環境保護署
Environmental Protection Department

Contract No. EP/SP/66/12

Integrated Waste Management Facilities, Phase 1

吉寶西格斯－振華聯營公司
KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Monthly EM&A Report No.3
(Period from 1 September to 30 September 2018)

(Clause 3.3, Further Environmental Permit FEP-01/429/2012/A)

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	Prepared by:	Certified by:	Verified by:
Name	Nelson Tsui	Gabriel C.K. Lam	Mandy To
Position	Environmental Team	Environmental Team Leader	Independent Environmental Checker
Signature			
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Revision History

A	First Submission	12 Oct 2018
Rev.	**DESCRIPTION OF MODIFICATION**	**DATE**

CONTENT

EXECUTIVE SUMMARY

Introduction

A1. The Project, Integrated Waste Management Facility (IWMF), is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO) and is currently governed by a Further Environmental Permit (FEP No. FEP-01/429/2012/A) for the construction and operation of the Project.

A2. In accordance with the Updated Environmental Monitoring and Audit (EM&A) Manual for the Project, EM&A works for marine water quality, noise, waste management and ecology should be carried out by Environmental Team (ET), Acuity Sustainability Consulting Limited (ASCL), during the construction phase of the Project.

A3. This is the 3rd Monthly EM&A Report, prepared by ASCL, for the Project summarizing the monitoring results and audit findings of the EM&A programme at and around Shek Kwu Chau (SKC) during the reporting period from 1 September 2018 to 30 September 2018.

Summary of Main Works Undertaken & Key Mitigation Measures Implemented

A4. Key activities carried out in this reporting period for the Project included the following:

- Marine Site Investigation Works
- Coring of DCM samples conducted at site trial location
- Collecting Marine Sediment Samples
- DCM installation for DCM Site Trial Re-trial
- Laying of Geotextile and Sand Blanket for DCM Injection Works

A5. The major environmental impacts brought by the above construction activities include:

- Water quality impact from DCM installation
- Disturbance and possible trapping of Finless Porpoise by silt curtains

A6. The key environmental mitigation measures implemented for the Project in this reporting period associated with the construction activities include:

- Reduction of noise from equipment and machinery on-site;
- Installation of silt curtains for DCM installation;
- Sorting and storage of general refuse and construction waste;
- Management of chemicals and avoidance of oil spillage on-site; and
- Implementation of MMEZ (Marine Mammal Exclusion Zone) and inspection of enclosed environment within silt curtains as per DMPFP (Detailed Monitoring Programme of Finless Porpoise)

Summary of Exceedance & Investigation & Follow-up

A7. The EM&A works for construction noise, water quality, construction waste, coral, marine mammal and White-Bellied Sea Eagle (WBSE) were conducted during the reporting period in accordance with the Updated EM&A Manual.

A8. No exceedance of the Action or Limit Levels in relation to the construction noise, construction waste, coral and WBSE monitoring was recorded in the reporting month.

A9. Twenty nine of the water quality monitoring results for Suspended Solid (SS) obtained during the reporting period had exceeded the relevant Action or Limit Levels, where findings from investigations carried out immediately for each of the exceedance cases had showed that these exceedances were unrelated to the Project, except for the exceedances on 20, 27 and 29 September 2018, where the investigation is undergoing and the investigation results will be presented in the next monthly report.

A10. No project-related Action Level & Limit Level exceedance was recorded from 1 to 19 and 24 September 2018.

A11. Weekly site inspections of the construction works by ET were carried out on 4, 11, 20 and 26 September 2018 to audit the mitigation measures implementation status. Monthly joint site inspection was carried out on 20 September 2018 by ET and IEC. Observations have been recorded in the site inspection checklists and provided to the contractors together with the appropriate follow-up actions where necessary.

Baseline Water Quality Monitoring during Wet Season

A12. Baseline marine water quality monitoring in wet season is being carried out from 13 August 2018 to 7 September 2018 at all fourteen water quality monitoring stations, which is located at and around SKC. Only the following construction activities were carried out during the baseline water quality monitoring:

- Ground Investigation Works for Marine Works
- Collect marine sediment samples
- Coring of DCM samples conducted at site trail location

All of the above construction activities shall not affect the Baseline Water Quality Monitoring results considering the limited scale and nature of works.

Complaint Handling and Prosecution

A13. No project-related environmental complaint was received during the reporting period.

A14. Neither notifications of summons nor prosecution was received for the Project.

Reporting Change

A15. There were no changes to be reported that may affect the on-going EM&A programme.

Summary of Upcoming Key Issues and Key Mitigation Measures

A16. Key activities anticipated in the next reporting period for the Project will include the following:

- Marine Site Investigation Works
- Coring of DCM samples conducted at site trial location
- Collecting Marine Sediment Samples
- DCM installation for DCM Site Trial Re-trial
- Laying of Geotextile and Sand Blanket for DCM Injection Works

A17. The major environmental impacts brought by the above construction activities will include:

- Water quality impact from laying of sand blanket
- Water quality impact from DCM installation
- Disturbance and possible trapping of Finless Porpoise by silt curtains

A18. The key environmental mitigation measures for the Project in the coming reporting period associated with the construction activities will include:

- Reduction of noise from equipment and machinery on-site;
- Installation of silt curtains for the sand blanket laying works and DCM installation works;
- Sorting, recycling, storage and disposal of general refuse and construction waste;
- Management of chemicals and avoidance of oil spillage on-site, especially under heavy rains and adverse weather; and
- Implementation of MMEZ and inspection of enclosed environment within silt curtains as per DMPFP

1. BASIC PROJECT INFORMATION

1.1 Background

1.1.1 The Government of Hong Kong SAR will develop the Integrated Waste Management Facilities (IWMF) Phase 1 (hereafter "the Project") with incineration to achieve substantial bulk reduction of unavoidable municipal solid waste (MSW) and to recover energy from the incineration process. The IWMF will be on an artificial island to be formed by reclamation at the south-western coast of Shek Kwu Chau. Keppel Seghers – Zhen Hua Joint Venture (KSZHJV) was awarded the contract under Contract No. EP/SP/66/12 Integrated Waste Management Facilities Phase 1 to construct and operate the Project.

1.1.2 An environmental impact assessment (EIA) study for the Project have been conducted and the EIA Report was approved under the Environmental Impact Assessment Ordinance on 17 January 2012. An Environmental Permit (EP) (EP No.: EP-429/2012) was granted to EPD on 19 January 2012 for the construction and operation of the Project. Subsequently, the EP was amended (EP No.: EP-429/2012/A) and a further EP (FEP) (EP No.: FEP-01/429/2012/A) was granted to the Keppel Seghers – Zhen Hua Joint Venture (KSZHJV) on 27 December 2017.

1.1.3 The key design and construction elements of the Project include the Design and the Works including but not limited to the design, engineering procurement, construction, testing and commissioning of the Facility including:

- Ground Treatment works;
- Seawall and Breakwater construction;
- Non-dredged Reclamation;
- Other Marine works and Harbour and Port Facilities,
- Site formation,
- Municipal Solid Waste (MSW) Treatment Processes,
- Energy Recovery for Power Generation and Surplus Electricity export,
- Wastewater treatment process,
- Desalination and water treatment process,
- Civil works;
- Building and Structural works,
- Electrical and Mechanical works,
- Building Services,
- Architectural and Landscaping works, and
- All other design and works required for the operation and maintenance of the Facility
- according to the Contract requirements

1.1.4 The location of the IWMF near Shek Kwu Chau (SKC) and general layout of IWMF are shown in **Figure 1.1** and **Figure 1.2** respectively.

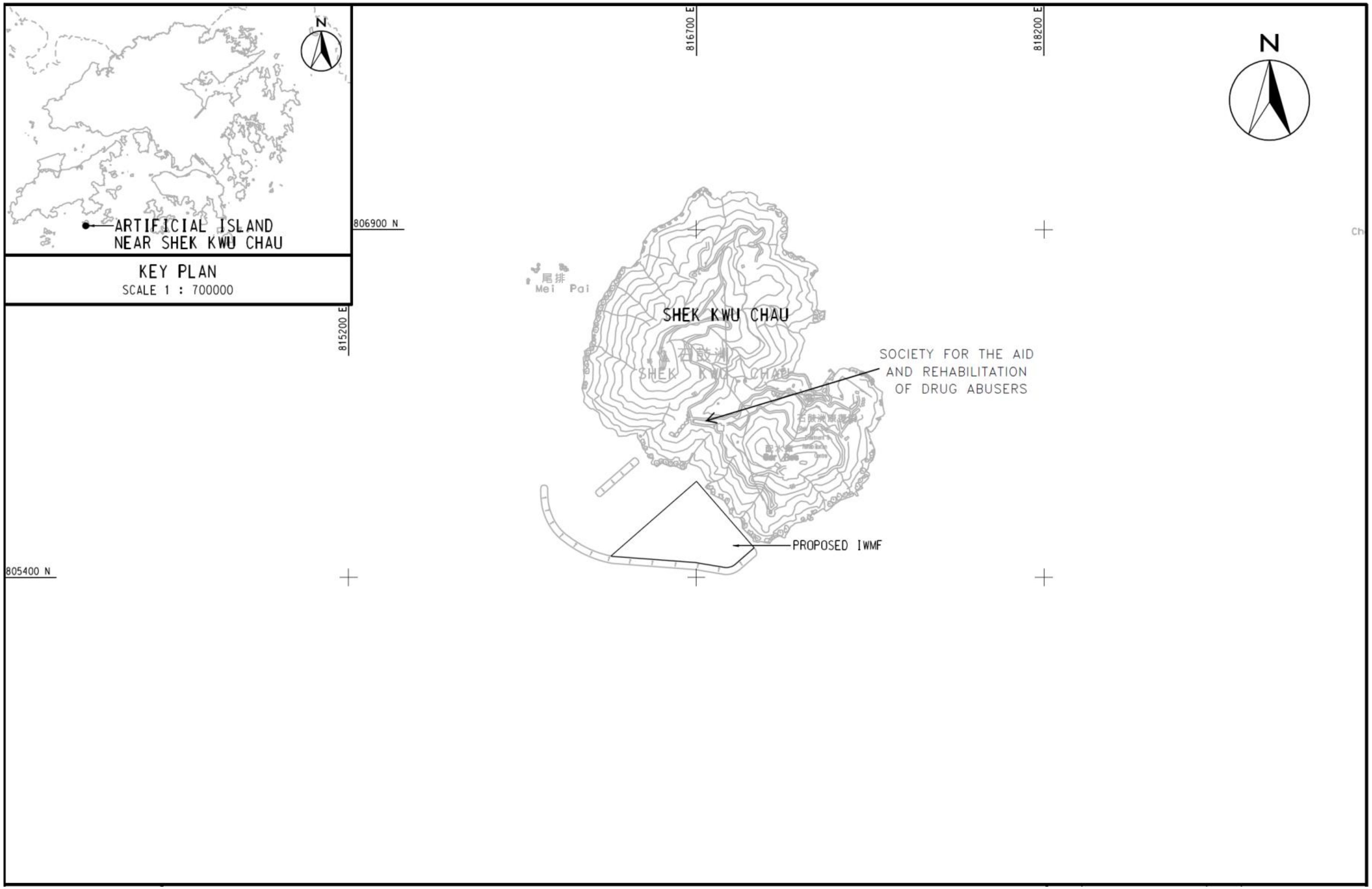


Figure 1.1 Location of the IWMF at the Artificial Island near SKC

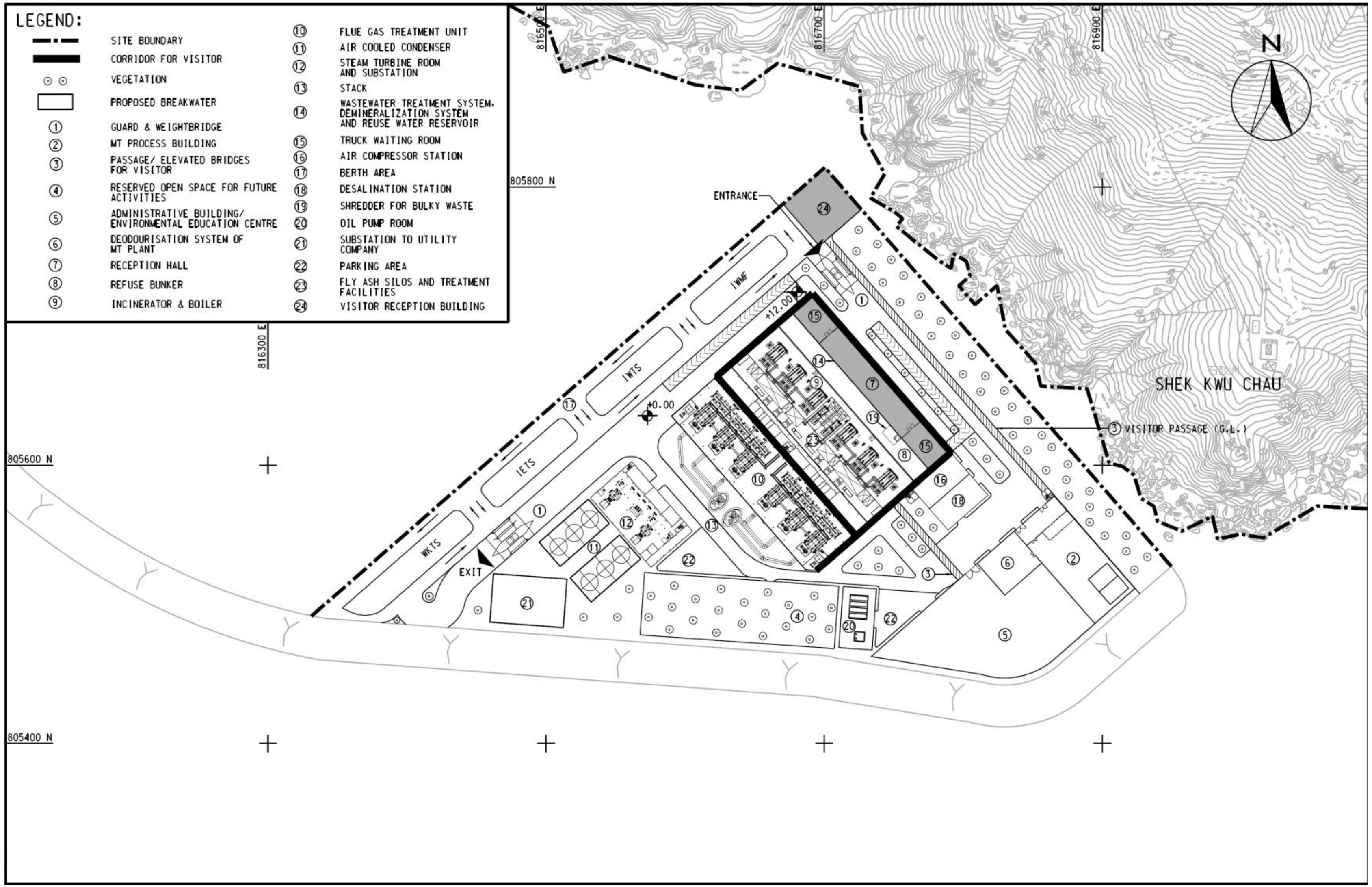


Figure 1.2 General Layout of the IWMF at the Artificial Island near SKC

1.2 The Reporting Scope

1.2.1 This is the 3rd Monthly EM&A Report for the Project which summarizes the key findings of the EM&A programme during the reporting period from 1 September 2018 to 30 September 2018.

1.3 Project Organization

1.3.1 The Project Organization structure for Construction Phase is presented in **Figure 1.3**.

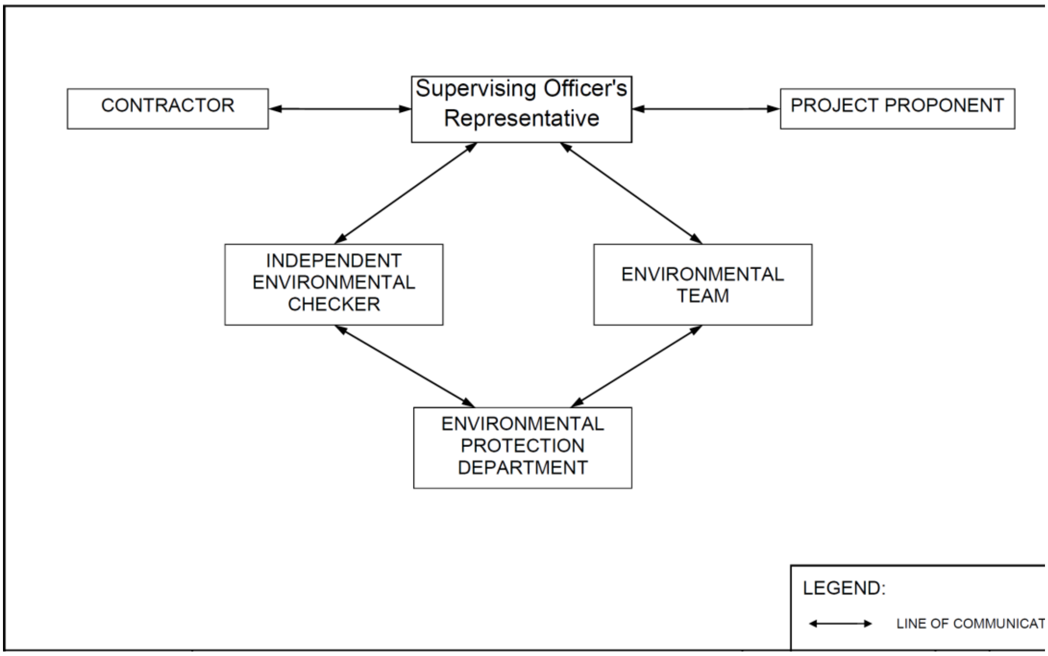
1.3.2 

Figure 1.3 Project Organization Chart

1.3.3 Contact details of the key personnel are presented in **Table 1.1** below:

Table 1.1 Contact Details of Key Personnel

Party	Position	Name	Telephone no.
Keppel Seghers – Zhen Hua Joint Venture	Project Manager	Kenny Yu	2192-0606
Acuity Sustainability Consulting Limited	Environmental Team Leader	Gabriel Lam	2698-6833
ERM-Hong Kong, Limited	Independent Environmental Checker	Mandy To	2271-3000

1.4 Summary of Construction Works

1.4.1 Details of the major construction activities undertaken in this reporting period are shown in **Table 1.2** and **Figure 1.4** below. The construction programme is presented in **Appendix A**.

Table 1.2 Summary of the Construction Activities Undertaken during the Reporting Month

Location of works	Construction activities undertaken	Remarks on progress
Seawall and breakwater locations	• Marine site investigation works	• 31 out of 51 drill holes were completed
Location of DCM Site Trial	• Coring of DCM samples	• Completed
Seawall locations	• Collecting of Marine Sediment Samples	• 5 out of 7 drill holes were completed
Location of DCM Site Trial Re-trial	• DCM installation	• On-going
Seawall and breakwater locations	• Laying of Geotextile and Sand Blanket	• Commenced on 30 September 2018

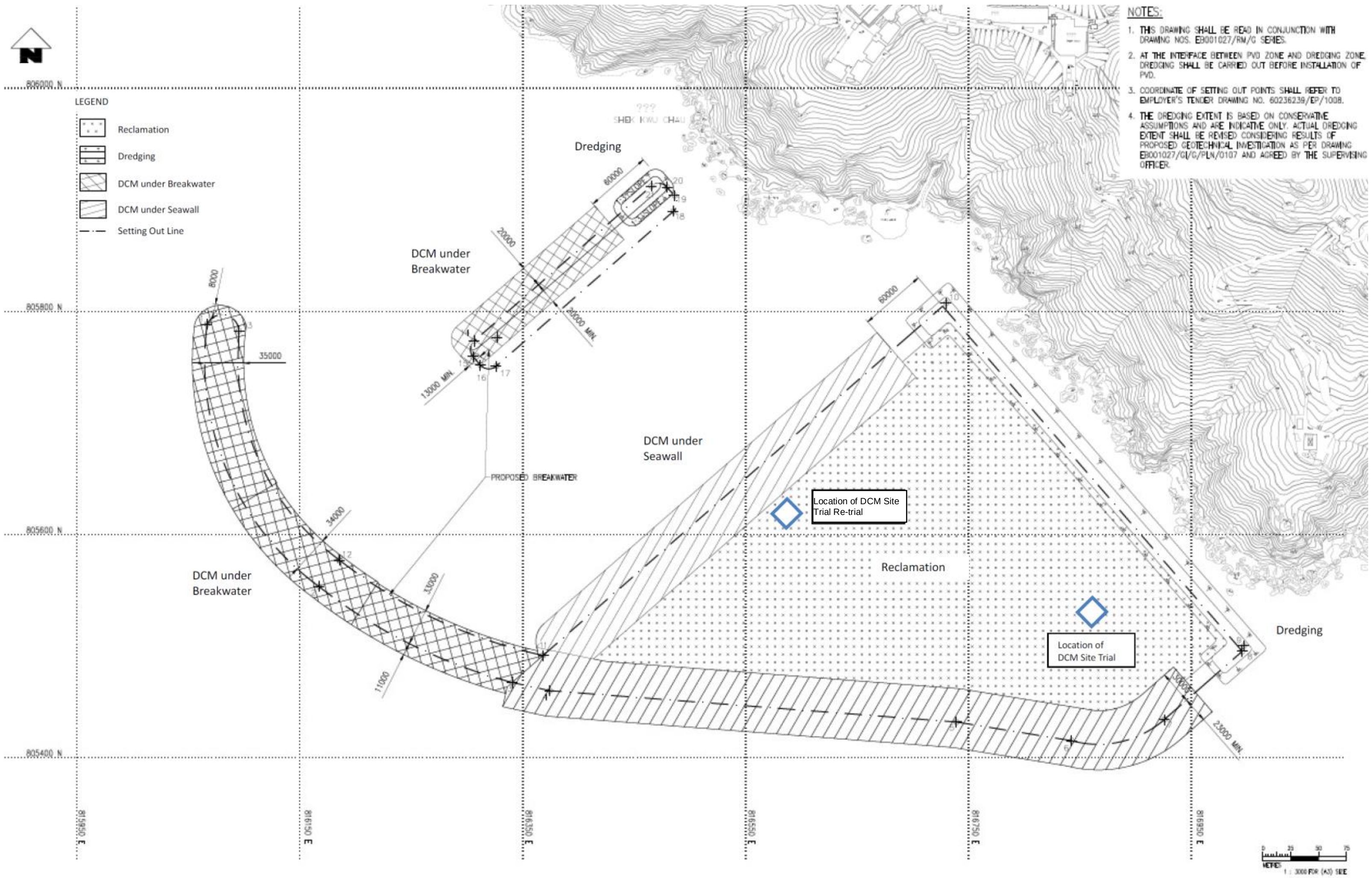


Figure 1.4 Location of Major Construction Activities Undertaken during the Reporting Month

1.5 Summary of Environmental Status

1.5.1 A summary of the valid permits, licences, and /or notifications on environmental protection for this Project is presented in **Table 1.3**

Table 1.3 Summary of the Status of Valid Environmental Licence, Notification, Permit and Documentations

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Variation of Environmental Permit	EP-429/2012/A	Throughout the Contract	
Further Environmental Permit	FEP-01/429/2012/A	Throughout the Contract	
Notification of Construction Works under the Air Pollution Control (Construction Dust) Regulation (Form NA)	Ref No.: 428778	15/12/2017-22/09/2024	
Wastewater Discharge Licence	-	-	Under Application
Chemical Waste Producer Registration	WPN0017-933-K3301-01	Throughout the Contract	
	WPN5213-961-K3301-02	Throughout the Contract	
Construction Noise Permit	GW-RS0534-18	22/6/2018-20/12/2018	
Billing Account for Disposal of Construction Waste	A/C No.:7029768	Throughout the Contract	

1.5.2 The status for all environmental aspects is presented **Table 1.4**.

Table 1.4 Summary of Status for Key Environmental Aspects under the Updated EM&A Manual

Parameters	Status
Water Quality	
Baseline Monitoring under Updated EM&A Manual and Detailed Plan on DCM	The baseline water quality monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Regular DCM Monitoring	On-going
Initial Intensive DCM Monitoring	To be commenced according to the Detailed Plan on DCM
Baseline Water Quality of wet season	Being carried out from 13 August 2018 to 7 September 2018
Noise	
Baseline Monitoring	The baseline niose monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4

Parameters	**Status**
Impact Monitoring	On-going
Waste Management	
Mitigation Measures in Waste Monitoring Plan	On-going
Coral	
Pre-translocation Survey and Coral Mapping	The Coral Translocation Plan was submitted and approved by EPD under EP Condition 2.12
Coral Translocation	Completed on 28 March 2018
Post-Translocation Coral Monitoring	On-going, survey obstructed due to missing of translocated and tagged coral colonies after typhoons
Pre-construction Coral Survey and Tagging	Completed on 26 June 2018
Tagged Coral Monitoring	On-going, survey obstructed due to missing of tagged coral colonies after typhoons
Marine Mammal	
Baseline Monitoring	The baseline marine mammal monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
White-bellied Sea Eagle	
Baseline Monitoring	The baseline WBSE monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Environmental Audit	
Site Inspection covering Measures of Air Quality, Noise Impact, Water Quality, Waste, Ecological Quality, Fisheries, Landscape and Visual	On-going
Mitigation Measures in Marine Mammal Watching Plan (MMWP)	On-going
Mitigation Measures in Detailed Monitoring Programme on Finless Porpoise (DMPFP)	On-going
Mitigation Measures in Vessel Travel Details	On-going

1.5.3 Other than the EM&A works by ET, environmental briefings, trainings and regular environmental management meetings were conducted, in order to enhance environmental awareness and closely monitor the environmental performance of the contractors.

1.5.4 The EM&A programme has been implemented in accordance with the recommendations presented in the approved EIA Report and the Updated EM&A Manual, except for the investigation on water quality monitoring exceedances on 20, 27 and 29 September 2018, where the investigation is undergoing and the investigation results will be presented in the next monthly report. A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix B**.

2. MARINE WATER QUALITY MONITORING

2.1 Water Quality Requirements

2.1.1 To ensure no adverse water quality impact, water quality monitoring is recommended to be carried out at the nearby water sensitive receivers (WSRs) during construction phase including proposed reclamation, breakwater construction, etc.

2.1.2 In accordance with the Updated EM&A Manual, impact water quality monitoring were conducted 3 days per week at mid-flood and mid-tide to obtain impact water quality levels at the eleven monitoring stations during general water quality monitoring and fourteen monitoring stations during regular DCM monitoring for the construction period.

2.2 Water Quality Parameters, Time, Frequency

2.2.1 Dissolved Oxygen (DO), Turbidity, Suspended Solids (SS), Salinity and pH have been undertaken at the eleven monitoring stations during general water quality monitoring. Beside the above parameters, monitoring for Total Alkalinity, Current Velocity and Current Direction have been undertaken at all fourteen monitoring stations (including S1, S2 and S3) during regular DCM monitoring. While the same parameters monitored during regular DCM monitoring would be undertaken at twelve immediate upstream and downstream area to the DCM works location during intensive DCM monitoring. Intensive DCM monitoring was not undertaken during the reporting period.

2.2.2 Current velocity and direction, DO , temperature, salinity, turbidity and pH have been measured in-situ and the SS, Total Alkalinity have been assayed in a HOKLAS laboratory.

2.2.3 In associate with the water quality parameters, other relevant data were also measured, such as monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or work underway nearby were also recorded. The monitoring schedule is provided in **Appendix C**.

2.2.4 Impact water quality monitoring was conducted 3 days per week in the reporting period. All parameters were monitored during mid-flood and mid-ebb tides at three water depths for general water quality monitoring. The interval between two sets of monitoring has not been less than 36 hours.

2.2.5 **Table 2.1** summarizes the monitoring parameters, frequency and duration of the impact water quality monitoring during construction phase.

Table 2.1 Water Quality Monitoring Parameters, Frequency and Duration

Parameter, unit	Frequency	No. of Depths
• Water Depth(m) • Temperature(^{o}C) • Salinity(ppt) • pH (pH unit) • Dissolved Oxygen (DO)(mg/L and % of saturation) • Turbidity(NTU) • Suspended Solids (SS),	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.

Parameter, unit	Frequency	No. of Depths
mg/L • Total alkalinity • Current velocity • Direction		

2.3 Water Quality Monitoring Locations

2.3.1 Impact water quality monitoring was conducted at eleven monitoring locations (B1-B4, H1, C1, C2, F1, CR1, CR2 & M1) during general water quality monitoring and was conducted at fourteen water monitoring locations (B1-B4, H1, C1, C2, F1, S1-S3, CR1, CR2 & M1) during regular DCM monitoring, as shown in **Figure 2.1**.

