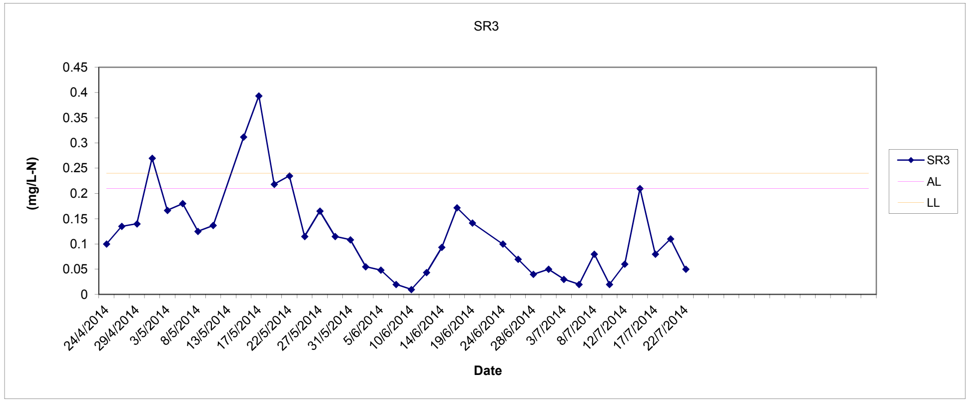




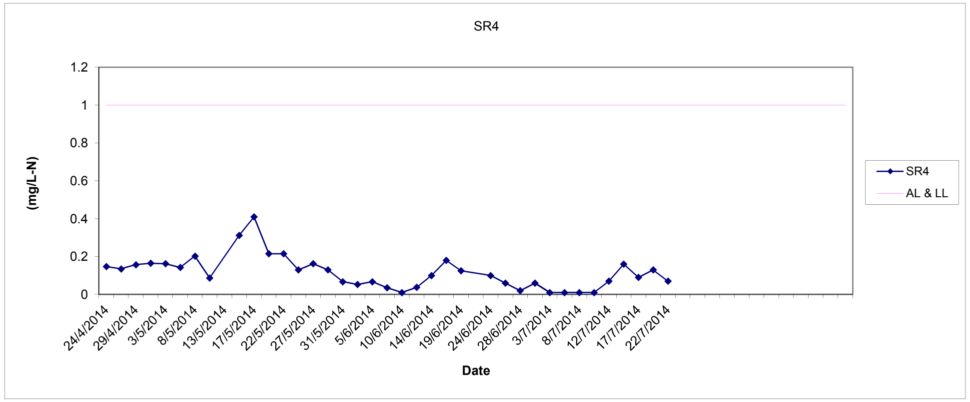
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

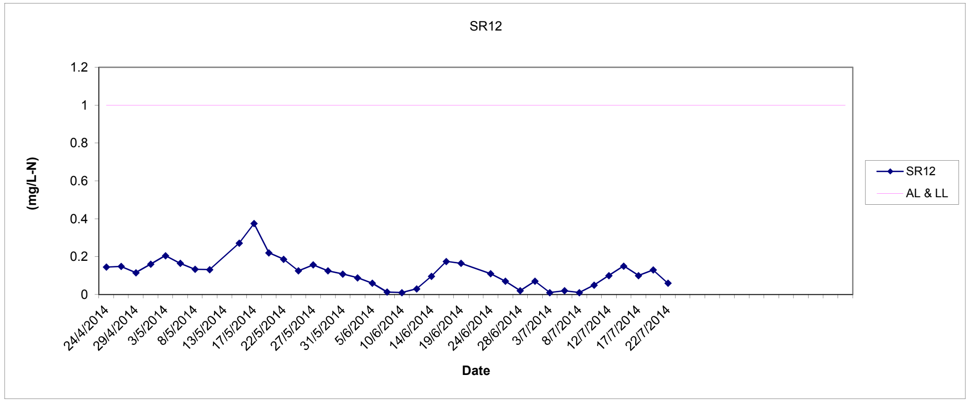




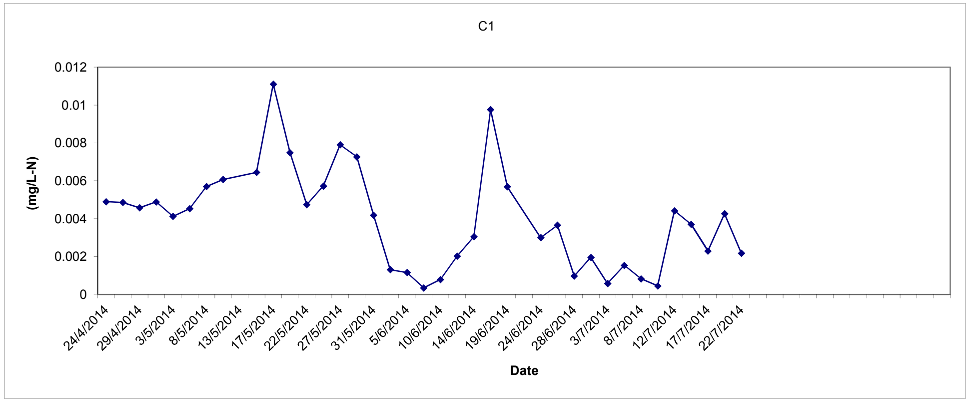


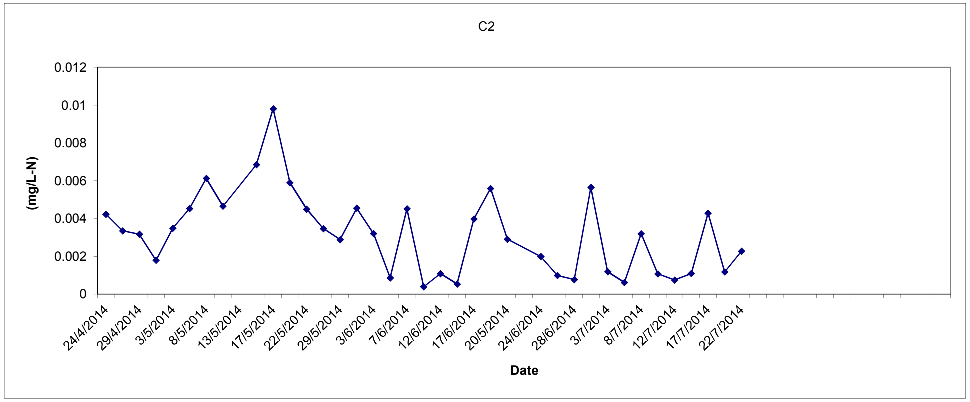
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

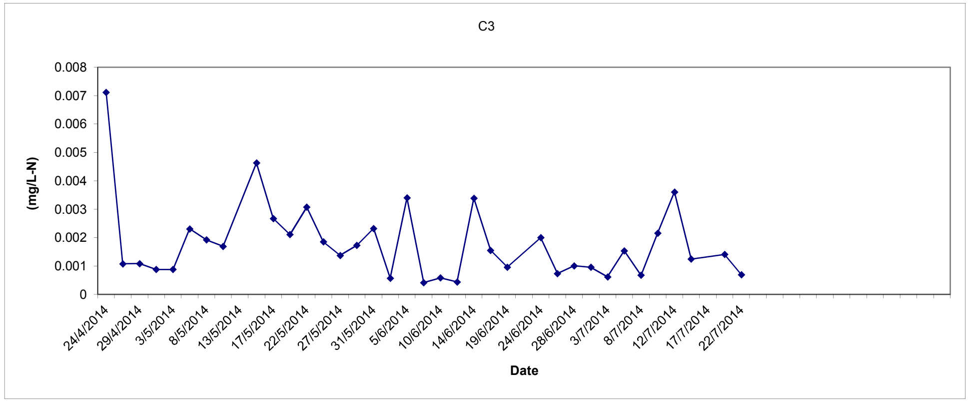




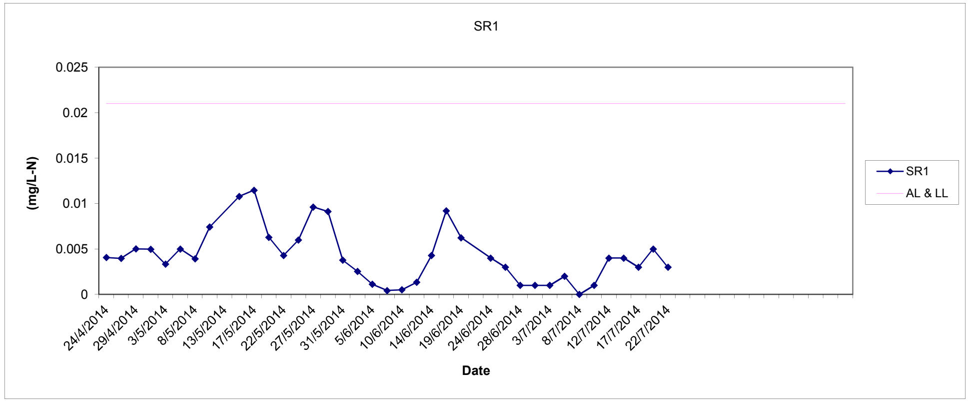
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

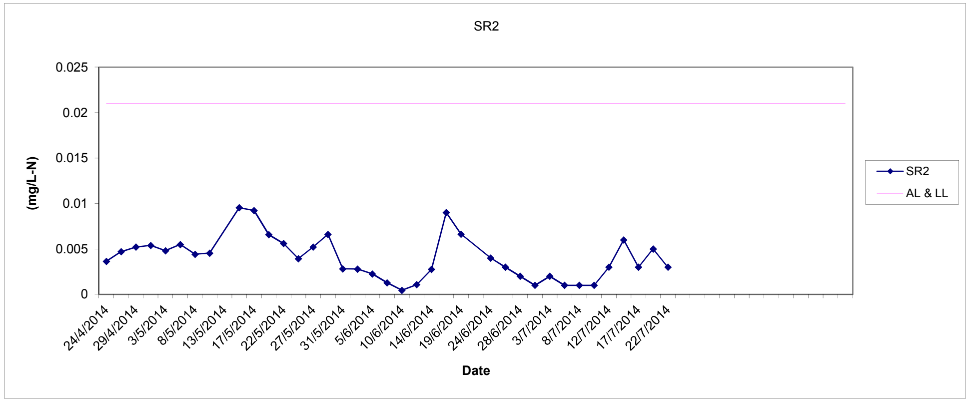


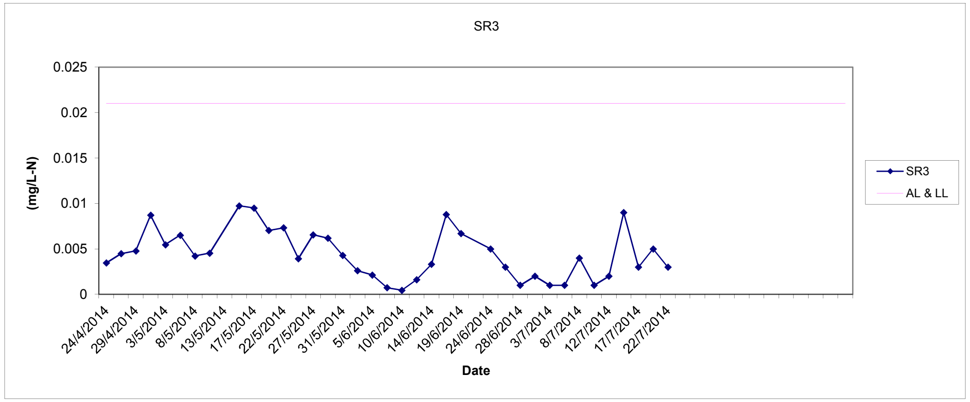




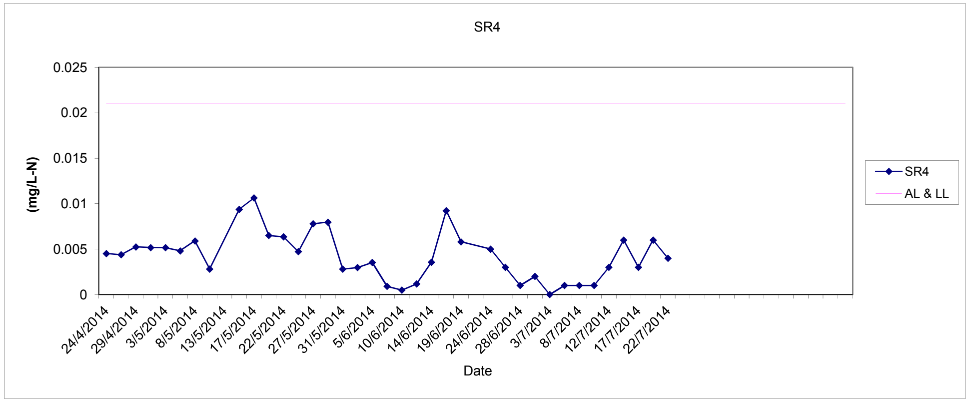
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

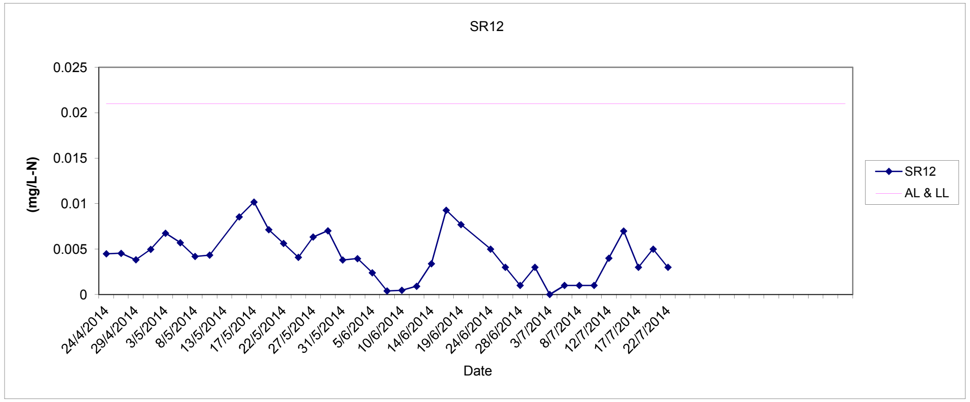






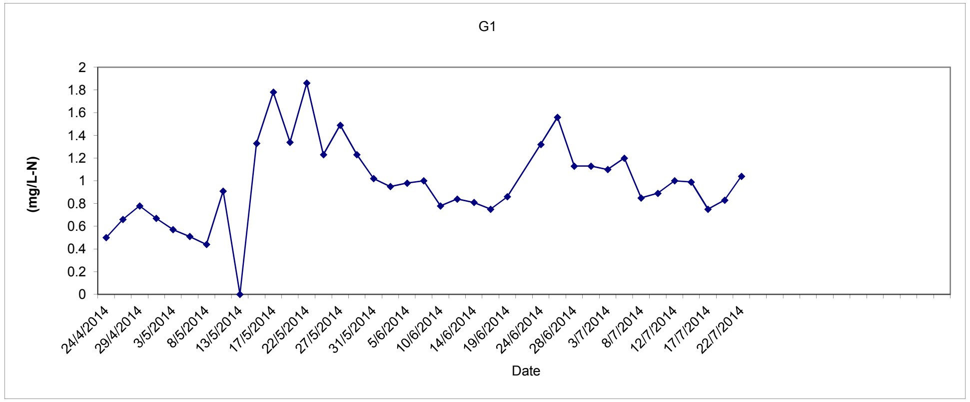
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

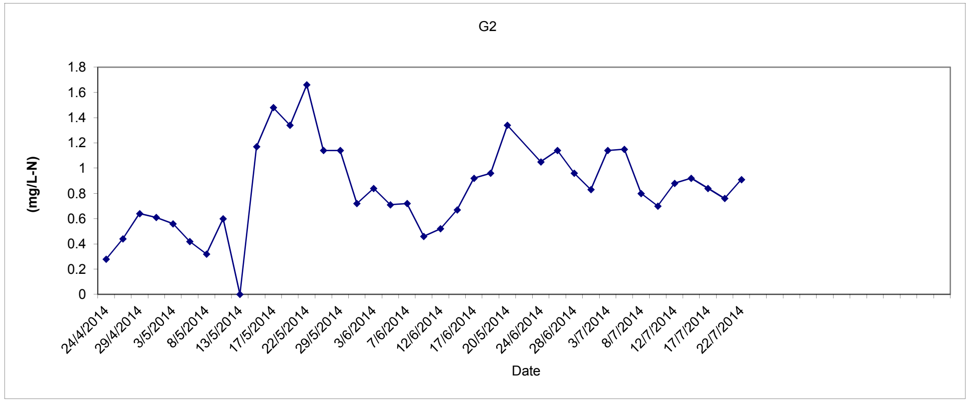


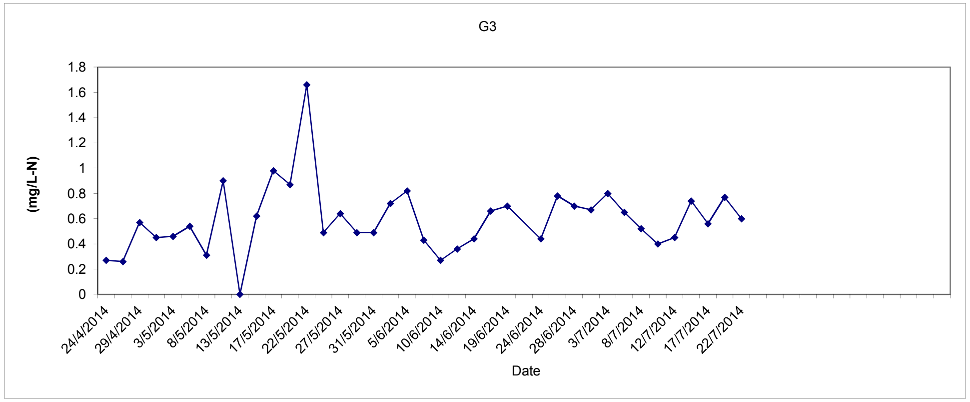


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

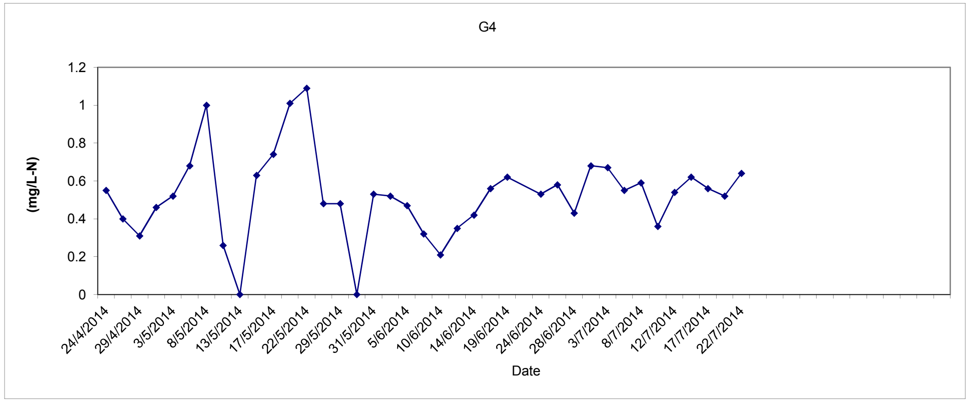
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

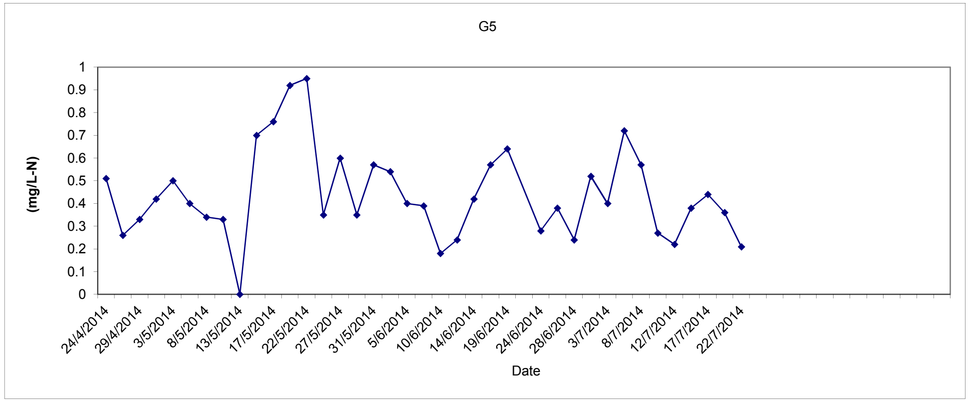


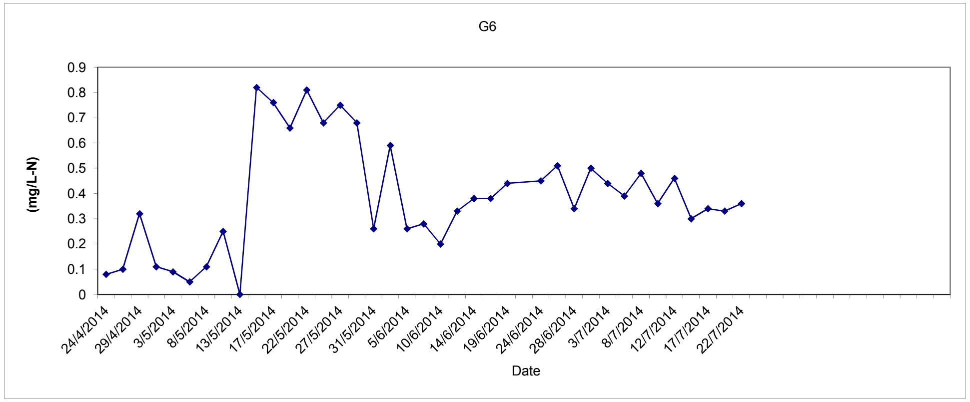




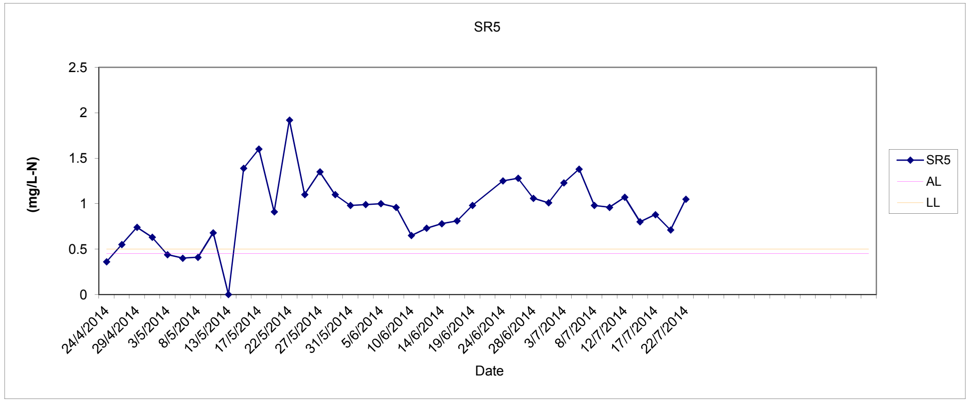
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

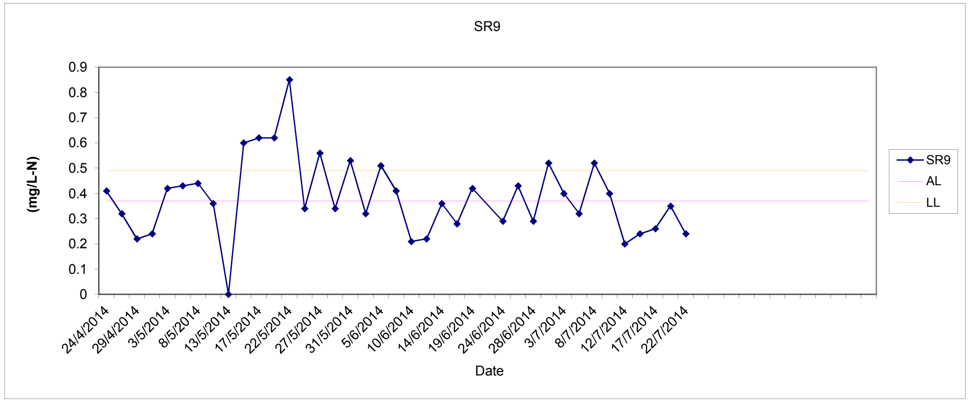


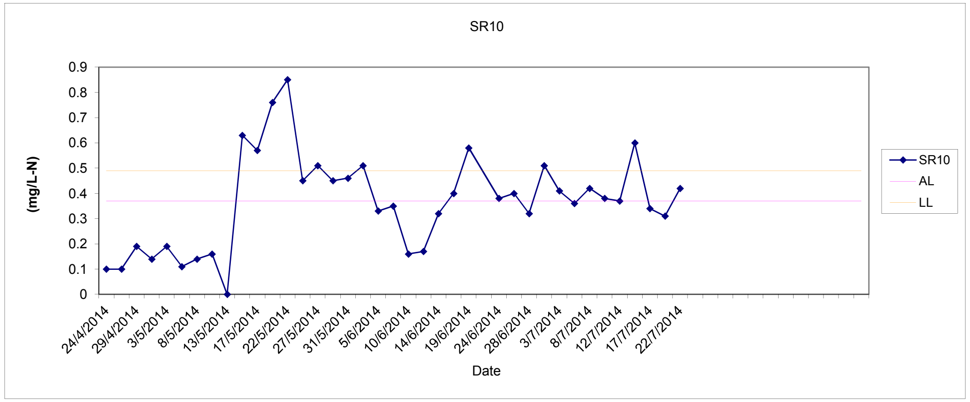




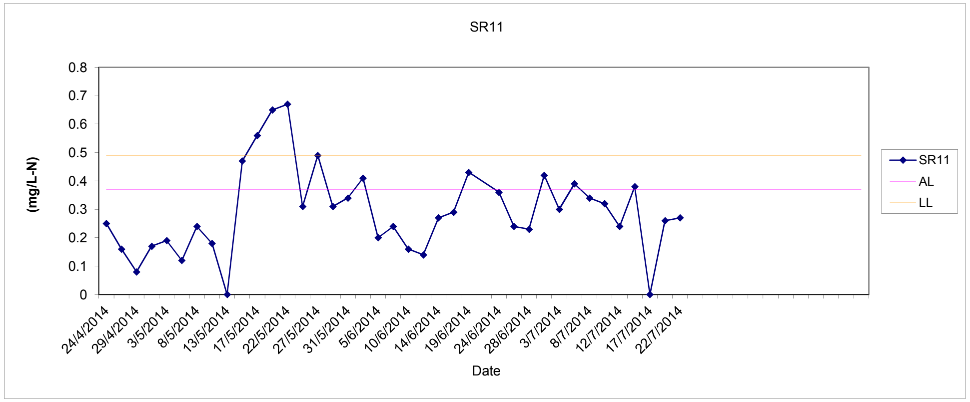
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



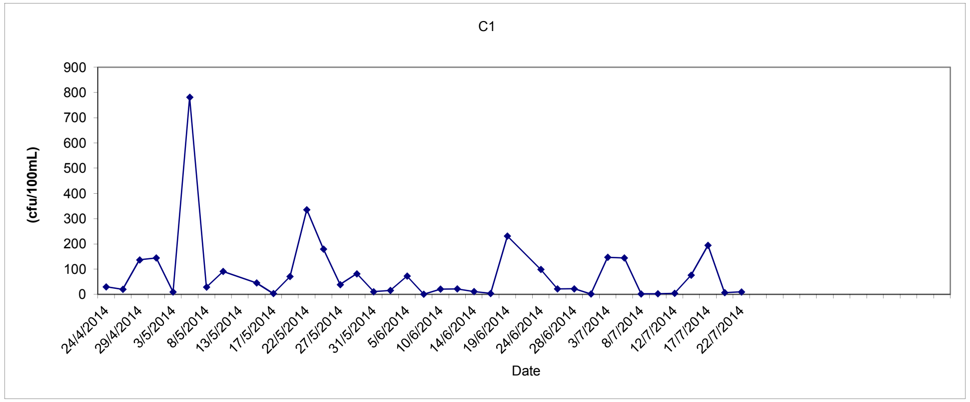


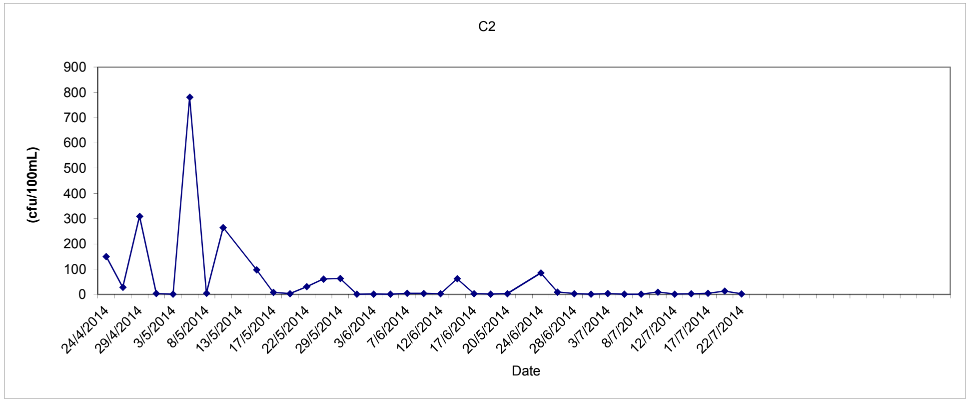


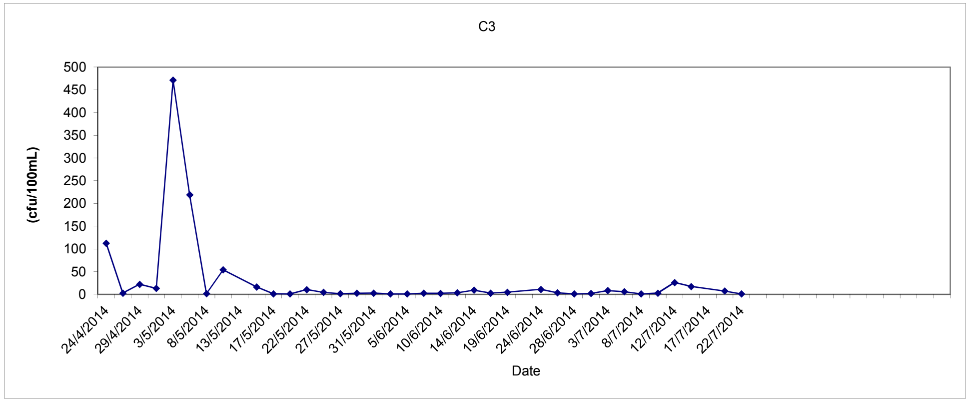
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



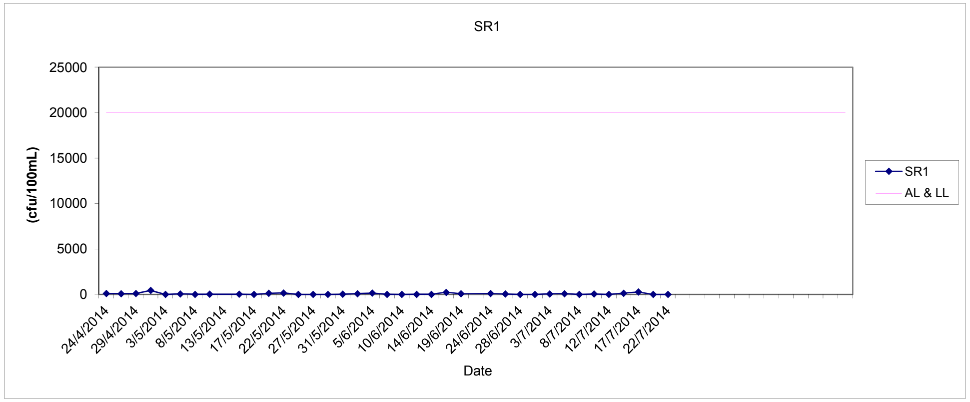
E.coli (Depth average) at Mid-Flood Tide

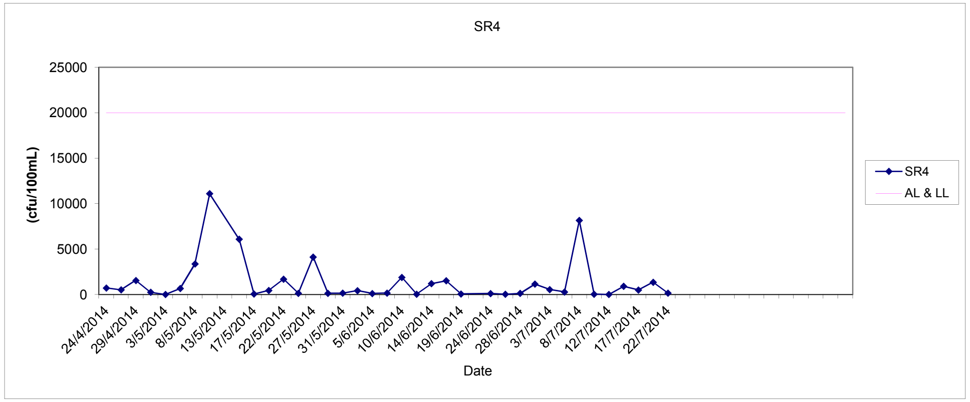


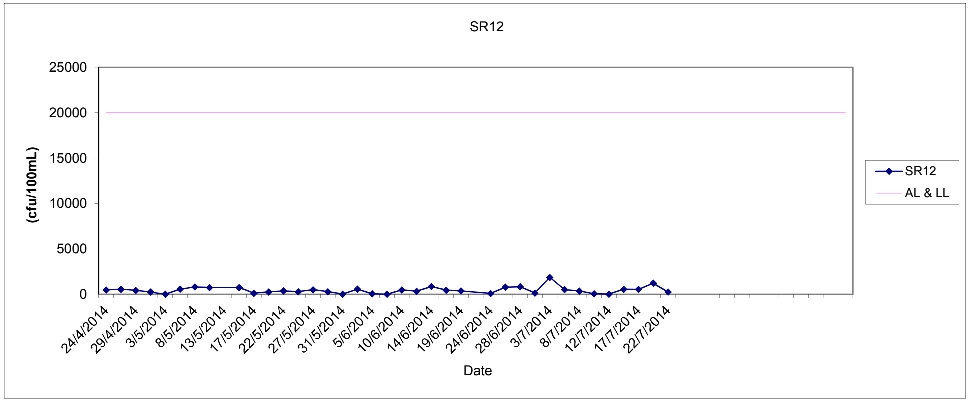




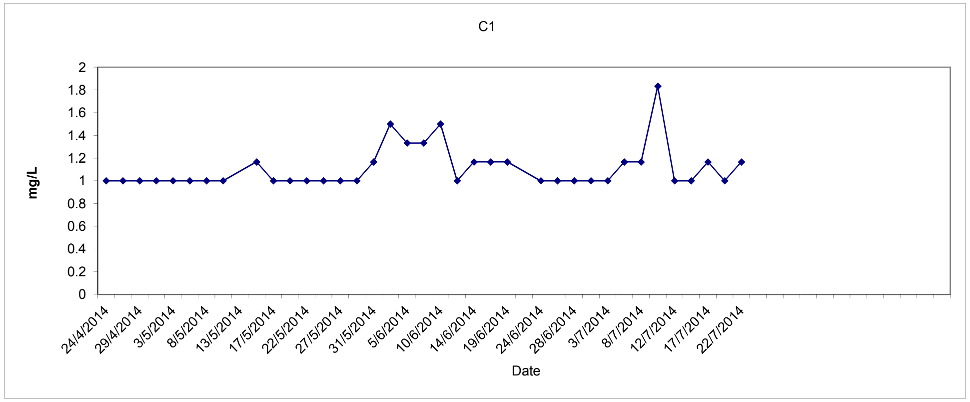
E.coli (Depth average) at Mid-Flood Tide

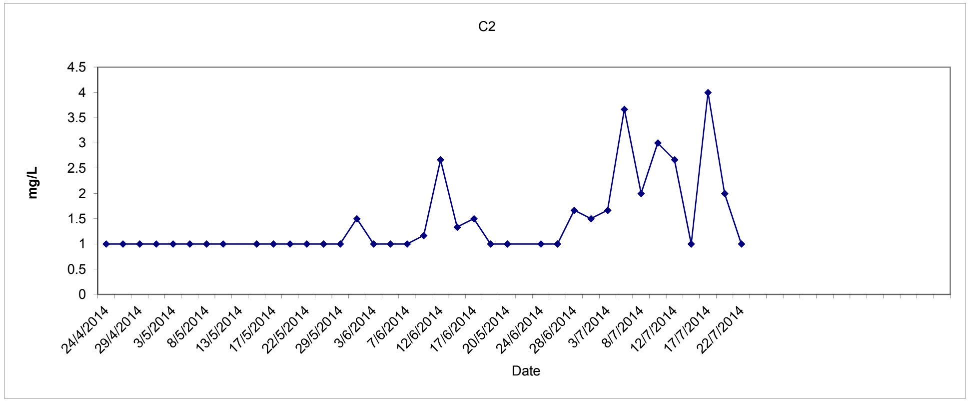


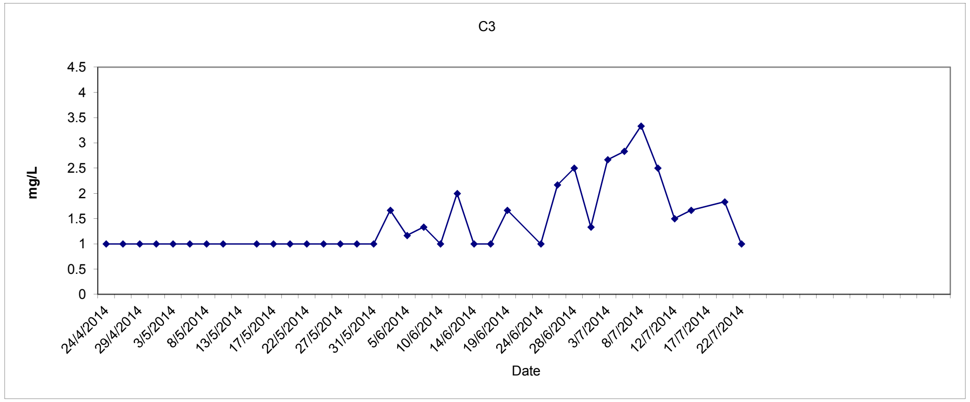




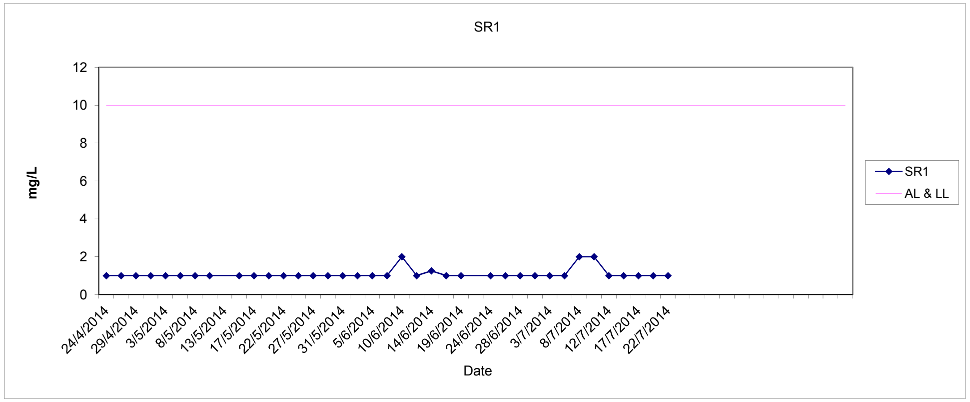
BOD_5 (Depth average) at Mid-Flood Tide

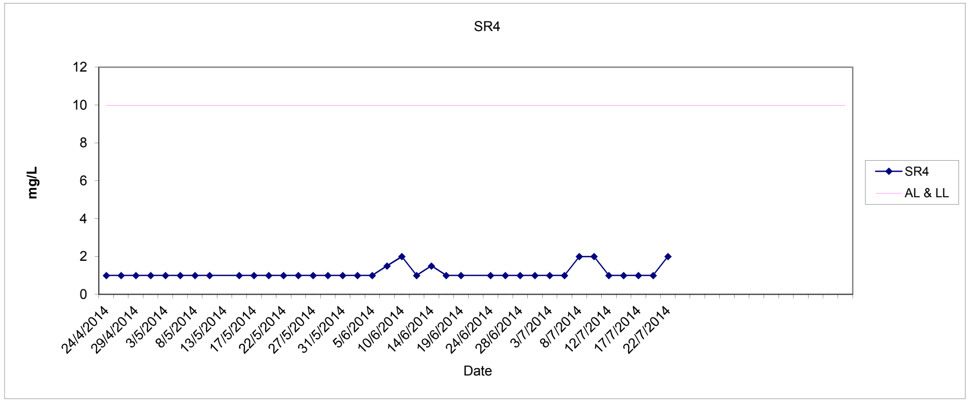


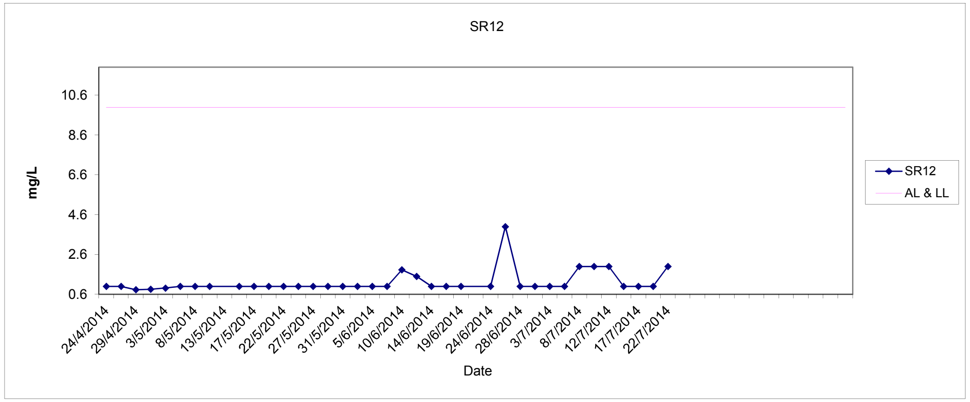




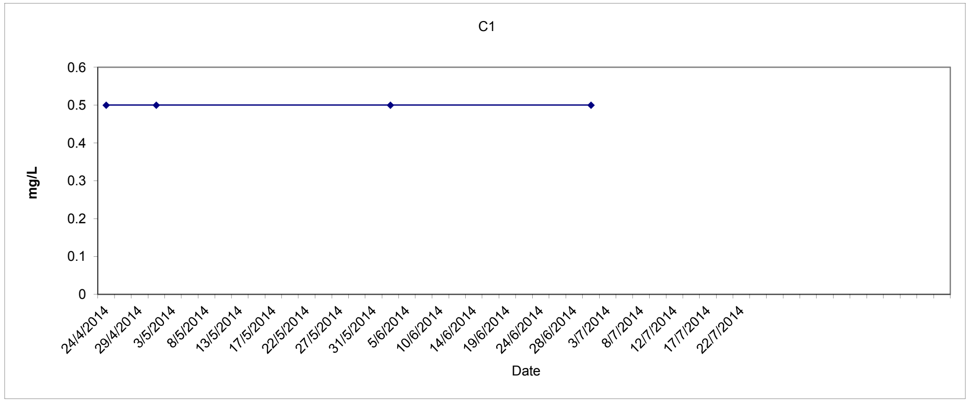
BOD_5 (Depth average) at Mid-Flood Tide

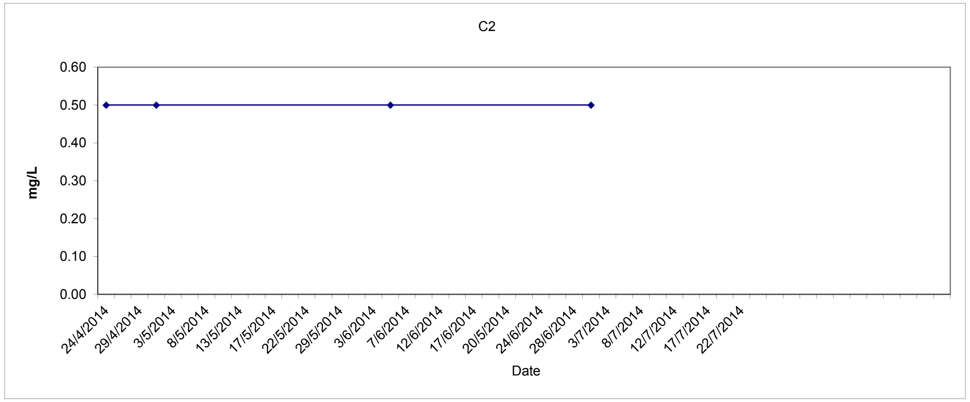


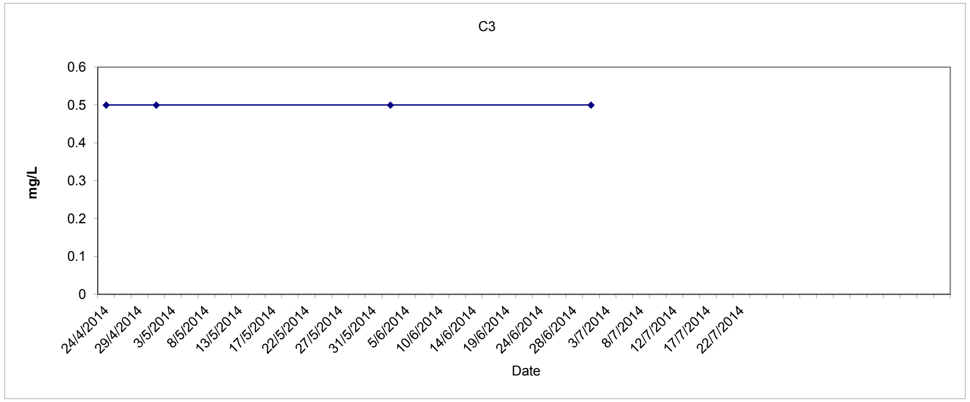




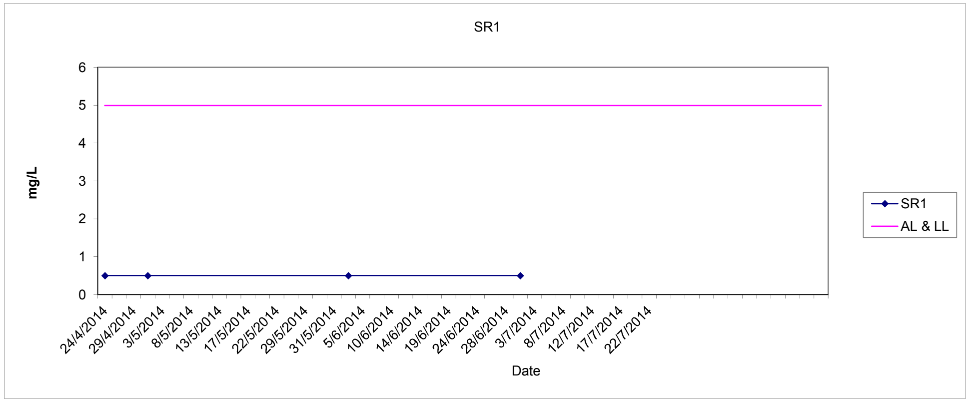
Synthetic Detergent (Depth average) at Mid-Flood Tide

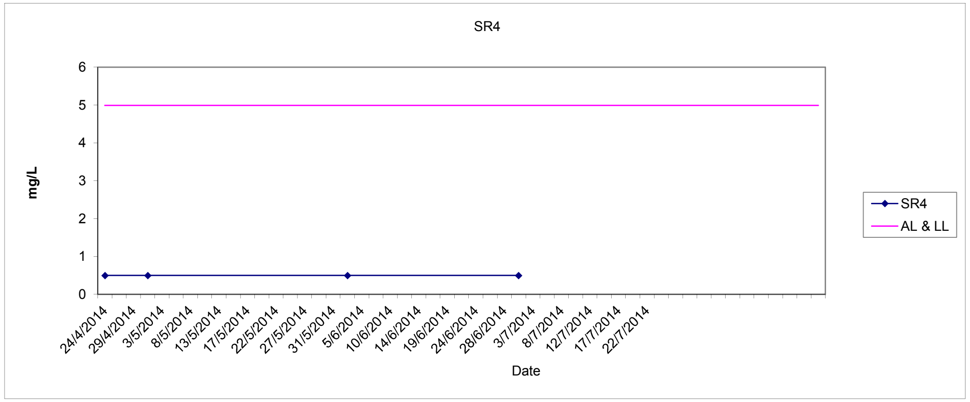


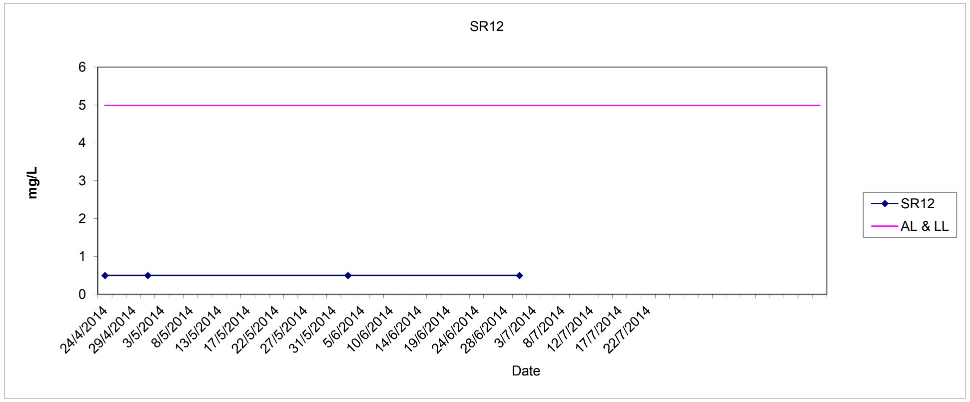




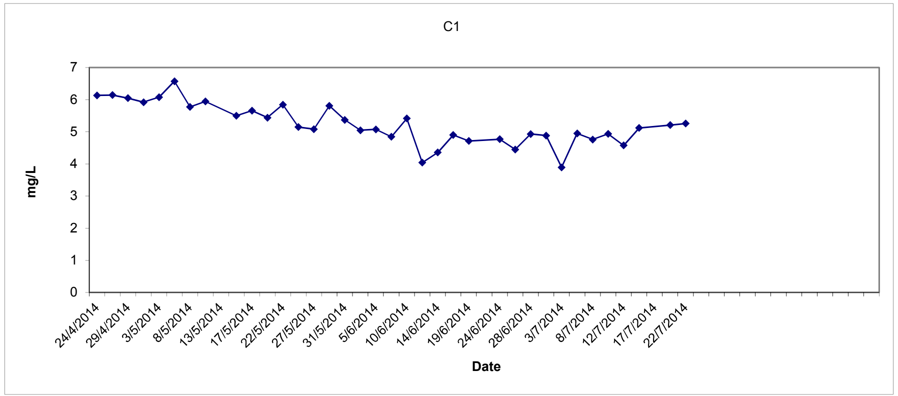
Synthetic Detergent (Depth average) at Mid-Flood Tide

