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

Quarterly EM&A Report

March 2020 - May 2020

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/0394C

Project Proponent:

Civil Engineering & Development Department
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Certified by:



Colin Yung
Environmental Team Leader for
Fugro Technical Services Limited

Ref.: CEDDWKTBEM00_0_0400L.20

10 August 2020
By Post

Mott MacDonald Hong Kong Ltd.
3/F Mapletree Bay Point,
348 Kwun Tong Road
Kwun Tong, Kowloon

Attention: Mr. C M Howley

Dear Mr. Howley,

**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 March 2020 to May 2020**

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for March 2020 to May 2020 (ET's Report No. 0394/13/ED/0394C) received by e-mail on 10 August 2020.

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

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

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



Y H Hui
Independent Environmental Checker

Cc:	MMHK	Mr. Jason Chan	(by post and email)
	MaterialLab	Mr. Colin Yung	(by email)
	CIWE	Mr. K.O. Leung	(by email)

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EXECUTIVE SUMMARY

- i. This is the twentieth Quarterly Environmental Monitoring Audit (EM&A) Report – March 2020 – May 2020 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 February 2020 to 22 May 2020.
- ii. Construction Activities for the Reporting Period
During this reporting period, the principal work activities included:

March 2019	April 2020	May 2020
<ul style="list-style-type: none"> • There was no construction work carried out in this month. 	<ul style="list-style-type: none"> • Preparation Works of Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP 	<ul style="list-style-type: none"> • Preparation Works of Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP • Dredging at Portion A / Zone 2B2 in EP

Note: According to the Contractor, the construction work under this Contract has been temporarily suspended since 1 February 2020 and was resumed on 30 March 2020.

- iii. Water Quality Monitoring
Routine impact water quality monitoring at 7 designated monitoring stations namely C1A, C2A, G2, SR4, SR5, SR12, SR13 were conducted during the reporting period. Exceedances TIN (in-situ & lab) and Suspended solid 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		NH ₃ -N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	1	2	1	2
	Limit	0	0	0	0	0	0	-	-	-	-	10	9	10	9
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	1	2	3	
	Limit	0	0	0	0	0	0	0	0	0	0	10	9	19	



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

Station	Exceedance Level	Suspended Solids		BOD ₅		<i>E. coli</i>		NH ₃ -N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	1	0	0	0	0	0	0	0	0	0	0	-	-	0	1
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	1	2	1	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	10	9	10	9
SR12	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
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	
	Limit	0	1	0	0	0	0	0	0	0	0	0	0	10	9	20	

Among the 7 monitoring stations, supplementary 24-hr water quality monitoring was also conducted at 4 of the stations, which are SR4, SR5, SR12 and SR13. No exceedance was recorded in the reporting period. Number of exceedances recorded in the reporting period at each impact station is summarized in **Table III**.

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

Station	Exceedance Level	Turbidity	DO	NH ₃ -N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

iv. Waste Management

There was marine sediment Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit. No general refuse were disposed off site in the reporting month.

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

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

vi. Site Inspections and Audit

The Environmental Team conducted 8 site inspections in the reporting period. No particular observation was recorded in the reporting period.



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

vii. Compliance with Specific EP conditions

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

viii. Construction Activities for the Coming Reporting Period

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

- Preparation Works of Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP
- Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP

Future Key Issues include:

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

1. INTRODUCTION

1.1 Background

- 1.1.1 The Project objective is to dredge approximately 4.0 million cubic metres of sediment from the seabed of Kwai Tsing Container Basin, as well as portions of Northern Fairway and Western Fairway, to provide sufficient depth of container basin and approach channel to Kwai Tsing Container Terminal (KTCT) for the safe navigation of Ultra Large Container Ships (ULCS).
- 1.1.2 The environmental monitoring and audit works of this Project is governed by Environmental Permit (EP) No. EP-426/2011/A, EM&A Manual (AEIAR-156/2010) and EM&A TIN (EPD Letter Ref: (34) in Ax(1) to EP2/N3/C/57Pt.7)).
- 1.1.3 The project proponent was the Civil Engineering & Development Department, HKSAR (CEDD). The Project General Layout is shown in **Figure 1**.
- 1.1.4 Mott MacDonald Hong Kong Ltd. (MMHK) was commissioned by CEDD as the Engineer for the Project. Ramboll Hong Kong Limited (RHK) was employed as the Independent Environmental Checker (IEC) in the Project.
- 1.1.5 China International Water & Electric Corporation Limited (CIWE) was appointed as the main contractor for the dredging works.
- 1.1.6 Fugro Technical Services Limited (FTS) 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 twentieth Quarterly EM&A Report is prepared by FTS. 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 February 2020 to 22 May 2020.

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

Section 7: Conclusions and Recommendation



2. BASIC PROJECT INFORMATION

2.1 Project Organizations

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

Table 2-1 Key Personnel Contact of the Contract

Party	Position	Name	Telephone	Fax
Engineer's Representative (MMHK)	Resident Engineer	Mr. Jason Chan	2585 8595	2827 1823
	Project Engineer	Ms. Sunny Zhao	2828 5908	2827 1823
Independent Environmental Checker (RHK)	Independent Environmental Checker	Mr. YH Hui	3465 2888	3465 2899
Contractor (CIWE)	Site Agent	Mr. KO Leung	2508 0983	2508 0987
Environmental Team (FTS)	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:

March 2019	April 2020	May 2020
<ul style="list-style-type: none"> There was no construction work carried out in this month. 	<ul style="list-style-type: none"> Preparation Works of Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP 	<ul style="list-style-type: none"> Preparation Works of Dredging at Portion A / Zone 2B1, 2B2 and 2C1 in EP Dredging at Portion A / Zone 2B2 in EP

Note: According to the Contractor, the construction work under this Contract has been temporarily suspended since 1 February 2020 and was resumed on 30 March 2020.



3. EM&A REQUIREMENTS – ROUTINE IMPACT MONITORING

3.1 Monitoring Parameters

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

Table 3-1 Monitoring Parameters and Frequency

Parameters	Monitoring Frequency
<u>In-situ Measurement</u> 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)	3 days per week, at mid-flood and mid-ebb tides (except ³ detergent which shall be taken one day per month, at mid-flood and mid-ebb)
<u>Laboratory Analysis</u> ¹ Ammonia-N (in mg/L-N and UIA), Suspended Solids (SS), ³ BOD ₅ , ³ E.coli, ³ Synthetic Detergent; ² TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L)	36 hours interval was allowed between subsequent sets of measurement.

Notes:

- Ammonia measurements and samples were taken at SR4, SR12, C1A, C2A only;
 UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH₃-N, temperature, pH and salinity;
 Laboratory determined unionized ammonia was calculated from analysed NH₃-N from water samples and in-situ measurement of temperature, pH and salinity;
- Total Inorganic Nitrogen (TIN) measurements and samples were taken at SR5, G2, C1A and C2A only;
- BOD₅, E.coli and Synthetic Detergent samples were taken at SR4, SR12, C1A, C2A only.



Table 3-2 Water Quality Monitoring Parameters

ID	In-situ Measurement							Laboratory Analysis					
	pH	Temperature	Salinity	Turbidity	Dissolved Oxygen / Dissolved Oxygen%	NH ₃ -N / UIA	TIN (NH ₃ -N, NO ₂ & NO ₃)	Suspended Solids	BOD ₅	E. coli	NH ₃ -N / UIA	Synthetic Detergent	TIN (NH ₃ -N, NO ₂ & NO ₃)
SR4	○	○	○	○	○	○		○	○	○	○	○	
SR5	○	○	○	○	○	○	○	○	○	○	○	○	○
SR12	○	○	○	○	○	○		○	○	○	○	○	
SR13	○	○	○	○	○	○		○					
G2	○	○	○	○	○		○	○					○
C1A	○	○	○	○	○	○	○	○	○	○	○	○	○
C2A	○	○	○	○	○	○	○	○	○	○	○	○	○

Note:

1. UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH₃-N, temperature, pH and salinity; laboratory determined unionized ammonia was calculated from analysed NH₃-N from water samples taken and in-situ measurement of temperature, pH and salinity.

3.2 Monitoring Locations

- 3.2.1 Referring to the Proposal for Temporary Suspension of Impact Water Quality Monitoring (0394_13_ED_0326F) which was submitted to EPD in August 2016 with no objection was received from EPD; removal of routine water quality monitoring stations at SR1 was effective on 24 December 2016.
- 3.2.2 Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of routine water quality monitoring stations at SR6, SR7, SR8, SR9, SR10 and SR11 was effective from 23 January 2017. Due to removal of some sensitive receivers in routine water quality monitoring, gradient stations G3, G5 and G6 were also be removed and gradient stations G1 and G4 replaced the previous control stations C1, C2 and C3 as C1A and C2A with reference to the approved proposal (0394_13_ED_0332I) which was effective from 23 January 2017.
- 3.2.3 Referring to the *Proposal of Scale down for the Water Quality Monitoring Stations during High Spots Removal at Sub-zone Z2B1, Z2B2 and Z2C1* (Ref.: 0394/13/ED/0370G), routine water quality monitoring stations at SR2 (Casam, Gazetted Beach) and SR3 (Approach, Gazetted Beach) were removed. The proposal was justified by ET and verified by IEC, also no objection was received from other parties. The proposal was approved by EPD as per EPD’s memo (Ref. (6) in Ax(1) to EP2/N3/C/57 Pt.10) dated 20 August 2019. The removal of the water quality monitoring at SR2 and SR3 was effective from 23 August 2019.



3.2.4 Impact water quality monitoring was conducted at 7 locations, including 4 sensitive receivers (SR4, SR5, SR12 and SR13), 1 gradient station (G2) and 2 control stations (C1A and C2A). The locations of the stations are also shown in **Figure 2**.

3.3 Results and Observations

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

3.3.2 During the monitoring period, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Strong Monsoon Signal, Rainstorm Warning Signal and Thunderstorm Warning were reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality. The above conditions may affect monitoring results. Summary of weather condition is provided in **Appendix I**.

3.3.3 Routine impact water quality monitoring programme was suspended between 25 January and 28 January 2020 due to the Chinese New Year Holidays.

3.3.4 According to the information provided by the Contractor, the construction work under this Contract has been temporarily suspended since 1 February 2020. The water quality monitoring programme (including routine water quality impact monitoring) was therefore proposed to be suspended from 21 February 2020 and was resumed on 30 March 2020. The proposal for temporary suspension of water quality monitoring works during no marine construction work period was agreed by EPD on 20 February 2020 (Ref: Ax(1) to EP2/N3/C/57 Pt.10).

3.3.5 Exceedances were recorded for TIN (in-situ & lab) and Suspended solid. Number of exceedances recorded in the reporting quarter at each impact station is summarized in **Table 3-3 and 3-4**.

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

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH ₃ -N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	1	2	1	2
	Limit	0	0	0	0	0	0	-	-	-	-	10	9	10	9
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	1	2	3	
	Limit	0	0	0	0	0	0	0	0	0	0	10	9	19	



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

Station	Exceedance Level	Suspended Solids		BOD ₅		<i>E. coli</i>		NH ₃ -N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	1	0	0	0	0	0	0	0	0	0	0	-	-	0	1
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	1	2	1	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	10	9	10	9
SR12	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
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	
	Limit	0	1	0	0	0	0	0	0	0	0	0	0	10	9	20	

3.3.6 During the reporting period, 3 AL and 19 LL exceedances for TIN (in-situ); 1 LL exceedance for Suspended Solids; 3 AL and 19 LL exceedances for TIN (lab) were recorded.

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



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

4.1 Monitoring Parameters

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

4.1.2 In-situ NH₃-N at WSD Flushing Water Intake is measured every 20 minutes, 24 hours a day 7 days a week during works.

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

Table 4-1 24-hr Water Quality Monitoring Parameters

ID	Description	Parameters				
		Temperature	Turbidity	DO (mg/L)	DO%	NH ₃ -N
SR4	Tsuen Wan, WSD Flushing Water Intake	○	○	○	○	○
SR5	Ma Wan, Fish Culture Zone	○	○	○	○	
SR12	Tsing Yi, WSD Flushing Water Intake	○	○	○	○	○
SR13	EMSD Cooling Water Intake for Kwai Chung Hospital	○	○	○	○	

4.2 Monitoring Locations

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

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

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



4.3 Results and Observations

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

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

4.3.3 According to the information provided by the Contractor, the construction work under this Contract has been temporarily suspended since 1 February 2020. The water quality monitoring programme (including 24-hour water quality monitoring) was therefore proposed to be suspended from 21 February 2020 and was resumed on 30 March 2020. The proposal for temporary suspension of water quality monitoring works during no marine construction work period was agreed by EPD on 20 February 2020 (Ref: Ax(1) to EP2/N3/C/57 Pt.10).

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

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

Station	Exceedance Level	Turbidity	DO	NH ₃ -N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

4.3.5 No exceedance was recorded in the reporting quarter.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1 Site Inspections

5.1.1 The Environmental Team conducted 8 site inspections in the reporting period. No particular observation was recorded in the reporting period.

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

5.2 Implementation Status of Environmental Mitigation Measures

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

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

5.3 Summary of Action taken

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

5.4 Advice on the Solid and Liquid Waste Management Status

5.4.1 According to the Contractor, no general refuse was disposed of site in the reporting period. Summary of waste flow table is detailed in **Appendix G**.

5.4.2 There was marine sediment Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit. The details can be referred to the **Table 5-1**.



Table 5-1 Waste Quantities of Dredging Works

Month	Marine Sediment Type	Quantity Generated in Reporting Period (m ³)	Cumulative-to Reporting Period (m ³)	Disposal / Dumping Ground
March 2020	Type 1 – Open Sea Disposal	0	1685700	NA
	Type 2 – Confined Marine Disposal	0	656930	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
April 2020	Type 1 – Open Sea Disposal	0	1685700	NA
	Type 2 – Confined Marine Disposal	0	656930	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
May 2020	Type 1 – Open Sea Disposal	0	1685700	NA
	Type 2 – Confined Marine Disposal	280	657210	East of Sha Chau Contaminated Mud Pit
	Type 3 – Special Treatment / Disposal	0	1260	NA

Note:

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

5.5 Review of Action and Limit Level

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

5.6 Quarterly Review of Constructional Impacts on Water Quality

- 5.6.1 The construction impact on water quality was assessed by comparing the quarterly mean values with the relevant ambient or baseline mean values. Results showed that the mean values of TIN (in-situ & lab) and TSS at all clusters of monitoring stations were below the 1.3 x baseline value.
- 5.6.2 Data from ebb tide for TIN (lab) at cluster 1 station (i.e. SR5) were not further compared to their 1.3 x baseline data as SR5 were situated at upstream position at ebb tide and not subject to project impact. Comparison between quarterly mean and 1.3 x baseline mean is given in **Table 5.2**, while the summary of key statistical analysis is provided in **Table 5.3**. Details of key statistical analysis results are provided in **Appendix H**.
- 5.6.3 As 24-hr monitoring is to supplement the routine WQM activities (EM&A Manual Section 2.1.10) and there is no baseline value and/or control / gradient value for a meaningful statistical analysis. Thus no statistical analysis was done for 24-hr monitoring. Also, statistical analysis was not performed for some parameters without exceedances (DO (S&M), DO (B), Turbidity, Ammonia, UIA, BOD5, *E. coli* and Synthetic Detergent) in the reporting quarter.



Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		TIN – In-situ						TIN - lab					
		Wet Season Baseline	Wet Season Baseline x 1.3	Average	Mar 2020 - May 2020	Average	Larger than Baseline x 1.3	Wet Season Baseline	Wet Season Baseline x 1.3	Average	Mar 2020 - May 2020	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	0.60	0.78	NA	0.48	NA	NA	0.42	0.55	NA	0.47	NA	NA
	C2A	0.69	0.90		0.63			0.43	0.56		0.61		
Control (Ebb)	C1A	0.57	0.74	NA	0.52	NA	NA	0.40	0.52	NA	0.49	NA	NA
	C2A	0.65	0.85		0.65			0.42	0.55		0.64		
Gradient (Flood)	G2	0.56	0.73	NA	0.48	NA	NA	0.39	0.51	NA	0.47	NA	NA
Gradient (Ebb)	G2	0.48	0.62	NA	0.51	NA	NA	0.36	0.47	NA	0.49	NA	NA
Cluster 1 (Flood)	SR4	NA	NA	0.64	NA	0.51	no	NA	NA	0.48	NA	0.46	no
	SR5	0.49	0.64		0.51			0.37	0.48		0.46		
	SR12	NA	NA		NA			NA	NA		NA		
Cluster 1 (Ebb)	SR4	NA	NA	0.68	NA	0.52	no	NA	NA	0.46	NA	0.50	yes
	SR5	0.52	0.68		0.52			0.35	0.46		0.50		
	SR12	NA	NA		NA			NA	NA		NA		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1. NA: Not Applicable

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

2. With reference to Review of Action and Limit Levels (0394/13/ED/0175C), the baseline results of TIN (lab) in C1A, C2A, G2 and SR5 in dry season are multiplying the relevant wet/dry season ratio to obtain the wet season baseline values.

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		TSS					
		Baseline	1.3 x Baseline	Average	Mar 2020 - May 2020	Average	Larger than Baseline x _{1.3}
Control (Flood)	C1A	7	9	NA	5	NA	NA
	C2A	8	10		5		
Control (Ebb)	C1A	5	7	NA	5	NA	NA
	C2A	7	9		5		
Gradient (Flood)	G2	5	7	NA	4	NA	NA
Gradient (Ebb)	G2	5	7	NA	3	NA	NA
Cluster 1 (Flood)	SR4	7	9	10	5	4	no
	SR5	6	8		4		
	SR12	9	12		4		
Cluster 1 (Ebb)	SR4	5	7	7	5	4	no
	SR5	5	7		3		
	SR12	5	7		4		
Cluster 3 (Flood)	SR13	16	21	21	4	4	no
Cluster 3 (Ebb)	SR13	10	13	14	4	4	no

Notes:

1. NA: Not Applicable

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

Table 5-3 Summary of Statistical Analysis

Parameter	Cluster	Compared against	Results and Conclusions
TIN (lab)	Cluster 1	Quarterly Mean at Impact Stations (flood tide) against 1.3 x Baseline Level (flood tide)	Quarterly mean at Impact Station (flood tide) is not significantly different than 1.3 x Baseline mean (flood tide) ($p>0.05$), indicating the project impact is not significant.

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



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

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

Table 6-1 Environmental Complaints Log

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

Table 6-2 Cumulative Statistics on Complaints

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

Table 6-3 Cumulative Statistics on Successful Prosecutions

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



7. CONCLUSIONS

- 7.1.1 The dredging works was commenced on 23 April 2014. The EM&A programme was carried out in accordance with the EM&A Manual requirements. As per the EM&A Manual, water quality impact monitoring was conducted during the dredging works.
- 7.1.2 During the reporting period, exceedances were recorded for TIN (in-situ & lab) and Suspended Solids in the routine impact monitoring. No exceedance was recorded in 24-hr monitoring. Investigation found that the exceedances were not project related and were considered caused by influences in the vicinity of the stations or change in ambient conditions.
- 7.1.3 Eight (8) environmental site inspections were carried out weekly in the reporting period.
- 7.1.4 No environmental complaint was received and followed up by Environmental Team in the reporting period.
- 7.1.5 No notification of summons and prosecution was received in the reporting period.

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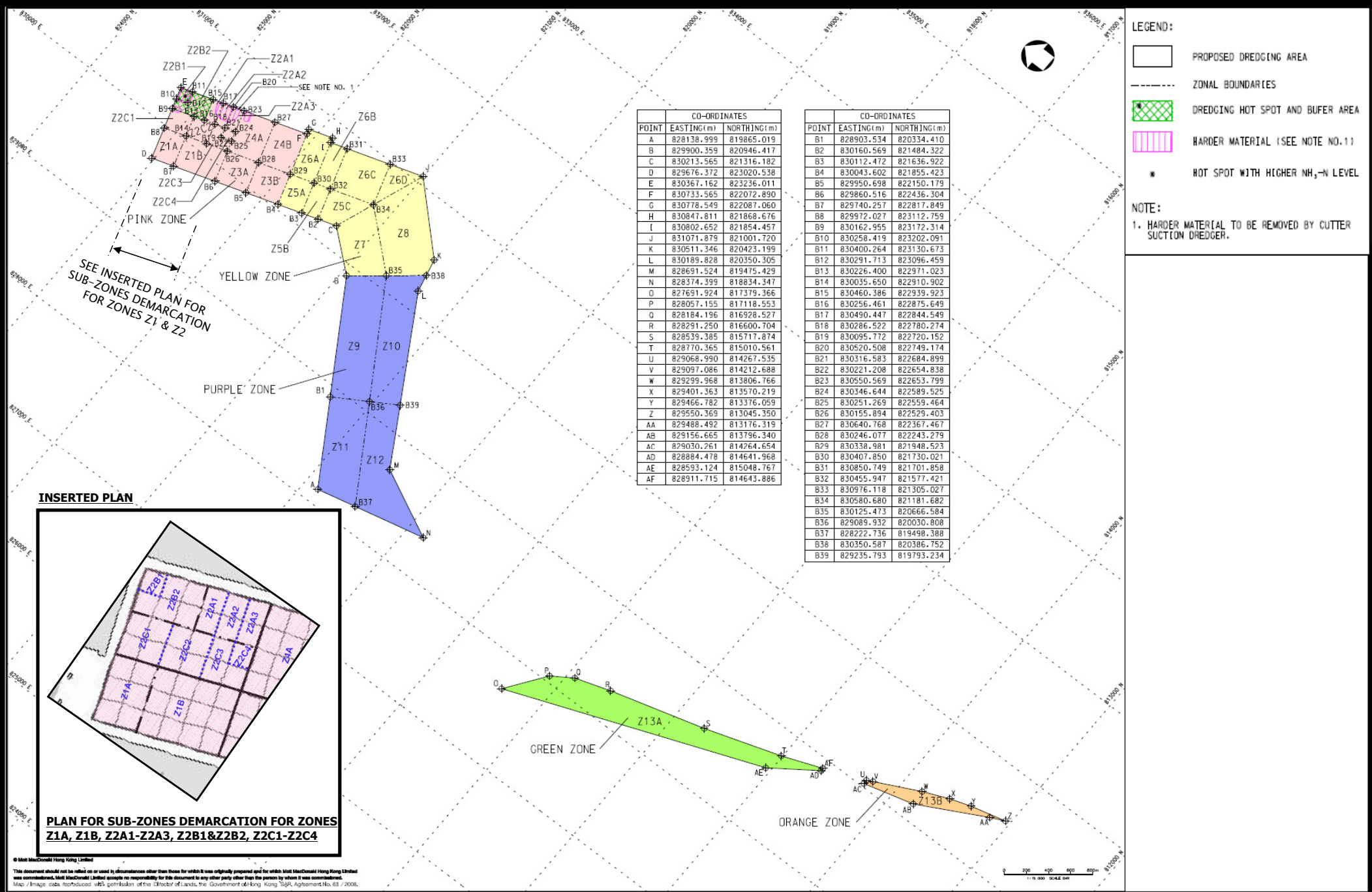
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Figure 1

Project General Layout



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

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

Environmental Permit No.:

EP-426/2011/A



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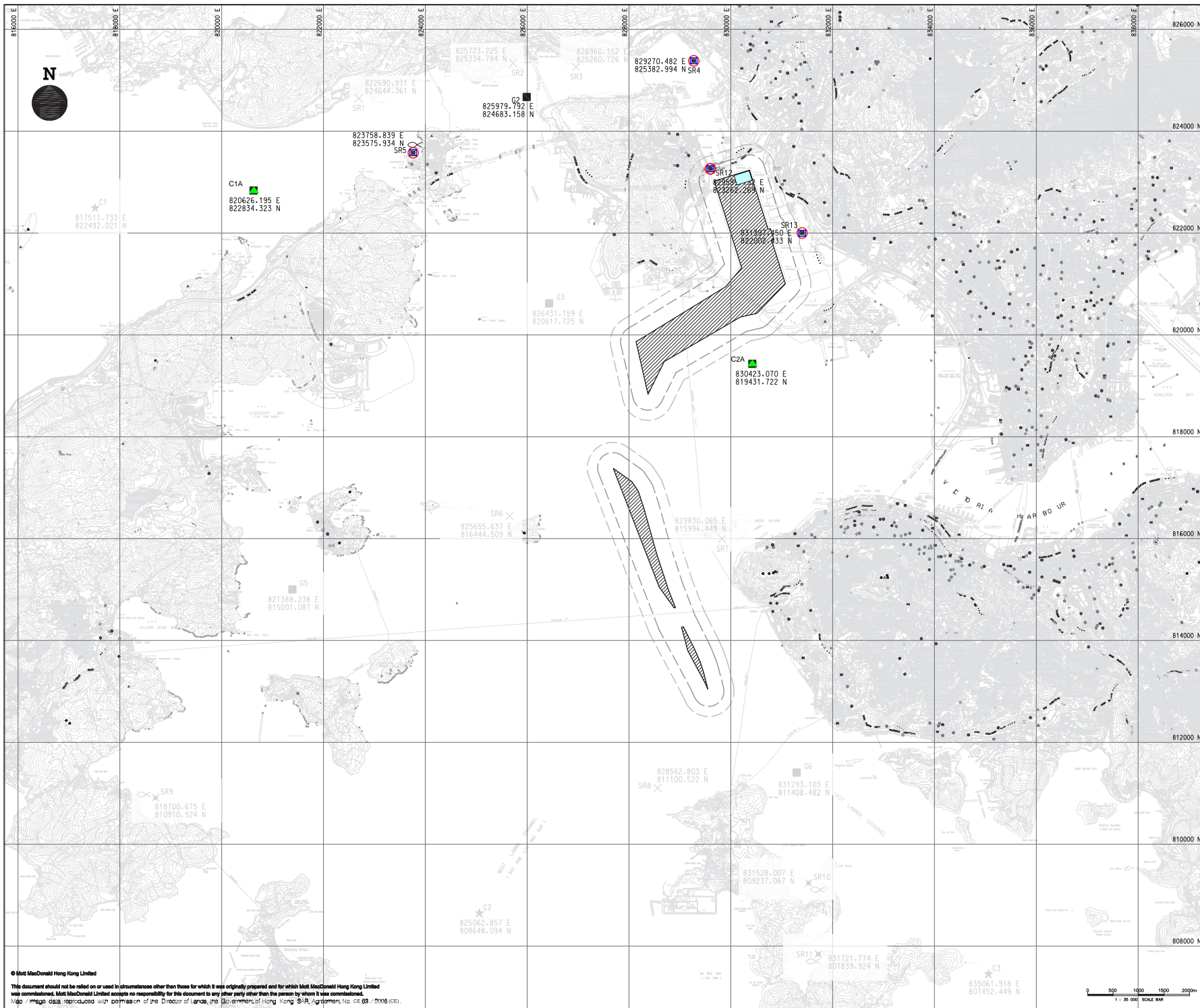
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Figure 2