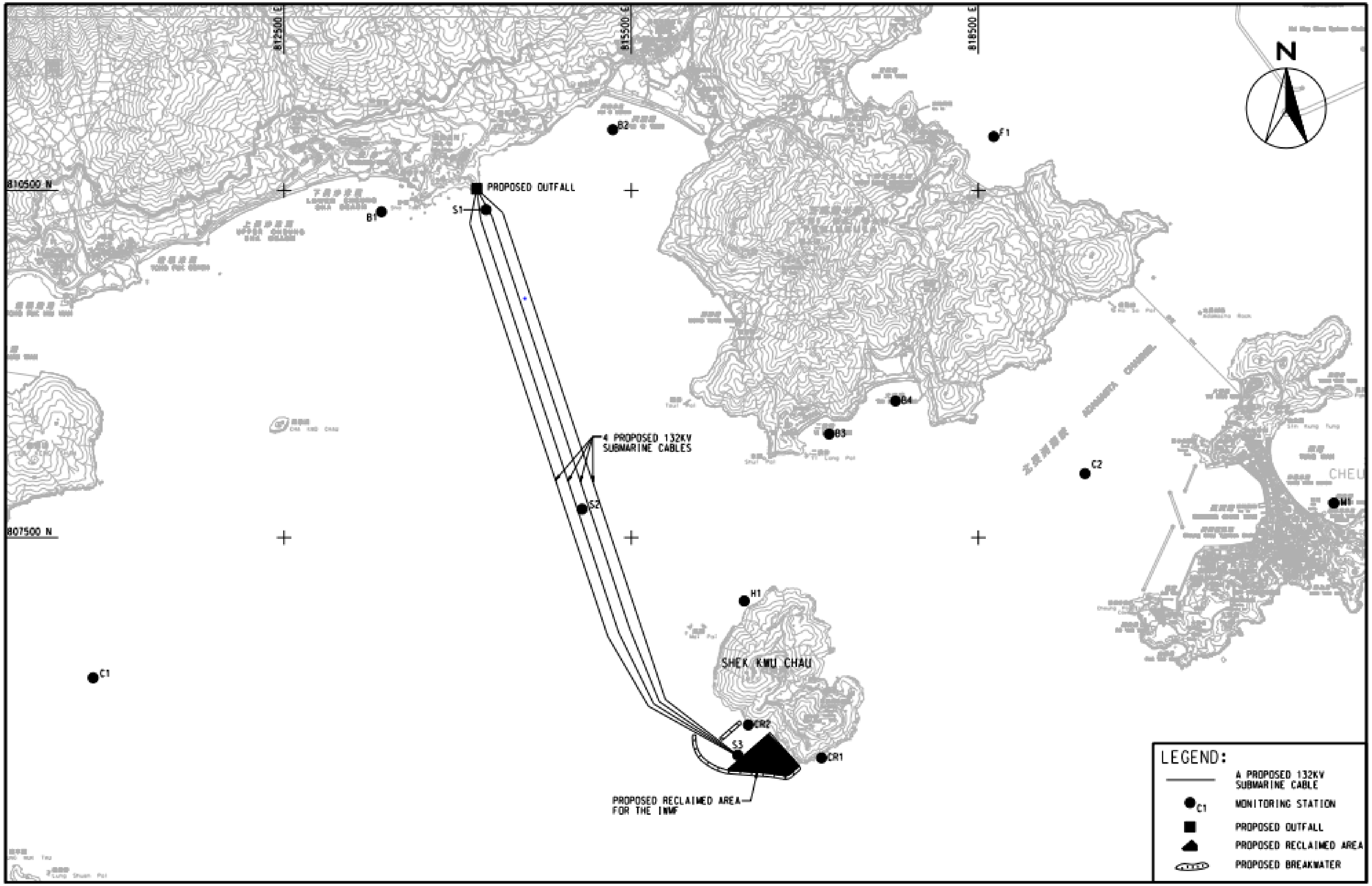


Figure 2.1 Water monitoring locations at Artificial Island near SKC

2.3.2 B1 to B4 are located at 4 beaches respectively at the southern shore of Lantau Island. Monitoring station H1 is located at the horseshoe crab habitat at northern SKC, while CR1 and CR2 are located at the coral communities at southwestern shore of SKC. Monitoring station F1 is located at the Cheung Sha Wan Fish Culture Zone while monitoring station M1 is located at Tung Wan at Cheung Chau. S1, S2 and S3 are located at the northern landing site, midway and southern landing site of the proposed submarine cable, respectively. S1, S2 and S3 are required for monitoring due to the laying of submarine cable. Control stations C1 and C2 at far field locations are for comparison.

2.3.3 Fourteen monitoring stations are listed in **Table 2.2**:

Table 2.2 - Locations of Marine Water Quality Stations

Monitoring station	Description	Easting	Northing
B1	Beach - Cheung Sha Lower	813342	810316
B2	Beach - Pui O	815340	811025
B3	Beach - Yi Long Wan	817210	808395
B4	Beach - Tai Long Wan	817784	808682
H1	Horseshoe Crab - Shek Kwu Chau	816477	806953
C1	Control Station	810850	806288
C2	Control Station	819421	808053
F1	Cheung Sha Wan Fish Culture Zone	818631	810966
S1	Submarine Cable Landing Site	814245	810335
S2	Submarine Cable	815076	807747
S3	Submarine Cable Landing Site	816420	805621
CR1	Coral	817144	805597
CR2	Coral	816512	805882
M1	Tung Wan	821572	807799

2.3.4 For initial intensive DCM monitoring, mobile impact monitoring stations shall be located within fixed distances from the DCM group works area to obtain water quality information in the immediate upstream and downstream area. A total of 12 nos. monitoring stations will be deployed with the following arrangement and illustrated in **Figure 2.2**:

- Two monitoring stations upstream and at 150 m envelope of DCM group works area (Representative Control stations).
- Five monitoring stations downstream and at 150 m envelope of DCM group works area (Impact 1 stations).
- Five monitoring stations downstream and at 250 m envelope of DCM group works area (Impact 2 stations).
- Monitoring stations should be at least 50 m apart;
- Downstream monitoring stations should be perpendicular to the tidal direction.

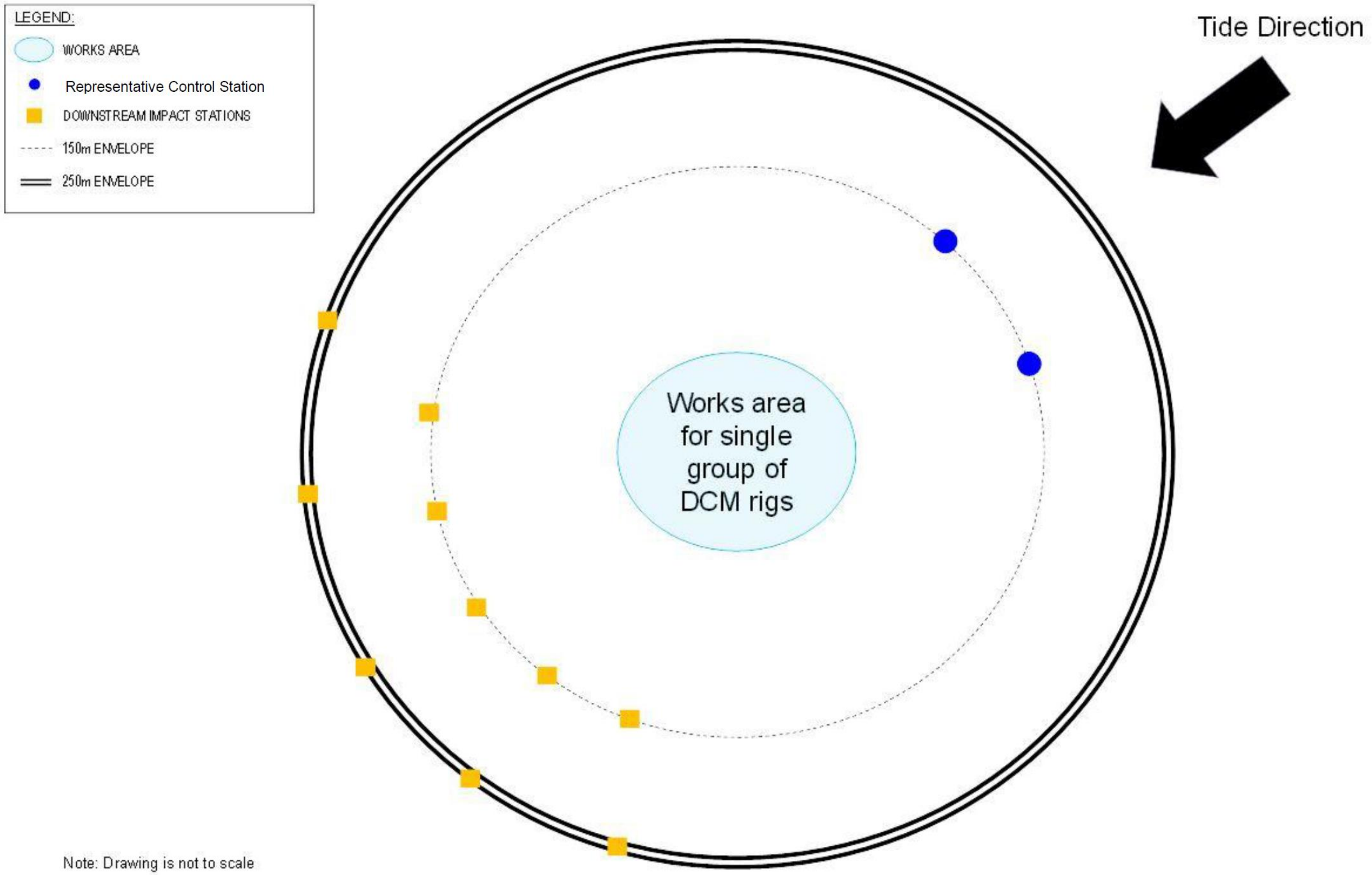


Figure 2.2 Water monitoring locations during intensive DCM monitoring

2.4 Impact Monitoring Methodology

2.4.1 General water quality monitoring was conducted three days per week, at mid-flood and mid-ebb tides, at the designated water quality monitoring stations during the reporting period.

2.4.2 The interval between 2 sets of monitoring was not less than 36 hours. Sampling was collected at three water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except where the water depth is less than 6m, the mid-depth was omitted. If the water depth was less than 3m, only the mid-depth station was monitored.

2.4.3 All observations and results were recorded in the data record sheets in **Appendix D**. Duplicate in-situ measurements and water sampling were carried out in each sampling event. The monitoring probes were retrieved out of water after the first measurement and then redeployed for the second measurement. When the difference in value between the first and second readings of DO or turbidity is more than 25% of the value of the first reading, the reading was discarded and further readings were taken.

<u>In-situ Measurement</u>

2.4.4 Levels of DO, pH, temperature, turbidity and salinity would be measured in-situ by portable and weatherproof measuring instrument, e.g. YSI ProDSS and Horiba U-53 Multiparameter complete with cable and sensor. (Refer to http://www.ysi.com/ProDSS for YSI ProDSS technical specification and http://www.horiba.com/process-environmental/products/water-treatment-environment/details/u-50-multiparameter-water-quality-checker-368/ for Horiba U-53 technical specification). Water current velocity and Water Current direction would be measured by portable and weatherproof current meter, e.g. SonTek Hydrosurveyor (Refer to https://www.sontek.com/media/pdfs/riversurveyor-s5-m9-brochure.pdf for SonTek Hydrosurveyor M9 technical specification). Parameters measured by in-situ measurement is tabulated in **Table 2.3**

Table 2.3 - Parameters Measured by In-situ Measurement

Parameter	Resolution	Range
Temperature	0.1 ^{o}C	-5-70 ^{o}C
Dissolved Oxygen (DO)	0.01 mg/L	0-50.0 mg/L
Turbidity	0.01 NTU	0-1000 NTU
pH	0.01 pH	pH 0-14
Salinity	0.01 ppt	0-40 ppt
Water Current Velocity	0.001m/s	±20m/s
Water Current Direction	±1^{o}	±2^{o}

<u>Laboratory Analysis</u>

2.4.5 Analysis of Total Alkalinity and SS should be carried out in a HOKLAS accredited laboratory, as shown in **Appendix E**. Sufficient water samples shall be collected at the monitoring stations for carrying out the laboratory determinations. The determination work should be started within 24 hours after collection of the water samples. Analytical methods and detection limits for SS and total alkalinity are present in **Table 2.4**.

Table 2.4 - Analytical Methods Applied to Water Quality Samples

Parameter	Analytical method	Detection Level
Suspended Solids, SS	APHA 2540 D_i	1 mg/L
Total Alkalinity	APHA 2320	0.01 mg/L

Footnote:
i. "APHA 2540 D" stands for American Public Health Association Standard Methods for the Examination of Water and Wastewater, 23rd Edition.

Field Log

2.4.6 Other relevant data was recorded, such as: monitoring location / position, time, water depth, weather conditions and any special phenomena underway near the monitoring station.

2.5 Baseline Water Quality Monitoring for Wet Season

2.5.1 Baseline marine water quality monitoring was undertaken in accordance with the requirements provided in the EM&A Manual between 26 February and 26 March 2018 during the dry season (October - March). A Baseline Monitoring Report was submitted on 14 June 2018 to fulfil Condition 3.3 of the FEP. It is proposed to supplement the marine water quality monitoring data in wet season (April – September) so as to further improve the baseline data to take into account potential variations within a year due to natural fluctuations and also enhance the representativeness of the water quality monitoring parameters.

2.5.2 A detailed Proposal for Review Baseline Marine Water Quality prepared by KSZHJV has been submitted to EPD and approved on 22 August 2018 on the above proposed actions as attached in **Appendix Q**.

2.6 Monitoring Equipment

2.6.1 Equipment used in the impact water quality monitoring programme is summarized in **Table 2.5** below. Calibration certificates for the water quality monitoring equipment are attached in **Appendix F**.

Table 2.5 Impact Water Quality Monitoring Equipment

Monitored Parameter	Equipment	Brand and Model
DO, Temperature, Salinity, pH and Turbidity	Multi-functional Meter	Horiba U-53
Coordinates	Positioning Equipment	Garmin GPSMAP 78s
Water depth	Water Depth Detector	Hummingbird 160 Portable
SS	Water Sampler	Wildco 2 L Water Sampler with messenger

2.6.2 Dissolved Oxygen and Temperature Measuring Equipment

The instrument was a portable and weatherproof DO probe mounted on the multi-functional meter complete with cable and sensor, and use a DC power source. The equipment was capable of measuring:

- A DO level in the range of 0 - 50 mg/L; and
- Temperature of -5 - 70 degree Celsius.

2.6.3 Turbidity Measurement Instrument

The instrument was a portable and weatherproof turbidity-measuring probe mounted on the multi-functional meter using a DC power source. It had a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.

2.6.4 pH Measurement Instrument

The probe was consisted of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device mounted on the multi-functional meter. It was readable to 0.1 pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 were used for calibration of the instrument before and after use.

2.6.5 Salinity Measurement Instrument

A portable salinometer mounted on the multi-functional meter capable of measuring salinity in the range of 0-40 parts per thousand (ppt) was provided for measuring salinity of the water at each monitoring location.

2.6.6 Sampler

The water sampler comprised a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.

2.6.7 Sample Containers and Storage

Water samples for SS were stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples was collected to achieve the detection limit stated in **Table 2.4**.

2.6.8 Water Depth Detector

A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station. This unit could either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

2.6.9 Monitoring Position Equipment

Hand-held digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message ‘screen pop-up’ facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office) was provided and used to ensure that the water sampling locations were correct during the water quality monitoring work.

2.7 Maintenance and Calibration

2.7.1 The multi-functional meters were checked and calibrated before use. Multi-functional meters were certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter was carried out before commencement of monitoring and after completion of all measurements each day. Calibration was not conducted at each monitoring location as daily calibration is adequate for the type of DO meter employed.

2.7.2 Sufficient stocks of spare parts were provided and maintained for replacements when necessary. Backup monitoring equipment was prepared for uninterrupted monitoring during equipment maintenance or calibration during monitoring.

2.8 Action and Limit Levels

2.8.1 The Action and Limit Levels have been set based on the derivation criteria specified in the Updated EM&A Manual and Detailed DCM Plan, as shown in **Table 2.6** below.

Table 2.6 Criteria of Action and Limit Levels for Water Quality

Parameters	**Action**	**Limit**
Construction Phase Impact Monitoring		
DO in mg/L	≤ 5 %-ile of baseline data	≤ 4
SS in mg/L	≥ 95 %-ile of baseline data or 120% of control station's SS at the same tide of the same day of measurement, whichever is higher	≥ 99 %-ile of baseline data or 130% of control station's SS at the same tide of the same day of measurement, whichever is higher
Turbidity in NTU	≥ 95 %-ile of baseline data or 120% of control station's turbidity at the same tide of the same day of measurement, whichever is higher	≥ 99 %-ile of baseline data or 130% of control station's turbidity at the same tide of the same day of measurement, whichever is higher
Temperature in°C	1.8°C above the temperature recorded at representative control station at the same tide of the same day	2°C above the temperature recorded at representative control station at the same tide of the same day
Total Alkalinity in mg/L	≥ 95 %-ile of baseline data or 120% of representative control station at the same tide of the same day, whichever is higher	≥ 99 %-ile of baseline data or 130% of representative control station at the same tide of the same day, whichever is higher

2.8.2 Based on the baseline monitoring data and the derivation criteria specified above, the Action/Limit Levels have been derived and are presented in **Table 2.7**.

Table 2.7 Derived Action and Limit Levels for Water Quality Monitoring

Parameters	**Action**	**Limit**
Construction Phase Impact Monitoring		

Parameters	Action	Limit
DO in mg/L	≤ 7.13	≤ 4
SS in mg/L	≥ 8 or 120% of control station's SS at the same tide of the same day of measurement, whichever is higher	≥ 10 or 130% of control station's SS at the same tide of the same day of measurement, whichever is higher
Turbidity in NTU	≥ 5.6 or 120% of control station's turbidity at the same tide of the same day of measurement, whichever is higher	≥ 12.81 or 130% of control station's turbidity at the same tide of the same day of measurement, whichever is higher
Temperature in°C	1.8°C above the temperature recorded at representative control station at the same tide of the same day	2°C above the temperature recorded at representative control station at the same tide of the same day
Total Alkalinity in mg/L	≥116 or 120% of control station's Total Alkalinity at the same tide of the same day of measurement, whichever is higher	≥ 118 or 130% of control station's Total Alkalinity at the same tide of the same day of measurement, whichever is higher

Notes:

i. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
ii. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
iii. For turbidity, SS and Salinity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

2.8.3 If exceedances were found during water quality monitoring, the actions in accordance with the Event and Action Plan shall be carried out according to **Appendix G**.

2.9 Monitoring Results and Observations

2.9.1 DCM injection works for DCM Site Trial Re-trial was commenced on 11 September 2018, and then suspended on 12 September 2018 due to typhoons, and then resumed on 19 September 2018, and then paused on 24 & 25 September 2018 due to Mid-Autumn Festival, and now resumed since 26 September 2018. During the reporting period, general water quality monitoring was conducted on 3, 5, 7, 10, 12, 14, 18 and 24 September 2018 at all the eleven monitoring stations. Regular DCM monitoring including monitoring station S1, S2 and S3 were conducted on 20, 22, 27 and 29 September 2018. Monitoring results of 7 key parameters: Salinity, DO, turbidity, SS, pH, temperature and total alkalinity in this reporting month, are summarized in **Table 2.8**, and details results are presented in **Appendix D**.

Table 2.8 Summary of Impact Water Quality Monitoring Results

Locations		Parameters							
		Salinity (ppt)	Dissolved Oxygen (mg/L)		pH	Turbidity (NTU)	Suspended Solids (mg/L)	Temp. (^{o}C)	Total Alkalinity (mg/L) note ii
			Surface & Middle	Bottom					
B1	Avg.	28.80	8.40	8.29	8.16	3.19	7.35	28.2	97.06
	Min.	26.75	7.18	7.07	8.00	1.81	3.00	25.9	92.00
	Max.	30.70	10.23	10.44	8.24	6.03	16.00	31.1	106.00
B2	Avg.	28.63	8.47	8.45	8.16	3.48	7.36	28.2	97.13
	Min.	26.06	7.15	7.10	8.00	1.60	3.00	25.8	91.00
	Max.	30.70	10.48	10.42	8.25	5.94	19.00	31.2	109.00
B3	Avg.	28.49	8.39	8.28	8.16	3.45	6.78	28.0	97.06
	Min.	25.89	7.29	7.12	8.01	1.51	3.00	26.0	92.00
	Max.	30.70	10.38	10.42	8.26	5.83	16.00	31.2	107.00
B4	Avg.	28.61	8.44	8.34	8.17	3.56	7.14	28.2	96.94
	Min.	25.81	7.18	7.22	8.00	1.62	3.00	25.8	92.00
	Max.	30.70	10.27	10.22	8.25	5.94	14.00	31.1	108.00
C1	Avg.	28.55	8.33	8.32	8.17	3.30	7.42	28.2	97.13
	Min.	25.58	7.13	7.15	8.00	1.03	3.00	26.0	91.00
	Max.	30.69	10.42	10.44	8.27	6.08	16.00	31.2	109.00
C2	Avg.	28.52	8.53	8.39	8.17	3.54	7.42	28.4	97.40
	Min.	25.81	7.13	7.33	8.00	1.67	2.00	26.0	92.00
	Max.	30.70	10.48	10.37	8.28	6.05	14.00	31.2	109.00
CR1	Avg.	28.74	8.45	8.27	8.16	3.29	6.99	28.3	97.65
	Min.	25.77	7.13	7.18	8.00	1.02	3.00	26.0	91.00
	Max.	30.70	10.48	10.37	8.26	6.01	17.00	31.0	110.00
CR2	Avg.	28.31	8.64	8.65	8.17	3.26	6.58	28.1	97.25
	Min.	25.56	7.16	7.14	8.00	1.71	2.00	26.0	91.00
	Max.	30.70	10.41	10.47	8.29	6.05	13.00	31.2	109.00
F1	Avg.	28.53	8.62	8.50	8.17	3.20	6.75	28.4	97.40
	Min.	25.82	7.09	7.09	8.01	0.92	2.00	26.0	91.00
	Max.	30.69	10.86	10.64	8.27	7.99	13.00	31.1	108.00
H1	Avg.	28.53	8.41	8.36	8.17	3.48	7.86	28.3	97.13
	Min.	26.10	7.11	7.11	8.00	1.59	3.00	26.0	91.00
	Max.	30.69	10.42	10.48	8.27	6.06	16.00	31.2	110.00
M1	Avg.	28.58	8.51	8.44	8.16	3.49	7.37	28.3	97.38
	Min.	26.59	7.08	7.08	8.00	0.92	3.00	26.9	90.00
	Max.	30.69	10.50	10.35	8.24	6.97	22.00	31.2	109.00
S1	Avg.	28.62	8.49	8.53	8.16	3.68	6.95	28.6	97.13
	Min.	26.04	7.20	7.11	8.01	1.73	3.00	26.9	91.00
	Max.	30.69	10.44	10.48	8.24	5.69	13.00	31.2	108.00
S2	Avg.	28.60	8.41	8.43	8.16	3.51	7.01	28.3	97.40
	Min.	26.06	7.11	7.32	8.00	1.12	2.00	26.3	92.00
	Max.	30.70	10.49	10.50	8.24	6.08	17.00	31.2	110.00
S3	Avg.	28.54	8.67	8.66	8.17	3.28	6.96	28.5	97.44
	Min.	25.77	7.13	7.36	8.00	0.99	3.00	26.8	91.00
	Max.	30.68	10.44	10.49	8.30	6.01	15.00	31.1	111.00

Notes:

i. "Avg", "Min" and "Max" is the average, minimum and maximum respectively of the data from measurements conducted under mid-flood and mid-ebb tides at three water depths, except that of DO where the data for "Surface & Middle" and "Bottom" are calculated separately.

ii. Total alkalinity test only conducted on 20/09/2018, 22/09/2018, 27/09/2018 and 29/09/2018

2.9.2 Addition monitoring was carried out during the reporting period for Salinity, DO, turbidity, SS, pH and temperature at S1, S2 and S3 for the purpose of baseline monitoring for wet season, **Table 2.8** only shows the impact monitoring results while the baseline monitoring results for wet season will be presented in a separate submission.

2.9.3 Monitoring originally scheduled on 12 and 19 September 2018 were cancelled due to the typhoons, monitoring after 19 September has therefore been shifted for one day as shown in **Appendix C**.

2.9.4 The weather conditions during the monitoring period were mainly fine and cloudy. Sea conditions for the majority of monitoring days were either slight or moderate. No major pollution source and extreme weather which might affect the results were observed during the impact monitoring.

2.9.5 During the impact monitoring period for September 2018, twenty nine exceedances of the Action and Limit for SS were recorded. Investigations were conducted and results indicated the SS exceedances were not attributable to the Project works, except for the exceedances on 20, 27 and 29 September 2018, where the investigation is undergoing and the investigation results will be presented in the next monthly report. Details of the exceedance are presented in **Section 8**.

2.9.6 Implemented mitigation measures minimizing the adverse impacts on water are listed in the implementation schedule given in **Appendix B**.

3. NOISE MONITORING

3.1 Monitoring Requirements

3.1.1 To ensure no adverse noise impact, noise monitoring is recommended to be carried out at the nearby noise sensitive receivers (NSRs) during construction phase.

3.1.2 In accordance with the Updated EM&A Manual, baseline noise level at the noise monitoring stations were established as presented in the Baseline Monitoring Report. Impact noise monitoring was conducted once per week in the form of 30-minutes measurements Leq, L10 and L90 levels recorded at each monitoring station between 0700 and 1900 on normal weekdays.

3.2 Noise Monitoring Parameters, Time, Frequency

3.2.1 Impact noise monitoring was conducted weekly in the reporting period between 0700-1900 on normal weekdays.

3.2.2 Construction noise level measured in terms of the A-weighted equivalent continuous sound pressure level (LAeq). Leq_{30min} was used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. **Table 3.1** summarizes the monitoring parameters, frequency and duration of the impact noise monitoring. The monitoring schedule is provided in **Appendix C**.

Table 3.1 Noise Monitoring Parameters, Time, Frequency and Duration

Monitoring Station	Time	Duration	Parameters
M1/ N_S1, M2/ N_S2, M3/ N_S3	Daytime: 0700-1900 hrs (during normal weekdays, not include Sunday or general holiday)	Once per week $L_{eq\ 5min}$/$L_{eq\ 30min}$ (average of 6 consecutive $L_{eq\ 5min}$)	L_{eq}, L_{10} & L_{90}

3.3 Noise Monitoring Locations

3.3.1 Three noise monitoring locations for impact monitoring at the nearby sensitive receivers are shown in **Figure 3.1**

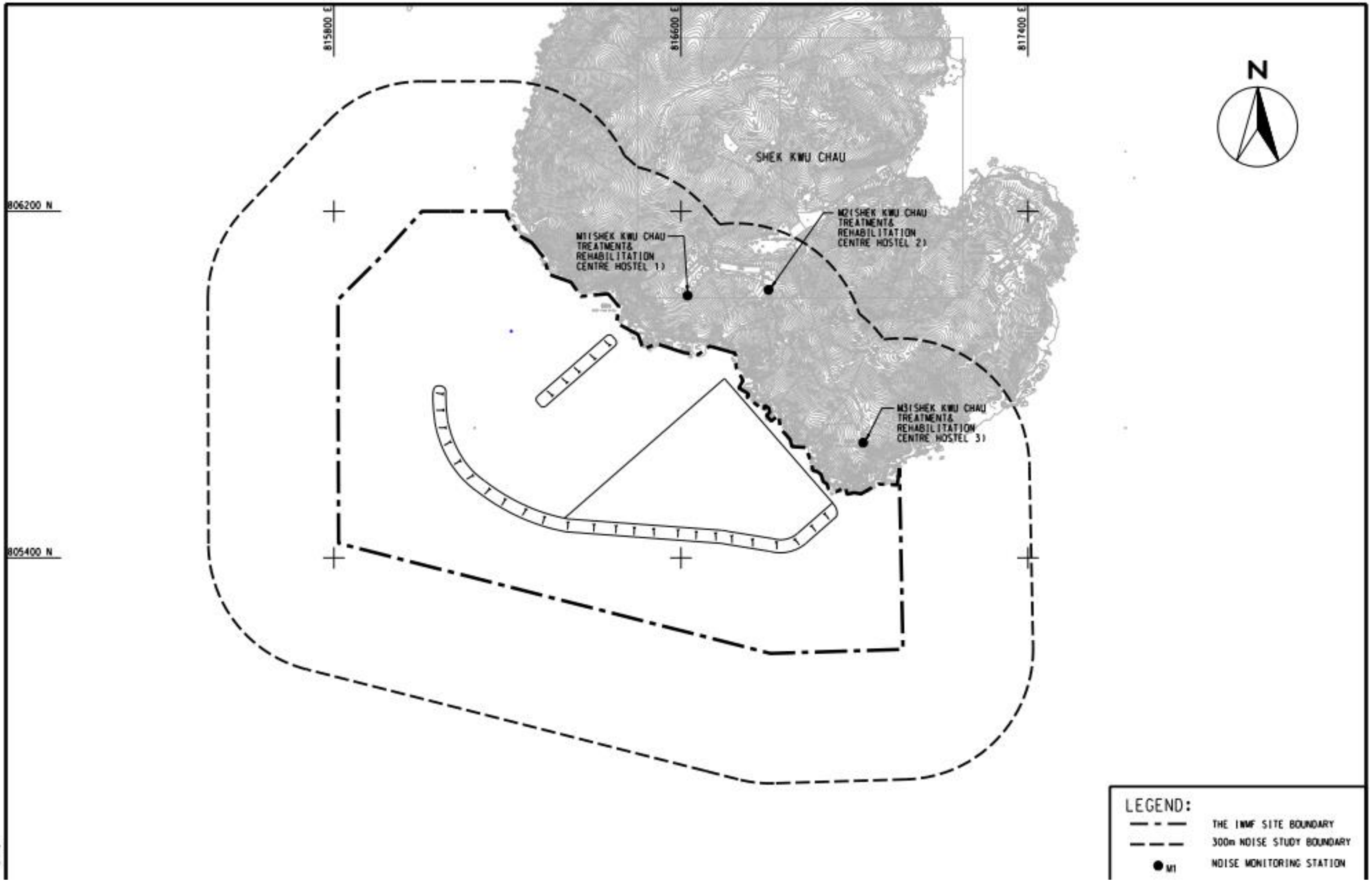


Figure 3.1 Noise monitoring locations at SKC

3.3.2 M1, M2 and M3 are Shek Kwu Chau Treatment and Rehabilitation Centre Hostel 1, 2 and 3 respectively of The Society for the Aid and Rehabilitation of Drug Abusers (SARDA) located at southern part of Shek Kwu Chau.