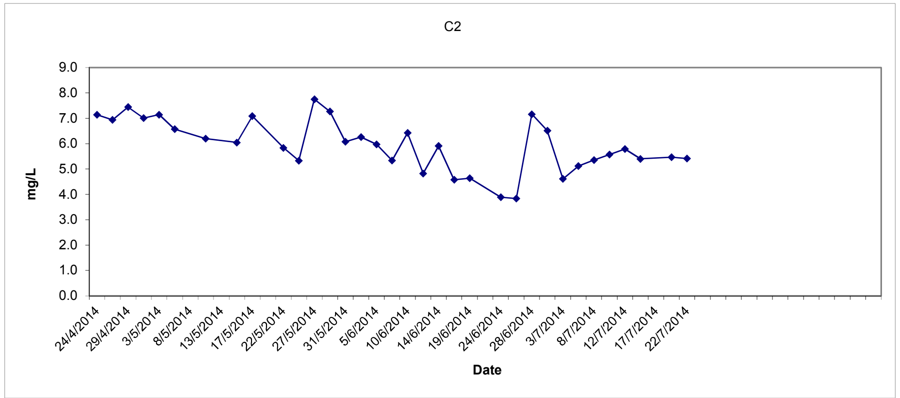


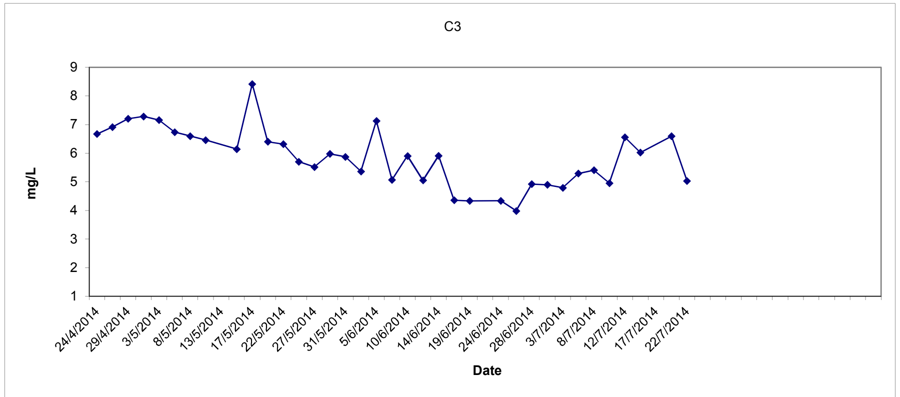




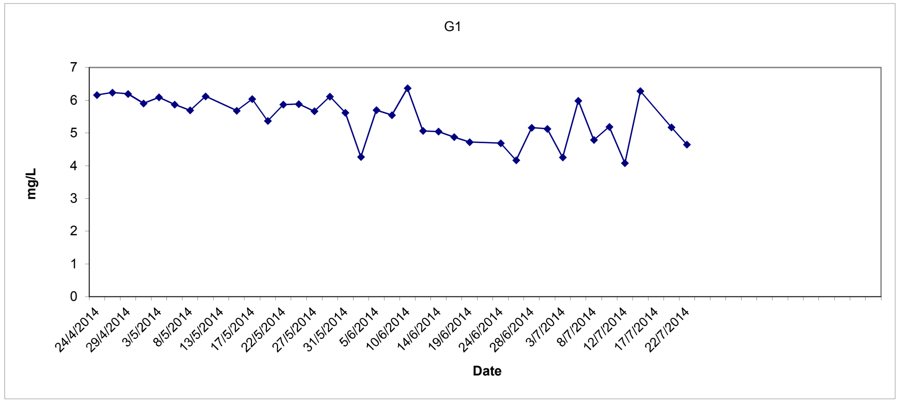
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

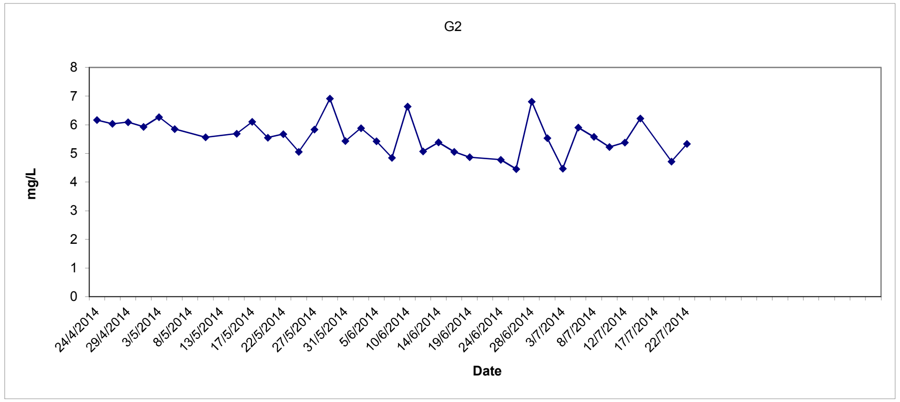


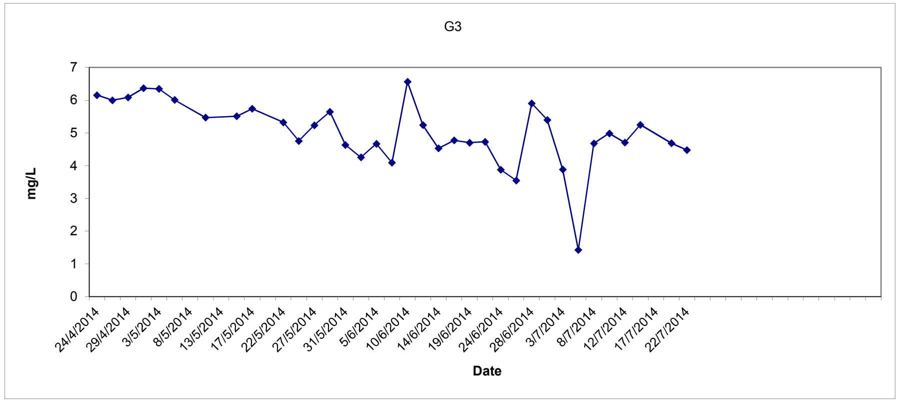




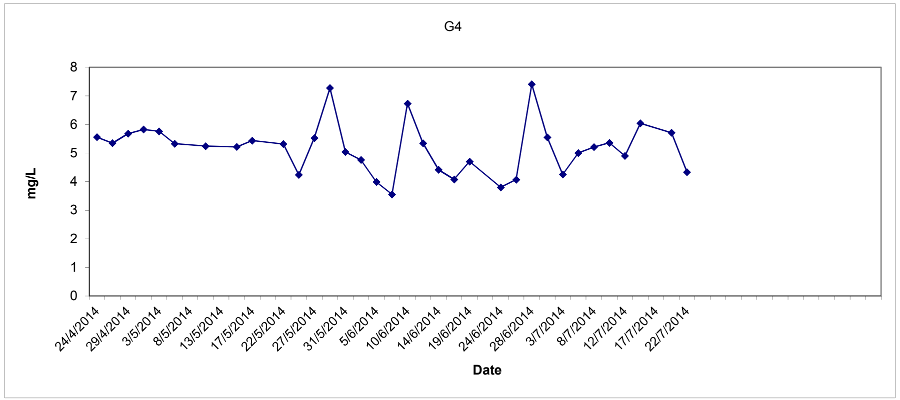
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

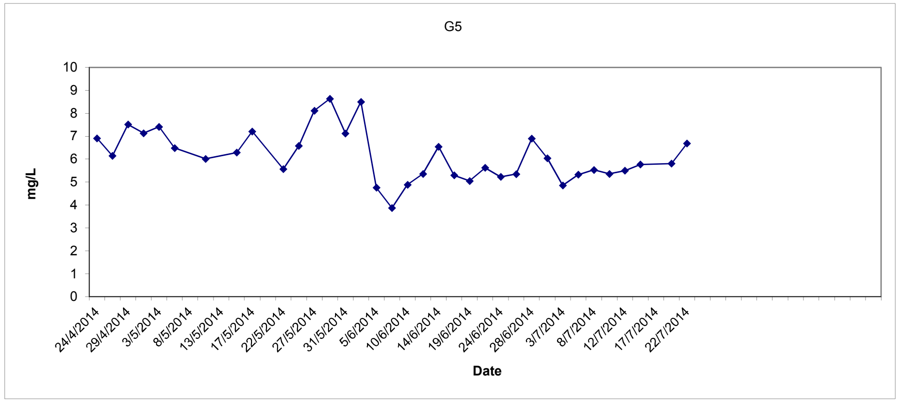


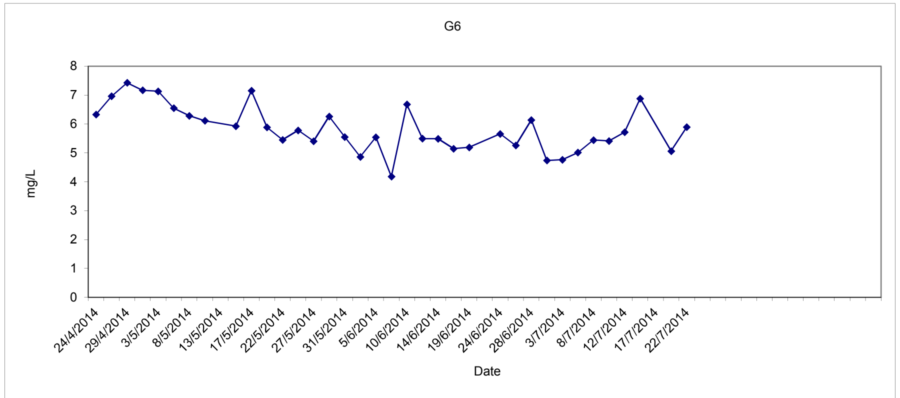




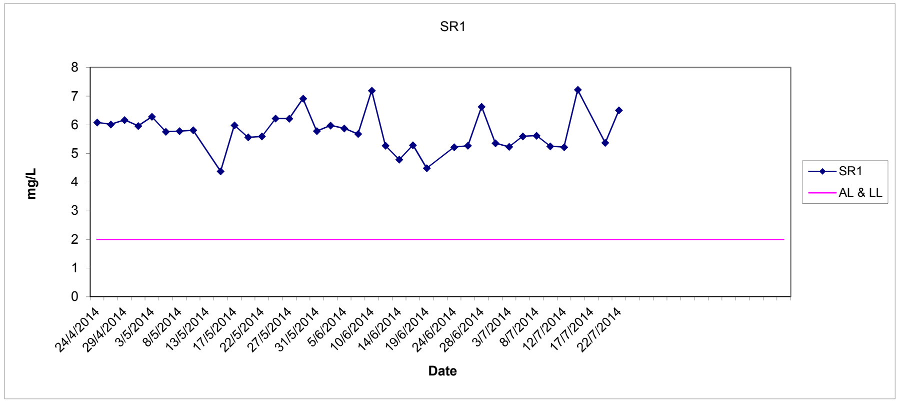
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

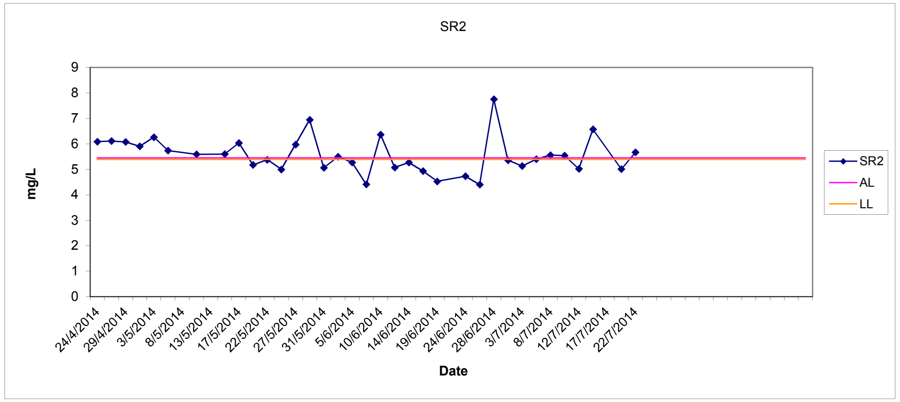


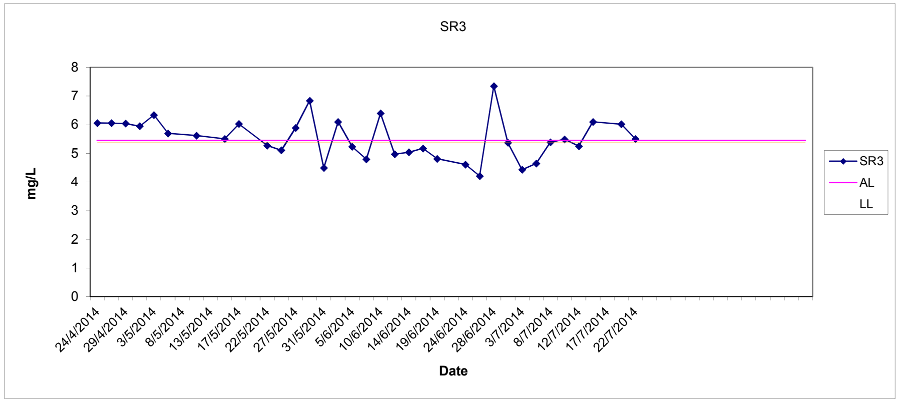




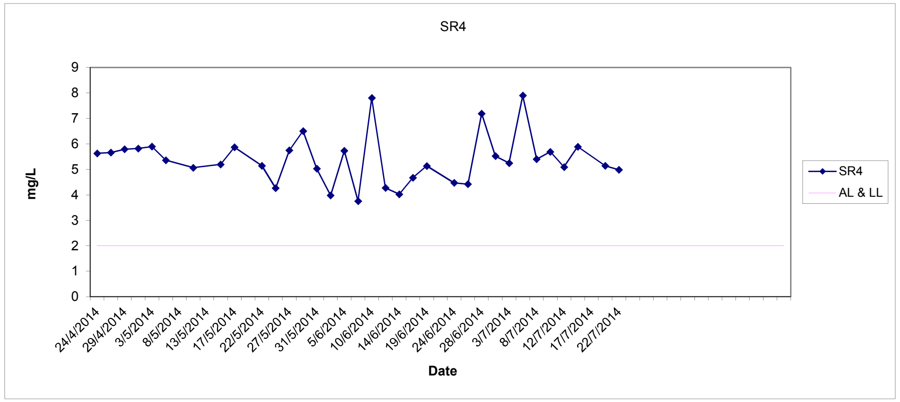
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

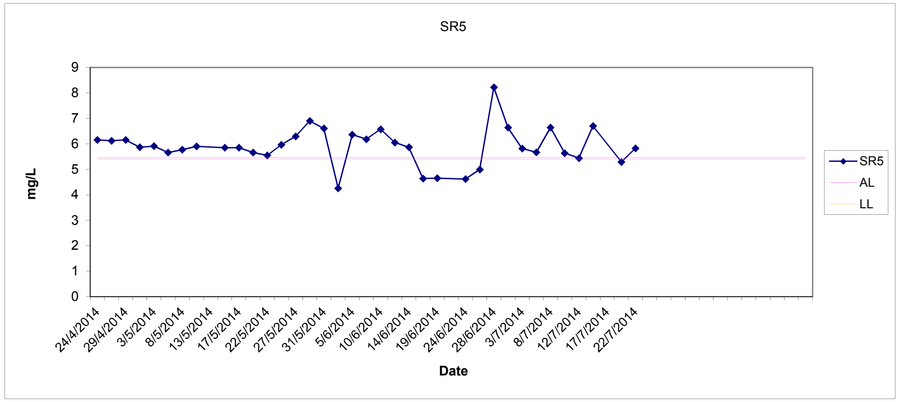


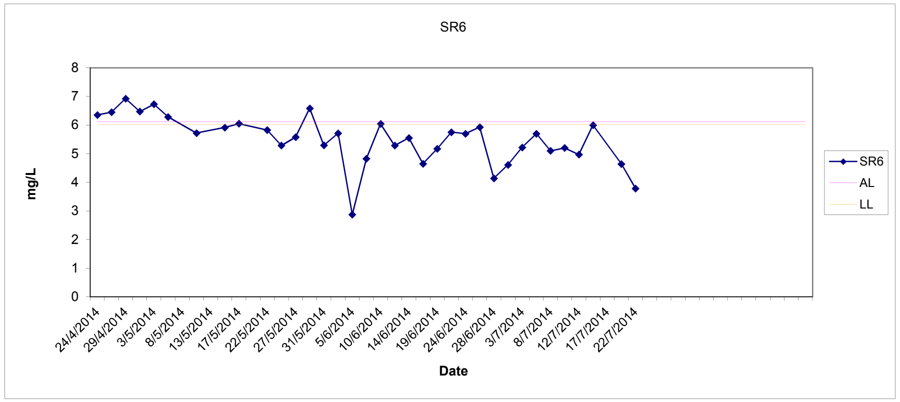




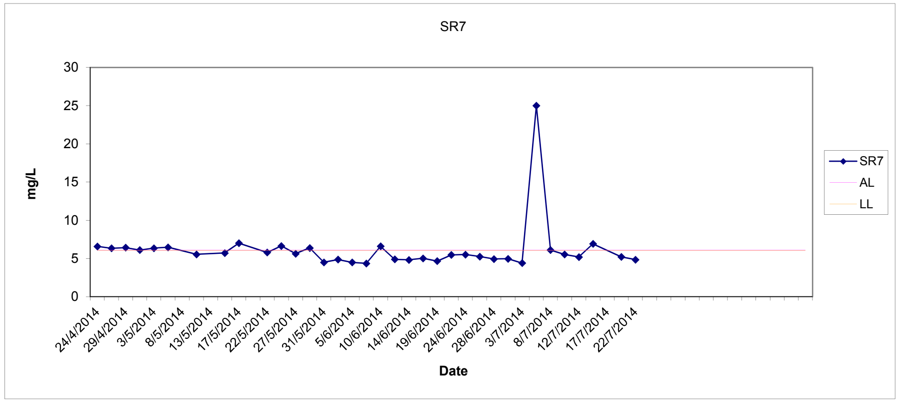
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

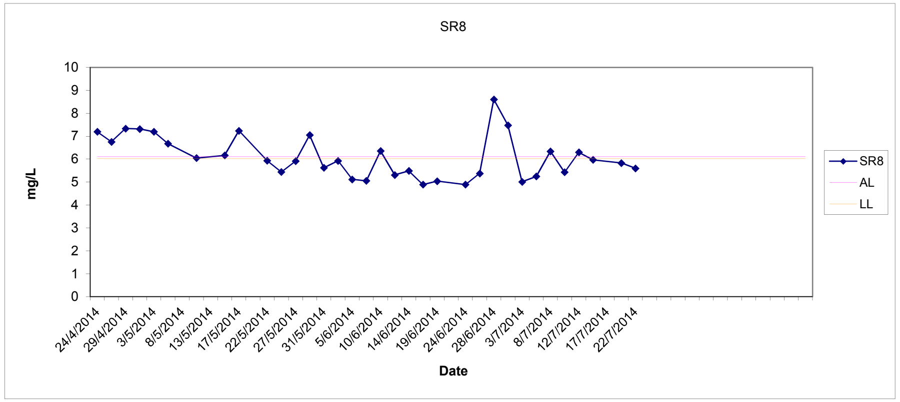


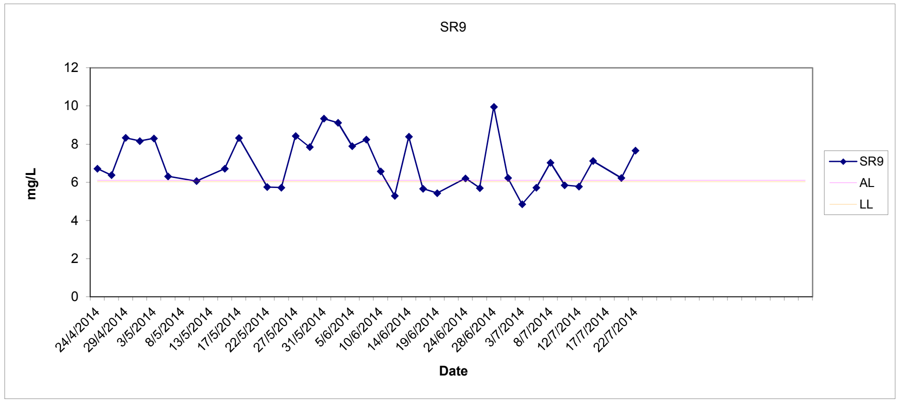




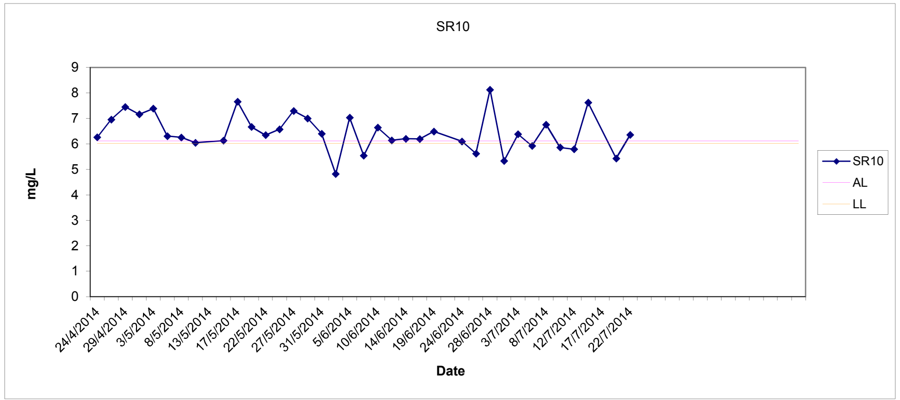
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

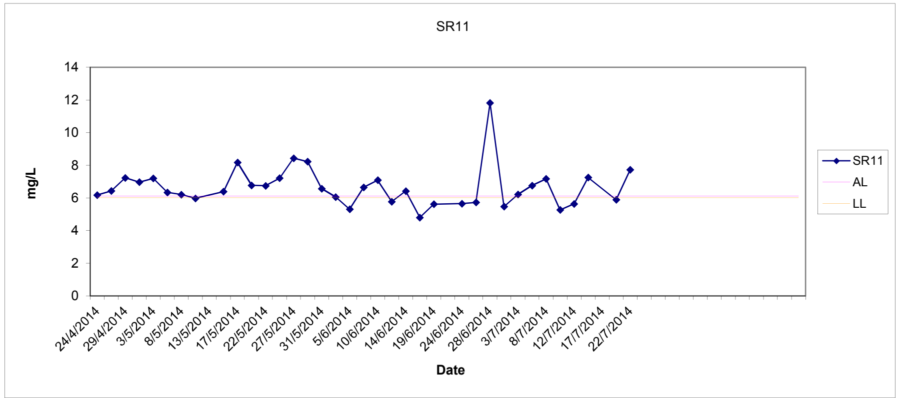


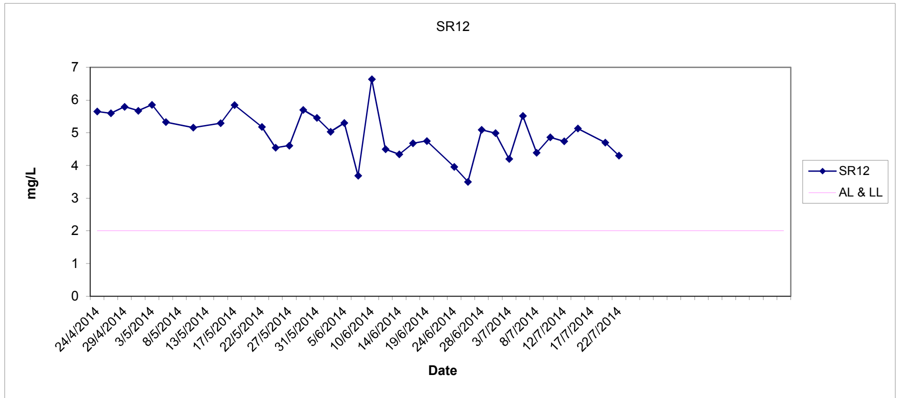




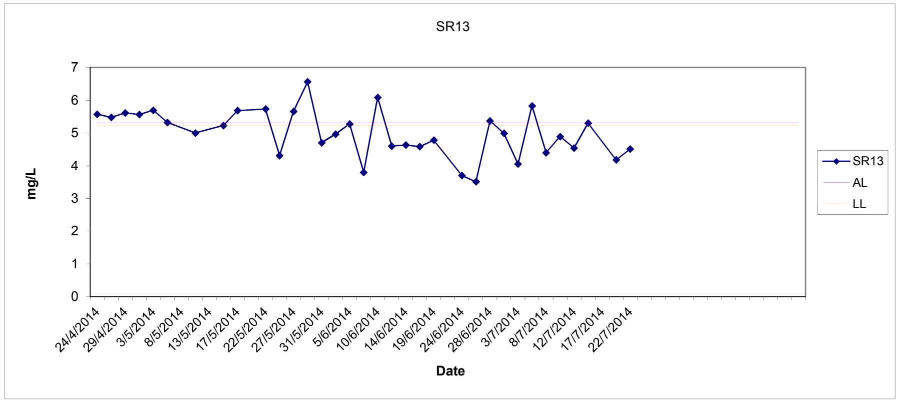
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



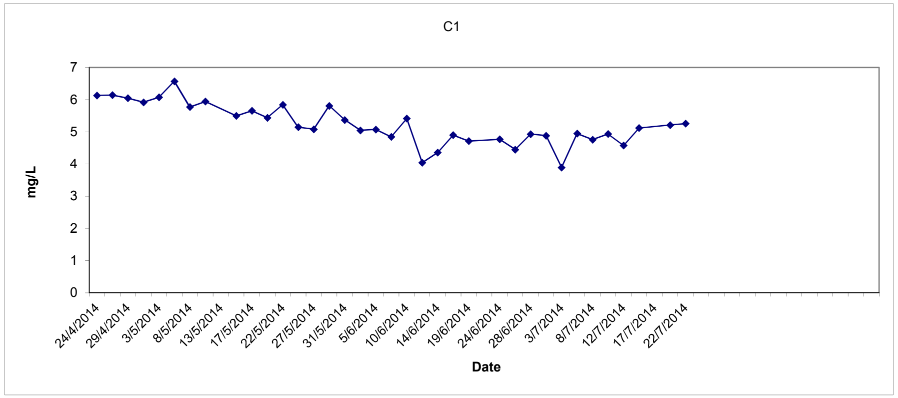


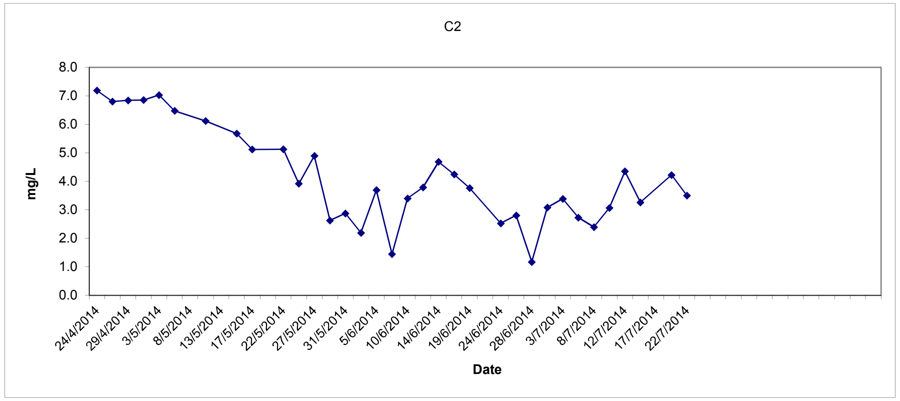


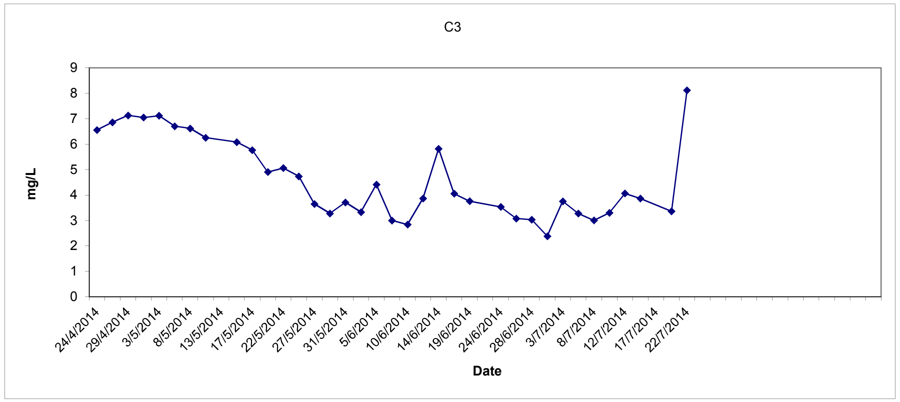
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



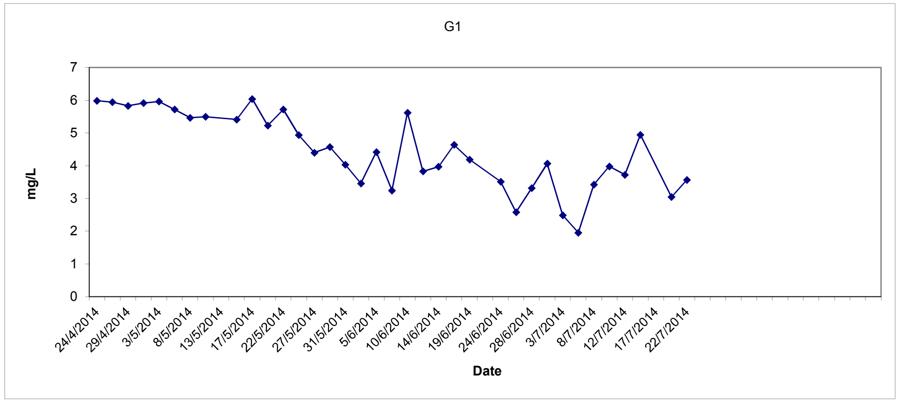
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

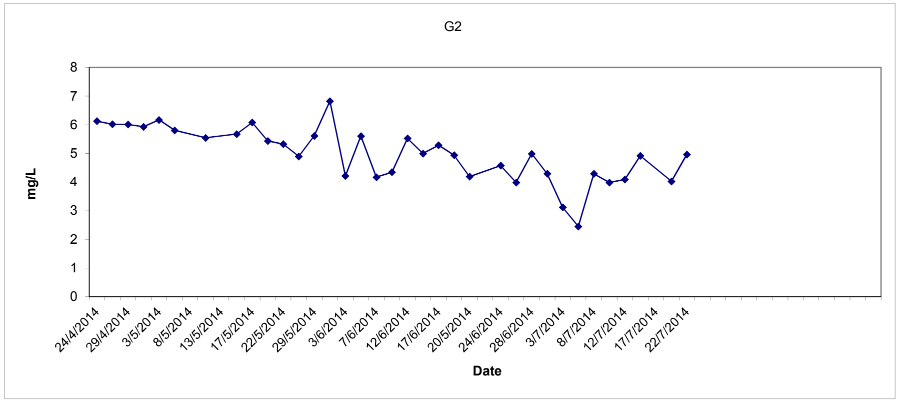


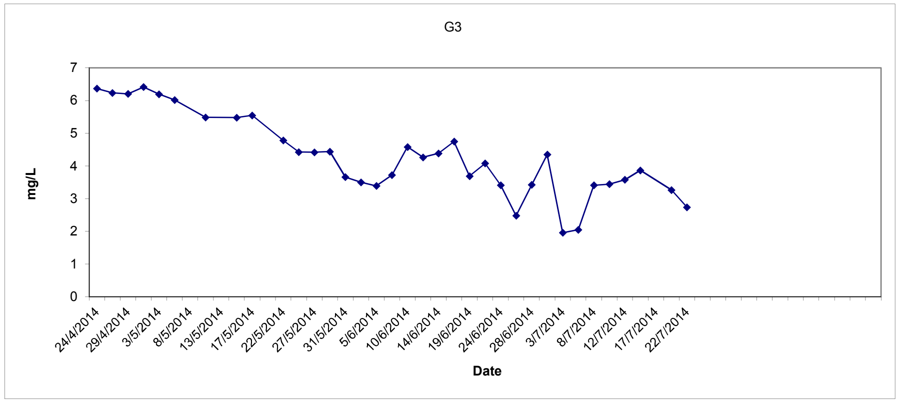




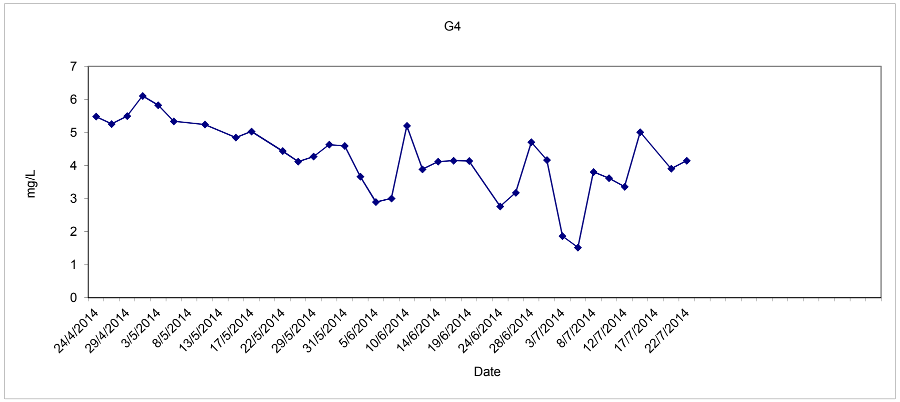
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

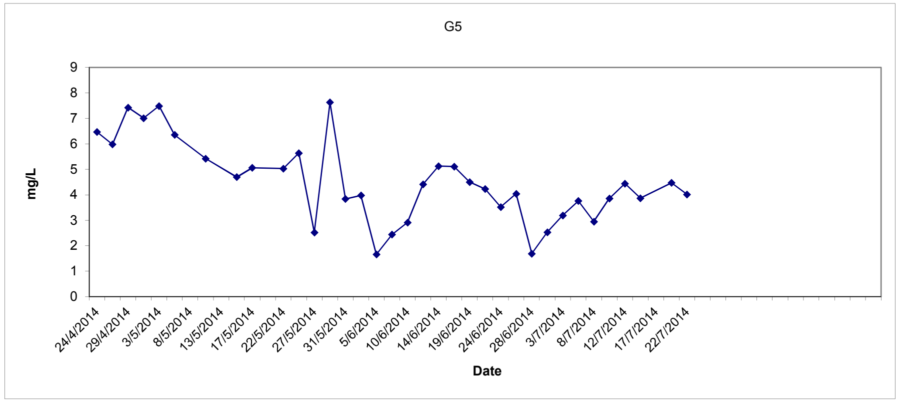


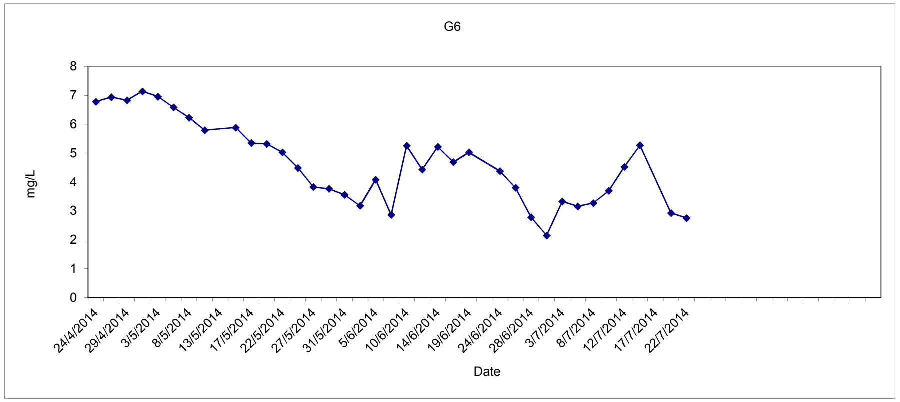




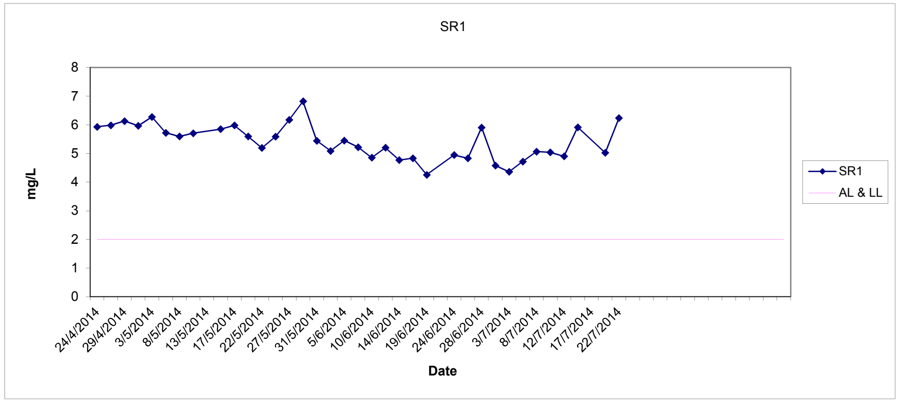
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

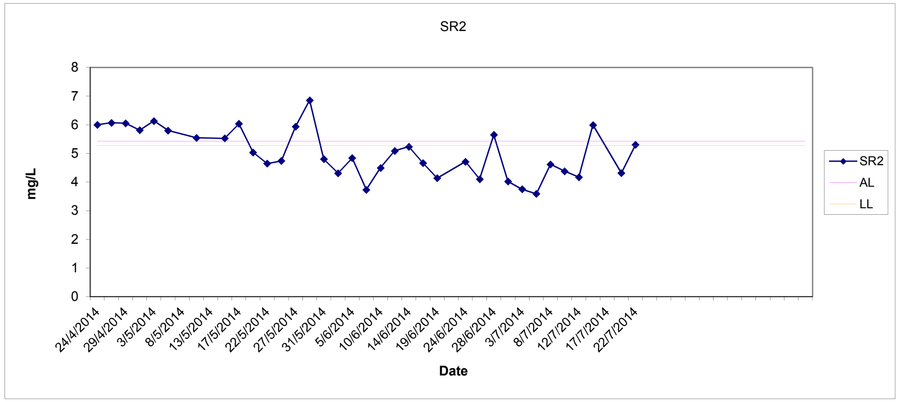


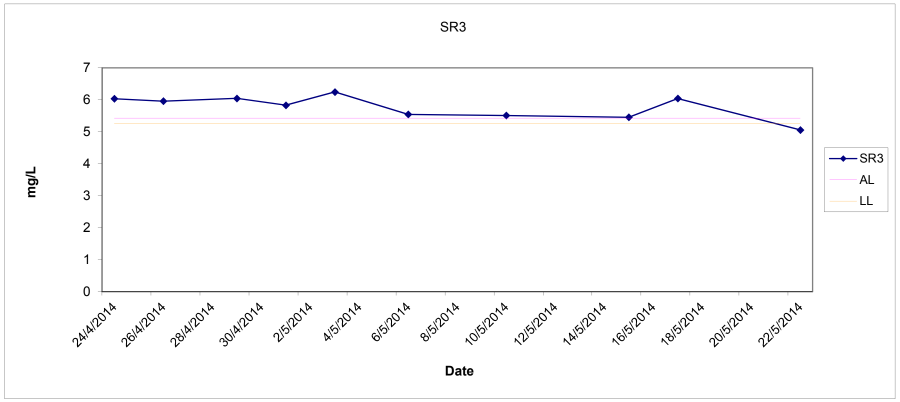




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

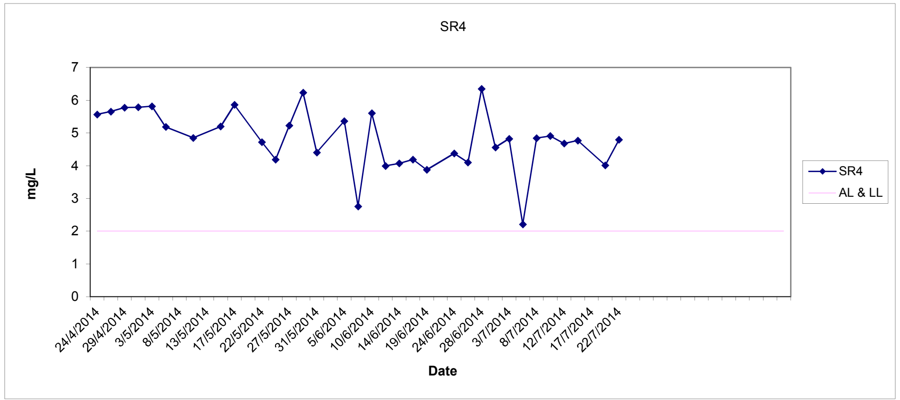


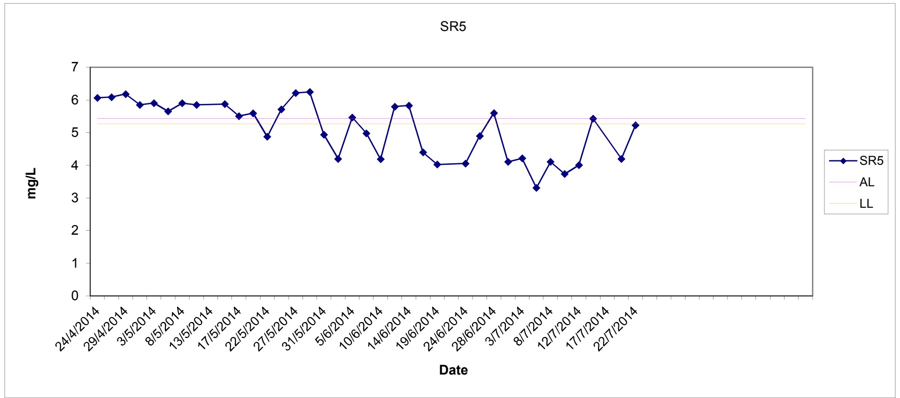


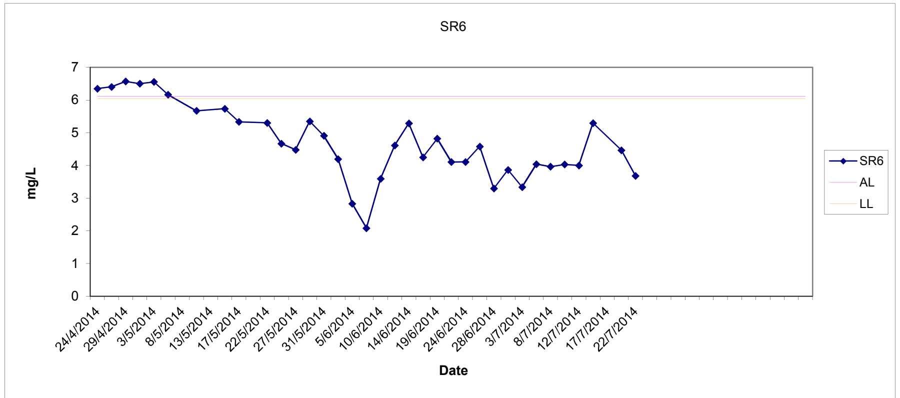


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

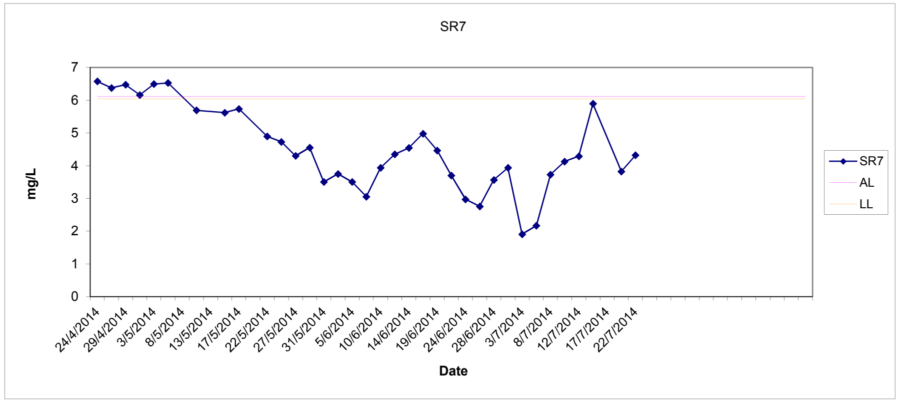
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

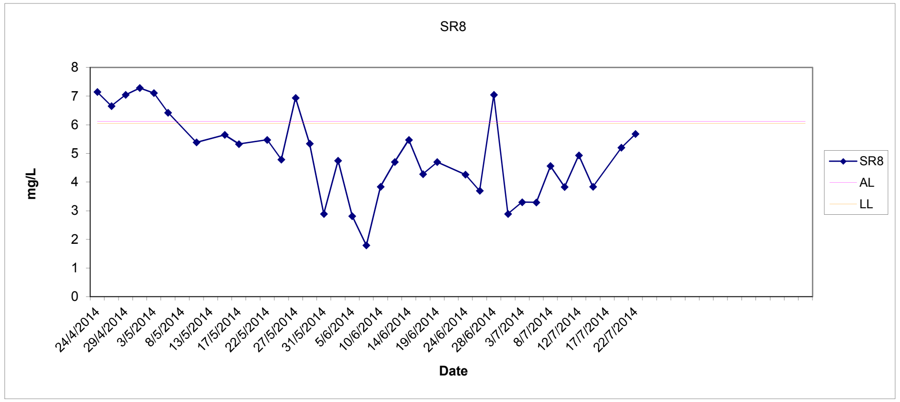


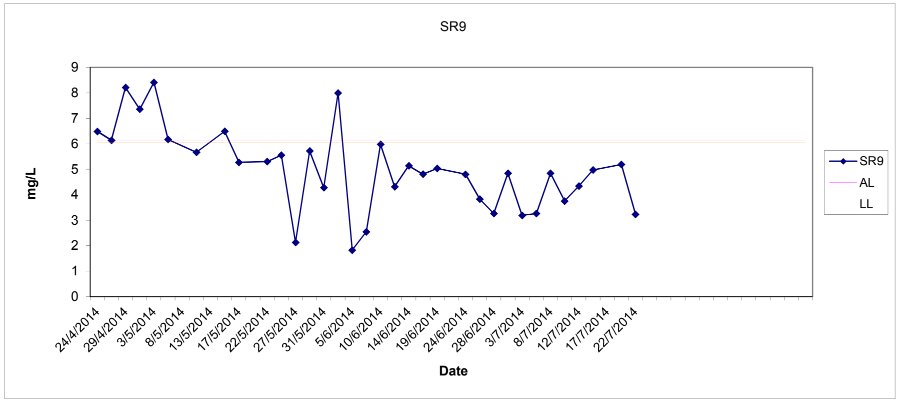




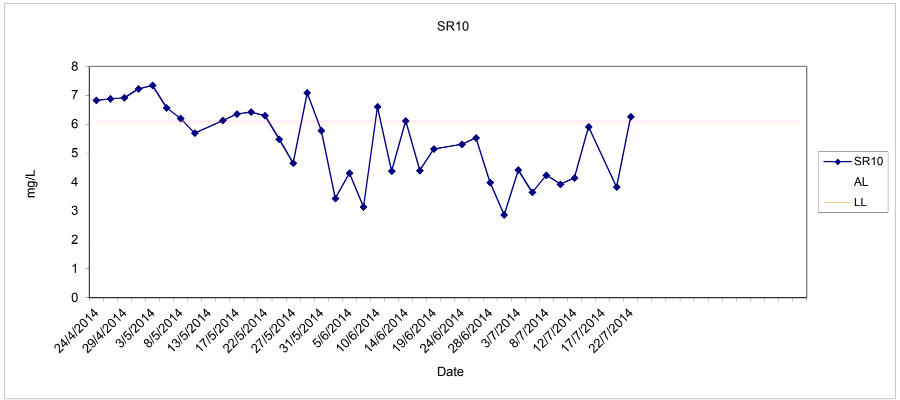
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