Locations of Water Quality Monitoring Stations



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

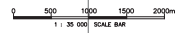
- LEGEND:
-  SITE BOUNDARY UNDER EP-426/2011A
 -  CURRENT SCOPE OF DREDGING WORK BOUNDARY
 -  ROUTINE IMPACT MONITORING STATION
 -  24 HOUR MONITORING STATION
 -  CONTROL STATION
 -  GRADIENT STATION

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

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

Title
 PROVISIONAL LOCATION OF WATER QUALITY MONITORING STATIONS

Scale at A1	Status	Rev
1:35000	TEN	2



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Figure 2 - Location of Water Quality Monitoring Stations

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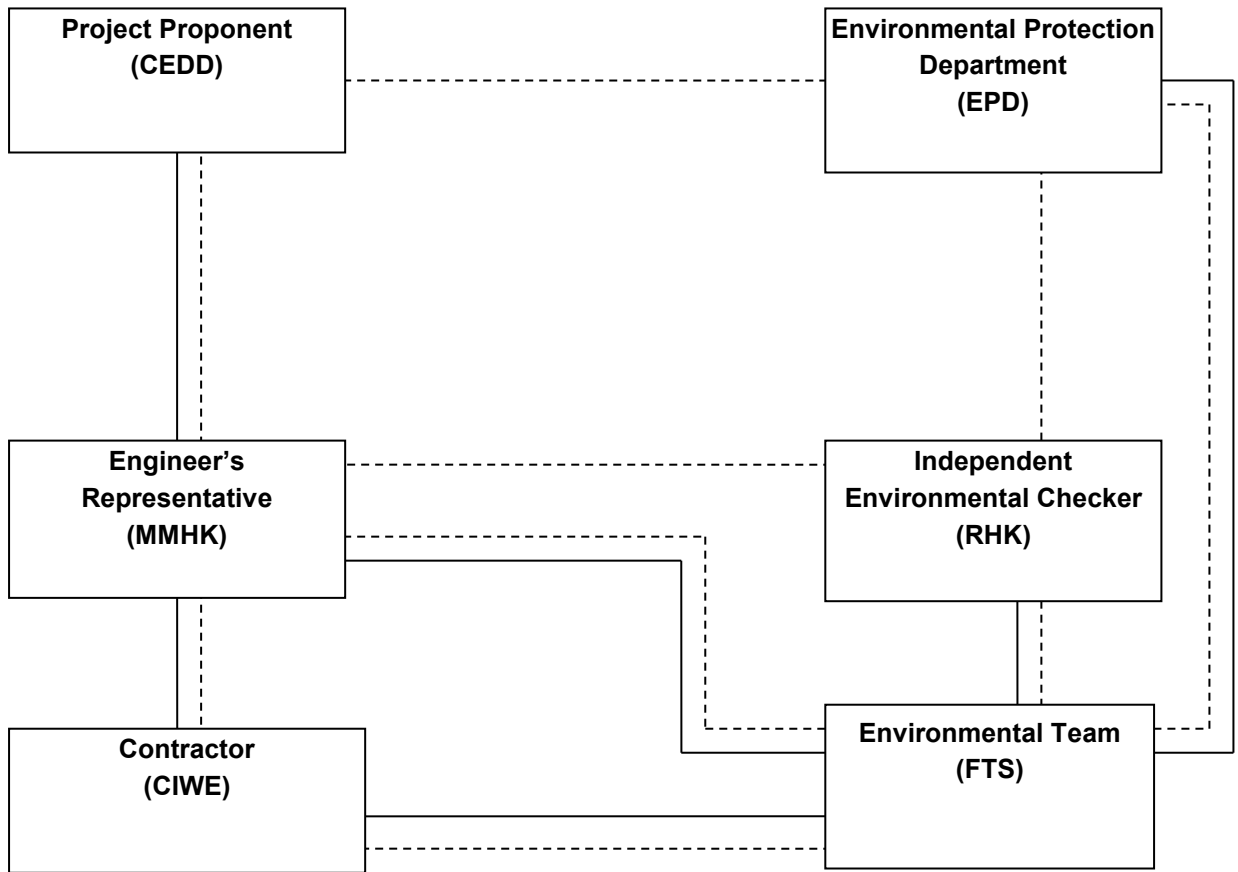
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Appendix A Project Organization Chart



Legend:
 — Line of Reporting
 - - - Line of Communication

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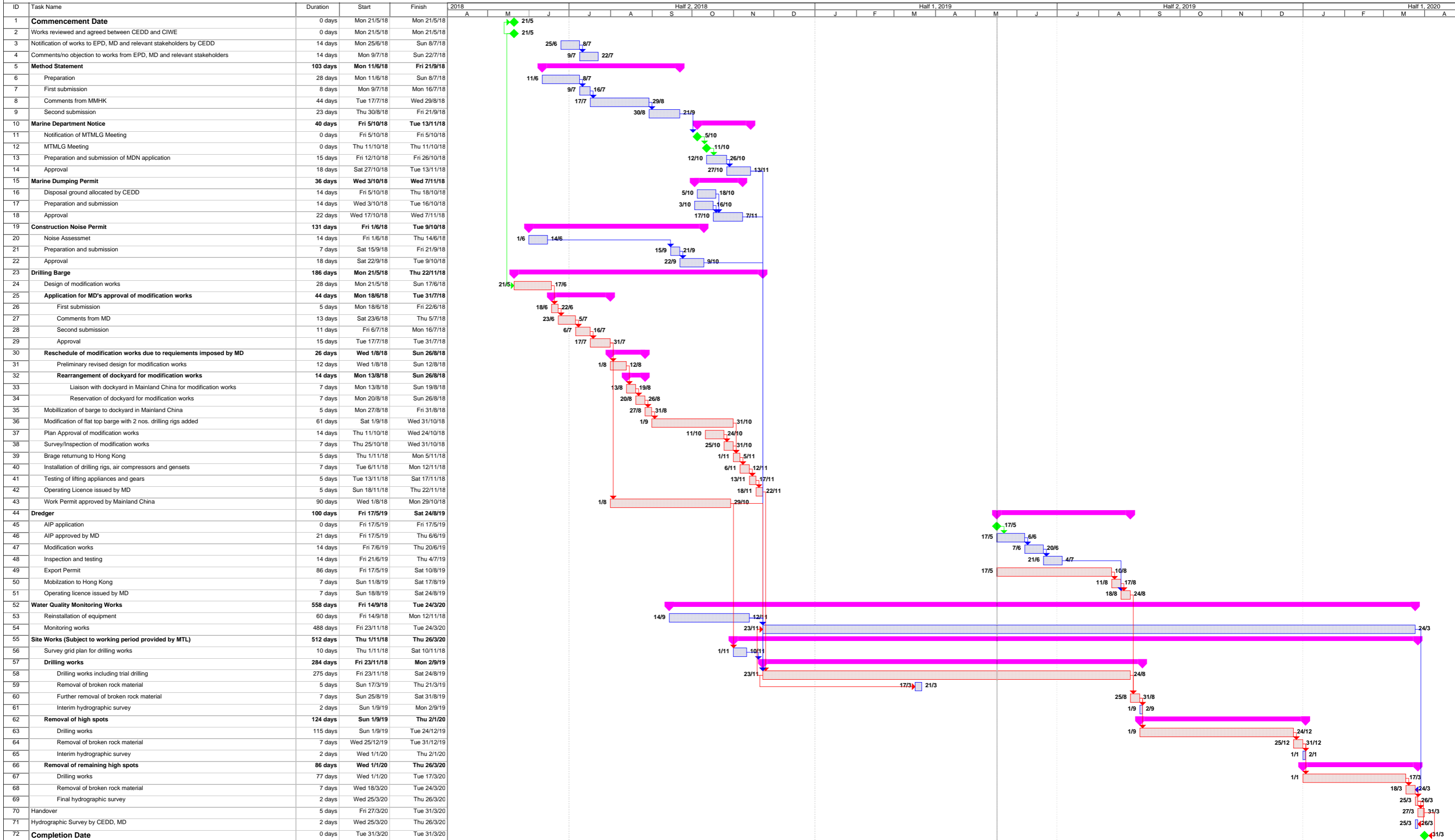
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Appendix B Construction Programme



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

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Appendix C Action and Limit Levels

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

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

Note:

* Or 120% of upstream control station at the same tide of the day

^ Or 130% of upstream control station at the same tide of the day

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

+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data

For DO measurement, non-compliance occurs when monitoring result is lower than the limits;

For TIN, UIA, NH₃-N, SS, BOD₅, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;

AL/LL of TIN and NH₃-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.

Dry Season: November to March

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

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

Note:

* Or 120% of upstream control station at the same tide of the day

^ Or 130% of upstream control station at the same tide of the day

According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (5%ile & 1 %ile determined from wet season baseline data for cluster 1 (4.68mg/L & 4.62mg/L) and cluster 2 (5.00mg/L & 4.82mg/L) are 5mg/L or below, thus 5mg/L was adopted as the AL & LL for the SR in FCZ)

+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data

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

For DO measurement, non-compliance occurs when monitoring result is lower than the limits;

For TIN, UIA, NH₃-N, SS, BOD₅, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;

AL/LL of TIN and NH₃-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.

Wet season: April to October

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

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

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

Dry Season: November to March.

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

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

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

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

Wet Season: April to October

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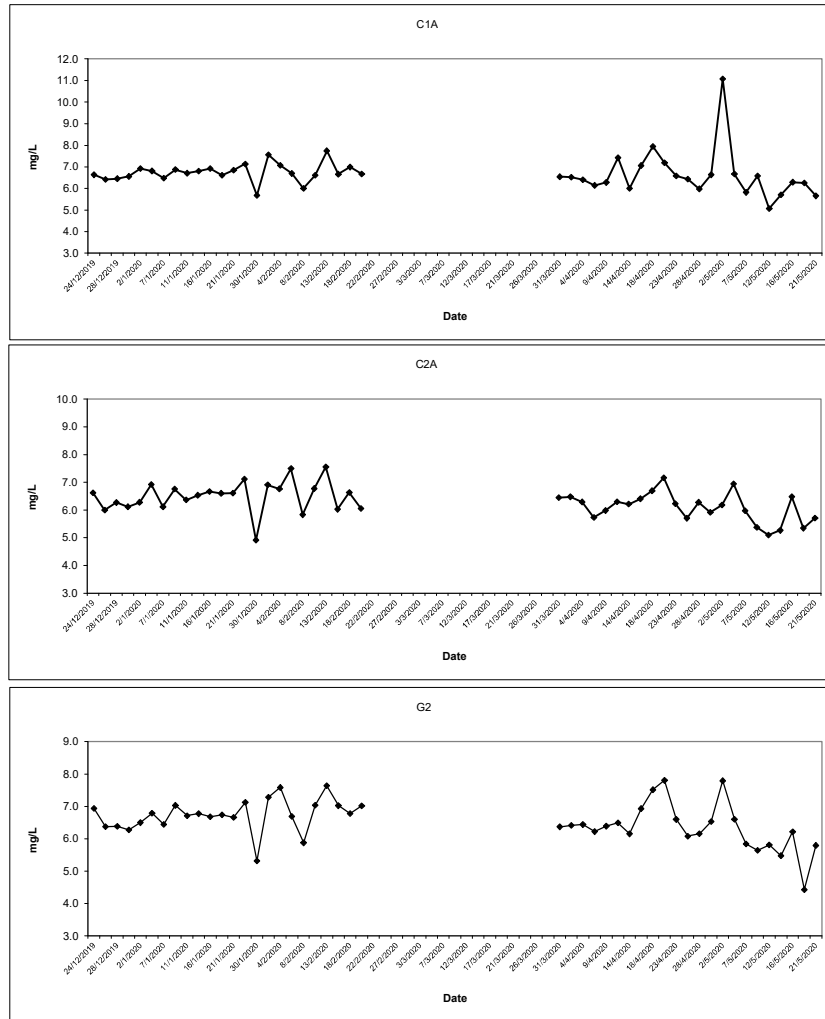
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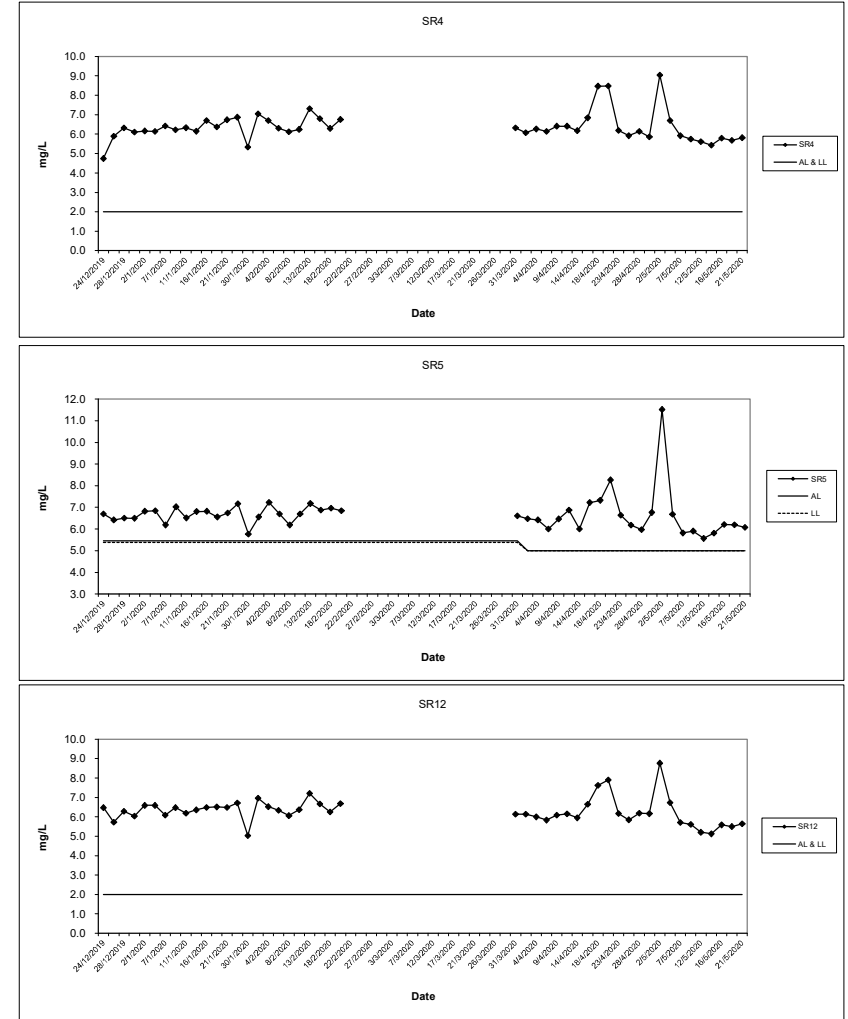
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Appendix D Graphical Presentation – Routine Impact Monitoring Results

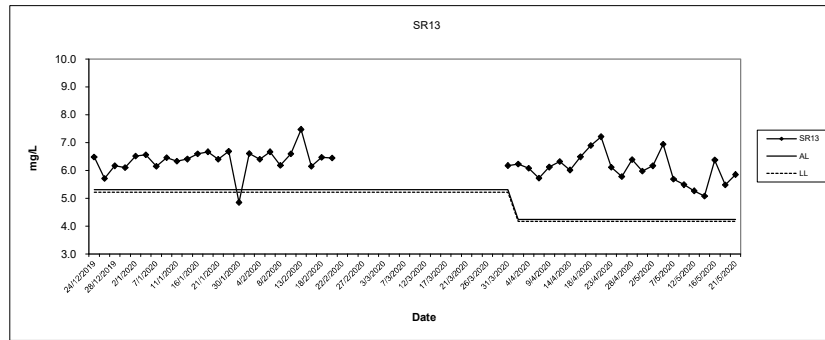
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



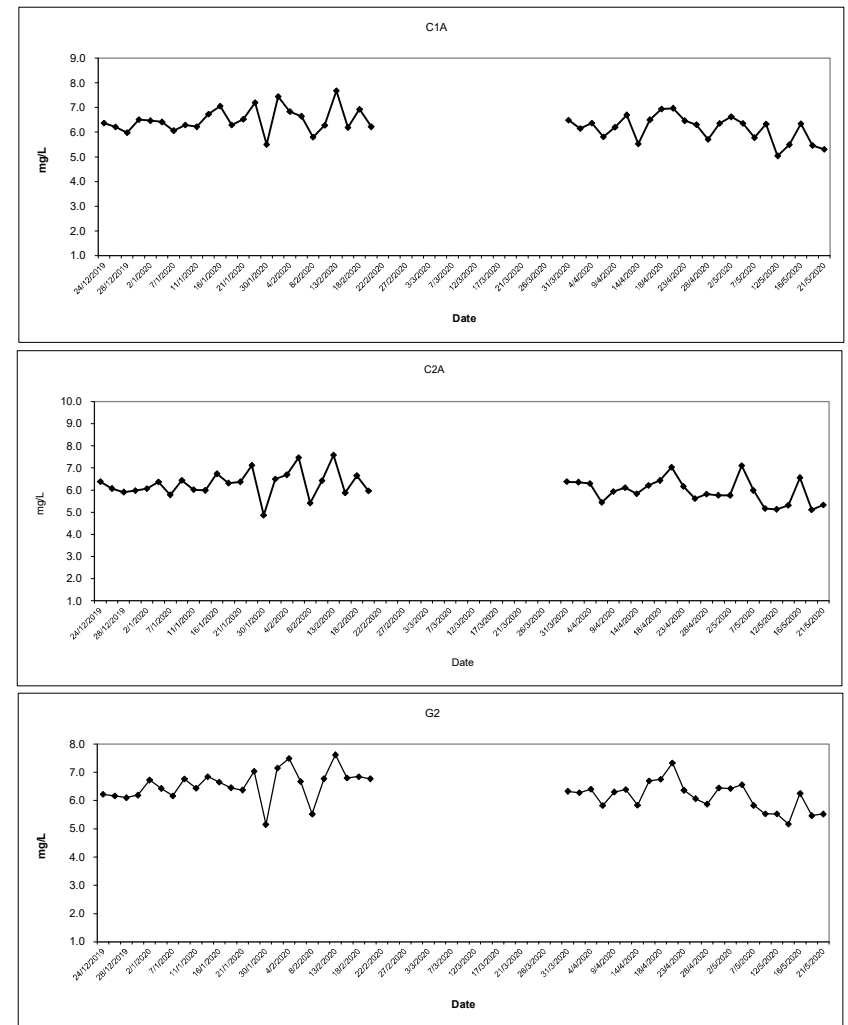
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



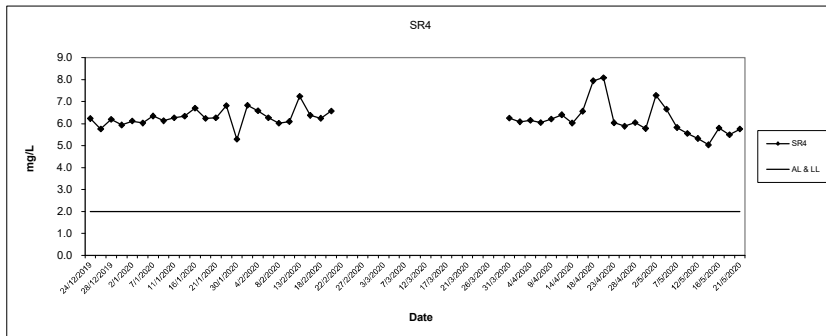
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



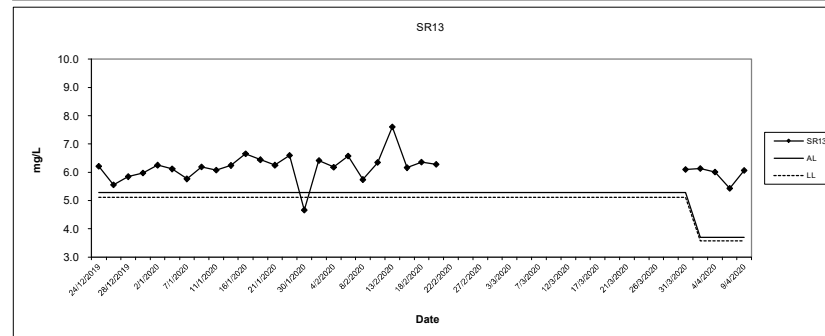
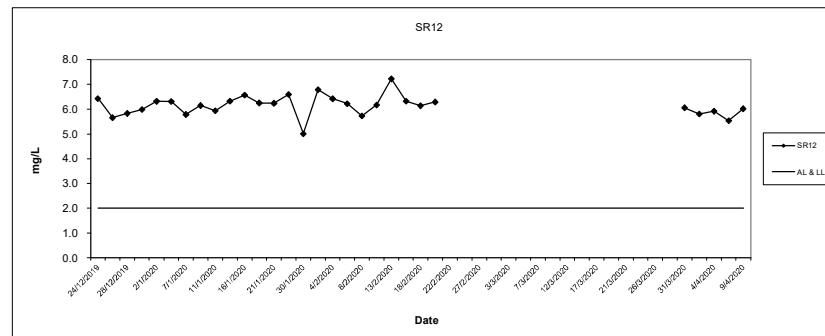
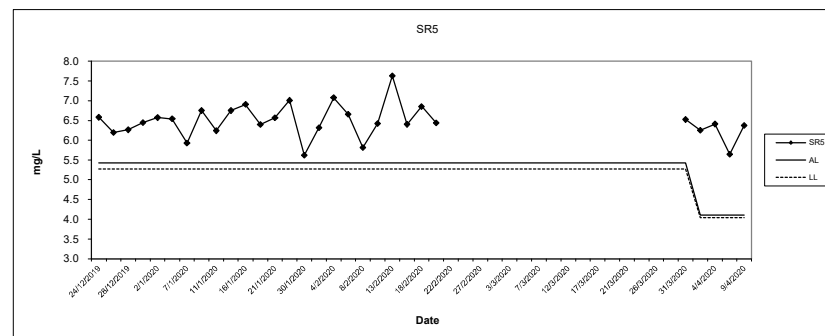
Dissolved Oxygen (Bottom) at Mid-Flood Tide



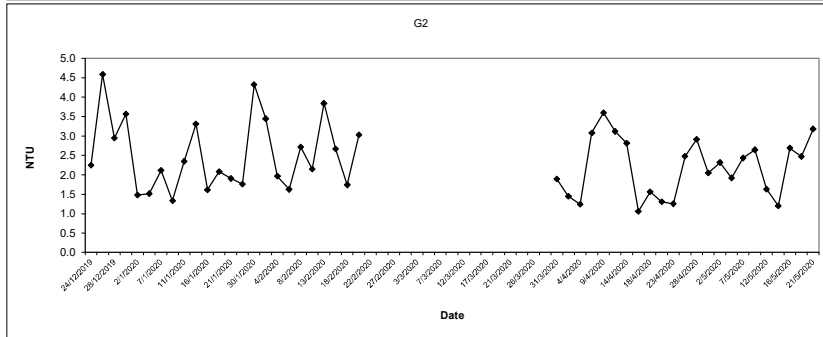
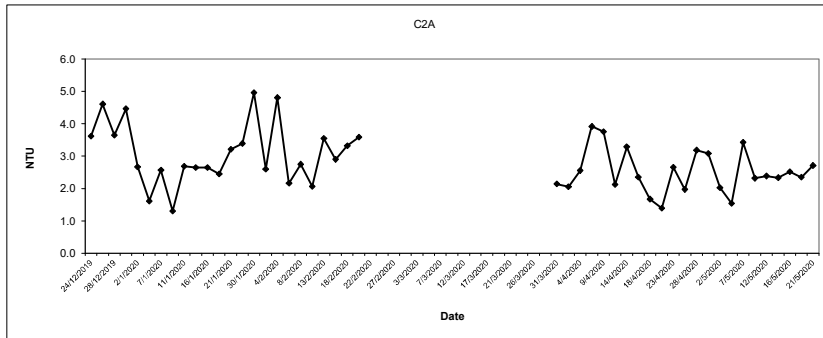
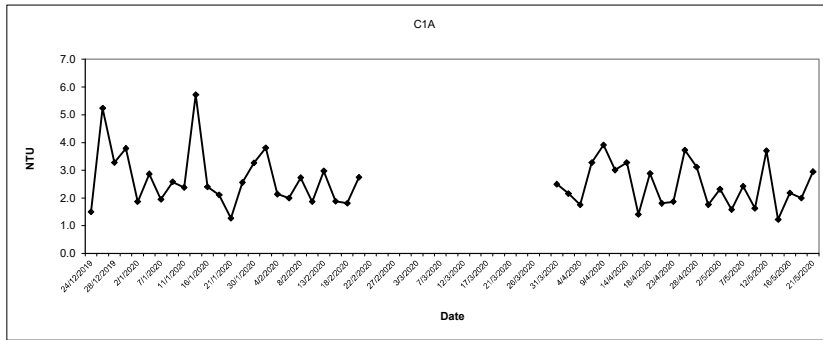
Dissolved Oxygen (Bottom) at Mid-Flood Tide