3.3.3 Measurement at M1, M2 and M3 were conducted at a point 1m from the exterior of the sensitive receivers building façade and at a position 1.2m above the ground. The noise monitoring stations are summarized in **Table 3.2** below.

Table 3.2 Noise Monitoring Location

Station	NSR ID in EIA Report	Noise Monitoring Location	Type of sensitive receiver(s)	Measurement Type
M1	N_S1	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1	Residential	Façade
M2	N_S2	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2	Residential	Façade
M3	N_S3	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3	Residential	Façade

3.4 Impact Monitoring Methodology

3.4.1 At each designated monitoring location, measurements of six 5-minutes A-weighted equivalent sound pressure level ["$L_{eq\ 5min}$"] was carried out between 0700 and 1900 for daytime measurements on a normal weekdays (exclude Sunday or general holiday). The measured six impact noise levels at each monitoring location shall then be averaged in logarithmic scale and expressed in terms of the 30 minutes A-weighted equivalent continuous sound pressure level ($L_{eq\ 30min}$) for the time period between 0700 and 1900 hours on normal weekdays.

3.4.2 The monitoring procedures are as follows:

- The microphone head of the lead level meter was normally positioned 1m exterior of the noise sensitive façade and lowered sufficiently so that the building's external wall acts as a reflecting surface.
- The battery condition was checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - Frequency weight: A
  - Time weighting: Fast
  - Measurement time: 5 minutes
- Prior to and after noise measurement, the meter was calibrated using the calibrator for 94.0 dB at 1000Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB, the measurement was considered invalid and repeat of noise measurement was required after re-calibration or repair of the equipment.
- Noise monitoring was carried out for 30 mins by sound level meter. At the end of the monitoring period, noise levels in term of L_{eq}, L_{10},and L_{90} were recorded. In addition, site conditions and noise sources were recorded when the equipment were checked and inspected.
- All the monitoring data within the sound level meter system was downloaded through the computer software.

3.5 Monitoring Equipment

3.5.1 Integrated sound level meter was used for the noise monitoring. The meter shall be in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications.

3.5.2 Equipment used in the impact noise monitoring programme is summarized in **Table 3.3** below. Calibration certificates for the noise monitoring equipment are attached in **Appendix H**.

Table 3.3 Impact Noise Monitoring Equipment

Equipment	Brand and Model
Sound Level Meter	Nti XL2
Sound Level Meter Calibrator	Pulsar 105

3.6 Maintenance and Calibration

3.6.1 The maintenance and calibration procedures were as follows:

- The microphone head of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.
- The sound level meter and calibrator were checked and calibrated at yearly intervals
- Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0dB.

3.7 Action and Limit Levels

3.7.1 The Action/Limit Levels in line with the criteria of Practice Note for Professional Persons (ProPECC PN 2/93) "Noise from Construction Activities – Non-statutory Controls" and Technical Memorandum on Environmental Impact Assessment Process issued by HKSAR Environmental Protection Department ["EPD"] under the Environmental Impact Assessment Ordinance, Cap 499, S.16 are presented in **Table 3.4.**

Table 3.4 Action and Limit Levels for Noise

Time Period	Action	Limit (dB(A))
0700-1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)

3.7.2 If exceedances were found during noise monitoring. The actions in accordance with the Event and Action Plan shall be carried out according to **Appendix I**.

3.8 Monitoring Results and Observations

3.8.1 Impact monitoring for noise impact was carried out on 3, 10, 18 and 24 September 2018. The impact noise levels at Noise Monitoring Stations at SKC (i.e. M1/ N_S1 to M3/ N_S3) are summarized in **Table 3.6**. Details of noise monitoring results are presented in **Appendix J**.

3.8.2 Major construction activity, major noise source and extreme weather which might affect the results were recorded during the impact monitoring.

3.8.3 According to our field observations, the major noise source identified at the designated noise monitoring station in the reporting month are summarised in **Table 3.5**:

Table 3.5 Summary of Field Observation

Monitoring Station	Major Noise Source
M1	Nil
M2	Nil
M3	Air-conditioning units nearby

3.8.4 No data from impact monitoring has exceeded the stipulated limit level at 75 dB(A).

Table 3.6 Summary of Impact Noise Monitoring Results

Location	Noise in dB(A)		
	Range of $L_{eq\ 30min}$	Range of $L_{10\ 5min}$	Range of $L_{90\ 5min}$
M1	48.2 – 53.3	50.4 – 62.1	40.6 – 58.4
M2	55.7 – 59.3	57.9 – 68.5	50.1 – 57.6
M3	46.9 – 51.7	48.1 – 60.5	41.2 – 49.5

4. WASTE

4.1 The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse, vegetative wastes and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials.

4.2 As advised by the Contractor, no C&D material was generated on site in the reporting month. For C&D waste, no metals was generated and collected by registered recycling collector. No paper cardboard packing were generated on site and collected by registered recycling collector. No plastic and chemical waste were collected by registered recycling collector and licensed chemical waste collectors respectively. No other types of wastes (e.g. general refuse) were generated on site and disposed of at Landfill.

4.3 With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in **Table 4.1**. Details of cumulative waste management data are presented as a waste flow table in **Appendix K**.

Table 4.1 Quantities of Waste Generated from the Project

<table>
<tr><th rowspan="4">Reporting period</th><th colspan="6">Quantity</th></tr>
<tr><th rowspan="3">Inert C&D Materials (in‘000kg)</th><th rowspan="3">Chemical Waste (in‘000kg)</th><th colspan="4">Non-inert C&D Materials</th></tr>
<tr><th rowspan="2">Others, e.g. General Refuse disposed at Landfill (in‘000kg)</th><th colspan="3">Recycled materials</th></tr>
<tr><th>Paper/card board (in‘000kg)</th><th>Plastics (in‘000kg)</th><th>Metals (in‘000kg)</th></tr>
<tr><td>September 2018</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>

4.4 Although there is not much waste generation anticipated in the coming month from the Project, the Contractor is advised to sort and store any solid and liquid waste on-site properly prior to disposal.

5. CORAL

5.1 Coral Monitoring Requirements

5.1.1 To monitor the health condition of corals during different phases, corals located within areas likely to be affected by the Project, corals located at control sites (areas unlikely to be affected by the Project), the trans-located coral colonies as well as the tagged natural coral colonies at the recipient site were chosen, in order to identify any adverse indirect impact from the marine works. The size, percentage cover and health condition of corals (i.e. any sign of abnormal appearance, such as layer of mucus, bleaching, partial mortality etc.) at representative transects should be recorded during each monitoring.

5.2 Coral Monitoring Parameters, Time, Frequency

5.2.1 REA survey was conducted at the suggested control site and indirect impact site within two week before commencement of the construction work. 10 selected hard coral colonies with the similar species were tagged at both control and indirect impact site. Following coral translocation in the recipient site R3, 16 coral colonies attached to rocks less than 50 cm in diameter were translocated and tagged, as well as 10 selected natural coral colonies, at the recipient site.

5.2.2 Tagged coral colonies at the suggested control site and indirect impact site are being monitored weekly for the first month and followed by monthly monitoring for three months. Quarterly monitoring will be carried out after the first three-months monthly monitoring for until the end of the construction phase. The selected Control Site is located at Yuen Kong Chau of Soko Islands about 7 km away from the project area. Tagged coral colonies at the proposed recipient site are being monitored quarterly for one year. The selected recipient site R3 is located the opposite side of the Project area at about 2 km away. The detailed survey of the Control Site and Impact Site were conducted before the commencement of the Construction Phase.

5.2.3 Monitoring recorded the following parameters (using the same methodology adopted during the pre-translocation survey); the size, presence, health conditions (percentage of mortality/bleaching) and percentage of sediment of each tagged coral colony. The general environmental conditions including weather, sea, and tidal conditions of impact site, control site and recipient site were monitored.

5.2.4 **Table 5.1** summarizes the monitoring locations, time and frequency of the tagged coral colonies monitoring. The monitoring schedule is provided in **Appendix C**.

Table 5.1 Tagged Coral Monitoring Locations, Time and Frequency

Monitoring Location	Monitoring Month/Year	Frequency	No. of Monitoring Survey
10 selected hard coral colonies at control site / indirect impact site	1st Month	Weekly Survey	4
	2nd to 4th Months	Monthly Survey	3
	5th to 76th Months	Quarterly Survey	24
16 translocated hard coral colonies and 10 selected natural hard coral colonies at recipient site R3	1st Year	Quarterly Survey	4

5.3 Coral Monitoring Locations

5.3.1 Location of the ten tagged coral colonies at each of the proposed indirect impact site, control site and the recipient site R3 are shown in **Figure 5.1**, **Figure 5.2** and **Figure 5.3** respectively:

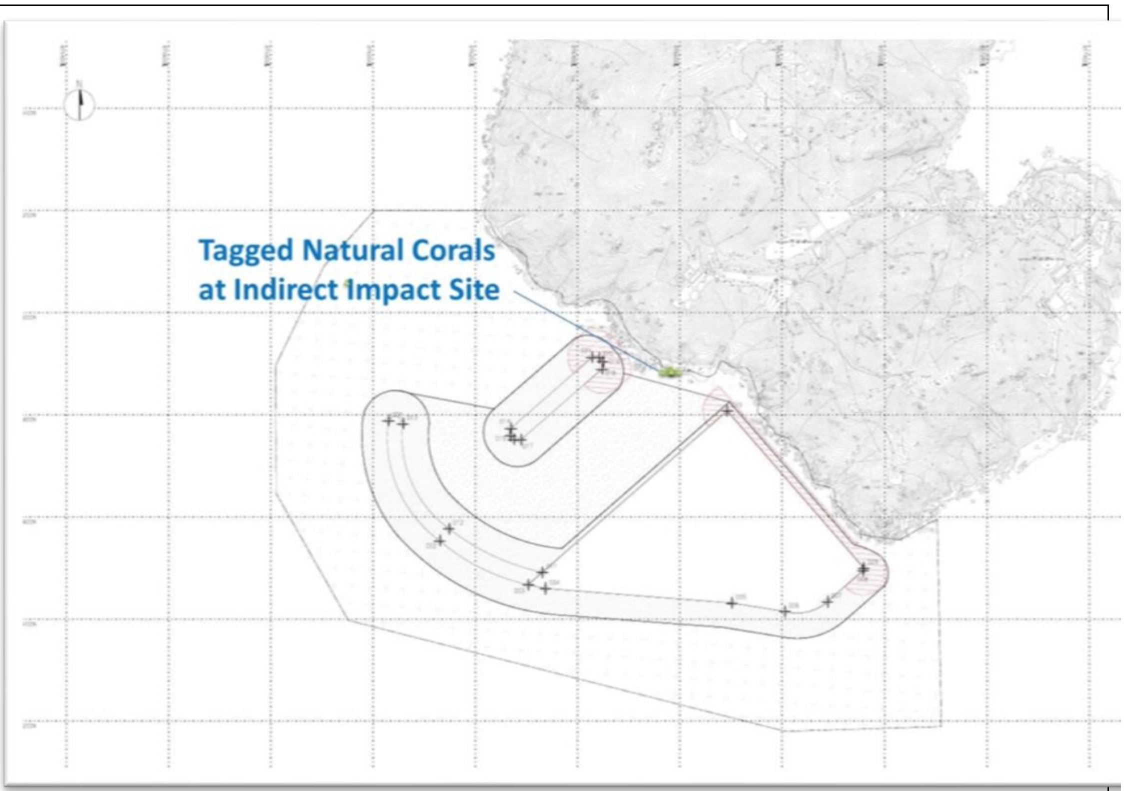


Figure 5.1 Tagged Natural Corals at Indirect Impact Site Near SKC

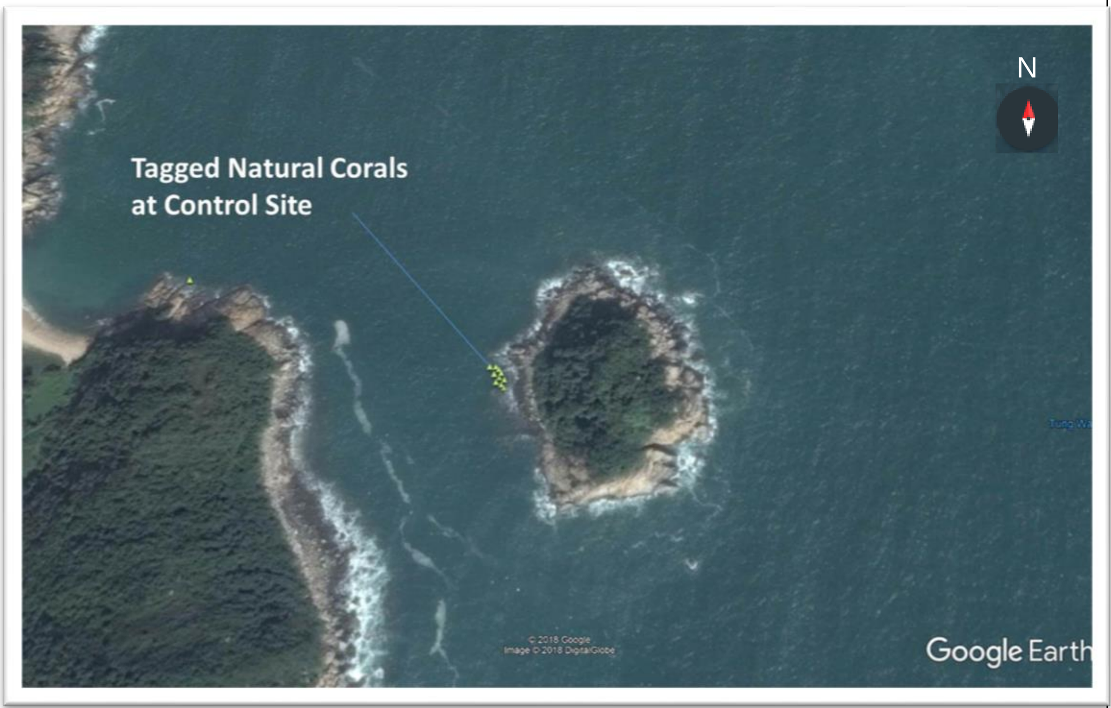


Figure 5.2 Tagged Natural Corals at Control Site Near Yuen Kong Chau

Figure 5.3 Tagged Translocation Corals at Recipient Site R3 near SKC

5.3.2 The GPS coordinates of the tagged coral colonies were shown in **Table 5.2** and **Table 5.3**.

Table 5.2 Tagged Natural Corals at Indirect Impact Site Near SKC

Coral #	GPS Coordinates	
1	N22°09’45.96”	E113°54’57.81”
2	N22°09’45.88”	E113°54’57.89”
3	N22°09’45.81”	E113°54’57.78”
4	N22°09’45.70”	E113°54’57.95”
5	N22°09’45.83”	E113°54’57.81”
6	N22°09’45.75”	E113°54’58.02”
7	N22°09’45.65”	E113°54’57.94”
8	N22°09’45.53”	E113°54’57.90”
9	N22°09’46.23”	E113°54’54.70”
10	N22°09’46.40”	E113°54’57.79”

Table 5.3 Tagged Natural Corals at Control Site Near Yuen Kong Chau

Coral #	GPS Coordinates	
11	N22°11’29.12”	E113°59’08.98”
12	N22°11’29.08”	E113°59’09.06”
13	N22°11’29.01”	E113°59’09.21”
14	N22°11’29.01”	E113°59’09.29”
15	N22°11’29.00”	E113°59’09.37”
16	N22°11’29.00”	E113°59’09.50”
17	N22°11’28.94”	E113°59’09.48”
18	N22°11’28.99”	E113°59’09.36”
19	N22°11’28.95”	E113°59’09.29”
20	N22°11’29.00”	E113°59’09.18”

5.3.3 The ET leader will review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

5.4 Impact Monitoring Methodology

5.4.1 Health status of coral was assessed by the following criteria:

- Gorgonian coral: Percentage of branches exhibiting partial mortality, secretion of mucus and degree of sedimentation;
- Hard coral: Percentage of surface area exhibiting partial mortality and blanched/bleached area of each coral colony and degree of sedimentation. Monitoring Equipment

5.5 Action and Limit Levels

5.5.1 Monitoring result was reviewed and compared against the below Action Level and Limit Level (AL/LL) as set with the below **Table 5.4** and **Table 5.5**.

Table 5.4 Action and Limit Levels for Construction Phase Coral Monitoring

Parameter	Action Level	Limit Level
Mortality	If during Impact Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the tagged indirect impact site coral colonies that is not recorded on the tagged corals at the control site, then the Action Level is exceeded.	If during Impact Monitoring a 25% increase in the percentage of partial mortality on the corals occurs at more than 20% of the tagged indirect impact site coral colonies that is not recorded on the tagged corals at the control site, then the Limit Level is exceeded.

Table 5.5 Action and Limit Levels for Post-Translocation Coral Monitoring

Parameter	Action Level	Limit Level
Mortality	If during Post-Translocation Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals in the recipient site, then the Action Level is exceeded.	If during Post-Translocation Monitoring a 25% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals in the recipient site, then the Limit Level is exceeded.

5.5.2 If exceedance was found during coral monitoring. The actions in accordance with the Event and Action Plan should be carried out according to **Appendix L.**

5.6 Monitoring Results and Observations

5.6.1 The third month construction phase monitoring was performed on 20th September 2018 for the both Indirect Impact Site and Control Site (**Figure 5.1** and **5.2** respectively); and the weather conditions were summarized in **Table 5.6**.

Table 5.6 Weather Condition for the Third Month Construction Phase Monitoring

Date	Condition	Average Underwater Visibility

Date	Condition	Average Underwater Visibility
20 September 2018	- Southwest force 3 to 4, - Sunny periods	Less than 0.5m

5.6.2 Ten (10) hard coral colonies were monitored at each site of Control and Indirect Impact sites as suggested in the Coral Monitoring Plan. The general health conditions (size, condition, mortality, bleaching and sediment) at Control and Indirect Impact sites were recorded and summarized in **Table 5.8** and **Table 5.9** respectively.

5.6.3 The second Post-translocation Monitoring was performed on 20th September 2018 for the Recipient Site R3 (Figure 5.3) and the weather conditions were summarized in **Table 5.7**.

Table 5.7 Weather Condition for the Second Coral Translocation Monitoring

Date	Condition	Average Underwater Visibility
20 September 2018	- Southeast force 3 - Sunny periods	Less than 0.5 m

5.6.4 Sixteen (16) and ten (10) hard coral colonies were monitored at Recipient Site R3 as suggested at Coral Translocation Plan. The general health conditions (size, condition, mortality, bleaching and sediment) at Recipient site were recorded and summarized in **Table 5.10** and **Table 5.11** respectively.

Table 5.8 Sizes, Condition, Mortality, Bleaching and Sediment of 10 Natural Coral Colonies at Control Site during Third Month Construction Phase Monitoring

Tag #	Species	Size (cm) – Max. Diameter	Condition	Mortality (%)		Bleaching (%)		Sediment (%)	
				Baseline	20-Sep	Baseline	20-Sep	Baseline	20-Sep
1	*Goniopora stutchburyi*	25	Fair	0	5	0	0	0	0
2	*Psammocora superficialis*	22	N/A	0	N/A	0	N/A	0	N/A
3	*Psammocora superficialis*	18	Fair	0	0	0	0	0	10
4	*Turbinaria peltata*	13	Good	0	0	0	0	0	0
5	*Coscinaraea n* sp.	20	N/A	0	N/A	0	N/A	0	N/A
6	*Cyphastrea serailia*	43	Fair	0	0	0	0	0	5
7	*Psammocora superficialis*	16	N/A	0	N/A	0	N/A	0	N/A
8	*Goniopora stutchburyi*	21	Good	0	0	0	0	0	0
9	*Goniopora stutchburyi*	11	Fair	0	5	0	0	0	0
10	*Psammocora superficialis*	18	N/A	0	N/A	0	N/A	0	N/A

*N/A: Non Applicable as coral colonies were missing

Table 5.9 Sizes, Condition, Mortality, Bleaching and Sediment of 10 Natural Coral Colonies at Indirect Impact Site during Third Month Construction Phase Monitoring

Tag #	Species	Size (cm) – Max. Diameter	Condition	Mortality (%)		Bleaching (%)		Sediment (%)	
				Baseline	20-Sep	Baseline	20-Sep	Baseline	20-Sep
11	*Psammocora superficialis*	25	N/A	0	N/A	0	N/A	0	N/A
12	*Psammocora superficialis*	35	N/A	0	N/A	0	N/A	0	N/A
13	*Psammocora superficialis*	21	N/A	0	N/A	0	N/A	0	N/A
14	*Goniopora stutchburyi*	13	N/A	0	N/A	0	N/A	0	N/A
15	*Psammocora superficialis*	23	N/A	0	N/A	0	N/A	0	N/A
16	*Goniopora stutchburyi*	14	N/A	0	N/A	0	N/A	0	N/A
17	*Psammocora superficialis*	7	N/A	0	N/A	0	N/A	0	N/A
18	*Psammocora superficialis*	12.5	N/A	0	N/A	0	N/A	0	N/A
19	*Psammocora superficialis*	10	N/A	0	N/A	0	N/A	0	N/A
20	*Psammocora superficialis*	8	N/A	0	N/A	0	N/A	0	N/A

5.6.5 *N/A: Non Applicable as coral colonies were missing

Table 5.10 Sizes, Condition, Mortality, Bleaching and Sediment of 16 Translocated Coral Colonies at Recipient Site during Second Translocation Coral Monitoring

Coral #	Species	Size (cm) – Max. Diameter/ Height	Mortality (%)		Bleaching (%)		Sediment (%)	
			Baseline	20-Sep	Baseline	20-Sep	Baseline	20-Sep
1	*Psammocora superficialis*	35	0	15	0	0	0	0
2	*Psammocora superficialis*	N/A	35	N/A	0	N/A	0	N/A
3	*Psammocora superficialis*	N/A	0	N/A	0	N/A	0	N/A
4	*Turbinaria peltata*	9	0	10	0	0	0	0
5	*Goniopora stutchburyi*	N/A	0	N/A	0	N/A	0	N/A
6	*Psammocora superficialis*	26	0	15	0	0	0	0
7	*Psammocora superficialis*	23	0	5	0	0	5	0
8	*Psammocora superficialis*	N/A	0	N/A	0	N/A	0	N/A
9	*Goniopora stutchburyi*	N/A	0	N/A	0	N/A	0	N/A
10	*Coscinaraea n sp.*	21	0	5	0	0	1	0
11	*Psammocora superficialis*	13	0	0	0	0	0	0
12	*Psammocora superficialis*	N/A	0	N/A	0	N/A	0	N/A
13	*Psammocora superficialis*	N/A	0	N/A	0	N/A	0	N/A
14	*Psammocora superficialis*	N/A	0	N/A	0	NA	0	N/A
15	*Goniopora stutchburyi*	N/A	0	N/A	0	N/A	0	N/A
16	*Psammocora superficialis*	26	0	1/0	0	N/A	0	0

*N/A: Non Applicable as coral colonies were missing

Table 5.11 Sizes, Condition, Mortality, Bleaching and Sediment of 10 Natural Control Coral Colonies at Recipient Site during Second Translocation Coral Monitoring

Coral #	Species	Size (cm) – Max. Diameter/ Height	Mortality (%)		Bleaching (%)		Sediment (%)	
			Baseline	20-Sep	Baseline	20-Sep	Baseline	20-Sep
1	*Coscinaraea n* sp.	16	0	0	0	0	0	0
2	*Psammocora superficialis*	24	0	0	0	0	0	0
3	*Psammocora superficialis*	23	0	0	0	0	0	0
4	*Coscinaraea n* sp.	15	0	0	0	0	0	0
5	*Cyphastrea serailia*	42	0	0	0	0	0	0
6	*Cyphastrea serailia*	12	0	0	0	0	0	0
7	*Cyphastrea serailia*	46	0	0	0	0	0	0
8	*Psammocora superficialis*	21	0	0	0	0	0	0
9	*Psammocora superficialis*	19	0	0	0	0	0	0
10	*Goniopora stutchburyi*	N/A	0	N/A	0	N/A	0	N/A

*N/A: Non Applicable as coral colonies were missing.

5.6.7 After the super typhoon Mangkhut hitting Hong Kong on 14th and 15th September 2018. The whole bottom at the Indirect Impact Site were covered with 1 m thick of sand and mud in which the all ten tagged hard coral colonies were all missing during the third month monitoring. At the control site of Soko Island, most of the rocks at the bottom were turned over by the super typhoon Mangkhut, however only 4 tagged coral colonies were missing during the monitoring survey.

5.6.8 All remaining tagged coral colonies at Control Site still showed either fair or good health condition during the Third Month Construction Phase Monitoring. Tagged coral #1 and #9 showed 5% of increased mortality of the whole colony, while tagged coral #3 and #6 showed increased sediment coverage of 10% and 5% respectively. There was not increased level of mortality, bleaching and sediment of the tagged colonies #4 and #8 when compared with the baseline results.

5.6.9 Since all tagged coral colonies at Indirect Impact Site and 4 tagged coral at Control Site were missing during the third month monitoring, it is suggested to re-tag all the missing corals. The re-tagging activity should be done before the next monitoring survey. As the missing tagged coral colonies was caused by the Super Typhoon Mangkhut, the AL/LL will not be applied at this time.

5.6.10 The second post-translocation coral monitoring was carried out on 20 September 2018. Sixteen (16) movable hard coral colonies were monitored at the recipient site R3. However, 9 translocated coral colonies were missing during the second monitoring survey and only 7 left (**Table 5.9**). The remaining translocated coral colonies also showed an increased mortality from 5% to 15% (**Table 5.9**). The missing colonies probably were swept away by the strong wave action caused by the Super Typhoon Mangkhut hitting Hong Kong on 15th and 16th September 2018.

5.6.11 Ten (10) natural hard coral colonies were also monitoring at the recipient site as control and 1 coral colony was missing during the monitoring survey (**Table 5.10**). Similar to the translocated coral colonies, the missing tagged coral colony probably was swept away by the strong wave action caused by the Super Typhoon Mangkhut hitting Hong Kong on 15th and 16th September 2018.

5.6.12 Since all missing tagged coral colonies at the Recipient Site R3 were caused by the Super Typhoon Mangkhut, the AL/LL will not be applied at this time. Post-translocation monitoring survey will be continued to monitor the remaining tagged coral colonies for both translocated coral and natural coral colonies.

5.6.13 Further details of the survey findings including overall cumulative trending and photo records will be analysed and presented in the coming Quarterly EM&A Report.

6. MARINE MAMMAL

6.1 Monitoring Requirements

6.1.1 The marine mammal monitoring programme would focus on Finless Porpoise, as the study area near Shek Kwu Chau has been identified as a hotspot for this species, while the Chinese White Dolphins rarely occurred there in the past.

6.1.2 The monitoring would verify the predicted impacts on marine mammals, and examine whether the mitigation measures recommended in the EIA report have been effectively implemented to protect marine mammals from negative impacts from construction activities.

6.1.3 The Vessel-based Line-transect Survey, the Passive Acoustic Monitoring and the Land-based Theodolite Tracking will be conducted to provide systematic, quantitative measurements of occurrence, encounter rate, habitat use, movement and behavioural patterns of marine mammals within or near the Project Area during construction and operational phases.

6.1.4 The mammal monitoring works during construction consist of the following three survey methods:

- Vessel-based Line-transect Survey – to monitor the occurrence of Finless Porpoises (and Chinese White Dolphins) in the study area during construction works, by comparing with the findings of the pre-construction marine mammal monitoring;
- Passive Acoustic Monitoring – to study the usage of the Project Area and two control sites in South Lantau Waters by Finless Porpoise during construction works, in reference with the baseline findings of the pre-construction marine mammal monitoring; and
- Land-based Theodolite Tracking – to study the movement and behavioral pattern of Finless Porpoise within and around the Project Area during construction works.

6.1.5 The marine mammal observation works of Marine Mammal Exclusion Zone (MMEZ) and Marine Mammal Watching as two of the specific mitigation measures recommended in the approved EIA report shall be fully and properly implemented for the Project to minimize disturbance on Finless Porpoise during construction and operational phases.