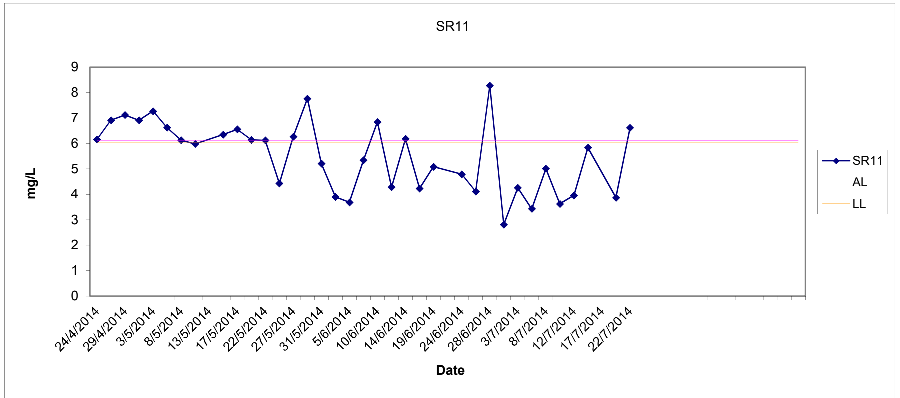


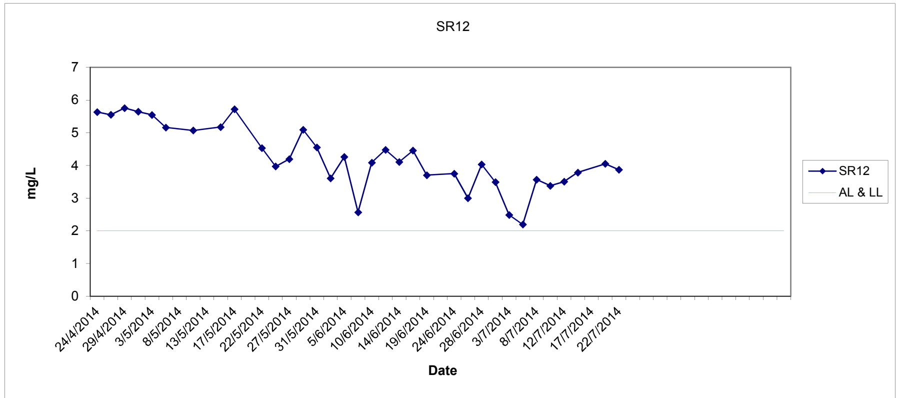




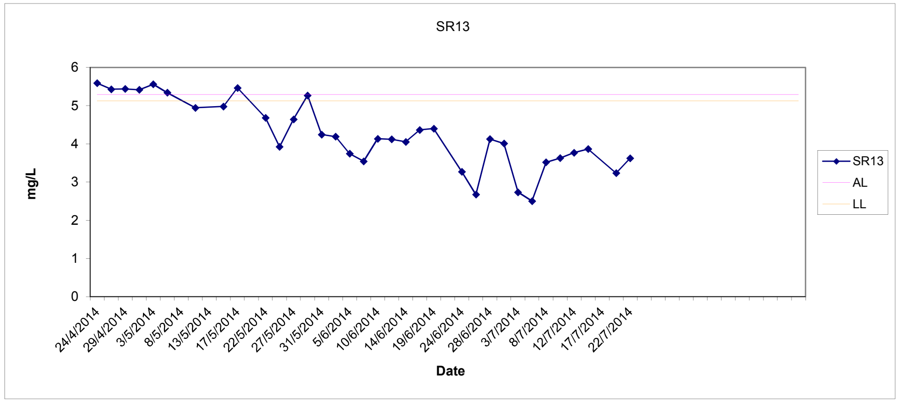
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



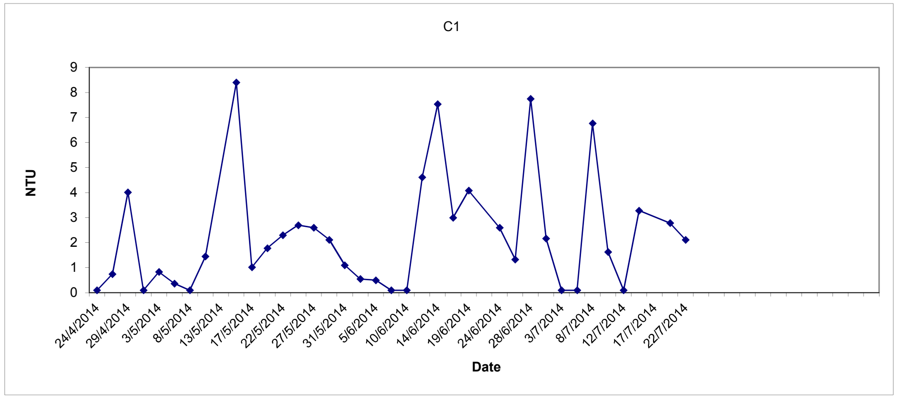


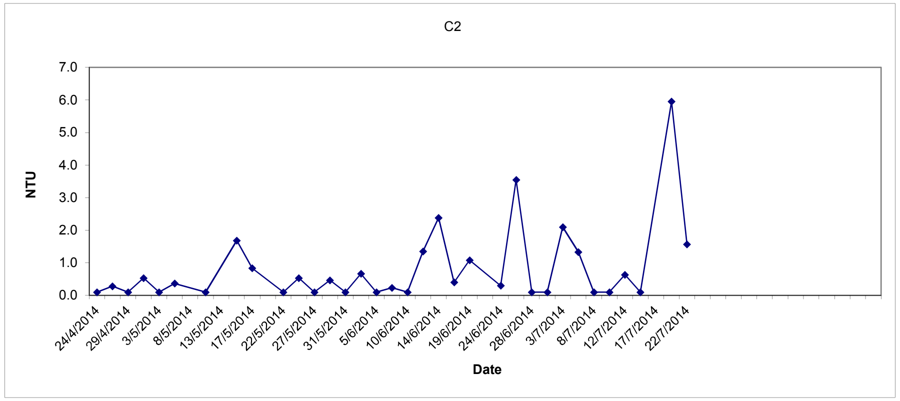


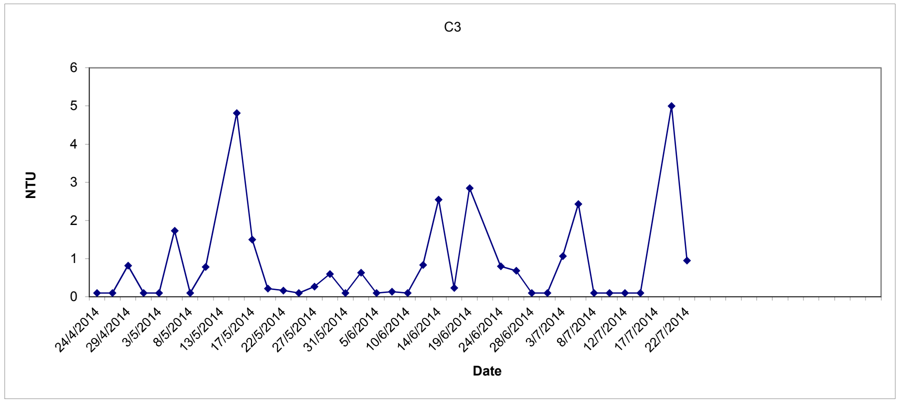
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



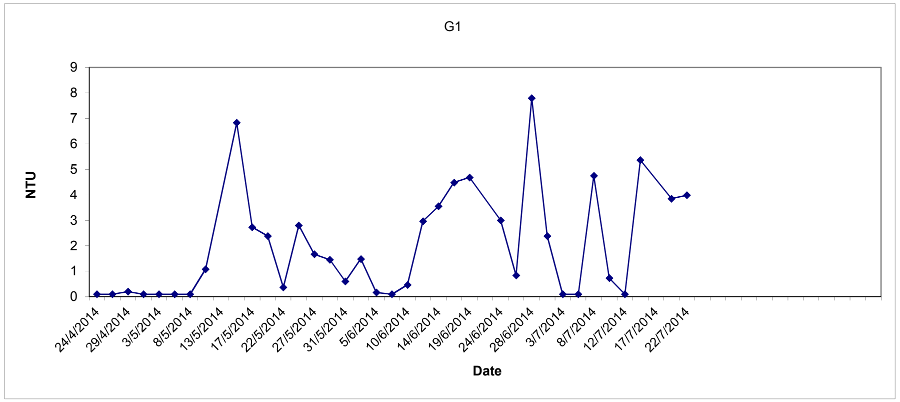
Turbidity (Depth average) at Mid-Ebb Tide

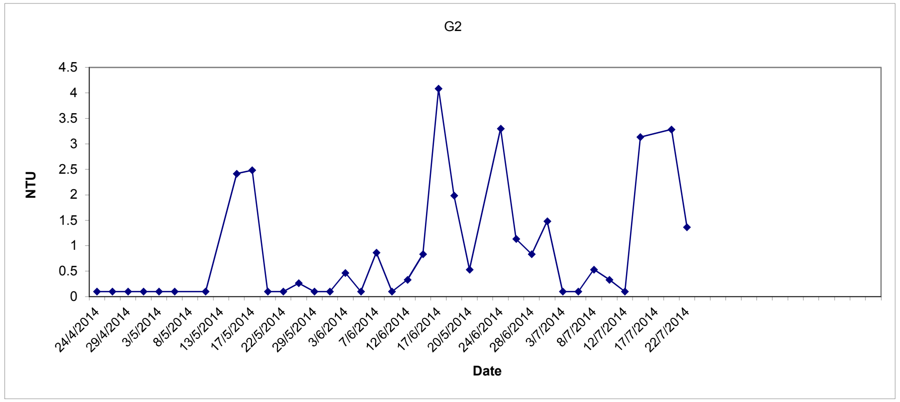


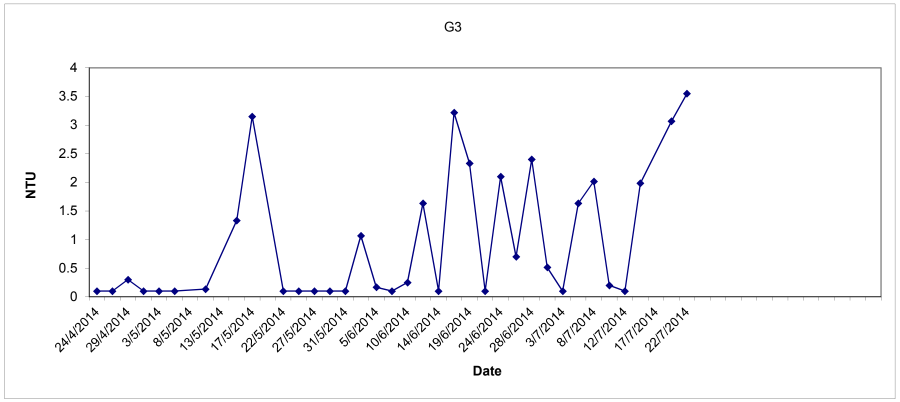




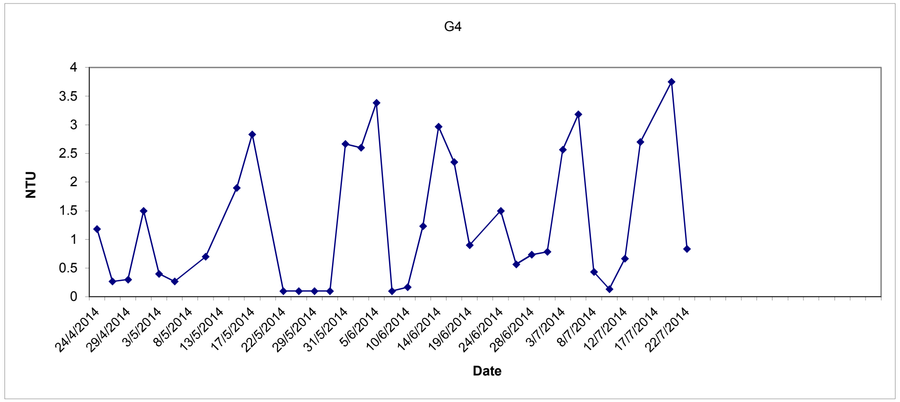
Turbidity (Depth average) at Mid-Ebb Tide

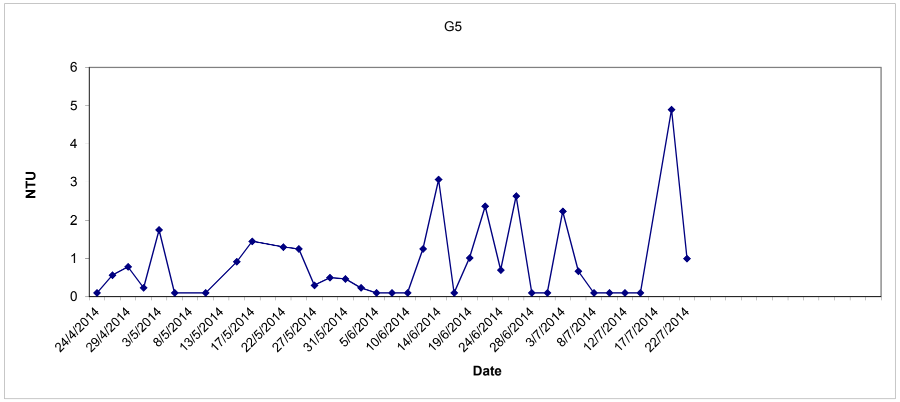


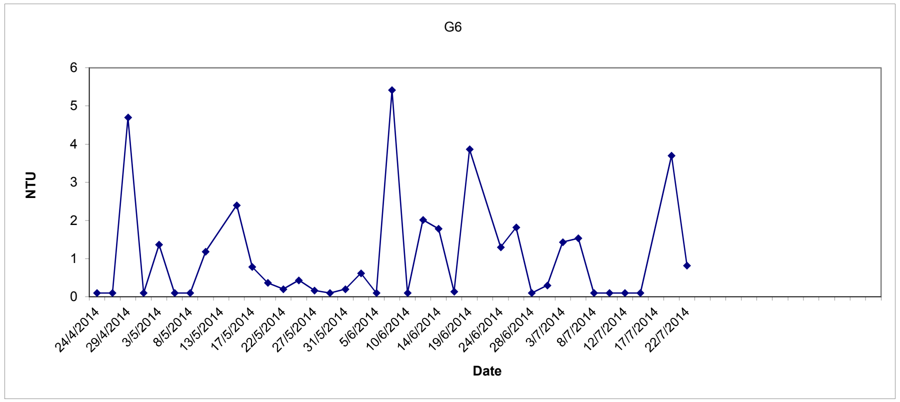




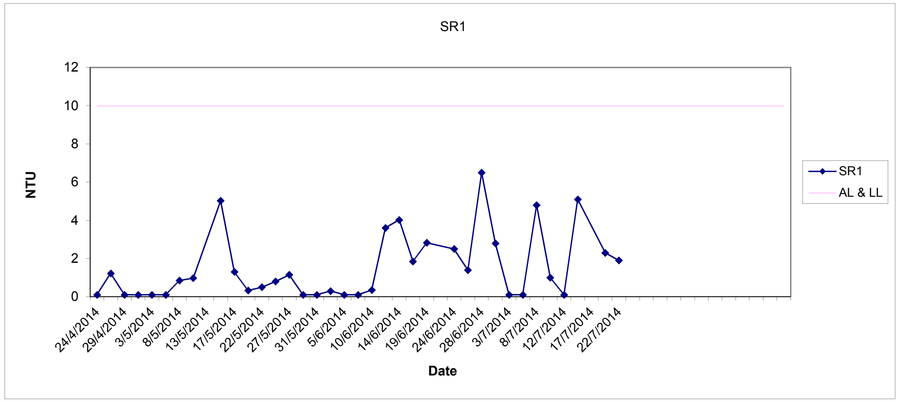
Turbidity (Depth average) at Mid-Ebb Tide

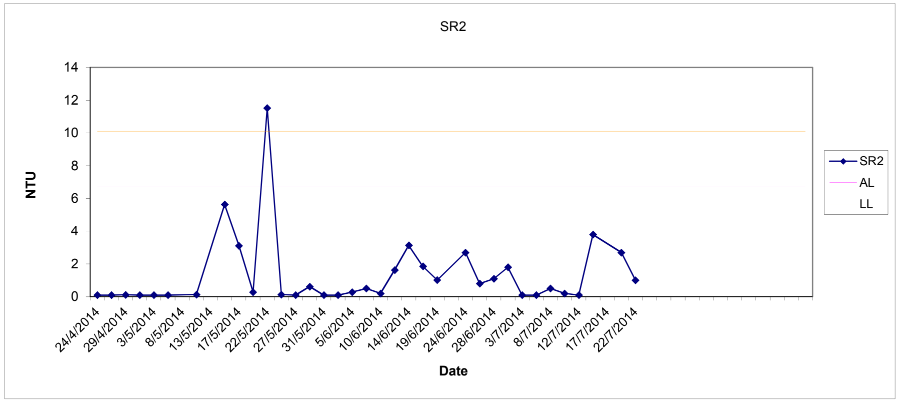


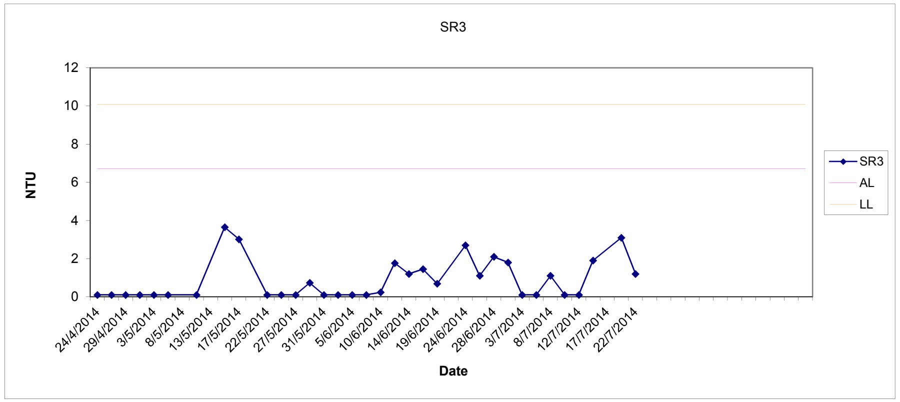




Turbidity (Depth average) at Mid-Ebb Tide







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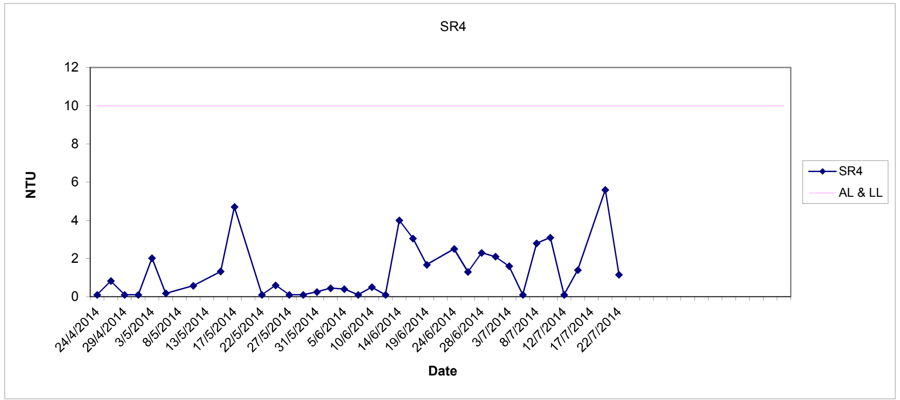

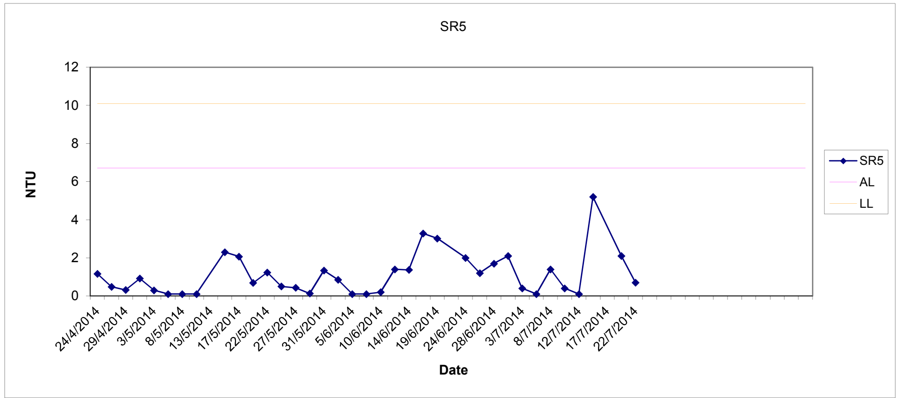

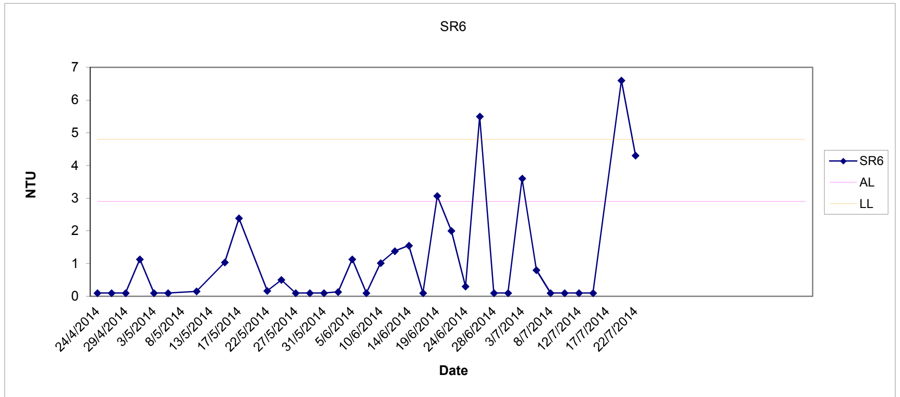

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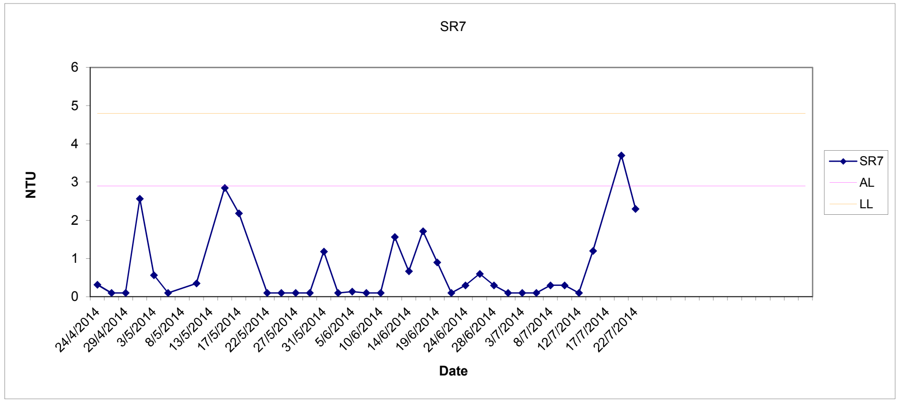

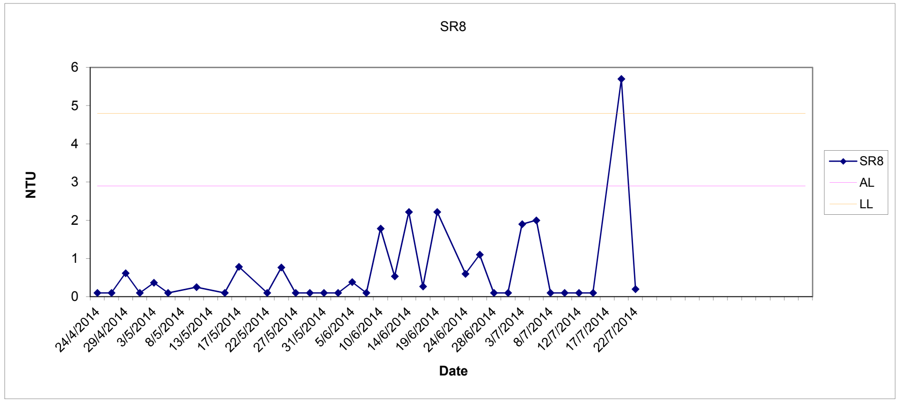

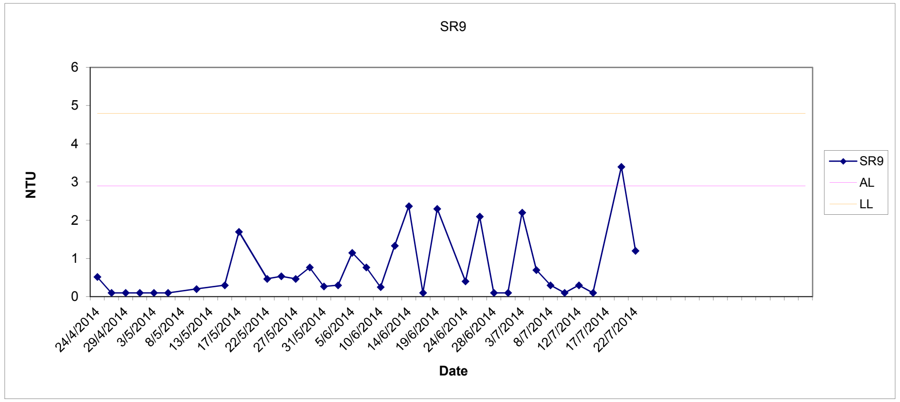

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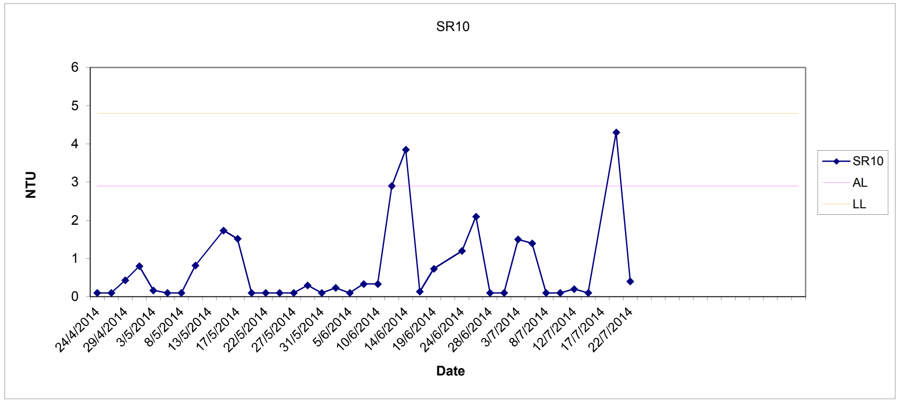

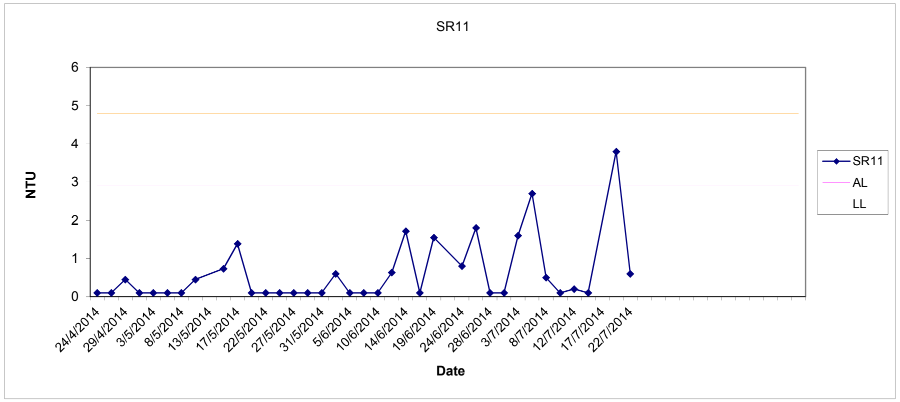

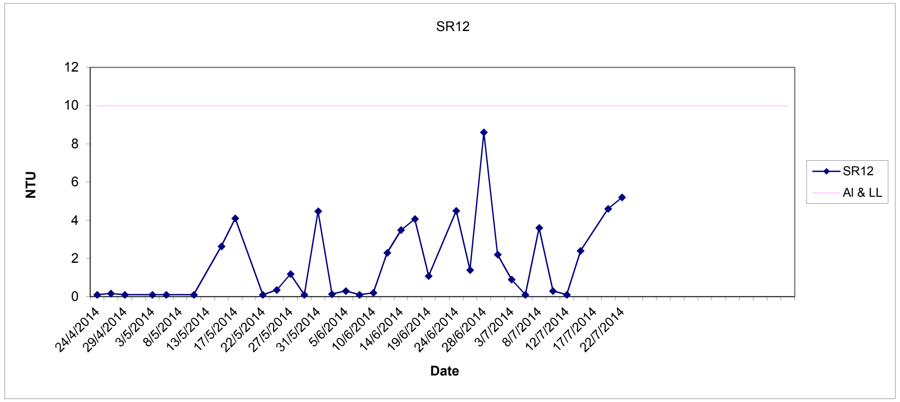

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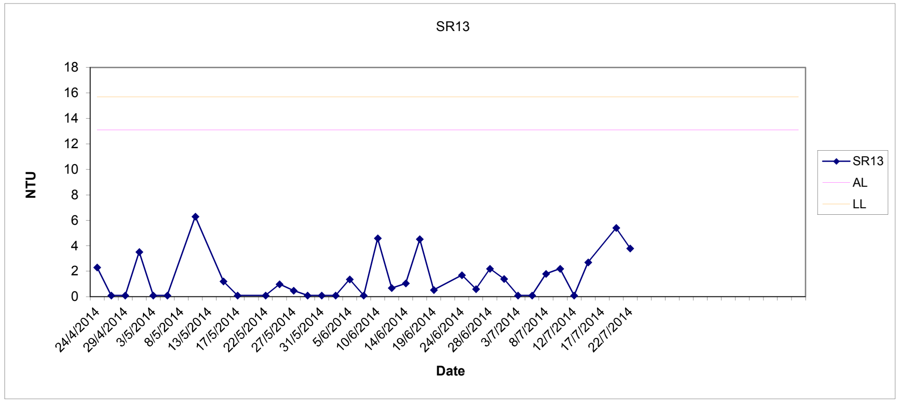
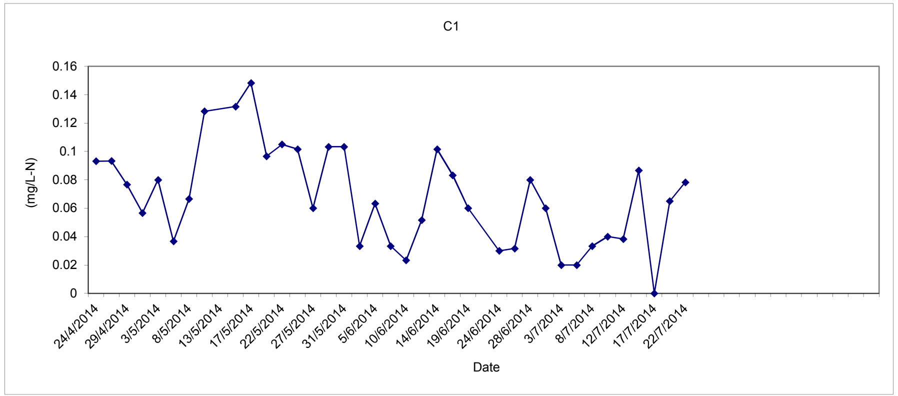
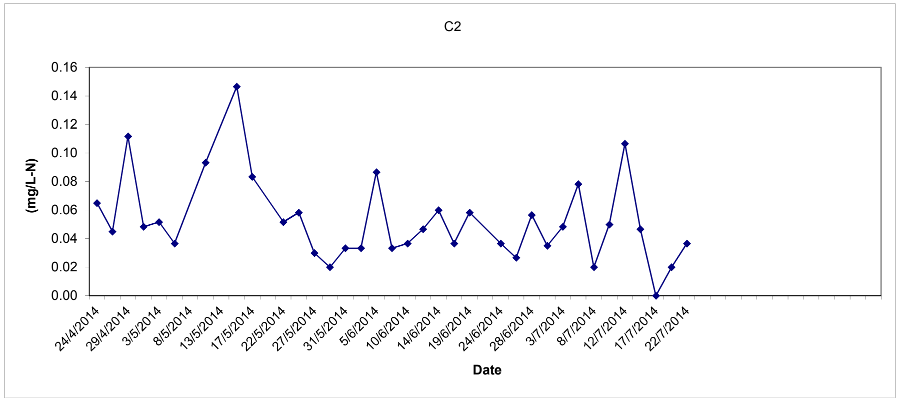
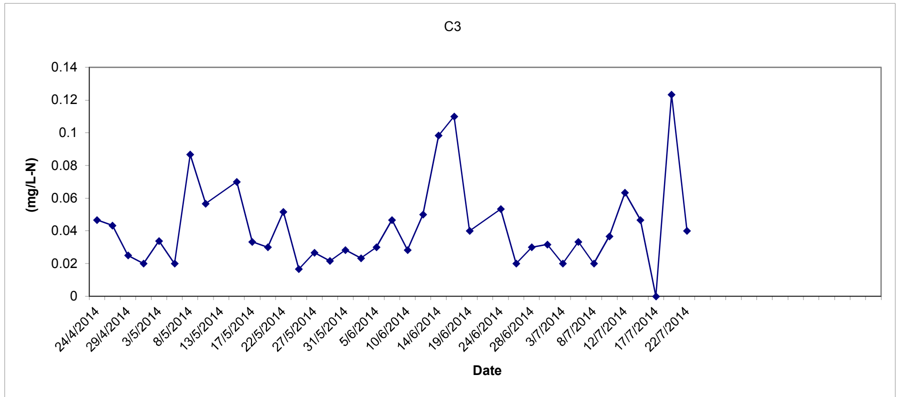


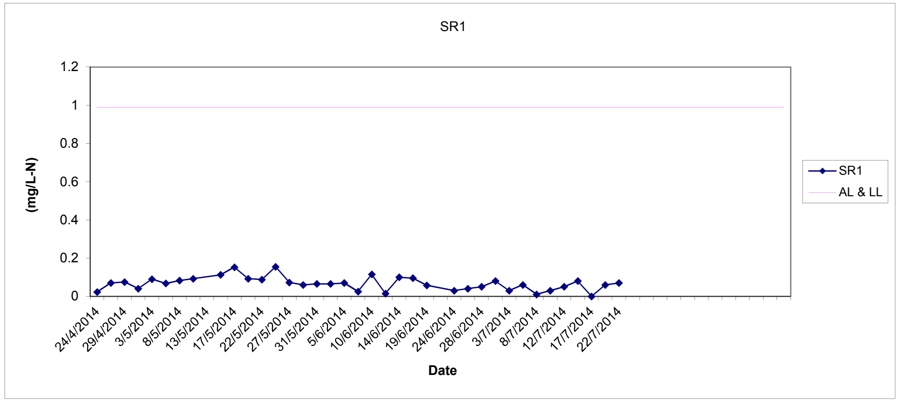
In-situ Ammonia (Depth average) at Mid-Ebb Tide

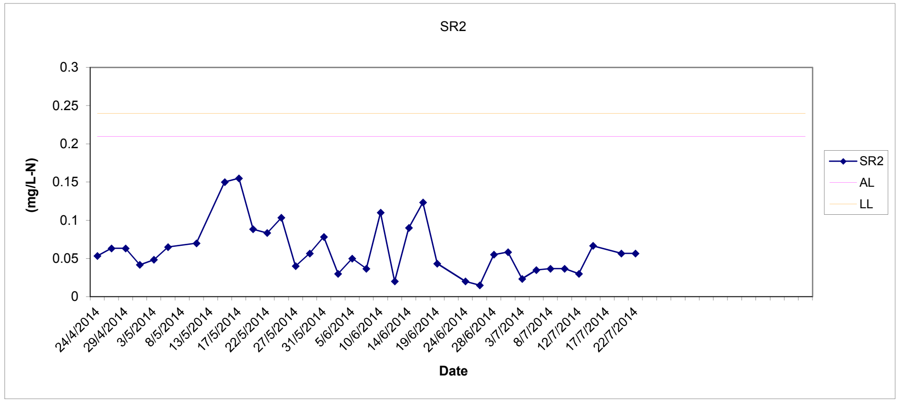


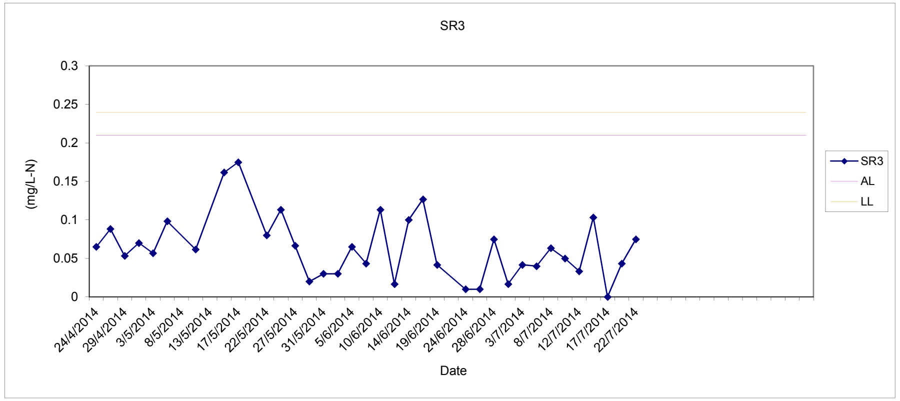




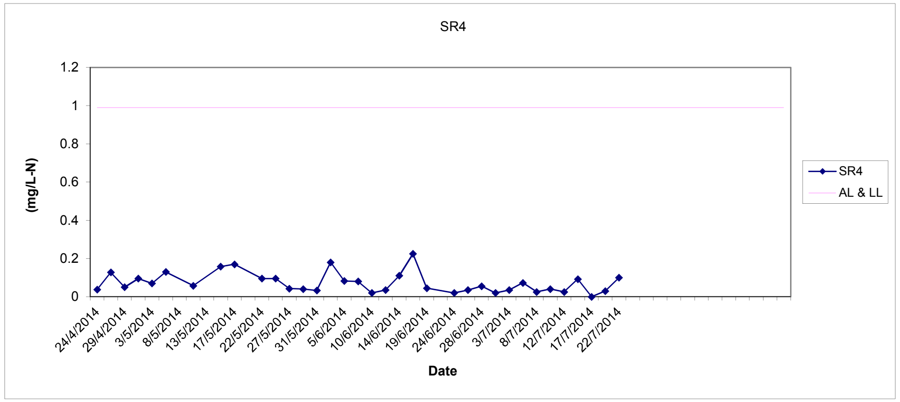
In-situ Ammonia (Depth average) at Mid-Ebb Tide

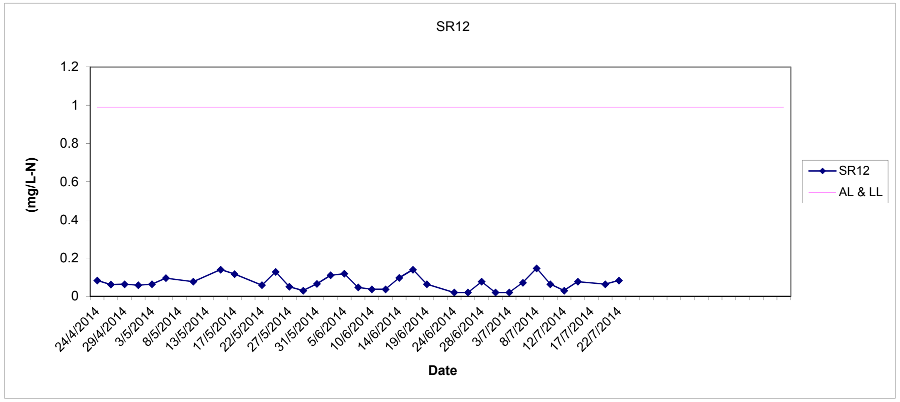




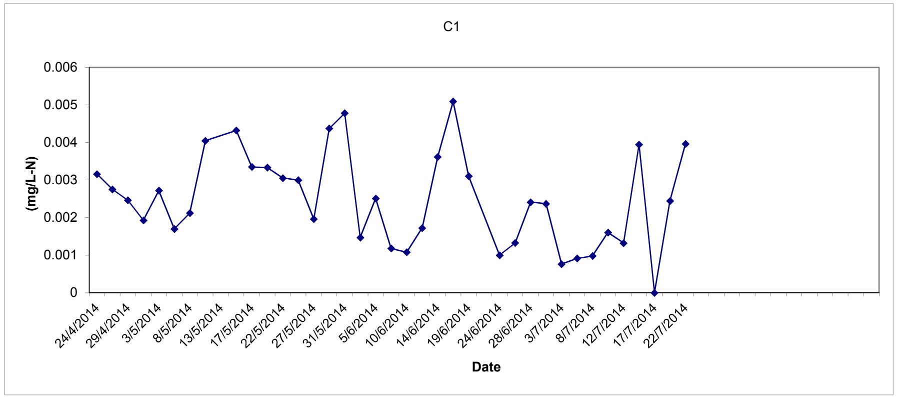


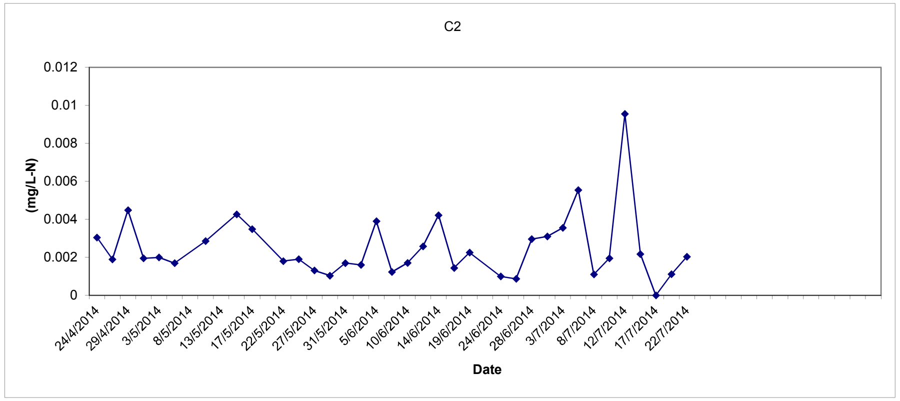
In-situ Ammonia (Depth average) at Mid-Ebb Tide

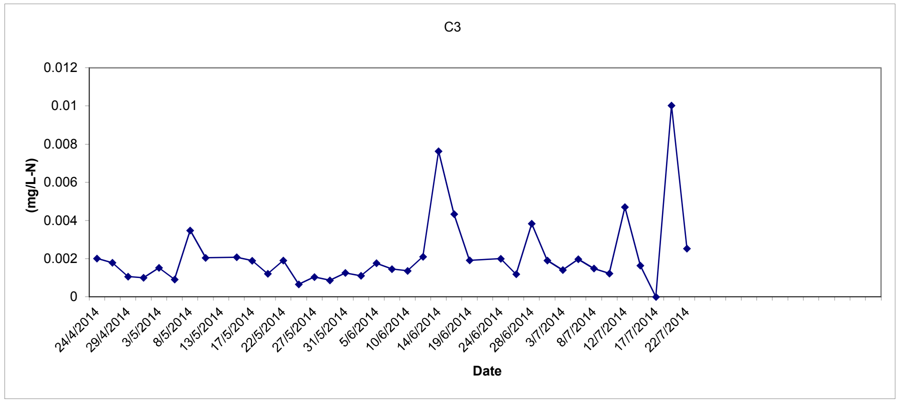




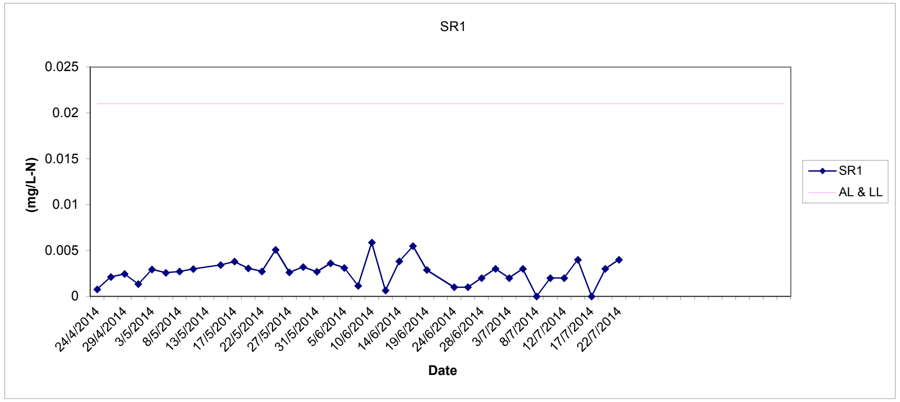
In-situ UIA (Depth average) at Mid-Ebb Tide

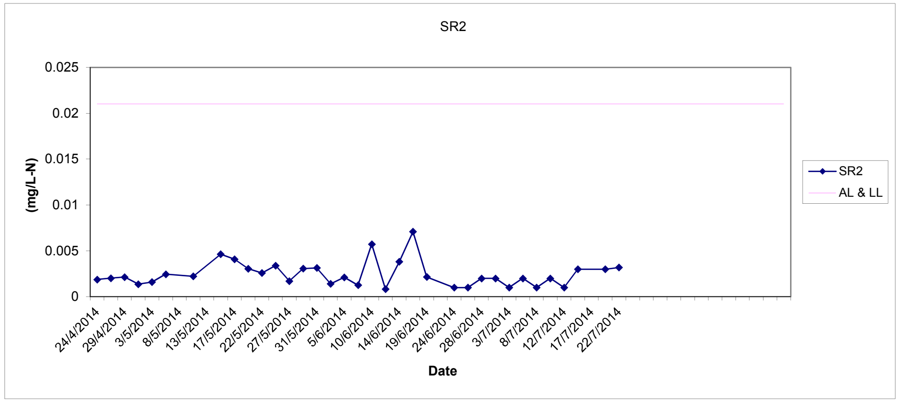


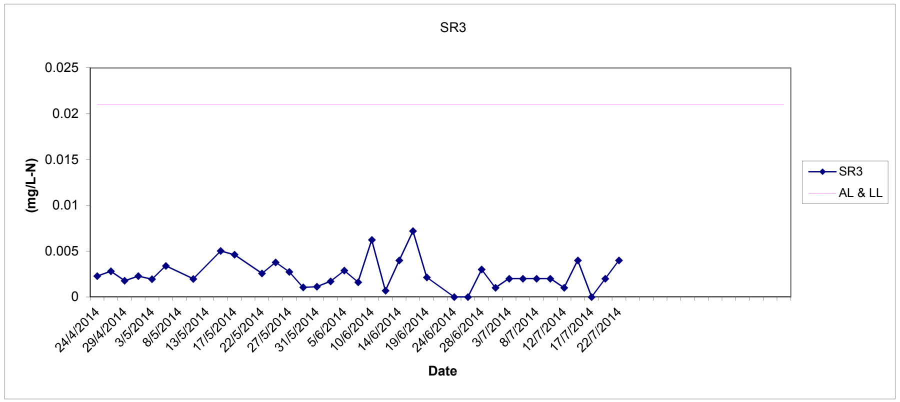




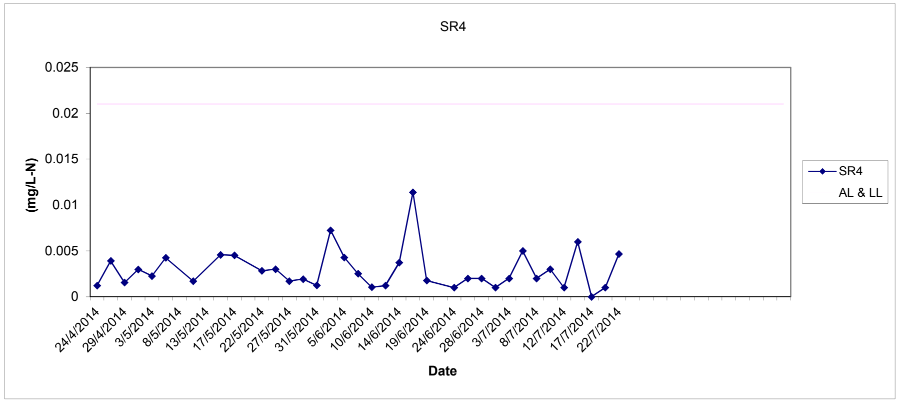
In-situ UIA (Depth average) at Mid-Ebb Tide

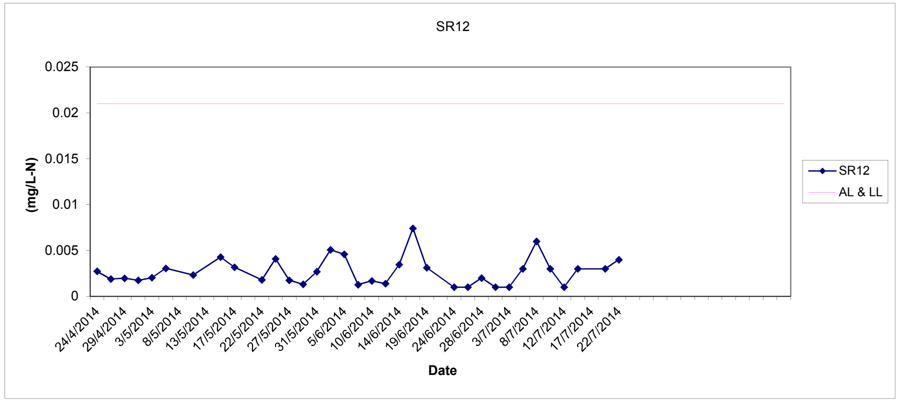




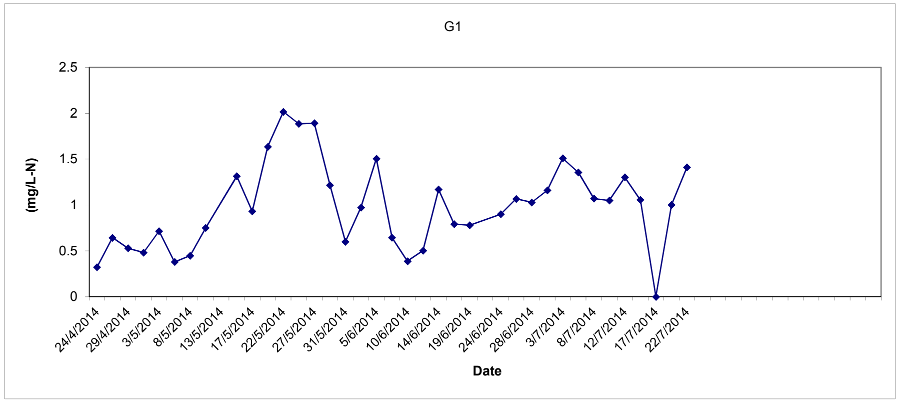


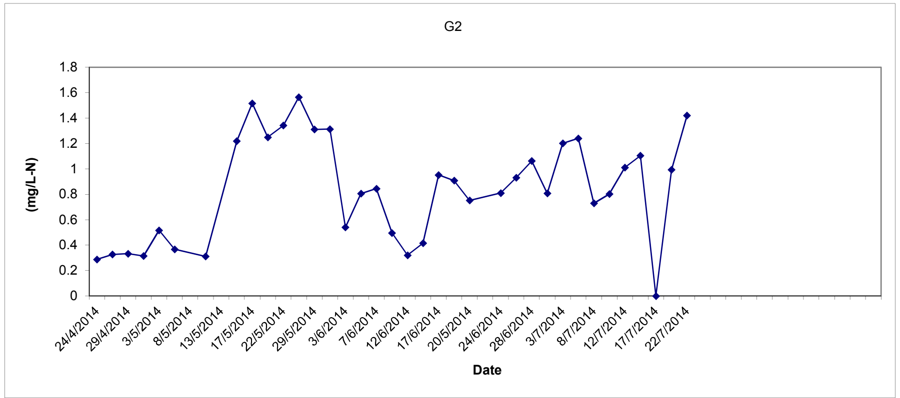
In-situ UIA (Depth average) at Mid-Ebb Tide