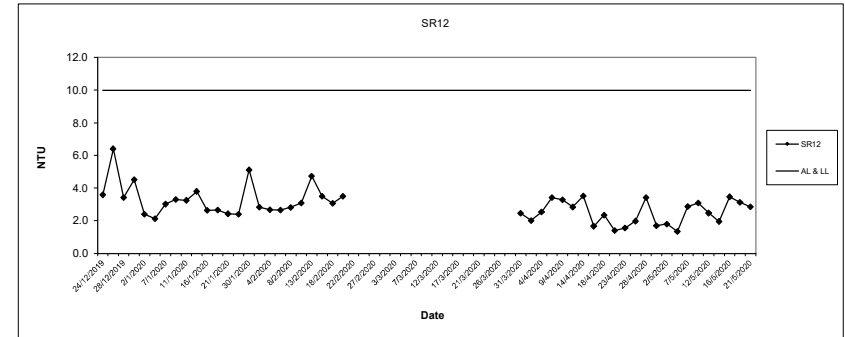
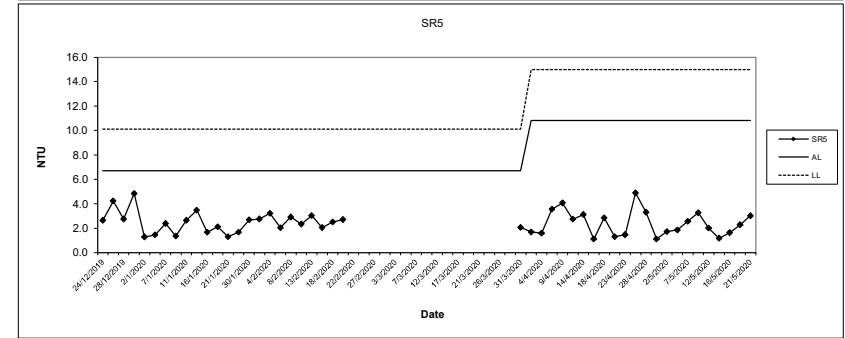
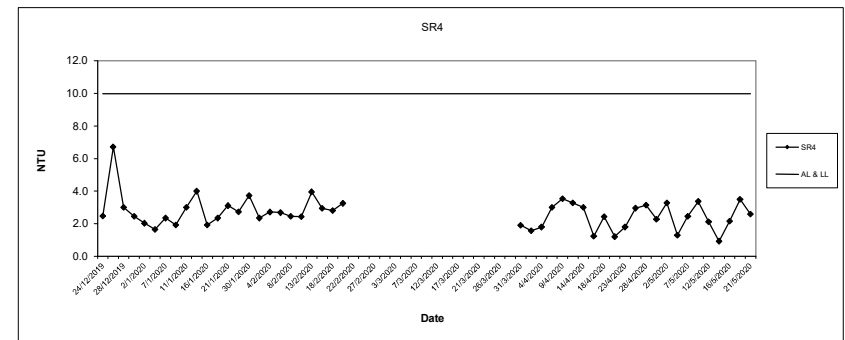
Dissolved Oxygen (Bottom) at Mid-Flood Tide



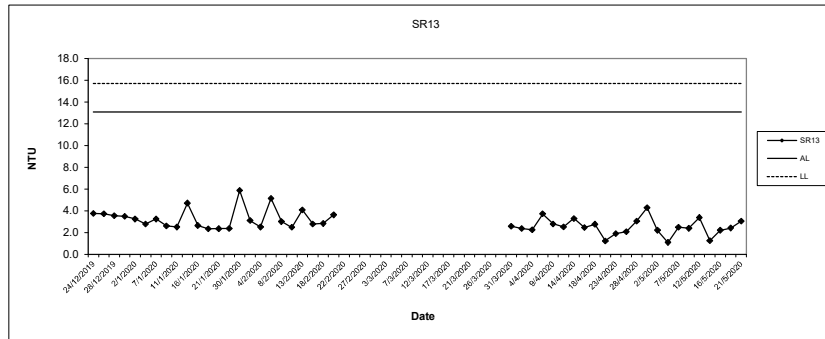
Turbidity (Depth average) at Mid-Flood Tide



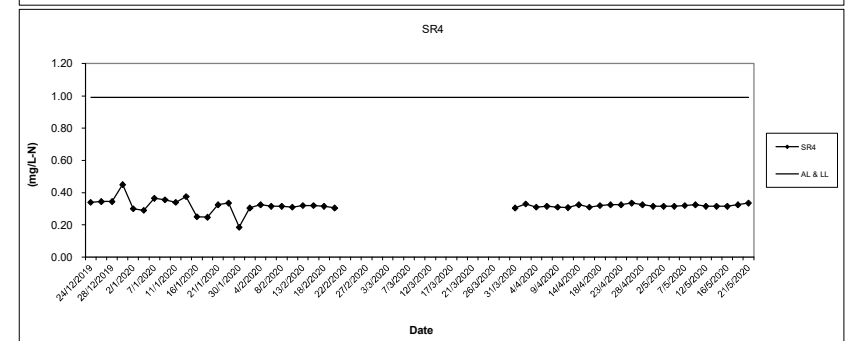
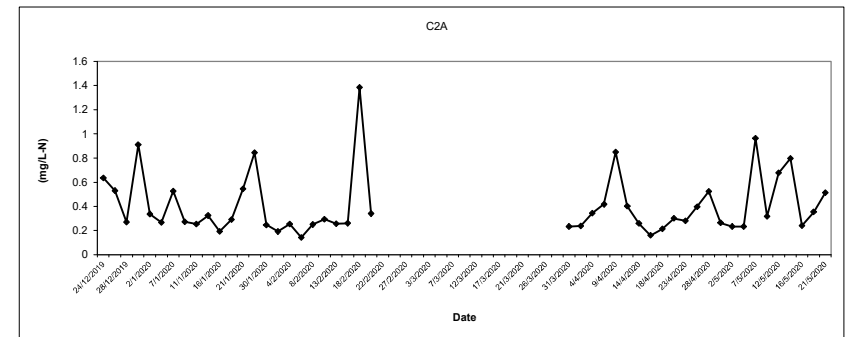
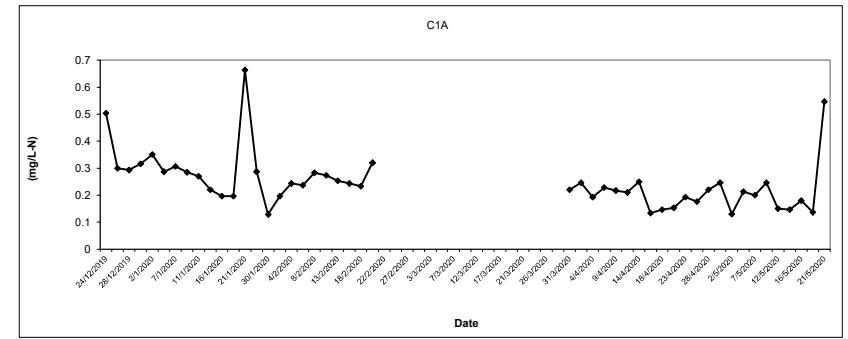
Turbidity (Depth average) at Mid-Flood Tide



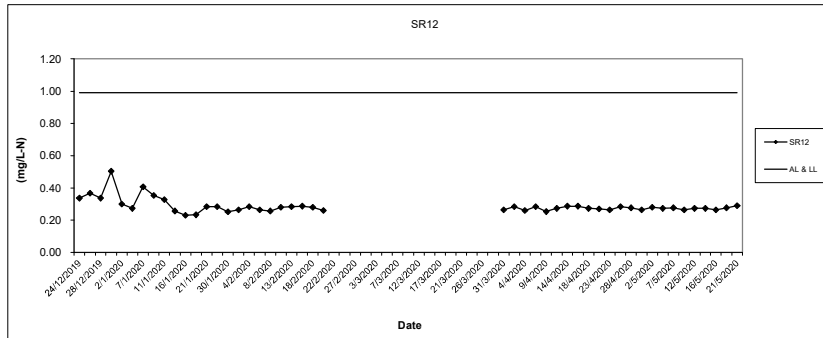
Turbidity (Depth average) at Mid-Flood Tide



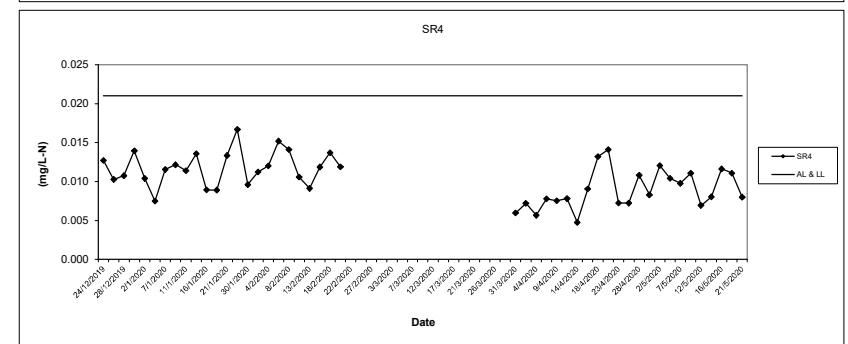
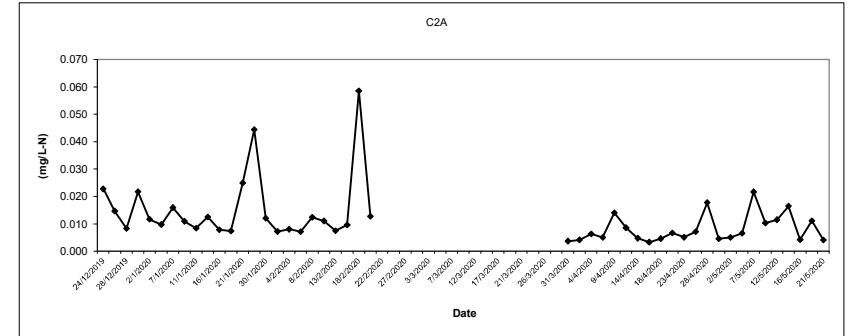
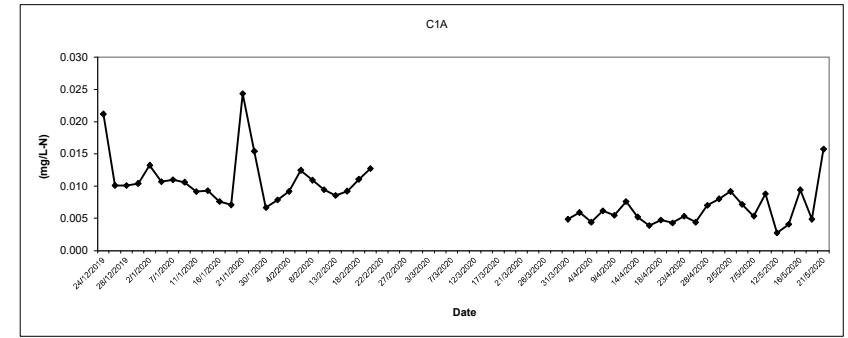
In-situ Ammonia (Depth average) at Mid-Flood Tide



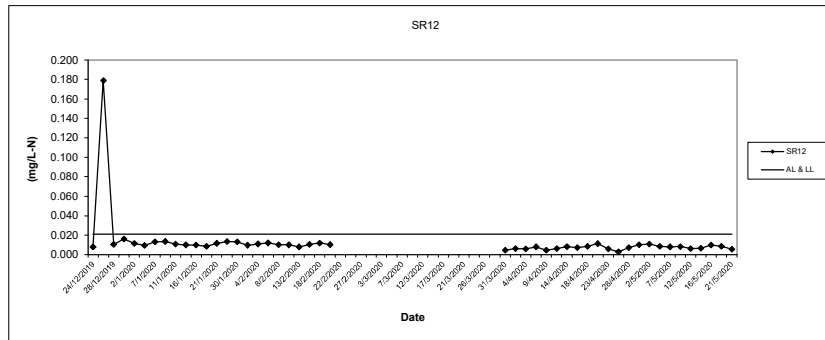
In-situ Ammonia (Depth average) at Mid-Flood Tide



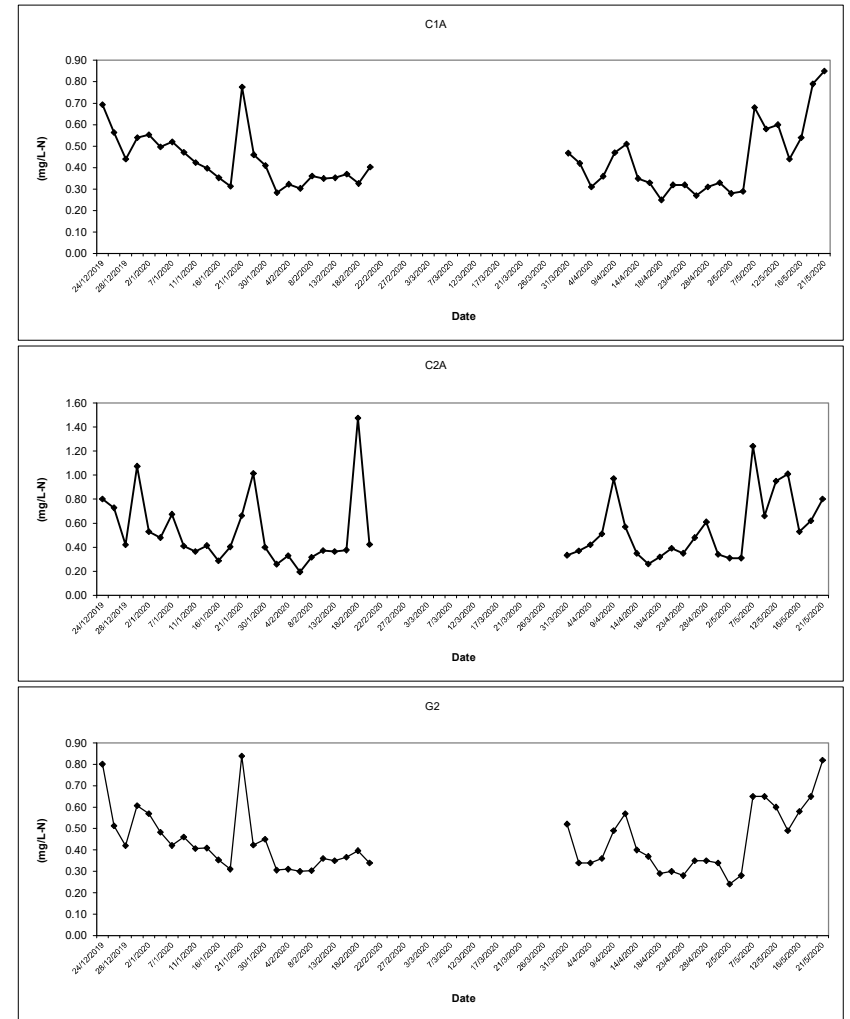
In-situ UIA (Depth average) at Mid-Flood Tide



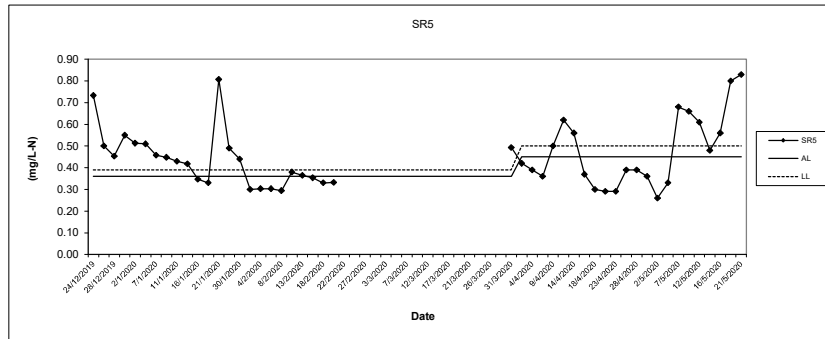
In-situ UIA (Depth average) at Mid-Flood Tide



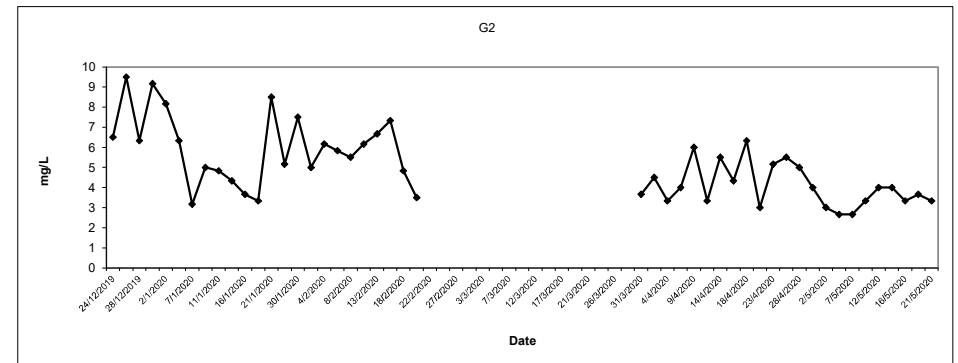
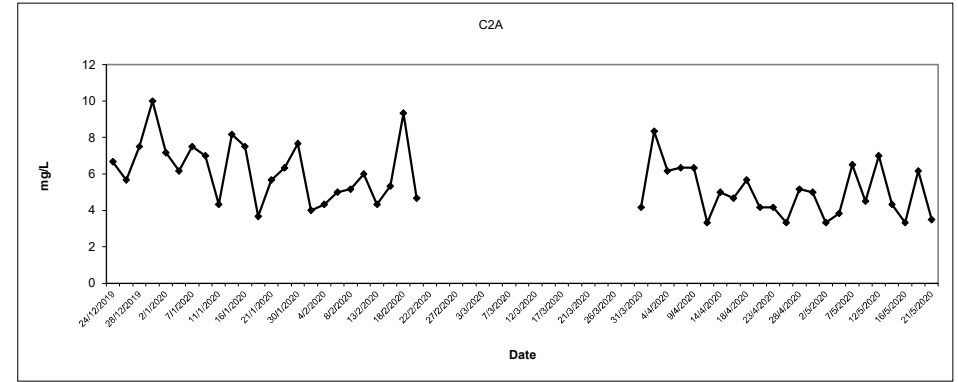
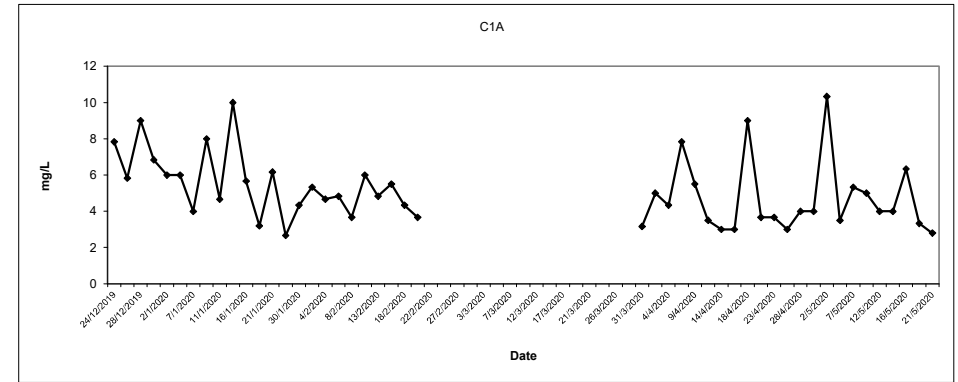
In-situ TIN (Depth average) at Mid-Flood Tide



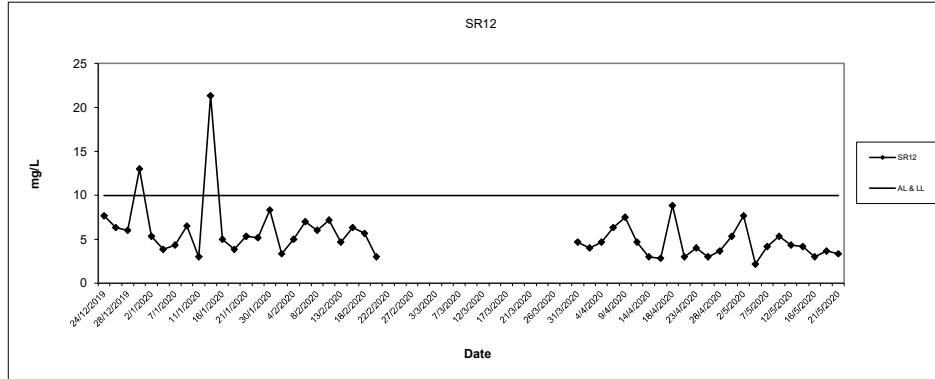
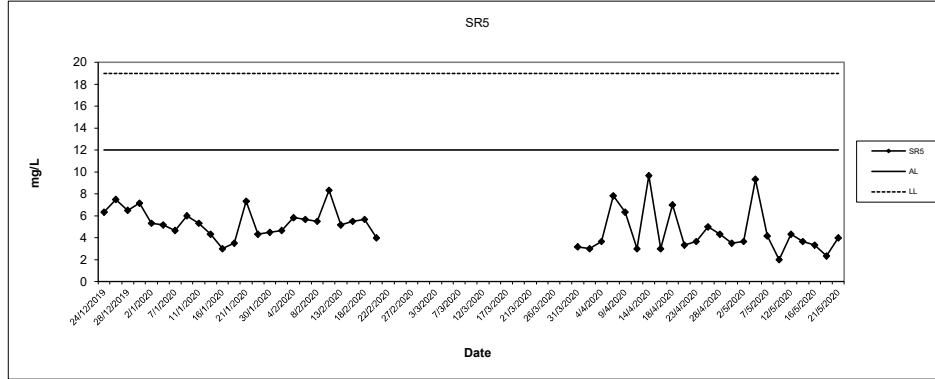
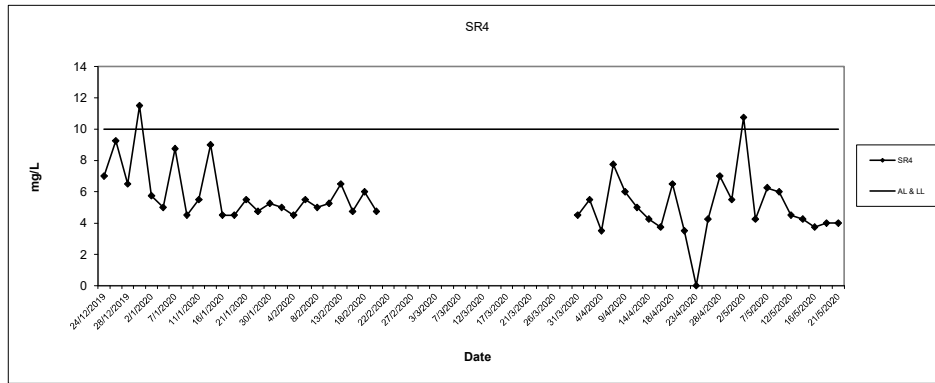
In-situ TIN (Depth average) at Mid-Flood Tide



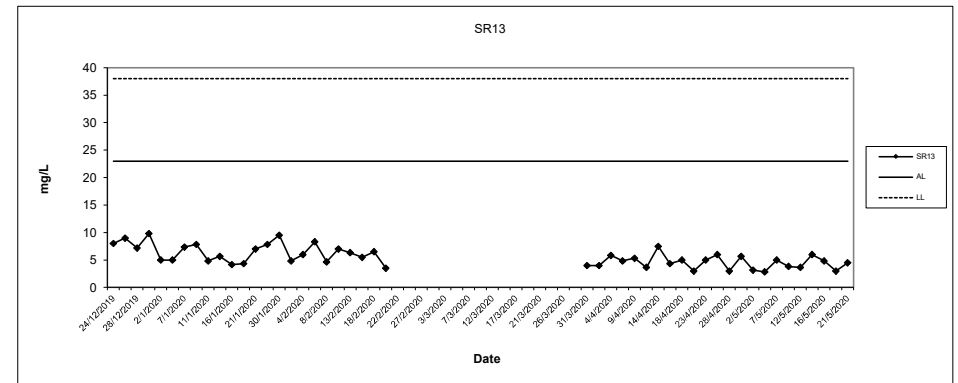
Total Suspended Solids (Depth average) at Mid-Flood Tide