6.2 Survey Methods

6.2.1 Vessel-based Line-transect Survey

For the vessel-based marine mammal surveys, the monitoring team adopted the standard line-transect method (Buckland et al. 2001) as same as that adopted during the EIA study and pre-construction phase monitoring to allow fair comparison of marine mammal monitoring results.

Eight transect lines are set at Southeast Lantau survey area, including Shek Kwu Chau, waters between Shek Kwu Chau and the Soko Islands, inshore waters of Lantau Island (e.g. Pui O Wan) as well as southwest corner of Cheung Chau as shown in **Figure 6.1** below:

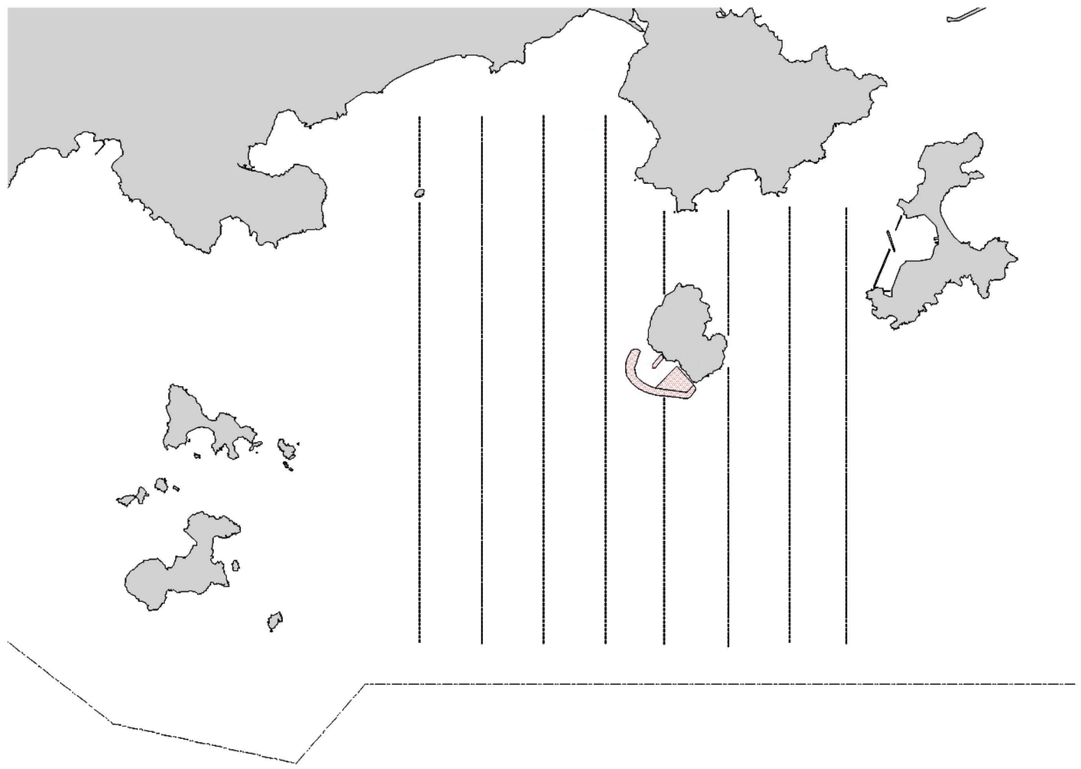


Figure 6.1 Line Transects for Marine Mammal Surveys

The surveys should cover all 4 seasons in order to take natural fluctuation and seasonal variations into account for data analysis of distribution, encounter rate, density and habitat use of both porpoises and dolphins (if any). In comparison to the baseline monitoring results, results from the analysed construction phase monitoring data would allow the detection of any changes of their usage of habitat, in response to the scheduled construction works. The monitoring surveys shall be conducted throughout the entire construction period with the frequency shown in **Table 6.1** below:

Table 6.1 Vessel-based Line-transect Survey Frequency

Season	Months	Frequency
Peak Season	December, January, February, March, April & May	Twice per month
Non-peak Season	June, July, August, September, October & November	Once per month

For each vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) would be used to make observations from the flying bridge area. Two experienced marine mammal observers (a data recorder and a primary observer) would make up the on-effort survey team, and the survey vessel would transit different transect lines at a constant speed of 13-15 km per hour. The data recorder shall search with unaided eyes and fill out the datasheets, while the primary observer shall search for dolphins and porpoises continuously through 7 x 50 marine binoculars. Both observers shall search the sea ahead of the vessel, between 270^{o} and 90^{o} (in relation to the bow, which is defined as 0o). Two additional experienced observers shall be available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers shall be experienced in small cetacean survey techniques and identifying local cetacean species with extensive training by marine mammal specialist of the ET

During on-effort survey periods, the survey team shall record effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance travelled in each series (a continuous period of search effort) with the assistance of a handheld GPS (Garmin eTrex Legend). Data including time, position and vessel speed would also be automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.

When porpoises or dolphins are sighted, the survey team shall end the survey effort, and immediately record the initial sighting distance and angle of the porpoise or dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel shall be diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, behavioural observations, and collection of identification photos (feasible only for Chinese White Dolphin). The perpendicular distance (PSD) of the porpoise or dolphin group to the transect line would then be calculated from the initial sighting distance and angle, which shall be used in the line-transect analysis for density and abundance estimation.

The line-transect survey data shall be integrated with a Geographic Information System (GIS) to visualize and interpret different spatial and temporal patterns of porpoise and dolphin distribution using their sighting positions collected from vessel surveys. Location data of porpoise and dolphin groups would be plotted on map layers of Hong Kong using a desktop GIS (e.g. ArcView© 3.1) to examine their distribution patterns in details. The encounter rate could be used as an indicator to determine areas or time periods of importance to porpoises within the study area. For encounter rate analysis of finless porpoises, only survey data collected under Beaufort 2 or below condition would be used for encounter rate analysis.

To take into account of the variations of survey effort across different sections within survey area, the quantitative grid analysis of habitat use would be conducted to examine finless porpoise usage among 1-km^2 grids within the Southeast Lantau survey area. For the grid analysis, SPSE (sighting density) and DPSE (porpoise density) values would be deduced for evaluation on level of porpoise usage. First, positions of on-effort porpoise sightings from the study period are plotted onto 68 grids (1 km x 1 km each) within the survey area. Sighting density grids and porpoise density grids shall then be normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid shall be calculated by examining the survey coverage on each line-transect survey to determine how many times the grid had been surveyed during study period. With the amount of survey effort calculated for each grid, the sighting density and porpoise density of each grid shall be further normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual porpoise density was termed DPSE, representing the number of dolphins/porpoise per 100 units of survey effort. Among the 1-km^2 grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae shall be used to estimate SPSE and DPSE in each 1-km^2 grid within the study area:

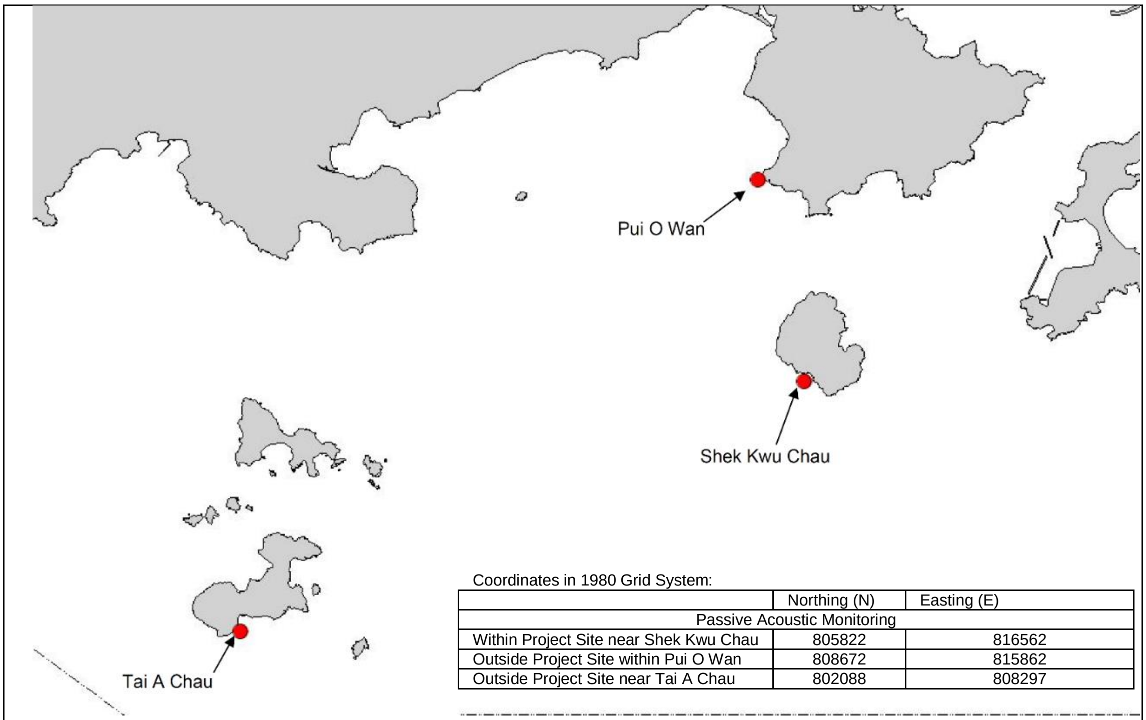
$$SPSE = ((S / E) \times 100) / SA\%$$

$$DPSE = ((D / E) \times 100) / SA\%$$

where S = total number of on-effort sightings
D = total number of dolphins/porpoises from on-effort sightings
E = total number of units of survey effort
SA% = percentage of sea area

6.2.2 Passive Acoustic Monitoring (PAM)

The PAM aims to study the usage of an area by Finless Porpoise by using an array of automated static porpoise detectors (e.g. C-POD) which would be deployed at different locations to detect the unique ultra-high frequency sounds produced by Finless Porpoise. During the construction period, the PAM survey will be conducted including placement of two passive porpoise detectors outside the Project Area as control site (i.e. within Pui O Wan and to the south of Tai A Chau) and one porpoise detector within the Project Area (i.e. near Shek Kwu Chau) as shown in **Figure 6.2** below.



	Northing (N)	Easting (E)
Passive Acoustic Monitoring		
Within Project Site near Shek Kwu Chau	805822	816562
Outside Project Site within Pui O Wan	808672	815862
Outside Project Site near Tai A Chau	802088	808297

Figure 6.2 Locations of Passive Acoustic Monitoring

6.2.3 These three detectors will be deployed on-site to carry out 24-hours monitoring for a period listed as **Table 6.2** below during the construction phase.

Table 6.2 PAM Deployment Period

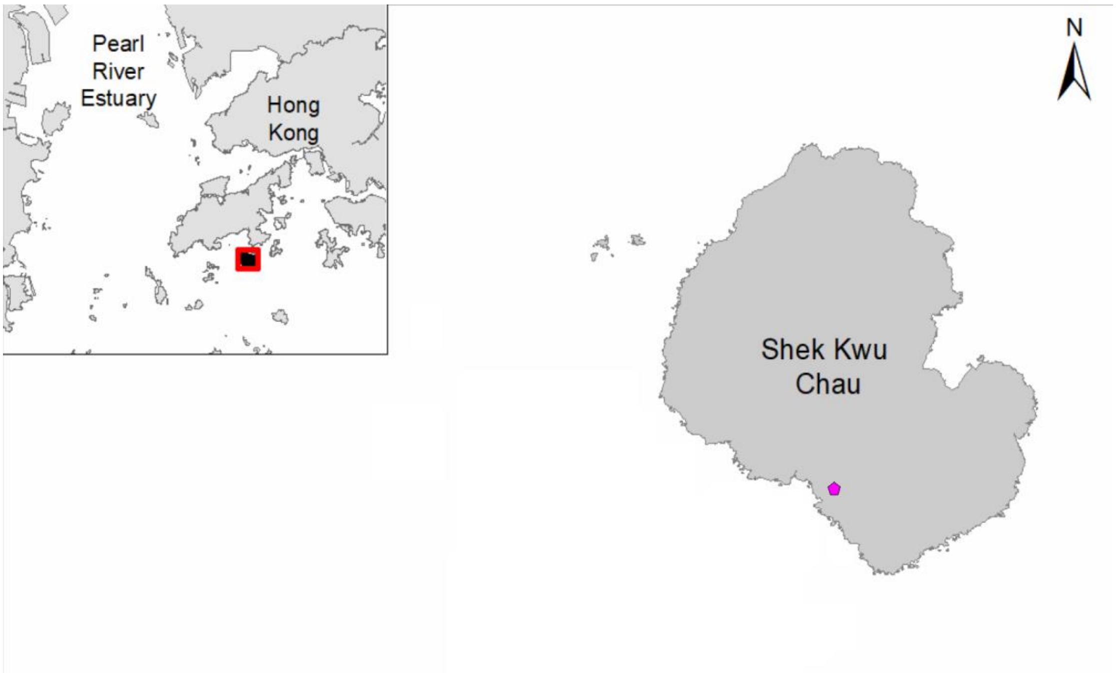
Season	Months	Deployment Period
Peak Season	December, January, February, March, April or May	At least 30 days during the peak months of porpoise occurrence in South Lantau waters

The automated static porpoise detectors shall detect the presence and number of finless porpoise and Chinese White Dolphins respectively over the deployment period, with the false signal such as boat sonar and sediment transport noise distinguished and filtered out. The detectors shall be deployed and retrieved by professional dive team on the seabed of the three selected location shown in **Figure 6.2**. During each deployment, the C-POD unit serial numbers as well as the time and date of deployments shall be recorded. Information including the GPS positions and water depth at each of the deployment locations shall also be obtained.

The diel patterns (i.e. 24-hour activity pattern) of finless porpoise occurrence among the three sites at Shek Kwu Chau, Tai A Chau and Pui O Wan shall be analyzed. Peaks and troughs of finless porpoise occurrence per hour of day would be identified and compared with the results obtained from pre-construction monitoring.

6.2.4 Land-based Theodolite Tracking

The Land-based Theodolite Tracking study would use the same station as in the AFCD monitoring study(same as the baseline monitoring location), which is situated at the southwest side of Shek Kwu Chau (GPS position: 22°11.47’ N and 113°59.33’ E) as shown in below **Figure 6.3**. The station was selected based on its height above sea level (at least 20 metres), close proximity to shore, and relatively unobstructed views of the entire Project Area to the southwest of Shek Kwu Chau. The height of the Shek Kwu Chau Station established by the HKCRP team is 74.6 m high at mean low water, and only a few hundred metres to the IWMF reclamation site, which is ideal for the purpose for the present behavioural and movement monitoring of finless porpoises as well during construction phase considering there as an un-obstructed vantage point at a height above the Project Site.



Coordinates in 1980 Grid System:

	Northing (N)	Easting (E)
Land-based Theodolite Tracking		
Observation site on Shek Kwu Chau	805848	816873

Figure 6.3 Locations of Land-based Theodolite Tracking

During the construction phase, Land-based Theodolite Tracking will be carried out for approximately six hours of tracking for each day of field work for a period listed as **Table 6.3** below, preferably at the initial stage of the construction period (i.e. December 2018 to May 2019).

Table 6.3 Land-based Theodolite Tracking Survey Period

Season	Months	Survey Period
Peak Season	December, January, February, March, April or May	30 days during the peak months of porpoise occurrence in South Lantau waters

The monitoring period for land-based theodolite tracking will be proposed to be overlapped with the PAM. The monitoring team consists of one experienced theodolite operator and at least two field observers for assistance. To conduct theodolite tracking, our observers will search systematically for Finless Porpoise using the unaided eye and 7 x 50 handheld binoculars on each survey day throughout the study area. When an individual or group of porpoises is located, a theodolite tracking session will be initiated and focal follow methods will be used to track the porpoise(s). Behavioural state data (i.e. resting, milling, travelling, feeding and socializing) shall also be recorded every 5 minutes for the focal individual or group. Positions of porpoises and boats shall be measured using a digital theodolite connected to a laptop computer. This tracking survey will be conducted during the peak season between December 2018 and May 2019 for 30 surveys spanning across 15-16 weeks during the peak season to provide good temporal coverage during the initial stage of the construction period.

6.3 Specific Mitigation Measures

6.3.1 Monitored exclusion zones

During the installation/re-installation/relocation process of floating type silt curtains, in order to avoid the accidental entrance and entrapment of marine mammals within the silt curtains, a monitored exclusion zone of 250 m radius from silt curtain should be implemented. The exclusion zone should be closely monitored by an experienced marine mammal observer (MMO) for at least 30 minutes before the start of installation/re-installation/relocation process. If a marine mammal is noted within the exclusion zone, all marine works should stop immediately and remain idle for 30 minutes, or until the exclusion zone is free from marine mammals. The experienced marine mammal observer should be well trained to detect marine mammals. Binoculars should be used to search the exclusion zone from an elevated platform with unobstructed visibility. The marine mammal observer(s) shall be independent of the construction contractor and shall form part of the Environmental Team and have the power to call-off construction activities.

According to the Condition 2.25 of the FEP, MMEZ should be implemented during the installation/re-installation/relocation process of floating type silt curtains in order to avoid the accidental entrance and entrapment of marine mammals within the silt curtains. Also, marine construction works expected to produce underwater acoustic disturbance as per Condition 2.27 of the FEP, especially within December and May, would require the implementation of MMEZ, which currently all those specific construction activities have been replaced by less acoustically disturbing construction methods such as Deep Cement Mixing (DCM) and Precast Concrete Blocks Installation as discussed in Section 5.3 of the Detailed Monitoring Programme on Finless Porpoise, however, MMEZ would also be implemented for precautionary purpose for DCM works.

A MMEZ with 250 m distance from the boundary of a work area shall be established during the above situation. A typical MMEZ is indicated in **Figure 6.4** for reference. The MMEZ serves as a monitoring approach to provide appropriate and immediate actions once finless porpoise or Chinese White Dolphin is sighted within the MMEZ. All MMEZ will be monitored by competent Marine Mammal Observers (MMOs) to be provided by the Environmental Team (ET) for the IWMF and trained by the Marine Mammal Monitoring Specialist of the ET who is independent from JV.

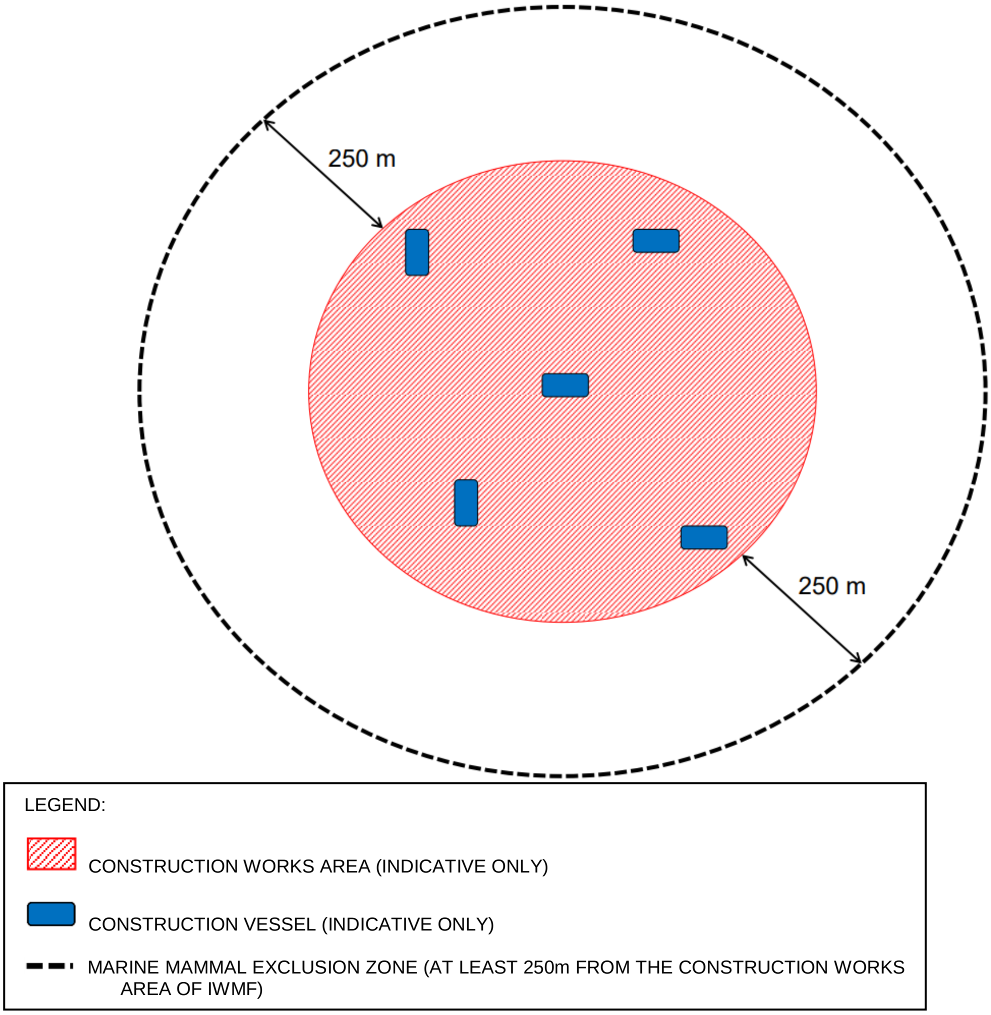


Figure 6.4 Illustration of Typical MMEZ

Prior to the commencement of construction activity, our MMOs shall ensure the boundary of a marine work area and setting up of the MMEZ for the work area and get access to the monitoring location on a barge or a lookout point where there is no obstructed views for monitoring the MMEZ during the construction activity. The MMEZ shall be scanned thoroughly by a MMO for any presence of marine mammal e.g. finless porpoise for an initial period of 30 minutes. Construction activity shall only be commenced after the MMO has confirmed that the MMEZ is clear of the marine mammal for the initial period of 30 minutes. The MMO shall then inform the construction superintendent through mobile phone or handheld transceivers to certify the commencement of construction activity. The MMEZ monitoring shall be carried on throughout the period for all active construction activities requiring implementation of MMEZ.

When any mammal marine, e.g. Finless Porpoise, is detected by the MMO within the MMEZ during construction, the MMO shall inform the construction superintendent immediately through mobile phone or handheld transceivers to cease construction activity within the MMEZ. Construction activity shall not be re-commenced until the MMO confirms that the MMEZ is continuously clear of marine mammal for a period of 30 minutes. The MMO shall then inform the construction superintendent through mobile phone or handheld transceivers to certify the re-commencement of construction activity.

As there could be a number of Contractors working at the same time within a work area for the IWMF project, a full contact list of MMEZ monitoring team members of the ET and the relevant responsible construction superintendents of the Contractor at the site shall be prepared, updated regularly and circulated to all parties involved in the MMEZ monitoring. With a full contact list, our MMOs shall be able to find out the contacts of corresponding persons in case of marine mammal sighting within and near the MMEZ or emergent occurrence of any unpredictable impact on marine mammal.

If a marine mammal is still observed in close vicinity but outside the MMEZ, the MMO shall inform the construction superintendent about the presence of marine mammal. The MMO shall remain in position and closely observe the movement of the marine mammal as well as searching for the appearance of any other marine mammal within the MMEZ. No matter the marine mammal is observed within or in close vicinity but outside the MMEZ, the construction superintendent or relevant persons shall inform all vessel captains involved in construction activities around the MMEZ to pay special attention of the presence of the marine mammal in order to reduce chance of collision with them. In case of injury or live-stranded marine mammal being found within the MMEZ, the marine mammal observer shall immediately inform the construction superintendent to suspend construction activities within the works area and contact AFCD through “1823” marine mammal stranding hotline.

6.3.2 Marine mammal watching plan

Upon the completion of silt curtain installation/re-installation/relocation, all marine works would be conducted within a fully enclosed environment within the silt curtain. Hence exclusion zone monitoring would no longer be required. Subsequently, a marine mammal watching plan would be implemented.

Before commencement of dredging/sand blanket laying work at each designated area, a trained MMO shall check whether position frame silt curtains are ready, well prepared and operated without any obvious damage. Also, the MMO shall confirm the presence of the relevant frontline staff of the main contractor or its sub-contractors and engineers on board to ensure the effective communication, coordination and implementation of the response plan in relation to any incidents involving marine mammals within the waters surrounded by the position frame type silt curtains and the work areas. Also, there are lookout points at an elevated level on each barge, clear and safe access at the edges of the derrick lighter/ flag-top barge for inspection during dredging/sand blanket laying works, provision of sufficient lighting is required if working at night.

During the operation, the inspection will be conducted daily. The MMO will walk along the edge of derrick lighter (DL) and flag-top barge (FB) along the position frame silt curtain or proper location without obstacles where appropriate to inspect the position frame silt curtain with naked eyes, the MMO will check that the position frame silt curtains are maintained in the correct positions with no obvious defects / entanglement and there is no observable muddy water passing through the position frame silt curtain system. Any floating refuse trapped by the silt curtain shall be removed as part of the regular inspection. For night inspection, spotlight will be used to provide sufficient brightness to assist the inspection in dark condition.

For the localized silt curtain re-deployment, MMO will conduct visual inspection to confirm that there is no presence of marine mammal within the localized silt curtain. Visual inspection will be conducted every an hour by MMO till confirming that there is not any marine mammal observed in the surrounding area of the frame type silt curtain. The duration will be subject to various conditions, e.g. weather or angle of observation. The works can only commence after confirming that the surrounding waters of the localized silt curtains has not contain any marine mammal. Thereafter, frontline staff, i.e. foremen, site agent, superintendents and engineers will assist our MMO in implementing the plan from the active work fronts within the waters surrounded by the silt curtains throughout the work period. The MMO will conduct regular check every 60 minutes to observe the presence of any marine mammal around the localized silt curtain or being trapped by the localized silt curtain. The MMOs will also check if the localized silt curtains are in correct positions..

The MMO shall fill up our Marine Mammal Sighting Record Sheet. After inspection, those records should be kept properly and submitted to the project team. In case there is any marine mammal being found, the MMO should carry out the response actions and communicate with relevant parties to stop and then resume work after the discovered marine mammal leaves. After lifting up and mobilization of silt curtain, the MMO will repeat the procedures of regular and visual inspection until the end of the construction works.

Details of the lookout points at derrick lighter (DL) and flat-top barge (FB) for dredging/sand blanket filling are shown in **Figure 6.4** and **Figure 2.2** respectively. Each lookout point will have an unobstructed view to waters around the DL and FB. The MMO will move around the DL and FB to establish a clear and unobstructed view as much as they can without compromising the safety concern. When appropriate, the lookout point can be replaced by a proper location if unobstructed view can be assured.

6.4 Results and Observations

6.4.1 Vessel-based Line-transect Survey

The monthly survey was conducted on 11 September 2018. As this is the designated off-peak season (June-November), only one survey was completed. A total on effort (transects only) survey length of 38.7km was completed, 21.7km at Beaufort Sea State 2 or better (**Table 6.4**). No sightings of marine mammals were recorded.

Table 6.4 Summary of Vessel-based Line-transect Survey Effort

Date	Area*	Beaufort	Effort (km)	Season	Vessel	Effort Type**
11-Sep-18	SEL	1	18.2	AUTUMN	SMRUHK	P
11-Sep-18	SEL	2	3.5	AUTUMN	SMRUHK	P
11-Sep-18	SEL	3	17.0	AUTUMN	SMRUHK	P

* As shown in **Figure. 6.1**
** P (from AFCD) denotes the ON EFFORT survey on the transect line, not the adjoining passages

A review of the long term AFCD marine mammal monitoring programme, the EIA and the pre-construction baseline monitoring report for this project was conducted. Both the EIA and the pre-construction baseline monitoring were conducted during the peak porpoise months (Dec-May 2008 and Feb-April 2018, respectively), and, as such, these data are not directly comparable to this survey month which is a porpoise off-peak month. Therefore, a comparison can only be made to the AFCD long term marine mammal monitoring data.

A review of the Beaufort Sea state September survey conditions between 2009 and 2017 (only data available from AFCD at time of writing; (AFCD 2018; 2017; 2016; 2015; 2014; 2013; 2012; 2011; 2010)) show that between 33% and 72% of survey effort has been conducted at Beaufort Sea State 2 or better in the past (Table 2). For this project in September 2018, 56% of the survey was conducted at Beaufort Sea State 2 or better and, as such, survey conditions in September 2018 were within the % limits of previous AFCD surveys.

A review of all the porpoise sightings in the survey area for September between for 2009-2017 indicate that there are fluctuations between the number of sightings usually recorded in September. For all weather conditions, and for the nine years data available, 3 years recorded no (0) sightings (2009, 2010 and 2015), 3 years recorded 1 sighting (2011, 2016 and 2017), 1 year recorded 3 sightings (2012) and 1 year recorded 4 sightings (2014). Effort varied between years and the average number of sightings (per 100km) varied between 0 and 10.1 100km1 (Average 2.8 100km1). As detailed in Table 2, there is no trend in encounter rates recorded by the AFCD long term monitoring programme, i.e., the highest encounter rates were recorded in 2012 and 2014, with encounter rates of less than 2 porpoise per 100km in 2016 and 2017. Given the similar survey conditions and the low encounter rate recorded for porpoise in the project area during this survey month, no sightings within this area in September 2018 is not deemed to be significantly different from normal, with reference to the AFCD long term marine mammal monitoring data.