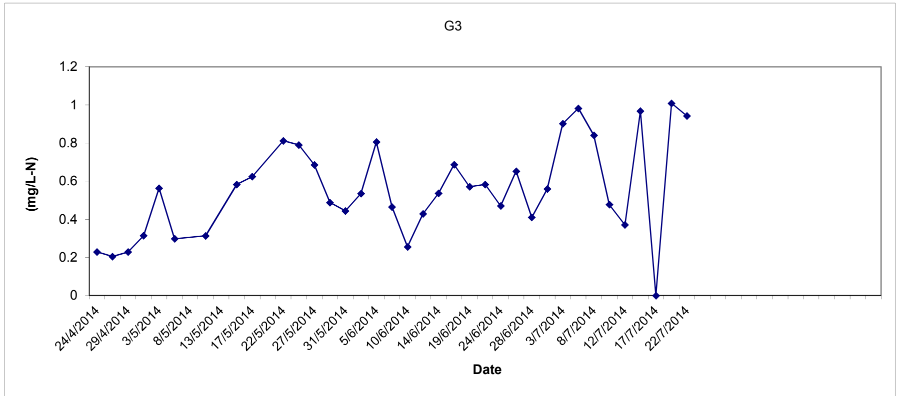




In-situ TIN (Depth average) at Mid-Ebb Tide







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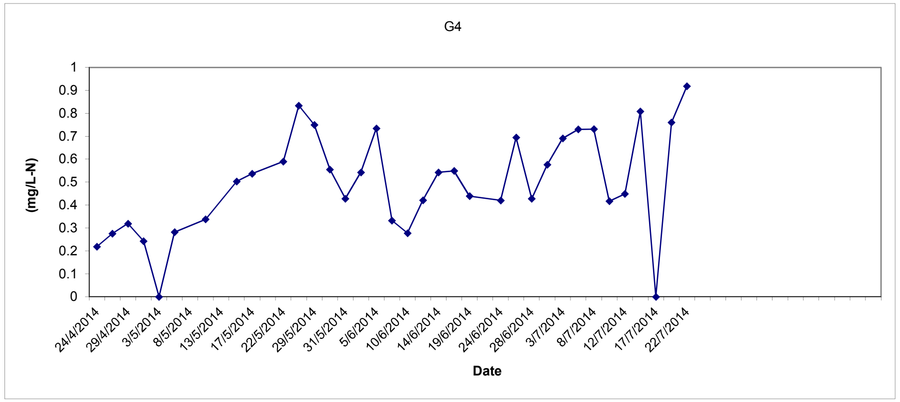

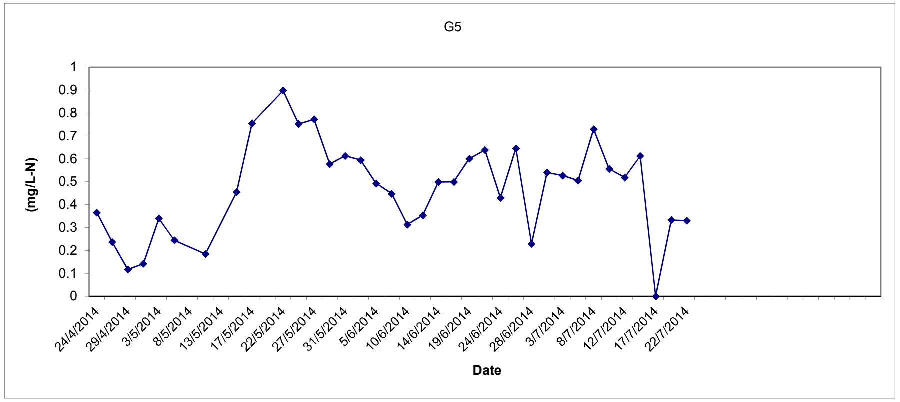

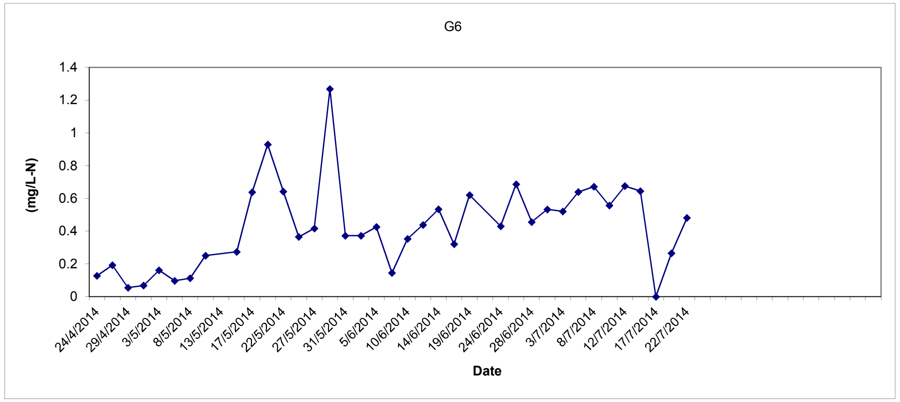

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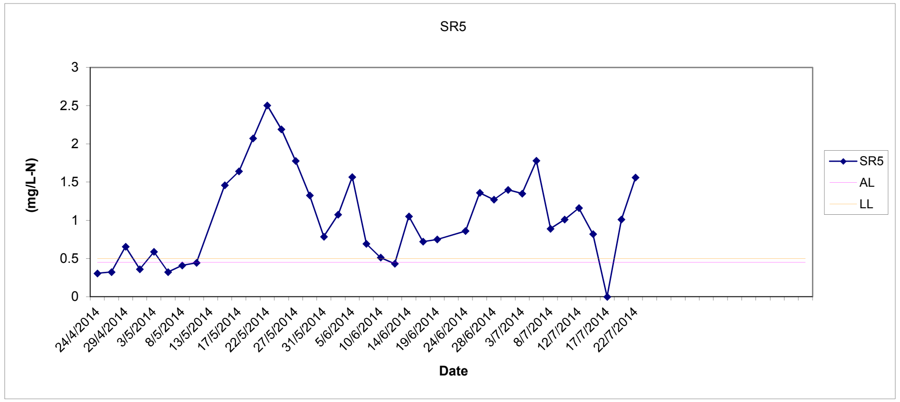
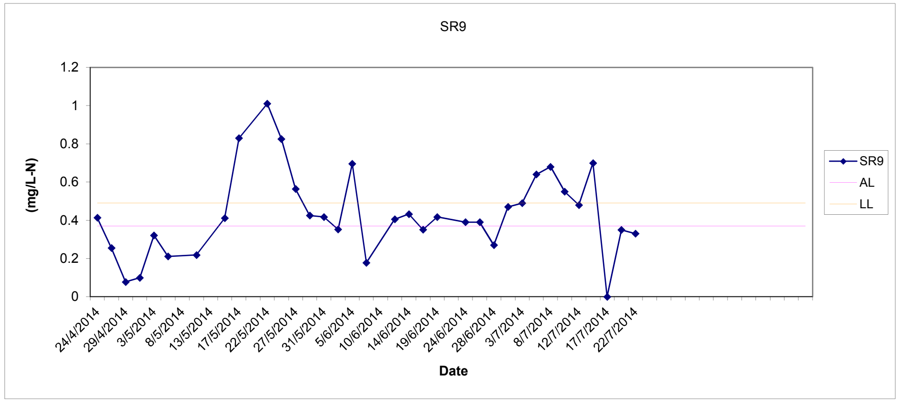
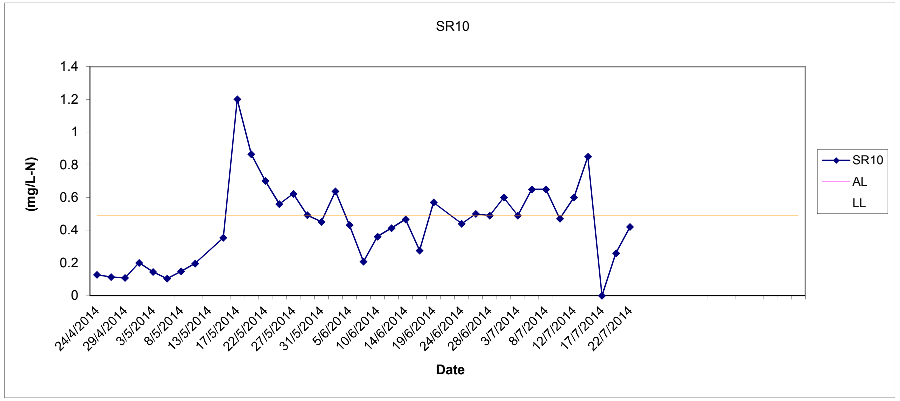
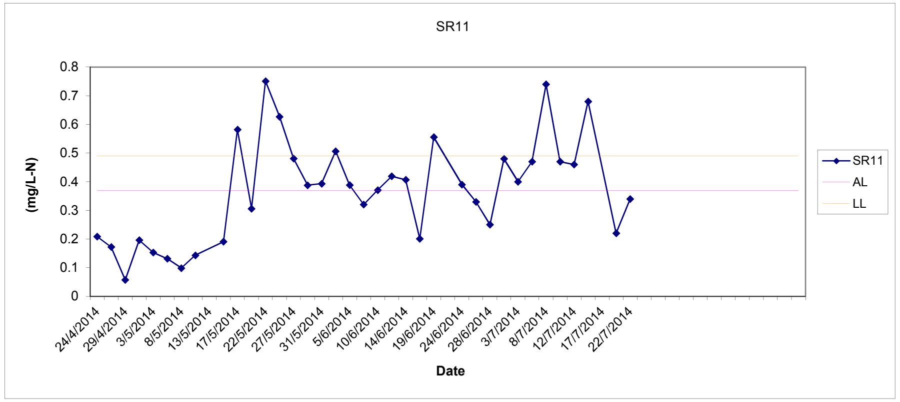


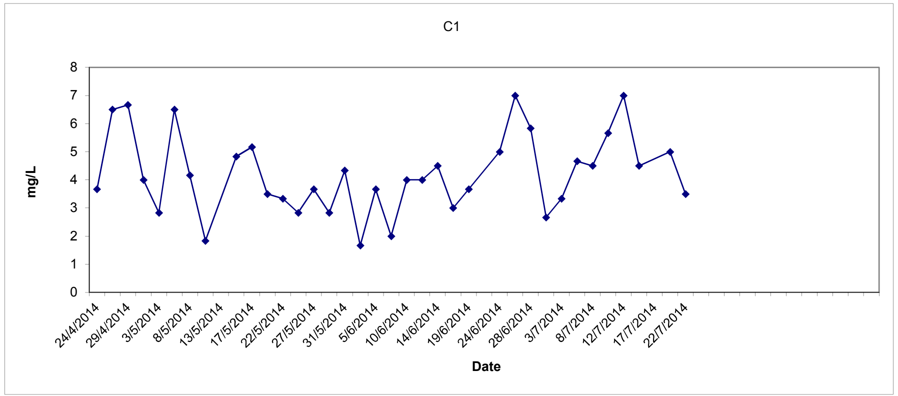


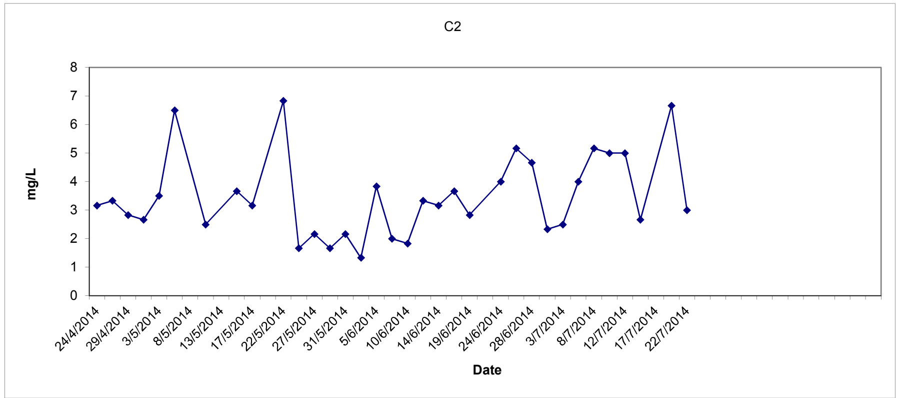


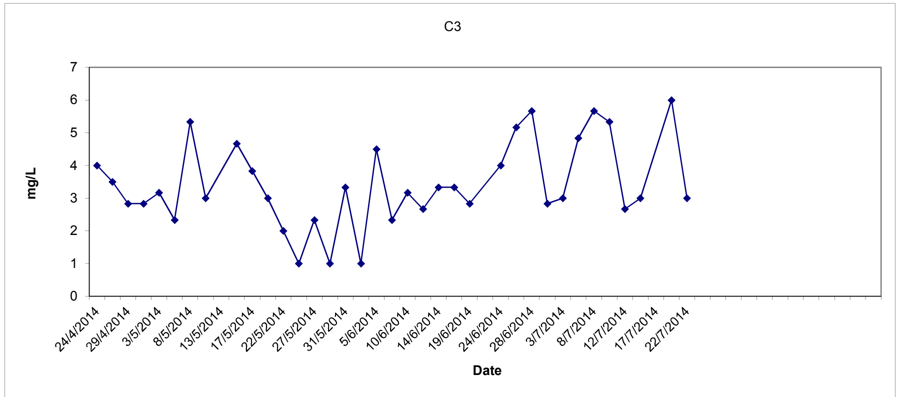
In-situ TIN (Depth average) at Mid-Ebb Tide



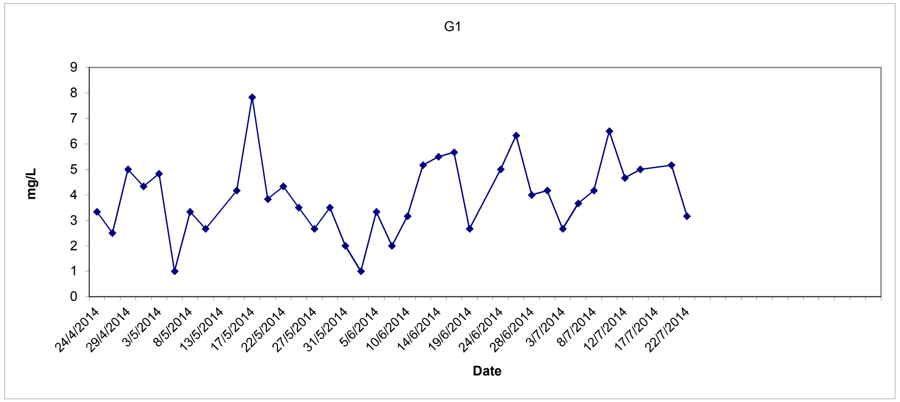
Total Suspended Solids (Depth average) at Mid-Ebb Tide

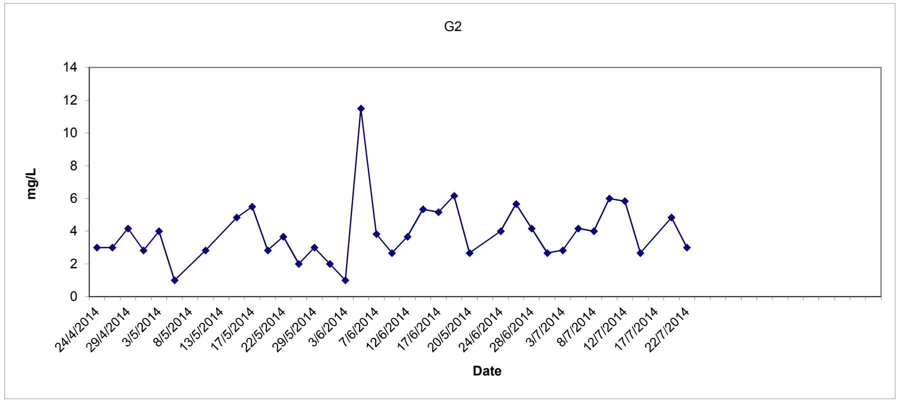


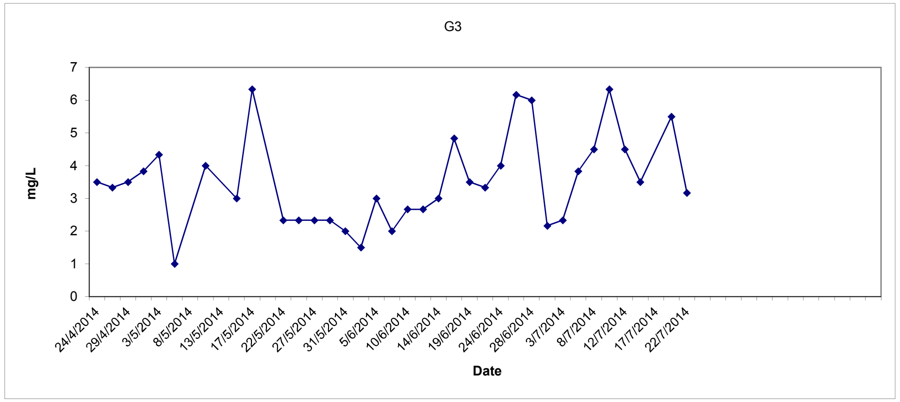




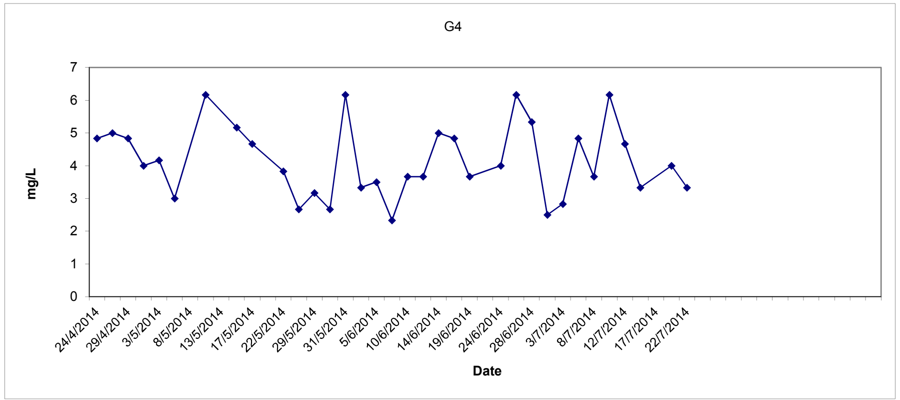
Total Suspended Solids (Depth average) at Mid-Ebb Tide

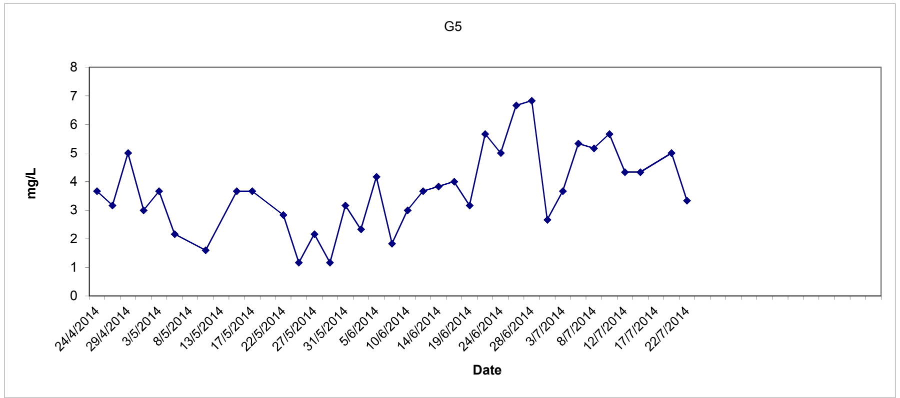


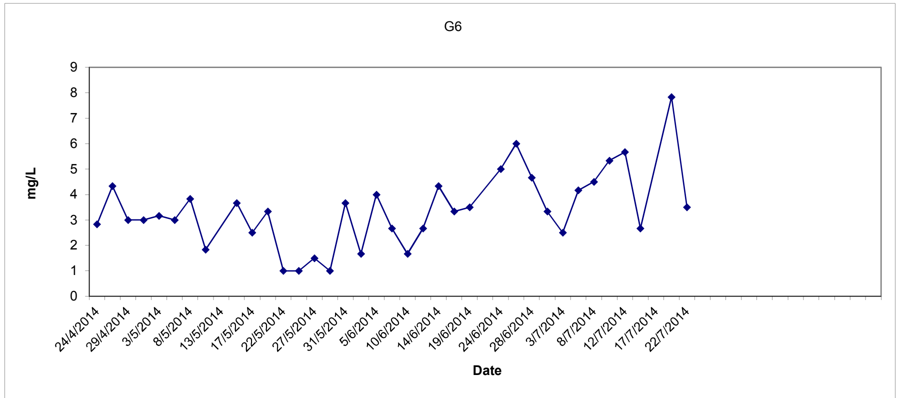




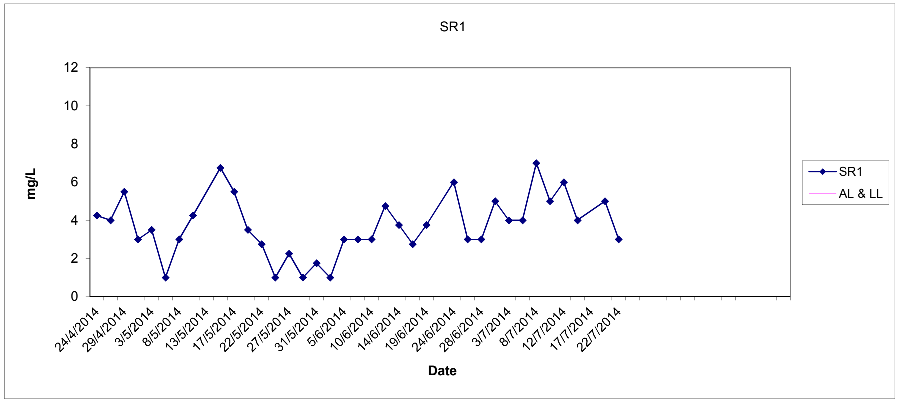
Total Suspended Solids (Depth average) at Mid-Ebb Tide

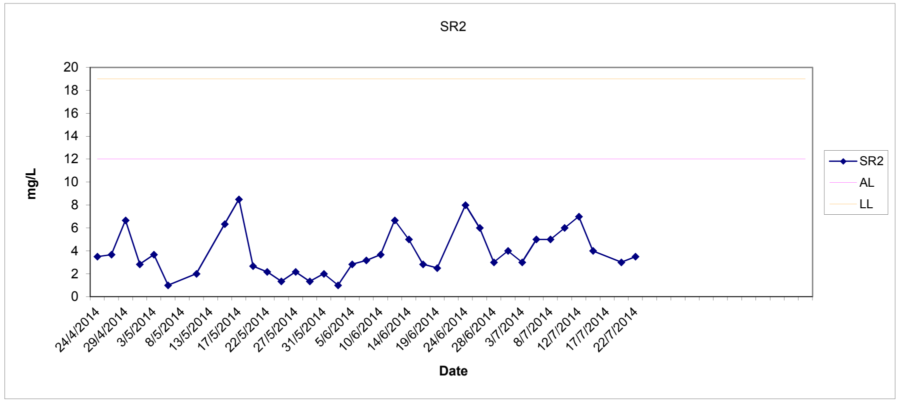


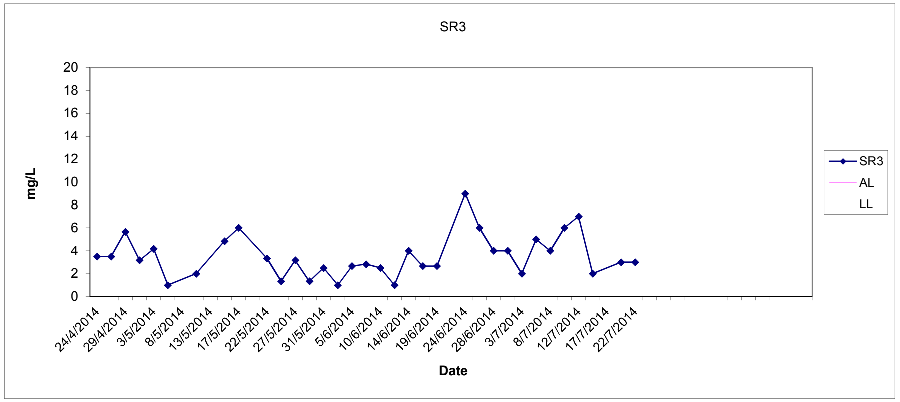




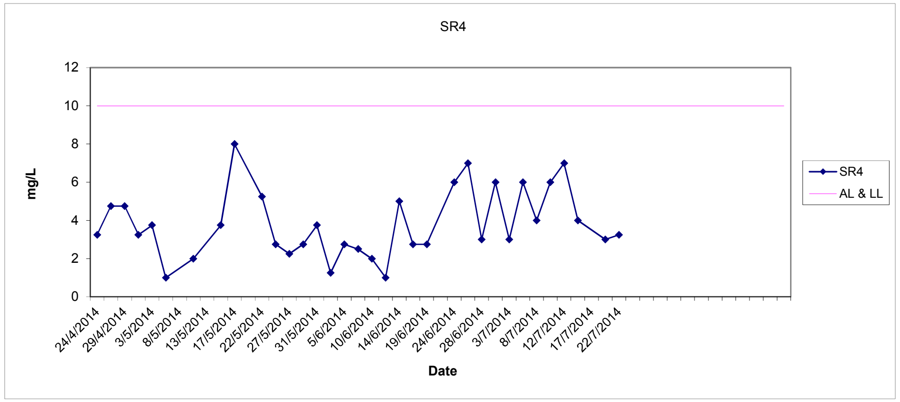
Total Suspended Solids (Depth average) at Mid-Ebb Tide

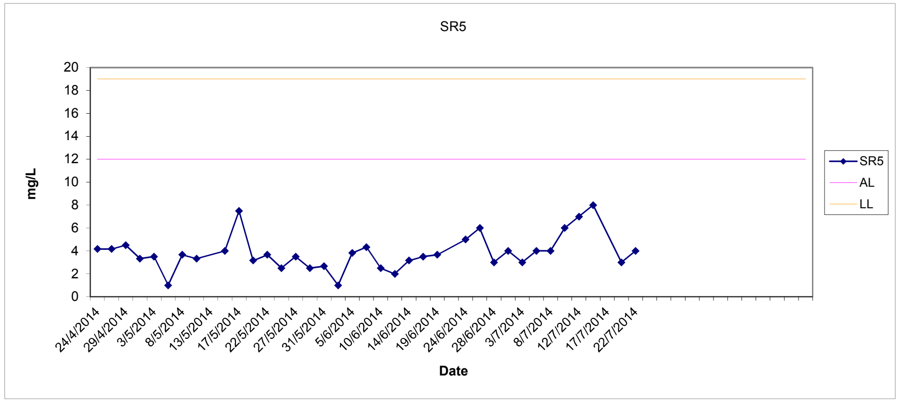


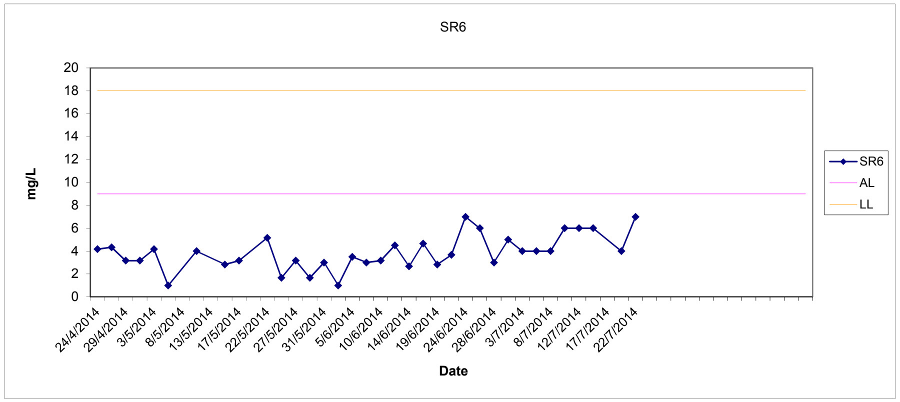




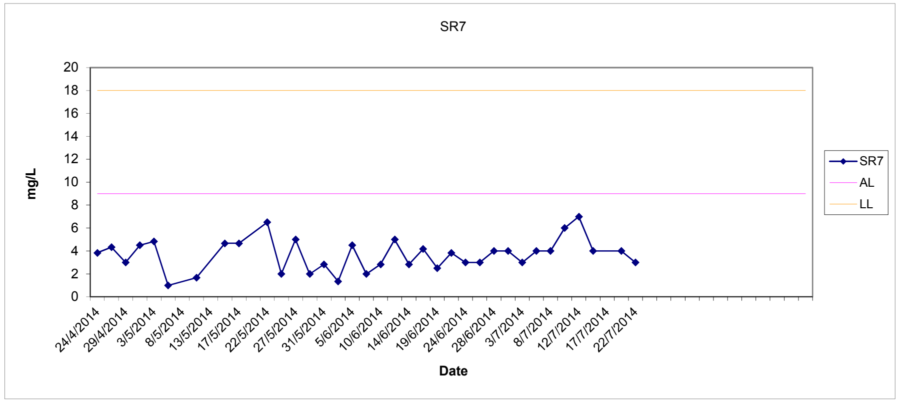
Total Suspended Solids (Depth average) at Mid-Ebb Tide

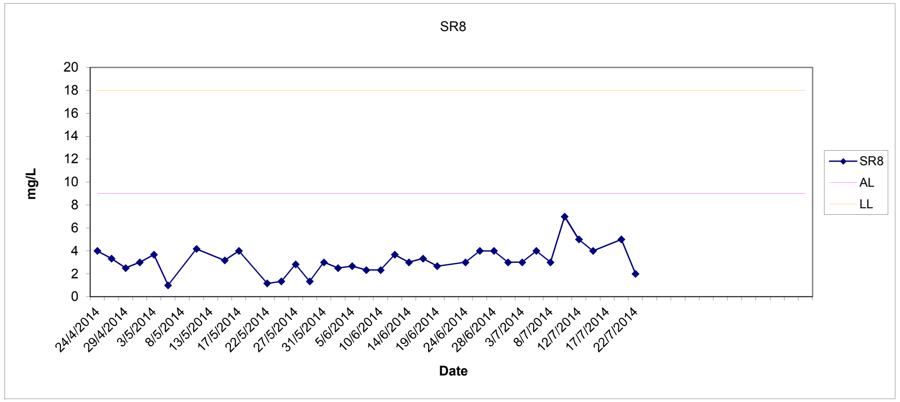


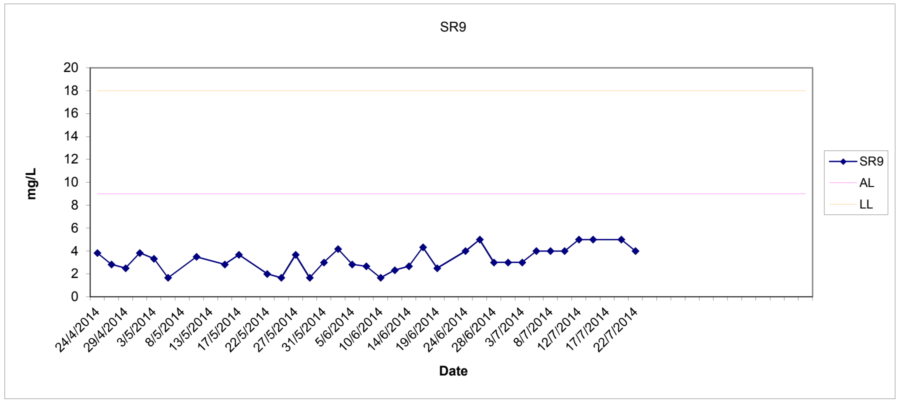




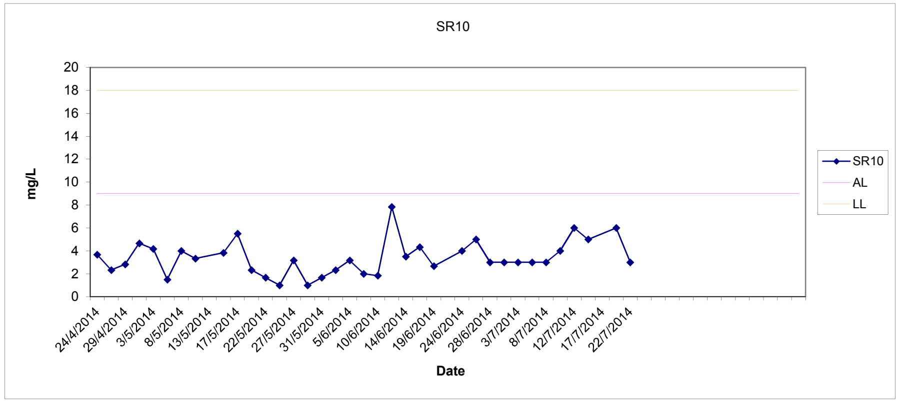
Total Suspended Solids (Depth average) at Mid-Ebb Tide

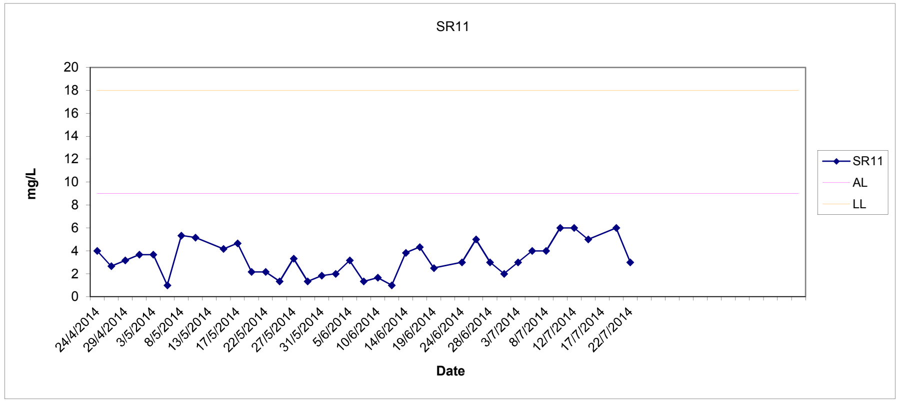


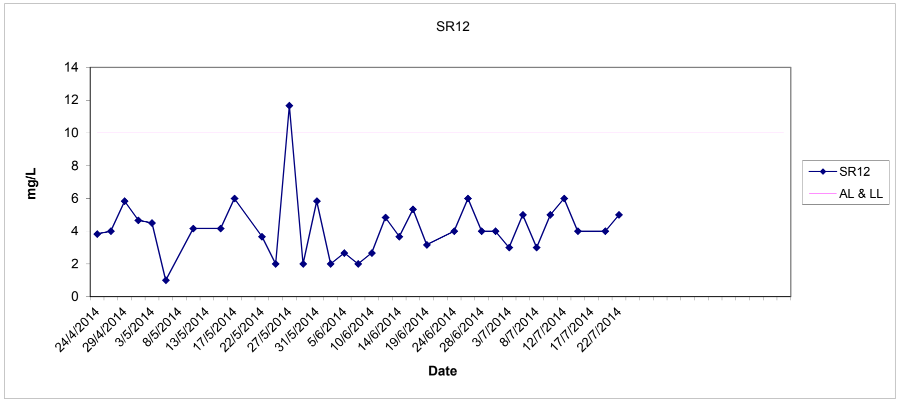




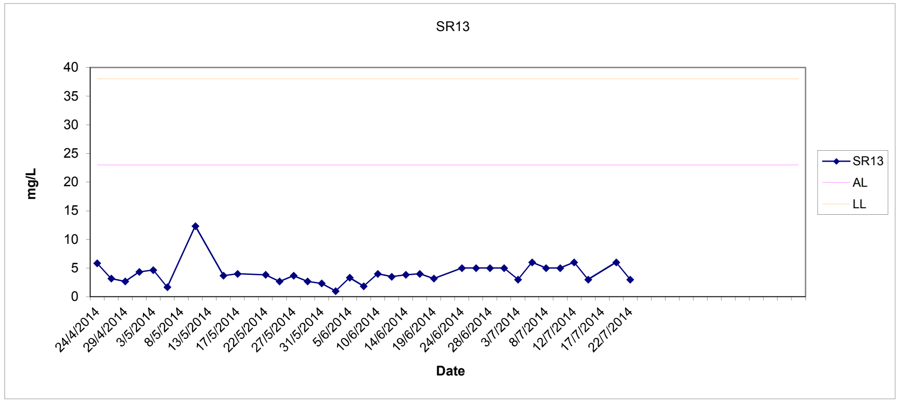
Total Suspended Solids (Depth average) at Mid-Ebb Tide





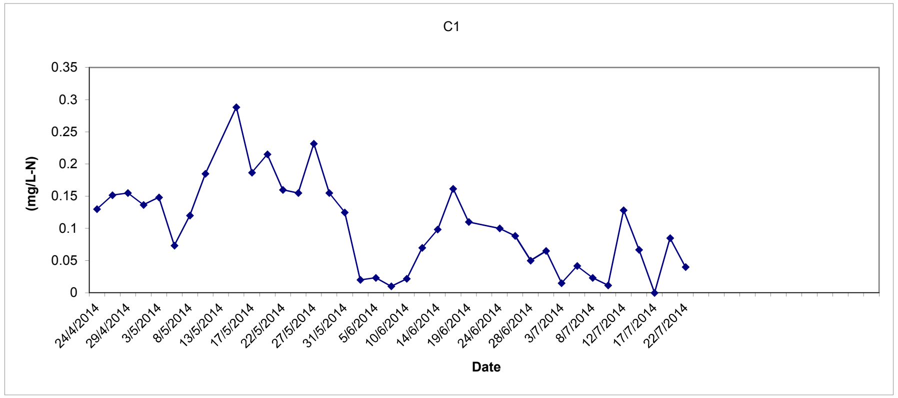


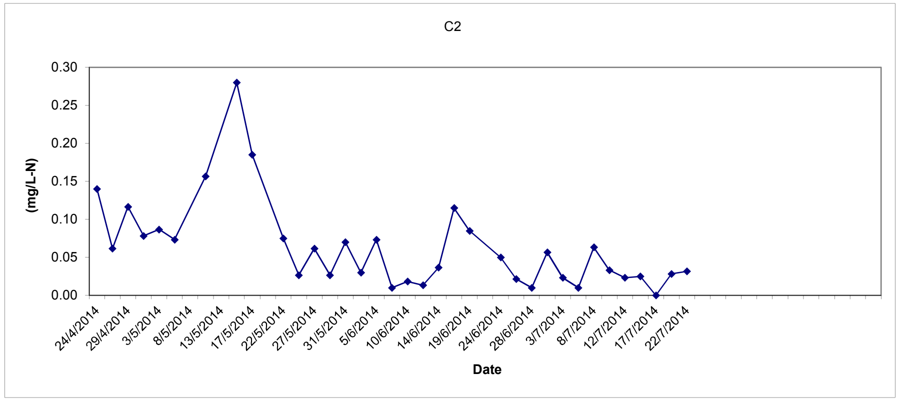
Total Suspended Solids (Depth average) at Mid-Ebb Tide

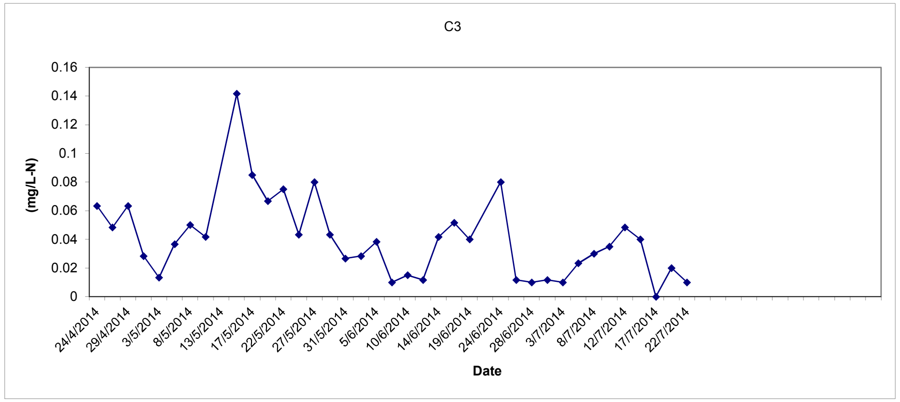


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

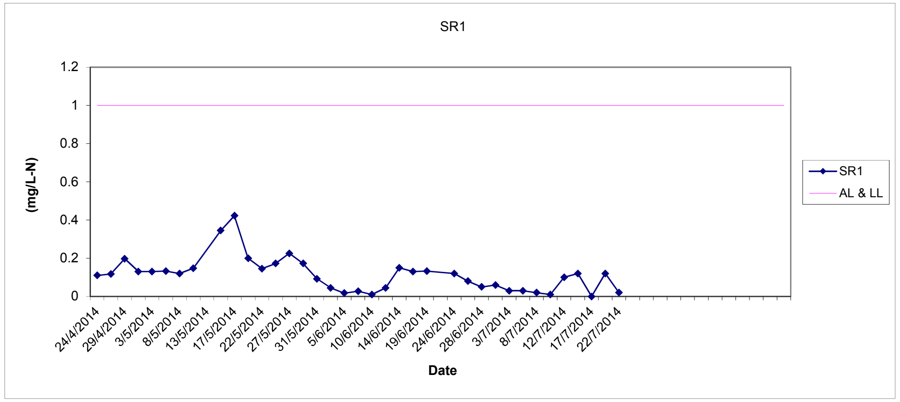
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

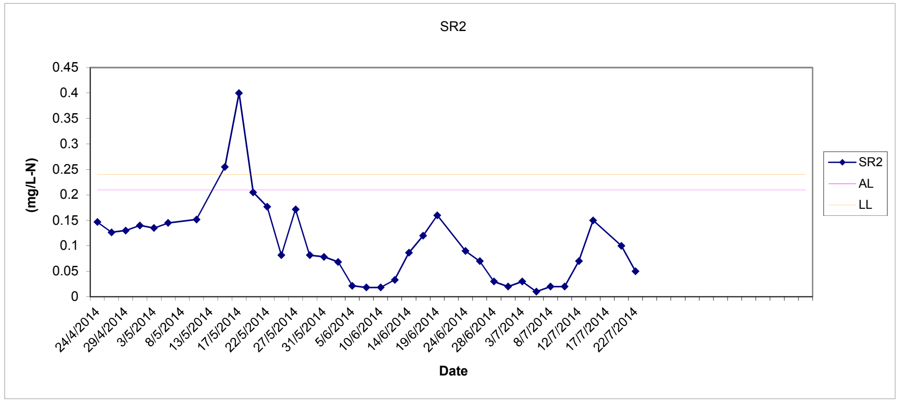


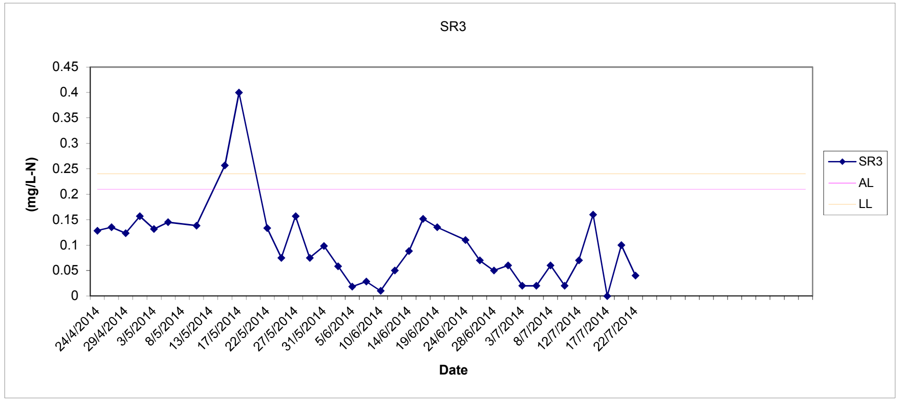




Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

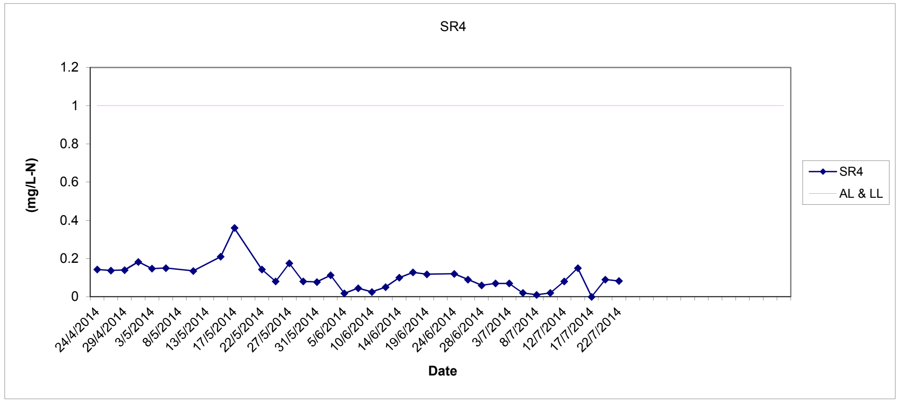


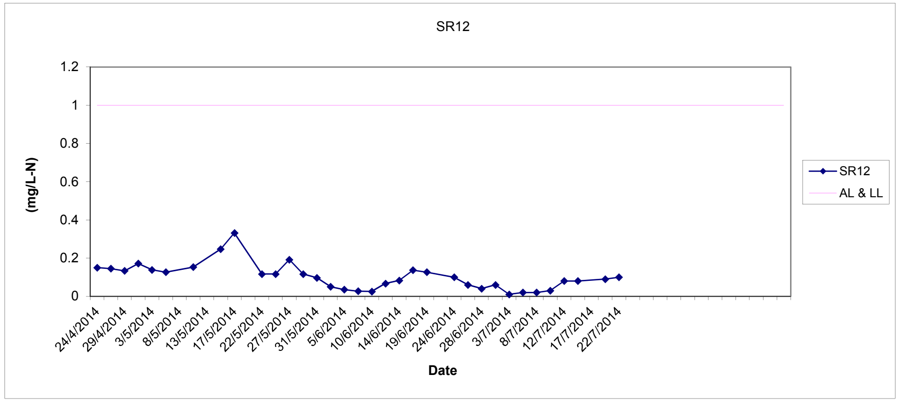




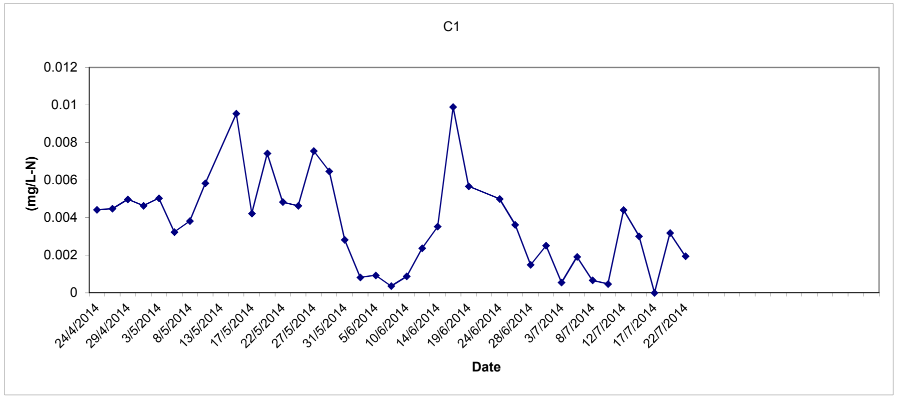
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

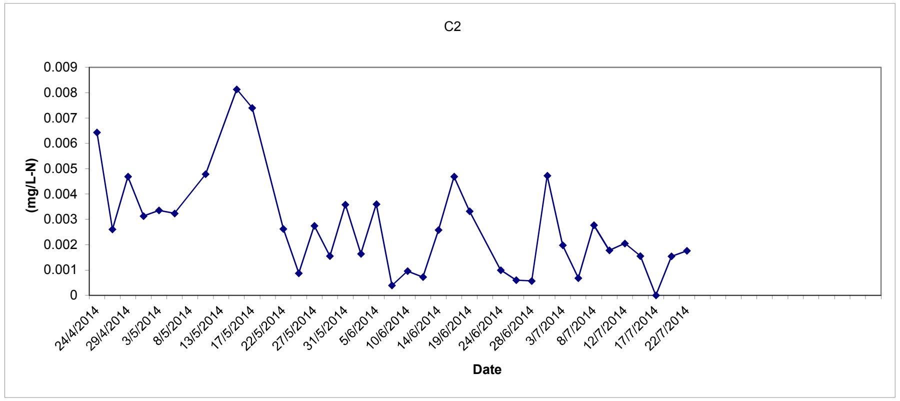
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