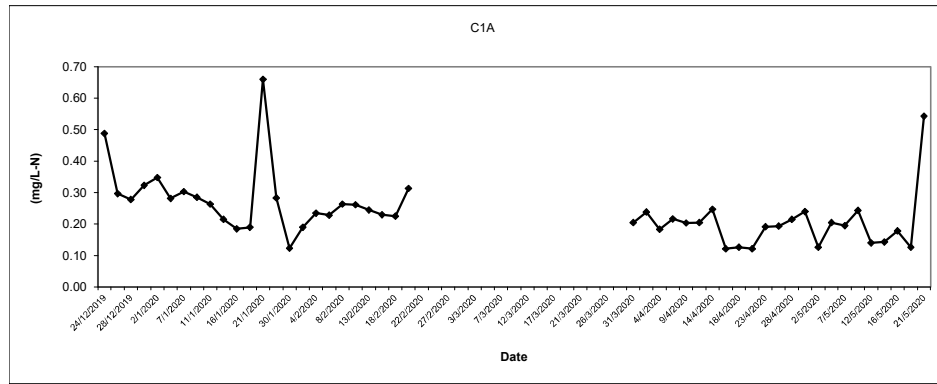
Total Suspended Solids (Depth average) at Mid-Flood Tide



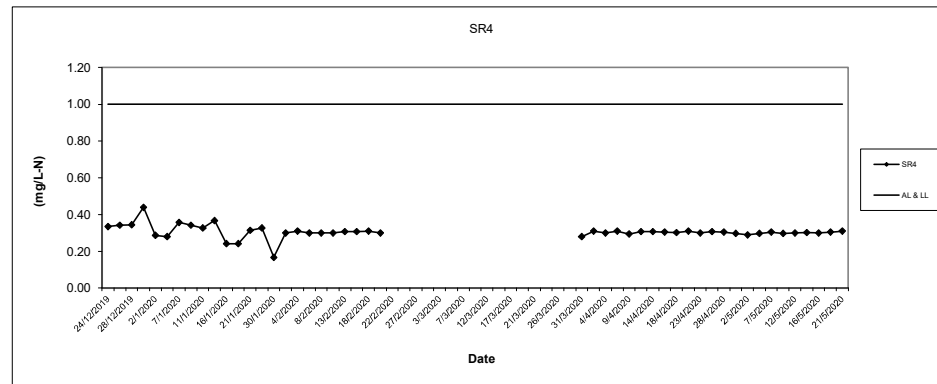
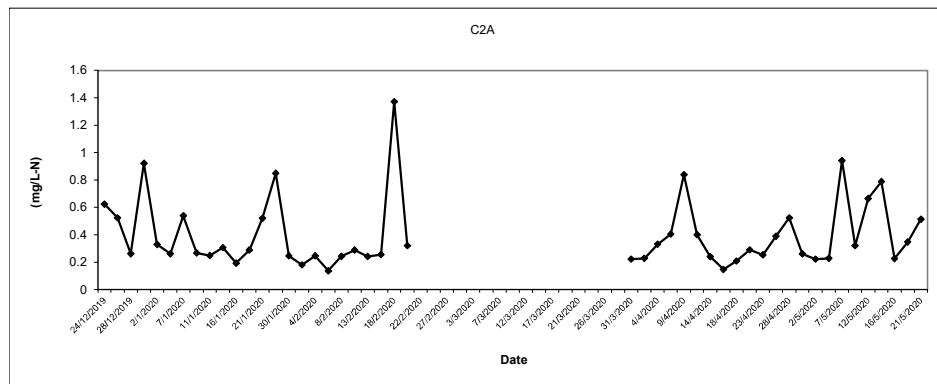
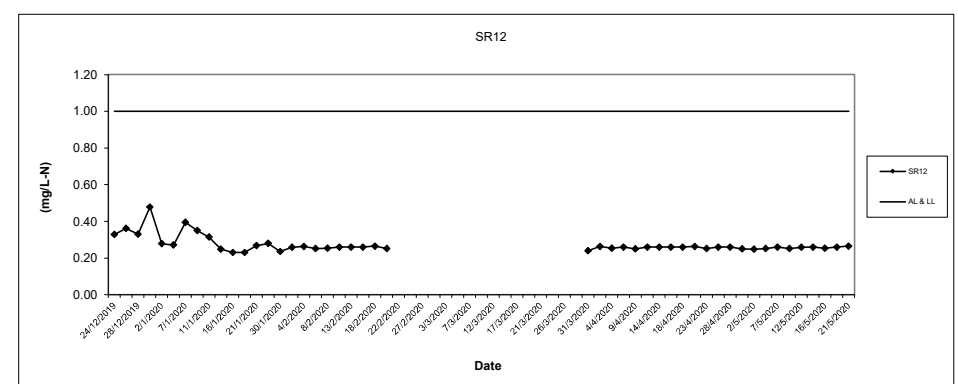
Total Suspended Solids (Depth average) at Mid-Flood Tide



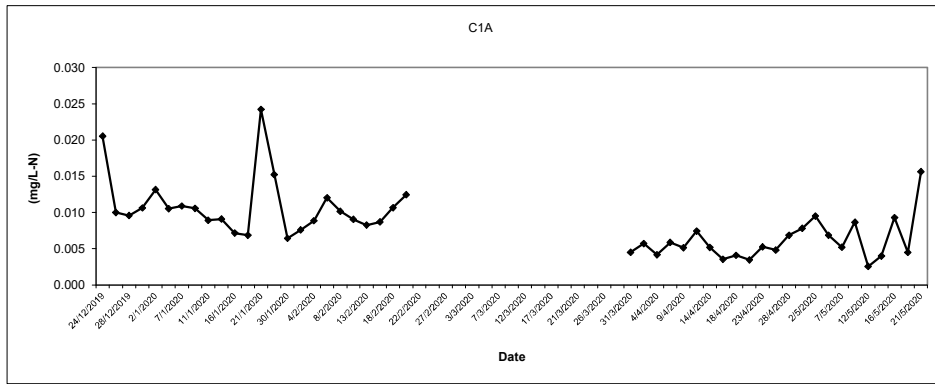
Ammonia Nitrogen (Depth average) at Mid-Flood Tide



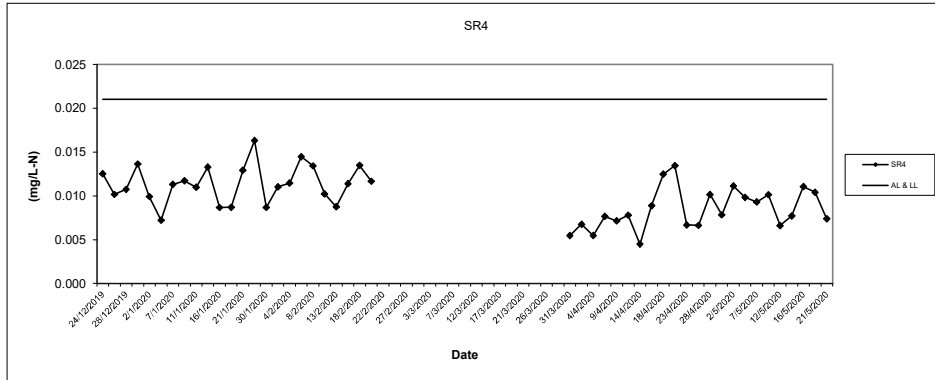
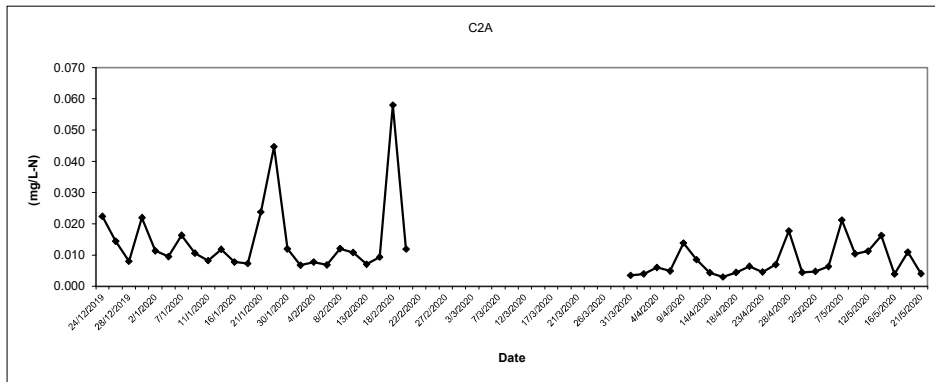
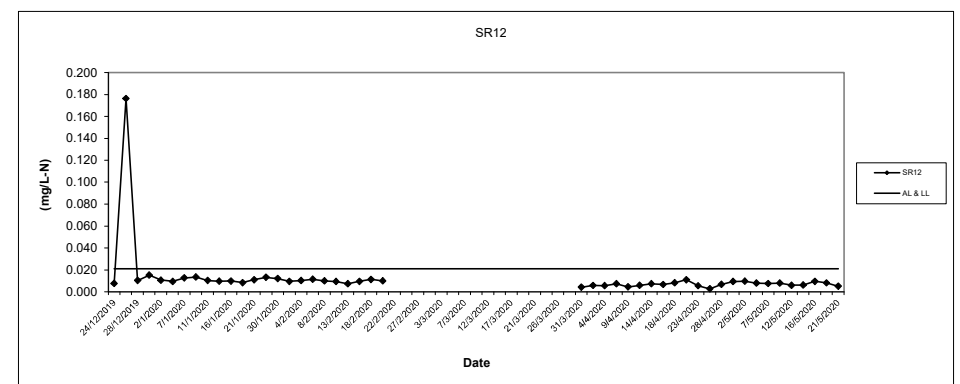
Ammonia Nitrogen (Depth average) at Mid-Flood Tide



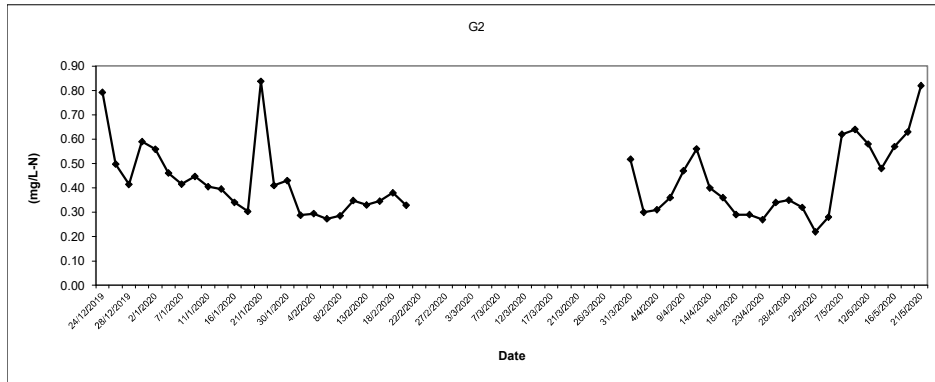
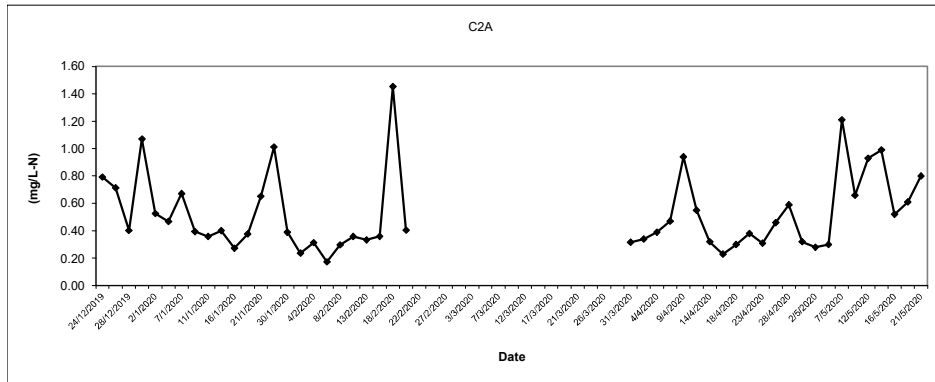
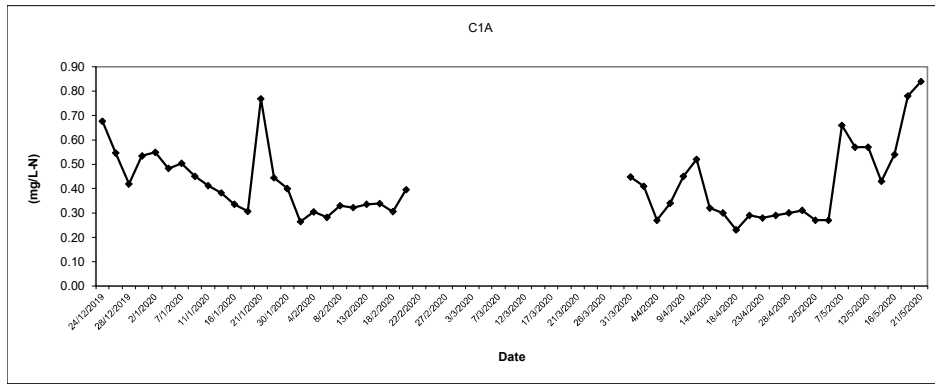
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide



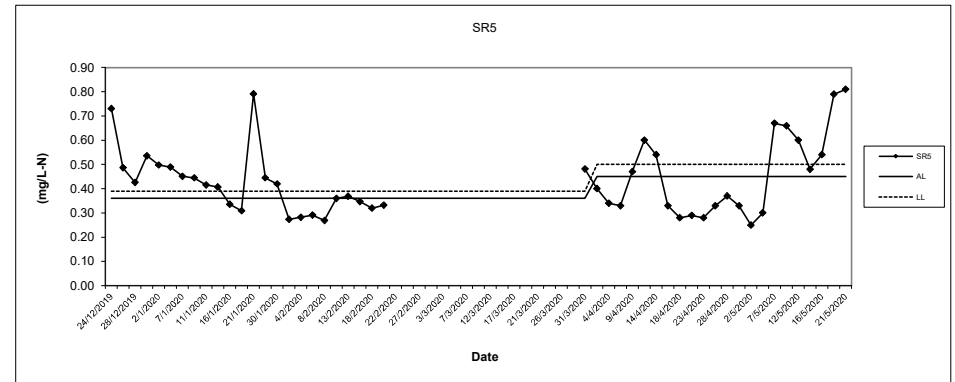
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide



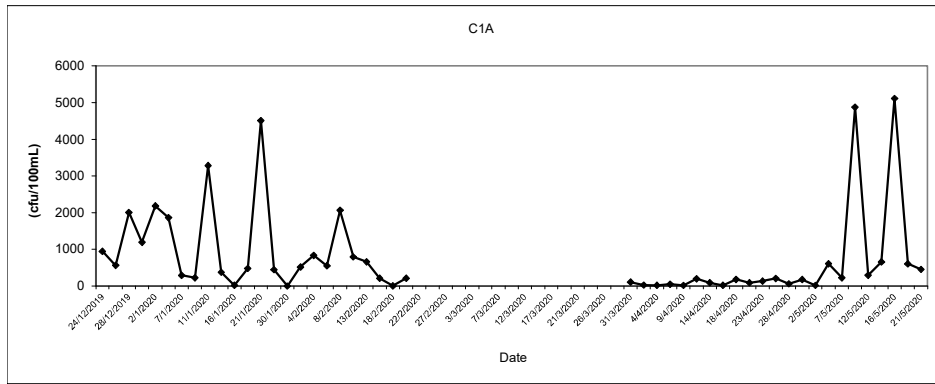
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



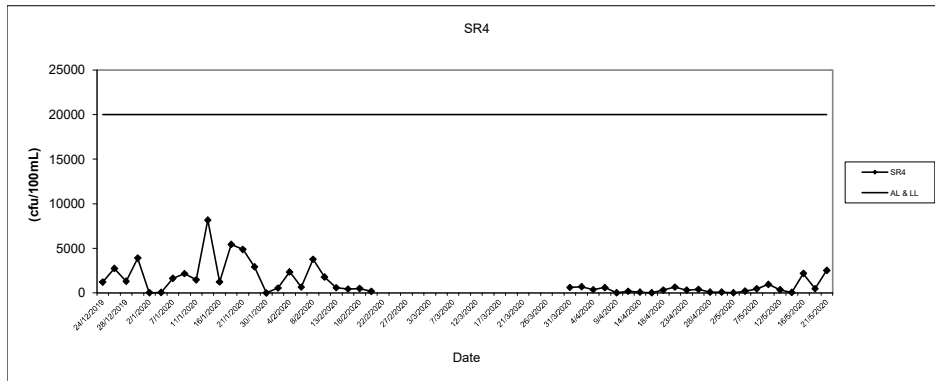
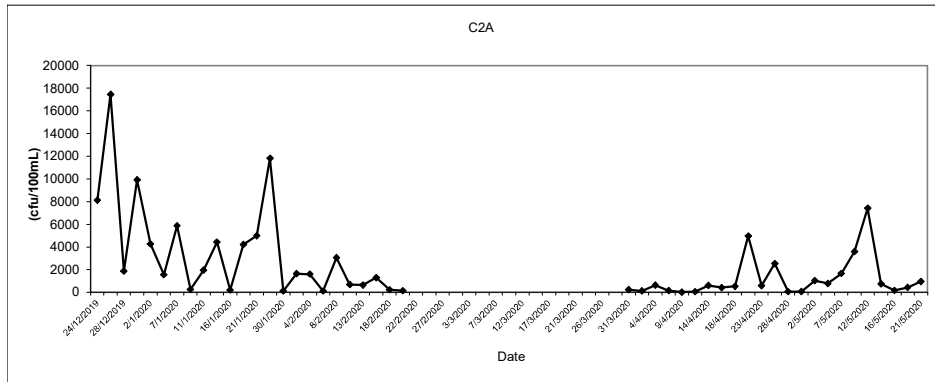
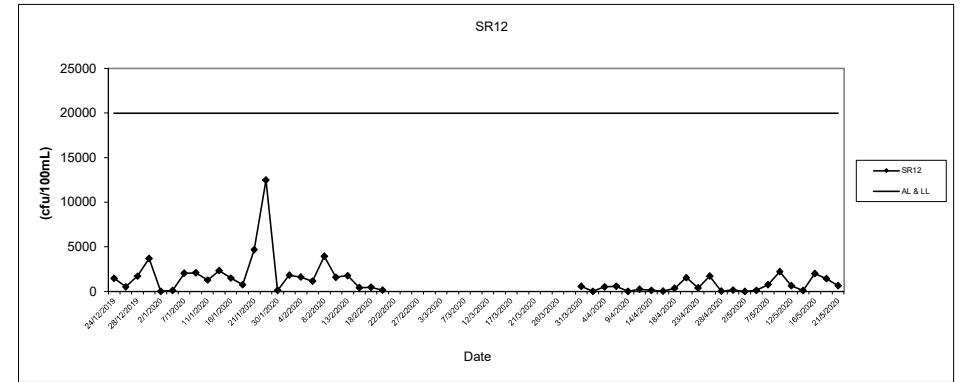
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



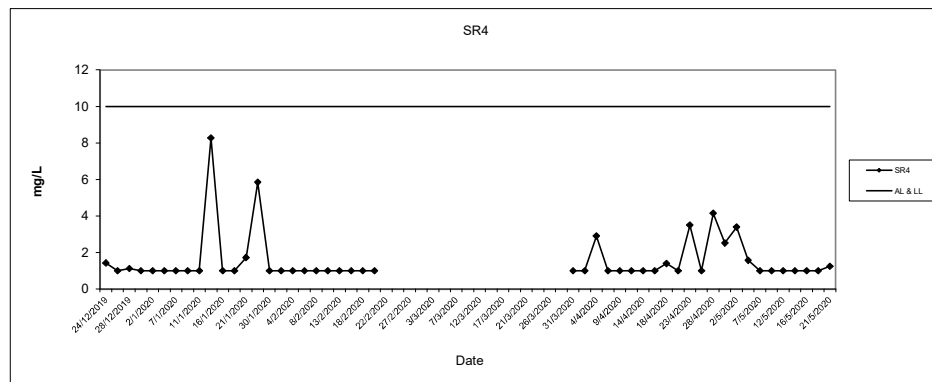
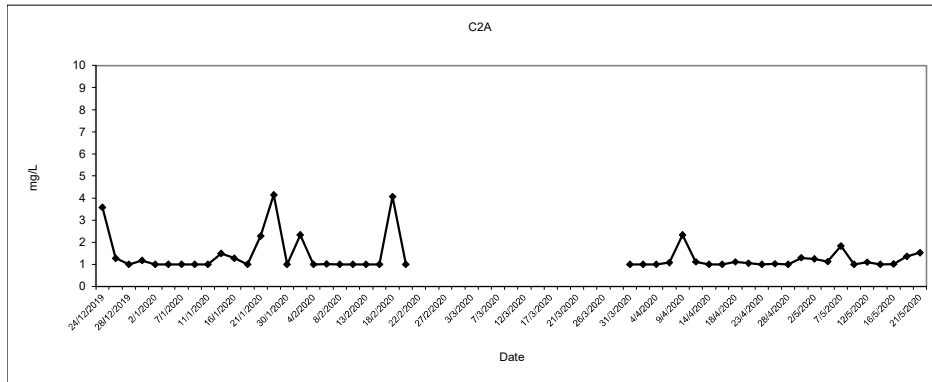
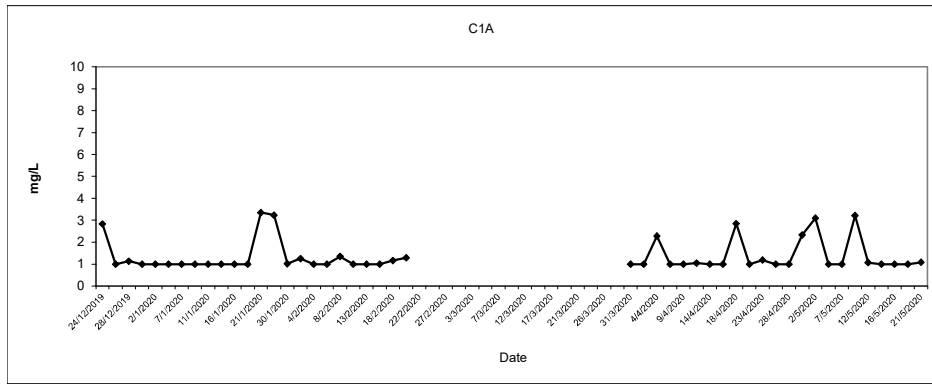
E. coli (Depth average) at Mid-Flood Tide



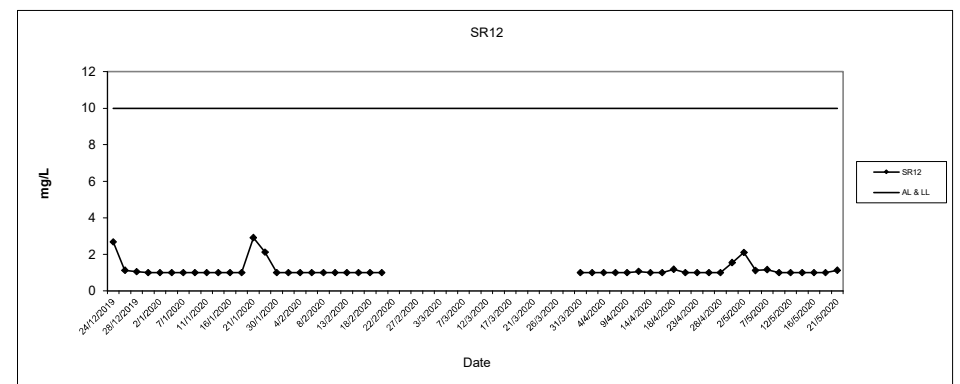
E. coli (Depth average) at Mid-Flood Tide



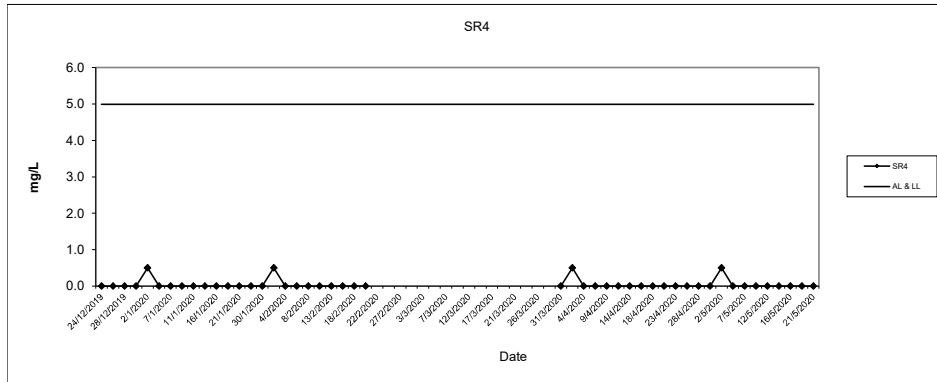
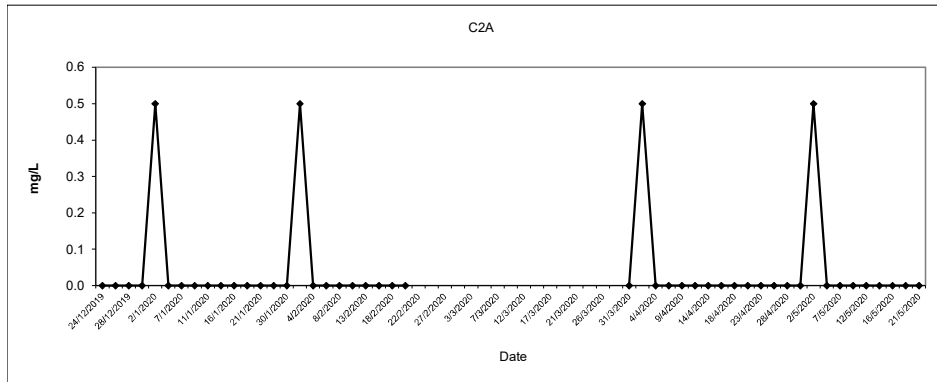
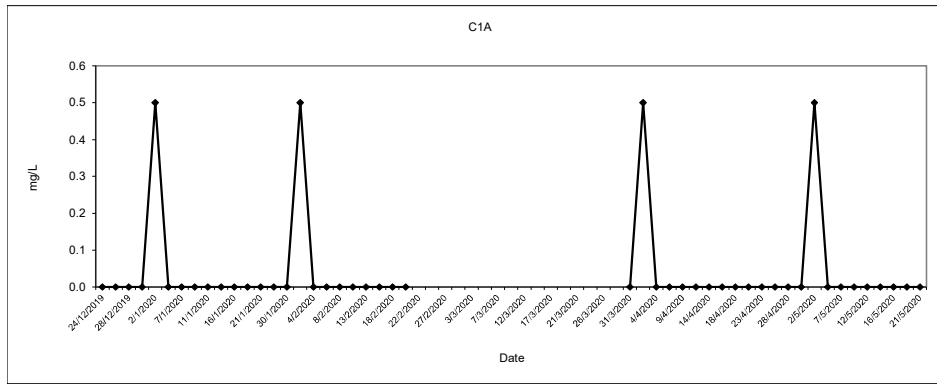
BOD₅ (Depth average) at Mid-Flood Tide