It is difficult to draw conclusions with regards to impacts on marine mammals as predicted in the EIA and the effectiveness of project mitigation measures during the initial phase of construction activities when porpoise sightings are typically absent or very low during the survey month. As surveys continue for this project, data shall be constantly re-evaluated across survey months to discern trends and impacts, if any.

6.4.2 PAM and Land-based Theodolite Tracking

These tracking surveys will be conducted during the peak season between December 2018 and May 2019 for 30 surveys spanning across 15-16 weeks during the peak season to provide good temporal coverage during the initial stage of the construction period.

6.4.3 Specific Mitigation Measures

Silt curtains were deployed for sand blanket laying works and DCM trial during the reporting period. At least two MMO were on duty for continuous monitoring of the Marine Mammal Exclusion Zone (MMEZ) for DCM trial works and installation/re-installation/relocation process of silt curtains, and the marine mammal trapping checking and silt curtains inspection in accordance with the Detailed Monitoring Programme of Finless Porpoise and Marine Mammal Watching Plan respectively. Trainings for the MMO were provided by the ET prior to the aforementioned works, with a cumulative total of 13 individuals being trained and the training records kept by the ET. From the Marine Mammal Watching observation records and MMEZ monitoring log records, no Finless Porpoise or other marine mammals were observed within or around the MMEZ and silt curtains in the reporting month.

7. WHITE-BELLIED SEA EAGLE

7.1 Monitoring Requirement

7.1.1 On Shek Kwu Chau Island, a nest of WBSE is located about 60 m above ground within a hillside shrubland habitat, 130 m in-land from shore, about 550 m away from the proposed reclaimed land, with no human access. 3 phases monitoring programme will be comprise including: pre-construction phase, construction phase and operation phase.

7.1.2 The Pre-Construction WBSE monitoring was started on 30 January 2018 and the location of WBSE nest was confirmed on 21 February 2018 and it is located at the western part of SKC Island (Figure 1). Two adults and two chicks were also recorded on 5th March 2018 survey till the end of the Pre-construction monitoring on 15th May 2018. Construction Phase monitoring were carried out followed by the commencement of the Construction Phase on 28th June 2018.

7.2 WBSE Monitoring Parameters, Time, Frequency

7.2.1 The objective of the construction phase monitoring should be to verify the utilisation of the area by WBSE, their responses to construction disturbance, as well as the effectiveness of the proposed mitigation measures. Throughout the construction phase, field surveys should be conducted twice per month during their core breeding season (from December to May), and once per month outside their core breeding season (from June to November). The monitoring frequency should be increased to weekly during the incubation period of each year. In order to confirm their foraging ground near the construction site, it is necessary to conduct daily monitoring during the first week of nestling period in each year and weekly monitoring will be continued for another ten weeks with daily monitoring at first week. The monitoring schedule during the reporting period is provided in **Appendix C**.

7.3 Monitoring Location

7.3.1 Since there is no suitable land-based along the coast of SKC, only boat surveys were conducted. On Shek Kwu Chau Island, a nest of WBSE is located about 60 m above ground within a hillside shrubland habitat, 130 m in-land from shore, about 550 m away from the proposed reclaimed land, with no human access.

7.4 Monitoring Methodology

7.4.1 Information to be collected included feeding, perching/rousing, preening, soaring, flying, nesting and territorial guarding and the time spent on each activity. The responses and reactions to any disturbance to the WBSEs were also recorded and examined in conjunction with the construction noise and/or other events in the vicinity. Other disturbances such as weather condition, or invasion by other fauna species were also recorded.

7.4.2 Binocular, scope, camera, lens and GPS device used are summarized as **Table 7.1** below:

Table 7.1 List of Equipment Used during Construction Phase Monitoring

Equipment	Quantity
Swarovski EL 8.5 x 42 Binocular	1
Swarovski EL Range 8 x 42 Binocular	1
Swarovski ATX 25-60 x 85 Spotting Scope	1
Canon 1Dx Mark II Camera	1
Canon EF300mm F2.8 Lens with Canon 2x Teleconverter	1
Canon PowerShot G7X Camera	1
Garmin GPSMAP 64S	1

7.4.3 If event such as absence of White-bellied Sea Eagle during a whole day of monitoring was found during WBSE monitoring, the actions in accordance with the Event and Action Plan should be carried out according to **Appendix M.**

7.5 Results and Observations

7.5.1 The third monthly construction phase monitoring was conducted on 20th September 2018. Since there is no landing point long the western part of SKC, boat survey were used for the monitoring survey. In order to increase the chance of finding the WBSEs, monitoring survey was carried out early in the morning. The weather conditions of monitoring survey were shown in **Table 7.2**.

Table 7.2 Weather Conditions during the WBSE Monitoring

Date	Condition	Temperature (℃)
20-September-18	- Southeast 3 to 4 - Sunny	33

7.5.2 The nest was gone after the super typhoon Mangkhut and only two adults WBSE were recorded during this monitoring survey. They were both staying on the same tip of the same tree where the original nest was built. During the monitoring survey, both WBSE were bringing tree branches from other area in SKC to the nesting tree and trying to re-build the nest again. The new WBSE nest was being built at the same location as the old one, which is located at the western part of SKC Island (**Figure 7.1**) quite away from the Shek Kwu Chau Treatment and Rehabilitation Centre.

7.5.3 Any disturbances from anthropogenic activities on the island were not recorded during the monitoring survey. However, there were fishing boats moving close the shore were recorded. Since the nesting tree is about 160m away from the shore and it is not accessible, fishing boat activities didn't show any direct disturbance to the WBSE nest.

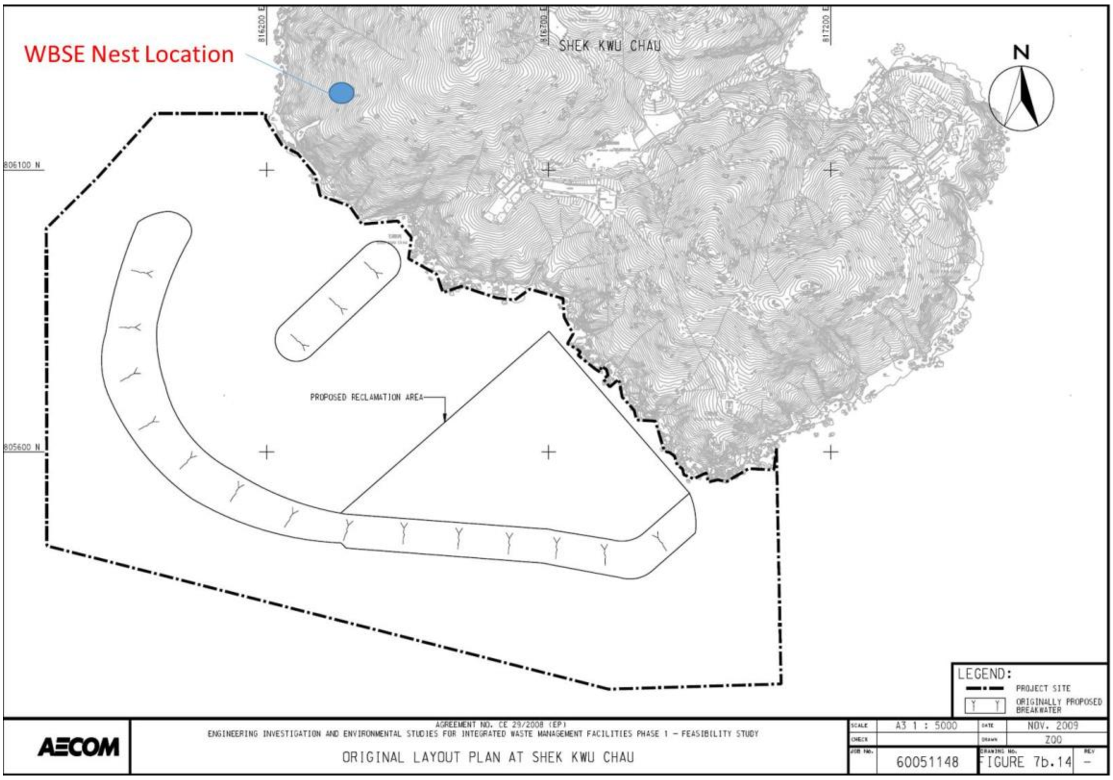


Figure 7.1 Location of WBSE Nest on SKC

7.5.4 No invasion of other fauna species was recorded and no sign of using the construction site as a foraging ground was recorded as well.

7.5.5 During the third month construction phase monitoring, no abnormal behaviour of the recorded adult was shown. All marine works during the third month construction period did not show any influence to the WBSE.

7.5.6 A construction phase monitoring will be continued outside their core breeding season (between June to November) in order to monitor the utilization of the area by WBSE and their responses to construction disturbance.

7.5.7 Further details of the survey findings including photo records will be presented in the coming Quarterly EM&A Report.

8. SUMMARY OF MONITORING EXCEEDANCE, COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

8.1 The Environmental Complaint Handling Procedure is shown in below **Figure 8.1**:

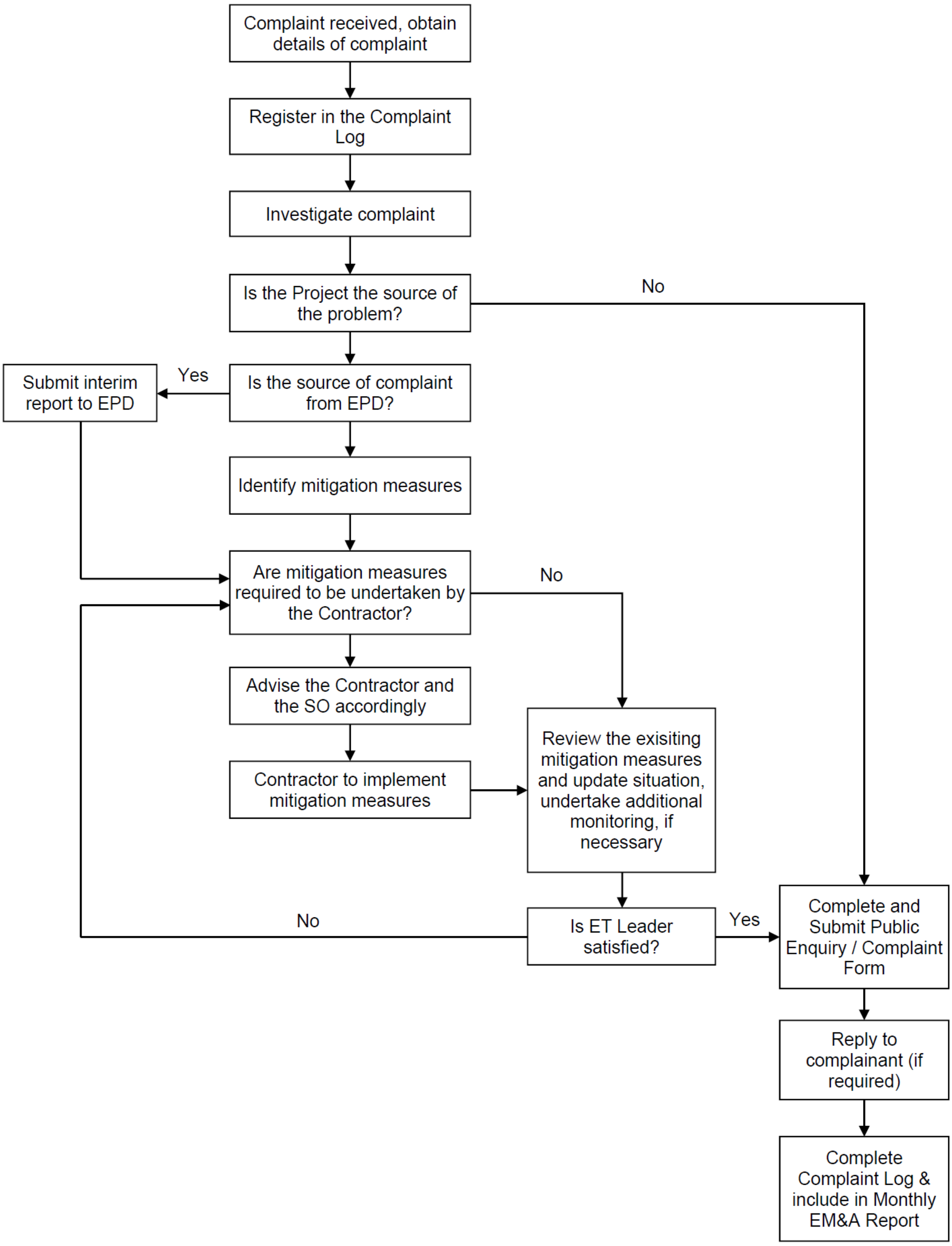


Figure 8.1 Environmental Complaint Handling Procedure

8.2 No exceedance of the Action and Limit Levels of the regular construction noise, coral and WBSE monitoring was recorded during the reporting period.

8.3 Twenty nine of the water quality monitoring results for Suspended Solid (SS) obtained during the reporting period had exceeded the relevant Action or Limit Levels as summarized in **Table 8.1** and **Table 8.2**, where findings from investigations carried out immediately for each of the exceedance cases had showed that these exceedances were unrelated to the Project as shown in **Appendix N**, except for the exceedances on 20, 27 and 29 September 2018, where the investigation is undergoing and the investigation results will be presented in the next monthly report.

8.4 Investigations on exceedances has also been made during the wet season baseline monitoring period confirming no improper site practice or construction activities that might contribute to deterioration of water quality was existed in the Project site.

Table 8.1 Summary of SS Compliance Status at Impact Stations (Mid-Ebb Tide)

Date	B1	B2	B3	B4	CR1	CR2	F1	H1	S1	S2	S3	M1
3-9-2018												
5-9-2018												
7-9-2018												
10-9-2018												
12-9-2018	Cancelled due to Typhoon BARIJAT											
14-9-2018												
17-9-2018	Cancelled due to Typhoon MANGKHUT											
18-9-2018												
20-9-2018												
22-9-2018												
24-9-2018												
27-9-2018												
29-9-2018												
No. of SS Exceedances	3	3	2	0	2	0	0	3	2	2	1	2

Note 1: Detailed results are presented in **Appendix D**
Note 2: The investigation on 20/09/2018, 27/09/2018 and 29/09/2018 are undergoing
Legend:

	No exceedance of Action Level and Limit Level
	Exceedance of Action Level recorded at monitoring station located downstream of the Project based on dominant tidal flow
	Exceedance of Action Level recorded at monitoring station located upstream/unrelated stream (neither upstream nor downstream, far away) of the Project based on dominant tidal flow
	Exceedance of Limit Level recorded at monitoring station located downstream of the Project based on dominant tidal flow
	Exceedance of Limit Level recorded at monitoring station located upstream/unrelated stream of the Project based on dominant tidal flow
	Upstream/unrelated stream station with respect to IWMF Project during the respective tide based on dominant tidal flow
	Downstream station with respect to IWMF Project during the respective tide based on dominant tidal flow/station within the Project site
	Cancelled due to adverse weather

Table 8.2 Summary of SS Compliance Status at Impact Stations (Mid-Flood Tide)

Date	B1	B2	B3	B4	CR1	CR2	F1	H1	S1	S2	S3	M1
3-9-2018												
5-9-2018												
7-9-2018												
10-9-2018												
12-9-2018	Cancelled due to Typhoon BARIJAT											
14-9-2018												
17-9-2018	Cancelled due to Typhoon MANGKHUT											
18-9-2018												
20-9-2018												
22-9-2018												
24-9-2018												
27-9-2018												
29-9-2018												
No. of SS Exceedances	1	0	0	0	2	1	0	2	0	0	1	2

Note 1: Detailed results are presented in **Appendix D**
Note 2: The investigation on 20/09/2018, 27/09/2018 and 29/09/2018 are undergoing
Legend:

	No exceedance of Action Level and Limit Level
	Exceedance of Action Level recorded at monitoring station located downstream of the Project based on dominant tidal flow
	Exceedance of Action Level recorded at monitoring station located upstream/unrelated stream (neither upstream nor downstream, far away) of the Project based on dominant tidal flow
	Exceedance of Limit Level recorded at monitoring station located downstream of the Project based on dominant tidal flow
	Exceedance of Limit Level recorded at monitoring station located upstream/unrelated stream of the Project based on dominant tidal flow
	Upstream/unrelated stream station with respect to IWMF Project during the respective tide based on dominant tidal flow
	Downstream station with respect to IWMF Project during the respective tide based on dominant tidal flow/station within the Project site
	Cancelled due to adverse weather

8.6 No project-related Action Level & Limit Level exceedance was recorded from 1 to 19 and 24 September 2018. Exceedance on 20, 27 and 29 September 2018 are under investigation and the investigation results will be presented in the next monthly report.

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

8.8 Statistics on complaints, notifications of summons and successful prosecutions are summarized in **Appendix O**.

9. EM&A SITE INSPECTION

9.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. In the reporting period, site inspections were carried out on 4, 11, 20 and 26 September 2018 at the site portions list in **Table 9.1** below.

Table 9.1 Site Inspection Record

Date	Inspected Site Portion	Time
4 September 2018	Portion 1, 1A & 1B (near SKC)	10:30-12:30
11 September 2018	Portion 1, 1A & 1B (near SKC)	10:15-12:15
20 September 2018	Portion 1, 1A & 1B (near SKC)	10:30-12:30
26 September 2018	Portion 1, 1A & 1B (near SKC)	10:00-12:00

9.2 One joint site inspection with IEC was carried out on 20 September 2018.

9.3 Environmental deficiencies were observed during weekly site inspection. Key observations during the site inspections are summarized in **Table 9.2**.

Table 9.2 Site Observations

Date	Environmental Observations	Follow-up Status
4 September 2018	<u>Observation(s) and Recommendation(s)</u> 1. On FTB 16 and ES-750, drip trays were found without plug. 2. On FTB 16, oil stains were found drip trays. 3. On FTB 16, oil accumulated on drip trays should be cleaned up. 4. On FTB 16, oil absorbents should be disposed as chemical wastes after cleaning up oil stains. 5. Good housekeeping should be maintained especially general refuse. 6. On ES-750, chemical should be stored properly.	1. The hole of drip trays was closed. 2. Oil stain was cleaned up. 3. Oil accumulated on drip trays was cleaned up. 4. Oil absorber has been stored at chemical waste storage tank. 5. The general refuse was removed. 6. The chemical has been stored properly.
11 September 2018	<u>Observation(s) and Recommendation(s)</u> Reminder: 1. On FTB 20, generator should be maintained in good condition to avoid generating loud noise.	-
20 September 2018	<u>Observation(s) and Recommendation(s)</u> 1. On ES-750, NRMM label of driller is found missing. Reminder: 1. Silt curtains shall be properly installed and checked prior to the DCM operation. 2. Chemical Waste Storage Tank shall be properly locked with functional locks.	1. NRMM label of driller has been posted.
26 September 2018	<u>Observation(s) and Recommendation(s)</u> 1. On FTB 16, Environmental Permit and Construction Noise Permit should be printed out for checking. 2. On FTB 16, Improper plug was used for	1. EP and CNP have been posted out on FTB 16. 2. Proper drain plug has been provided in hole of drip tray on FTB 16.

Date	Environmental Observations	Follow-up Status
	drip tray. 3. On FTB 20, Usage of washing basin not connected to sewage treatment/storage system should be prohibited. Reminder: 1. Chemical should be put in drip tray. 2. Bottom of silt curtain should be made sure of reaching the seabed during DCM operation.	3. The washing basin was closed on FTB 20.

9.4 The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period.

9.5 According to the EIA Study Report, Environmental Permit, contract documents and Updated EM&A Manual, the mitigation measures detailed in the documents are implemented as much as practical during the reporting period, except for the outstanding on-site checking record for the verification of implementation status on the deployed silt curtains. An updated Implementation Status of Environmental Mitigation Measures (EMIS) is provided in **Appendix B**.

10. FUTURE KEY ISSUES

10.1 Works to be undertaken in the next reporting month are:

- Marine Site Investigation Works
- Coring of DCM samples conducted at site trial location
- Collecting Marine Sediment Samples
- DCM installation for DCM Site Trial Re-trial
- Laying of Geotextile and Sand Blanket for DCM Injection Works

10.2 Potential environmental impacts arising from the above construction activities are mainly associated with water quality, construction noise, waste management and ecology.

10.3 The key environmental mitigation measures for the Project in the coming reporting period expected to be associated with the construction activities include:

- Reduction of noise from equipment and machinery on-site;
- Installation of silt curtains for the sand blanket laying works and DCM installation works;
- Sorting, recycling, storage and disposal of general refuse and construction waste;
- Management of chemicals and avoidance of oil spillage on-site, especially under heavy rains and adverse weather; and
- Implementation of MMEZ and inspection of enclosed environment within silt curtains as per DMPFP

10.4 The tentative schedule of regular construction noise, water quality and ecology monitoring in the next reporting period is presented in **Appendix P**. The regular construction noise, water quality and ecology monitoring will be conducted at the same monitoring locations in the next reporting period.

11. CONCLUSION AND RECOMMENDATIONS

11.1 This 3rd monthly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 1 September 2018 to 30 Septemeber 2018 in accordance with the Updated EM&A Manual and the requirement under EP-429/2012/A and FEP-01/429/2012/A.

11.2 Construction noise, water quality, construction waste, coral, marine mammal and White-Bellied Sea Eagle (WBSE) monitoring were carried out in the reporting period. No project-related exceedance of the Action and Limit Level was recorded during the reporting period, except for the water quality exceedances on 20, 27 and 29 September 2018, where the investigation is undergoing and the investigation results will be presented in the next monthly report.

11.3 Weekly environmental site inspection was conducted during the reporting period. Environmental deficiencies were observed during site inspection and were rectified.

11.4 According to the environmental site inspections performed in the reporting month, the Contractor is reminded to pay attention on maintaining site tidiness and avoidance of oil spillage on-site, especially under heavy rains and adverse weather.

11.5 Regarding to the deployment of silt curtains as a principal water quality impact mitigation measures on various marine works, the Contractor is reminded to follow strictly to the design and checking procedure as specified in the Silt Curtain Deployment Plan. The Contractor is reminded that all measures recommended in the deposited silt curtain deployment plan shall be fully and properly implemented for the Project as per EP condition 2.6 of the FEP.

11.6 No environmental complaint was received in the reporting period.

11.7 No notification of summons or prosecution was received since commencement of the Contract.

11.8 The ET will continue the outstanding water quality exceedance investigation and keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A Master Programme

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1

Activity ID	Activity Name	Remaining Duration	Start	Finish
EP_SP_66_12-WP-2-M0	Programme for Design and Construction Works	2835	22-Nov-17 A	26-Aug-25
EP_SP_66_12-WP-2-M0.01	Key Dates	2496	22-Nov-17	21-Sep-24
EP_SP_66_12-WP-2-M0.02	Contract Preliminaries	2807	19-Dec-17	26-Aug-25
EP_SP_66_12-WP-2-M0.03	Licence/Permit Applications	2252	15-Dec-17	13-Feb-24
EP_SP_66_12-WP-2-M0.04	General Submissions	1320	22-Nov-17	03-Jul-21
EP_SP_66_12-WP-2-M0.05	Design Submissions	1724	22-Nov-17 A	11-Aug-22
EP_SP_66_12-WP-2-M0.06	Procurement of Major Equipment	1903	13-Sep-18	28-Nov-23
EP_SP_66_12-WP-2-M0.07	Environmental Works	1708	05-Jan-18	09-Sep-22
EP_SP_66_12-WP-2-M0.08	Maritime Works	1277	29-Dec-17	27-Jun-21
EP_SP_66_12-WP-2-M0.08.3	Submissions	196	29-Dec-17	12-Jul-18
EP_SP_66_12-WP-2-M0.08.1	Marine Construction	1265	10-Jan-18	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.1	Phase I - Construction of Perimeter Seawalls	740	10-Jan-18	19-Jan-20
EP_SP_66_12-WP-2-M0.08.1.1.3	Marine Works Preparations	274	10-Jan-18	10-Oct-18
08-0900	Carry out hydrographic survey	14	10-Jan-18	23-Jan-18
08-1005	Ground Investigation for DCM Design	180	13-Feb-18	11-Aug-18
08-1010	Mobilization of DCM Barge for Load Test	30	14-May-18	12-Jun-18
08-1020	Mobilization of Remaining DCM Barge for Construction	30	11-Sep-18	10-Oct-18
08-1340(2)	Sediment Sample collection and testing Dumping Permit Application	21	05-Sep-18*	25-Sep-18
EP_SP_66_12-WP-2-M0.08.1.1.1	Seawall and Berth at DCM Area	676	15-Mar-18	19-Jan-20
08-1030	DCM Mix Trial (incl. Bench-scale testing and Lab Tests)	106	15-Mar-18	28-Jun-18
08-1040	DCM Pre-construction Site Trial and testing	43	29-Jun-18	10-Aug-18
08-1050	Static Load Test Preparation	31	11-Aug-18	10-Sep-18
08-1060	Carry out static loading test	22	11-Sep-18	02-Oct-18
08-1065(2)	Static load test report submission	8	03-Oct-18	10-Oct-18
08-1070	Geotextile Laying	60	11-Aug-18	09-Oct-18
08-1075(2)	Sand Blanket Laying	60	11-Aug-18	09-Oct-18
08-1080	DCM Injection Works (575,000m3, approx 6300 nr.)	120	11-Oct-18	07-Feb-19
08-1090	DCM Final Completion Tests	180	10-Nov-18	08-May-19
08-1100	Rubble Mound Laying (100,000m3 approx, @550m3/d)	180	09-Jan-19	07-Jul-19
08-1105(1)	Prefabrication for Caission	282	24-Nov-18	01-Sep-19
08-1110	Caisson Laying (Total 50nrs, @2 nrs/week)	182	24-Mar-19	21-Sep-19
08-1120	Wave Wall Construction	120	22-Sep-19	19-Jan-20
EP_SP_66_12-WP-2-M0.08.1.1.2	Seawall at Dredging Area	295	25-Dec-18	15-Oct-19
08-1130	Dredging Works (26,000m3 @ 285m3/d avg. to comply EP Conditions 2. 18)	110	25-Dec-18	13-Apr-19
08-1140	Lay Rock & Sand Fill	50	15-Mar-19	03-May-19
08-1150	Place Rubble Mound (35,000m3 approx., @550m3/d)	88	30-Mar-19	25-Jun-19
08-1155(2)	Fabrication and delivery of Precast Seawall Blocks (12,000nr. approx)	90	15-Mar-19	12-Jun-19
08-1160	Lay Concrete Block Walls (300m length approx. @4m/d)	80	29-Apr-19	17-Jul-19
08-1170	Insitu Concrete Wall Construction	90	18-Jul-19	15-Oct-19
EP_SP_66_12-WP-2-M0.08.1.2	Phase II - Reclamation, Breakwater and Berth Construction	999	03-Oct-18	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.2.1	Reclamation	999	03-Oct-18	27-Jun-21
08-1180	Geotextile Laying	100	03-Oct-18	10-Jan-19
08-1185(2)	Sand Blanket Laying	100	03-Oct-18	10-Jan-19
08-1190	Install Vertical Band Drain by Barge	160	10-Feb-19	19-Jul-19
08-1200	Reclamation fill up to +2.5mPD	375	22-Sep-19	30-Sep-20
08-1210	Reclamation fill from +2.5 to Formation Level	120	03-Jul-20	30-Oct-20
08-1220	Lay Surcharge	80	11-Sep-20	29-Nov-20
08-1230	Surcharge Period	180	30-Nov-20	28-May-21
08-1240	Remove Surcharge	85	04-Apr-21	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.2.2	Breakwater	583	02-Sep-19	06-Apr-21
08-1250	Geotextile and Sand Blanket Laying	45	22-Sep-19	05-Nov-19
08-1260	DCM Injection Works (290,000m3, approx 3200 nr.)	65	06-Nov-19	09-Jan-20
08-1270	DCM Final Completion Test	71	05-Jan-20	15-Mar-20
08-1280	Rubble Mound Laying (100,000m3 approx, @550m3/d)	188	05-Mar-20	08-Sep-20
08-1285(1)	Prefabrication for Caission	411	02-Sep-19	16-Oct-20
08-1290	Caisson Laying (Total 43nrs, @2 nrs/week)	150	11-Jul-20	07-Dec-20
08-1300	Wave Wall Construction	120	08-Dec-20	06-Apr-21
EP_SP_66_12-WP-2-M0.08.1.2.3	Seawall and Berth at Marine Access	150	03-Jul-20	29-Nov-20
08-1310(2)	Prefabrication for Caission (4nrs)	90	03-Jul-20	30-Sep-20
08-1320(2)	Caisson Laying (4nrs)	30	01-Oct-20	30-Oct-20
08-1330(2)	Wave Wall Construction	30	31-Oct-20	29-Nov-20
EP_SP_66_12-WP-2-M0.09	Foundation Works	397	12-Apr-21	13-May-22
EP_SP_66_12-WP-2-M0.09.0	Site Investigation and Preliminary Pile	46	12-Apr-21	27-May-21
EP_SP_66_12-WP-2-M0.09.1	Administration Bld Foundation	138	25-Nov-21	11-Apr-22
EP_SP_66_12-WP-2-M0.09.2	Waste Bunker & Tipping Hall Bld Foundation	203	13-May-21	01-Dec-21
EP_SP_66_12-WP-2-M0.09.3	Boiler & Flue Gas Bld Foundation	331	12-Apr-21	08-Mar-22
EP_SP_66_12-WP-2-M0.09.4	ACC Area Foundation	129	20-Sep-21	26-Jan-22
EP_SP_66_12-WP-2-M0.09.5	Turbine Hall Bld Foundation	142	28-Jun-21	16-Nov-21
EP_SP_66_12-WP-2-M0.09.6	Air Compressor Bld Foundation	28	17-Nov-21	14-Dec-21