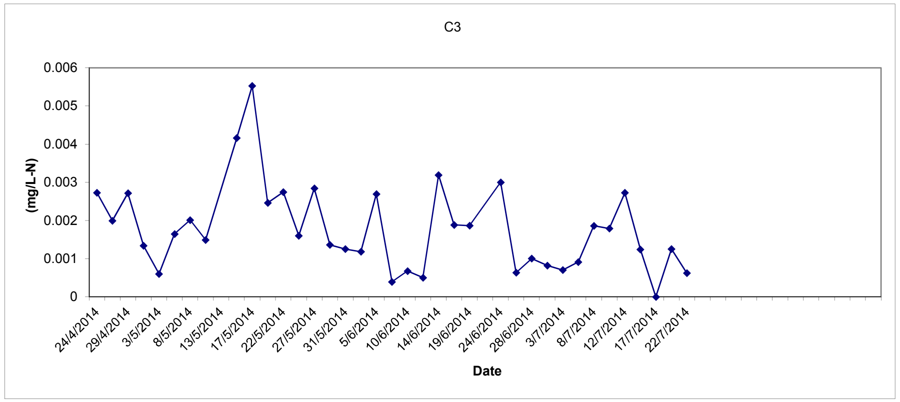




Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

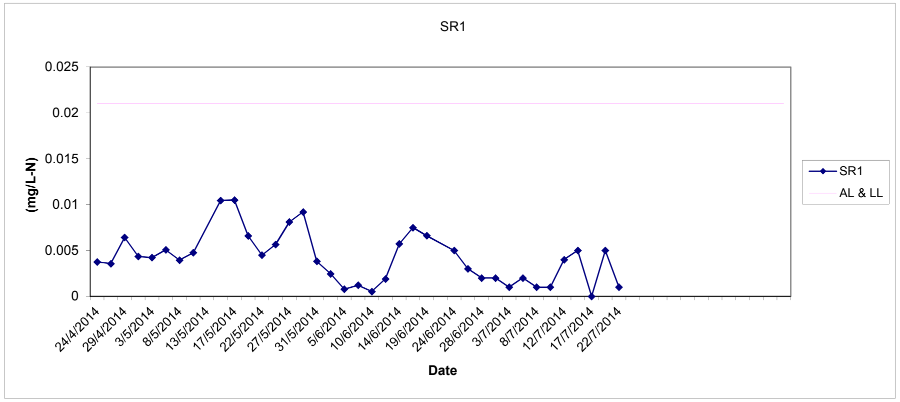


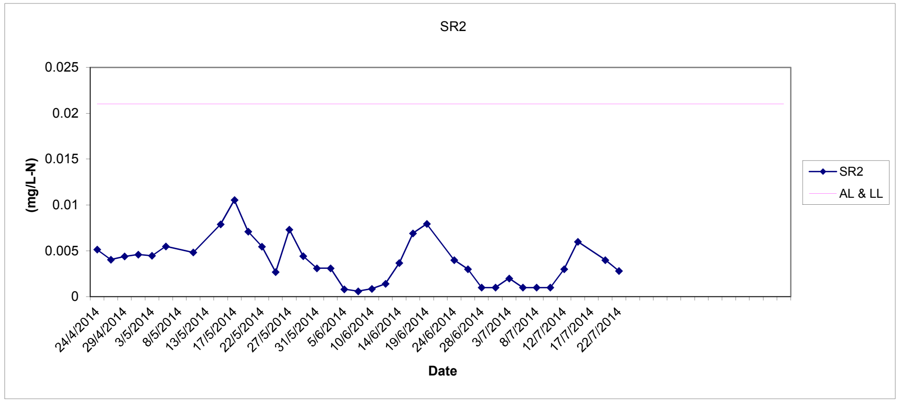


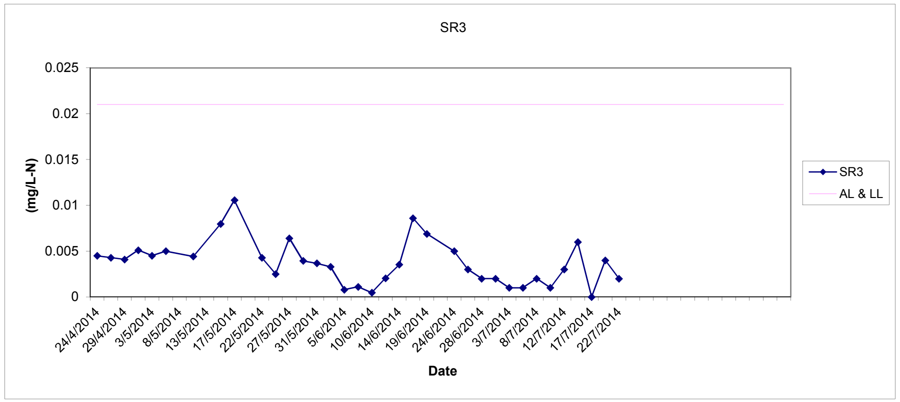


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

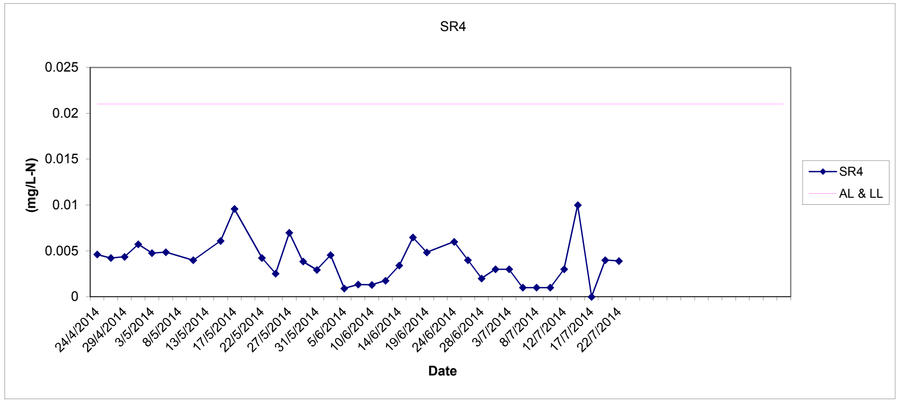
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

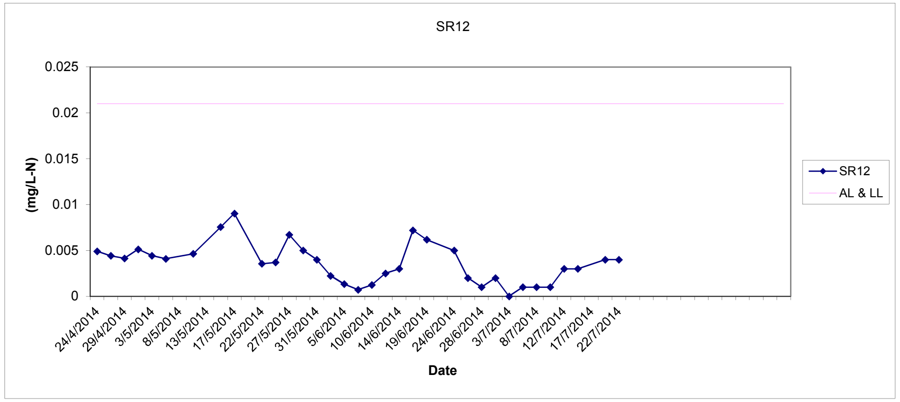






Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide





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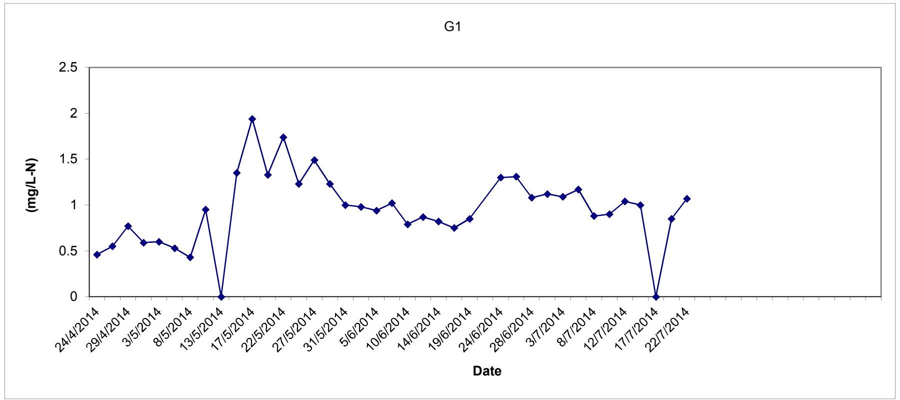
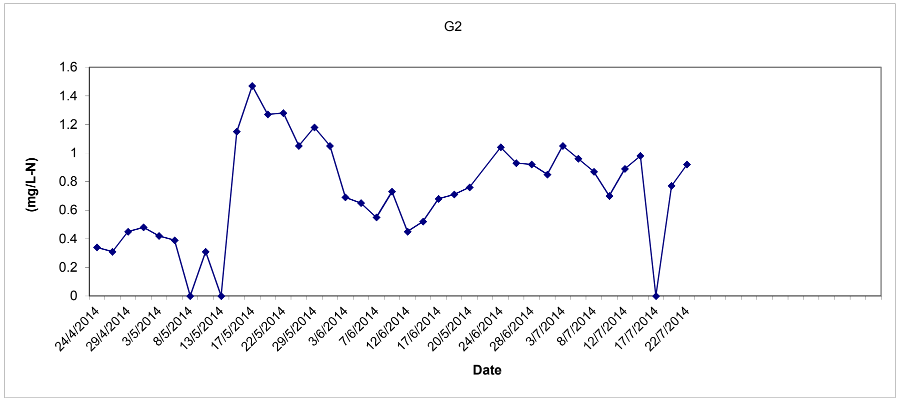
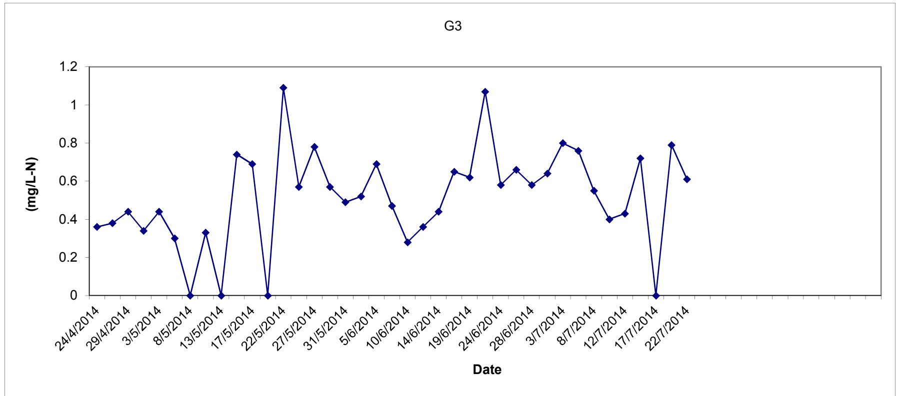
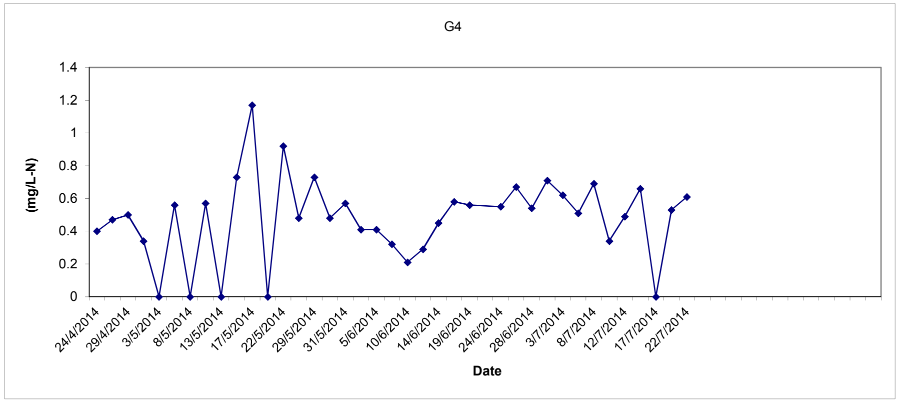
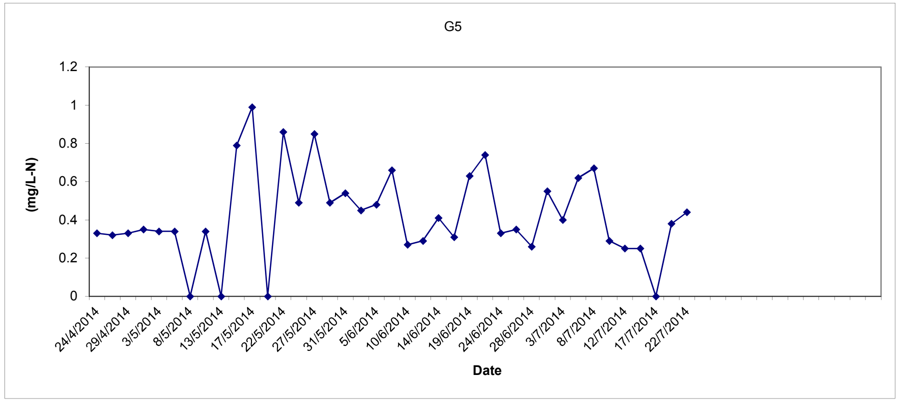


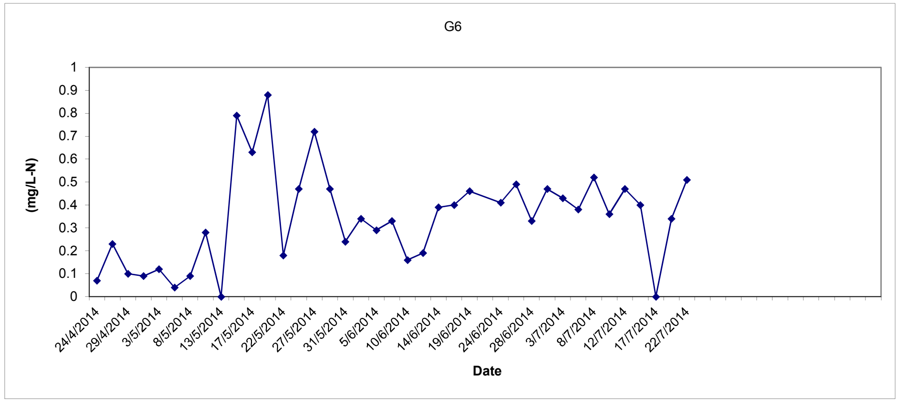




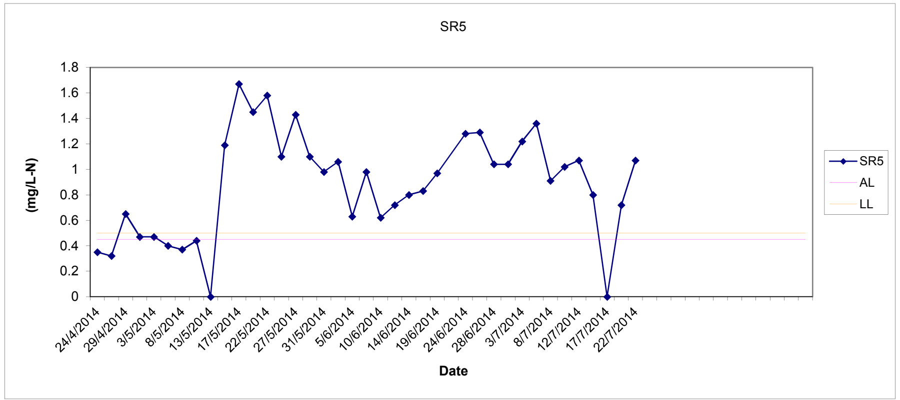
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

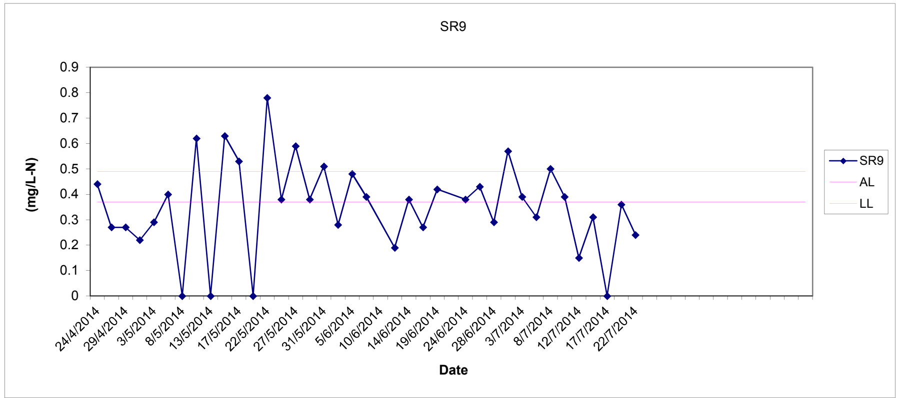


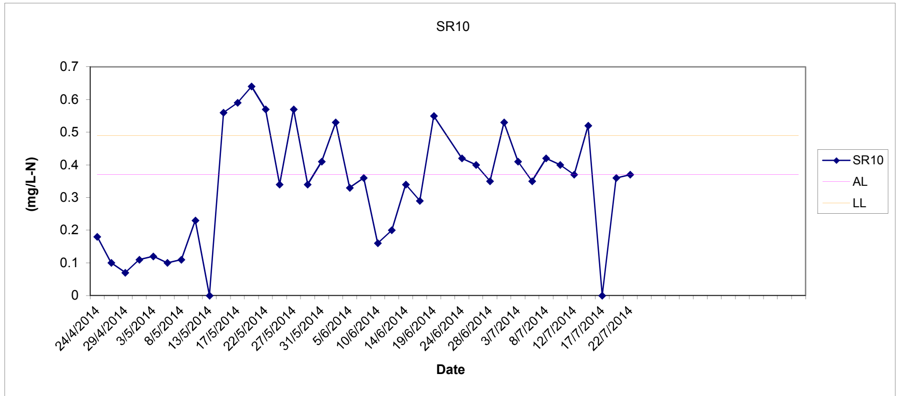




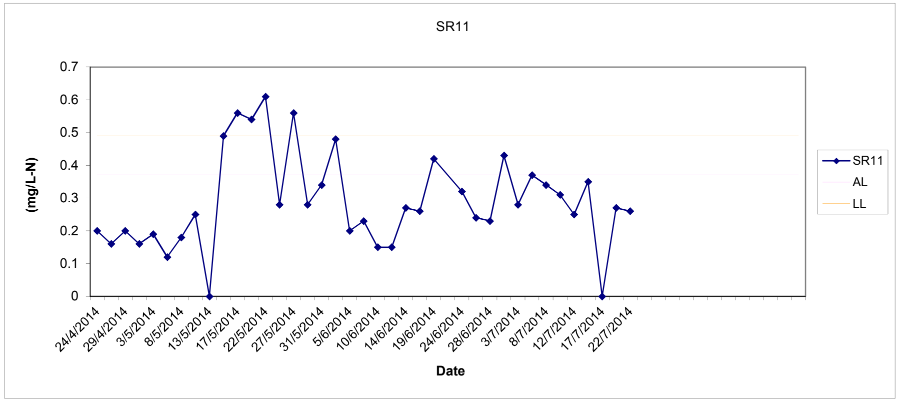
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



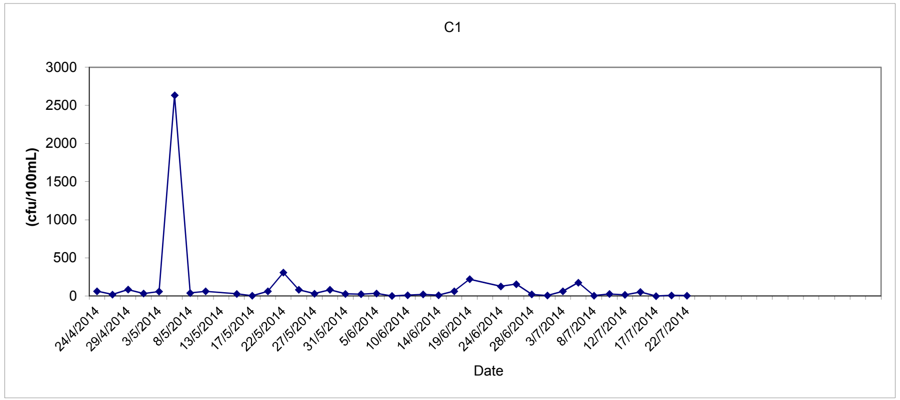


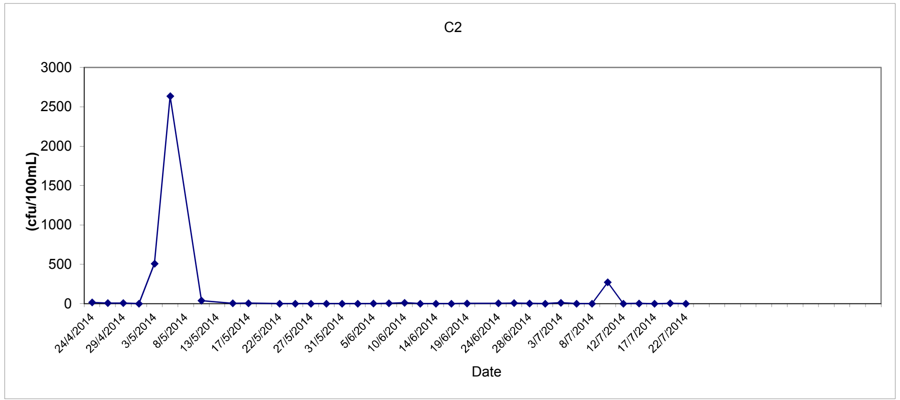


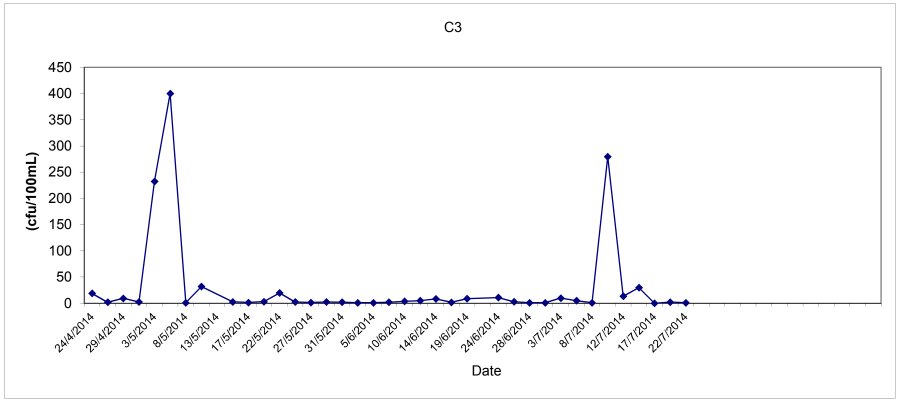
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



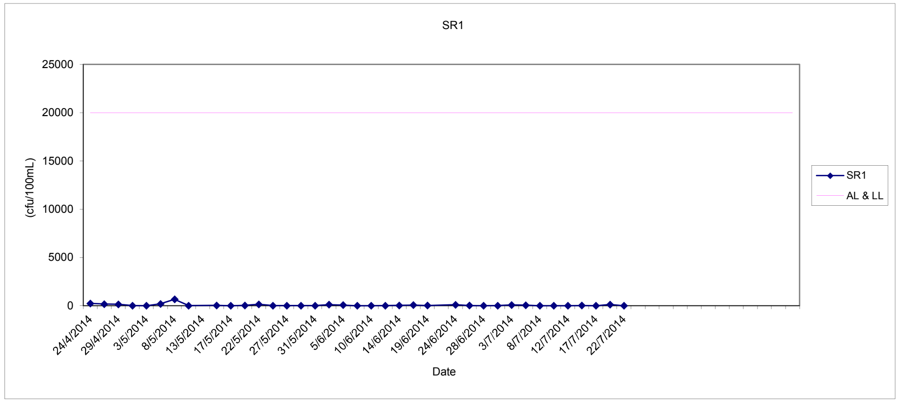
E.coli (Depth average) at Mid-Ebb Tide

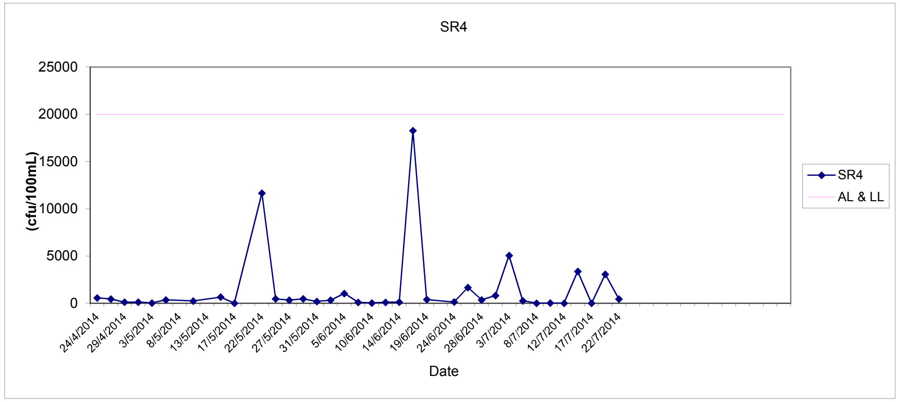


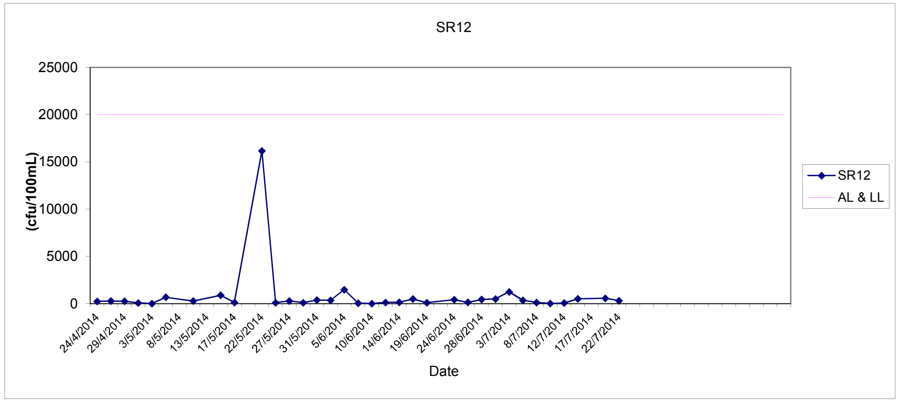




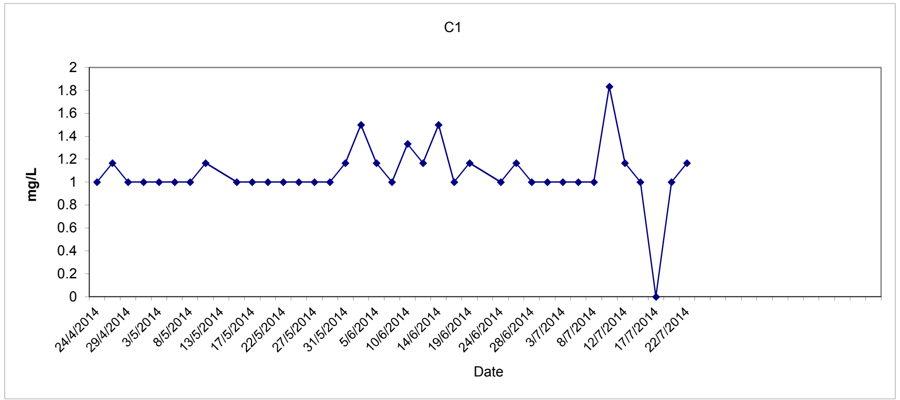
E.coli (Depth average) at Mid-Ebb Tide

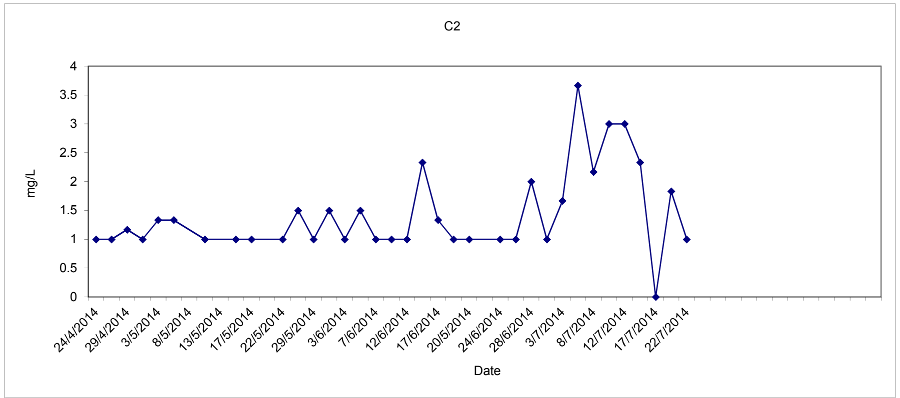


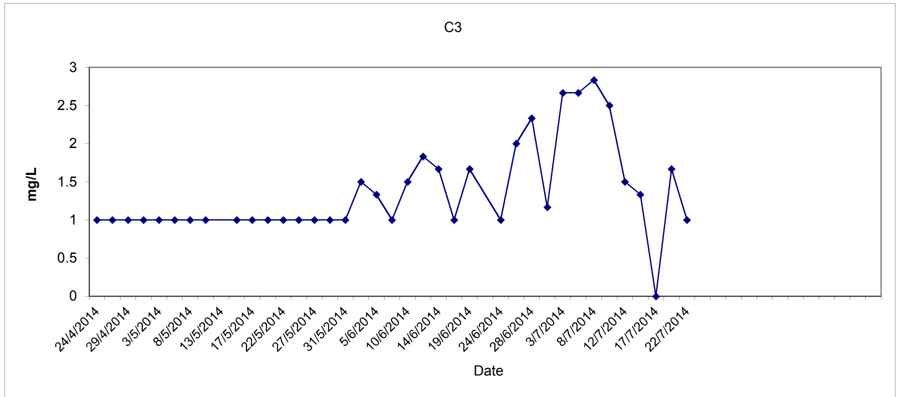


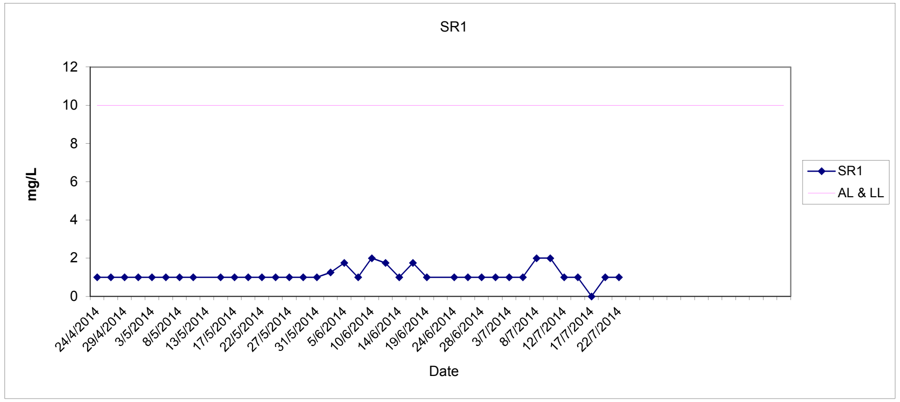


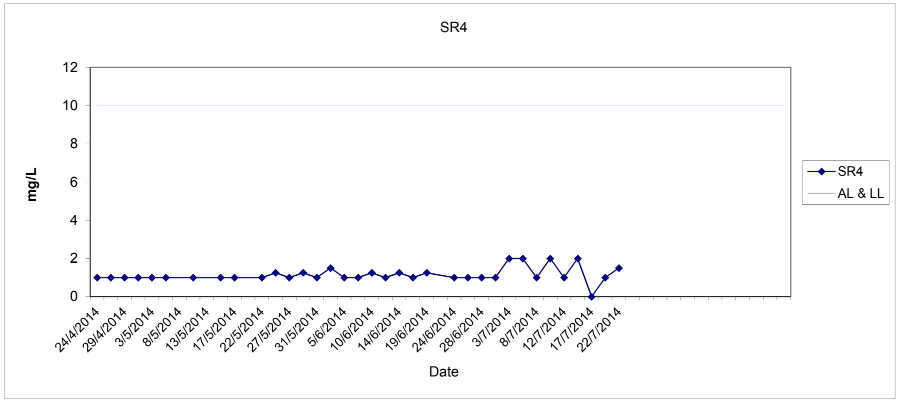
BOD_5 (Depth average) at Mid-Ebb Tide

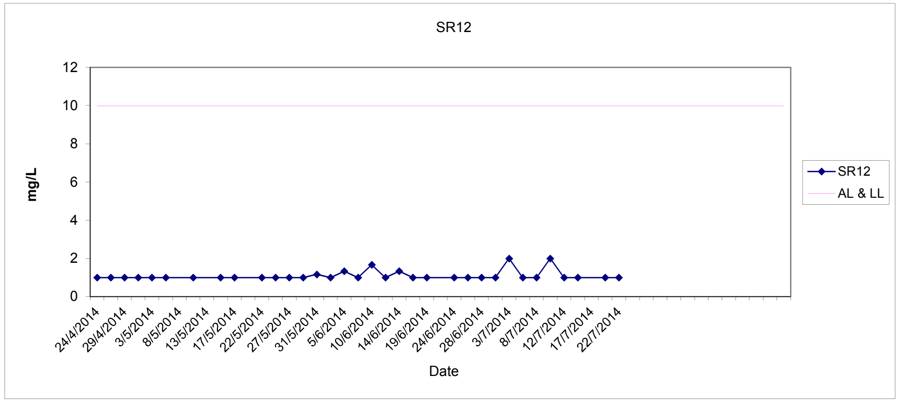




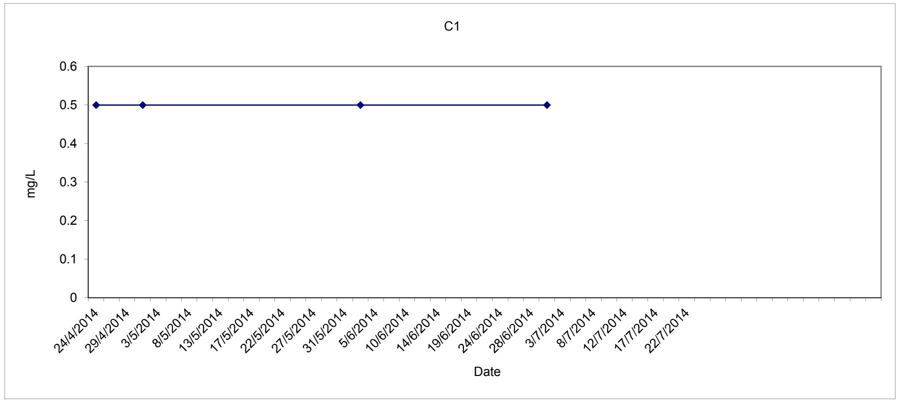


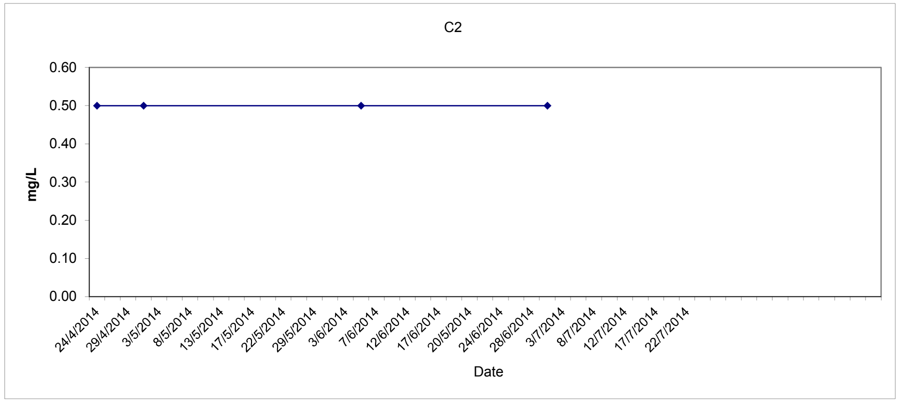


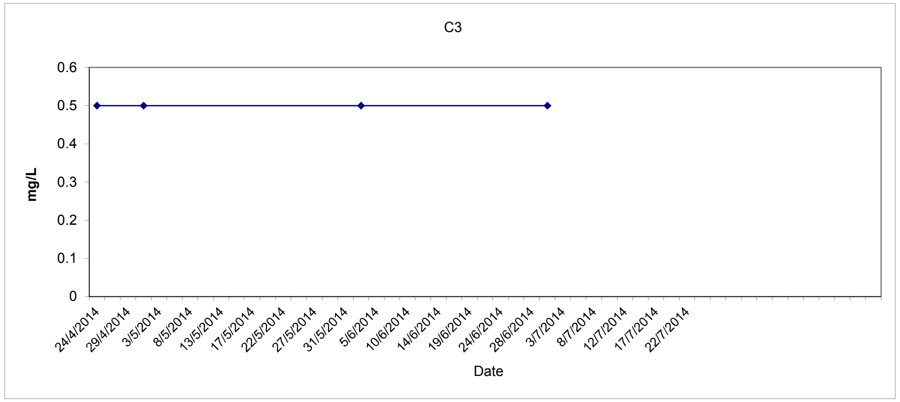




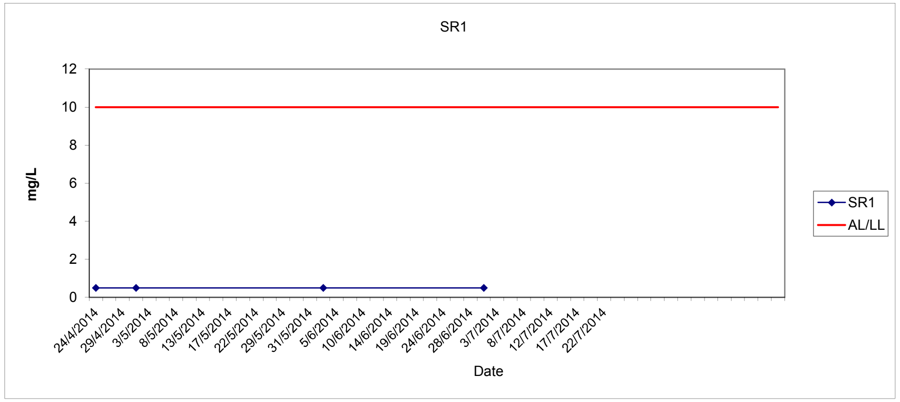
Synthetic Detergent (Depth average) at Mid-Ebb Tide

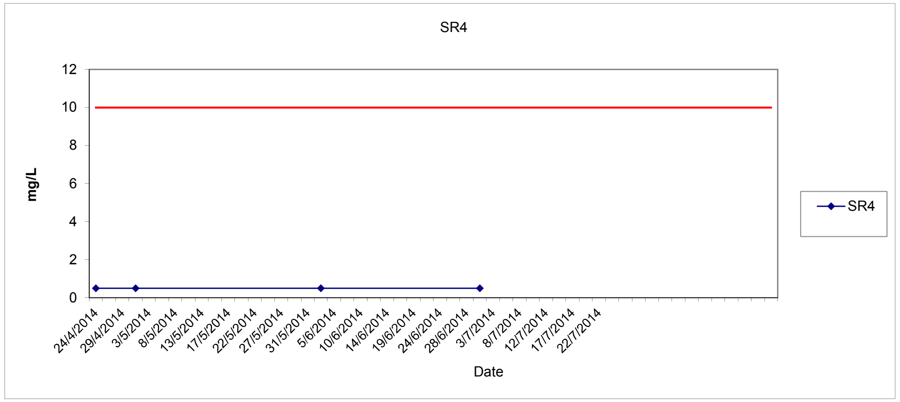


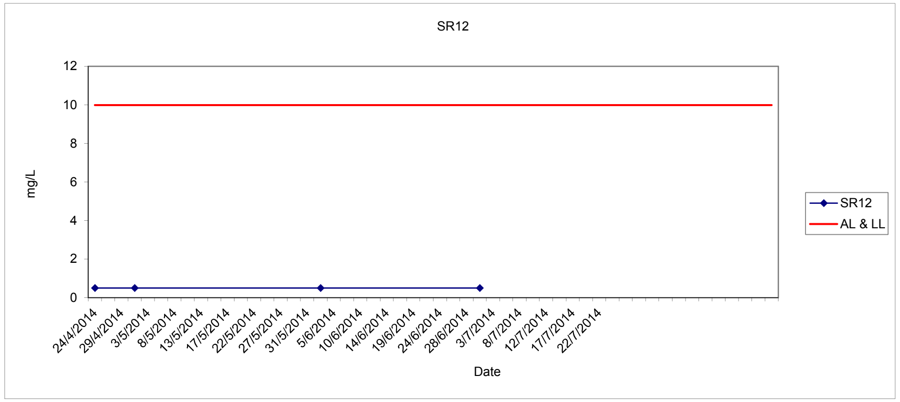




Synthetic Detergent (Depth average) at Mid-Ebb Tide







Appendix E

Graphical Presentation – 24-hr Monitoring Results

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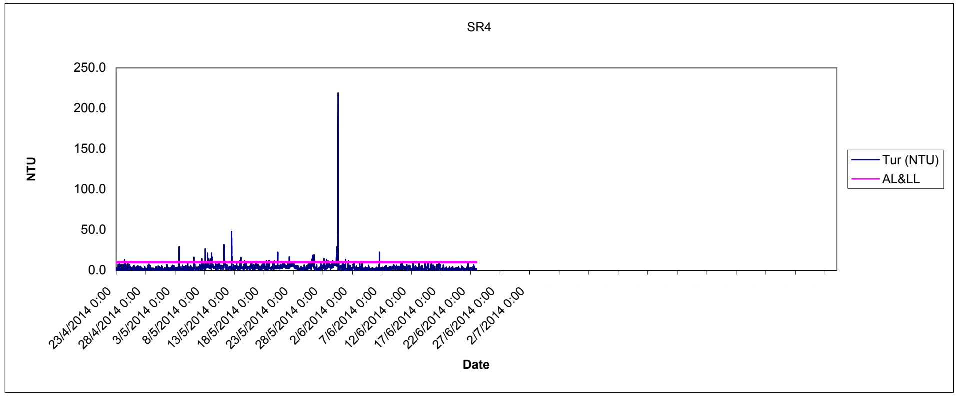
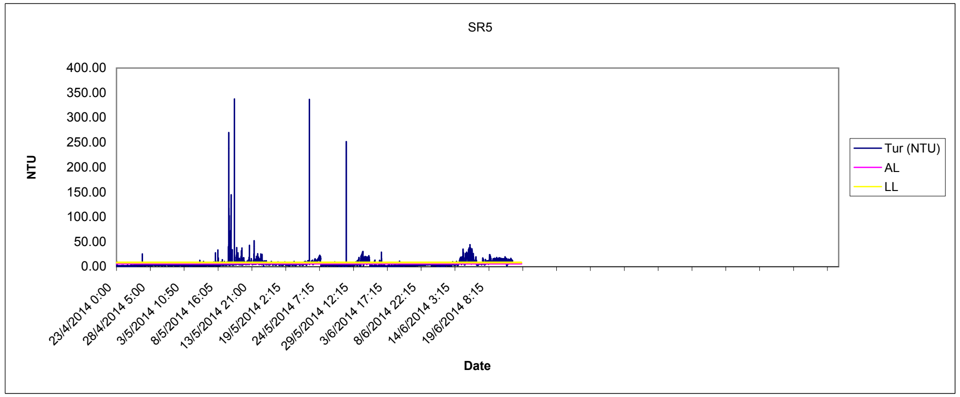
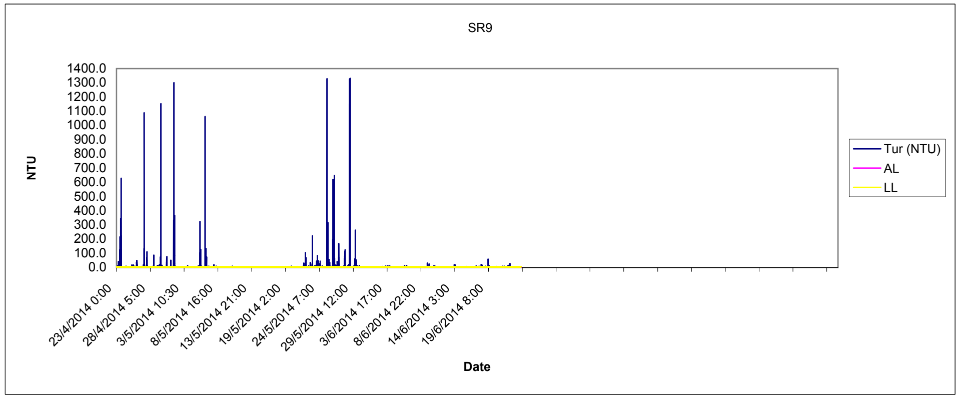
Turbidity
24-hr Water Quality Monitoring

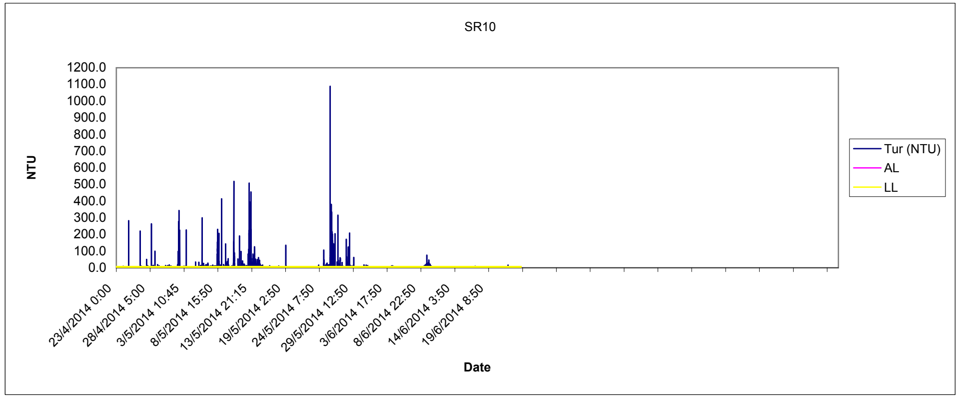


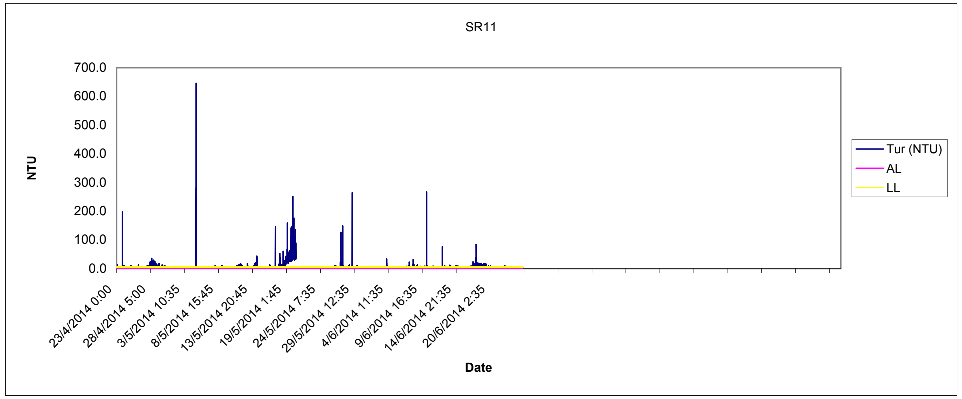


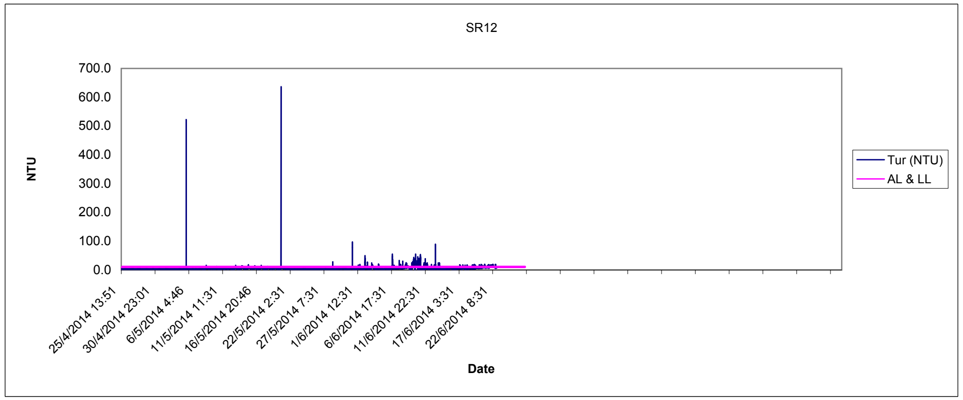


Providing Sufficient Water Depth for Kwai Tsing Container and its Approach Channel