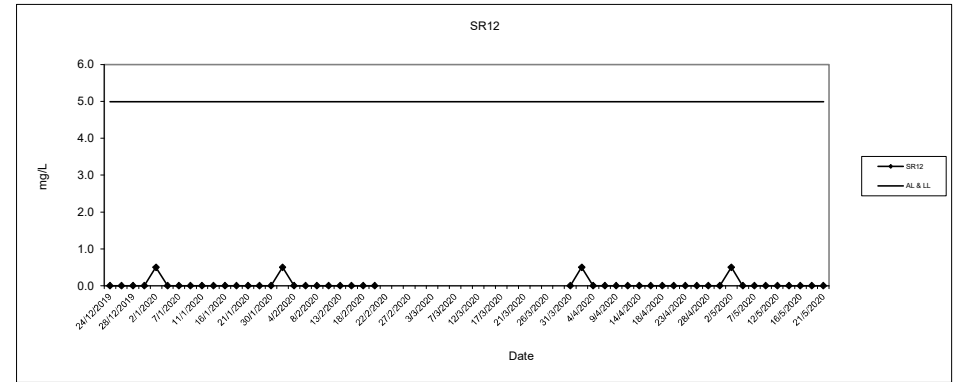
BOD₅ (Depth average) at Mid-Flood Tide



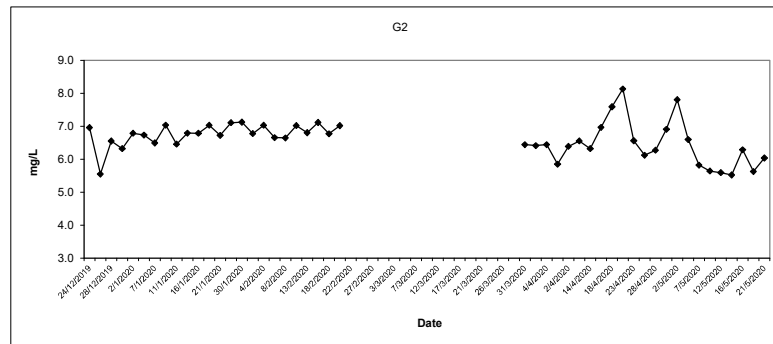
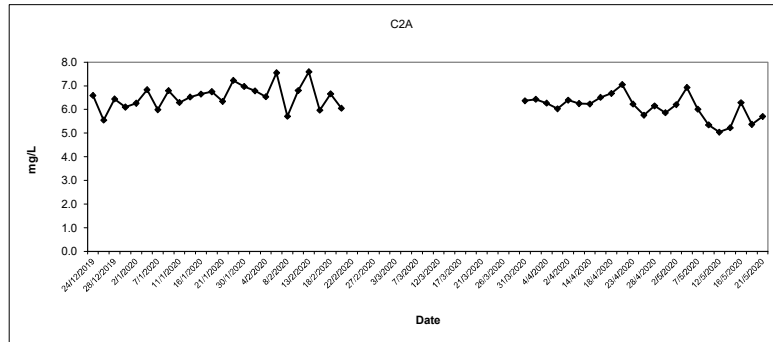
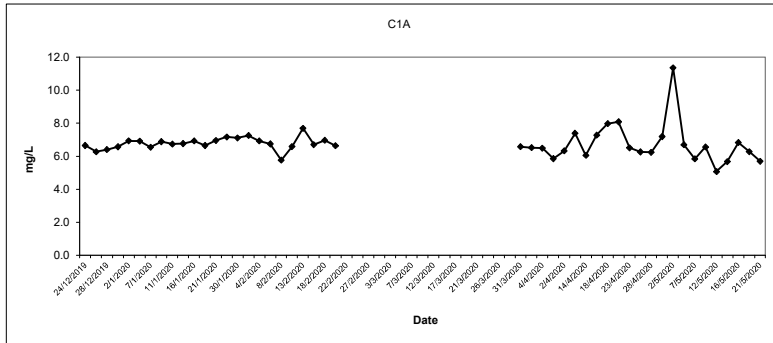
Synthetic Detergent (Depth average) at Mid-Flood Tide



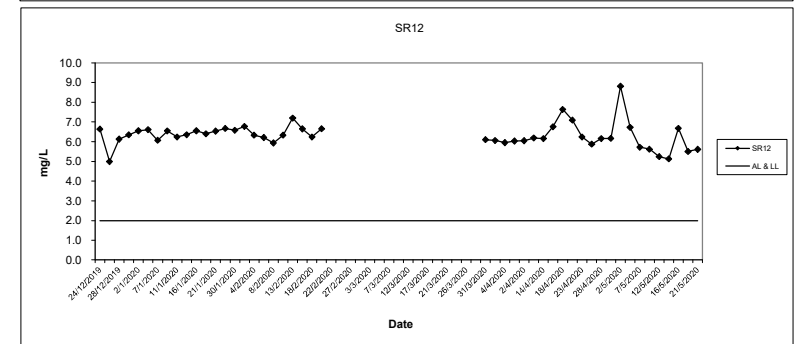
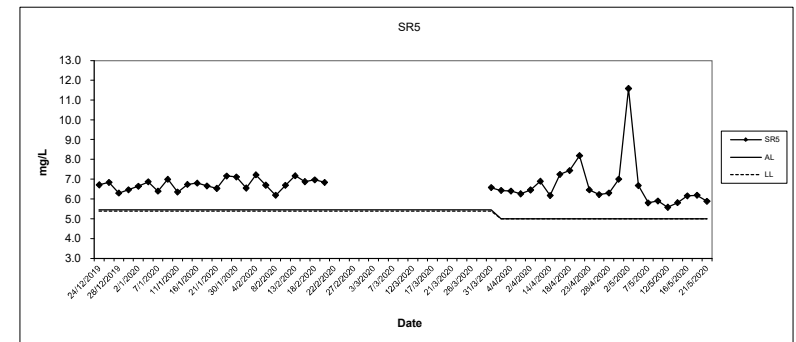
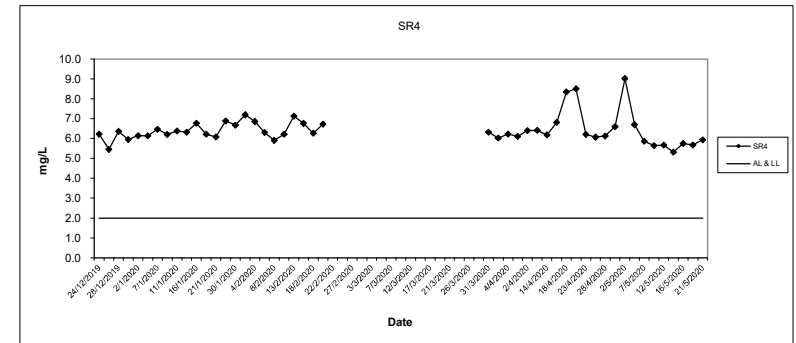
Synthetic Detergent (Depth average) at Mid-Flood Tide



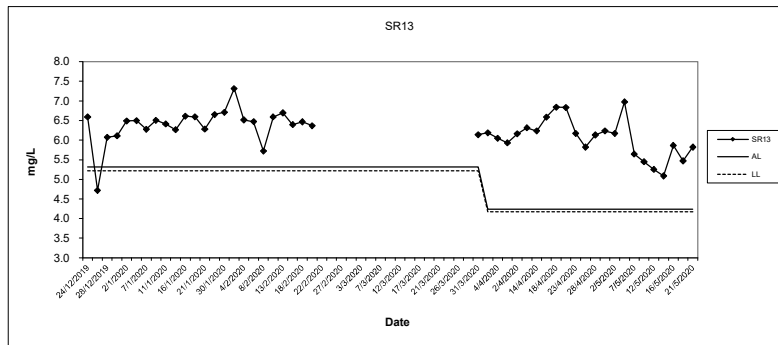
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



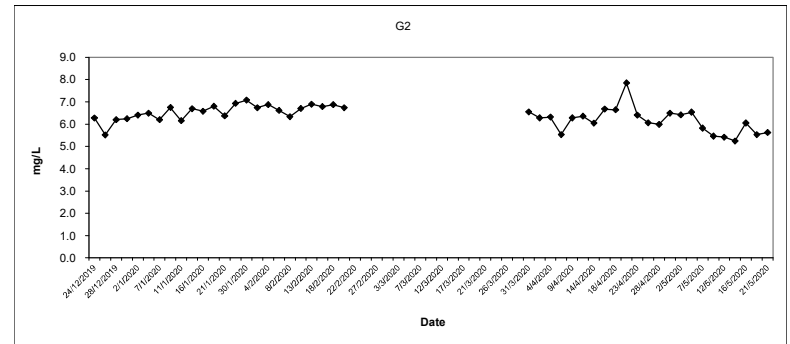
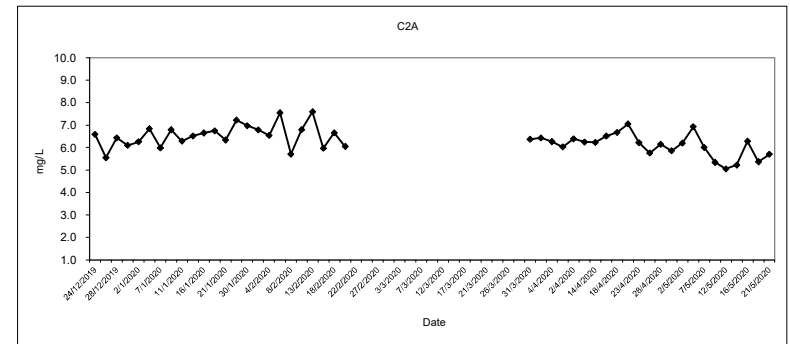
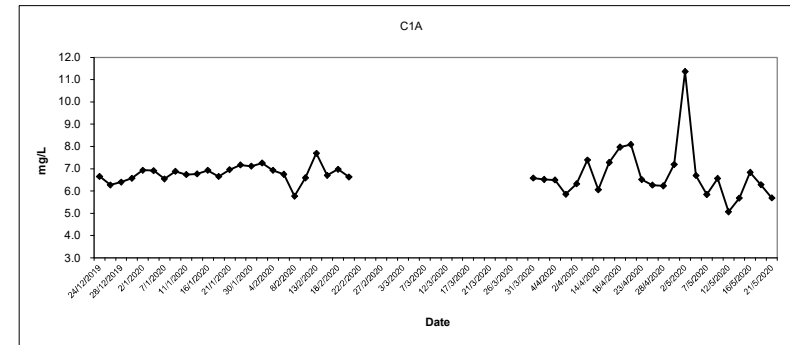
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



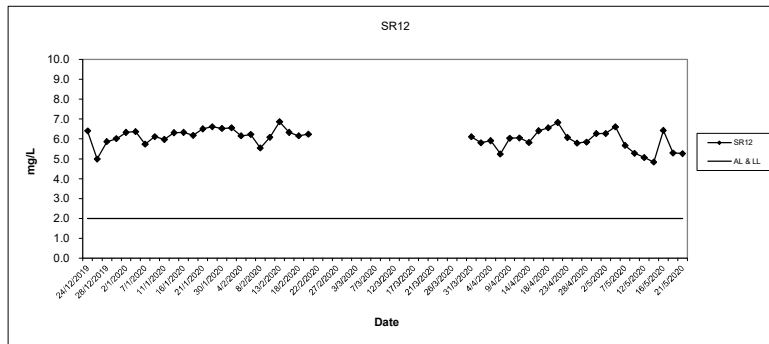
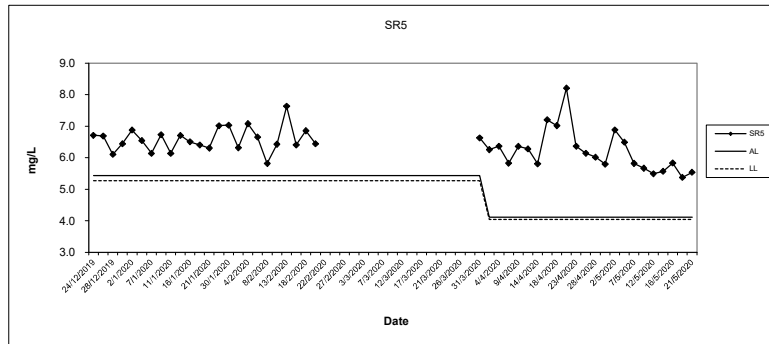
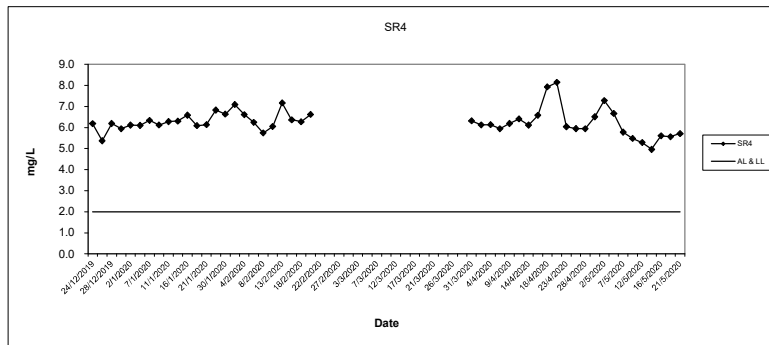
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



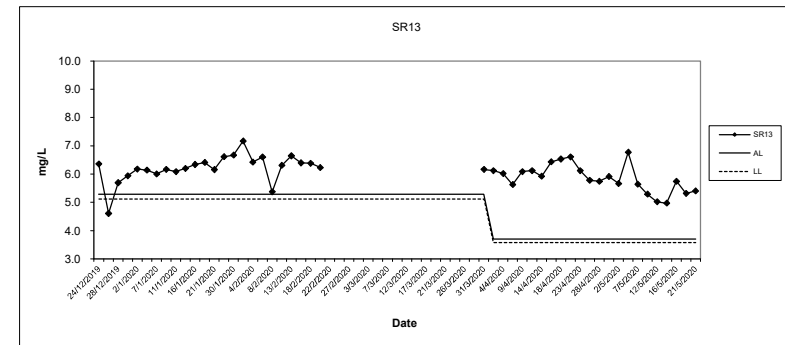
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



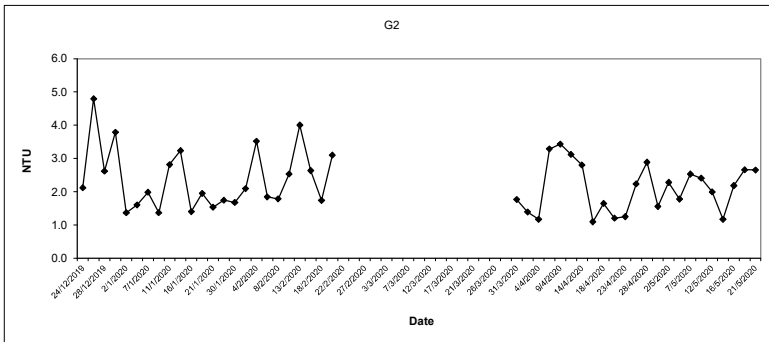
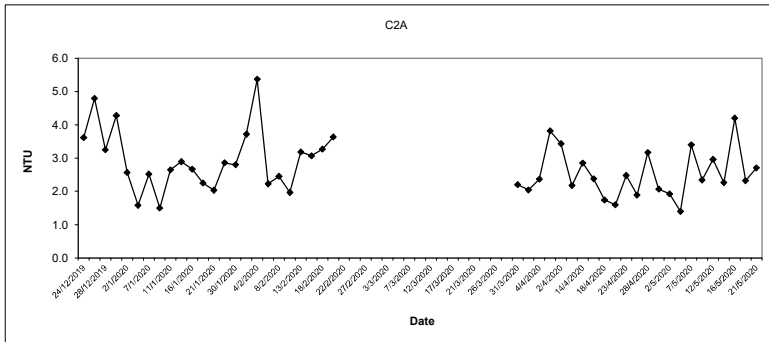
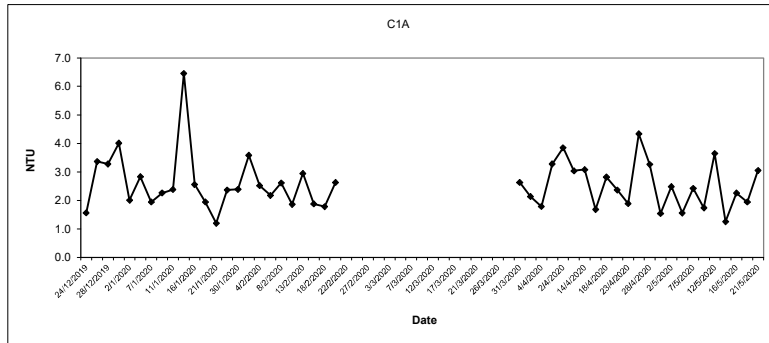
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



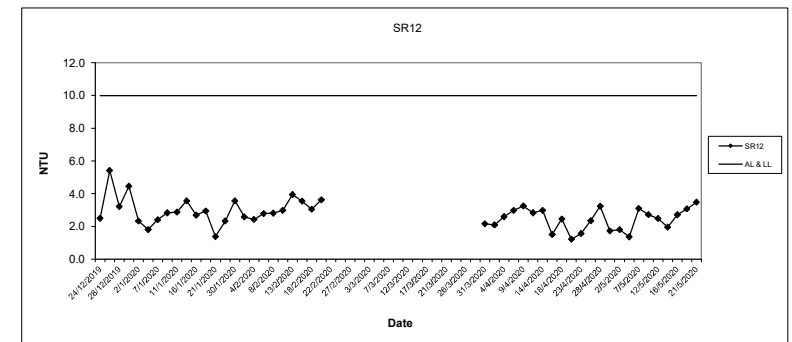
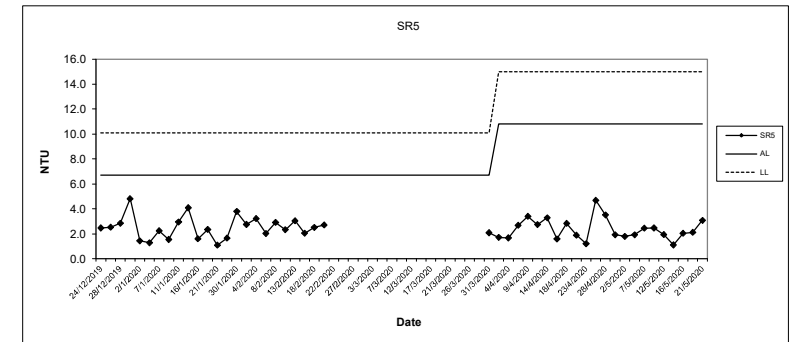
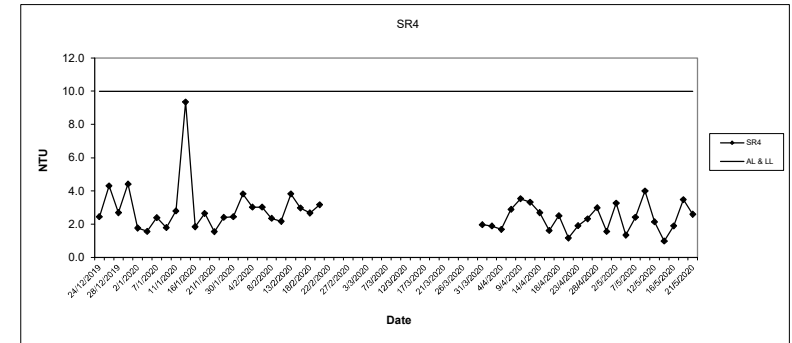
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



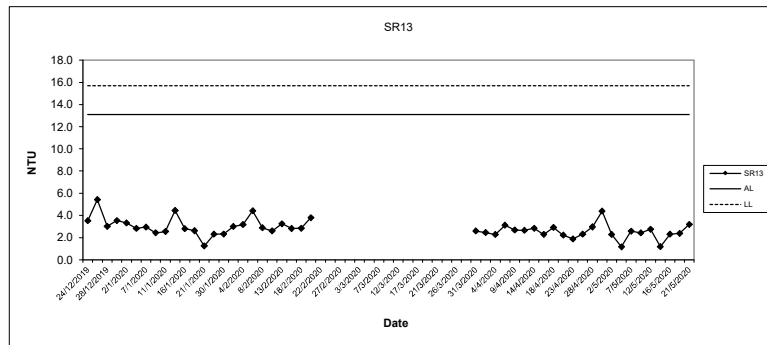
Turbidity (Depth average) at Mid-Ebb Tide



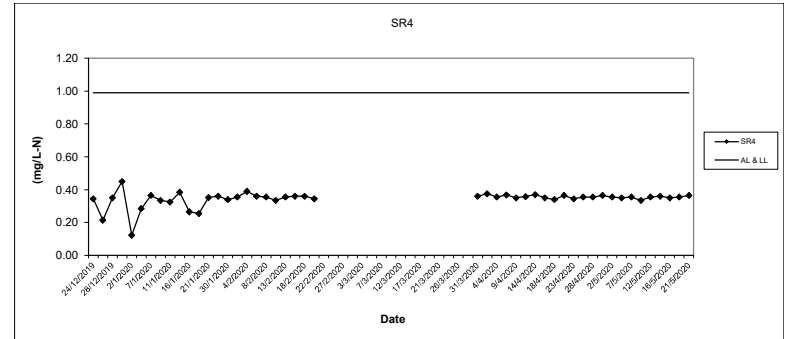
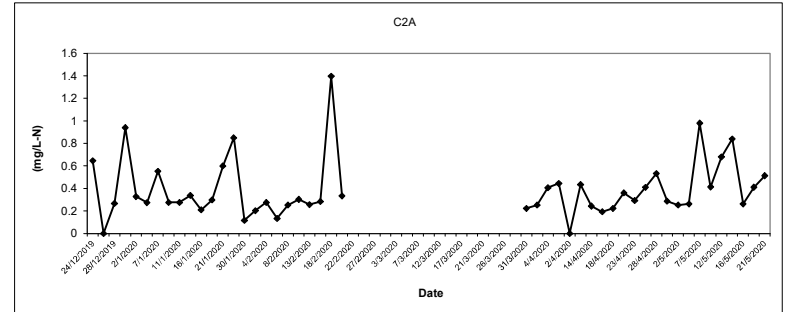
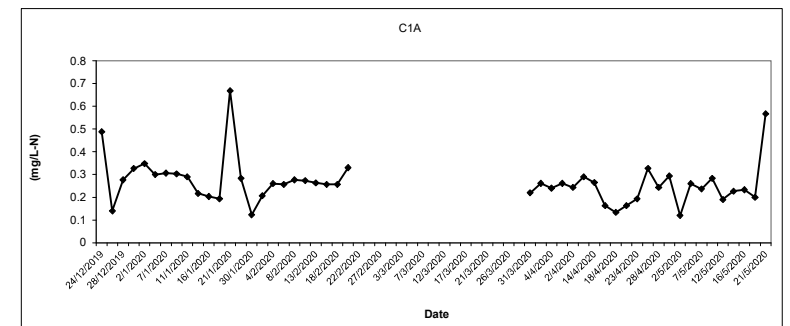
Turbidity (Depth average) at Mid-Ebb Tide



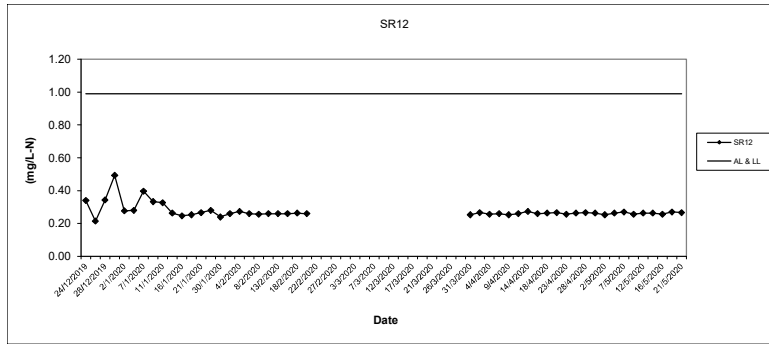
Turbidity (Depth average) at Mid-Ebb Tide