Progarmme for Design and Construction Works

Summary Progarmme

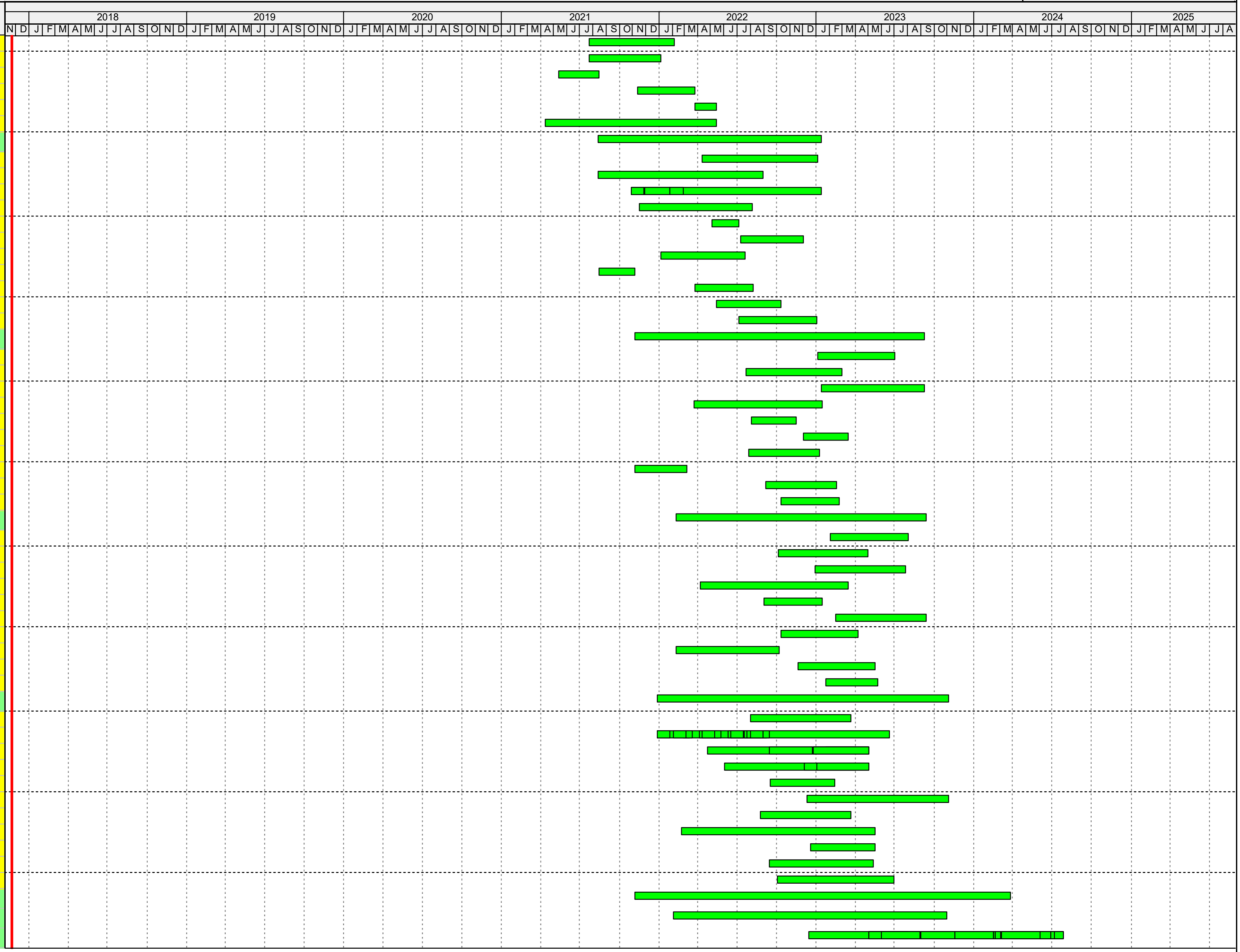
Date	Revision	Checked	Approved
04-Dec-17	Rev. 0 - 1st Issue		
16-Jul-18	Rev. 1 - Revised to SO's comments		
03-Sep-18	Rev. 2 - Revised to SO's comments		

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1

KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

環境保護署 Environmental Protection Department

Activity ID	Activity Name	Remaining Duration	Start	Finish
EP_SP_66_12-WP-2-M0.09.7	Chimney Foundation	198	23-Jul-21	05-Feb-22
EP_SP_66_12-WP-2-M0.09.8	MT Plant & Desalination Bld Foundation	168	22-Jul-21	05-Jan-22
EP_SP_66_12-WP-2-M0.09.9	IWMF Substation Building Foundation	94	13-May-21	14-Aug-21
EP_SP_66_12-WP-2-M0.09.10	Access Ramp Bld Foundation	133	13-Nov-21	25-Mar-22
EP_SP_66_12-WP-2-M0.09.11	Reception Bld Foundation	49	26-Mar-22	13-May-22
EP_SP_66_12-WP-2-M0.09.12	Pipe Bridge Foundation	397	12-Apr-21	13-May-22
EP_SP_66_12-WP-2-M0.10	**Superstructural Works**	519	12-Aug-21	12-Jan-23
EP_SP_66_12-WP-2-M0.10.1	Administration Bld Structure	267	12-Apr-22	03-Jan-23
EP_SP_66_12-WP-2-M0.10.2	Waste Bunker & Tipping Hall Bld Sturcture	384	12-Aug-21	30-Aug-22
EP_SP_66_12-WP-2-M0.10.3	Boiler & Flue Gas Treatment Bld Structure	441	29-Oct-21	12-Jan-23
EP_SP_66_12-WP-2-M0.10.5	Turbine Hall Bld Structure	262	17-Nov-21	05-Aug-22
EP_SP_66_12-WP-2-M0.10.6	Air Compressor Bld Structure	63	04-May-22	05-Jul-22
EP_SP_66_12-WP-2-M0.10.7	Chimney Structure	145	10-Jul-22	01-Dec-22
EP_SP_66_12-WP-2-M0.10.8	MT Plant & Desalination Bld Structure	196	06-Jan-22	20-Jul-22
EP_SP_66_12-WP-2-M0.10.9	IWMF Substation Structure	84	15-Aug-21	06-Nov-21
EP_SP_66_12-WP-2-M0.10.10	Access Ramp Bld Structure	135	26-Mar-22	07-Aug-22
EP_SP_66_12-WP-2-M0.10.11	Reception Bld Structure	150	14-May-22	10-Oct-22
EP_SP_66_12-WP-2-M0.10.13	Pipe Bridge Structure	180	06-Jul-22	01-Jan-23
EP_SP_66_12-WP-2-M0.11	**Architectual Builders Works & Finishes**	672	07-Nov-21	09-Sep-23
EP_SP_66_12-WP-2-M0.11.1	Administration Bld ABWF Works	180	04-Jan-23	02-Jul-23
EP_SP_66_12-WP-2-M0.11.2	Weste Bunker & Tipping Hall Bld ABWF Works	225	21-Jul-22	02-Mar-23
EP_SP_66_12-WP-2-M0.11.3	Boiler & Flue Gas Bld ABWF Works	240	13-Jan-23	09-Sep-23
EP_SP_66_12-WP-2-M0.11.5	Turbine Hall Bld ABWF Works	299	23-Mar-22	15-Jan-23
EP_SP_66_12-WP-2-M0.11.6	Air Compress Bld ABWF Works	105	03-Aug-22	15-Nov-22
EP_SP_66_12-WP-2-M0.11.7	Chimney ABWF Works	105	02-Dec-22	16-Mar-23
EP_SP_66_12-WP-2-M0.11.8	MT Plant & Desalination Bld ABWF Works	165	28-Jul-22	08-Jan-23
EP_SP_66_12-WP-2-M0.11.9	IWMF Substation ABWF Works	120	07-Nov-21	06-Mar-22
EP_SP_66_12-WP-2-M0.11.10	Access Ramp Bld ABWF Works	165	05-Sep-22	16-Feb-23
EP_SP_66_12-WP-2-M0.11.11	Reception Bld ABWF Works	135	11-Oct-22	22-Feb-23
EP_SP_66_12-WP-2-M0.12	**Building Services Installation**	581	09-Feb-22	12-Sep-23
EP_SP_66_12-WP-2-M0.12.1	Administration Bld BS Works	180	03-Feb-23	01-Aug-23
EP_SP_66_12-WP-2-M0.12.2	Weste Bunker & Tipping Hall Bld BS Works	210	04-Oct-22	01-May-23
EP_SP_66_12-WP-2-M0.12.3	Boiler & Flue Gas Bld BS Works	210	29-Dec-22	26-Jul-23
EP_SP_66_12-WP-2-M0.12.5	Turbine Hall Bld BS Works	344	07-Apr-22	16-Mar-23
EP_SP_66_12-WP-2-M0.12.6	Air Compressor Bld BS Works	135	02-Sep-22	14-Jan-23
EP_SP_66_12-WP-2-M0.12.4	Chimney BS Works	210	15-Feb-23	12-Sep-23
EP_SP_66_12-WP-2-M0.12.8	MT Plant & Desalination Bld BS Works	180	11-Oct-22	08-Apr-23
EP_SP_66_12-WP-2-M0.12.9	IWMF Substation BS Works	241	09-Feb-22	07-Oct-22
EP_SP_66_12-WP-2-M0.12.10	Access Ramp Bld BS Works	180	19-Nov-22	17-May-23
EP_SP_66_12-WP-2-M0.12.11	Reception Bld BS Works	120	24-Jan-23	23-May-23
EP_SP_66_12-WP-2-M0.13	**Process Equipment Installation**	677	28-Dec-21	04-Nov-23
EP_SP_66_12-WP-2-M0.13.2	Waste Bunker & Tipping Hall Bld Process Equipment Installation	233	01-Aug-22	21-Mar-23
EP_SP_66_12-WP-2-M0.13.3	Boiler House & Flue Gas Treatment Bld Process Equipment Installation	539	28-Dec-21	19-Jun-23
EP_SP_66_12-WP-2-M0.13.4	ACC Area Equipment Installation	375	23-Apr-22	02-May-23
EP_SP_66_12-WP-2-M0.13.5	Turbine Hall Bld Equipment Installation	335	02-Jun-22	02-May-23
EP_SP_66_12-WP-2-M0.13.6	Air Compressor Bld Equipment Installation	150	17-Sep-22	13-Feb-23
EP_SP_66_12-WP-2-M0.13.8a	MT Process Bld Process Equipment Installation	330	10-Dec-22	04-Nov-23
EP_SP_66_12-WP-2-M0.13.8b	Desalination Bld Process Equipment Installation	210	24-Aug-22	21-Mar-23
EP_SP_66_12-WP-2-M0.13.09	IWMF Substation Bld Equipment Installation	450	22-Feb-22	17-May-23
EP_SP_66_12-WP-2-M0.13.10	Ramp & Storage Bld Process Equipment Installation	150	19-Dec-22	17-May-23
EP_SP_66_12-WP-2-M0.13.12	Equipment Installaion at External Area	240	15-Sep-22	12-May-23
EP_SP_66_12-WP-2-M0.13.13	External Process Pipe Works	271	03-Oct-22	30-Jun-23
EP_SP_66_12-WP-2-M0.14	**Landscape, External Road and Drains Works**	872	07-Nov-21	27-Mar-24
EP_SP_66_12-WP-2-M0.15	**Works By CLP**	633	04-Feb-22	30-Oct-23
EP_SP_66_12-WP-2-M0.16	**Testing & Commissioning**	591	15-Dec-22	27-Jul-24



Progarmme for Design and Construction Works
Summary Programme

Date	Revision	Checked	Approved
04-Dec-17	Rev. 0 - 1st Issue		
16-Jul-18	Rev. 1 - Revised to SO's comments		
03-Sep-18	Rev. 2 - Revised to SO's comments		

Appendix B Summary of Implementation Status of Environmental Mitigation

Appendix B

Table B.1 Implementation Schedule for Air Quality Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S3b.8.1	Air Pollution Control (Construction Dust) Regulation & Good Site Practices • Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines. • Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading	Work site / During the construction period	Contractor		✓			Air Pollution Control (Construction Dust) Regulation	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	points, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods. • Imposition of speed controls for vehicles on unpaved site roads. Ten kilometers per hour is the recommended limit. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.								
S3b.6.3	<u>Odour Removal by Deodorizers</u> • Deodorizers with 95% odour removal efficiency would be installed for the air ventilated from the mechanical treatment plant before discharge to the atmosphere	Waste reception halls, the waste storage area,	IWMF Operator	✓		✓		EIAO-TM	N/A
S3b.8.2	<u>Air Pollution Control and Stack Monitoring</u> • Air pollution control and stack monitoring system will be installed for the IWMF to ensure that the emissions from the IWMF stack will meet the proposed target emission limits.	IWMF stack emissions / During design & operation phase	IWMF Operator	✓		✓		EIAO-TM, Supporting Document for Application for Variation of Environmental Permit (EP-	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	• Voluntary Enhancement Measures in Flue Gas Cleaning and Emission Monitoring: 1. Two-stage bag filter system with reagent recirculation; 2. In addition to SCR, provide SNCR for removal of NO_x; tighten emission limit for half-hourly and daily NO_x to 160 mg/m^3 and 80 mg/m$_3$ respectively; 3. Well-mixed feed waste: to minimize the fluctuation of pollutant loading on the flue gas treatment system; 4. Two more AQMSs would be set up at South Lantau and Shek Kwu Chau respectively; 5. Limit levels will be set under the IWMF DBO contract to require that waste feed shall cease if any of the air pollutant has exceeded 95% of the emission concentration limit as stipulated in the Special Process license; and 6. Each incineration chamber shall be fitted with auxiliary burners to ensure complete burn out of the combustion gases.							429/2012)	
-	<u>Treated Fly Ash and Air Pollution Control Residues:</u> • During testing and commissioning, the Contractor shall sample and test every container of treated fly ash and air	IWMF stack emissions / During design & operation	IWMF Operator	✓		✓		Supporting Document for Application for Variation of Environmental	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit. If a test result confirms that any one of the samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every container of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria for the next six months. • During the first six months of operation, if the requirements in (a) could be fully conformed with, the Contractor shall sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit. The Contractor shall take two samples from each shipload for testing and the Contractor shall not dispose of any of that shipload of treated fly ash and air pollution control residues until the test results confirm that the two samples conform to the limits and the criteria. If a test result confirms that any one of	phase						Permit (EP-429/2012)	

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	the two samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria for the next six months. The Contractor shall make due allowance in the Design and the Operation for the time to sample and test treated fly ash and air pollution control residues before disposal. • Provided that there is no non-conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit throughout a continuous sixmonth period in the Operation Period, the testing frequency shall be reduced to monthly interval.Two samples from one shipload of treated fly ash and air pollution control residues shall be collected and tested for conformance to the Incineration Residue Pollution Control Limits and leachability criteria. The Contractor shall not dispose of any of the treated fly ash and air pollution control residues in the shipload which the samples are taken until the test results confirm that the samples conform to the limits and the								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	criteria. If the test result confirm that any one of the samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit for the next six months.								
-	Bottom Ash: • During testing and commissioning, the Contractor shall sample and test every container of bottom ash for conformance to the leachability criteria shown in Table 2 of the Environmental Permit. If a test result confirms that any one of the samples does not conform to the criteria, the Contractor shall be required to sample and test every container of bottom ash for conformance to the leachability criteria for the next six months. • During the first six months of operation, if the requirements in (d) could be fully conformed with, the Contractor shall sample and test one shipload of bottom ash each month for conformance to the leachability criteria shown in Table 2 of the Environmental Permit. The	IWMF stack emissions / During design & operation phase	IWMF Operator	✓		✓		Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	Contractor shall take two samples from the shipload for testing and the Contractor shall not dispose of any of that shipload of bottom ash until the test results confirm that the two samples conform to the criteria. If a test result confirms that any one of the two samples does not conform to the criteria, the Contractor shall be required to sample and test each shipload of bottom ash for conformance to the leachability criteria for the next six months. The Contractor shall make due allowance in the Design and the Operation for the time to sample and test bottom ash before disposal. • Provided that there is no non-conformance to the leachability criteria shown in Table 2 of the Environmental Permit throughout a continuous sixmonth period in the Operation Period, the Contractor shall be allowed to take two samples from any one shipload of bottom ash once every six months for conformance to the leachability criteria. The Contractor shall not dispose of any of the bottom ash in the shipload which the samples are taken until the test results confirm that the samples conform to the criteria. If the test result confirm that								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	any one of the samples does not conform to the criteria, the Contractor shall be required to sample and test one shipload of bottom ash each month for conformance to the leachability criteria shown in Table 2 of the Environmental Permit for the next six months as stipulated above.								

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.2 Implementation Schedule for Noise Impact Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S4b.8	Good site practices to limit noise emissions at source and use of quiet plant and working methods, whenever practicable.	Work Sites / Construction Period	EPD and its contractors		✓			EIAO-TM	Implemented
S4b.6 & S4b.8	All the ventilation fans installed in the below will be provided with silencers or acoustics treatment. (i) Stack of the incinerator (ii) Ventilation systems within the IWMF Enclosure and discharge silencer or other acoustic treatment equipment should be installed in the air-cooled chillers Other than provision of silencer or other acoustic treatment equipment for the stack of the incinerator and ventilation system, the detailed design should incorporate the following good practice in order to minimize the nuisance on the neighboring NSRs. (i) The exhaust of the ventilation system and any opening of the building should be located facing away from any NSRs; and (ii) Louver or other acoustic treatment equipment could also be applied to the exhaust of the ventilation system.	Within IWMF area / Construction Period	EPD and its contractors	✓		✓		EIAO-TM	N/A

-	Voluntary Enhancement Measure • Provision of air-conditioner and double glazed windows to nearby NSR at Shek Kwu Chau (i.e. SARDA) as precautionary measures.	IWMF site	Design team, contractor, IWMF operator	✓	✓			Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	Implemented

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.3 Implementation Schedule for Water Quality Measures for the Artificial Island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S5b.8.1.1	<u>Drainage and Construction Site Runoff</u> The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. These practices include the following items: • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented to the commencement of construction. • Boundaries of earthworks should be surrounded by dykes or embankments for flood protection, as necessary. • Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM-DSS. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be 5 minutes under maximum flow conditions. The detailed design of the sand/silt traps shall be undertaken by the contractor • Water pumped out from foundation	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	piles must be discharged into silt removal facilities. • Measures should be taken to minimize the ingress of site runoff and drainage into excavations. Drainage water pumped out from excavations should be discharged into storm drains via silt removal facilities. • During rainstorms, exposed slope/soil surfaces should be covered by a tarpaulin or other means, as far as practicable. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94. • Exposed soil areas should be minimized to reduce potential for increased siltation and contamination of runoff. • Earthwork final surfaces should be well compacted and subsequent permanent work or surface protection should be immediately performed. • Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.								
S5b.8.1.2	<u>General Construction Activities</u> Construction solid waste should be collected, handled and disposed of properly to avoid entering to the nearby watercourses and public drainage	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	system. Rubbish and litter from construction sites should also be collected to prevent spreading of rubbish and litter from the site area.								
S5b.8.1.3	There is a need to apply to EPD for a discharge license for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge license. All the run-off and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. The beneficial uses of the treated effluent for other on-site activities such as dust suppression and general cleaning etc., can minimize water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO license which is under the ambit of regional office of EPD.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	Deficiency of Mitigation Measures but rectified by the Contractor
S5b.8.1.4	Accidental Spillage Contractor must register as a chemical waste producer if chemical wastes would be produced from construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
S5b.8.1.5	Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas which appropriately equipped to control these discharges.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Implemented
S5b.8.1.6	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Deficiency of Mitigation Measures but rectified by the Contractor
S5b.8.1.7	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: • Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. • Storage area should be selected at a safe location on site and adequate space should be allocated to the	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	storage area.								
S5b.8.1.8	Sewage Effluent Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor would be responsible.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	N/A
S5b.8.1.9	Reclamation and Construction of Breakwaters • The proposed dredging and reclamation should be commenced in phases. The breakwaters and seawalls should be constructed and the reclamation should be started within the enclosed breakwaters after the completion of the breakwater. Silt curtain should be applied around caissons / blockwork during the filling of the cell to prevent the loss of fine in the filling material. • The maximum production rate for dredging for the anti-scouring protection layer shall not exceed the permitted maximum daily dredging rate and carried out within its respective distance from the nearest non-translocatable coral community by the dredging contractor as specified in S.2.18 of the Further Environmental Permit (no.:FEP-01/429/2012/A). It is recommended to employ closed grab with small capacity of 2 m^3 to control the dredging rate. • Any gap that may need to be provided for marine access will be located at the middle of the North Western seawall, away from the identified coral communities and will be shielded by silt curtains systems to control	Work site / During the marine construction period	Contractor		✓			EIAO-TM; WPCO, Supporting Document for Application for Variation of Environmental Permit (EP-429/2012) Further Environmental Permit No. FEP-01/429/2012/A	Implemented for Silt curtains and sand blankets; N/A for others Reminder given on proper silt curtains checking

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	sediment plume dispersion. • The silt curtain system at marine access opening should be closed as soon as the barges passes through the marine access opening in order to minimize the period of curtain opening. Filling should only be carried out behind the silt curtain when the silt curtain is completely closed. • To enhance the effectiveness of the silt curtain at the marine access, the northern breakwater would be built before the commencement of the reclamation to reduce the current velocity towards the marine access opening. • The silt curtain system at marine access opening should be regularly checked and maintained to ensure proper functioning. • Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25% which is in line with the CEDD's General Specification; • The filling for reclamation should be carried out behind the seawall. The filling material should only consist of public fill, rock and sand. The filling composition and filling rates at each filling area should follow those delineated in Table 1 of the FEP-01/429/2012/. The filling above high watermark is not restricted; • No dredging should be carried out within 16m to the nearest non-translocatable coral community;								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	• Daily site audit including full-time on-site monitoring by the ET is recommended during the dredging for anti-scouring protection layer for checking the compliance with the permitted no. of grab; • Closed grab dredger should be used to minimize the loss of sediment during the raising of the loaded grabs through the water column; • Frame-type silt curtains should be deployed around the dredging operations; • Floating-type silt curtains should be used to surround the circular cell during the sheetpiling work; • The descent speed of grabs should be controlled to minimize the seabed impact speed; • Barges should be loaded carefully to avoid splashing of material; • All barges used for the transport of dredged materials should be fitted with tight bottom seals in order to prevent leakage of material during loading and transport; • No concurrence works between laying of submarine cables and dredging/reclamation works within the same location is allowed. For works close to each other, the construction program should be arranged so that the dredging/reclamation works within area bounded by the breakwaters and the laying of cables would not operate within a								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	distance of 80m from each other to avoid any accumulative impact on the environment (in case if such tight schedule is necessary). • All barges should be filled to a level which ensures that material does not spill over during loading and transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action. • No DCM works should be carried out within 100m to the nearest non-translocatable coral colony / colonies. • Silt curtains should be employed to enclose DCM field trial and any full scale DCM work to minimize the potential impacts on water aspect. • A sand blanket is to be placed on top of the marine deposit using tremie pipes prior to the DCM ground treatment to avoid seabed sediment disturbance.								
S5b.8.2.3	Operational Phase Discharges A pipeline drainage system will serve the development area collecting surface runoff from paved areas, roof, etc. Sustainable drainage principle would be adopted in the drainage system design to minimize peak surface runoff, maximize permeable surface and maximize beneficial use of rainwater.	Within IWMF site / During the operational phase	IWMF Operator	✓		✓		WPCO	N/A
S5b.8.2.4	Oil interceptors should be provided in the drainage system of any potentially contaminated areas (such as truck parking area and maintenance workshop) and	Within IWMF site / During the operational	IWMF Operator	✓		✓		WPCO; WDO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	regularly cleaned to prevent the release of oil products into the storm water drainage system in case of accidental spillages. Accidental spillage should be cleaned up as soon as practicable and all waste oils and fuels should be collected and handled in compliance with the Waste Disposal Ordinance.	phase							
S5b.8.2.5	<u>Refuse Entrapment</u> Collection and removal of floating refuse should be performed at regular intervals for keeping the water within the Project site boundary and the neighboring water free from rubbish.	Within the Project site / During the operational phase	IWMF Operator			✓		WPCO	N/A
S5b.8.2.6	<u>Transportation of bottom ash, fly ash and APC residues to WENT Landfill for disposal</u> Covered container should be used in the shipping of the incineration waste to limit the contact between the incineration waste and the marine water. A comprehensive emergency response plan for any accidental spillage should be submitted by the operation contractor to the EPD for agreement before the operation of the facilities. Salvage and cleanup action to recover the spilled incineration waste containers following the spillage should be carried out according to the emergency response plan to mitigate the environmental impact in case of spillage.	Transportation of Incineration Ash / During the operational phase	IWMF Operator			✓			N/A

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.4 Implementation Schedule for Waste Management Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
6b.5.1.2	Good Site Practices Adverse environmental impacts in relation to waste management are not expected, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities would include: • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and • Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Separate chemical wastes for special handling and disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste.	Work Site/ During Construction Period	Contractor		✓			WDO; LDO; ETWB TCW No. 19/2005; EIAO-TM	Implemented; N/A for some as no chemical waste was generated in the reporting period.