Turbidity
24-hr Water Quality Monitoring

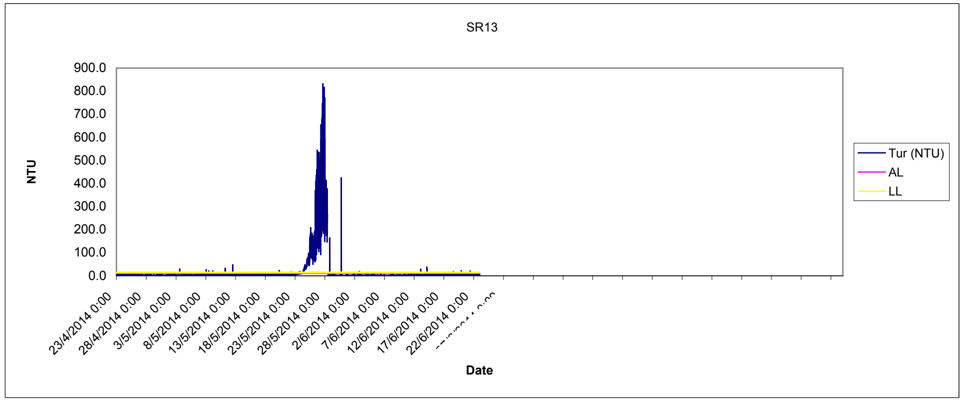




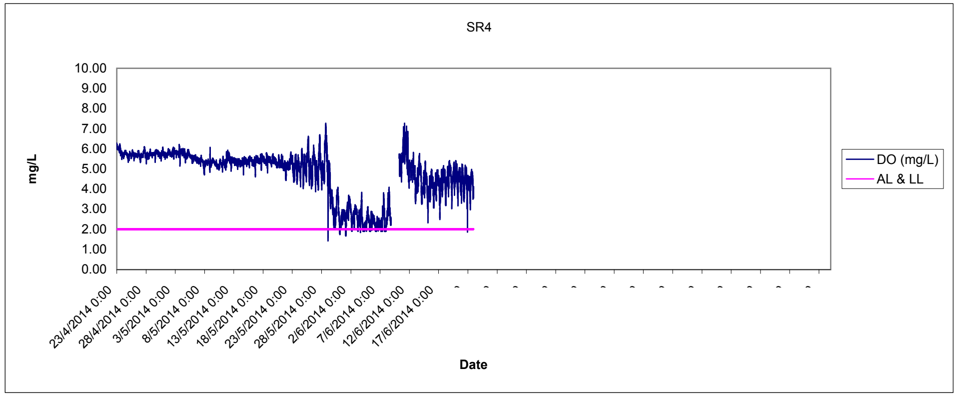


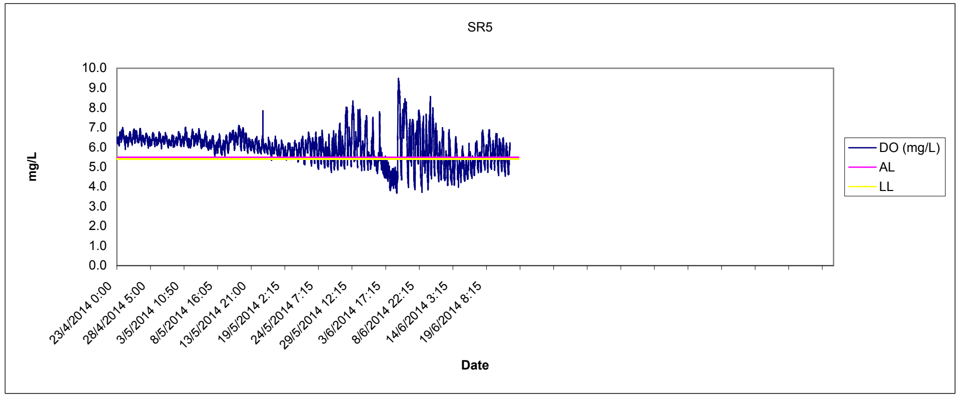
Providing Sufficient Water Depth for Kwai Tsing Container and its Approach Channel

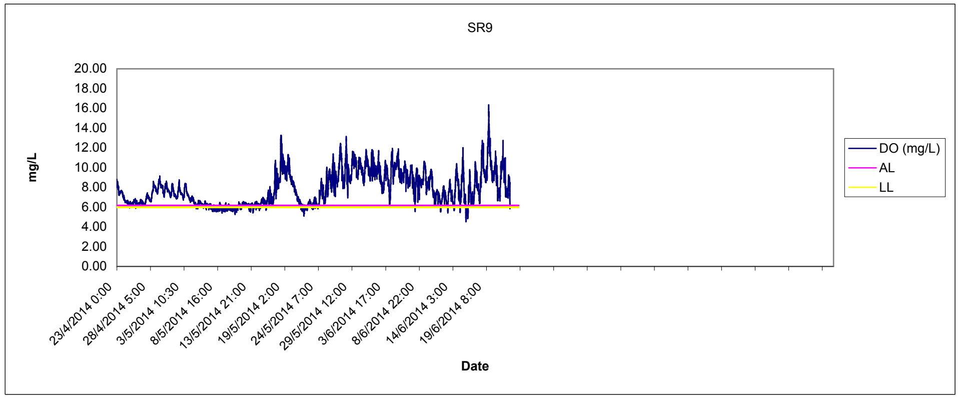
Turbidity
24-hr Water Quality Monitoring



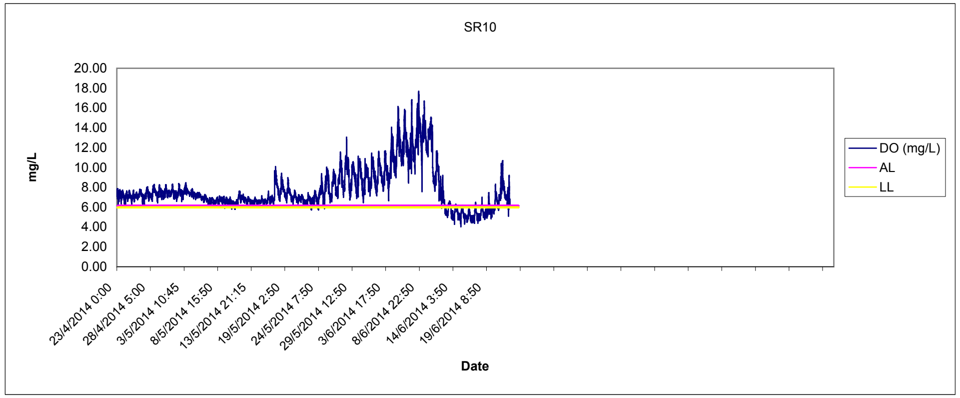
Dissolved Oxygen
24-hr Water Quality Monitoring

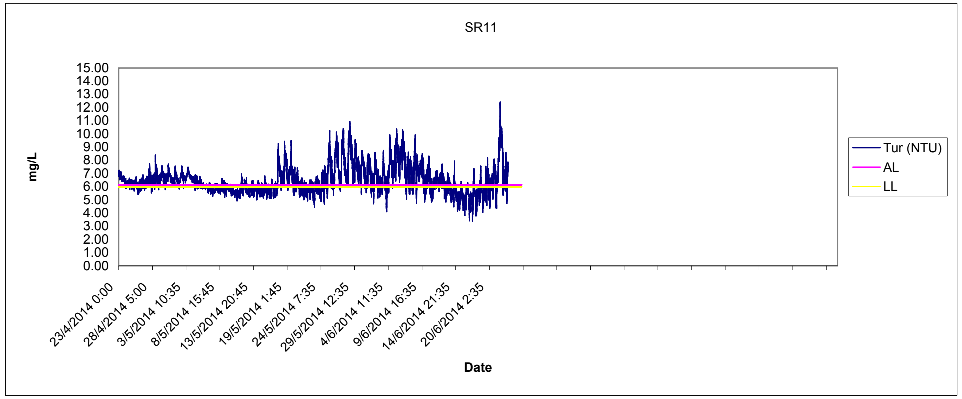


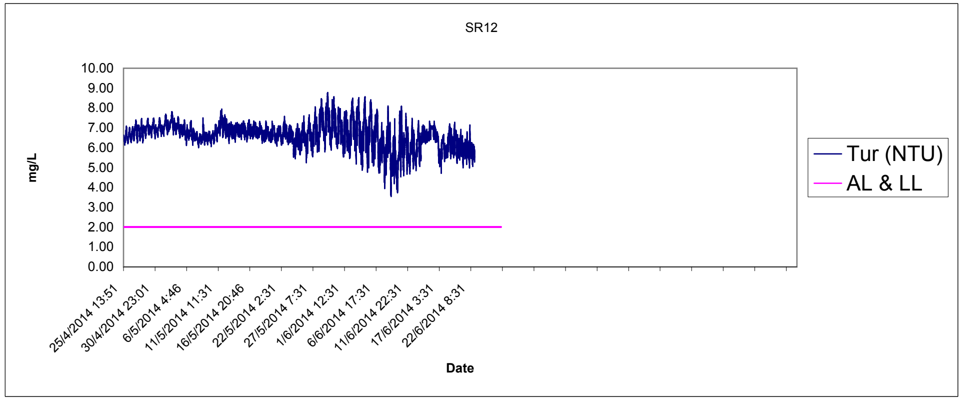




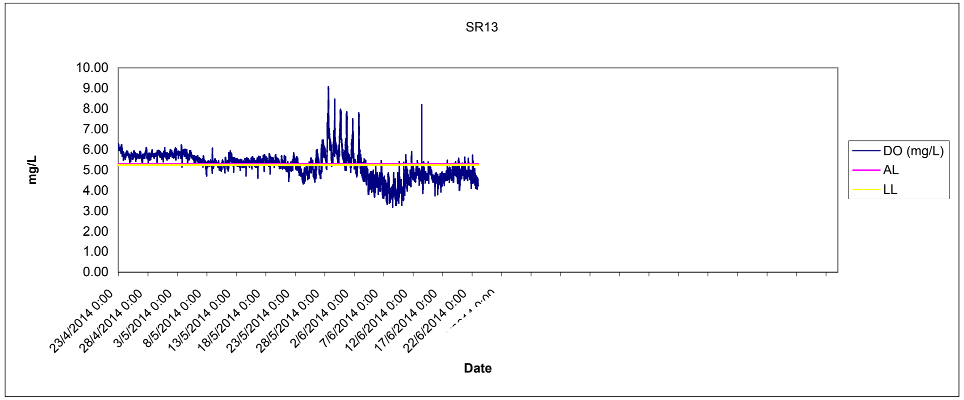
Dissolved Oxygen
24-hr Water Quality Monitoring



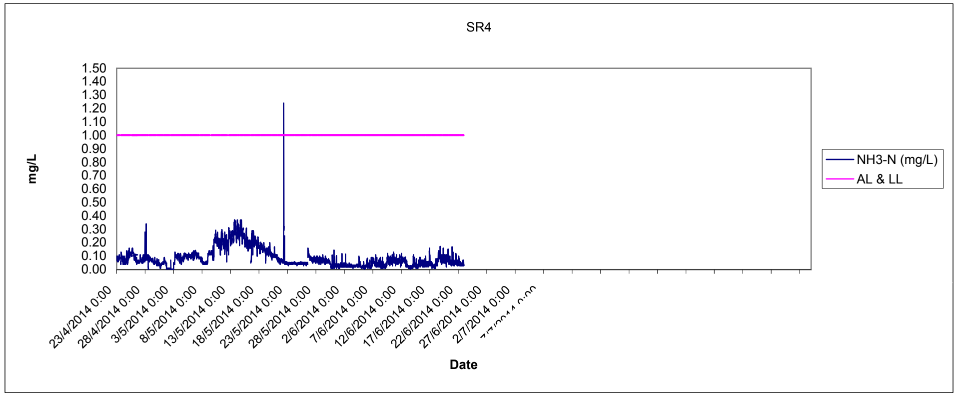


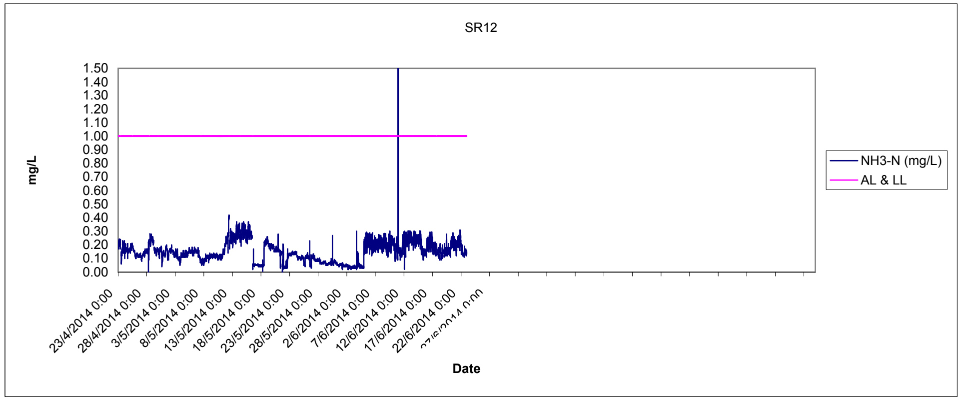


Dissolved Oxygen
24-hr Water Quality Monitoring



Ammonia-N
24-hr Water Quality Monitoring





Appendix F

Environmental Mitigation Implementation Schedule

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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 work in such location
		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.					NA-no work in such location
		A10	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 3 to 4 (subzones Z3A to Z4B) shall not exceed 1,600 m³ per day during dry season or 3,440 m³ per day during wet season as shown in EP-426/2011/A.					NA-no work in such location
		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 work in such location
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel –					NA-no work in

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.					such location
		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 work in such location
		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.					Implemented
		A15	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13B shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-no work in such location
		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 work in relevant location
		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 work in such location
		A23	Administrative control in terms of dredging rate adjustment in controlling the release of contaminants shall be employed as mitigation measures.					Implemented
		A24	Field trials shall be carried out to propose the most effective dredging process and rate to control the release of ammoniacal nitrogen and UIA into the water column and achieve compliance at the WSD1 seawater intake (NH_3-N) and at the beaches for UIA. Capital dredging works in dredging sub-zone Z2B (Figure 1.2h refers) should not therefore be carried out until the proposed method and rate are confirmed.					NA-no work in such location

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
		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 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					NA-no chemical waste produced

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
			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 marine archaeological impact during dredging activities	Contractor	Locations of the 20 unidentified sonar	During Construction works	
9.5	8		Monitoring Brief					
		G1	A monitoring brief shall be conducted during the dredging. It shall only be required during dredging at the locations of the 20 unidentified sonar					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
			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.			contacts and masked areas		
		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

Appendix G

Waste Generation in Reporting Period

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

Monthly Summary Waste Flow Table for 2014 (year)

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	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Feb	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Mar	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.05
Apr	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
May	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jun	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jul	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Aug	-	-	-	-	-	-	-	-	-	-
Sep	-	-	-	-	-	-	-	-	-	-
Oct	-	-	-	-	-	-	-	-	-	-
Nov	-	-	-	-	-	-	-	-	-	-
Dec	-	-	-	-	-	-	-	-	-	-
Total	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.11

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 ‘000m^3)										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 m^3)	
	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020																				
2021																				
Grand Total																			0.2	

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)

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)
Jan	nil	nil	nil
Feb	nil	nil	nil
Mar	nil	nil	nil
Apr	nil	nil	nil
May	3,700	nil	nil
Jun	66,950	nil	nil
Jul	80,600	nil	nil
Aug	-	-	-
Sep	-	-	-
Oct	-	-	-
Nov	-	-	-
Dec	-	-	-
Total	151,250	nil	nil

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Appendix H

Quarterly Assessment of Construction Impact

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Cluster 2 DO (B)
0.7 x Baseline vs Impact

0.7 x Baseline DO (B) (mg/L) data

SR6	04/01/2014	Mid-Flood	7.00	SR12	18/01/2014	Mid-Flood	5.95
SR6	07/01/2014	Mid-Flood	6.10	SR12	21/01/2014	Mid-Flood	5.95
SR6	09/01/2014	Mid-Flood	6.10	SR12	23/01/2014	Mid-Flood	5.82
SR6	11/01/2014	Mid-Flood	6.22	SR12	25/01/2014	Mid-Flood	6.15
SR6	14/01/2014	Mid-Flood	7.30	SR12	27/01/2014	Mid-Flood	6.20
SR6	16/01/2014	Mid-Flood	7.14	SR12	29/01/2014	Mid-Flood	6.55
SR6	18/01/2014	Mid-Flood	6.66				
SR6	21/01/2014	Mid-Flood	6.52				
SR6	23/01/2014	Mid-Flood	7.31				
SR6	25/01/2014	Mid-Flood	6.68				
SR6	27/01/2014	Mid-Flood	7.67				
SR6	29/01/2014	Mid-Flood	7.57				
SR7	04/01/2014	Mid-Flood	6.75				
SR7	07/01/2014	Mid-Flood	5.85				
SR7	09/01/2014	Mid-Flood	6.20				
SR7	11/01/2014	Mid-Flood	6.20				
SR7	14/01/2014	Mid-Flood	7.11				
SR7	16/01/2014	Mid-Flood	7.00				
SR7	18/01/2014	Mid-Flood	6.40				
SR7	21/01/2014	Mid-Flood	6.64				
SR7	23/01/2014	Mid-Flood	6.59				
SR7	25/01/2014	Mid-Flood	7.31				
SR7	27/01/2014	Mid-Flood	7.65				
SR7	29/01/2014	Mid-Flood	7.71				
SR8	04/01/2014	Mid-Flood	7.50				
SR8	07/01/2014	Mid-Flood	6.40				
SR8	09/01/2014	Mid-Flood	6.40				
SR8	11/01/2014	Mid-Flood	6.62				
SR8	14/01/2014	Mid-Flood	7.50				
SR8	16/01/2014	Mid-Flood	7.62				
SR8	18/01/2014	Mid-Flood	7.21				
SR8	21/01/2014	Mid-Flood	6.90				
SR8	23/01/2014	Mid-Flood	7.72				
SR8	25/01/2014	Mid-Flood	7.15				
SR8	27/01/2014	Mid-Flood	7.78				
SR8	29/01/2014	Mid-Flood	8.31				
SR9	04/01/2014	Mid-Flood	8.30				
SR9	07/01/2014	Mid-Flood	6.70				
SR9	09/01/2014	Mid-Flood	6.25				
SR9	11/01/2014	Mid-Flood	6.54				
SR9	14/01/2014	Mid-Flood	6.98				
SR9	16/01/2014	Mid-Flood	7.33				
SR9	18/01/2014	Mid-Flood	7.30				
SR9	21/01/2014	Mid-Flood	8.06				
SR9	23/01/2014	Mid-Flood	8.99				
SR9	25/01/2014	Mid-Flood	9.18				
SR9	27/01/2014	Mid-Flood	8.46				
SR9	29/01/2014	Mid-Flood	9.97				
SR10	04/01/2014	Mid-Flood	7.10				
SR10	07/01/2014	Mid-Flood	6.20				
SR10	09/01/2014	Mid-Flood	6.30				
SR10	11/01/2014	Mid-Flood	6.63				
SR10	14/01/2014	Mid-Flood	7.75				
SR10	16/01/2014	Mid-Flood	7.26				
SR10	18/01/2014	Mid-Flood	6.89				
SR10	21/01/2014	Mid-Flood	6.97				
SR10	23/01/2014	Mid-Flood	7.55				
SR10	25/01/2014	Mid-Flood	7.60				
SR10	27/01/2014	Mid-Flood	7.59				
SR10	29/01/2014	Mid-Flood	8.04				
SR11	04/01/2014	Mid-Flood	7.00				
SR11	07/01/2014	Mid-Flood	6.50				
SR11	09/01/2014	Mid-Flood	6.30				
SR11	11/01/2014	Mid-Flood	6.69				
SR11	14/01/2014	Mid-Flood	7.51				
SR11	16/01/2014	Mid-Flood	7.65				
SR11	18/01/2014	Mid-Flood	7.23				
SR11	21/01/2014	Mid-Flood	7.05				
SR11	23/01/2014	Mid-Flood	7.35				
SR11	25/01/2014	Mid-Flood	7.37				
SR11	27/01/2014	Mid-Flood	7.83				
SR11	29/01/2014	Mid-Flood	8.50				
SR12	04/01/2014	Mid-Flood	6.45				
SR12	07/01/2014	Mid-Flood	5.64				
SR12	09/01/2014	Mid-Flood	5.39				
SR12	11/01/2014	Mid-Flood	5.40				
SR12	14/01/2014	Mid-Flood	5.46				
SR12	16/01/2014	Mid-Flood	5.90				

Impact DO (B) (mg/L) data

SR6	24/04/2014	Mid-Flood	6.72	SR8	24/04/2014	Mid-Flood	7.10	SR10	24/04/2014	Mid-Flood	6.16
SR6	26/04/2014	Mid-Flood	6.61	SR8	26/04/2014	Mid-Flood	6.67	SR10	26/04/2014	Mid-Flood	7.10
SR6	29/04/2014	Mid-Flood	6.41	SR8	29/04/2014	Mid-Flood	6.62	SR10	29/04/2014	Mid-Flood	6.94
SR6	01/05/2014	Mid-Flood	6.33	SR8	01/05/2014	Mid-Flood	7.15	SR10	01/05/2014	Mid-Flood	6.87
SR6	03/05/2014	Mid-Flood	6.30	SR8	03/05/2014	Mid-Flood	6.90	SR10	03/05/2014	Mid-Flood	6.97
SR6	06/05/2014	Mid-Flood	6.14	SR8	06/05/2014	Mid-Flood	6.48	SR10	06/05/2014	Mid-Flood	6.55
SR6	08/05/2014	Mid-Flood	6.12	SR8	08/05/2014	Mid-Flood	6.18	SR10	08/05/2014	Mid-Flood	6.12
SR6	10/05/2014	Mid-Flood	5.71	SR8	10/05/2014	Mid-Flood	5.89	SR10	10/05/2014	Mid-Flood	6.23
SR6	13/05/2014	Mid-Flood		SR8	13/05/2014	Mid-Flood		SR10	13/05/2014	Mid-Flood	
SR6	15/05/2014	Mid-Flood	5.80	SR8	15/05/2014	Mid-Flood	5.74	SR10	15/05/2014	Mid-Flood	6.18
SR6	17/05/2014	Mid-Flood	5.55	SR8	17/05/2014	Mid-Flood	5.43	SR10	17/05/2014	Mid-Flood	6.93
SR6	20/05/2014	Mid-Flood	5.45	SR8	20/05/2014	Mid-Flood	5.43	SR10	20/05/2014	Mid-Flood	6.38
SR6	22/05/2014	Mid-Flood	4.50	SR8	22/05/2014	Mid-Flood	4.94	SR10	22/05/2014	Mid-Flood	6.20
SR6	24/05/2014	Mid-Flood	4.95	SR8	24/05/2014	Mid-Flood	4.31	SR10	24/05/2014	Mid-Flood	4.38
SR6	27/05/2014	Mid-Flood	5.00	SR8	27/05/2014	Mid-Flood	5.85	SR10	27/05/2014	Mid-Flood	5.84
SR6	29/05/2014	Mid-Flood	5.71	SR8	29/05/2014	Mid-Flood	5.64	SR10	29/05/2014	Mid-Flood	7.91
SR6	31/05/2014	Mid-Flood	5.06	SR8	31/05/2014	Mid-Flood	2.89	SR10	31/05/2014	Mid-Flood	5.80
SR6	03/06/2014	Mid-Flood	3.68	SR8	03/06/2014	Mid-Flood	2.43	SR10	03/06/2014	Mid-Flood	3.26
SR6	05/06/2014	Mid-Flood	2.86	SR8	05/06/2014	Mid-Flood	2.77	SR10	05/06/2014	Mid-Flood	4.19
SR6	07/06/2014	Mid-Flood	3.78	SR8	07/06/2014	Mid-Flood	1.75	SR10	07/06/2014	Mid-Flood	3.53
SR6	10/06/2014	Mid-Flood	5.61	SR8	10/06/2014	Mid-Flood	3.84	SR10	10/06/2014	Mid-Flood	4.64
SR6	12/06/2014	Mid-Flood	4.51	SR8	12/06/2014	Mid-Flood	4.75	SR10	12/06/2014	Mid-Flood	4.73
SR6	14/06/2014	Mid-Flood	4.84	SR8	14/06/2014	Mid-Flood	5.88	SR10	14/06/2014	Mid-Flood	6.09
SR6	17/6/2014	Mid-Flood	4.10	SR8	17/6/2014	Mid-Flood	4.24	SR10	17/6/2014	Mid-Flood	4.30
SR6	19/06/2014	Mid-Flood	4.73	SR8	19/06/2014	Mid-Flood	4.53	SR10	19/06/2014	Mid-Flood	5.24
SR6	21/06/2014	Mid-Flood		SR8	21/06/2014	Mid-Flood		SR10	21/06/2014	Mid-Flood	
SR6	24/06/2014	Mid-Flood	4.63	SR8	24/06/2014	Mid-Flood	4.33	SR10	24/06/2014	Mid-Flood	5.32
SR6	26/06/2014	Mid-Flood	4.37	SR8	26/06/2014	Mid-Flood	4.09	SR10	26/06/2014	Mid-Flood	5.16
SR6	28/06/2014	Mid-Flood	3.32	SR8	28/06/2014	Mid-Flood	6.31	SR10	28/06/2014	Mid-Flood	3.25
SR6	01/07/2014	Mid-Flood	3.90	SR8	01/07/2014	Mid-Flood	4.70	SR10	01/07/2014	Mid-Flood	2.90
SR6	03/07/2014	Mid-Flood	3.13	SR8	03/07/2014	Mid-Flood	3.04	SR10	03/07/2014	Mid-Flood	3.53
SR6	05/07/2014	Mid-Flood	3.77	SR8	05/07/2014	Mid-Flood	2.73	SR10	05/07/2014	Mid-Flood	3.37
SR6	08/07/2014	Mid-Flood	4.25	SR8	08/07/2014	Mid-Flood	4.40	SR10	08/07/2014	Mid-Flood	4.32
SR6	10/07/2014	Mid-Flood	3.73	SR8	10/07/2014	Mid-Flood	3.95	SR10	10/07/2014	Mid-Flood	3.94
SR6	12/07/2014	Mid-Flood	4.29	SR8	12/07/2014	Mid-Flood	4.52	SR10	12/07/2014	Mid-Flood	4.21
SR6	15/07/2014	Mid-Flood	4.53	SR8	15/07/2014	Mid-Flood	4.33	SR10	15/07/2014	Mid-Flood	5.89
SR6	17/07/2014	Mid-Flood	3.43	SR8	17/07/2014	Mid-Flood	5.94	SR10	17/07/2014	Mid-Flood	5.43
SR6	19/07/2014	Mid-Flood	4.47	SR8	19/07/2014	Mid-Flood	5.20	SR10	19/07/2014	Mid-Flood	4.11
SR6	22/07/2014	Mid-Flood	4.08	SR8	22/07/2014	Mid-Flood	5.67	SR10	22/07/2014	Mid-Flood	7.31
SR7	24/04/2014	Mid-Flood	6.17	SR9	24/04/2014	Mid-Flood	6.51	SR11	24/04/2014	Mid-Flood	6.16
SR7	26/04/2014	Mid-Flood	6.35	SR9	26/04/2014	Mid-Flood	6.84	SR11	26/04/2014	Mid-Flood	6.82
SR7	29/04/2014	Mid-Flood	6.26	SR9	29/04/2014	Mid-Flood	6.50	SR11	29/04/2014	Mid-Flood	7.41
SR7	01/05/2014	Mid-Flood	6.45	SR9	01/05/2014	Mid-Flood	7.32	SR11	01/05/2014	Mid-Flood	6.90
SR7	03/05/2014	Mid-Flood	6.12	SR9	03/05/2014	Mid-Flood	7.16	SR11	03/05/2014	Mid-Flood	7.17
SR7	06/05/2014	Mid-Flood	6.24	SR9	06/05/2014	Mid-Flood	6.14	SR11	06/05/2014	Mid-Flood	6.51
SR7	08/05/2014	Mid-Flood	5.88	SR9	08/05/2014	Mid-Flood	5.62	SR11	08/05/2014	Mid-Flood	6.17
SR7	10/05/2014	Mid-Flood	5.61	SR9	10/05/2014	Mid-Flood	5.90	SR11	10/05/2014	Mid-Flood	5.93
SR7	13/05/2014	Mid-Flood		SR9	13/05/2014	Mid-Flood		SR11	13/05/2014	Mid-Flood	
SR7	15/05/2014	Mid-Flood	5.93	SR9	15/05/2014	Mid-Flood	5.55	SR11	15/05/2014	Mid-Flood	6.34
SR7	17/05/2014	Mid-Flood	5.96	SR9	17/05/2014	Mid-Flood	4.43	SR11	17/05/2014	Mid-Flood	6.52
SR7	20/05/2014	Mid-Flood	5.11	SR9	20/05/2014	Mid-Flood	6.25	SR11	20/05/2014	Mid-Flood	6.71
SR7	22/05/2014	Mid-Flood	4.72	SR9	22/05/2014	Mid-Flood	4.00	SR11	22/05/2014	Mid-Flood	6.14
SR7	24/05/2014	Mid-Flood	4.47	SR9	24/05/2014	Mid-Flood	6.33	SR11	24/05/2014	Mid-Flood	5.19
SR7	27/05/2014	Mid-Flood	4.97	SR9	27/05/2014	Mid-Flood	3.03	SR11	27/05/2014	Mid-Flood	7.14
SR7	29/05/2014	Mid-Flood	4.45	SR9	29/05/2014	Mid-Flood	5.20	SR11	29/05/2014	Mid-Flood	7.65
SR7	31/05/2014	Mid-Flood	3.49	SR9	31/05/2014	Mid-Flood	4.72	SR11	31/05/2014	Mid-Flood	5.28
SR7	03/06/2014	Mid-Flood	3.83	SR9	03/06/2014	Mid-Flood	7.77	SR11	03/06/2014	Mid-Flood	4.18
SR7	05/06/2014	Mid-Flood	3.61	SR9	05/06/2014	Mid-Flood	1.95	SR11	05/06/2014	Mid-Flood	3.82
SR7	07/06/2014	Mid-Flood	3.00	SR9	07/06/2014	Mid-Flood	1.60	SR11	07/06/2014	Mid-Flood	2.93
SR7	10/06/2014	Mid-Flood	3.56	SR9	10/06/2014	Mid-Flood	2.16	SR11	10/06/2014	Mid-Flood	6.98
SR7	12/06/2014	Mid-Flood	4.82	SR9	12/06/2014	Mid-Flood	4.42	SR11	12/06/2014	Mid-Flood	4.50
SR7	14/06/2014	Mid-Flood	4.56	SR9	14/06/2014	Mid-Flood	5.00	SR11	14/06/2014	Mid-Flood	5.66
SR7	17/6/2014	Mid-Flood	4.97	SR9	17/6/2014	Mid-Flood	4.89	SR11	17/6/2014	Mid-Flood	4.21
SR7	19/06/2014	Mid-Flood	4.49	SR9	19/06/2014	Mid-Flood	4.95	SR11	19/06/2014	Mid-Flood	5.20
SR7	21/06/2014	Mid-Flood		SR9	21/06/2014	Mid-Flood		SR11	21/06/2014	Mid-Flood	
SR7	24/06/2014	Mid-Flood	2.93	SR9	24/06/2014	Mid-Flood	4.72	SR11	24/06/2014	Mid-Flood	4.56
SR7	26/06/2014	Mid-Flood	2.66	SR9	26/06/2014	Mid-Flood	4.33	SR11	26/06/2014	Mid-Flood	4.13
SR7	28/06/2014	Mid-Flood	4.07	SR9	28/06/2014	Mid-Flood	1.59	SR11	28/06/2014	Mid-Flood	6.12
SR7	01/07/2014	Mid-Flood	4.21	SR9	01/07/2014	Mid-Flood	4.55	SR11	01/07/2014	Mid-Flood	2.77
SR7	03/07/2014	Mid-Flood	1.95	SR9	03/07/2014	Mid-Flood	3.58	SR11	03/07/2014	Mid-Flood	3.71
SR7	05/07/2014	Mid-Flood	1.77	SR9	05/07/2014	Mid-Flood	3.83	SR11	05/07/2014	Mid-Flood	4.34
SR7	08/07/2014	Mid-Flood	3.38	SR9	08/07/2014	Mid-Flood	4.33	SR11	08/07/2014	Mid-Flood	4.76
SR7	10/07/2014	Mid-Flood	4.01	SR9	10/07/2014	Mid-Flood	4.12	SR11	10/07/2014	Mid-Flood	3.67
SR7	12/07/2014	Mid-Flood	3.94	SR9	12/07/2014	Mid-Flood	4.14	SR11	12/07/2014	Mid-Flood	4.07
SR7	15/07/2014	Mid-Flood	4.21	SR9	15/07/2014	Mid-Flood	6.85	SR11	15/07/2014	Mid-Flood	6.01
SR7	17/07/2014	Mid-Flood	2.44	SR9	17/07/2014	Mid-Flood	6.43	SR11	17/07/2014	Mid-Flood	
SR7	19/07/2014	Mid-Flood	3.16	SR9	19/07/2014	Mid-Flood	5.14	SR11	19/07/2014	Mid-Flood	4.05
SR7	22/07/2014	Mid-Flood	3.72	SR9	22/07/2014	Mid-Flood	4.97	SR11	22/07/2014	Mid-Flood	6.82

Cluster 2 DO (B)
0.7 x Baseline vs Impact

0.7 x Baseline DO (B) (mg/L) data							
SR6	04/01/2014	Mid-Ebb	7.00	SR12	18/01/2014	Mid-Ebb	6.04
SR6	07/01/2014	Mid-Ebb	6.10	SR12	21/01/2014	Mid-Ebb	5.98
SR6	09/01/2014	Mid-Ebb	6.10	SR12	23/01/2014	Mid-Ebb	6.06
SR6	11/01/2014	Mid-Ebb	6.09	SR12	25/01/2014	Mid-Ebb	6.31
SR6	14/01/2014	Mid-Ebb	7.24	SR12	27/01/2014	Mid-Ebb	6.25
SR6	16/01/2014	Mid-Ebb	6.92	SR12	29/01/2014	Mid-Ebb	6.40
SR6	18/01/2014	Mid-Ebb	6.77				
SR6	21/01/2014	Mid-Ebb	6.85				
SR6	23/01/2014	Mid-Ebb	6.93				
SR6	25/01/2014	Mid-Ebb	6.99				
SR6	27/01/2014	Mid-Ebb	7.48				
SR6	29/01/2014	Mid-Ebb	6.95				
SR7	04/01/2014	Mid-Ebb	7.00				
SR7	07/01/2014	Mid-Ebb	6.00				
SR7	09/01/2014	Mid-Ebb	6.18				
SR7	11/01/2014	Mid-Ebb	6.20				
SR7	14/01/2014	Mid-Ebb	7.12				
SR7	16/01/2014	Mid-Ebb	7.10				
SR7	18/01/2014	Mid-Ebb	6.57				
SR7	21/01/2014	Mid-Ebb	6.85				
SR7	23/01/2014	Mid-Ebb	6.45				
SR7	25/01/2014	Mid-Ebb	7.84				
SR7	27/01/2014	Mid-Ebb	7.07				
SR7	29/01/2014	Mid-Ebb	7.22				
SR8	04/01/2014	Mid-Ebb	7.50				
SR8	07/01/2014	Mid-Ebb	6.50				
SR8	09/01/2014	Mid-Ebb	6.50				
SR8	11/01/2014	Mid-Ebb	6.51				
SR8	14/01/2014	Mid-Ebb	7.32				
SR8	16/01/2014	Mid-Ebb	7.59				
SR8	18/01/2014	Mid-Ebb	7.42				
SR8	21/01/2014	Mid-Ebb	6.91				
SR8	23/01/2014	Mid-Ebb	7.42				
SR8	25/01/2014	Mid-Ebb	7.43				
SR8	27/01/2014	Mid-Ebb	7.31				
SR8	29/01/2014	Mid-Ebb	7.98				
SR9	04/01/2014	Mid-Ebb	9.00				
SR9	07/01/2014	Mid-Ebb	6.60				
SR9	09/01/2014	Mid-Ebb	6.10				
SR9	11/01/2014	Mid-Ebb	6.42				
SR9	14/01/2014	Mid-Ebb	6.83				
SR9	16/01/2014	Mid-Ebb	7.02				
SR9	18/01/2014	Mid-Ebb	7.87				
SR9	21/01/2014	Mid-Ebb	8.96				
SR9	23/01/2014	Mid-Ebb	8.69				
SR9	25/01/2014	Mid-Ebb	9.53				
SR9	27/01/2014	Mid-Ebb	7.93				
SR9	29/01/2014	Mid-Ebb	8.09				
SR10	04/01/2014	Mid-Ebb	7.10				
SR10	07/01/2014	Mid-Ebb	6.35				
SR10	09/01/2014	Mid-Ebb	6.40				
SR10	11/01/2014	Mid-Ebb	6.51				
SR10	14/01/2014	Mid-Ebb	7.75				
SR10	16/01/2014	Mid-Ebb	7.31				
SR10	18/01/2014	Mid-Ebb	7.00				
SR10	21/01/2014	Mid-Ebb	7.13				
SR10	23/01/2014	Mid-Ebb	7.41				
SR10	25/01/2014	Mid-Ebb	7.96				
SR10	27/01/2014	Mid-Ebb	7.43				
SR10	29/01/2014	Mid-Ebb	7.64				
SR11	04/01/2014	Mid-Ebb	7.40				
SR11	07/01/2014	Mid-Ebb	6.55				
SR11	09/01/2014	Mid-Ebb	6.30				
SR11	11/01/2014	Mid-Ebb	6.66				
SR11	14/01/2014	Mid-Ebb	7.58				
SR11	16/01/2014	Mid-Ebb	7.65				
SR11	18/01/2014	Mid-Ebb	7.00				
SR11	21/01/2014	Mid-Ebb	7.24				
SR11	23/01/2014	Mid-Ebb	7.33				
SR11	25/01/2014	Mid-Ebb	7.55				
SR11	27/01/2014	Mid-Ebb	7.53				
SR11	29/01/2014	Mid-Ebb	8.27				
SR12	04/01/2014	Mid-Ebb	6.48				
SR12	07/01/2014	Mid-Ebb	5.57				
SR12	09/01/2014	Mid-Ebb	5.25				
SR12	11/01/2014	Mid-Ebb	5.43				
SR12	14/01/2014	Mid-Ebb	5.44				
SR12	16/01/2014	Mid-Ebb	5.90				

Impact DO (B) (mg/L) data											
SR6	24/04/2014	Mid-Ebb	6.35	SR8	24/04/2014	Mid-Ebb	7.15	SR10	24/04/2014	Mid-Ebb	6.83
SR6	26/04/2014	Mid-Ebb	6.41	SR8	26/04/2014	Mid-Ebb	6.66	SR10	26/04/2014	Mid-Ebb	6.88
SR6	29/04/2014	Mid-Ebb	6.57	SR8	29/04/2014	Mid-Ebb	7.05	SR10	29/04/2014	Mid-Ebb	6.92
SR6	01/05/2014	Mid-Ebb	6.50	SR8	01/05/2014	Mid-Ebb	7.29	SR10	01/05/2014	Mid-Ebb	7.23
SR6	03/05/2014	Mid-Ebb	6.56	SR8	03/05/2014	Mid-Ebb	7.11	SR10	03/05/2014	Mid-Ebb	7.35
SR6	06/05/2014	Mid-Ebb	6.17	SR8	06/05/2014	Mid-Ebb	6.43	SR10	06/05/2014	Mid-Ebb	6.57
SR6	08/05/2014	Mid-Ebb		SR8	08/05/2014	Mid-Ebb		SR10	08/05/2014	Mid-Ebb	6.20
SR6	10/05/2014	Mid-Ebb	5.67	SR8	10/05/2014	Mid-Ebb	5.39	SR10	10/05/2014	Mid-Ebb	5.70
SR6	13/05/2014	Mid-Ebb		SR8	13/05/2014	Mid-Ebb		SR10	13/05/2014	Mid-Ebb	
SR6	15/05/2014	Mid-Ebb	5.74	SR8	15/05/2014	Mid-Ebb	5.65	SR10	15/05/2014	Mid-Ebb	6.13
SR6	17/05/2014	Mid-Ebb	5.34	SR8	17/05/2014	Mid-Ebb	5.33	SR10	17/05/2014	Mid-Ebb	6.36
SR6	20/05/2014	Mid-Ebb		SR8	20/05/2014	Mid-Ebb		SR10	20/05/2014	Mid-Ebb	6.42
SR6	22/05/2014	Mid-Ebb	5.31	SR8	22/05/2014	Mid-Ebb	5.48	SR10	22/05/2014	Mid-Ebb	6.30
SR6	24/05/2014	Mid-Ebb	4.67	SR8	24/05/2014	Mid-Ebb	4.79	SR10	24/05/2014	Mid-Ebb	5.49
SR6	27/05/2014	Mid-Ebb	4.48	SR8	27/05/2014	Mid-Ebb	6.94	SR10	27/05/2014	Mid-Ebb	4.66
SR6	29/05/2014	Mid-Ebb	5.35	SR8	29/05/2014	Mid-Ebb	5.34	SR10	29/05/2014	Mid-Ebb	7.09
SR6	31/05/2014	Mid-Ebb	4.91	SR8	31/05/2014	Mid-Ebb	2.89	SR10	31/05/2014	Mid-Ebb	5.78
SR6	03/06/2014	Mid-Ebb	4.20	SR8	03/06/2014	Mid-Ebb	4.75	SR10	03/06/2014	Mid-Ebb	3.44
SR6	05/06/2014	Mid-Ebb	2.83	SR8	05/06/2014	Mid-Ebb	2.82	SR10	05/06/2014	Mid-Ebb	4.31
SR6	07/06/2014	Mid-Ebb	2.09	SR8	07/06/2014	Mid-Ebb	1.79	SR10	07/06/2014	Mid-Ebb	3.14
SR6	10/06/2014	Mid-Ebb	3.60	SR8	10/06/2014	Mid-Flood	3.84	SR10	10/06/2014	Mid-Ebb	6.61
SR6	12/06/2014	Mid-Ebb	4.61	SR8	12/06/2014	Mid-Ebb	4.70	SR10	12/06/2014	Mid-Ebb	4.38
SR6	14/06/2014	Mid-Ebb	5.29	SR8	14/06/2014	Mid-Ebb	5.48	SR10	14/06/2014	Mid-Ebb	6.12
SR6	17/6/2014	Mid-Ebb	4.25	SR8	17/6/2014	Mid-Ebb	4.28	SR10	17/6/2014	Mid-Ebb	4.40
SR6	19/06/2014	Mid-Ebb	4.82	SR8	19/06/2014	Mid-Ebb	4.70	SR10	19/06/2014	Mid-Ebb	5.15
SR6	21/06/2014	Mid-Ebb	4.11	SR8	21/06/2014	Mid-Ebb		SR10	21/06/2014	Mid-Ebb	
SR6	24/06/2014	Mid-Ebb	4.11	SR8	24/06/2014	Mid-Ebb	4.26	SR10	24/06/2014	Mid-Ebb	5.31
SR6	26/06/2014	Mid-Ebb	4.58	SR8	26/06/2014	Mid-Ebb	3.70	SR10	26/06/2014	Mid-Ebb	5.53
SR6	28/06/2014	Mid-Ebb	3.30	SR8	28/06/2014	Mid-Ebb	7.05	SR10	28/06/2014	Mid-Ebb	3.99
SR6	01/07/2014	Mid-Ebb	3.87	SR8	01/07/2014	Mid-Ebb	2.89	SR10	01/07/2014	Mid-Ebb	2.87
SR6	03/07/2014	Mid-Ebb	3.34	SR8	03/07/2014	Mid-Ebb	3.30	SR10	03/07/2014	Mid-Ebb	4.42
SR6	05/07/2014	Mid-Ebb	4.04	SR8	05/07/2014	Mid-Ebb	3.29	SR10	05/07/2014	Mid-Ebb	3.65
SR6	08/07/2014	Mid-Ebb	3.97	SR8	08/07/2014	Mid-Ebb	4.56	SR10	08/07/2014	Mid-Ebb	4.24
SR6	10/07/2014	Mid-Ebb	4.03	SR8	10/07/2014	Mid-Ebb	3.83	SR10	10/07/2014	Mid-Ebb	3.93
SR6	12/07/2014	Mid-Ebb	4.00	SR8	12/07/2014	Mid-Ebb	4.94	SR10	12/07/2014	Mid-Ebb	4.15
SR6	15/07/2014	Mid-Ebb	5.30	SR8	15/07/2014	Mid-Ebb	3.84	SR10	15/07/2014	Mid-Ebb	5.92
SR6	17/07/2014	Mid-Ebb		SR8	17/07/2014	Mid-Ebb		SR10	17/07/2014	Mid-Ebb	
SR6	19/07/2014	Mid-Ebb	4.47	SR8	19/07/2014	Mid-Ebb	5.20	SR10	19/07/2014	Mid-Ebb	3.83
SR6	22/07/2014	Mid-Ebb	3.68	SR8	22/07/2014	Mid-Ebb	5.68	SR10	22/07/2014	Mid-Ebb	6.27
SR7	24/04/2014	Mid-Ebb	6.58	SR9	24/04/2014	Mid-Ebb	6.49	SR11	24/04/2014	Mid-Ebb	6.16
SR7	26/04/2014	Mid-Ebb	6.38	SR9	26/04/2014	Mid-Ebb	6.14	SR11	26/04/2014	Mid-Ebb	6.92
SR7	29/04/2014	Mid-Ebb	6.48	SR9	29/04/2014	Mid-Ebb	8.22	SR11	29/04/2014	Mid-Ebb	7.12
SR7	01/05/2014	Mid-Ebb	6.16	SR9	01/05/2014	Mid-Ebb	7.36	SR11	01/05/2014	Mid-Ebb	6.91
SR7	03/05/2014	Mid-Ebb	6.50	SR9	03/05/2014	Mid-Ebb	8.42	SR11	03/05/2014	Mid-Ebb	7.27
SR7	06/05/2014	Mid-Ebb	6.53	SR9	06/05/2014	Mid-Ebb	6.17	SR11	06/05/2014	Mid-Ebb	6.63
SR7	08/05/2014	Mid-Ebb		SR9	08/05/2014	Mid-Ebb		SR11	08/05/2014	Mid-Ebb	6.13
SR7	10/05/2014	Mid-Ebb	5.69	SR9	10/05/2014	Mid-Ebb	5.67	SR11	10/05/2014	Mid-Ebb	5.98
SR7	13/05/2014	Mid-Ebb		SR9	13/05/2014	Mid-Ebb		SR11	13/05/2014	Mid-Ebb	
SR7	15/05/2014	Mid-Ebb	5.62	SR9	15/05/2014	Mid-Ebb	6.50	SR11	15/05/2014	Mid-Ebb	6.35
SR7	17/05/2014	Mid-Ebb	5.74	SR9	17/05/2014	Mid-Ebb	5.28	SR11	17/05/2014	Mid-Ebb	6.56
SR7	20/05/2014	Mid-Ebb		SR9	20/05/2014	Mid-Ebb		SR11	20/05/2014	Mid-Ebb	6.14
SR7	22/05/2014	Mid-Ebb	4.90	SR9	22/05/2014	Mid-Ebb	5.31	SR11	22/05/2014	Mid-Ebb	6.12
SR7	24/05/2014	Mid-Ebb	4.73	SR9	24/05/2014	Mid-Ebb	5.56	SR11	24/05/2014	Mid-Ebb	3.90
SR7	27/05/2014	Mid-Ebb	4.30	SR9	27/05/2014	Mid-Ebb	2.13	SR11	27/05/2014	Mid-Ebb	3.69
SR7	29/05/2014	Mid-Ebb	4.56	SR9	29/05/2014	Mid-Ebb	5.72	SR11	29/05/2014	Mid-Ebb	5.35
SR7	31/05/2014	Mid-Ebb	3.51	SR9	31/05/2014	Mid-Ebb	4.28	SR11	31/05/2014	Mid-Ebb	6.85
SR7	03/06/2014	Mid-Ebb	3.75	SR9	03/06/2014	Mid-Ebb	8.00	SR11	03/06/2014	Mid-Ebb	4.28
SR7	05/06/2014	Mid-Ebb	3.51	SR9	05/06/2014	Mid-Ebb	1.83	SR11	05/06/2014	Mid-Ebb	6.18
SR7	07/06/2014	Mid-Ebb	3.06	SR9	07/06/2014	Mid-Ebb	2.55	SR11	07/06/2014	Mid-Ebb	4.23
SR7	10/06/2014	Mid-Ebb	3.94	SR9	10/06/2014	Mid-Ebb	5.98	SR11	10/06/2014	Mid-Ebb	6.85
SR7	12/06/2014	Mid-Ebb	4.35	SR9	12/06/2014	Mid-Ebb	4.32	SR11	12/06/2014	Mid-Ebb	4.28
SR7	14/06/2014	Mid-Ebb	4.55	SR9	14/06/2014	Mid-Ebb	5.14	SR11	14/06/2014	Mid-Ebb	6.18
SR7	17/6/2014	Mid-Ebb	4.98	SR9	17/6/2014	Mid-Ebb	4.81	SR11	17/6/2014	Mid-Ebb	4.23
SR7	19/06/2014	Mid-Ebb	4.47	SR9	19/06/2014	Mid-Ebb	5.04	SR11	19/06/2014	Mid-Ebb	5.09
SR7	21/06/2014	Mid-Ebb	3.70	SR9	21/06/2014	Mid-Ebb		SR11	21/06/2014	Mid-Ebb	
SR7	24/06/2014	Mid-Ebb	2.98	SR9	24/06/2014	Mid-Ebb	4.81	SR11	24/06/2014	Mid-Ebb	4.26
SR7	26/06/2014	Mid-Ebb	2.76	SR9	26/06/2014	Mid-Ebb	3.84	SR11	26/06/2014	Mid-Ebb	3.43
SR7	28/06/2014	Mid-Ebb	3.57	SR9	28/06/2014	Mid-Ebb	3.27	SR11	28/06/2014	Mid-Ebb	5.01
SR7	01/07/2014	Mid-Ebb	3.94	SR9	01/07/2014	Mid-Ebb	4.85	SR11	01/07/2014	Mid-Ebb	3.63
SR7	03/07/2014	Mid-Ebb	1.91	SR9	03/07/2014	Mid-Ebb	3.19	SR11	03/07/2014	Mid-Ebb	3.96
SR7	05/07/2014	Mid-Ebb	2.17	SR9	05/07/2014	Mid-Ebb	3.27	SR11	05/07/2014	Mid-Ebb	5.84
SR7	08/07/2014	Mid-Ebb	3.73	SR9	08/07/2014	Mid-Ebb	4.85	SR11	08/07/2014	Mid-Ebb	
SR7	10/07/2014	Mid-Ebb	4.13	SR9	10/07/2014	Mid-Ebb	3.76	SR11	10/07/2014	Mid-Ebb	3.63
SR7	12/07/2014	Mid-Ebb	4.29	SR9	12/07/2014	Mid-Ebb	4.34	SR11	12/07/2014	Mid-Ebb	3.96
SR7	15/07/2014	Mid-Ebb	5.90	SR9	15/07/2014	Mid-Ebb	4.98	SR11	15/07/2014	Mid-Ebb	5.84
SR7	17/07/2014	Mid-Ebb		SR9	17/07/2014	Mid-Ebb		SR11	17/07/2014	Mid-Ebb	
SR7	19/07/2014	Mid-Ebb	3.83	SR9	19/07/2014	Mid-Ebb	5.19	SR11	19/07/2014	Mid-Ebb	3.87
SR7	22/07/2014	Mid-Ebb	4.32	SR9	22/07/2014	Mid-Ebb	3.24	SR11	22/07/2014	Mid-Ebb	6.62