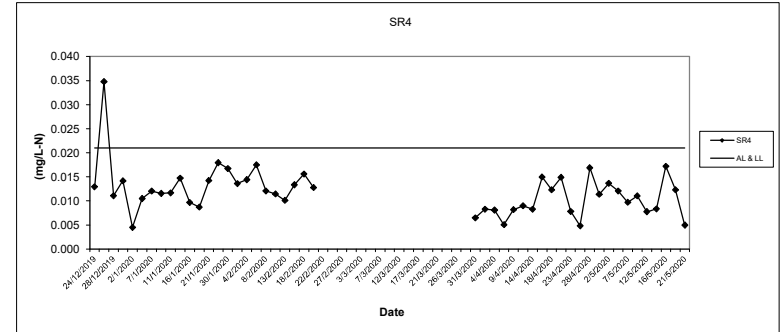
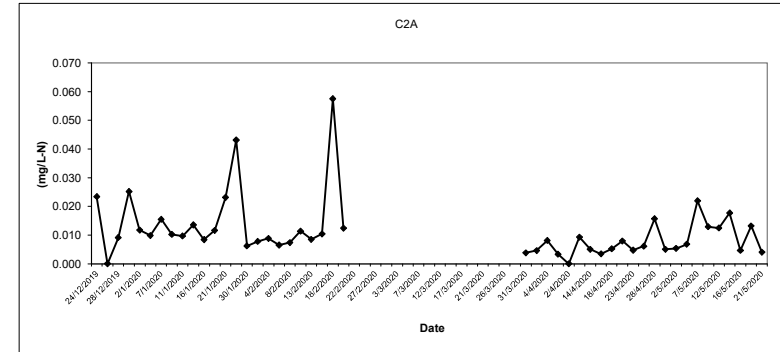
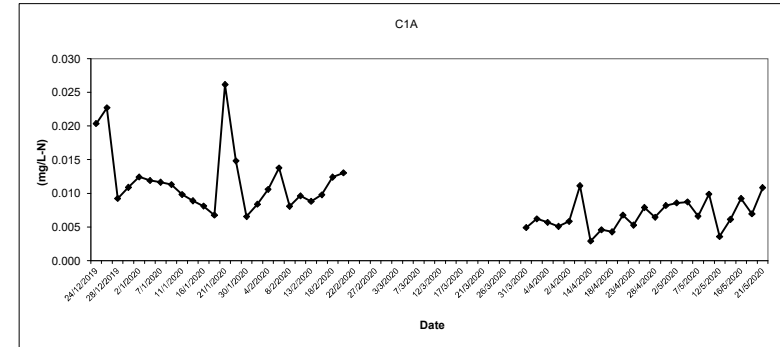
In-situ Ammonia (Depth average) at Mid-Ebb Tide



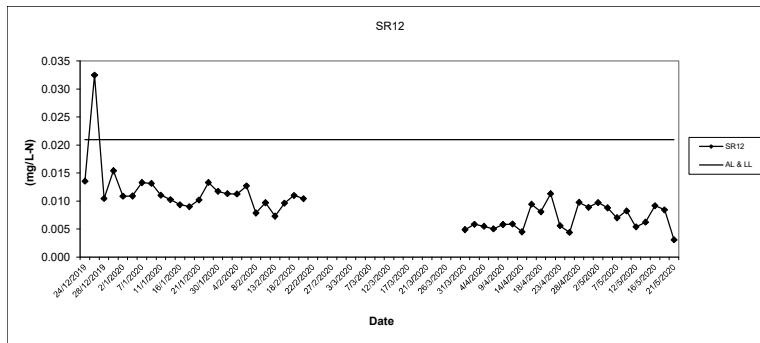
In-situ Ammonia (Depth average) at Mid-Ebb Tide



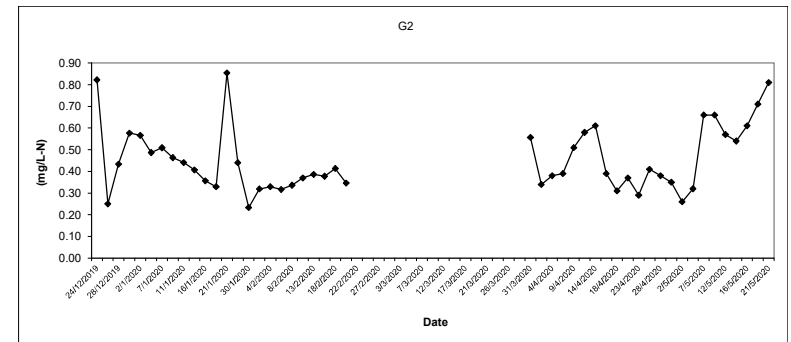
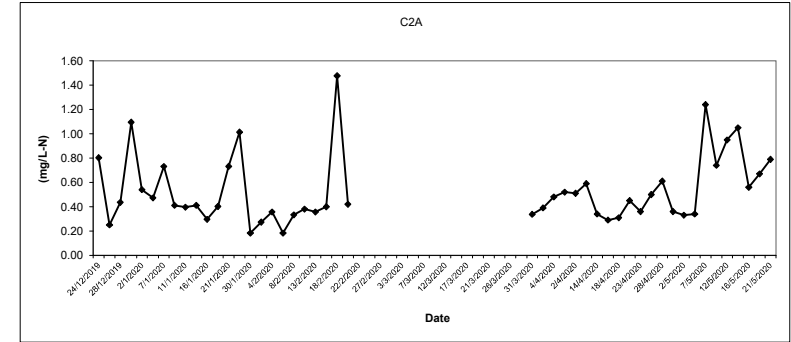
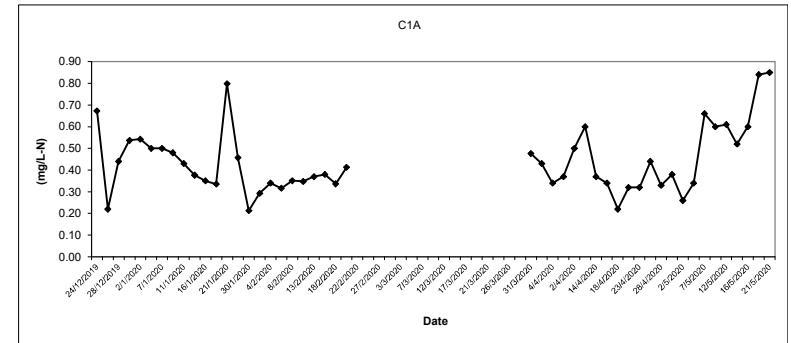
In-situ UIA (Depth average) at Mid-Ebb Tide



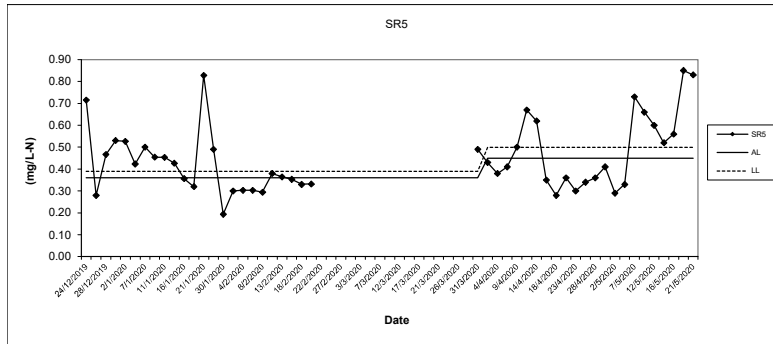
In-situ UIA (Depth average) at Mid-Ebb Tide



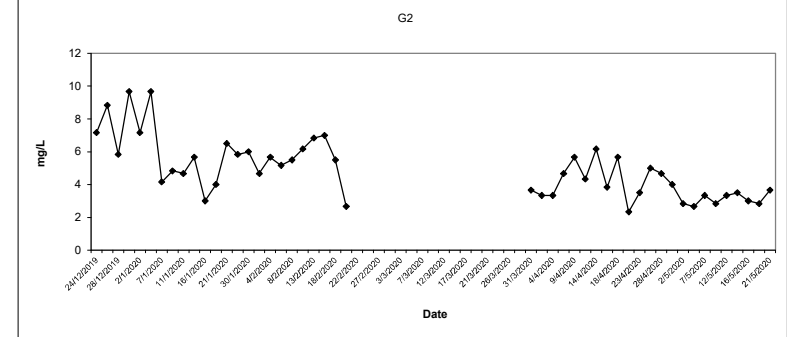
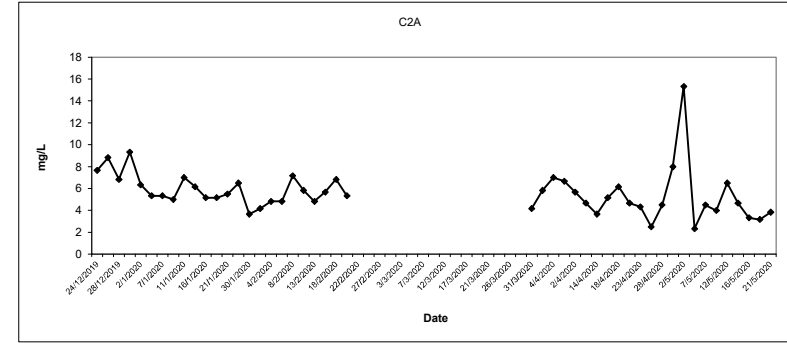
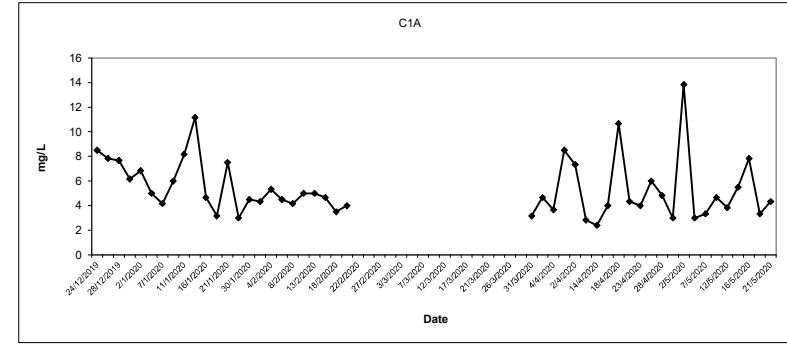
In-situ TIN (Depth average) at Mid-Ebb Tide



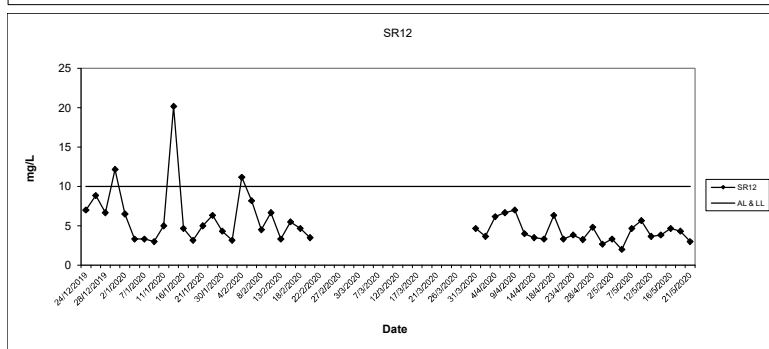
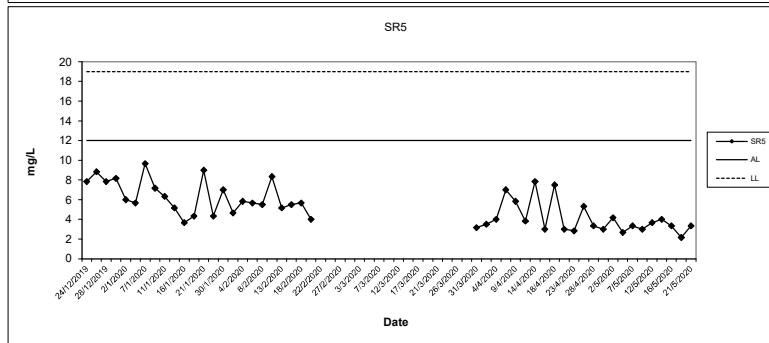
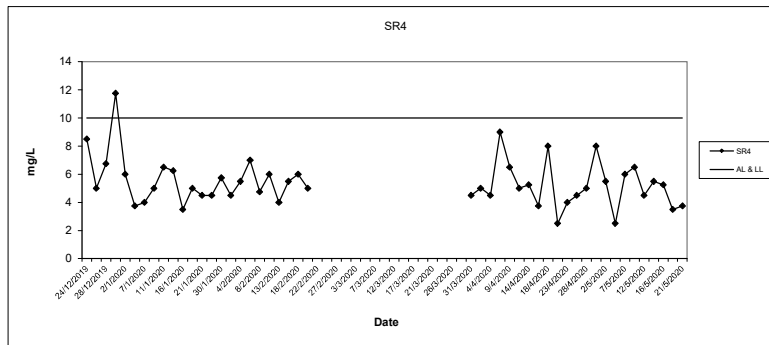
In-situ TIN (Depth average) at Mid-Ebb Tide



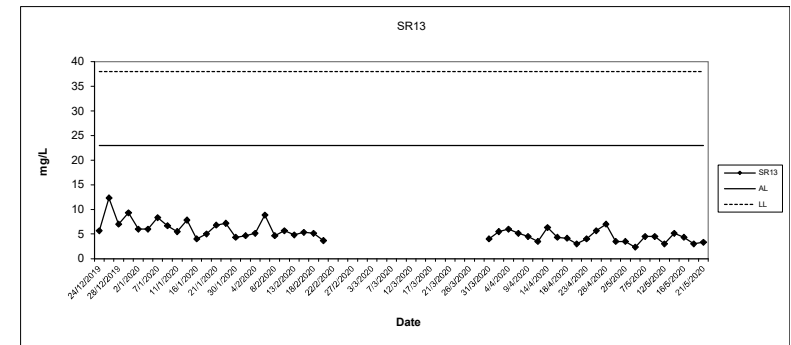
Total Suspended Solids (Depth average) at Mid-Ebb Tide



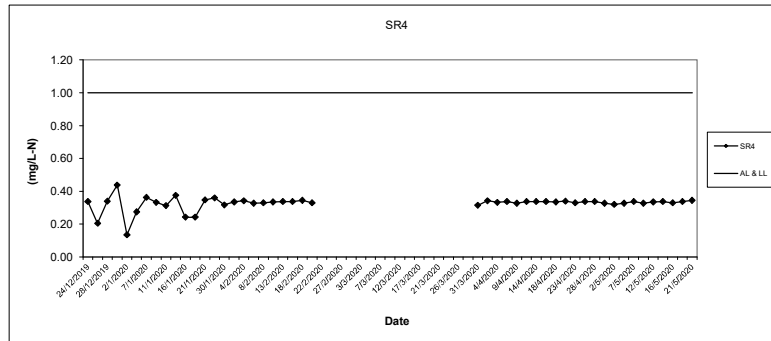
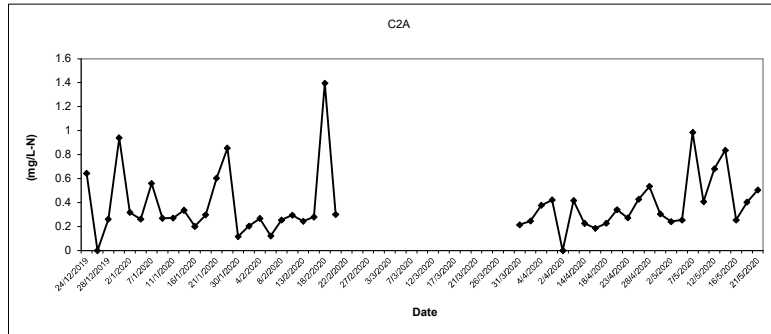
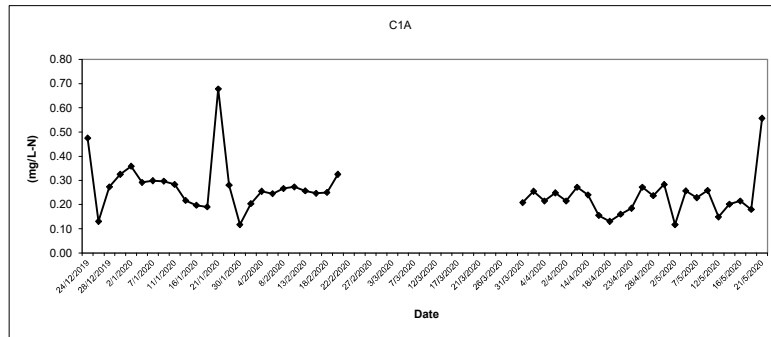
Total Suspended Solids (Depth average) at Mid-Ebb Tide



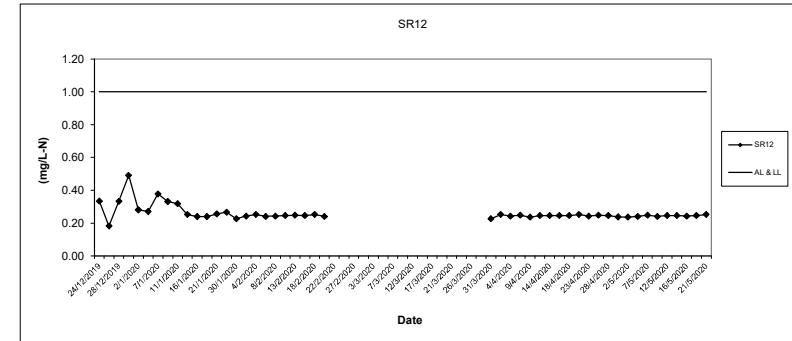
Total Suspended Solids (Depth average) at Mid-Ebb Tide



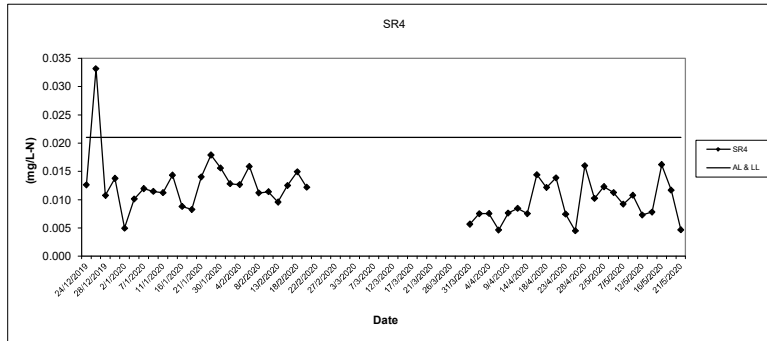
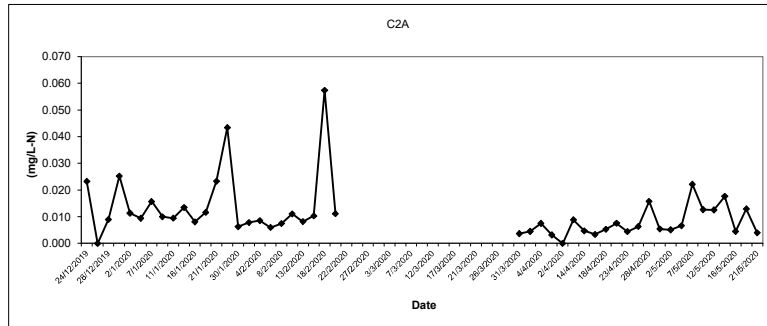
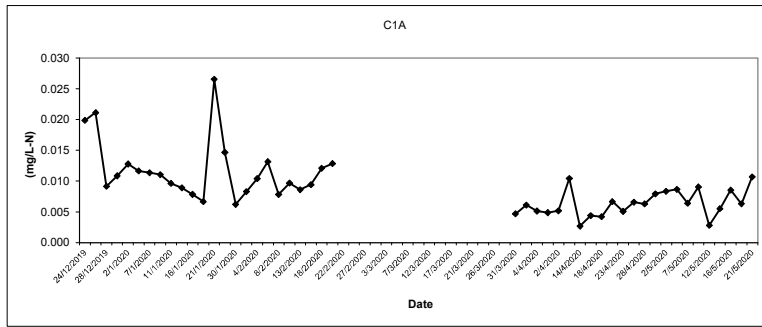
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide



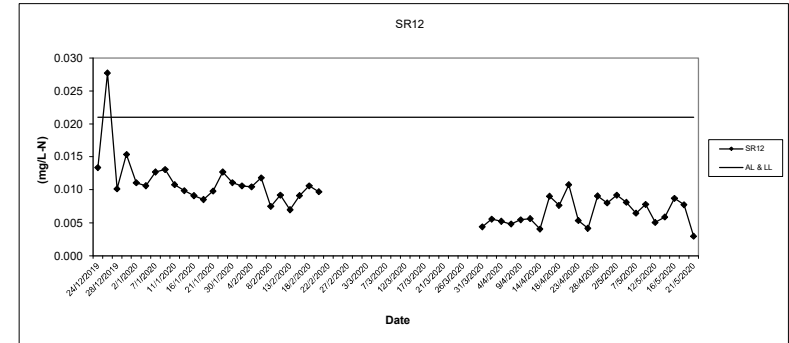
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide



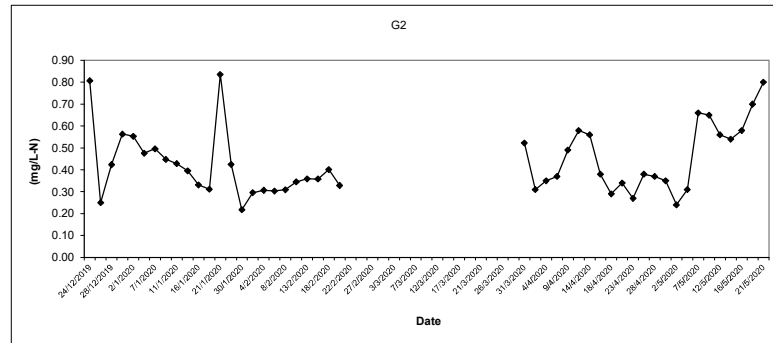
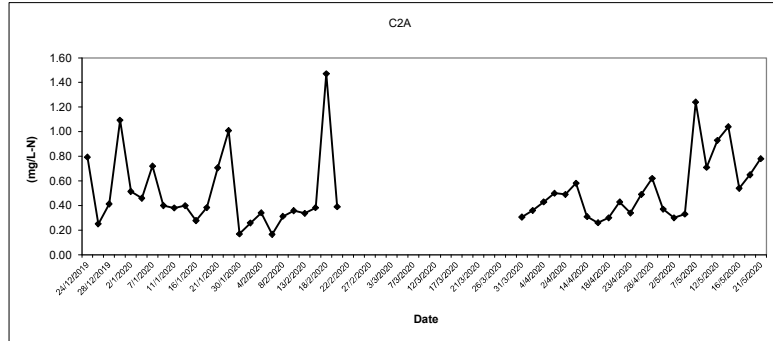
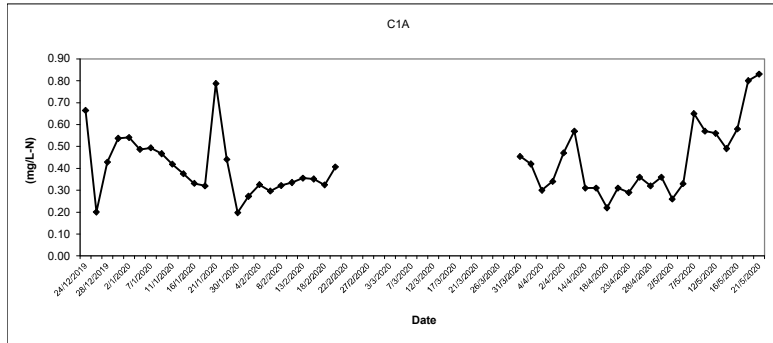
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide



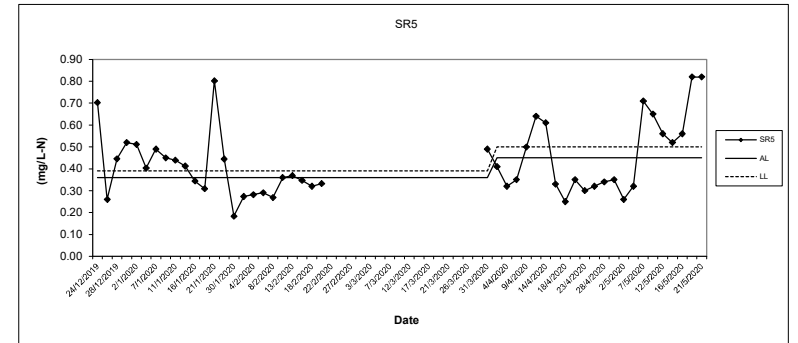
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide