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
6b.5.1.3	Waste Reduction Measures Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: • Design foundation works that could minimize the amount of excavated material to be generated. • Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; • Sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage the collection of aluminum cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force; • Proper storage and site practices to minimize the potential for damage or contamination of construction materials; and	Work Site/ During Design & Construction Period	Contractor	✓	✓				Implemented; N/A for foundation and demolition items

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	• Plan and stock construction materials carefully to minimize amount of waste to be generated and to avoid unnecessary generation of waste.								
6b.5.1.7	Dredged Sediment – Application of Dumping Permit The project proponent should agree in advance with MFC of CEDD on the site allocation. The project proponent or contractor for the dredging works shall then apply for the site allocations of marine sediment disposal based on the prior agreement with MFC/CEDD. The project proponent or contractor should also be responsible for the application of all necessary permits from relevant authorities, including the dumping permit as required under DASO from EPD, for the disposal of dredged sediment prior to the commencement of the dredging works.	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓	✓			DASO ETWB TCW 34/2002	Implemented, marine sediment samples have been collected.
6b.5.1.8	Dredged Sediment – Sediment Quality Report The project proponent or contractor will need to satisfy the appropriate authorities that the quality of the marine sediment to be dredged has been identified according to the requirements of ETWB TCW 34/2002. This should be completed well before the dredging works and would include at least the submission of a formal Sediment Quality Report under Tier I of ETWB TCW No. 34/2002 to DEP for approval. Subject to advice from DEP, it is possible that further marine SI in accordance with ETWB TCW 34/2002	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓				DASO ETWB TCW 34/2002	Undergoing

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	might be necessary for the application of dumping permit under DASO. In such case, a sediment sampling and testing proposal shall be submitted to and approved by DEP before the additional marine SI works.								
6b.5.1.9	Dredged Sediment – Sediment Transportation The barge transporting the sediments to the designated disposal sites should be equipped with tight fitting seals to prevent leakage and should not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, 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 DEP.	Seawall and Reclamation site / Construction Period	EPD and its contractor		✓			DASO ETWB TCW 34/2002	N/A
6b.5.1.10	Construction and Demolition Materials In order to minimize the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below: • A Waste Management Plan (WMP), which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005;	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	• A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be adopted for easy tracking; and • In order to monitor the disposal of C&D materials at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to *ETWB TCW No. 31/2004*).								
6b.5.1.11 – 6b.5.1.12	The Contactor should prepare and implement an EMP in accordance with ETWB TCW No.19/2005, which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor All surplus C&D materials arising from or in connection with construction works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on-site. The system should be	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.								
6b.5.1.13	Chemical Wastes Should chemical wastes be produced at the construction site, the Contractor would be required to register with 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 should be used, and incompatible corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Work Site/ During Construction Period	Contractor		✓			Waste Disposal (Chemical Waste) (General) Regulation	Implemented
6b.5.1.14	General Refuse General refuse should be stored in enclosed bins or compaction units separate from C&D materials. A licensed waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Work Site/ During Construction Period	Contractor		✓			Public Health and Municipal Services Ordinance	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
6b.5.1.16 – 6b.5.1.33	Biogas Generation The Contractor shall review the data and analysis results, and the data from further Site Investigation, if any. Subject to the review findings, the following gas protection measures may be considered if necessary: - gas monitoring after reclamation; - passive ventilation; - gas impermeable membrane; - ventilation with "at risk" rooms; - protection of utilities or below ground services; - precautions during construction works; - precautions prior to entry of belowground services	Reclamation site (if dredging at the reclamation site is not required) / Design & Construction Period	Designer and/or contractor	✓	✓			EPD/TR8/97	N/A
6b.5.2.1	Good Site Practices It is recommended that the following good operational practices should be adopted to minimise waste management impacts: • Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and Waste Disposal (Chemical	IWMF Site/During Operation Period	IWMF Operator			✓		Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Waste) (General) Regulation; ETWB TCW No. 1/2004	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	Waste) (General) Regulation; • Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; • Use of a waste haulier licensed to collect specific category of waste; • A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at landfills, and to control fly tipping. Reference should be made to ETWB TCW No. 31/2004. • Training of site personnel in proper waste management and chemical waste handling procedures; • Separation of chemical wastes for special handling and appropriate treatment at a licensed facility; • Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Provision of sufficient waste disposal points and regular collection for disposal; • Adoption of appropriate measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and • Implementation of a recording system for the amount of wastes generated, and disposed of (including recycled								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	the disposal sites).								
6b.5.2.2	<u>Waste Reduction Measures</u> Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction: • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage collection of aluminum cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and • Any unused chemicals or those with remaining functional capacity should be reused as far as practicable.	IWMF Site/ During Operation Period	IWMF Operator			✓			Implemented
6b.5.2.3	<u>Storage, Handling, Treatment, Collection and Disposal of Incineration By-Products</u> The following measures are recommended for the storage, handling and collection of the incineration by-products: • Ash should be stored in storage silos; • Ash should be handled and conveyed in closed systems fully	IWMF Site/ During Operation Period	IWMF Operator			✓		Incineration Residue Pollution Control Limits	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	segregated from the ambient environment; • Ash should be wetted with water to control fugitive dust, where necessary; • All fly ash and APC residues should be treated, e.g. by cement solidification or chemical stabilization, for compliance with the proposed Incineration Residue Pollution Control Limits and leachability criteria prior to disposal; • The ash should be transported in covered trucks or containers to the designated landfill site. The Contractor should provide EPD with chemical analysis results of the bottom ash, and treated fly ash and APC residues to confirm that the ash/residue can comply with the proposed Incineration Residue Pollution Control Limits before disposal.								
6b.6.3.1	<u>Fuel Oil Tank Construction and Test</u> • The fuel tank to be installed should be of specified durability. • Double skin tanks are preferred. • Underground fuel storage tank should be placed within a concrete pit. • The concrete pit shall be accessible	Fuel Oil Storage Tank/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	to allow regular tank integrity tests to be carried out at regular intervals. • Tank integrity tests should be conducted by an independent qualified surveyor or structural engineer. • Any potential problems identified in the test should be rectified as soon as possible.								
6b.6.3.1	Fuel Oil Pipeline Construction and Test • Installation of aboveground fuel oil pipelines is preferable; if underground pipelines are unavoidable, concrete lined trenches should be constructed to contain the pipelines. • Double skin pipelines are preferred. • Distance between the fuel oil refuelling points and the fuel oil storage tank shall be minimized. • Integrity tests for the pipelines should be conducted by an independent qualified surveyor or structural engineer at regular intervals. • Any potential problems identified in the test should be rectified as soon as possible.	Fuel Oil Pipelines/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓			N/A
6b.6.3.1	Fuel Oil Leakage Detection • Installation of leak detection device at storage tank and pipelines.	Fuel Oil Storage Tank and Pipelines/	IWMF Contractor	✓	✓	✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	• Installation and use of pressure gauges (e.g. at the two ends of a filling line) in fuel filling, which allows unexpected pressure drop or difference and sign of leakage to be detected.	During Design, Construction and Operation Periods							
6b.6.3.1	Fuel Oil Storage Tank Refuelling • Storage tank refuelling (from road tanker) should only be conducted by authorized staff of the oil company using the company's standard procedures.	Fuel Oil Refuelling Point/ During Operation Period	IWMF Operator			✓			N/A
6b.6.3.1	Fuel Oil Spillage Response An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incidents in detail. General procedures to be taken in case of fuel oil spillage are presented below. • Training - Training on oil spill response actions should be given to relevant staff. The training shall cover the followings: ➢ Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and fire fighting equipment; ➢ General methods to deal with oil spillage and fire incidents; ➢ Procedures for emergency drills in the event of oil spills and fire; and	IWMF Site/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	➢Regular drills shall be carried out. • Communication -Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department can be quickly sought. • Response Procedures -Any fuel oil spillage within the IWMF site should be immediately reported to the Plant Manager with necessary details including location, source, possible cause and extent of the spillage. -Plant Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures shall include the following: ➢Identify and isolate the source of spillage as soon as possible. ➢Contain the oil spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels. ➢Remove the oil spillage. ➢Clean up the contaminated area. ➢If the oil spillage occurs during storage tank refuelling, the refueling operation should immediately be								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	stopped. ➢Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs.								
6b.6.3.2	Chemicals and Chemical Wastes Handling & Storage • Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas. • The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • The storage areas for chemicals and chemical wastes shall have an impermeable floor or surface. The impermeable floor/ surface shall possess the following properties: - Not liable to chemically react with the materials and their containers to be stored. - Able to withstand normal loading and physical damage caused by container handling - The integrity and condition of the impermeable floor or surface should	Chemicals and Chemical Wastes Storage Area / During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	be inspected at regular intervals to ensure that it is satisfactorily maintained ➢ For liquid chemicals and chemical wastes storage, the storage area should be bunded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater. ➢ Storage containers shall be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed. ➢ Chemical handling shall be conducted by trained workers under supervision.								
6b.6.3.2	<u>Chemicals and Chemical Wastes Spillage Response</u> A Chemicals and/ or Chemical Wastes Spillage Response Plan shall be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals/ chemical waste spillages are presented below. • Training - Training on spill response actions	IWMF Site/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	should be given to relevant staff. The training shall cover the followings: ➢ Tools & resources to handle spillage, e.g. locations of spill handling equipment; ➢ General methods to deal with spillage; and ➢ Procedures for emergency drills in the event of spills. • Communication - Establish communication channel with FSD and EPD to report the spillage incident so that necessary assistance from relevant department can be quickly sought. • Response Procedures - Any spillage within the IWMF site should be reported to the Plant Manager. - Plant Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures shall include the followings: ➢ Identify and isolate the source of spillage as soon as possible; ➢ Contain the spillage and avoid infiltration into soil/								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas); ➢ Remove the spillage; the removal method/ procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed; ➢ Clean up the contaminated area (in case the spillage ➢ The waste arising from the cleanup operation should be considered as chemical wastes.								
6b.6.3.3	Preventive Measures for Incineration By-products Handling The recommended measures listed below can minimize the potential contamination to the surrounding environment due to the incineration by-products: • Ash should be stored in storage silos; • Ash should be handled and conveyed in closed systems fully • Ash should be wetted with water to control fugitive dust, where necessary; • All fly ash and APC residues should be treated, e.g. by cement solidification or chemical	Storage, Handling & Collection of Incineration Ash at IWMF/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	stabilization, for compliance with the proposed Incineration Residue Pollution Control Limits and leachability criteria prior to disposal; • The ash should be transported in covered trucks or containers to the designated landfill site.								
6b.6.3.4 - 6b.6.3.6	<u>Incident Record</u> After any spillage, an incident report should be prepared by the Plant Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary. The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken. In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the IWMF operator should be responsible for the cleanup of the affected area. The responses procedures described in **Section 6b.6.3.1** and **Section 6b.6.3.2** of EIA report should be followed accordingly together with the land contamination assessment and remediation guidelines	IWMF Site/ During Operation Period	IWMF Operator			✓		Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land and Remediation.	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	stipulated in the *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land and Remediation.*								

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.5 Implementation Schedule for Ecological Quality Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
7b.8.2.1	Measures to avoid direct loss of intertidal habitat • The site boundary has been proposed to avoid direct contact with the intertidal natural rocky shore of Shek Kwu Chau. It avoids direct loss of intertidal communities and the existing natural rocky shore habitat, where Reef Egret and White-bellied Sea Eagle have been recorded within and in the vicinity of this habitat.	IWMF site	Design team	✓				EIAO-TM	N/A
7b.8.2.2	Measures to minimise loss of coastal subtidal habitat • Extensive coral colonies were recorded at the coastal hard bottom habitat at Shek Kwu Chau. To avoid and minimise the extensive direct impact on the coral colonies, the proposed reclamation area has been moved further offshore to minimise loss of subtial habitat near shore.	IWMF site	Design team	✓				EIAO-TM	N/A
7b.8.2.3	Zero Discharge Scheme • The design scheme of the Project has avoided discharge of wastewater into the marine environment. mechanical treatment plant, or for onsite washdown and landscape.	IWMF site	Design team, IWMF operator	✓		✓		WPCO	N/A
7b.8.2.4	Measures to avoid loss of plant species of conservation importance • Landing portal construction works would not cause direct lost to the recorded individual of protected plant species,	Cheung Sha landing portal	Design team, Contractor	✓	✓		✓	EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	• *Aquilaria sinensis*, at the coastal shrubland habitat at Cheung Sha. As a precautionary measure, the plant should be tagged with eye-catching tape and fenced off prior to works, in order to avoid any damage by workers.								
7b.8.3.1-7b.8.3.15	Measures to minimise water quality impact • Measures for water quality as recommended in **Section 5b** of the EIA Report should be implemented.	Work site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM; ProPECC PN 1/94; WPCO	Implemented, investigation on condition of deployed silt curtain is undergoing
7b.8.3.16 - 7b.8.3.30	Measures to minimise disturbance on Finless Porpoise *Minimisation of Habitat Loss for Finless Porpoise* • Substantial revision has been made on the layout plan and form of the breakwater, in order to minimise the potential loss of important habitat for Finless Porpoise. The revision has greatly reduced the size of the embayment area, as well as the Project footprint. As a result, the size of habitat loss for Finless Porpoise has reduced from the original ~50 ha, down to ~31 ha. *Avoidance of peak season for finless porpoise occurrence* • To minimise potential acoustic disturbance from construction activities	IWMF site,	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM, Supporting Document for Application for Variation of the Environmental Permit (EP-429/2012)	Implemented for avoidance of construction works that may produce underwater acoustic disturbance, Vessel Travel Route implementation, training of staff, MMEZ and marine mammal watching works during deployment of silt curtain; N/A for others

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	on Finless Porpoise, construction works that may produce underwater acoustic disturbance should be scheduled outside the months with peak Finless Porpoise occurrence (December to May), including: - sheet piling works for construction of cofferdam surrounding the reclamation area (Phase 1); - sheet piling works for construction of the shorter section of breakwater (Phase 1); - sheet piling works for construction of the remaining section of breakwater (Phase 3); - bored piling works for berth area (Phase 3); and - submarine cable installation works between Shek Kwu Chau and Cheung Sha. Such works should be restricted within June to November. This approach would not only avoid the peak season for Finless Porpoise occurrence, the magnitude of impacts arise from acoustic disturbance would also be minimised. • Submarine cable installation works • Since the DCM ground treatment and the installation of precast seawalls and								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	breakwaters should generate no underwater acoustic disturbance to Finless Porpoise, no specific mitigation measures are required. *Opt for quieter construction methods and plants* • Considering the sensitivity of marine mammals to underwater acoustic disturbance, instead of the previously proposed conventional breakwater and reclamation peripheral structure, which requires noisy piling works, the current circular cells structure for breakwater and reclamation peripheral structure is proposed. A quieter sheet piling method using vibratory hammer or hydraulic impact hammer, should be adopted for the installation of circular cells for cellular cofferdam and northern breakwater during Phase 1, and southern breakwater Phase 3; • Non-percussive bore piling method would be adopted for the installation of tubular piles for the berth construction during Phase 3. *Monitored exclusion zones* • During the installation/re-installation/relocation process of floating type silt curtains, in order to avoid the accidental entrance and entrapment of marine								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	mammals within the silt curtains, a monitored exclusion zone of 250 m radius from silt curtain should be implemented. The exclusion zone should be closely monitored by an experienced marine mammal observer at least 30 minutes before the start of installation/re-installation/relocation process. If a marine mammal is noted within the exclusion zone, all marine works should stop immediately and remain idle for 30 minutes, or until the exclusion zone is free from marine mammals. • The experienced marine mammal observer should be well trained to detect marine mammals. Binoculars should be used to search the exclusion zone from an elevated platform with unobstructed visibility. The observer should also be independent from the project proponent and has the power to call-off construction activities. • In addition, as marine mammals cannot be effectively monitored within the proposed monitored exclusion zone at night, or during adverse weather conditions (i.e. Beaufort 5 or above, visibility of 300 meters or below), marine works should be avoided under weather conditions with low visibility.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	Marine mammal watching plan • Upon the completion of the installation/re-installation/relocation of floating type silt curtain, all marine works would be conducted within a fully enclosed environment within the silt curtain, hence exclusion zone monitoring would no longer be required. Subsequently, a marine mammal watching plan should be implemented. The plan should include regular inspection of silt curtains, and visual inspection of the waters surrounded by the curtains. Special attention should be paid to Phase 2 (reclamation) where the floating type still curtain would be opened occasionally for vessel access, leaving a temporary 50 m opening. An action plan should be devised to cope with any unpredicted incidents such as the case when marine mammals are found within the waters surrounded by the silt curtains. *Small openings at silt curtains* • The openings for vessel access at the silt curtains should be as small as possible to minimise the risk of accidental entrance. *Adoption of regular travel route*								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	• During construction and operation, captains of all vessels should adopt regular travel route, in order to minimize the chance of vessel collision with marine mammals, which may otherwise result in damage to health or mortality. The regular travel route should avoid areas with high sighting density of Finless Porpoise as much as possible. *Vessel speed limit* • The frequent vessel traffic in the vicinity of works area may increase the chance of mammal mammals being killed or seriously injured by vessel collision. A speed limit of ten knots should be strictly enforced within areas with high density of Finless Porpoise. • Passive acoustic monitoring and land-based theodolite monitoring surveys should be adopted to verify the predicted impacts and effectiveness of the proposed mitigation measures. *Training of Staff* • Staff, including captains of vessels, should be aware of the guidelines for safe vessel operations in the presence of cetaceans during construction and								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	operation phases. Adequate trainings should be provided								
7b.8.3.31 - 7b.8.3.34	<u>Measures to minimise impact on corals</u> *Coral translocation* • Coral communities within and in proximity to the proposed dredging sites would be disturbed by the Project due to the dredging operations. In order to minimise direct loss of coral communities, translocation of corals that are attached to movable rocks with diameter less than 50 cm are recommended. In order to avoid disturbance to corals during the spawning period, the spawning season of corals (June to August) should be avoided; and that translocation should be carried out during the winter season (November-March). • The REA survey results suggest that the 198 directly affected coral colonies were attached to movable rocks (less than 50 cm in diameter). It is technically feasible to translocate them to avoid direct loss. • Prior to coral translocation, a more detailed baseline survey, including event / action plan for coral monitoring should be submitted upon approval of this Project, prior to commencement of	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented, tagged coral found missing after hitting by typhoons

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	construction works. Advice from relevant governmental departments (i.e. AFCD) and professionals would be sought after, in order to identify a desirable location for the relocation of coral communities. Post-translocation monitoring on the translocated corals should also be considered. *Coral monitoring programme* • A coral monitoring programme is recommended to assess any adverse and unacceptable impacts to the coral communities at the coasts of Shek Kwu Chau during construction of the Project. *Phasing of Works* • To minimize environmental impacts, the proposed phasing of construction works has been carefully designed to reduce the amount of concurrent works, hence minimize SS elevation and the associated impacts on corals.								
7b.8.3.35 - 7b.8.3.41	<u>Specific measures to minimize disturbance on breeding White-bellied Sea Eagle</u> *Avoidance of noisy works during the breeding season of White-bellied Sea Eagle* • To minimize potential noise disturbance	IWMF site, marine traffic route	Design Team, Contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	from construction activities on WBSE, noisy construction works should be scheduled outside their breeding season (December to May) to minimise potential degradation in breeding ground quality and breeding activities, including: - sheet piling works for construction of cofferdam surrounding the reclamation area (Phase 1); - sheet piling works for construction of the shorter section of breakwater (Phase 1); - sheet piling works for construction of the remaining section of breakwater (Phase 3); and - bored piling works for berth area (Phase 3). *Opt for quieter construction methods and plants* • To minimise potential construction noise disturbance on WBSE, quieter construction methods and plants should be adopted. The recommended noise mitigation measures in the **Noise** chapter (**Section 4b.8** of the EIA Report) should be implemented to minimise potential noise disturbance to acceptable levels. *Restriction on vessel access near the nest of White-bellied Sea Eagle*								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	• During construction and operation, in order to minimize disturbance on the existing WBSE nest, a pre-defined practical route to restrict vessel access near the nest should be adopted to keep vessels and boats as far away from the nest as possible. *White-bellied Sea Eagle monitoring programme* • A WBSE monitoring programme is recommended to assess any adverse and unacceptable impacts to the breeding activities of WBSE during construction and operation of the Project. Monitoring surveys for WBSE would include pre-construction phase (twice per month for duration of three months during their breeding season -between December and May, immediately before the commencement of works), construction phase, and operation phase (two years after the completion of construction works). • Surveys should be conducted twice per month during their breeding season (from December to May); and once per month outside breeding season (June to November). More details on monitoring for WBSE are presented in the EM&A Manual.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	Education of staff • Staff, including captains of all vessels during construction and operation phases, should be aware of the ecological importance of WBSE. Awareness should be raised among staff to minimise any intentional or unintentional disturbance to the nest. *Minimisation of Glare Disturbance* • To minimise glare disturbance on WBSE, which may cause disorientation of birds by interfering with their magnetic compass, and disruption in behavioural patterns such as reproduction, fat storage and foraging pattern, any un-necessary outdoor lighting should be avoided, and in-ward and down-ward pointing of lights should be adopted.								
-	Construction of Seawall/Breakwaters • To widen the open channel between the Artificial Island and Shek Kwu Chau. • To design the precast concrete seawall with environmental friendly features.	IWMF site	Design team, contractor, IWMF operator	✓	✓			Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	N/A
7b.8.3.42	Opt for Quieter Construction Methods and Plants • Quieter construction methods and plants	Work site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	should be used to minimise disturbance to the nearby terrestrial habitat and the associated wildlife.								
7b.8.3.43	<u>Measures to minimize impacts from artificial lighting</u> • Unnecessary lighting should be avoided, and shielding of lights should be provided to minimize disturbance from light pollution on fauna groups.	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓		EIAO-TM	Implemented
7b.8.3.44 - 7b.8.3.45	<u>Measures to minimize accidental spillage</u> • Regular maintenance of vessels, vehicles and equipment that may cause leakage and spillage should only be undertaken within pre-designated areas, which are appropriately equipped to control the associated discharges. • Oils, fuels and chemicals should be contained in suitable containers, and only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Work site	Contractor, IWMF operator		✓	✓	✓	EIAO-TM	Deficiency of Mitigation Measures but rectified by the Contractor
7b.8.3.46	<u>Measures to minimise sewage effluent</u> • Temporary sanitary facilities, such as	Work site	Contractor		✓			EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce.								
7b.8.3.47	<u>Measures to minimise drainage and construction runoff</u> • Potential ecological impacts resulted from potential degradation of water quality due to unmitigated surface runoff could be minimised via the detailed mitigation measures in **Section 5b.8** of the EIA Report. The following presents some of the mitigation measures: - On-site drainage system with implemented sedimentation control facilities. - Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. - Provision of embankment at boundaries of earthworks for flood protection. - Water pumped out from foundation piles must be discharged into silt removal facilities. - During rainstorms, exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable. - Exposed soil surface should be minimized to reduce siltation and runoff. - Earthwork final surfaces should be	Work site	Contractor		✓		✓	EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	well compacted. Subsequent permanent surface protection should be immediately performed. - Open stockpiles of construction materials, and construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.								
7b.8.3.48	<u>Measures to minimise impacts from general construction activities</u> • To avoid the entering of construction solid waste into the nearby habitats, construction solid waste should be collected, handled and disposed of properly to avoid entering to the nearby habitats. It is recommended to clean the construction sites on a regular basis.	Work site	Contractor		✓			EIAO-TM	Implemented
7b.8.3.49	<u>Pest Control</u> Good waste management practices should be adopted at the IWMF in order to minimise the risk of introduction of pest to the island: - Transportation of wastes in enclosed containers - Waste storage area should be well maintained and cleaned - Waste should only be disposed of at designated areas - Timely removal of the newly arrived waste - Removal of items that are capable of	IWMF site	IWMF operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	retaining water - Rapid clean up of any waste spillages - Maintenance of a tidy and clean site environment - Regular application of pest control - Education of staff the importance of site cleanliness								
7b.8.3.50	Control of Marine Habitat Quality during Operation Phase • Depending on the seabed condition of the approach channel for marine vessels during operation phase of the IWMF, maintenance dredging may be required to ensure safe access. In order to avoid degradation in water quality due to elevation in SS and dispersion of sediment plume due to dredging works, it is recommended that any future maintenance dredging works should not be carried out within 100 m from the shore, similar to that of the dredging for anti-scouring protection layer during construction phase. All maintenance dredging works should be carried out with the implementation of silt curtain to control the dispersion of SS. The production rate should comply with the permit dredging rate and number of grab per hour.	IWMF site	IWMF operator			✓		EIAO-TM; WPCO	N/A
7b.8.4.1 – 7b.8.4.8	Compensation of loss of important habitat of Finless Porpoise	Waters between Shek Kwu Chau and Soko Islands	Project Proponent	✓		✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	Designation of Marine Park • The Project Proponent has made a firm commitment to seek to designate a marine park of approximately 700 ha in the waters between Soko Islands and Shek Kwu Chau, in accordance with the statutory process stipulated in the Marine Parks Ordinance, as a compensation measure for the habitat loss arising from the construction of the IWMF at the artificial island near SKC. • The Project Proponent shall seek to complete the designation by 2018 to tie in with the operation of the IWMF at the artificial island near SKC. • A further study should be carried out to review relevant previous studies and collate available information on the ecological characters of the proposed area for marine park designation; and review available survey data for Finless Porpoise, water quality, fisheries, marine traffic and planned development projects in the vicinity. Based on the findings, ecological profiles of the proposed area for marine park designation should be established, and the extent and location of the proposed marine park be determined. The adequacy of enhancement measures should also be reviewed.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
	• In addition, a management plan for the proposed marine park should be proposed, covering information on the responsible departments for operation and management (O&M) of the marine park, as well as the O&M duties of each of the departments involved. Consultation with relevant government departments and stakeholders should be conducted under the study. The study should be submitted to Director of Environmental Protection (DEP) for approval before the commencement of construction works. • The Project Proponent should provide assistance to AFCD during the process of the marine park designation. .								
7b.8.5.1 – 7b.8.5.4	<u>Additional Enhancement or Precautionary Measures</u> *Deployment of Artificial Reefs* • Deployment of artificial reefs (ARs) is an enhancement measure for the marine habitats. ARs are proposed to be deployed within the proposed marine park under this Project. The exact location, dimension and type of ARs to be deployed are to be further investigated along with the further study of the proposed marine park under this Project. The proposed ARs would be deployed at the same time as the complete	Within the proposed marine park under this study	Project Proponent	✓		✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
	designation of marine park. *Release of Fish Fry at Artificial Reefs and Marine Park* • Release of fish fry at the proposed ARs, as well as the proposed marine park under this study, should enhance the fish resources in the nearby waters, and subsequently food sources for Finless Porpoise. The proposed ARs with various micro-habitats would have the potential to provide shelter and nursery ground for the released fish fry. The frequency and quantity of fry to be released should be agreed by AFCD.								

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.6 Implementation Schedule for Fisheries Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
8b.8.1.2	Measure to minimize loss of and disturbance on fisheries resources • Alteration to the phasing of works, construction method, and layout plan of the IWMF at the artificial island near SKC has been made. The total fishing ground to be permanently lost due to the project has been significantly reduced from ~50 ha to ~31 ha. By adopting the current circular cells instead of the conventional seawall construction method, SS elevation would be greatly reduced, minimizing adverse impact on the health of fisheries resources.	IWMF site	Design team, contractor	✓	✓		✓	EIAO-TM	N/A
8b.8.1.3	Measure to minimize impingement and entrainment • Provision of a screen at the water intake point for desalination plant would be essential to minimize the risk of impingement and entrainment of fisheries resources (including fish, larvae and egg) through the intake point.	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages* Des	C	O	Dec	Relevant Legislation and Guidelines	Implantation Status and Remarks
8b.8.1.4-8b.8.1.6	Measures to control water quality • No wastewater effluent, anti-fouling agent, heavy metals and other contaminants would be released during operation phase of the Project. • Mitigation measures recommended in the water quality impact assessment during construction and operation would serve to protect fisheries resources from indirect impacts resulted from the Project	Work site, IWMF site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented, investigation on condition of deployed silt curtain is undergoing
8b.8.1.7 – 8b.8.1.8	Additional Enhancement / Precautionary Measures • Artificial Reefs (ARs) are proposed to be deployed within the proposed marine park under this Project as an enhancement measure for the marine habitats. This enhancement feature would bring positive impacts to the previously identified important spawning and nursery ground for fisheries resources. *Release of Fish Fry at Artificial Reefs* • Release of fish fry has been proposed under this Project. The proposed deployment of ARs within the proposed marine park would provide shelter and nursery ground for the released fish fry. The frequency and quantity of fry to be released should be agreed by AFCD.	Within the proposed marine park in the waters between Soko Islands and Shek Kwu Chau	Project Proponent	✓		✓		EIAO-TM	N/A

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Table B.7 Implementation Schedule for Landscape and Visual Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S10b.10 MLVC- 01	Grass-hydroseeded bare soil surface and stock pile area	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MLVC-02	<u>Landscape Design</u> 1) Early planting using fast grow trees and tall shrubs at strategic locations within site as buffer to block view corridors to the site from the VSRs, and to locally screen haul roads, excavation works and site preparation works. 2) Use of tree species of dense tree crown to serve as visual barrier. 3) Hard and soft landscape treatment (e.g. trees and shrubs) of open areas within development to provide a background for the outdoor containers from open view, shade and shelter, and a green appearance from surrounding viewpoints. 4) Planting strip along the periphery of the project site. 5) Selected tree species suitable for the coastal condition.	Work site / During design & construction phases	Contractor	✓	✓				N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S10b.10 MLVC-03	Adoption of Natural Features of the Existing Shoreline 1) Use of boulders in different sizes and with the similar textures of the existing rocky shores for the construction of breakwater and artificial shoreline in order to blend into the existing natural shoreline. 2) Use of cellular cofferdam together with the natural boulders to form a curvature shoreline for the reclamation area to echo with the natural shoreline of SKC.	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MLVC-04	Greening Design (Rooftop & Vertical Greening) 1) Implementation of rooftop and vertical greening (vertical building envelope) along the periphery of each building block to increase the amenity value of the work, moderate temperature extremes and enhance building energy performance. The greening appearance of the building shall enhance its visual harmony with the natural surroundings as well as reduce the apparent visual mass of the structure. 2) Sufficient space between concrete enclosure and stack to minimize heat transfer. 3) Introduction of landscape decks at the stack to further enhance the overall natural and green concept unique for this site.	Work site / During design & construction phases	Contractor	✓	✓				N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVC-01	Visual Mitigation and Aesthetic Design 1) Use of natural materials with recessive color to minimize the bulkiness of the building. 2) Adoption of innovative aesthetic design to the chimney to minimize or visually mitigate the massing of the chimney so as to reduce its visual impact to the surroundings. 3) Color of the chimney in a gradual changing manner to match with the color of the sky. 4) Provision of observation deck for public enjoyment at the top of the chimney to diminish the feeling of chimney. 5) Provision of sky gardens between the two stacks to allow additional greening for enhancing the aesthetic quality. Maintenance access (elevator and staircase) from the ground floor to the sky gardens will be provided to allow maintenance of the sky gardens. 6) Integration of the visitor's walkway with different material façade design of incinerator plant to enhance the aesthetic quality.	Structures in IWMF / During design & construction phases	Contractor	✓	✓				N/A
S10b.10 MVC-02	Control of the security floodlight for construction areas at night to avoid excessive glare to the surrounding receiver.	Work site / During construction phase	Contractor		✓				Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVC-03	Optimization of the construction sequence and construction programme to minimize the duration of impact.	Work site / During design & construction phases	Contractor	✓	✓				Implemented
S10b.10 MVC-04	Storage of the backfilling materials for site formation & construction materials / wastes on site at a maximum height of 2m, covered with an impermeable material of visually un-obtrusive material (in earth tone).	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MVC-05	Reduction of the number of construction traffic at the site to practical minimum.	Work site / During construction phase	Contractor		✓				Implemented
S10b.10 MLVO-01	<u>Planting Maintenance</u> Provision of proper planting maintenance and replacement of defective plant species on the new planting areas to enhance aesthetic and landscape quality.	Project site / During Operation phase	Contractor			✓			N/A
S10b.10 MVO-01	<u>Environmental Education Centre</u> Development of an Environmental Education Center, in which regular exhibitions and lectures to promote environmental awareness and waste reduction concept would be provided, as a part of the IWMF for the general public to alleviate negative public perceptions of the development.	Project site / During Operation phase	Contractor			✓			N/A
S10b.10 MVO-02	<u>Control of Light</u> Control the numbers of lights and their intensity to a level that is good enough to meet the safety requirements at night but not excessive.	Project site / During Operation phase	Contractor			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implantation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVO-03	Control of Operation Time Minimization of the frequency of waste transportation to practical minimum (e.g. limit the reception of MSW from 8 am to 8 pm)	Project site / During Operation phase	Contractor			✓			N/A