Baseline x 0.7		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	144	Number of Valid Observations	430
Number of Distinct Observations	95	Number of Missing Values	38
Minimum	4.1	Number of Distinct Observations	334
Maximum	6.98	Minimum	1.59
Mean of Raw Data	5.021	Maximum	8.415
Standard Deviation of Raw Data	0.519	Mean of Raw Data	4.986
Kstar	96.46	Standard Deviation of Raw Data	1.37
Mean of Log Transformed Data	1.609	Kstar	11.73
Standard Deviation of Log Transformed Data	0.1	Mean of Log Transformed Data	1.564
		Standard Deviation of Log Transformed Data	0.306
Normal Distribution Test Results			
		Normal Distribution Test Results	
Correlation Coefficient R	0.974		
Approximate Shapiro Wilk Test Statistic	0.944	Correlation Coefficient R	0.994
Approximate Shapiro Wilk P Value	1.05E-05	Approximate Shapiro Wilk Test Statistic	0.968
Lilliefors Test Statistic	7.03E-02	Approximate Shapiro Wilk P Value	8.50E-06
Lilliefors Critical (0.95) Value	0.0738	Lilliefors Test Statistic	0.0764
Data appear Normal at (0.05) Significance Level		Lilliefors Critical (0.95) Value	0.0427
		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 Greater Than or Equal to Background Mean/Median (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median

Area of Concern Data: Impact
Background Data: Baseline x 0.7

Raw Statistics

	Site	Background
Number of Valid Observations	430	144
Number of Missing Values	38	0
Number of Distinct Observations	334	95
Minimum	1.59	4.1
Maximum	8.415	6.98
Mean	4.986	5.021
Median	4.903	4.975
SD	1.37	0.519
SE of Mean	0.0661	0.0433

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	122499
WMW Test U-Stat	-0.653
WMW Critical Value (0.050)	-1.645
P-Value	2.57E-01

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

Cluster 1 TIN(Insitu)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (Insitu) (mg/L) data			
SR5	04/01/2014	Mid-Flood	0.38
SR5	07/01/2014	Mid-Flood	0.48
SR5	09/01/2014	Mid-Flood	0.51
SR5	11/01/2014	Mid-Flood	0.66
SR5	14/01/2014	Mid-Flood	0.54
SR5	16/01/2014	Mid-Flood	0.43
SR5	18/01/2014	Mid-Flood	0.44
SR5	21/01/2014	Mid-Flood	0.40
SR5	23/01/2014	Mid-Flood	0.49
SR5	25/01/2014	Mid-Flood	0.70
SR5	27/01/2014	Mid-Flood	0.61
SR5	29/01/2014	Mid-Flood	0.49

Impact TIN (Insitu) (mg/L) data			
SR5	24/04/2014	Mid-Flood	0.36
SR5	26/04/2014	Mid-Flood	0.55
SR5	29/04/2014	Mid-Flood	0.74
SR5	01/05/2014	Mid-Flood	0.63
SR5	03/05/2014	Mid-Flood	0.44
SR5	06/05/2014	Mid-Flood	0.40
SR5	08/05/2014	Mid-Flood	0.41
SR5	10/05/2014	Mid-Flood	0.68
SR5	13/05/2014	Mid-Flood	
SR5	15/05/2014	Mid-Flood	1.39
SR5	17/05/2014	Mid-Flood	1.60
SR5	20/05/2014	Mid-Flood	0.91
SR5	22/05/2014	Mid-Flood	1.92
SR5	24/05/2014	Mid-Flood	1.10
SR5	27/05/2014	Mid-Flood	1.35
SR5	29/05/2014	Mid-Flood	1.10
SR5	31/05/2014	Mid-Flood	0.98
SR5	03/06/2014	Mid-Flood	0.99
SR5	05/06/2014	Mid-Flood	1.00
SR5	07/06/2014	Mid-Flood	0.96
SR5	10/06/2014	Mid-Flood	0.65
SR5	12/06/2014	Mid-Flood	0.73
SR5	14/06/2014	Mid-Flood	0.78
SR5	17/6/2014	Mid-Flood	0.81
SR5	19/06/2014	Mid-Flood	0.98
SR5	21/06/2014	Mid-Flood	
SR5	24/06/2014	Mid-Flood	1.25
SR5	26/06/2014	Mid-Flood	1.28
SR5	28/06/2014	Mid-Flood	1.06
SR5	01/07/2014	Mid-Flood	1.01
SR5	03/07/2014	Mid-Flood	1.23
SR5	05/07/2014	Mid-Flood	1.38
SR5	08/07/2014	Mid-Flood	0.98
SR5	10/07/2014	Mid-Flood	0.96
SR5	12/07/2014	Mid-Flood	1.07
SR5	15/07/2014	Mid-Flood	0.80
SR5	17/07/2014	Mid-Flood	0.88
SR5	19/07/2014	Mid-Flood	0.71
SR5	22/07/2014	Mid-Flood	1.05

SR5		Baseline x 1.3	
Raw Statistics		Raw Statistics	
Number of Valid Observations	37	Number of Valid Observations	12
Number of Missing Values	2	Number of Distinct Observations	11
Number of Distinct Observations	33	Minimum	0.38
Minimum	0.31	Maximum	0.7
Maximum	2.01	Mean of Raw Data	0.511
Mean of Raw Data	1.025	Standard Deviation of Raw Data	0.101
Standard Deviation of Raw Data	0.455	Kstar	22.13
Kstar	4.281	Mean of Log Transformed Data	-0.689
Mean of Log Transformed Data	-0.0871	Standard Deviation of Log Transformed Data	0.191
Standard Deviation of Log Transformed Data	0.504		
		Normal Distribution Test Results	
Normal Distribution Test Results			
		Correlation Coefficient R	0.971
Correlation Coefficient R	0.987	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Test Statistic	0.959	Shapiro Wilk Critical (0.95) Value	0.859
Shapiro Wilk Critical (0.95) Value	0.936	Approximate Shapiro Wilk P Value	0.453
Approximate Shapiro Wilk P Value	0.251	Lilliefors Test Statistic	0.17
Lilliefors Test Statistic	0.101	Lilliefors Critical (0.95) Value	0.256
Lilliefors Critical (0.95) Value	0.146	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: SR5
Background Data: Baseline x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	37	12
Number of Missing Values	2	0
Number of Distinct Observations	33	11
Minimum	0.31	0.38
Maximum	2.01	0.7
Mean	1.025	0.511
Median	0.98	0.49
SD	0.455	0.101
SE of Mean	0.0748	0.0291

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)	47	3.857	1.678	0
Satterthwaite (Unequal Variance)	44.4	6.41E+00	1.68	0

Pooled SD 0.401
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
36	11	20.427	0

Conclusion with Alpha = 0.05
* Two variances are not equal

Cluster 1 TIN (Insitu)
Impact vs Gradient

Gradient TIN (Insitu) (mg/L) data							
G2	24/04/2014	Mid-Flood	0.34	G4	24/04/2014	Mid-Flood	0.28
G2	26/04/2014	Mid-Flood	0.34	G4	26/04/2014	Mid-Flood	0.30
G2	29/04/2014	Mid-Flood	0.49	G4	29/04/2014	Mid-Flood	0.30
G2	01/05/2014	Mid-Flood	0.51	G4	01/05/2014	Mid-Flood	0.41
G2	03/05/2014	Mid-Flood	0.50	G4	03/05/2014	Mid-Flood	0.28
G2	06/05/2014	Mid-Flood	0.22	G4	06/05/2014	Mid-Flood	0.19
G2	08/05/2014	Mid-Flood	0.34	G4	08/05/2014	Mid-Flood	0.14
G2	10/05/2014	Mid-Flood	0.58	G4	10/05/2014	Mid-Flood	0.43
G2	13/05/2014	Mid-Flood		G4	13/05/2014	Mid-Flood	
G2	15/05/2014	Mid-Flood	1.35	G4	15/05/2014	Mid-Flood	0.62
G2	17/05/2014	Mid-Flood	1.83	G4	17/05/2014	Mid-Flood	0.90
G2	20/05/2014	Mid-Flood	1.28	G4	20/05/2014	Mid-Flood	0.66
G2	22/05/2014	Mid-Flood	1.76	G4	22/05/2014	Mid-Flood	0.68
G2	24/05/2014	Mid-Flood	1.36	G4	24/05/2014	Mid-Flood	0.97
G2	27/05/2014	Mid-Flood	1.11	G4	27/05/2014	Mid-Flood	0.53
G2	29/05/2014	Mid-Flood	0.57	G4	29/05/2014	Mid-Flood	
G2	31/05/2014	Mid-Flood	0.83	G4	31/05/2014	Mid-Flood	0.43
G2	03/06/2014	Mid-Flood	0.68	G4	03/06/2014	Mid-Flood	0.56
G2	05/06/2014	Mid-Flood	0.54	G4	05/06/2014	Mid-Flood	0.44
G2	07/06/2014	Mid-Flood	0.63	G4	07/06/2014	Mid-Flood	0.40
G2	10/06/2014	Mid-Flood	0.42	G4	10/06/2014	Mid-Flood	0.40
G2	12/06/2014	Mid-Flood	0.97	G4	12/06/2014	Mid-Flood	0.31
G2	14/06/2014	Mid-Flood	0.93	G4	14/06/2014	Mid-Flood	0.51
G2	17/6/2014	Mid-Flood	0.65	G4	17/6/2014	Mid-Flood	0.80
G2	19/06/2014	Mid-Flood	1.28	G4	19/06/2014	Mid-Flood	0.63
G2	21/06/2014	Mid-Flood		G4	21/06/2014	Mid-Flood	
G2	24/06/2014	Mid-Flood	0.88	G4	24/06/2014	Mid-Flood	0.45
G2	26/06/2014	Mid-Flood	1.22	G4	26/06/2014	Mid-Flood	0.88
G2	28/06/2014	Mid-Flood	1.04	G4	28/06/2014	Mid-Flood	0.44
G2	01/07/2014	Mid-Flood	0.83	G4	01/07/2014	Mid-Flood	0.58
G2	03/07/2014	Mid-Flood	0.90	G4	03/07/2014	Mid-Flood	0.57
G2	05/07/2014	Mid-Flood	1.32	G4	05/07/2014	Mid-Flood	0.61
G2	08/07/2014	Mid-Flood	0.73	G4	08/07/2014	Mid-Flood	0.68
G2	10/07/2014	Mid-Flood	1.16	G4	10/07/2014	Mid-Flood	0.60
G2	12/07/2014	Mid-Flood	1.03	G4	12/07/2014	Mid-Flood	0.45
G2	15/07/2014	Mid-Flood	1.05	G4	15/07/2014	Mid-Flood	0.73
G2	17/07/2014	Mid-Flood	0.92	G4	17/07/2014	Mid-Flood	0.78
G2	19/07/2014	Mid-Flood	1.00	G4	19/07/2014	Mid-Flood	0.80
G2	22/07/2014	Mid-Flood	1.28	G4	22/07/2014	Mid-Flood	0.72
G3	24/04/2014	Mid-Flood	0.25				
G3	26/04/2014	Mid-Flood	0.20				
G3	29/04/2014	Mid-Flood	0.27				
G3	01/05/2014	Mid-Flood	0.34				
G3	03/05/2014	Mid-Flood	0.31				
G3	06/05/2014	Mid-Flood	0.16				
G3	08/05/2014	Mid-Flood	0.18				
G3	10/05/2014	Mid-Flood	0.34				
G3	13/05/2014	Mid-Flood					
G3	15/05/2014	Mid-Flood	0.51				
G3	17/05/2014	Mid-Flood	0.81				
G3	20/05/2014	Mid-Flood	0.87				
G3	22/05/2014	Mid-Flood	1.05				
G3	24/05/2014	Mid-Flood	0.75				
G3	27/05/2014	Mid-Flood	0.60				
G3	29/05/2014	Mid-Flood	0.32				
G3	31/05/2014	Mid-Flood	0.49				
G3	03/06/2014	Mid-Flood	0.61				
G3	05/06/2014	Mid-Flood	0.79				
G3	07/06/2014	Mid-Flood	0.37				
G3	10/06/2014	Mid-Flood	0.45				
G3	12/06/2014	Mid-Flood	0.42				
G3	14/06/2014	Mid-Flood	0.49				
G3	17/6/2014	Mid-Flood	0.84				
G3	19/06/2014	Mid-Flood	0.78				
G3	21/06/2014	Mid-Flood					
G3	24/06/2014	Mid-Flood	0.47				
G3	26/06/2014	Mid-Flood	0.70				
G3	28/06/2014	Mid-Flood	0.41				
G3	01/07/2014	Mid-Flood	0.58				
G3	03/07/2014	Mid-Flood	0.76				
G3	05/07/2014	Mid-Flood	0.87				
G3	08/07/2014	Mid-Flood	0.75				
G3	10/07/2014	Mid-Flood	0.61				
G3	12/07/2014	Mid-Flood	0.29				
G3	15/07/2014	Mid-Flood	0.85				
G3	17/07/2014	Mid-Flood	0.73				
G3	19/07/2014	Mid-Flood	0.90				
G3	22/07/2014	Mid-Flood	0.84				

Impact TIN (Insitu) (mg/L) data			
SR5	24/04/2014	Mid-Flood	0.32
SR5	26/04/2014	Mid-Flood	0.54
SR5	29/04/2014	Mid-Flood	0.65
SR5	01/05/2014	Mid-Flood	0.47
SR5	03/05/2014	Mid-Flood	0.56
SR5	06/05/2014	Mid-Flood	0.38
SR5	08/05/2014	Mid-Flood	0.44
SR5	10/05/2014	Mid-Flood	0.75
SR5	13/05/2014	Mid-Flood	
SR5	15/05/2014	Mid-Flood	1.59
SR5	17/05/2014	Mid-Flood	2.01
SR5	20/05/2014	Mid-Flood	1.50
SR5	22/05/2014	Mid-Flood	1.75
SR5	24/05/2014	Mid-Flood	1.72
SR5	27/05/2014	Mid-Flood	1.71
SR5	29/05/2014	Mid-Flood	1.34
SR5	31/05/2014	Mid-Flood	0.82
SR5	03/06/2014	Mid-Flood	1.12
SR5	05/06/2014	Mid-Flood	0.92
SR5	07/06/2014	Mid-Flood	0.31
SR5	10/06/2014	Mid-Flood	0.96
SR5	12/06/2014	Mid-Flood	0.44
SR5	14/06/2014	Mid-Flood	1.10
SR5	17/6/2014	Mid-Flood	0.67
SR5	19/06/2014	Mid-Flood	0.82
SR5	21/06/2014	Mid-Flood	
SR5	24/06/2014	Mid-Flood	1.02
SR5	26/06/2014	Mid-Flood	1.46
SR5	28/06/2014	Mid-Flood	1.29
SR5	01/07/2014	Mid-Flood	1.05
SR5	03/07/2014	Mid-Flood	1.01
SR5	05/07/2014	Mid-Flood	1.53
SR5	08/07/2014	Mid-Flood	0.90
SR5	10/07/2014	Mid-Flood	1.46
SR5	12/07/2014	Mid-Flood	1.15
SR5	15/07/2014	Mid-Flood	0.79
SR5	17/07/2014	Mid-Flood	0.890
SR5	19/07/2014	Mid-Flood	0.98
SR5	22/07/2014	Mid-Flood	1.50

SR5		Gradient	
Raw Statistics		Raw Statistics	
Number of Valid Observations	37	Number of Valid Observations	110
Number of Missing Values	2	Number of Missing Values	7
Number of Distinct Observations	33	Number of Distinct Observations	109
Minimum	0.31	Minimum	0.14
Maximum	2.01	Maximum	1.832
Mean of Raw Data	1.025	Mean of Raw Data	0.666
Standard Deviation of Raw Data	0.455	Standard Deviation of Raw Data	0.331
Kstar	4.281	Kstar	3.988
Mean of Log Transformed Data	-0.0871	Mean of Log Transformed Data	-0.533
Standard Deviation of Log Transformed Data	0.504	Standard Deviation of Log Transformed Data	0.525
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.987	Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.959	Approximate Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical (0.95) Value	0.936	Approximate Shapiro Wilk P Value	4.12E-05
Approximate Shapiro Wilk P Value	0.251	Lilliefors Test Statistic	0.0778
Lilliefors Test Statistic	0.101	Lilliefors Critical (0.95) Value	0.0845
Lilliefors Critical (0.95) Value	0.146	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: SR5
Background Data: Gradient

Raw Statistics

	Site	Background
Number of Valid Observations	37	110
Number of Missing Values	2	7
Number of Distinct Observations	33	109
Minimum	0.31	0.14
Maximum	2.01	1.832
Mean	1.025	0.666
Median	0.98	0.611
SD	0.455	0.331
SE of Mean	0.0748	0.0316

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)	145	5.157	1.655	0
Satterthwaite (Unequal Variance)	49.5	4.417	1.677	0

Pooled SD 0.366
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
36	109	1.885	0.013

Conclusion with Alpha = 0.05
* Two variances are not equal

Cluster 1 TIN(lab)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (lab) (mg/L) data			
SR5	04/01/2014	Mid-Flood	0.29
SR5	07/01/2014	Mid-Flood	0.32
SR5	09/01/2014	Mid-Flood	0.29
SR5	11/01/2014	Mid-Flood	0.32
SR5	14/01/2014	Mid-Flood	0.21
SR5	16/01/2014	Mid-Flood	0.26
SR5	18/01/2014	Mid-Flood	0.36
SR5	21/01/2014	Mid-Flood	0.20
SR5	23/01/2014	Mid-Flood	0.34
SR5	25/01/2014	Mid-Flood	0.29
SR5	27/01/2014	Mid-Flood	0.25
SR5	29/01/2014	Mid-Flood	0.40

Impact TIN (lab) (mg/L) data			
SR5	24/04/2014	Mid-Flood	0.36
SR5	26/04/2014	Mid-Flood	0.55
SR5	29/04/2014	Mid-Flood	0.74
SR5	01/05/2014	Mid-Flood	0.63
SR5	03/05/2014	Mid-Flood	0.44
SR5	06/05/2014	Mid-Flood	0.40
SR5	08/05/2014	Mid-Flood	0.41
SR5	10/05/2014	Mid-Flood	0.68
SR5	13/05/2014	Mid-Flood	
SR5	15/05/2014	Mid-Flood	1.39
SR5	17/05/2014	Mid-Flood	1.60
SR5	20/05/2014	Mid-Flood	0.91
SR5	22/05/2014	Mid-Flood	1.92
SR5	24/05/2014	Mid-Flood	1.10
SR5	27/05/2014	Mid-Flood	1.35
SR5	29/05/2014	Mid-Flood	1.10
SR5	31/05/2014	Mid-Flood	0.98
SR5	03/06/2014	Mid-Flood	0.99
SR5	05/06/2014	Mid-Flood	1.00
SR5	07/06/2014	Mid-Flood	0.96
SR5	10/06/2014	Mid-Flood	0.65
SR5	12/06/2014	Mid-Flood	0.73
SR5	14/06/2014	Mid-Flood	0.78
SR5	17/6/2014	Mid-Flood	0.81
SR5	19/06/2014	Mid-Flood	0.98
SR5	21/06/2014	Mid-Flood	
SR5	24/06/2014	Mid-Flood	1.25
SR5	26/06/2014	Mid-Flood	1.28
SR5	28/06/2014	Mid-Flood	1.06
SR5	01/07/2014	Mid-Flood	1.01
SR5	03/07/2014	Mid-Flood	1.23
SR5	05/07/2014	Mid-Flood	1.38
SR5	08/07/2014	Mid-Flood	0.98
SR5	10/07/2014	Mid-Flood	0.96
SR5	12/07/2014	Mid-Flood	1.07
SR5	15/07/2014	Mid-Flood	0.80
SR5	17/07/2014	Mid-Flood	0.88
SR5	19/07/2014	Mid-Flood	0.71
SR5	22/07/2014	Mid-Flood	1.05

SR5		Baseline x 1.3	
Raw Statistics		Raw Statistics	
Number of Valid Observations	38	Number of Valid Observations	12
Number of Missing Values	1	Number of Distinct Observations	11
Number of Distinct Observations	34	Minimum	0.26
Minimum	0	Maximum	0.52
Maximum	1.92	Mean of Raw Data	0.383
Mean of Raw Data	0.924	Standard Deviation of Raw Data	0.0759
Standard Deviation of Raw Data	0.368	Kstar	20.23
		Mean of Log Transformed Data	-0.98
Normal Distribution Test Results		Standard Deviation of Log Transformed Data	0.204
Correlation Coefficient R	0.987	Normal Distribution Test Results	
Shapiro Wilk Test Statistic	0.986		
Shapiro Wilk Critical (0.95) Value	0.938	Correlation Coefficient R	0.995
Approximate Shapiro Wilk P Value	0.938	Shapiro Wilk Test Statistic	0.986
Lilliefors Test Statistic	0.106	Shapiro Wilk Critical (0.95) Value	0.859
Lilliefors Critical (0.95) Value	0.144	Approximate Shapiro Wilk P Value	0.995
Data appear Normal at (0.05) Significance Level		Lilliefors Test Statistic	0.101
		Lilliefors Critical (0.95) Value	0.256
		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: SR5
Background Data: Baseline x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	38	12
Number of Missing Values	1	0
Number of Distinct Observations	34	11
Minimum	0	0.26
Maximum	1.92	0.52
Mean	0.924	0.383
Median	0.97	0.38
SD	0.368	0.0759
SE of Mean	0.0597	0.0219

Site vs Background Two-Sample t-Test

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

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	48	5.035	1.677	0
Satterthwaite (Unequal Variance)	44.9	8.52E+00	1.679	0

Pooled SD 0.325
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
37	11	23.454	0

Conclusion with Alpha = 0.05
 * Two variances are not equal

Cluster 1 TIN (Lab)
Impact vs Gradient

Gradient TIN (lab) (mg/L) data							
G2	24/04/2014	Mid-Flood	0.28	G4	24/04/2014	Mid-Flood	0.55
G2	26/04/2014	Mid-Flood	0.44	G4	26/04/2014	Mid-Flood	0.40
G2	29/04/2014	Mid-Flood	0.64	G4	29/04/2014	Mid-Flood	0.31
G2	01/05/2014	Mid-Flood	0.61	G4	01/05/2014	Mid-Flood	0.46
G2	03/05/2014	Mid-Flood	0.56	G4	03/05/2014	Mid-Flood	0.52
G2	06/05/2014	Mid-Flood	0.42	G4	06/05/2014	Mid-Flood	0.68
G2	08/05/2014	Mid-Flood	0.32	G4	08/05/2014	Mid-Flood	1.00
G2	10/05/2014	Mid-Flood	0.60	G4	10/05/2014	Mid-Flood	0.26
G2	13/05/2014	Mid-Flood		G4	13/05/2014	Mid-Flood	
G2	15/05/2014	Mid-Flood	1.17	G4	15/05/2014	Mid-Flood	0.63
G2	17/05/2014	Mid-Flood	1.48	G4	17/05/2014	Mid-Flood	0.74
G2	20/05/2014	Mid-Flood	1.34	G4	20/05/2014	Mid-Flood	1.01
G2	22/05/2014	Mid-Flood	1.66	G4	22/05/2014	Mid-Flood	1.09
G2	24/05/2014	Mid-Flood	1.14	G4	24/05/2014	Mid-Flood	0.48
G2	27/05/2014	Mid-Flood	1.14	G4	27/05/2014	Mid-Flood	0.48
G2	29/05/2014	Mid-Flood	0.72	G4	29/05/2014	Mid-Flood	
G2	31/05/2014	Mid-Flood	0.84	G4	31/05/2014	Mid-Flood	0.53
G2	03/06/2014	Mid-Flood	0.71	G4	03/06/2014	Mid-Flood	0.52
G2	05/06/2014	Mid-Flood	0.72	G4	05/06/2014	Mid-Flood	0.47
G2	07/06/2014	Mid-Flood	0.46	G4	07/06/2014	Mid-Flood	0.32
G2	10/06/2014	Mid-Flood	0.52	G4	10/06/2014	Mid-Flood	0.21
G2	12/06/2014	Mid-Flood	0.67	G4	12/06/2014	Mid-Flood	0.35
G2	14/06/2014	Mid-Flood	0.92	G4	14/06/2014	Mid-Flood	0.42
G2	17/6/2014	Mid-Flood	0.96	G4	17/6/2014	Mid-Flood	0.56
G2	19/06/2014	Mid-Flood	1.34	G4	19/06/2014	Mid-Flood	0.62
G2	21/06/2014	Mid-Flood		G4	21/06/2014	Mid-Flood	
G2	24/06/2014	Mid-Flood	1.05	G4	24/06/2014	Mid-Flood	0.53
G2	26/06/2014	Mid-Flood	1.14	G4	26/06/2014	Mid-Flood	0.58
G2	28/06/2014	Mid-Flood	0.96	G4	28/06/2014	Mid-Flood	0.43
G2	01/07/2014	Mid-Flood	0.83	G4	01/07/2014	Mid-Flood	0.68
G2	03/07/2014	Mid-Flood	1.14	G4	03/07/2014	Mid-Flood	0.67
G2	05/07/2014	Mid-Flood	1.15	G4	05/07/2014	Mid-Flood	0.55
G2	08/07/2014	Mid-Flood	0.80	G4	08/07/2014	Mid-Flood	0.59
G2	10/07/2014	Mid-Flood	0.70	G4	10/07/2014	Mid-Flood	0.36
G2	12/07/2014	Mid-Flood	0.88	G4	12/07/2014	Mid-Flood	0.54
G2	15/07/2014	Mid-Flood	0.92	G4	15/07/2014	Mid-Flood	0.62
G2	17/07/2014	Mid-Flood	0.84	G4	17/07/2014	Mid-Flood	0.56
G2	19/07/2014	Mid-Flood	0.76	G4	19/07/2014	Mid-Flood	0.52
G2	22/07/2014	Mid-Flood	0.91	G4	22/07/2014	Mid-Flood	0.64
G3	24/04/2014	Mid-Flood	0.27				
G3	26/04/2014	Mid-Flood	0.26				
G3	29/04/2014	Mid-Flood	0.57				
G3	01/05/2014	Mid-Flood	0.45				
G3	03/05/2014	Mid-Flood	0.46				
G3	06/05/2014	Mid-Flood	0.54				
G3	08/05/2014	Mid-Flood	0.31				
G3	10/05/2014	Mid-Flood	0.90				
G3	13/05/2014	Mid-Flood					
G3	15/05/2014	Mid-Flood	0.62				
G3	17/05/2014	Mid-Flood	0.98				
G3	20/05/2014	Mid-Flood	0.87				
G3	22/05/2014	Mid-Flood	1.66				
G3	24/05/2014	Mid-Flood	0.49				
G3	27/05/2014	Mid-Flood	0.64				
G3	29/05/2014	Mid-Flood	0.49				
G3	31/05/2014	Mid-Flood	0.49				
G3	03/06/2014	Mid-Flood	0.72				
G3	05/06/2014	Mid-Flood	0.82				
G3	07/06/2014	Mid-Flood	0.43				
G3	10/06/2014	Mid-Flood	0.27				
G3	12/06/2014	Mid-Flood	0.36				
G3	14/06/2014	Mid-Flood	0.44				
G3	17/6/2014	Mid-Flood	0.66				
G3	19/06/2014	Mid-Flood	0.70				
G3	21/06/2014	Mid-Flood					
G3	24/06/2014	Mid-Flood	0.44				
G3	26/06/2014	Mid-Flood	0.78				
G3	28/06/2014	Mid-Flood	0.70				
G3	01/07/2014	Mid-Flood	0.67				
G3	03/07/2014	Mid-Flood	0.80				
G3	05/07/2014	Mid-Flood	0.65				
G3	08/07/2014	Mid-Flood	0.52				
G3	10/07/2014	Mid-Flood	0.40				
G3	12/07/2014	Mid-Flood	0.45				
G3	15/07/2014	Mid-Flood	0.74				
G3	17/07/2014	Mid-Flood	0.56				
G3	19/07/2014	Mid-Flood	0.77				
G3	22/07/2014	Mid-Flood	0.60				

Impact TIN (lab) (mg/L) data			
SR5	24/04/2014	Mid-Flood	0.36
SR5	26/04/2014	Mid-Flood	0.55
SR5	29/04/2014	Mid-Flood	0.74
SR5	01/05/2014	Mid-Flood	0.63
SR5	03/05/2014	Mid-Flood	0.44
SR5	06/05/2014	Mid-Flood	0.40
SR5	08/05/2014	Mid-Flood	0.41
SR5	10/05/2014	Mid-Flood	0.68
SR5	13/05/2014	Mid-Flood	0.00
SR5	15/05/2014	Mid-Flood	1.39
SR5	17/05/2014	Mid-Flood	1.60
SR5	20/05/2014	Mid-Flood	0.91
SR5	22/05/2014	Mid-Flood	1.92
SR5	24/05/2014	Mid-Flood	1.10
SR5	27/05/2014	Mid-Flood	1.35
SR5	29/05/2014	Mid-Flood	1.10
SR5	31/05/2014	Mid-Flood	0.98
SR5	03/06/2014	Mid-Flood	0.99
SR5	05/06/2014	Mid-Flood	1.00
SR5	07/06/2014	Mid-Flood	0.96
SR5	10/06/2014	Mid-Flood	0.65
SR5	12/06/2014	Mid-Flood	0.73
SR5	14/06/2014	Mid-Flood	0.78
SR5	17/6/2014	Mid-Flood	0.81
SR5	19/06/2014	Mid-Flood	0.98
SR5	21/06/2014	Mid-Flood	
SR5	24/06/2014	Mid-Flood	1.25
SR5	26/06/2014	Mid-Flood	1.28
SR5	28/06/2014	Mid-Flood	1.06
SR5	01/07/2014	Mid-Flood	1.01
SR5	03/07/2014	Mid-Flood	1.23
SR5	05/07/2014	Mid-Flood	1.38
SR5	08/07/2014	Mid-Flood	0.98
SR5	10/07/2014	Mid-Flood	0.96
SR5	12/07/2014	Mid-Flood	1.07
SR5	15/07/2014	Mid-Flood	0.80
SR5	17/07/2014	Mid-Flood	0.88
SR5	19/07/2014	Mid-Flood	0.71
SR5	22/07/2014	Mid-Flood	1.05

SR5		Gradient	
Raw Statistics		Raw Statistics	
Number of Valid Observations	37	Number of Valid Observations	110
Number of Missing Values	2	Number of Missing Values	7
Number of Distinct Observations	33	Number of Distinct Observations	62
Minimum	0.36	Minimum	0.21
Maximum	1.92	Maximum	1.66
Mean of Raw Data	0.949	Mean of Raw Data	0.674
Standard Deviation of Raw Data	0.339	Standard Deviation of Raw Data	0.292
Kstar	7.005	Kstar	5.71
Mean of Log Transformed Data	-0.119	Mean of Log Transformed Data	-0.483
Standard Deviation of Log Transformed Data	0.386	Standard Deviation of Log Transformed Data	0.422
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.983	Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.969	Approximate Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical (0.95) Value	0.936	Approximate Shapiro Wilk P Value	6.16E-08
Approximate Shapiro Wilk P Value	0.465	Lilliefors Test Statistic	0.119
Lilliefors Test Statistic	0.112	Lilliefors Critical (0.95) Value	0.0845
Lilliefors Critical (0.95) Value	0.146	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: SR5
Background Data: Gradient

Raw Statistics

	Site	Background
Number of Valid Observations	37	110
Number of Missing Values	2	7
Number of Distinct Observations	33	62
Minimum	0.36	0.21
Maximum	1.92	1.66
Mean	0.949	0.674
Median	0.98	0.62
SD	0.339	0.292
SE of Mean	0.0557	0.0279

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	3738
WMW Test U-Stat	4.459
WMW Critical Value (0.050)	1.645
P-Value	4.12E-06

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

Cluster 2 TIN(Insitu)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (Insitu) (mg/L) data		
SR9	04/01/2014 Mid-Ebb	0.09
SR9	07/01/2014 Mid-Ebb	0.46
SR9	09/01/2014 Mid-Ebb	0.35
SR9	11/01/2014 Mid-Ebb	0.40
SR9	14/01/2014 Mid-Ebb	0.34
SR9	16/01/2014 Mid-Ebb	0.40
SR9	18/01/2014 Mid-Ebb	0.24
SR9	21/01/2014 Mid-Ebb	0.28
SR9	23/01/2014 Mid-Ebb	0.17
SR9	25/01/2014 Mid-Ebb	0.20
SR9	27/01/2014 Mid-Ebb	0.11
SR9	29/01/2014 Mid-Ebb	0.14
SR10	04/01/2014 Mid-Ebb	0.26
SR10	07/01/2014 Mid-Ebb	0.49
SR10	09/01/2014 Mid-Ebb	0.30
SR10	11/01/2014 Mid-Ebb	0.32
SR10	14/01/2014 Mid-Ebb	0.29
SR10	16/01/2014 Mid-Ebb	0.30
SR10	18/01/2014 Mid-Ebb	0.29
SR10	21/01/2014 Mid-Ebb	0.29
SR10	23/01/2014 Mid-Ebb	0.20
SR10	25/01/2014 Mid-Ebb	0.29
SR10	27/01/2014 Mid-Ebb	0.15
SR10	29/01/2014 Mid-Ebb	0.20
SR11	04/01/2014 Mid-Ebb	0.23
SR11	07/01/2014 Mid-Ebb	0.51
SR11	09/01/2014 Mid-Ebb	0.26
SR11	11/01/2014 Mid-Ebb	0.33
SR11	14/01/2014 Mid-Ebb	0.26
SR11	16/01/2014 Mid-Ebb	0.26
SR11	18/01/2014 Mid-Ebb	0.26
SR11	21/01/2014 Mid-Ebb	0.23
SR11	23/01/2014 Mid-Ebb	0.17
SR11	25/01/2014 Mid-Ebb	0.23
SR11	27/01/2014 Mid-Ebb	0.14
SR11	29/01/2014 Mid-Ebb	0.20

Impact TIN (Insitu) (mg/L) data					
SR9	24/04/2014 Mid-Ebb	0.44	SR11	24/04/2014 Mid-Ebb	0.20
SR9	26/04/2014 Mid-Ebb	0.27	SR11	26/04/2014 Mid-Ebb	0.16
SR9	29/04/2014 Mid-Ebb	0.27	SR11	29/04/2014 Mid-Ebb	0.20
SR9	01/05/2014 Mid-Ebb	0.22	SR11	01/05/2014 Mid-Ebb	0.16
SR9	03/05/2014 Mid-Ebb	0.29	SR11	03/05/2014 Mid-Ebb	0.19
SR9	06/05/2014 Mid-Ebb	0.40	SR11	06/05/2014 Mid-Ebb	0.12
SR9	08/05/2014 Mid-Ebb		SR11	08/05/2014 Mid-Ebb	0.18
SR9	10/05/2014 Mid-Ebb	0.62	SR11	10/05/2014 Mid-Ebb	0.25
SR9	13/05/2014 Mid-Ebb		SR11	13/05/2014 Mid-Ebb	
SR9	15/05/2014 Mid-Ebb	0.63	SR11	15/05/2014 Mid-Ebb	0.49
SR9	17/05/2014 Mid-Ebb	0.53	SR11	17/05/2014 Mid-Ebb	0.56
SR9	20/05/2014 Mid-Ebb		SR11	20/05/2014 Mid-Ebb	0.54
SR9	22/05/2014 Mid-Ebb	0.78	SR11	22/05/2014 Mid-Ebb	0.61
SR9	24/05/2014 Mid-Ebb	0.38	SR11	24/05/2014 Mid-Ebb	0.63
SR9	27/05/2014 Mid-Ebb	0.59	SR11	27/05/2014 Mid-Ebb	0.48
SR9	29/05/2014 Mid-Ebb	0.38	SR11	29/05/2014 Mid-Ebb	0.39
SR9	31/05/2014 Mid-Ebb	0.51	SR11	31/05/2014 Mid-Ebb	0.39
SR9	03/06/2014 Mid-Ebb	0.28	SR11	03/06/2014 Mid-Ebb	0.51
SR9	05/06/2014 Mid-Ebb	0.48	SR11	05/06/2014 Mid-Ebb	0.39
SR9	07/06/2014 Mid-Ebb	0.39	SR11	07/06/2014 Mid-Ebb	0.32
SR9	10/06/2014 Mid-Ebb		SR11	10/06/2014 Mid-Ebb	0.37
SR9	12/06/2014 Mid-Ebb	0.19	SR11	12/06/2014 Mid-Ebb	0.42
SR9	14/06/2014 Mid-Ebb	0.38	SR11	14/06/2014 Mid-Ebb	0.41
SR9	17/6/2014 Mid-Ebb	0.27	SR11	17/6/2014 Mid-Ebb	0.20
SR9	19/06/2014 Mid-Ebb	0.42	SR11	19/06/2014 Mid-Ebb	0.56
SR9	21/06/2014 Mid-Ebb		SR11	21/06/2014 Mid-Ebb	
SR9	24/06/2014 Mid-Ebb	0.38	SR11	24/06/2014 Mid-Ebb	0.39
SR9	26/06/2014 Mid-Ebb	0.43	SR11	26/06/2014 Mid-Ebb	0.33
SR9	28/06/2014 Mid-Ebb	0.29	SR11	28/06/2014 Mid-Ebb	0.25
SR9	01/07/2014 Mid-Ebb	0.57	SR11	01/07/2014 Mid-Ebb	0.48
SR9	03/07/2014 Mid-Ebb	0.39	SR11	03/07/2014 Mid-Ebb	0.40
SR9	05/07/2014 Mid-Ebb	0.31	SR11	05/07/2014 Mid-Ebb	0.47
SR9	08/07/2014 Mid-Ebb	0.50	SR11	08/07/2014 Mid-Ebb	0.74
SR9	10/07/2014 Mid-Ebb	0.39	SR11	10/07/2014 Mid-Ebb	0.47
SR9	12/07/2014 Mid-Ebb	0.15	SR11	12/07/2014 Mid-Ebb	0.46
SR9	15/07/2014 Mid-Ebb	0.31	SR11	15/07/2014 Mid-Ebb	0.68
SR9	17/07/2014 Mid-Ebb		SR11	17/07/2014 Mid-Ebb	
SR9	19/07/2014 Mid-Ebb	0.36	SR11	19/07/2014 Mid-Ebb	0.22
SR9	22/07/2014 Mid-Ebb	0.24	SR11	22/07/2014 Mid-Ebb	0.34
SR10	24/04/2014 Mid-Ebb	0.18			
SR10	26/04/2014 Mid-Ebb	0.10			
SR10	29/04/2014 Mid-Ebb	0.07			
SR10	01/05/2014 Mid-Ebb	0.11			
SR10	03/05/2014 Mid-Ebb	0.12			
SR10	06/05/2014 Mid-Ebb	0.10			
SR10	08/05/2014 Mid-Ebb	0.11			
SR10	10/05/2014 Mid-Ebb	0.23			
SR10	13/05/2014 Mid-Ebb				
SR10	15/05/2014 Mid-Ebb	0.56			
SR10	17/05/2014 Mid-Ebb	0.59			
SR10	20/05/2014 Mid-Ebb	0.64			
SR10	22/05/2014 Mid-Ebb	0.57			
SR10	24/05/2014 Mid-Ebb	0.34			
SR10	27/05/2014 Mid-Ebb	0.57			
SR10	29/05/2014 Mid-Ebb	0.34			
SR10	31/05/2014 Mid-Ebb	0.41			
SR10	03/06/2014 Mid-Ebb	0.53			
SR10	05/06/2014 Mid-Ebb	0.33			
SR10	07/06/2014 Mid-Ebb	0.36			
SR10	10/06/2014 Mid-Ebb	0.16			
SR10	12/06/2014 Mid-Ebb	0.20			
SR10	14/06/2014 Mid-Ebb	0.34			
SR10	17/6/2014 Mid-Ebb	0.29			
SR10	19/06/2014 Mid-Ebb	0.55			
SR10	21/06/2014 Mid-Ebb				
SR10	24/06/2014 Mid-Ebb	0.42			
SR10	26/06/2014 Mid-Ebb	0.40			
SR10	28/06/2014 Mid-Ebb	0.35			
SR10	01/07/2014 Mid-Ebb	0.53			
SR10	03/07/2014 Mid-Ebb	0.41			
SR10	05/07/2014 Mid-Ebb	0.35			
SR10	08/07/2014 Mid-Ebb	0.42			
SR10	10/07/2014 Mid-Ebb	0.40			
SR10	12/07/2014 Mid-Ebb	0.37			
SR10	15/07/2014 Mid-Ebb	0.52			
SR10	17/07/2014 Mid-Ebb				
SR10	19/07/2014 Mid-Ebb	0.36			
SR10	22/07/2014 Mid-Ebb	0.37			

Baseline x 1.3		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	103
Number of Distinct Observations	20	Number of Missing Values	14
Minimum	0.09	Number of Distinct Observations	84
Maximum	0.51	Minimum	0.0772
Mean of Raw Data	0.268	Maximum	1.2
Standard Deviation of Raw Data	0.0998	Mean of Raw Data	0.428
Kstar	6.59	Standard Deviation of Raw Data	0.214
Mean of Log Transformed Data	-1.389	Kstar	3.485
Standard Deviation of Log Transformed Data	0.395	Mean of Log Transformed Data	-0.995
		Standard Deviation of Log Transformed Data	0.582
Normal Distribution Test Results			
		Normal Distribution Test Results	
Correlation Coefficient R	0.981		
Shapiro Wilk Test Statistic	0.958	Correlation Coefficient R	0.98
Shapiro Wilk Critical (0.95) Value	0.935	Approximate Shapiro Wilk Test Statistic	0.955
Approximate Shapiro Wilk P Value	0.242	Approximate Shapiro Wilk P Value	0.00652
Lilliefors Test Statistic	0.123	Lilliefors Test Statistic	0.0915
Lilliefors Critical (0.95) Value	0.148	Lilliefors Critical (0.95) Value	0.0873
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
Background Data: Baseline x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	103	36
Number of Missing Values	14	0
Number of Distinct Observations	84	20
Minimum	0.0772	0.09
Maximum	1.2	0.51
Mean	0.428	0.268
Median	0.418	0.26
SD	0.214	0.0998
SE of Mean	0.0211	0.0166

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	8097
WMW Test U-Stat	4.26
WMW Critical Value (0.050)	1.645
P-Value	1.02E-05

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

Cluster 2 TIN(Insitu)
G5 G6 vs Impact

Gradient TIN (Insitu) (mg/L) data			
G5	24/04/2014	Mid-Ebb	0.37
G5	26/04/2014	Mid-Ebb	0.24
G5	29/04/2014	Mid-Ebb	0.12
G5	01/05/2014	Mid-Ebb	0.14
G5	03/05/2014	Mid-Ebb	0.34
G5	06/05/2014	Mid-Ebb	0.24
G5	08/05/2014	Mid-Ebb	NA
G5	10/05/2014	Mid-Ebb	0.18
G5	13/05/2014	Mid-Ebb	
G5	15/05/2014	Mid-Ebb	0.45
G5	17/05/2014	Mid-Ebb	0.75
G5	20/05/2014	Mid-Ebb	
G5	22/05/2014	Mid-Ebb	0.90
G5	24/05/2014	Mid-Ebb	0.75
G5	27/05/2014	Mid-Ebb	0.77
G5	29/05/2014	Mid-Ebb	0.58
G5	31/05/2014	Mid-Ebb	0.61
G5	03/06/2014	Mid-Ebb	0.59
G5	05/06/2014	Mid-Ebb	0.49
G5	07/06/2014	Mid-Ebb	0.45
G5	10/06/2014	Mid-Ebb	0.31
G5	12/06/2014	Mid-Ebb	0.35
G5	14/06/2014	Mid-Ebb	0.50
G5	17/6/2014	Mid-Ebb	0.50
G5	19/06/2014	Mid-Ebb	0.60
G5	21/06/2014	Mid-Ebb	0.64
G5	24/06/2014	Mid-Ebb	0.43
G5	26/06/2014	Mid-Ebb	0.65
G5	28/06/2014	Mid-Ebb	0.23
G5	01/07/2014	Mid-Ebb	0.54
G5	03/07/2014	Mid-Ebb	0.53
G5	05/07/2014	Mid-Ebb	0.50
G5	08/07/2014	Mid-Ebb	0.73
G5	10/07/2014	Mid-Ebb	0.56
G5	12/07/2014	Mid-Ebb	0.52
G5	15/07/2014	Mid-Ebb	0.61
G5	17/07/2014	Mid-Ebb	
G5	19/07/2014	Mid-Ebb	0.33
G5	22/07/2014	Mid-Ebb	0.33
G6	24/04/2014	Mid-Ebb	0.13
G6	26/04/2014	Mid-Ebb	0.19
G6	29/04/2014	Mid-Ebb	0.05
G6	01/05/2014	Mid-Ebb	0.07
G6	03/05/2014	Mid-Ebb	0.16
G6	06/05/2014	Mid-Ebb	0.10
G6	08/05/2014	Mid-Ebb	0.11
G6	10/05/2014	Mid-Ebb	0.25
G6	13/05/2014	Mid-Ebb	
G6	15/05/2014	Mid-Ebb	0.27
G6	17/05/2014	Mid-Ebb	0.64
G6	20/05/2014	Mid-Ebb	0.93
G6	22/05/2014	Mid-Ebb	0.64
G6	24/05/2014	Mid-Ebb	0.36
G6	27/05/2014	Mid-Ebb	0.42
G6	29/05/2014	Mid-Ebb	1.27
G6	31/05/2014	Mid-Ebb	0.37
G6	03/06/2014	Mid-Ebb	0.37
G6	05/06/2014	Mid-Ebb	0.43
G6	07/06/2014	Mid-Ebb	0.14
G6	10/06/2014	Mid-Ebb	0.35
G6	12/06/2014	Mid-Ebb	0.44
G6	14/06/2014	Mid-Ebb	0.53
G6	17/6/2014	Mid-Ebb	0.32
G6	19/06/2014	Mid-Ebb	0.62
G6	21/06/2014	Mid-Ebb	
G6	24/06/2014	Mid-Ebb	0.43
G6	26/06/2014	Mid-Ebb	0.69
G6	28/06/2014	Mid-Ebb	0.46
G6	01/07/2014	Mid-Ebb	0.53
G6	03/07/2014	Mid-Ebb	0.52
G6	05/07/2014	Mid-Ebb	0.64
G6	08/07/2014	Mid-Ebb	0.67
G6	10/07/2014	Mid-Ebb	0.56
G6	12/07/2014	Mid-Ebb	0.68
G6	15/07/2014	Mid-Ebb	0.64
G6	17/07/2014	Mid-Ebb	
G6	19/07/2014	Mid-Ebb	0.27
G6	22/07/2014	Mid-Ebb	0.48