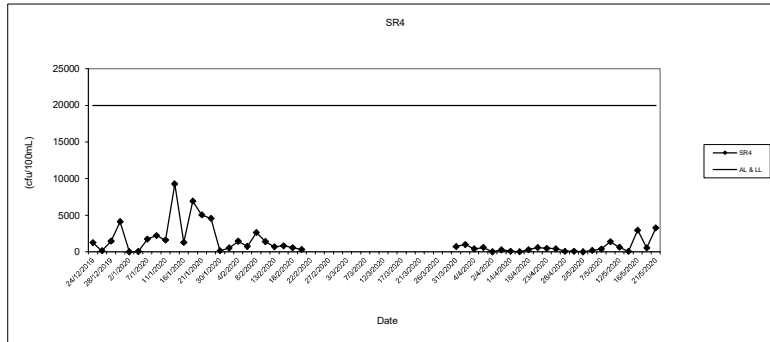
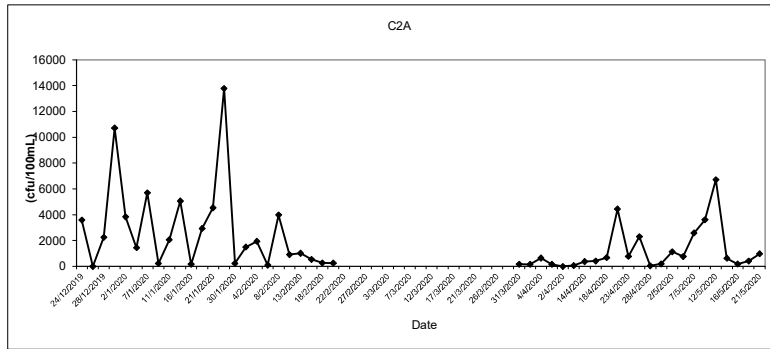
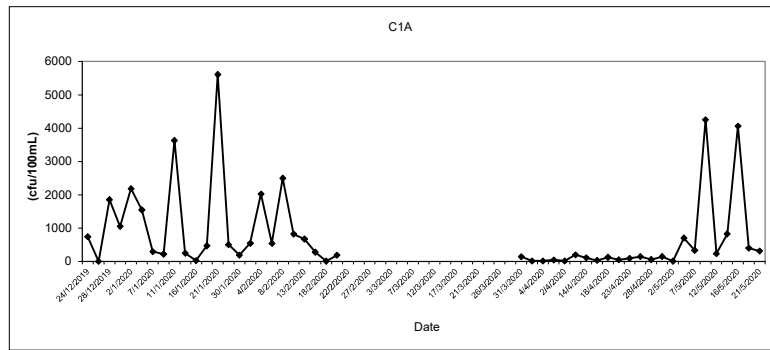
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



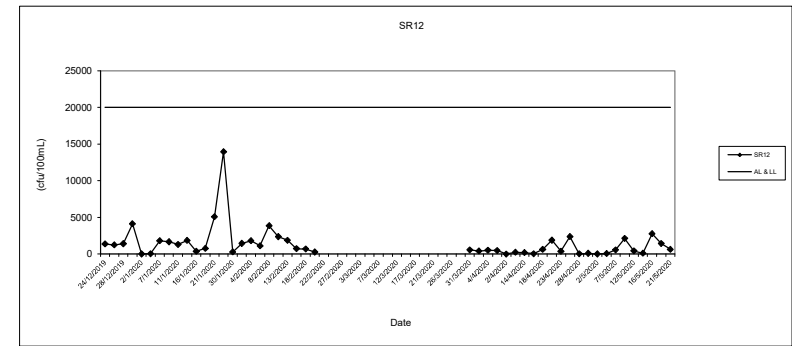
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



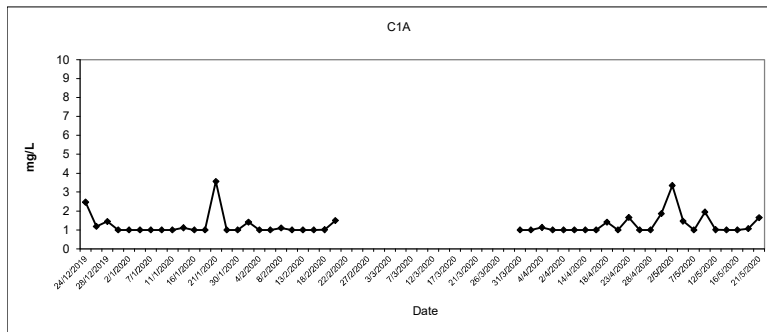
E.coli (Depth average) at Mid-Ebb Tide



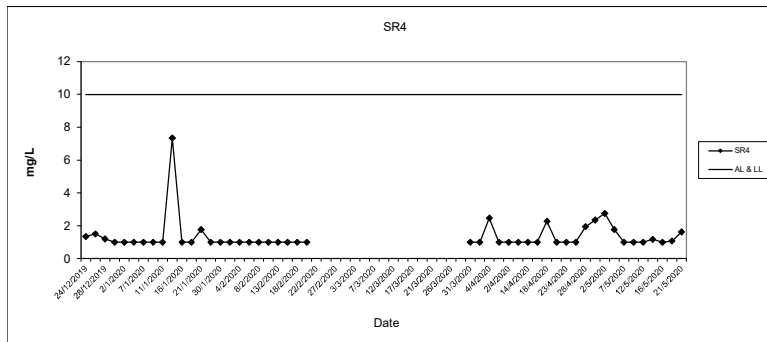
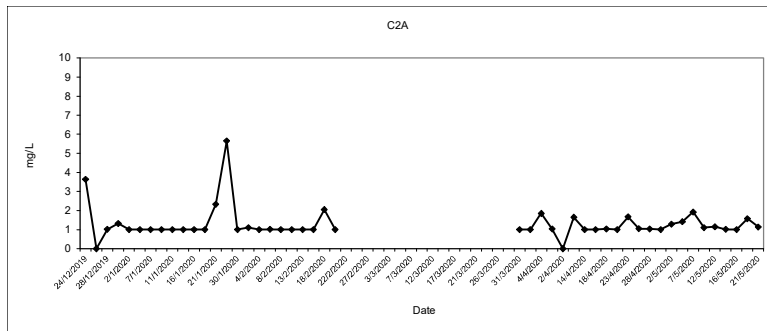
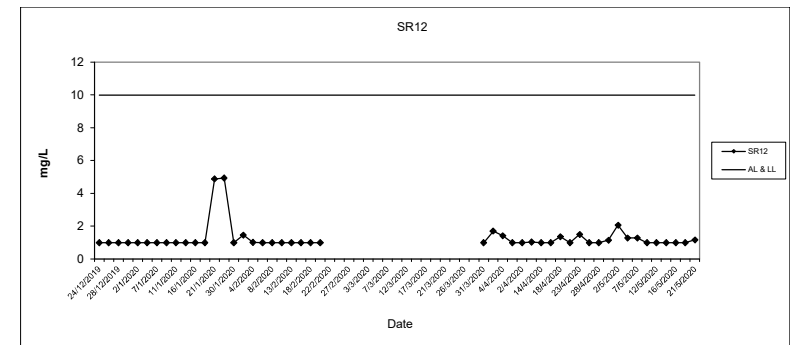
E.coli (Depth average) at Mid-Ebb Tide



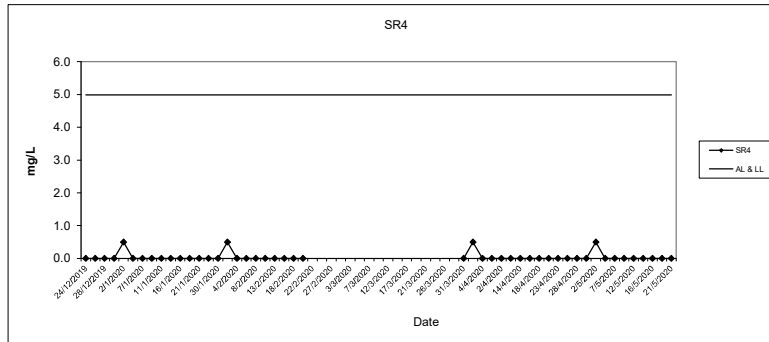
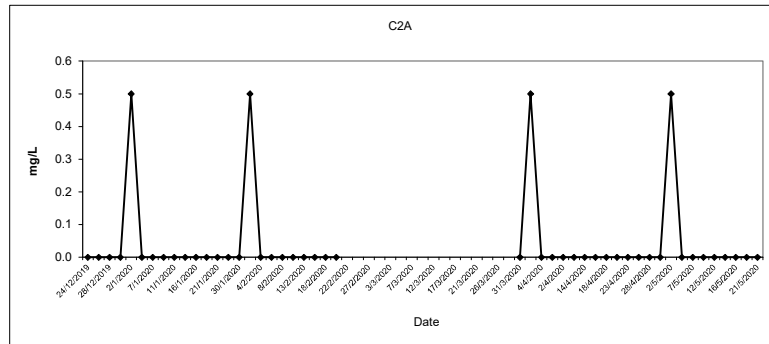
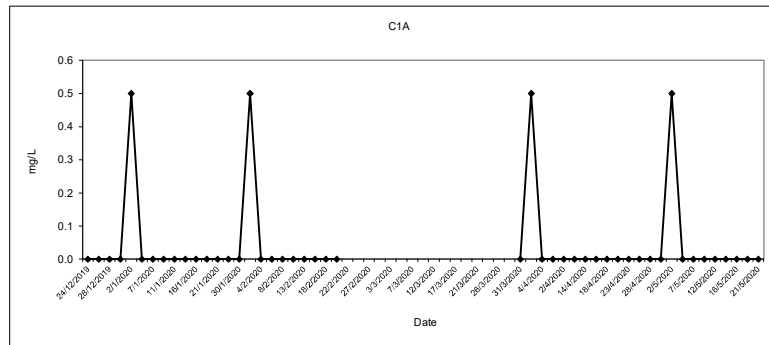
BOD₅ (Depth average) at Mid-Ebb Tide



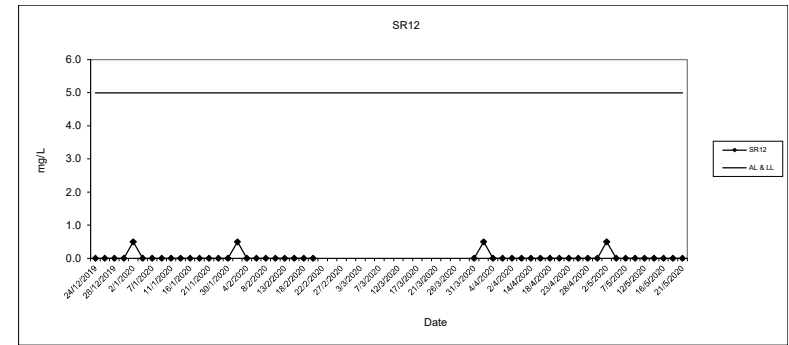
BOD₅ (Depth average) at Mid-Ebb Tide



Synthetic Detergent (Depth average) at Mid-Ebb Tide



Synthetic Detergent (Depth average) at Mid-Ebb Tide



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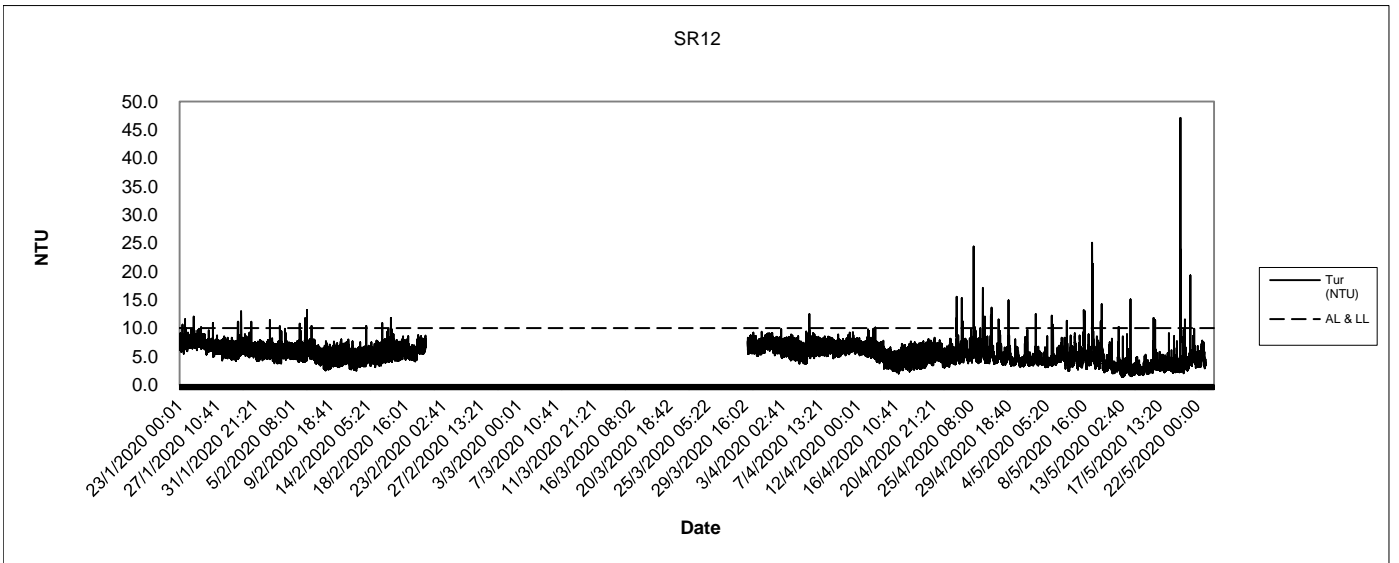
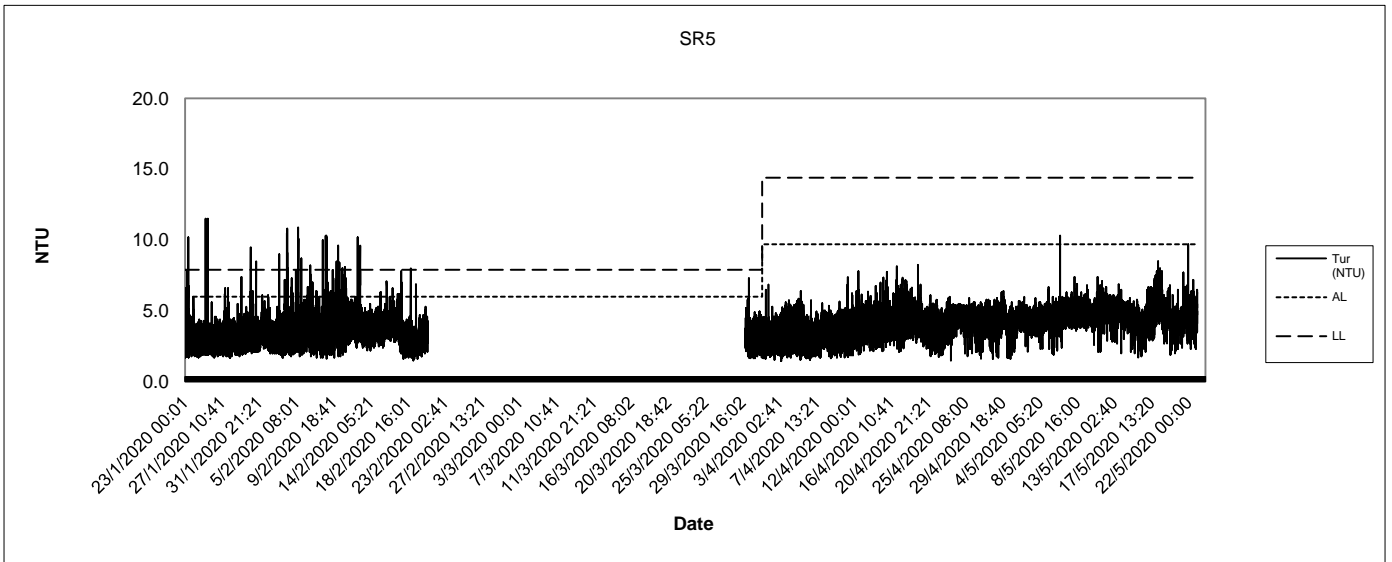
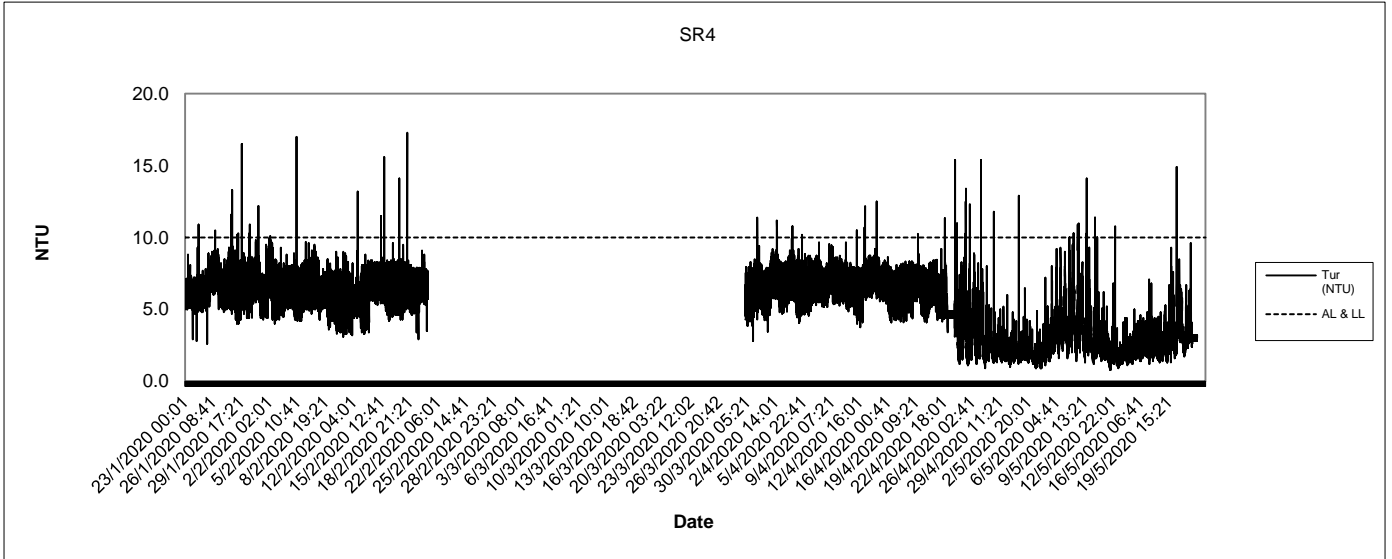
Tel : +852 2450 8233
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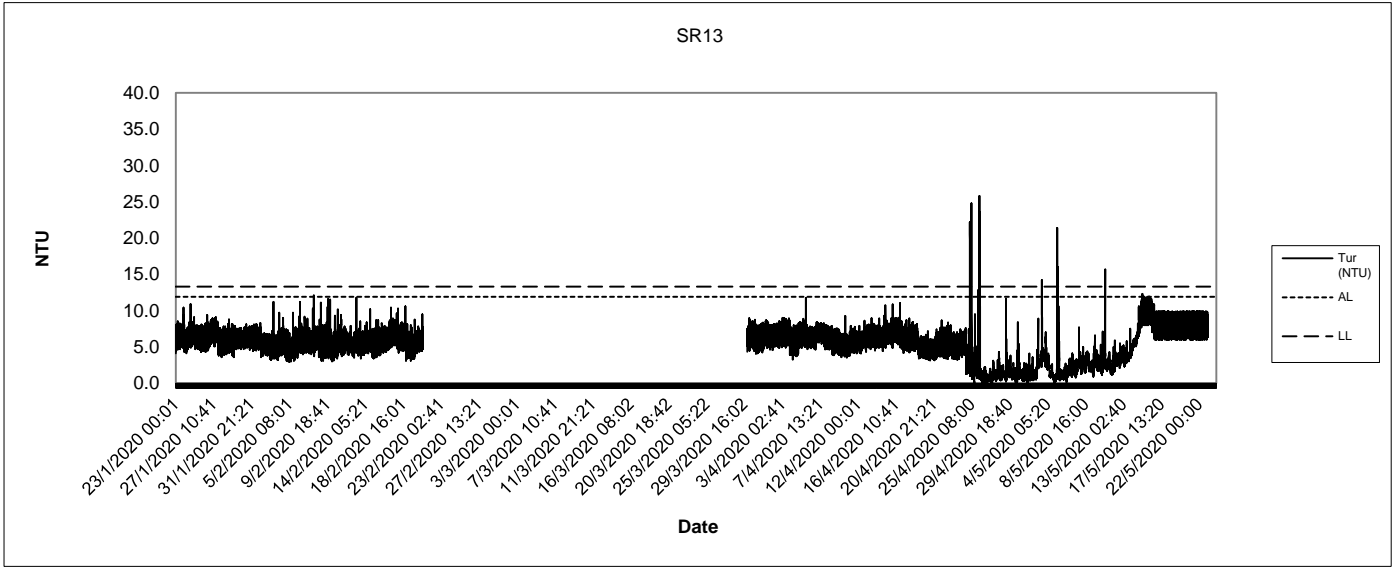
Report No.: 0394/13/ED/0394C

Appendix E Graphical Presentation – 24-hr Monitoring Results

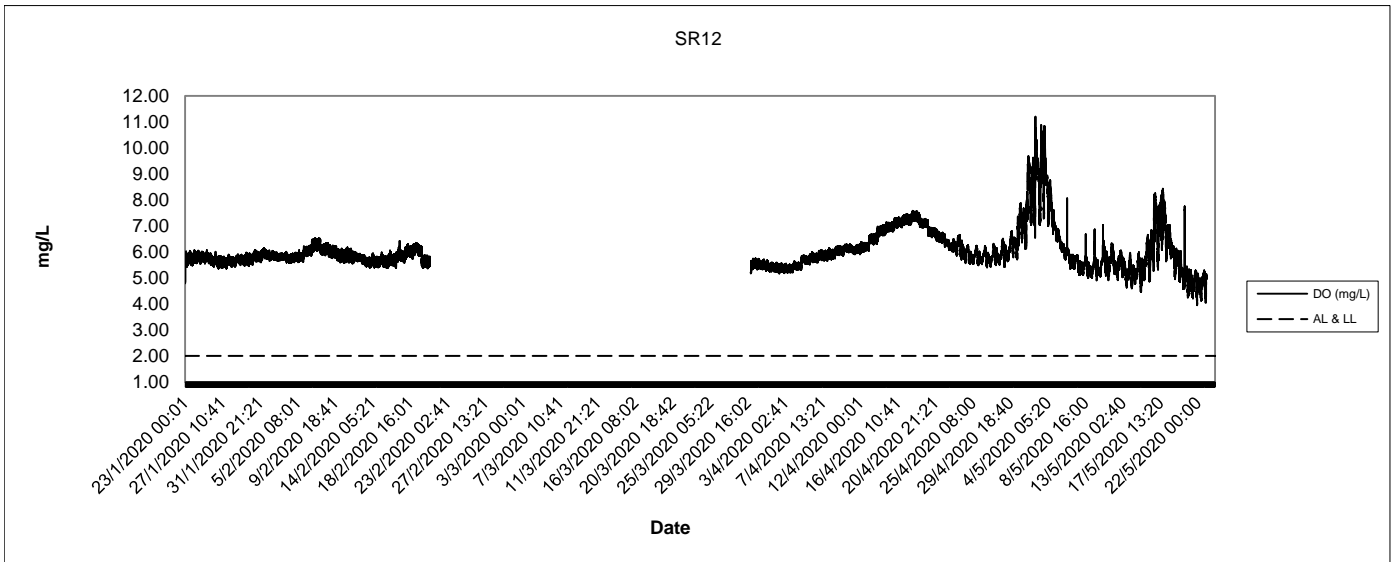
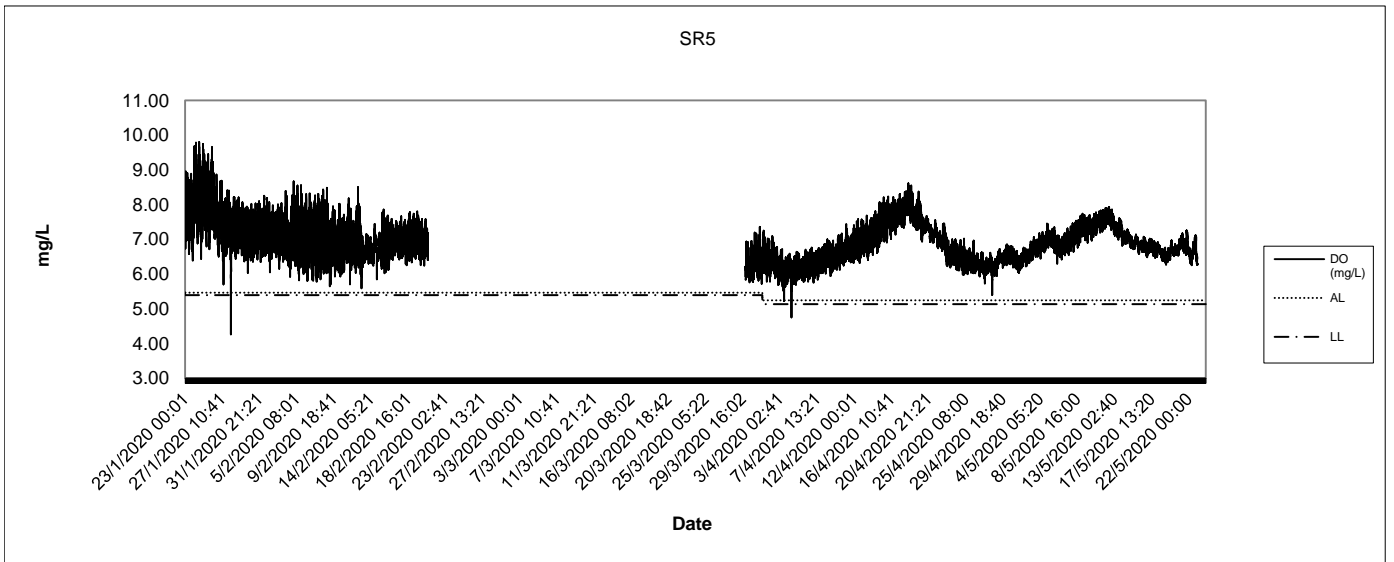
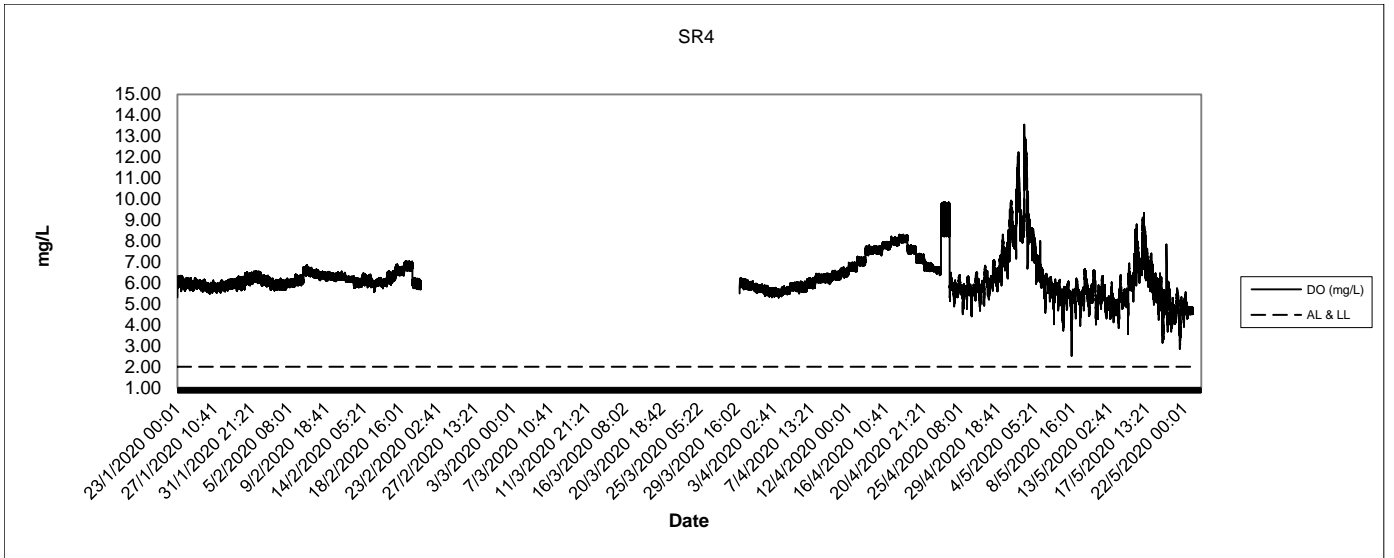
Turbidity 24-hr Water Quality Monitoring