Impact TIN (Insitu) (mg/L) data							
SR9	24/04/2014	Mid-Ebb	0.44	SR11	24/04/2014	Mid-Ebb	0.20
SR9	26/04/2014	Mid-Ebb	0.27	SR11	26/04/2014	Mid-Ebb	0.16
SR9	29/04/2014	Mid-Ebb	0.27	SR11	29/04/2014	Mid-Ebb	0.20
SR9	01/05/2014	Mid-Ebb	0.22	SR11	01/05/2014	Mid-Ebb	0.16
SR9	03/05/2014	Mid-Ebb	0.29	SR11	03/05/2014	Mid-Ebb	0.19
SR9	06/05/2014	Mid-Ebb	0.40	SR11	06/05/2014	Mid-Ebb	0.12
SR9	08/05/2014	Mid-Ebb		SR11	08/05/2014	Mid-Ebb	0.18
SR9	10/05/2014	Mid-Ebb	0.62	SR11	10/05/2014	Mid-Ebb	0.25
SR9	13/05/2014	Mid-Ebb		SR11	13/05/2014	Mid-Ebb	
SR9	15/05/2014	Mid-Ebb	0.63	SR11	15/05/2014	Mid-Ebb	0.49
SR9	17/05/2014	Mid-Ebb	0.53	SR11	17/05/2014	Mid-Ebb	0.56
SR9	20/05/2014	Mid-Ebb		SR11	20/05/2014	Mid-Ebb	0.54
SR9	22/05/2014	Mid-Ebb	0.78	SR11	22/05/2014	Mid-Ebb	0.61
SR9	24/05/2014	Mid-Ebb	0.38	SR11	24/05/2014	Mid-Ebb	0.63
SR9	27/05/2014	Mid-Ebb	0.59	SR11	27/05/2014	Mid-Ebb	0.48
SR9	29/05/2014	Mid-Ebb	0.38	SR11	29/05/2014	Mid-Ebb	0.39
SR9	31/05/2014	Mid-Ebb	0.51	SR11	31/05/2014	Mid-Ebb	0.39
SR9	03/06/2014	Mid-Ebb	0.28	SR11	03/06/2014	Mid-Ebb	0.51
SR9	05/06/2014	Mid-Ebb	0.48	SR11	05/06/2014	Mid-Ebb	0.39
SR9	07/06/2014	Mid-Ebb	0.39	SR11	07/06/2014	Mid-Ebb	0.32
SR9	10/06/2014	Mid-Ebb		SR11	10/06/2014	Mid-Ebb	0.37
SR9	12/06/2014	Mid-Ebb	0.19	SR11	12/06/2014	Mid-Ebb	0.42
SR9	14/06/2014	Mid-Ebb	0.38	SR11	14/06/2014	Mid-Ebb	0.41
SR9	17/6/2014	Mid-Ebb	0.27	SR11	17/6/2014	Mid-Ebb	0.20
SR9	19/06/2014	Mid-Ebb	0.42	SR11	19/06/2014	Mid-Ebb	0.56
SR9	21/06/2014	Mid-Ebb		SR11	21/06/2014	Mid-Ebb	
SR9	24/06/2014	Mid-Ebb	0.38	SR11	24/06/2014	Mid-Ebb	0.39
SR9	26/06/2014	Mid-Ebb	0.43	SR11	26/06/2014	Mid-Ebb	0.33
SR9	28/06/2014	Mid-Ebb	0.29	SR11	28/06/2014	Mid-Ebb	0.25
SR9	01/07/2014	Mid-Ebb	0.57	SR11	01/07/2014	Mid-Ebb	0.48
SR9	03/07/2014	Mid-Ebb	0.39	SR11	03/07/2014	Mid-Ebb	0.40
SR9	05/07/2014	Mid-Ebb	0.31	SR11	05/07/2014	Mid-Ebb	0.47
SR9	08/07/2014	Mid-Ebb	0.50	SR11	08/07/2014	Mid-Ebb	0.74
SR9	10/07/2014	Mid-Ebb	0.39	SR11	10/07/2014	Mid-Ebb	0.47
SR9	12/07/2014	Mid-Ebb	0.15	SR11	12/07/2014	Mid-Ebb	0.46
SR9	15/07/2014	Mid-Ebb	0.31	SR11	15/07/2014	Mid-Ebb	0.68
SR9	17/07/2014	Mid-Ebb		SR11	17/07/2014	Mid-Ebb	
SR9	19/07/2014	Mid-Ebb	0.36	SR11	19/07/2014	Mid-Ebb	0.22
SR9	22/07/2014	Mid-Ebb	0.24	SR11	22/07/2014	Mid-Ebb	0.34
SR10	24/04/2014	Mid-Ebb	0.18				
SR10	26/04/2014	Mid-Ebb	0.10				
SR10	29/04/2014	Mid-Ebb	0.07				
SR10	01/05/2014	Mid-Ebb	0.11				
SR10	03/05/2014	Mid-Ebb	0.12				
SR10	06/05/2014	Mid-Ebb	0.10				
SR10	08/05/2014	Mid-Ebb	0.11				
SR10	10/05/2014	Mid-Ebb	0.23				
SR10	13/05/2014	Mid-Ebb					
SR10	15/05/2014	Mid-Ebb	0.56				
SR10	17/05/2014	Mid-Ebb	0.59				
SR10	20/05/2014	Mid-Ebb	0.64				
SR10	22/05/2014	Mid-Ebb	0.57				
SR10	24/05/2014	Mid-Ebb	0.34				
SR10	27/05/2014	Mid-Ebb	0.57				
SR10	29/05/2014	Mid-Ebb	0.34				
SR10	31/05/2014	Mid-Ebb	0.41				
SR10	03/06/2014	Mid-Ebb	0.53				
SR10	05/06/2014	Mid-Ebb	0.33				
SR10	07/06/2014	Mid-Ebb	0.36				
SR10	10/06/2014	Mid-Ebb	0.16				
SR10	12/06/2014	Mid-Ebb	0.20				
SR10	14/06/2014	Mid-Ebb	0.34				
SR10	17/6/2014	Mid-Ebb	0.29				
SR10	19/06/2014	Mid-Ebb	0.55				
SR10	21/06/2014	Mid-Ebb					
SR10	24/06/2014	Mid-Ebb	0.42				
SR10	26/06/2014	Mid-Ebb	0.40				
SR10	28/06/2014	Mid-Ebb	0.35				
SR10	01/07/2014	Mid-Ebb	0.53				
SR10	03/07/2014	Mid-Ebb	0.41				
SR10	05/07/2014	Mid-Ebb	0.35				
SR10	08/07/2014	Mid-Ebb	0.42				
SR10	10/07/2014	Mid-Ebb	0.40				
SR10	12/07/2014	Mid-Ebb	0.37				
SR10	15/07/2014	Mid-Ebb	0.52				
SR10	17/07/2014	Mid-Ebb					
SR10	19/07/2014	Mid-Ebb	0.36				
SR10	22/07/2014	Mid-Ebb	0.37				

Gradient		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	71	Number of Valid Observations	105
Number of Missing Values	7	Number of Missing Values	12
Number of Distinct Observations	70	Number of Distinct Observations	93
Minimum	0.0549	Minimum	0.0571
Maximum	1.269	Maximum	1.2
Mean of Raw Data	0.459	Mean of Raw Data	0.42
Standard Deviation of Raw Data	0.226	Standard Deviation of Raw Data	0.215
Kstar	3.213	Kstar	3.33
Mean of Log Transformed Data	-0.936	Mean of Log Transformed Data	-1.02
Standard Deviation of Log Transformed Data	0.629	Standard Deviation of Log Transformed Data	0.6
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.982	Correlation Coefficient R	0.98
Approximate Shapiro Wilk Test Statistic	0.967	Approximate Shapiro Wilk Test Statistic	0.957
Approximate Shapiro Wilk P Value	0.175	Approximate Shapiro Wilk P Value	0.00908
Lilliefors Test Statistic	0.0636	Lilliefors Test Statistic	0.0932
Lilliefors Critical (0.95) Value	0.105	Lilliefors Critical (0.95) Value	0.0865
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/Mediar

Area of Concern Data: Impact
Background Data: Gradient

Raw Statistics

	Site	Background
Number of Valid Observations	105	71
Number of Missing Values	12	7
Number of Distinct Observations	93	70
Minimum	0.0571	0.0549
Maximum	1.2	1.269
Mean	0.42	0.459
Median	0.413	0.456
SD	0.215	0.226
SE of Mean	0.021	0.0268

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	8849
WMW Test U-Stat	-1.339
WMW Critical Value (0.050)	1.645
P-Value	9.03E-02

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

Cluster 2 TIN(Insitu)
G1 vs Impact

G1 TIN (insitu) (mg/L) data		
G1	24/04/2014 Mid-Ebb	0.32
G1	26/04/2014 Mid-Ebb	0.64
G1	29/04/2014 Mid-Ebb	0.53
G1	01/05/2014 Mid-Ebb	0.48
G1	03/05/2014 Mid-Ebb	0.72
G1	06/05/2014 Mid-Ebb	0.38
G1	08/05/2014 Mid-Ebb	0.45
G1	10/05/2014 Mid-Ebb	0.75
G1	13/05/2014 Mid-Ebb	
G1	15/05/2014 Mid-Ebb	1.31
G1	17/05/2014 Mid-Ebb	0.93
G1	20/05/2014 Mid-Ebb	1.64
G1	22/05/2014 Mid-Ebb	2.02
G1	24/05/2014 Mid-Ebb	1.89
G1	27/05/2014 Mid-Ebb	1.89
G1	29/05/2014 Mid-Ebb	1.22
G1	31/05/2014 Mid-Ebb	0.60
G1	03/06/2014 Mid-Ebb	0.97
G1	05/06/2014 Mid-Ebb	1.51
G1	07/06/2014 Mid-Ebb	0.65
G1	10/06/2014 Mid-Ebb	0.39
G1	12/06/2014 Mid-Ebb	0.50
G1	14/06/2014 Mid-Ebb	1.17
G1	17/6/2014 Mid-Ebb	0.79
G1	19/06/2014 Mid-Ebb	0.78
G1	21/06/2014 Mid-Ebb	
G1	24/06/2014 Mid-Ebb	0.90
G1	26/06/2014 Mid-Ebb	1.07
G1	28/06/2014 Mid-Ebb	1.03
G1	01/07/2014 Mid-Ebb	1.16
G1	03/07/2014 Mid-Ebb	1.51
G1	05/07/2014 Mid-Ebb	1.36
G1	08/07/2014 Mid-Ebb	1.07
G1	10/07/2014 Mid-Ebb	1.05
G1	12/07/2014 Mid-Ebb	1.30
G1	15/07/2014 Mid-Ebb	1.06
G1	17/07/2014 Mid-Ebb	
G1	19/07/2014 Mid-Ebb	1.00
G1	22/07/2014 Mid-Ebb	1.41

Impact TIN (insitu) (mg/L) data					
SR9	24/04/2014 Mid-Ebb	0.41	SR11	24/04/2014 Mid-Ebb	0.21
SR9	26/04/2014 Mid-Ebb	0.25	SR11	26/04/2014 Mid-Ebb	0.17
SR9	29/04/2014 Mid-Ebb	0.08	SR11	29/04/2014 Mid-Ebb	0.06
SR9	01/05/2014 Mid-Ebb	0.10	SR11	01/05/2014 Mid-Ebb	0.20
SR9	03/05/2014 Mid-Ebb	0.32	SR11	03/05/2014 Mid-Ebb	0.15
SR9	06/05/2014 Mid-Ebb	0.21	SR11	06/05/2014 Mid-Ebb	0.13
SR9	08/05/2014 Mid-Ebb		SR11	08/05/2014 Mid-Ebb	0.10
SR9	10/05/2014 Mid-Ebb	0.22	SR11	10/05/2014 Mid-Ebb	0.14
SR9	13/05/2014 Mid-Ebb		SR11	13/05/2014 Mid-Ebb	
SR9	15/05/2014 Mid-Ebb	0.41	SR11	15/05/2014 Mid-Ebb	0.19
SR9	17/05/2014 Mid-Ebb	0.83	SR11	17/05/2014 Mid-Ebb	0.58
SR9	20/05/2014 Mid-Ebb		SR11	20/05/2014 Mid-Ebb	0.31
SR9	22/05/2014 Mid-Ebb	1.01	SR11	22/05/2014 Mid-Ebb	0.75
SR9	24/05/2014 Mid-Ebb	0.83	SR11	24/05/2014 Mid-Ebb	0.63
SR9	27/05/2014 Mid-Ebb	0.56	SR11	27/05/2014 Mid-Ebb	0.48
SR9	29/05/2014 Mid-Ebb	0.43	SR11	29/05/2014 Mid-Ebb	0.39
SR9	31/05/2014 Mid-Ebb	0.42	SR11	31/05/2014 Mid-Ebb	0.39
SR9	03/06/2014 Mid-Ebb	0.35	SR11	03/06/2014 Mid-Ebb	0.51
SR9	05/06/2014 Mid-Ebb	0.70	SR11	05/06/2014 Mid-Ebb	0.39
SR9	07/06/2014 Mid-Ebb	0.18	SR11	07/06/2014 Mid-Ebb	0.32
SR9	10/06/2014 Mid-Ebb		SR11	10/06/2014 Mid-Ebb	0.37
SR9	12/06/2014 Mid-Ebb	0.41	SR11	12/06/2014 Mid-Ebb	0.42
SR9	14/06/2014 Mid-Ebb	0.43	SR11	14/06/2014 Mid-Ebb	0.41
SR9	17/6/2014 Mid-Ebb	0.35	SR11	17/6/2014 Mid-Ebb	0.20
SR9	19/06/2014 Mid-Ebb	0.42	SR11	19/06/2014 Mid-Ebb	0.56
SR9	21/06/2014 Mid-Ebb		SR11	21/06/2014 Mid-Ebb	
SR9	24/06/2014 Mid-Ebb	0.39	SR11	24/06/2014 Mid-Ebb	0.39
SR9	26/06/2014 Mid-Ebb	0.39	SR11	26/06/2014 Mid-Ebb	0.33
SR9	28/06/2014 Mid-Ebb	0.27	SR11	28/06/2014 Mid-Ebb	0.25
SR9	01/07/2014 Mid-Ebb	0.47	SR11	01/07/2014 Mid-Ebb	0.48
SR9	03/07/2014 Mid-Ebb	0.49	SR11	03/07/2014 Mid-Ebb	0.40
SR9	05/07/2014 Mid-Ebb	0.64	SR11	05/07/2014 Mid-Ebb	0.47
SR9	08/07/2014 Mid-Ebb	0.68	SR11	08/07/2014 Mid-Ebb	0.74
SR9	10/07/2014 Mid-Ebb	0.55	SR11	10/07/2014 Mid-Ebb	0.47
SR9	12/07/2014 Mid-Ebb	0.48	SR11	12/07/2014 Mid-Ebb	0.46
SR9	15/07/2014 Mid-Ebb	0.70	SR11	15/07/2014 Mid-Ebb	0.68
SR9	17/07/2014 Mid-Ebb		SR11	17/07/2014 Mid-Ebb	
SR9	19/07/2014 Mid-Ebb	0.35	SR11	19/07/2014 Mid-Ebb	0.22
SR9	22/07/2014 Mid-Ebb	0.33	SR11	22/07/2014 Mid-Ebb	0.34
SR10	24/04/2014 Mid-Ebb	0.13			
SR10	26/04/2014 Mid-Ebb	0.11			
SR10	29/04/2014 Mid-Ebb	0.11			
SR10	01/05/2014 Mid-Ebb	0.20			
SR10	03/05/2014 Mid-Ebb	0.14			
SR10	06/05/2014 Mid-Ebb	0.10			
SR10	08/05/2014 Mid-Ebb	0.15			
SR10	10/05/2014 Mid-Ebb	0.20			
SR10	13/05/2014 Mid-Ebb				
SR10	15/05/2014 Mid-Ebb	0.35			
SR10	17/05/2014 Mid-Ebb	1.20			
SR10	20/05/2014 Mid-Ebb	0.86			
SR10	22/05/2014 Mid-Ebb	0.70			
SR10	24/05/2014 Mid-Ebb	0.56			
SR10	27/05/2014 Mid-Ebb	0.62			
SR10	29/05/2014 Mid-Ebb	0.49			
SR10	31/05/2014 Mid-Ebb	0.45			
SR10	03/06/2014 Mid-Ebb	0.64			
SR10	05/06/2014 Mid-Ebb	0.43			
SR10	07/06/2014 Mid-Ebb	0.21			
SR10	10/06/2014 Mid-Ebb	0.36			
SR10	12/06/2014 Mid-Ebb	0.41			
SR10	14/06/2014 Mid-Ebb	0.47			
SR10	17/6/2014 Mid-Ebb	0.28			
SR10	19/06/2014 Mid-Ebb	0.57			
SR10	21/06/2014 Mid-Ebb				
SR10	24/06/2014 Mid-Ebb	0.44			
SR10	26/06/2014 Mid-Ebb	0.50			
SR10	28/06/2014 Mid-Ebb	0.49			
SR10	01/07/2014 Mid-Ebb	0.60			
SR10	03/07/2014 Mid-Ebb	0.49			
SR10	05/07/2014 Mid-Ebb	0.65			
SR10	08/07/2014 Mid-Ebb	0.65			
SR10	10/07/2014 Mid-Ebb	0.47			
SR10	12/07/2014 Mid-Ebb	0.60			
SR10	15/07/2014 Mid-Ebb	0.85			
SR10	17/07/2014 Mid-Ebb				
SR10	19/07/2014 Mid-Ebb	0.26			
SR10	22/07/2014 Mid-Ebb	0.42			

G1		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	105
Number of Missing Values	3	Number of Missing Values	12
Number of Distinct Observations	36	Number of Distinct Observations	93
Minimum	0.323	Minimum	0.0571
Maximum	2.017	Maximum	1.2
Mean of Raw Data	1.012	Mean of Raw Data	0.42
Standard Deviation of Raw Data	0.449	Standard Deviation of Raw Data	0.215
Kstar	4.515	Kstar	3.33
Mean of Log Transformed Data	-0.0935	Mean of Log Transformed Data	-1.02
Standard Deviation of Log Transformed Data	0.483	Standard Deviation of Log Transformed Data	0.6
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.985	Correlation Coefficient R	0.98
Shapiro Wilk Test Statistic	0.957	Approximate Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical (0.95) Value	0.935	Approximate Shapiro Wilk P Value	0.00908
Approximate Shapiro Wilk P Value	0.224	Lilliefors Test Statistic	0.0932
Lilliefors Test Statistic	0.0869	Lilliefors Critical (0.95) Value	0.0865
Lilliefors Critical (0.95) Value	0.148	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 Greater Than or Equal to Background Mean/Median (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median

Area of Concern Data: Impact
Background Data: G1

Raw Statistics

	Site	Background
Number of Valid Observations	105	36
Number of Missing Values	12	3
Number of Distinct Observations	93	36
Minimum	0.0571	0.323
Maximum	1.2	2.017
Mean	0.42	1.012
Median	0.413	1.015
SD	0.215	0.449
SE of Mean	0.021	0.0749

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	5987
WMW Test U-Stat	-6.939
WMW Critical Value (0.050)	-1.645
P-Value	1.98E-12

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

Cluster 2 TIN(lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L) data			
SR9	04/01/2014	Mid-Ebb	0.10
SR9	07/01/2014	Mid-Ebb	0.16
SR9	09/01/2014	Mid-Ebb	0.38
SR9	11/01/2014	Mid-Ebb	0.40
SR9	14/01/2014	Mid-Ebb	0.23
SR9	16/01/2014	Mid-Ebb	0.22
SR9	18/01/2014	Mid-Ebb	0.13
SR9	21/01/2014	Mid-Ebb	0.04
SR9	23/01/2014	Mid-Ebb	0.03
SR9	25/01/2014	Mid-Ebb	0.03
SR9	27/01/2014	Mid-Ebb	0.03
SR9	29/01/2014	Mid-Ebb	0.03
SR10	04/01/2014	Mid-Ebb	0.19
SR10	07/01/2014	Mid-Ebb	0.20
SR10	09/01/2014	Mid-Ebb	0.20
SR10	11/01/2014	Mid-Ebb	0.21
SR10	14/01/2014	Mid-Ebb	0.14
SR10	16/01/2014	Mid-Ebb	0.13
SR10	18/01/2014	Mid-Ebb	0.13
SR10	21/01/2014	Mid-Ebb	0.12
SR10	23/01/2014	Mid-Ebb	0.15
SR10	25/01/2014	Mid-Ebb	0.08
SR10	27/01/2014	Mid-Ebb	0.09
SR10	29/01/2014	Mid-Ebb	0.12
SR11	04/01/2014	Mid-Ebb	0.18
SR11	07/01/2014	Mid-Ebb	0.17
SR11	09/01/2014	Mid-Ebb	0.19
SR11	11/01/2014	Mid-Ebb	0.21
SR11	14/01/2014	Mid-Ebb	0.14
SR11	16/01/2014	Mid-Ebb	0.12
SR11	18/01/2014	Mid-Ebb	0.10
SR11	21/01/2014	Mid-Ebb	0.12
SR11	23/01/2014	Mid-Ebb	0.18
SR11	25/01/2014	Mid-Ebb	0.12
SR11	27/01/2014	Mid-Ebb	0.07
SR11	29/01/2014	Mid-Ebb	0.09

Impact TIN (lab) (mg/L) data							
SR9	24/04/2014	Mid-Ebb	0.44	SR11	24/04/2014	Mid-Ebb	0.20
SR9	26/04/2014	Mid-Ebb	0.27	SR11	26/04/2014	Mid-Ebb	0.16
SR9	29/04/2014	Mid-Ebb	0.27	SR11	29/04/2014	Mid-Ebb	0.20
SR9	01/05/2014	Mid-Ebb	0.22	SR11	01/05/2014	Mid-Ebb	0.16
SR9	03/05/2014	Mid-Ebb	0.29	SR11	03/05/2014	Mid-Ebb	0.19
SR9	06/05/2014	Mid-Ebb	0.40	SR11	06/05/2014	Mid-Ebb	0.12
SR9	08/05/2014	Mid-Ebb		SR11	08/05/2014	Mid-Ebb	0.18
SR9	10/05/2014	Mid-Ebb	0.62	SR11	10/05/2014	Mid-Ebb	0.25
SR9	13/05/2014	Mid-Ebb		SR11	13/05/2014	Mid-Ebb	
SR9	15/05/2014	Mid-Ebb	0.63	SR11	15/05/2014	Mid-Ebb	0.49
SR9	17/05/2014	Mid-Ebb	0.53	SR11	17/05/2014	Mid-Ebb	0.56
SR9	20/05/2014	Mid-Ebb		SR11	20/05/2014	Mid-Ebb	0.54
SR9	22/05/2014	Mid-Ebb	0.78	SR11	22/05/2014	Mid-Ebb	0.61
SR9	24/05/2014	Mid-Ebb	0.38	SR11	24/05/2014	Mid-Ebb	0.63
SR9	27/05/2014	Mid-Ebb	0.59	SR11	27/05/2014	Mid-Ebb	0.48
SR9	29/05/2014	Mid-Ebb	0.38	SR11	29/05/2014	Mid-Ebb	0.39
SR9	31/05/2014	Mid-Ebb	0.51	SR11	31/05/2014	Mid-Ebb	0.39
SR9	03/06/2014	Mid-Ebb	0.28	SR11	03/06/2014	Mid-Ebb	0.51
SR9	05/06/2014	Mid-Ebb	0.48	SR11	05/06/2014	Mid-Ebb	0.39
SR9	07/06/2014	Mid-Ebb	0.39	SR11	07/06/2014	Mid-Ebb	0.32
SR9	10/06/2014	Mid-Ebb		SR11	10/06/2014	Mid-Ebb	0.37
SR9	12/06/2014	Mid-Ebb	0.19	SR11	12/06/2014	Mid-Ebb	0.42
SR9	14/06/2014	Mid-Ebb	0.38	SR11	14/06/2014	Mid-Ebb	0.41
SR9	17/6/2014	Mid-Ebb	0.27	SR11	17/6/2014	Mid-Ebb	0.20
SR9	19/06/2014	Mid-Ebb	0.42	SR11	19/06/2014	Mid-Ebb	0.56
SR9	21/06/2014	Mid-Ebb		SR11	21/06/2014	Mid-Ebb	
SR9	24/06/2014	Mid-Ebb	0.38	SR11	24/06/2014	Mid-Ebb	0.39
SR9	26/06/2014	Mid-Ebb	0.43	SR11	26/06/2014	Mid-Ebb	0.33
SR9	28/06/2014	Mid-Ebb	0.29	SR11	28/06/2014	Mid-Ebb	0.25
SR9	01/07/2014	Mid-Ebb	0.57	SR11	01/07/2014	Mid-Ebb	0.48
SR9	03/07/2014	Mid-Ebb	0.39	SR11	03/07/2014	Mid-Ebb	0.40
SR9	05/07/2014	Mid-Ebb	0.31	SR11	05/07/2014	Mid-Ebb	0.47
SR9	08/07/2014	Mid-Ebb	0.50	SR11	08/07/2014	Mid-Ebb	0.74
SR9	10/07/2014	Mid-Ebb	0.39	SR11	10/07/2014	Mid-Ebb	0.47
SR9	12/07/2014	Mid-Ebb	0.15	SR11	12/07/2014	Mid-Ebb	0.46
SR9	15/07/2014	Mid-Ebb	0.31	SR11	15/07/2014	Mid-Ebb	0.68
SR9	17/07/2014	Mid-Ebb		SR11	17/07/2014	Mid-Ebb	
SR9	19/07/2014	Mid-Ebb	0.36	SR11	19/07/2014	Mid-Ebb	0.22
SR9	22/07/2014	Mid-Ebb	0.24	SR11	22/07/2014	Mid-Ebb	0.34
SR10	24/04/2014	Mid-Ebb	0.18				
SR10	26/04/2014	Mid-Ebb	0.10				
SR10	29/04/2014	Mid-Ebb	0.07				
SR10	01/05/2014	Mid-Ebb	0.11				
SR10	03/05/2014	Mid-Ebb	0.12				
SR10	06/05/2014	Mid-Ebb	0.10				
SR10	08/05/2014	Mid-Ebb	0.11				
SR10	10/05/2014	Mid-Ebb	0.23				
SR10	13/05/2014	Mid-Ebb					
SR10	15/05/2014	Mid-Ebb	0.56				
SR10	17/05/2014	Mid-Ebb	0.59				
SR10	20/05/2014	Mid-Ebb	0.64				
SR10	22/05/2014	Mid-Ebb	0.57				
SR10	24/05/2014	Mid-Ebb	0.34				
SR10	27/05/2014	Mid-Ebb	0.57				
SR10	29/05/2014	Mid-Ebb	0.34				
SR10	31/05/2014	Mid-Ebb	0.41				
SR10	03/06/2014	Mid-Ebb	0.53				
SR10	05/06/2014	Mid-Ebb	0.33				
SR10	07/06/2014	Mid-Ebb	0.36				
SR10	10/06/2014	Mid-Ebb	0.16				
SR10	12/06/2014	Mid-Ebb	0.20				
SR10	14/06/2014	Mid-Ebb	0.34				
SR10	17/6/2014	Mid-Ebb	0.29				
SR10	19/06/2014	Mid-Ebb	0.55				
SR10	21/06/2014	Mid-Ebb					
SR10	24/06/2014	Mid-Ebb	0.42				
SR10	26/06/2014	Mid-Ebb	0.40				
SR10	28/06/2014	Mid-Ebb	0.35				
SR10	01/07/2014	Mid-Ebb	0.53				
SR10	03/07/2014	Mid-Ebb	0.41				
SR10	05/07/2014	Mid-Ebb	0.35				
SR10	08/07/2014	Mid-Ebb	0.42				
SR10	10/07/2014	Mid-Ebb	0.40				
SR10	12/07/2014	Mid-Ebb	0.37				
SR10	15/07/2014	Mid-Ebb	0.52				
SR10	17/07/2014	Mid-Ebb					
SR10	19/07/2014	Mid-Ebb	0.36				
SR10	22/07/2014	Mid-Ebb	0.37				

Baseline x 1.3		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	104
Number of Distinct Observations	20	Number of Distinct Observations	47
Minimum	0.03	Minimum	0
Maximum	0.4	Maximum	0.78
Mean of Raw Data	0.145	Mean of Raw Data	0.349
Standard Deviation of Raw Data	0.0833	Standard Deviation of Raw Data	0.152
Kstar	2.693		
Mean of Log Transformed Data	-2.11	Normal Distribution Test Results	
Standard Deviation of Log Transformed Data	0.663		
		Correlation Coefficient R	0.993
Normal Distribution Test Results		Approximate Shapiro Wilk Test Statistic	0.979
		Approximate Shapiro Wilk P Value	0.458
Correlation Coefficient R	0.944	Lilliefors Test Statistic	0.0612
Shapiro Wilk Test Statistic	0.894	Lilliefors Critical (0.95) Value	0.0869
Shapiro Wilk Critical (0.95) Value	0.935	Data appear Normal at (0.05) Significance Level	
Approximate Shapiro Wilk P Value	0.00213		
Lilliefors Test Statistic	0.109		
Lilliefors Critical (0.95) Value	0.148		
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
Background Data: Baseline x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	104	36
Number of Distinct Observations	47	20
Minimum	0	0.03
Maximum	0.78	0.4
Mean	0.349	0.145
Median	0.35	0.13
SD	0.152	0.0833
SE of Mean	0.0149	0.0139

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	8756
WMW Test U-Stat	6.785
WMW Critical Value (0.050)	1.645
P-Value	5.824E-12

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

Cluster 2 TIN(lab)
G5 G6 vs Impact

Gradient TIN (lab) (mg/L) data			
G5	24/04/2014	Mid-Ebb	0.33
G5	26/04/2014	Mid-Ebb	0.32
G5	29/04/2014	Mid-Ebb	0.33
G5	01/05/2014	Mid-Ebb	0.35
G5	03/05/2014	Mid-Ebb	0.34
G5	06/05/2014	Mid-Ebb	0.34
G5	08/05/2014	Mid-Ebb	
G5	10/05/2014	Mid-Ebb	0.34
G5	13/05/2014	Mid-Ebb	
G5	15/05/2014	Mid-Ebb	0.79
G5	17/05/2014	Mid-Ebb	0.99
G5	20/05/2014	Mid-Ebb	
G5	22/05/2014	Mid-Ebb	0.86
G5	24/05/2014	Mid-Ebb	0.49
G5	27/05/2014	Mid-Ebb	0.85
G5	29/05/2014	Mid-Ebb	0.49
G5	31/05/2014	Mid-Ebb	0.54
G5	03/06/2014	Mid-Ebb	0.45
G5	05/06/2014	Mid-Ebb	0.48
G5	07/06/2014	Mid-Ebb	0.66
G5	10/06/2014	Mid-Ebb	0.27
G5	12/06/2014	Mid-Ebb	0.29
G5	14/06/2014	Mid-Ebb	0.41
G5	17/6/2014	Mid-Ebb	0.31
G5	19/06/2014	Mid-Ebb	0.63
G5	21/06/2014	Mid-Ebb	0.74
G5	24/06/2014	Mid-Ebb	0.33
G5	26/06/2014	Mid-Ebb	0.35
G5	28/06/2014	Mid-Ebb	0.26
G5	01/07/2014	Mid-Ebb	0.55
G5	03/07/2014	Mid-Ebb	0.40
G5	05/07/2014	Mid-Ebb	0.62
G5	08/07/2014	Mid-Ebb	0.67
G5	10/07/2014	Mid-Ebb	0.29
G5	12/07/2014	Mid-Ebb	0.25
G5	15/07/2014	Mid-Ebb	0.25
G5	17/07/2014	Mid-Ebb	
G5	19/07/2014	Mid-Ebb	0.38
G5	22/07/2014	Mid-Ebb	0.44
G6	24/04/2014	Mid-Ebb	0.07
G6	26/04/2014	Mid-Ebb	0.23
G6	29/04/2014	Mid-Ebb	0.10
G6	01/05/2014	Mid-Ebb	0.09
G6	03/05/2014	Mid-Ebb	0.12
G6	06/05/2014	Mid-Ebb	0.04
G6	08/05/2014	Mid-Ebb	0.09
G6	10/05/2014	Mid-Ebb	0.28
G6	13/05/2014	Mid-Ebb	
G6	15/05/2014	Mid-Ebb	0.79
G6	17/05/2014	Mid-Ebb	0.63
G6	20/05/2014	Mid-Ebb	0.88
G6	22/05/2014	Mid-Ebb	0.18
G6	24/05/2014	Mid-Ebb	0.47
G6	27/05/2014	Mid-Ebb	0.72
G6	29/05/2014	Mid-Ebb	0.47
G6	31/05/2014	Mid-Ebb	0.24
G6	03/06/2014	Mid-Ebb	0.34
G6	05/06/2014	Mid-Ebb	0.29
G6	07/06/2014	Mid-Ebb	0.33
G6	10/06/2014	Mid-Ebb	0.16
G6	12/06/2014	Mid-Ebb	0.19
G6	14/06/2014	Mid-Ebb	0.39
G6	17/6/2014	Mid-Ebb	0.40
G6	19/06/2014	Mid-Ebb	0.46
G6	21/06/2014	Mid-Ebb	
G6	24/06/2014	Mid-Ebb	0.41
G6	26/06/2014	Mid-Ebb	0.49
G6	28/06/2014	Mid-Ebb	0.33
G6	01/07/2014	Mid-Ebb	0.47
G6	03/07/2014	Mid-Ebb	0.43
G6	05/07/2014	Mid-Ebb	0.38
G6	08/07/2014	Mid-Ebb	0.52
G6	10/07/2014	Mid-Ebb	0.36
G6	12/07/2014	Mid-Ebb	0.47
G6	15/07/2014	Mid-Ebb	0.40
G6	17/07/2014	Mid-Ebb	
G6	19/07/2014	Mid-Ebb	0.34
G6	22/07/2014	Mid-Ebb	0.51

Impact TIN (lab) (mg/L) data							
SR9	24/04/2014	Mid-Ebb	0.44	SR11	24/04/2014	Mid-Ebb	0.20
SR9	26/04/2014	Mid-Ebb	0.27	SR11	26/04/2014	Mid-Ebb	0.16
SR9	29/04/2014	Mid-Ebb	0.27	SR11	29/04/2014	Mid-Ebb	0.20
SR9	01/05/2014	Mid-Ebb	0.22	SR11	01/05/2014	Mid-Ebb	0.16
SR9	03/05/2014	Mid-Ebb	0.29	SR11	03/05/2014	Mid-Ebb	0.19
SR9	06/05/2014	Mid-Ebb	0.40	SR11	06/05/2014	Mid-Ebb	0.12
SR9	08/05/2014	Mid-Ebb		SR11	08/05/2014	Mid-Ebb	0.18
SR9	10/05/2014	Mid-Ebb	0.62	SR11	10/05/2014	Mid-Ebb	0.25
SR9	13/05/2014	Mid-Ebb		SR11	13/05/2014	Mid-Ebb	
SR9	15/05/2014	Mid-Ebb	0.63	SR11	15/05/2014	Mid-Ebb	0.49
SR9	17/05/2014	Mid-Ebb	0.53	SR11	17/05/2014	Mid-Ebb	0.56
SR9	20/05/2014	Mid-Ebb		SR11	20/05/2014	Mid-Ebb	0.54
SR9	22/05/2014	Mid-Ebb	0.78	SR11	22/05/2014	Mid-Ebb	0.61
SR9	24/05/2014	Mid-Ebb	0.38	SR11	24/05/2014	Mid-Ebb	0.63
SR9	27/05/2014	Mid-Ebb	0.59	SR11	27/05/2014	Mid-Ebb	0.48
SR9	29/05/2014	Mid-Ebb	0.38	SR11	29/05/2014	Mid-Ebb	0.39
SR9	31/05/2014	Mid-Ebb	0.51	SR11	31/05/2014	Mid-Ebb	0.39
SR9	03/06/2014	Mid-Ebb	0.28	SR11	03/06/2014	Mid-Ebb	0.51
SR9	05/06/2014	Mid-Ebb	0.48	SR11	05/06/2014	Mid-Ebb	0.39
SR9	07/06/2014	Mid-Ebb	0.39	SR11	07/06/2014	Mid-Ebb	0.32
SR9	10/06/2014	Mid-Ebb		SR11	10/06/2014	Mid-Ebb	0.37
SR9	12/06/2014	Mid-Ebb	0.19	SR11	12/06/2014	Mid-Ebb	0.42
SR9	14/06/2014	Mid-Ebb	0.38	SR11	14/06/2014	Mid-Ebb	0.41
SR9	17/6/2014	Mid-Ebb	0.27	SR11	17/6/2014	Mid-Ebb	0.20
SR9	19/06/2014	Mid-Ebb	0.42	SR11	19/06/2014	Mid-Ebb	0.56
SR9	21/06/2014	Mid-Ebb		SR11	21/06/2014	Mid-Ebb	
SR9	24/06/2014	Mid-Ebb	0.38	SR11	24/06/2014	Mid-Ebb	0.39
SR9	26/06/2014	Mid-Ebb	0.43	SR11	26/06/2014	Mid-Ebb	0.33
SR9	28/06/2014	Mid-Ebb	0.29	SR11	28/06/2014	Mid-Ebb	0.25
SR9	01/07/2014	Mid-Ebb	0.57	SR11	01/07/2014	Mid-Ebb	0.48
SR9	03/07/2014	Mid-Ebb	0.39	SR11	03/07/2014	Mid-Ebb	0.40
SR9	05/07/2014	Mid-Ebb	0.31	SR11	05/07/2014	Mid-Ebb	0.47
SR9	08/07/2014	Mid-Ebb	0.50	SR11	08/07/2014	Mid-Ebb	0.74
SR9	10/07/2014	Mid-Ebb	0.39	SR11	10/07/2014	Mid-Ebb	0.47
SR9	12/07/2014	Mid-Ebb	0.15	SR11	12/07/2014	Mid-Ebb	0.46
SR9	15/07/2014	Mid-Ebb	0.31	SR11	15/07/2014	Mid-Ebb	0.68
SR9	17/07/2014	Mid-Ebb		SR11	17/07/2014	Mid-Ebb	
SR9	19/07/2014	Mid-Ebb	0.36	SR11	19/07/2014	Mid-Ebb	0.22
SR9	22/07/2014	Mid-Ebb	0.24	SR11	22/07/2014	Mid-Ebb	0.34
SR10	24/04/2014	Mid-Ebb	0.18				
SR10	26/04/2014	Mid-Ebb	0.10				
SR10	29/04/2014	Mid-Ebb	0.07				
SR10	01/05/2014	Mid-Ebb	0.11				
SR10	03/05/2014	Mid-Ebb	0.12				
SR10	06/05/2014	Mid-Ebb	0.10				
SR10	08/05/2014	Mid-Ebb	0.11				
SR10	10/05/2014	Mid-Ebb	0.23				
SR10	13/05/2014	Mid-Ebb					
SR10	15/05/2014	Mid-Ebb	0.56				
SR10	17/05/2014	Mid-Ebb	0.59				
SR10	20/05/2014	Mid-Ebb	0.64				
SR10	22/05/2014	Mid-Ebb	0.57				
SR10	24/05/2014	Mid-Ebb	0.34				
SR10	27/05/2014	Mid-Ebb	0.57				
SR10	29/05/2014	Mid-Ebb	0.34				
SR10	31/05/2014	Mid-Ebb	0.41				
SR10	03/06/2014	Mid-Ebb	0.53				
SR10	05/06/2014	Mid-Ebb	0.33				
SR10	07/06/2014	Mid-Ebb	0.36				
SR10	10/06/2014	Mid-Ebb	0.16				
SR10	12/06/2014	Mid-Ebb	0.20				
SR10	14/06/2014	Mid-Ebb	0.34				
SR10	17/6/2014	Mid-Ebb	0.29				
SR10	19/06/2014	Mid-Ebb	0.55				
SR10	21/06/2014	Mid-Ebb					
SR10	24/06/2014	Mid-Ebb	0.42				
SR10	26/06/2014	Mid-Ebb	0.40				
SR10	28/06/2014	Mid-Ebb	0.35				
SR10	01/07/2014	Mid-Ebb	0.53				
SR10	03/07/2014	Mid-Ebb	0.41				
SR10	05/07/2014	Mid-Ebb	0.35				
SR10	08/07/2014	Mid-Ebb	0.42				
SR10	10/07/2014	Mid-Ebb	0.40				
SR10	12/07/2014	Mid-Ebb	0.37				
SR10	15/07/2014	Mid-Ebb	0.52				
SR10	17/07/2014	Mid-Ebb					
SR10	19/07/2014	Mid-Ebb	0.36				
SR10	22/07/2014	Mid-Ebb	0.37				

Impact		Gradient	
Raw Statistics		Raw Statistics	
Number of Valid Observations	105	Number of Valid Observations	71
Number of Missing Values	12	Number of Missing Values	7
Number of Distinct Observations	61	Number of Distinct Observations	47
Minimum	0.07	Minimum	0.04
Maximum	0.78	Maximum	0.99
Mean of Raw Data	0.378	Mean of Raw Data	0.415
Standard Deviation of Raw Data	0.155	Standard Deviation of Raw Data	0.204
Kstar	4.862	Kstar	3.428
Mean of Log Transformed Data	-1.076	Mean of Log Transformed Data	-1.026
Standard Deviation of Log Transformed Data	0.493	Standard Deviation of Log Transformed Data	0.605
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.994		
Approximate Shapiro Wilk Test Statistic	0.973		
Approximate Shapiro Wilk P Value	0.195		
Lilliefors Test Statistic	0.069		
Lilliefors Critical (0.95) Value	0.0865		
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/Mediar

Area of Concern Data: Impact
Background Data: Gradient

Raw Statistics

Number of Valid Observations	Site	Background
Number of Missing Values	105	71
Number of Distinct Observations	12	7
Minimum	61	47
Maximum	0.07	0.04
Mean	0.78	0.99
Median	0.378	0.415
SD	0.38	0.38
SE of Mean	0.155	0.204
	0.0151	0.0242

Wilcoxon-Mann-Whitney (WMW) Test

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

Site Rank Sum W-Stat	
WMW Test U-Stat	9075
WMW Critical Value (0.050)	-0.657
P-Value	1.65E+00
	0.255

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

Cluster 2 TIN(Lab)
G1 vs Impact

G1 TIN (lab) (mg/L) data		
G1	24/04/2014 Mid-Ebb	0.46
G1	26/04/2014 Mid-Ebb	0.55
G1	29/04/2014 Mid-Ebb	0.77
G1	01/05/2014 Mid-Ebb	0.59
G1	03/05/2014 Mid-Ebb	0.60
G1	06/05/2014 Mid-Ebb	0.53
G1	08/05/2014 Mid-Ebb	0.43
G1	10/05/2014 Mid-Ebb	0.95
G1	13/05/2014 Mid-Ebb	
G1	15/05/2014 Mid-Ebb	1.35
G1	17/05/2014 Mid-Ebb	1.94
G1	20/05/2014 Mid-Ebb	1.33
G1	22/05/2014 Mid-Ebb	1.74
G1	24/05/2014 Mid-Ebb	1.23
G1	27/05/2014 Mid-Ebb	1.49
G1	29/05/2014 Mid-Ebb	1.23
G1	31/05/2014 Mid-Ebb	1.00
G1	03/06/2014 Mid-Ebb	0.98
G1	05/06/2014 Mid-Ebb	0.94
G1	07/06/2014 Mid-Ebb	1.02
G1	10/06/2014 Mid-Ebb	0.79
G1	12/06/2014 Mid-Ebb	0.87
G1	14/06/2014 Mid-Ebb	0.82
G1	17/6/2014 Mid-Ebb	0.75
G1	19/06/2014 Mid-Ebb	0.85
G1	21/06/2014 Mid-Ebb	
G1	24/06/2014 Mid-Ebb	1.30
G1	26/06/2014 Mid-Ebb	1.31
G1	28/06/2014 Mid-Ebb	1.08
G1	01/07/2014 Mid-Ebb	1.12
G1	03/07/2014 Mid-Ebb	1.09
G1	05/07/2014 Mid-Ebb	1.17
G1	08/07/2014 Mid-Ebb	0.88
G1	10/07/2014 Mid-Ebb	0.90
G1	12/07/2014 Mid-Ebb	1.04
G1	15/07/2014 Mid-Ebb	1.00
G1	17/07/2014 Mid-Ebb	
G1	19/07/2014 Mid-Ebb	0.85
G1	22/07/2014 Mid-Ebb	1.07

Impact TIN (lab) (mg/L) data					
SR9	24/04/2014 Mid-Ebb	0.44	SR11	24/04/2014 Mid-Ebb	0.20
SR9	26/04/2014 Mid-Ebb	0.27	SR11	26/04/2014 Mid-Ebb	0.16
SR9	29/04/2014 Mid-Ebb	0.27	SR11	29/04/2014 Mid-Ebb	0.20
SR9	01/05/2014 Mid-Ebb	0.22	SR11	01/05/2014 Mid-Ebb	0.16
SR9	03/05/2014 Mid-Ebb	0.29	SR11	03/05/2014 Mid-Ebb	0.19
SR9	06/05/2014 Mid-Ebb	0.40	SR11	06/05/2014 Mid-Ebb	0.12
SR9	08/05/2014 Mid-Ebb		SR11	08/05/2014 Mid-Ebb	0.18
SR9	10/05/2014 Mid-Ebb	0.62	SR11	10/05/2014 Mid-Ebb	0.25
SR9	13/05/2014 Mid-Ebb		SR11	13/05/2014 Mid-Ebb	
SR9	15/05/2014 Mid-Ebb	0.63	SR11	15/05/2014 Mid-Ebb	0.49
SR9	17/05/2014 Mid-Ebb	0.53	SR11	17/05/2014 Mid-Ebb	0.56
SR9	20/05/2014 Mid-Ebb		SR11	20/05/2014 Mid-Ebb	0.54
SR9	22/05/2014 Mid-Ebb	0.78	SR11	22/05/2014 Mid-Ebb	0.61
SR9	24/05/2014 Mid-Ebb	0.38	SR11	24/05/2014 Mid-Ebb	0.63
SR9	27/05/2014 Mid-Ebb	0.59	SR11	27/05/2014 Mid-Ebb	0.48
SR9	29/05/2014 Mid-Ebb	0.38	SR11	29/05/2014 Mid-Ebb	0.39
SR9	31/05/2014 Mid-Ebb	0.51	SR11	31/05/2014 Mid-Ebb	0.39
SR9	03/06/2014 Mid-Ebb	0.28	SR11	03/06/2014 Mid-Ebb	0.51
SR9	05/06/2014 Mid-Ebb	0.48	SR11	05/06/2014 Mid-Ebb	0.39
SR9	07/06/2014 Mid-Ebb	0.39	SR11	07/06/2014 Mid-Ebb	0.32
SR9	10/06/2014 Mid-Ebb		SR11	10/06/2014 Mid-Ebb	0.37
SR9	12/06/2014 Mid-Ebb	0.19	SR11	12/06/2014 Mid-Ebb	0.42
SR9	14/06/2014 Mid-Ebb	0.38	SR11	14/06/2014 Mid-Ebb	0.41
SR9	17/6/2014 Mid-Ebb	0.27	SR11	17/6/2014 Mid-Ebb	0.20
SR9	19/06/2014 Mid-Ebb	0.42	SR11	19/06/2014 Mid-Ebb	0.56
SR9	21/06/2014 Mid-Ebb		SR11	21/06/2014 Mid-Ebb	
SR9	24/06/2014 Mid-Ebb	0.38	SR11	24/06/2014 Mid-Ebb	0.39
SR9	26/06/2014 Mid-Ebb	0.43	SR11	26/06/2014 Mid-Ebb	0.33
SR9	28/06/2014 Mid-Ebb	0.29	SR11	28/06/2014 Mid-Ebb	0.25
SR9	01/07/2014 Mid-Ebb	0.57	SR11	01/07/2014 Mid-Ebb	0.48
SR9	03/07/2014 Mid-Ebb	0.39	SR11	03/07/2014 Mid-Ebb	0.40
SR9	05/07/2014 Mid-Ebb	0.31	SR11	05/07/2014 Mid-Ebb	0.47
SR9	08/07/2014 Mid-Ebb	0.50	SR11	08/07/2014 Mid-Ebb	0.74
SR9	10/07/2014 Mid-Ebb	0.39	SR11	10/07/2014 Mid-Ebb	0.47
SR9	12/07/2014 Mid-Ebb	0.15	SR11	12/07/2014 Mid-Ebb	0.46
SR9	15/07/2014 Mid-Ebb	0.31	SR11	15/07/2014 Mid-Ebb	0.68
SR9	17/07/2014 Mid-Ebb		SR11	17/07/2014 Mid-Ebb	
SR9	19/07/2014 Mid-Ebb	0.36	SR11	19/07/2014 Mid-Ebb	0.22
SR9	22/07/2014 Mid-Ebb	0.24	SR11	22/07/2014 Mid-Ebb	0.34
SR10	24/04/2014 Mid-Ebb	0.18			
SR10	26/04/2014 Mid-Ebb	0.10			
SR10	29/04/2014 Mid-Ebb	0.07			
SR10	01/05/2014 Mid-Ebb	0.11			
SR10	03/05/2014 Mid-Ebb	0.12			
SR10	06/05/2014 Mid-Ebb	0.10			
SR10	08/05/2014 Mid-Ebb	0.11			
SR10	10/05/2014 Mid-Ebb	0.23			
SR10	13/05/2014 Mid-Ebb				
SR10	15/05/2014 Mid-Ebb	0.56			
SR10	17/05/2014 Mid-Ebb	0.59			
SR10	20/05/2014 Mid-Ebb	0.64			
SR10	22/05/2014 Mid-Ebb	0.57			
SR10	24/05/2014 Mid-Ebb	0.34			
SR10	27/05/2014 Mid-Ebb	0.57			
SR10	29/05/2014 Mid-Ebb	0.34			
SR10	31/05/2014 Mid-Ebb	0.41			
SR10	03/06/2014 Mid-Ebb	0.53			
SR10	05/06/2014 Mid-Ebb	0.33			
SR10	07/06/2014 Mid-Ebb	0.36			
SR10	10/06/2014 Mid-Ebb	0.16			
SR10	12/06/2014 Mid-Ebb	0.20			
SR10	14/06/2014 Mid-Ebb	0.34			
SR10	17/6/2014 Mid-Ebb	0.29			
SR10	19/06/2014 Mid-Ebb	0.55			
SR10	21/06/2014 Mid-Ebb				
SR10	24/06/2014 Mid-Ebb	0.42			
SR10	26/06/2014 Mid-Ebb	0.40			
SR10	28/06/2014 Mid-Ebb	0.35			
SR10	01/07/2014 Mid-Ebb	0.53			
SR10	03/07/2014 Mid-Ebb	0.41			
SR10	05/07/2014 Mid-Ebb	0.35			
SR10	08/07/2014 Mid-Ebb	0.42			
SR10	10/07/2014 Mid-Ebb	0.40			
SR10	12/07/2014 Mid-Ebb	0.37			
SR10	15/07/2014 Mid-Ebb	0.52			
SR10	17/07/2014 Mid-Ebb				
SR10	19/07/2014 Mid-Ebb	0.36			
SR10	22/07/2014 Mid-Ebb	0.37			

G1		Impact	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	105
Number of Missing Values	3	Number of Missing Values	12
Number of Distinct Observations	33	Number of Distinct Observations	61
Minimum	0.43	Minimum	0.07
Maximum	1.94	Maximum	0.78
Mean of Raw Data	1.001	Mean of Raw Data	0.378
Standard Deviation of Raw Data	0.334	Standard Deviation of Raw Data	0.155
Kstar	8.343	Kstar	4.862
Mean of Log Transformed Data	-0.0555	Mean of Log Transformed Data	-1.076
Standard Deviation of Log Transformed Data	0.347	Standard Deviation of Log Transformed Data	0.493
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.981	Correlation Coefficient R	0.994
Shapiro Wilk Test Statistic	0.963	Approximate Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical (0.95) Value	0.935	Approximate Shapiro Wilk P Value	0.195
Approximate Shapiro Wilk P Value	0.341	Lilliefors Test Statistic	0.069
Lilliefors Test Statistic	0.089	Lilliefors Critical (0.95) Value	0.0865
Lilliefors Critical (0.95) Value	0.148	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 Greater Than or Equal to Background Mean (Form 2)
Alternative Hypothesis	Site or AOC Mean Less Than the Background Mean

Area of Concern Data: Impact
Background Data: Gradient

Raw Statistics

	Site	Background
Number of Valid Observations	105	36
Number of Missing Values	12	3
Number of Distinct Observations	61	33
Minimum	0.07	0.43
Maximum	0.78	1.94
Mean	0.378	1.001
Median	0.38	0.99
SD	0.155	0.334
SE of Mean	0.0151	0.0557

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)	139	-15.028	-1.656	0
Satterthwaite (Unequal Variance)	40.2	-1.08E+01	-1.684	0

Pooled SD: 0.214
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
35	104	4.681	0

Conclusion with Alpha = 0.05
 * Two variances are not equal