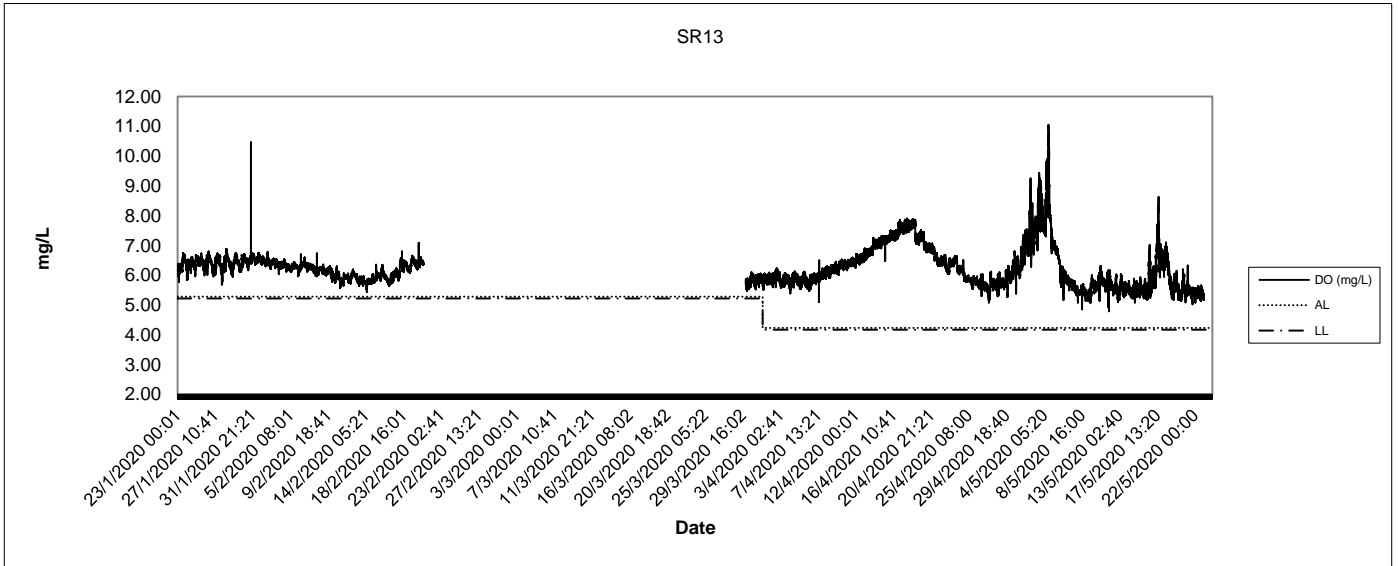
Turbidity 24-hr Water Quality Monitoring



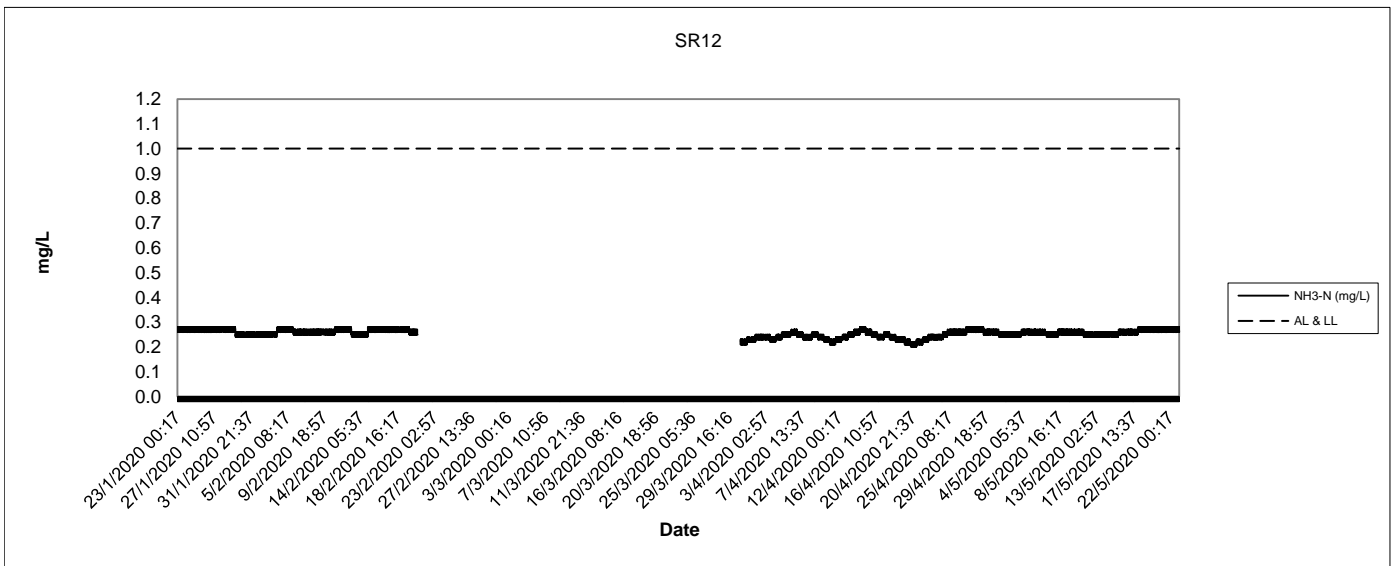
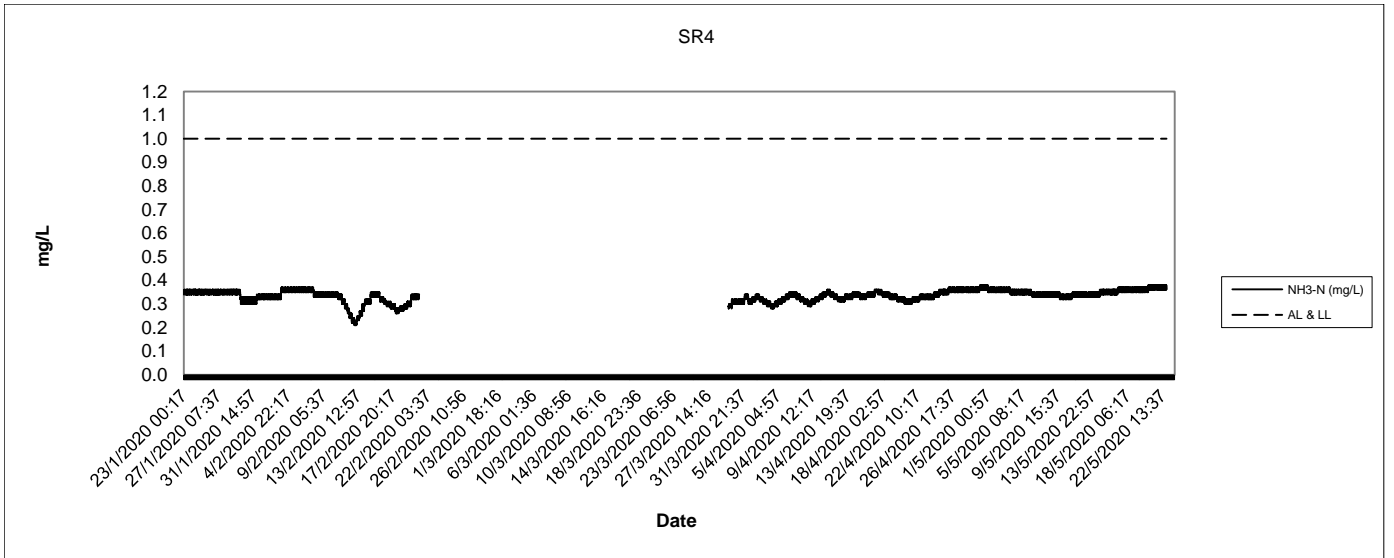
Dissolved Oxygen 24-hr Water Quality Monitoring



Dissolved Oxygen 24-hr Water Quality Monitoring



Ammonia-N 24-hr Water Quality Monitoring



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Appendix F Environmental Mitigation Implementation Schedule

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

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
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 8 (subzones Z5C, Z6B, Z6C, Z6D, Z7 and Z8) shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA – No work in such area
		A13	The maximum dredging rate for closed grab dredger at Northern Fairway – Zones 9 to 12 shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA – No work in such area
		A14	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13A shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA – No work in such area
		A15	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13B shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA – No dredging was carried out
		A16	The dredging pump of cutter suction dredger shall be operated during cutting to reduce the sediment loss to water body.					NA-no CSD employed
		A17	Project dredging works within Zone 1 to 6 (including sub-zones) of the Container Basin shall not be carried out at the same time with Terminal Operator's maintenance dredging activities.					NA-No Terminal Operator's maintenance dredging carried out
		A18	Cutter suction dredger is only to be deployed for the removal of harder material during daytime only (07:00 to 19:00) in Zone 2 (including subzones) of the Container Basin.					NA-no CSD employed
		A19	In case of rainstorm warning in effect during dredging works, the dredged material on barge shall be covered properly before transportation to disposal site.					Implemented
		A20	In case of exceedance of SS and NH ₃ -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.					Implemented
		A23	Administrative control in terms of dredging rate adjustment in controlling the release of contaminants shall be employed as mitigation measures.					Implemented
		A24	Field trials shall be carried out to propose the most effective dredging process and rate to control the release of ammoniacal nitrogen and UIA into the water column and achieve compliance at the WSD1 seawater intake (NH ₃ -N) and at the beaches for UIA.					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			Capital dredging works in dredging sub-zone Z2B (Figure 1.2h refers) should not therefore be carried out until the proposed method and rate are confirmed.					
		A25	Detailed dredging plan shall be prepared providing details of individual dredging subzones and dredging rate taking into account of the field trial results.					Implemented
3.8	-		<u>Other Good Site Practices for Dredging</u>	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A26	All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.					Implemented
		A27	The speed of all Contractor's vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments.					Implemented
		A28	All barges / dredgers used should be fitted with tight fitting seals to their bottom openings to prevent leakage of material.					Implemented
		A29	Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds.					Implemented
		A30	No overflow of dredged mud should be allowed. Barges or hopper should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.					Implemented
		B	Waste Management					
			<u>Good Site Practices</u>	Minimize potential adverse effect arising from the handling of dredged material	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B1	Obtain the profile of different sediment categories and careful planning of sediment removal.					Implemented
		B2	Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.					Implemented
		B3	Training of site personnel in proper waste management and chemical handling procedures.					Implemented
		B4	Provision of sufficient waste disposal points and regular collection of waste.					Implemented
		B5	Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting sediment material is not anticipated.					Implemented
		B6	Use well maintained PME on site.					Implemented
			<u>General Refuse</u>	Minimize the adverse effect arising from the handling of site general refuse	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B7	General refuse should be stored in enclosed bins. A reputable waste collector should be employed by the contractor to remove general refuse from the site.					Implemented
			<u>Chemical Waste</u>	Minimize the adverse effect arising from the handling of site chemical waste	Contractor	Construction Work Site	Construction Phase	
4.5	3.3	B8	If chemical wastes are produced at the construction site, the Contractor shall be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals should be stored separately. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					
4.5	3.3		Marine Dredged Sediment	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality	Contractor	Construction Work Site	Construction Phase	
		B9	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality.					Implemented
		B10	Bottom opening of barges will be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved.					Implemented
		B11	Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the EPD.					Implemented
		B12	Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.					Implemented
		B13	Sediment Quality Report shall be prepared and submit to EPD under DASO.					Implemented
		B14	If disposal of Type 3 sediment is identified, agreement with EPD shall be reached regarding the treatment of sediment before disposal.					NA – no type 3 material disposed
		B15	Project works shall not be carried out before obtaining confirmation from MFC on disposal option.					Implemented
		B16	Follow strictly all conditions stipulated in the dumping permit.	Implemented				
		C	Marine Ecology	Review and assess the potential adverse effect on marine ecology	Contractor	Construction Work Sites	Construction Phase	
5.7	4.1	C1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to marine ecology due to dredging operation.					Implemented
		D	Fisheries	Review and assess the potential adverse effect on fisheries	Contractor	Construction Work Sites	Construction Phase	
6.7	5.1	D1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to fisheries due to dredging operation.					Implemented
		E	Hazard to Life		Contractor	Construction Work Sites (General)	Construction Phase	
7.8.2	6.2	E1	Sound communication channel shall be established with the oil companies, Marine Department, and Fire Services Department for effective notification and emergency evacuation in case of accidents.					Implemented
		E2	Proper safety and emergency training shall be given to the relevant operation staff at the dredging site. Emergency plans and procedures should be prepared and drills should be performed periodically.					Implemented
		F	Landscape Visual and Glare	Minimize landscape and visual impacts during construction phase	Contractor	Construction activities' area	Throughout design, construction phase	
8.9 Table 8-3 & 8-6	7.2	F1	Visa shields to the lights of dredgers shall be provided.					Implemented
		F2	The light source shall not point directly to any VSRs.					Implemented
		F3	Lights shall be switched off if they are not in use.					Implemented
		G	Cultural Heritage		Contractor		During	

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
9.5	8		<u>Monitoring Brief</u>	Minimize potential marine archaeological impact during dredging activities		Locations of the 20 unidentified sonar contacts and masked areas	Construction works	NA- no archaeological deposit was found during reporting period.
		G1	A monitoring brief shall be conducted during the dredging. It shall only be required during dredging at the locations of the 20 unidentified sonar contacts and masked areas and does not need to cover all of the dredging activities. Dredging staff should be briefed about the possibility of locating archaeological objects and a marine archaeologist shall be available to monitor the dredged spoil and provide advice. If material indicative of archaeological remains is retrieved, the AMO should be contacted as soon as possible.					
		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				

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Appendix G Waste Generation in Reporting Period

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

Monthly Summary Waste Flow Table for 2020 (year)

Year	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated (in '000 m ³)	Broken Concrete (see Note 3) (in '000 m ³)	Reused in the Contract (in '000 m ³)	Reused in other Projects (in '000 m ³)	Disposed as Public Fill (in '000 m ³)	Metals (in '000 kg)	Paper/cardboard packaging (in '000 kg)	Plastics (see Note 2) (in '000 kg)	Chemical Waste (in '000 kg)	Others, e.g. general refuse (in '000 m ³)
2020	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Jan	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Feb	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Mar	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Apr	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
May	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Jun										
Jul										
Aug										
Sep										
Oct										
Nov										
Dec										
Total	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil

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 (2020)

Marine Sediment Type	Type 1 – Open Sea Disposal	Type 2 – Confined Marine Disposal	Type 3 – Special Treatment / Disposal
Month	Quantity (m ³)	Quantity (m ³)	Quantity (m ³)
2014			
Jan-Dec	549,430	99,660	nil
2015			
Jan-Dec	938,560	372,370	nil
2016			
Jan-Dec	195,860	153,250	1,260
2017			
Jan-Dec	1,850	28,550	nil
2018			
Jan-Dec	nil	nil	nil
2019			
Jan-Dec	nil	2,850	nil
2020			
January	nil	250	nil
February	nil	nil	nil
March	nil	nil	nil
April	nil	nil	nil
May	nil	280	nil
Total	1,685,700	657,210	1,260

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	Nil	0.003	0.01
2014	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2	0.16
2015	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	13	14.4	0.2	0.12	
2016	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	17	Nil	0.2	0.12	
2017	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	10	Nil	0.15	0.10	
2018	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
2019	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
2020																					
2021																					
Grand Total	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	40	14.4	0.753	0.51	

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.

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

Appendix H

Weather Conditions and Red Tide Occurrences for the Reporting Period

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

Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
February 2020					
23	23.9	19.4	17.5	11	0
24	22.0	19.6	17.5	67	0
25	25.0	21.8	19.7	81	0
26	28.1	23.3	20.6	56	Trace
27	22.6	20.5	19.1	29	0
28	25.3	20.8	18.1	78	0.4
29	26.6	22.5	20.2	84	0
23	23.9	19.4	17.5	54	0
March 2020					
1	26.6	22.8	20.4	82	0
2	21.8	20.1	18.8	84	Trace
3	21	19.4	18.2	81	Trace
4	21.5	19.9	18.2	84	3.1
5	20.7	18.2	16.5	85	0.4
6	19.8	18.3	17.2	80	Trace
7	24.3	20.6	18.8	88	Trace
8	23.6	22.1	20.9	92	Trace
9	26.8	23.4	20.8	89	Trace
10	26.7	23.4	20.7	67	Trace
11	20.8	19.2	17.9	72	Trace
12	20.2	19.2	18	89	Trace
13	25	21.4	19.3	91	0
14	25.9	21.6	19.8	78	0.4
15	23	20.2	18.9	70	0
16	22.8	20.3	18.5	75	0
17	21.7	20.3	19.5	79	0
18	21.6	20.5	19.7	86	10.7
19	23	21.1	20.3	88	0.8
20	23	21.2	20.5	87	0.4
21	23	21.2	20.2	94	0.2
22	28.5	24.2	21.6	84	0

Source: Hong Kong Observatory

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Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
March 2020					
23	28.5	24.6	22	81	0
24	26.6	22.8	21	82	Trace
25	26.5	22.8	21.2	83	Trace
26	26.3	23.3	22	90	1
27	27.7	24.4	22.4	86	Trace
28	25.9	22.8	19.8	91	9.8
29	21.9	20.2	19.1	91	2.2
30	21.4	20.4	19.7	95	6.5
31	21.3	20.3	19.2	95	5.8
April 2020					
1	21.3	19.7	18.9	91	0.2
2	20.7	19.9	19.3	86	0.4
3	21.3	20.4	19.4	88	0.6
4	24.1	20.8	19.7	89	1.1
5	19.9	18.2	16.9	88	4.6
6	17.9	17.1	16.1	92	21.5
7	21.1	19.1	17.2	86	Trace
8	24	20.6	18.7	71	0
9	25.6	21.6	18.8	69	0
10	24.6	21.7	19.9	73	0
11	24.3	22.5	20.5	88	20.5
12	25.6	20.8	18.1	59	0.4
13	25.4	20.2	16.4	44	0
14	24.1	21.1	19.6	65	0
15	25.9	22.2	19	66	0
16	28.3	23.3	20	77	0
17	28.3	24.1	22	79	0
18	27.8	24.4	22.4	81	Trace
19	30	25.9	23.7	80	0
20	29.4	26.4	24.6	81	0
21	30	26.7	24.9	82	0
22	25.7	22.1	19.4	94	25.8

Source: Hong Kong Observatory

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Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
April 2020					
23	21.7	20.6	19.4	89	1.3
24	21.4	19.4	18.1	84	0.6
25	22.7	20.5	18.4	83	0.1
26	27.8	23.1	19.9	75	0.7
27	28.5	24.4	21.6	65	0
28	27.9	24.3	22.4	64	0
29	28.5	24.2	21.7	72	0
30	30.3	25.3	22.2	74	0
31	21.7	20.6	19.4	89	1.3
May 2020					
1	30.2	25.7	23.6	81	0
2	30	26.3	23.9	77	0
3	31.3	27.3	24.9	78	0
4	31.5	27.8	25.9	79	0
5	29.9	27.9	26.6	80	0
6	31.4	28.7	27.2	81	0
7	30.8	29	27.7	81	0
8	32	29.3	28.2	81	0.1
9	31.7	29.2	27.7	79	0.1
10	32.4	29	26.4	78	0.8
11	33.5	28.9	24.2	76	14.8
12	30.4	27	24.4	82	3.6
13	28	26.6	25.8	84	0.3
14	29.8	27.1	25.1	83	0.1
15	31.7	28.5	26.7	81	0
16	32.9	28.9	26.5	80	0
17	32.5	28.9	26.7	77	Trace
18	28.6	25.8	24.1	88	46.7
19	31.7	28	25.6	82	0
20	28.5	27.6	26.7	87	4.3
21	29.5	27.6	25.5	92	84.6
22	29.4	27.9	27	88	17

Source: Hong Kong Observatory

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Rainstorm Warning Signals

Color	Start Time		End Time		Duration hh mm
	hh mm	dd/mon/yyyy	hh mm	dd/mon/yyyy	
Amber	10:10	13-Feb-20	11:15	13-Feb-20	1:05
Amber	10:45	18-Mar-20	11:45	18-Mar-20	1:00
Amber	21:25	11-May-20	23:10	11-May-20	01 45
Amber	10:10	18-May-20	11:15	18-May-20	01 05
Amber	01:10	21-May-20	02:30	21-May-20	01 20
Red	02:30	21-May-20	04:30	21-May-20	02 00
Amber	04:30	21-May-20	05:15	21-May-20	00 45
Amber	21:25	11-May-20	23:10	11-May-20	01 45

Source: Hong Kong Observatory

Hong Kong Red Tide Record

Sighting Start Date dd/mon/yyyy	Sighting End Date dd/mon/yyyy	Location	Group	Species
3-May-20	4-May-20	Golden Beach, Tuen Mun	Others	<i>Heterosigma akashiwo</i>

Source: Agriculture, Fisheries and Conservation Department

Strong Monsoon Signals

Direction	Start Time		End Time		Duration hh mm
	hh mm	dd/mon/yyyy	hh mm	dd/mon/yyyy	
East	16:15	5-Feb-20	14:40	6-Feb-20	22:25
North	03:40	16-Feb-20	11:30	17-Feb-20	31:50
East	22:05	11-Mar-20	08:45	12-Mar-20	10:40
East	23:25	28-Mar-20	03:15	30-Mar-20	27 50
East	03:45	5-Apr-20	09:45	6-Apr-20	30 00
North	06:15	12-Apr-20	01:40	13-Apr-20	19 25
East	11:00	22-Apr-20	07:45	23-Apr-20	20 45
East	20:45	20-May-20	00:30	21-May-20	03 45

Source: Hong Kong Observatory

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Thunderstorm Warning

Start Time		End Time		Duration
hh mm	dd/mon/yyyy	hh mm	dd/mon/yyyy	hh mm
08:50	13-Feb-20	12:00	13-Feb-20	03:10
13:20	13-Feb-20	16:30	13-Feb-20	02:10
03:30	14-Feb-20	12:00	14-Feb-20	08:30
10:05	18-Feb-20	16:00	18-Feb-20	05:55
50:50	26-Mar-20	07:30	26-Mar-20	01 40
22:15	27-Mar-20	01:45	28-Mar-20	03 30
00:50	4-Apr-20	02:30	4-Apr-20	01 40
21:55	11-Apr-20	01:00	12-Apr-20	03 05
19:45	22-Apr-20	23:10	22-Apr-20	03 25
16:20	10-May-20	20:15	10-May-20	03 55
09:58	11-May-20	11:00	11-May-20	01 02
12:09	11-May-20	13:15	11-May-20	01 06
21:10	11-May-20	00:30	12-May-20	03 20
05:35	13-May-20	07:00	13-May-20	01 25
00:40	18-May-20	18:30	18-May-20	17 50
03:00	19-May-20	05:15	19-May-20	02 15
15:30	19-May-20	17:30	19-May-20	02 00
10:15	20-May-20	11:30	20-May-20	01 15
22:40	20-May-20	07:00	21-May-20	08 20
10:05	21-May-20	11:00	21-May-20	00 55
13:07	21-May-20	18:15	21-May-20	05 08
02:00	22-May-20	12:00	22-May-20	10 00

Source: Hong Kong Observatory