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Appendix C Impact Monitoring Schedule of the Reporting Month

Impact Monitoring Schedule for IWMF

Sep-18

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2, M1, S1, S2 & S3 <u>Tidal Period:</u> Ebb Tide: 2:03-9:17 Flood Tide: 19:11 (2/9/2018)-2:03 <u>Monitoring Time:</u> Mid-ebb: 3:55-7:25 Mid-flood: 20:52 (2/9/2018)-0:22 Daytime Noise monitoring for M1, M2 & M3	4	5 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2, M1, S1, S2 & S3 <u>Tidal Period:</u> Ebb Tide: 4:31-11:59 Flood Tide: 20:34 (4/9/2018)-4:31 <u>Monitoring Time:</u> Mid-ebb: 6:30-10:00 Mid-flood: 22:48 (4/9/2018)-2:18	6	7 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2, M1, S1, S2 & S3 <u>Tidal Period:</u> Ebb Tide: 6:36-13:57 Flood Tide: 0:00-6:36 <u>Monitoring Time:</u> Mid-ebb: 8:31-12:01 Mid-flood: 1:33-5:03	8
9	10 Impact *Ecology monitoring for Marine Mammals by Vessel-based Line-transect Survey Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 09:27-16:00 Flood Tide: 03:00-09:27 <u>Monitoring Time:</u> Mid-ebb: 10:58-14:28 Mid-flood: 4:28-7:58 Daytime Noise monitoring for M1, M2 & M3	11 Impact ^Ecology monitoring for Marine Mammals by Vessel-based Line-transect Survey	12 Impact *Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 11:00-17:07 Flood Tide: 4:28-11:00 <u>Monitoring Time:</u> Mid-ebb: 12:18-15:48 Mid-flood: 5:59-9:29	13	14 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 12:42-18:09 Flood Tide: 6:00-12:42 <u>Monitoring Time:</u> Mid-ebb: 13:40-17:10 Mid-flood: 7:36-11:06	15
16	17 Impact *Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 2:00-10:00 Flood Tide: 19:04(16/9/2018)-2:00 <u>Monitoring Time:</u> Mid-ebb: 4:15-7:45 Mid-flood:20:47(16/9/2018)-0:17 *Daytime Noise monitoring for M1, M2 & M3	18 Impact ^Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 02:51-11:51 Flood Tide: 11:51-19:00 <u>Monitoring Time:</u> Mid-ebb: 5:36-9:06 Mid-flood:13:40-17:10 ^Daytime Noise monitoring for M1, M2 & M3	19	20 Impact Ecology monitroing for WBSE, Tagged Coral Monitoring and Post-translocation Coral Monitoring Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, S1, S2, S3, CR1, CR2 & M1 Tidal Period: Ebb Tide: 05:06-13:32 Flood Tode:13:32-20:00 Monitoring Time: Mid-ebb: 7:34-11:04 Mid-flood: 15:01-18:31	21	22 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, S1, S2, S3, CR1, CR2 & M1 Tidal Period: Ebb Tide: 06:55-14:34 Flood Tide: 14:34-21:00 Monitoring Time: Mid-ebb: 08:59-12:29 Mid-flood: 16:02-19:32
23	24 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 8:00-15:00 Flood Tide: 15:00-21:41 <u>Monitoring Time:</u> Mid-ebb: 9:15-13:15 Mid-flood: 16:35-20:05 Daytime Noise monitoring for M1, M2 & M3	25	26	27 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, S1, S2, S3, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 10:40-16:35 Flood Tide: 04:20-10:40 <u>Monitoring Time:</u> Mid-ebb: 11:52-15:22 Mid-flood: 5:45-9:15	28	29 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, S1, S2, S3, CR1, CR2 & M1 <u>Tidal Period:</u> Ebb Tide: 10:40-16:35 Flood Tode: 04:20-10:40 <u>Monitoring Time:</u> Mid-ebb: 13:08-16:38 Mid-flood: 7:16-10:46
30						

Remarks:
1. Daytime Noise Monitoring (07:00-1900), Evening Time Noise Monitoring (1900-2300), Night Time Noise Monitoring (2300-0700)
2. Water Quality Monitoring for S1,S2 and S3 will only conduct during DCM works, refer to Detailed DCM Plan
3. Water Quality Monitoring for S1, S2 and S3 will perfrom on 3, 5 & 7 Sep for baseline monitoring during wet season

Note:
* - cancelled due to adverse weather
^ - rescheduled due to adverse weather

Appendix D Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	2/9/2018	Cloudy	Calm	Mid-Flood	B	6.6	20:53	9.18	8.2	28.97	27.8	3.06	6	-	-	-
C2	2/9/2018	Cloudy	Calm	Mid-Flood	B	6.6	20:53	9.04	8.23	27.91	30.6	3.09	5	-	-	-
C2	2/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	20:54	9.42	8.2	27	30.4	3.24	6	-	-	-
C2	2/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	20:54	10.19	8.2	27.96	30.9	1.84	6	-	-	-
C2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	20:55	8.24	8.22	27	30.9	2.1	5	-	-	-
C2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	20:56	10.15	8.2	26.82	28	2.02	5	-	-	-
B4	2/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	21:09	9.03	8.22	26.79	29	3.19	6	-	-	-
B4	2/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	21:10	8.25	8.21	26.97	29.9	1.62	7	-	-	-
B4	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:11	10.14	8.2	29.21	29.8	3.87	6	-	-	-
B4	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:11	8.3	8.2	26.9	29.1	2.13	6	-	-	-
B3	2/9/2018	Cloudy	Calm	Mid-Flood	B	4	21:20	9.1	8.18	28.24	30.3	2.09	6	-	-	-
B3	2/9/2018	Cloudy	Calm	Mid-Flood	B	4	21:20	9.26	8.16	27.7	29.9	3.01	7	-	-	-
B3	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:21	8.44	8.2	27.6	30.8	4.11	6	-	-	-
B3	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:22	10.21	8.21	27.22	30.8	2.79	5	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	B	15.2	21:33	8.3	8.2	29.32	30.6	2.64	7	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	B	15.2	21:34	9.46	8.15	28.41	27.8	2.1	7	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	M	8.1	21:34	8.34	8.18	28.01	28.8	2.96	7	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	M	8.1	21:35	10.37	8.18	28.31	30	1.85	7	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:36	9.28	8.19	26.68	28.9	1.79	6	-	-	-
CR1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:36	10.43	8.22	26.94	29.7	3.89	7	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	B	10.9	21:48	10.04	8.2	28.18	27.9	1.84	6	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	B	10.9	21:49	9.19	8.23	29.08	31.1	3.11	6	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	M	6	21:49	8.1	8.2	28.14	30.1	3.71	6	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	M	6	21:50	10.32	8.23	28.14	30.7	1.72	6	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:50	8.07	8.22	28.1	29	1.78	4	-	-	-
S3	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	21:51	8.46	8.16	28.77	28.8	1.64	5	-	-	-
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	B	11.2	22:04	10.47	8.18	29.12	29.9	4.14	8	-	-	-
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	B	11.2	22:04	10.25	8.21	28.94	30.6	2.01	8	-	-	-
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	22:05	10.05	8.2	29.01	29.4	1.9	6	-	-	-
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	22:05	9.28	8.19	28.72	30.4	4.4	6	-	-	-

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:06	9.44	8.23	27.02	27.9	1.93	6	-	-	-
CR2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:07	10.25	8.22	27.88	29.9	1.71	6	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	B	5.6	22:20	9.02	8.22	27.98	29	3.18	6	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	B	5.6	22:21	10.24	8.21	26.91	30.4	1.98	5	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	22:22	10.41	8.16	28.78	28.1	2.91	4	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	22:22	9.42	8.21	28.07	29	3.22	5	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:23	8.25	8.16	27.88	29.8	2.08	5	-	-	-
H1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:23	9.11	8.19	26.95	29	2.17	5	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	B	8	22:37	8.44	8.22	28.17	30.7	3.02	7	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	B	8	22:38	9.14	8.18	27.22	28.1	3.71	6	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	22:38	10.07	8.19	27.11	27.8	2.2	5	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	22:39	10.36	8.22	29.11	30.2	3.74	5	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:39	10.25	8.19	26.68	30	2.01	5	-	-	-
S2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:40	8.12	8.19	26.92	29	2.26	4	-	-	-
B2	2/9/2018	Cloudy	Calm	Mid-Flood	B	3.5	22:53	8.2	8.17	29.32	29.9	3.88	7	-	-	-
B2	2/9/2018	Cloudy	Calm	Mid-Flood	B	3.5	22:53	8.21	8.23	29.06	27.9	2.58	7	-	-	-
B2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:54	8.46	8.2	27.18	30	2.73	6	-	-	-
B2	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	22:55	9.25	8.2	26.77	30	2.86	7	-	-	-
S1	2/9/2018	Cloudy	Calm	Mid-Flood	B	4.1	23:05	10.38	8.19	28.65	31.2	3.56	7	-	-	-
S1	2/9/2018	Cloudy	Calm	Mid-Flood	B	4.1	23:06	9.18	8.2	28.66	28.8	2.1	7	-	-	-
S1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:06	9.4	8.16	27.66	31	1.73	6	-	-	-
S1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:07	9.29	8.21	26.57	27.6	2.47	5	-	-	-
B1	2/9/2018	Cloudy	Calm	Mid-Flood	B	4.6	23:18	8.46	8.19	27.23	27.8	1.9	8	-	-	-
B1	2/9/2018	Cloudy	Calm	Mid-Flood	B	4.6	23:18	8.47	8.18	27.1	27.6	1.84	8	-	-	-
B1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:19	9.3	8.22	27.84	30.3	3.84	7	-	-	-
B1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:20	9.42	8.2	29.22	28.8	4.12	8	-	-	-
C1	2/9/2018	Cloudy	Calm	Mid-Flood	B	9.6	23:33	9.22	8.23	29.02	30.1	2.3	8	-	-	-
C1	2/9/2018	Cloudy	Calm	Mid-Flood	B	9.6	23:34	9.38	8.16	28.08	31.1	2.99	7	-	-	-
C1	2/9/2018	Cloudy	Calm	Mid-Flood	M	5.3	23:34	9.32	8.19	26.76	28.3	4.18	7	-	-	-
C1	2/9/2018	Cloudy	Calm	Mid-Flood	M	5.3	23:35	10.2	8.21	28.23	31.1	4.03	6	-	-	-
C1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:36	8.15	8.2	28.79	31.1	2.83	4	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:36	8.09	8.2	27.19	31.1	4.03	4	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	B	8.1	23:53	8.39	8.24	26.65	31.2	4.05	8	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	B	8.1	23:53	10.2	8.23	27.33	29.9	4.01	8	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	23:54	10.37	8.21	29.08	31	1.63	7	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	23:55	10.42	8.17	29	28	3.03	7	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:55	9.21	8.19	27.33	30.9	2.82	6	-	-	-
M1	2/9/2018	Cloudy	Calm	Mid-Flood	S	1	23:56	8.23	8.17	28.97	30.9	1.97	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	B	5.5	0:10	8.45	8.21	28.99	31	3.99	9	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	B	5.5	0:10	10.09	8.15	29.11	31.1	2.97	10	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	0:11	9.29	8.18	28.97	30.1	1.69	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	0:11	10.26	8.19	28.97	28	3.71	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	S	1	0:12	10.44	8.2	29.12	28.8	2.18	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Flood	S	1	0:13	9.04	8.19	26.95	30.5	2.73	5	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	9.5	3:55	10.44	8.18	27.14	29.4	2.12	9	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	9.5	3:56	10.35	8.21	27.88	29.4	4.12	9	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	5.3	3:56	8.39	8.23	26.89	30.9	4.07	5	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	5.3	3:57	9.33	8.21	28.42	28	4.11	5	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	3:58	9.39	8.19	27.4	28.6	3.86	5	-	-	-
C1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	3:58	10.19	8.23	26.85	28.3	3.48	4	-	-	-
B1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	4.3	4:11	9.37	8.22	26.76	28.8	3.27	3	-	-	-
B1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	4.3	4:12	8.38	8.19	27.88	29	1.82	4	-	-	-
B1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:12	9.33	8.21	28.13	28	3.28	3	-	-	-
B1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:13	8.29	8.2	29.03	28.3	2.55	4	-	-	-
S1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	4.1	4:22	9.01	8.2	28.1	30.3	2.36	5	-	-	-
S1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	4.1	4:23	8.04	8.17	29.05	29.1	4.31	6	-	-	-
S1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:24	9.09	8.2	28.16	28.6	2.99	5	-	-	-
S1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:24	8.19	8.2	27.24	30.3	4.02	5	-	-	-
B2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.1	4:35	10.13	8.23	27.98	28.8	1.85	9	-	-	-
B2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.1	4:35	10.11	8.23	28.69	29.9	1.98	8	-	-	-
B2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:36	9.37	8.2	27.21	30	3.81	8	-	-	-
B2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:37	8.4	8.23	28.05	31	3.98	9	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	4:50	8.43	8.16	28.79	28.8	2.76	5	-	-	-
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	4:51	9.17	8.22	27.95	29.4	3.87	5	-	-	-
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	4:52	9.24	8.22	28.87	29.9	1.67	5	-	-	-
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	4:52	9.08	8.23	29.2	28.1	3.97	6	-	-	-
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:53	9.03	8.22	29.31	28	4.01	5	-	-	-
S2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	4:53	9.42	8.21	28.68	29	1.97	5	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	5.1	5:06	8.11	8.2	28.87	28.5	2.9	10	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	5.1	5:07	8.36	8.19	27.86	29	4.21	11	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	5:07	8.02	8.23	27.3	29.3	4.28	9	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	5:08	10.18	8.21	28.96	30.4	3.03	10	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:08	8.21	8.22	29.13	30.5	4.04	7	-	-	-
H1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:09	10.42	8.24	27.65	27.7	2.79	7	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	11.1	5:22	9.41	8.2	26.82	29	4.1	8	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	11.1	5:22	9.41	8.17	27.96	29.3	2.11	8	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	6.1	5:23	8.22	8.19	29.19	30.1	4.38	7	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	6.1	5:24	8.49	8.24	28.88	30.4	3.73	7	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:24	9.33	8.22	26.94	30.2	1.93	7	-	-	-
CR2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:25	10.21	8.18	27.91	28.9	2.12	7	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	B	10.1	5:39	8.33	8.21	28.82	28.8	3.95	5	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	B	10.1	5:40	10.43	8.2	29.07	29.3	2.02	5	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	M	5.6	5:41	8.27	8.23	27.28	27.9	2.24	4	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	M	5.6	5:41	10.02	8.24	29.12	30.8	1.79	4	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:42	9.26	8.2	27	28.8	2.66	4	-	-	-
S3	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:43	8.46	8.2	26.93	28	2.37	4	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	14.9	5:55	8.46	8.17	27.85	31	2.8	8	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	14.9	5:56	10.22	8.19	27.56	29	4.06	8	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	8	5:56	10.41	8.21	26.96	29.2	3.05	5	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	8	5:57	8.27	8.22	26.76	29.3	3.42	5	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:58	10.31	8.2	27.44	30	1.81	4	-	-	-
CR1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	5:58	9.28	8.16	28.24	30.7	3.78	4	-	-	-
B3	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.7	6:07	9.28	8.21	28.87	29.1	3.91	4	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B3	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.7	6:07	9.48	8.23	28.84	28.1	1.63	5	-	-	-
B3	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:08	10.22	8.17	27.62	29.2	2.19	5	-	-	-
B3	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:09	9.15	8.17	29.08	30.9	2.83	5	-	-	-
B4	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.3	6:20	10.22	8.16	27.06	31	4.49	6	-	-	-
B4	3/9/2018	Cloudy	Calm	Mid-Ebb	B	3.3	6:21	8.2	8.2	26.58	30.9	4.22	5	-	-	-
B4	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:22	9.24	8.18	26.53	30.7	1.98	5	-	-	-
B4	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:22	8.07	8.22	28.14	30.2	2.33	4	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	6.1	6:35	9.35	8.18	27.28	30.3	1.94	9	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	B	6.1	6:35	8.31	8.18	27.37	30.8	1.67	9	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.6	6:36	9.22	8.18	29.18	30	2.42	7	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.6	6:37	9.48	8.19	27.93	30.9	4.06	7	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:37	8.38	8.18	26.96	28	1.96	6	-	-	-
C2	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:38	10.15	8.19	26.78	28	3.88	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	5.5	6:55	8.09	8.22	26.98	28	2.05	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	5.5	6:56	10.16	8.22	29.32	28.6	2.92	7	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.3	6:57	9.17	8.2	27.97	30.3	4.32	7	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	3.3	6:57	8.37	8.2	27.89	29.1	1.98	7	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:58	8.1	8.17	28.31	29.2	2.79	6	-	-	-
F1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	6:59	10.36	8.2	28.34	28.9	2.83	5	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	7.7	7:12	10	8.22	29.03	30	4.18	7	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	B	7.7	7:13	10.15	8.22	27.03	28.9	3.81	6	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	7:13	10.45	8.24	28.23	31	4.03	4	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	7:14	9.03	8.18	28.07	28.2	3.97	4	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	7:15	9.43	8.18	29.12	28.3	3.6	3	-	-	-
M1	3/9/2018	Cloudy	Calm	Mid-Ebb	S	1	7:15	8.08	8.21	29.14	30	3.86	4	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	B	6.7	22:48	9.14	8.22	28.1	28.7	2.78	8	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	B	6.7	22:48	10.37	8.22	28.21	29.4	1.84	8	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	M	3.9	22:49	9.3	8.19	28.87	30.7	1.8	6	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	M	3.9	22:50	10.3	8.23	26.95	29	2.21	6	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	S	1	22:50	8	8.18	27.63	29	3.06	4	-	-	-
C2	4/9/2018	Fine	Calm	Mid-Flood	S	1	22:51	10.2	8.21	29	28.1	4.16	5	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B4	4/9/2018	Fine	Calm	Mid-Flood	B	3.7	23:04	8.47	8.17	27.34	30.9	3.21	6	-	-	-
B4	4/9/2018	Fine	Calm	Mid-Flood	B	3.7	23:04	9.05	8.23	28.96	28.9	2.67	6	-	-	-
B4	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:05	9.24	8.2	26.77	28.1	3.75	5	-	-	-
B4	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:05	10.22	8.18	26.97	30.9	2.44	4	-	-	-
B3	4/9/2018	Fine	Calm	Mid-Flood	B	4.2	23:15	8.15	8.21	29.18	27.8	4.15	5	-	-	-
B3	4/9/2018	Fine	Calm	Mid-Flood	B	4.2	23:16	10.42	8.21	27.64	28.9	3.99	6	-	-	-
B3	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:16	8.31	8.21	27.07	29.2	2.07	5	-	-	-
B3	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:17	10.14	8.2	29.09	29	4.02	6	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	B	15.3	23:28	8.12	8.16	29.18	29.2	2.94	3	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	B	15.3	23:29	8.02	8.2	27.41	29.8	3.18	3	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	M	8.2	23:30	10.48	8.22	29	31	2.09	3	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	M	8.2	23:30	8.34	8.2	29.23	28.1	3.01	4	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:31	10.34	8.22	27.93	30.2	2.04	3	-	-	-
CR1	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:32	8.49	8.21	27.09	27.8	4.33	4	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	B	10.8	23:43	10.49	8.22	27.93	30.6	2.19	6	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	B	10.8	23:44	8.5	8.23	28.89	30.2	3.4	6	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	M	5.9	23:44	10.15	8.17	27.77	30.7	2.02	5	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	M	5.9	23:45	9.14	8.18	27.91	30.8	3.29	6	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:46	10.16	8.16	26.97	29.9	3.04	4	-	-	-
S3	4/9/2018	Fine	Calm	Mid-Flood	S	1	23:46	10.44	8.15	28.09	29.9	2.97	5	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	B	11.3	0:00	9.41	8.22	26.91	28.1	2.97	6	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	B	11.3	0:01	8.48	8.17	27.17	30.3	3.83	6	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	M	6.2	0:01	10.41	8.2	28.67	29.8	2.12	3	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	M	6.2	0:02	9.06	8.23	29.37	29.8	2.65	4	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:02	8.08	8.22	28.96	28.9	2.31	3	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:03	9.32	8.21	27.62	28.3	4.02	3	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Flood	B	5.6	0:15	10.31	8.19	28.73	28.8	2.01	7	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Flood	B	5.6	0:15	8.17	8.22	28.87	28.8	2.93	7	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Flood	M	3.3	0:16	10.4	8.21	27.67	29.9	1.84	6	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Flood	M	3.3	0:16	9.09	8.18	28.12	28.7	1.97	5	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:17	8.34	8.21	27.06	28.9	3.92	4	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:18	10.42	8.22	27.96	29.9	1.98	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	B	8.1	0:32	8.3	8.2	26.91	28.7	3.96	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	B	8.1	0:33	8.38	8.21	29.18	27.7	2.84	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	M	4.6	0:34	8.16	8.19	27.87	27.9	3.16	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	M	4.6	0:34	10.19	8.21	28	30.3	3.33	5	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:35	10.03	8.21	28.99	31.1	3.04	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:35	9.13	8.21	27.86	28.1	2.8	3	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Flood	B	3.7	0:48	9.13	8.21	27.72	30.7	3.77	7	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Flood	B	3.7	0:49	9.32	8.19	27.92	29.2	1.91	8	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:49	9.36	8.19	26.96	30	2.11	4	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Flood	S	1	0:50	9.3	8.21	28.17	29.1	1.86	5	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Flood	B	4.2	1:00	10.48	8.21	29.37	27.8	2.9	6	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Flood	B	4.2	1:01	9.11	8.21	28.2	29.8	4.41	6	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:02	8.36	8.18	28.01	30.7	2.86	5	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:02	10.44	8.21	27.99	30.2	4.11	4	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Flood	B	4.7	1:13	9.08	8.19	28.9	29.8	2.82	5	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Flood	B	4.7	1:14	8.01	8.24	28.23	28.8	2.08	5	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:14	10.16	8.17	27.14	28.9	3.01	4	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:15	10.13	8.24	28.71	30.1	3.83	3	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	B	9.9	1:28	9.35	8.21	26.89	29.6	1.94	6	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	B	9.9	1:29	8.02	8.17	28.18	30	1.89	7	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	M	5.5	1:30	8.01	8.2	28.24	27.9	2.03	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	M	5.5	1:30	9.01	8.17	28.72	30.3	1.86	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:31	10.29	8.23	27.8	31.1	4.37	4	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:31	8.49	8.2	28.94	27.8	2.68	4	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	B	8.3	1:48	10.11	8.19	26.91	27.9	4.03	6	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	B	8.3	1:49	8.15	8.17	28.22	27.8	3.21	6	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	M	4.7	1:49	9.23	8.2	28.92	29.2	3.89	5	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	M	4.7	1:50	8.41	8.21	26.68	30.9	4.04	5	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:51	10.49	8.17	27.91	28.1	3.15	5	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Flood	S	1	1:51	10.13	8.19	28.02	27.7	2.97	5	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
F1	5/9/2018	Fine	Calm	Mid-Flood	B	6	2:05	8.33	8.2	26.99	28.9	2.08	9	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Flood	B	6	2:05	9.39	8.17	29.06	29.1	2.03	9	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Flood	M	3.5	2:06	8.1	8.17	26.99	29	2	7	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Flood	M	3.5	2:07	8.37	8.22	28.93	28.1	3.96	6	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Flood	S	1	2:07	9.41	8.18	27.81	29	2.19	5	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Flood	S	1	2:08	9.06	8.21	29.2	28.9	4.18	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	B	9.3	6:30	9.07	8.16	26.94	29	2.67	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	B	9.3	6:31	8.14	8.21	29.14	31.2	2.2	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	M	5.2	6:32	10.03	8.2	28.32	29.8	3.17	5	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	M	5.2	6:32	8.03	8.18	27.77	29.2	3.98	4	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:33	8.04	8.19	27.6	30	2.97	4	-	-	-
C1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:34	8.18	8.21	26.68	30.3	3.78	5	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Ebb	B	4.3	6:46	9.07	8.17	27.33	27.8	1.97	4	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Ebb	B	4.3	6:47	10.44	8.18	28.06	31.1	3.31	3	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:47	9.14	8.17	28	30	3.91	3	-	-	-
B1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:48	9.08	8.2	28.82	30.6	4.07	4	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Ebb	B	4.1	6:57	9.4	8.19	28.42	30.2	4	3	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Ebb	B	4.1	6:57	9.01	8.16	28.02	30.9	3.96	3	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:58	8.14	8.19	28.92	27.7	3.26	3	-	-	-
S1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	6:59	10.28	8.2	27.77	29.2	3.15	3	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Ebb	B	3.3	7:10	10.38	8.16	28.96	30.7	3.75	6	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Ebb	B	3.3	7:11	8.11	8.21	27.76	31.2	2.08	5	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:11	9.17	8.17	27.94	29.7	1.92	4	-	-	-
B2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:12	9.13	8.19	29.17	29	3.29	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	B	8.1	7:25	9.48	8.16	27.92	31.2	2.71	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	B	8.1	7:25	10.05	8.21	28.58	29.5	1.81	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	M	4.6	7:26	8.49	8.19	26.88	28.1	3.92	5	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	M	4.6	7:26	10.36	8.2	28.98	30	3.95	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:27	8.37	8.21	28.47	29.4	2.98	4	-	-	-
S2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:28	10.49	8.22	27.73	29.2	2.78	4	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Ebb	B	5.5	7:41	10.15	8.21	27.34	27.9	3.76	7	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	5/9/2018	Fine	Calm	Mid-Ebb	B	5.5	7:42	9.3	8.22	29.32	30.7	3.78	7	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Ebb	M	3.3	7:43	8.45	8.19	29.26	30.1	2.17	5	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Ebb	M	3.3	7:43	9.26	8.21	27.01	30.3	1.64	5	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:44	9.38	8.2	26.88	29.9	2.95	4	-	-	-
H1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:44	8.43	8.2	27.14	27.6	3.01	5	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	B	11.1	7:57	10.4	8.19	27.95	31.1	1.81	7	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	B	11.1	7:58	9.36	8.19	27.09	28	2.91	7	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	M	6.1	7:58	9.48	8.21	28.94	28.1	3.06	5	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	M	6.1	7:59	10.16	8.19	27.41	28.2	1.82	5	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	7:59	9.27	8.2	28.17	29.6	3.85	4	-	-	-
CR2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:00	10.41	8.23	26.99	29.6	3.87	3	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	B	10.7	8:14	8.41	8.17	26.72	28.1	3.31	5	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	B	10.7	8:14	10.31	8.2	29.12	30.8	4.22	6	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	M	5.9	8:15	10.4	8.22	27.15	30.3	2.44	4	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	M	5.9	8:16	8.29	8.18	28	29.2	4.07	4	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:16	9.33	8.18	28.71	30.9	2.93	3	-	-	-
S3	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:17	8.15	8.2	27.32	30.9	3.16	3	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	B	15	8:30	9.24	8.19	28.94	30.2	4.16	6	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	B	15	8:31	8.44	8.22	26.91	30.7	4.01	6	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	M	8	8:32	8.14	8.22	27.04	27.8	2.26	6	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	M	8	8:32	10.14	8.21	28.92	30.1	3.39	6	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:33	9.21	8.19	27.14	30.2	3	5	-	-	-
CR1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:33	10.03	8.2	28.08	28.1	2.13	5	-	-	-
B3	5/9/2018	Fine	Calm	Mid-Ebb	B	3.9	8:42	9.26	8.24	29.11	29.9	2.56	3	-	-	-
B3	5/9/2018	Fine	Calm	Mid-Ebb	B	3.9	8:43	8.46	8.22	28.22	28.4	3.8	4	-	-	-
B3	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:43	8.36	8.19	28.85	28.1	3.23	3	-	-	-
B3	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:44	8.16	8.19	27.3	29.9	3.71	4	-	-	-
B4	5/9/2018	Fine	Calm	Mid-Ebb	B	3.7	8:55	9.14	8.18	26.56	29.1	3.6	5	-	-	-
B4	5/9/2018	Fine	Calm	Mid-Ebb	B	3.7	8:55	8.42	8.24	28.1	30.1	4.14	5	-	-	-
B4	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:56	10.01	8.23	28.89	28	1.94	3	-	-	-
B4	5/9/2018	Fine	Calm	Mid-Ebb	S	1	8:56	10.27	8.2	29.27	27.8	3.89	3	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	5/9/2018	Fine	Calm	Mid-Ebb	B	6.4	9:10	8.15	8.19	29	28	2.1	5	-	-	-
C2	5/9/2018	Fine	Calm	Mid-Ebb	B	6.4	9:11	8.2	8.22	29.3	29.2	3.12	5	-	-	-
C2	5/9/2018	Fine	Calm	Mid-Ebb	M	3.7	9:11	8.21	8.2	26.98	29.9	4.11	4	-	-	-
C2	5/9/2018	Fine	Calm	Mid-Ebb	M	3.7	9:12	10.05	8.23	26.93	28.6	2.8	5	-	-	-
C2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:12	8.31	8.22	29.25	31	2.3	3	-	-	-
C2	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:13	9.26	8.2	26.57	28.3	4.18	3	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	B	5.8	9:30	8.12	8.22	28	31	3.16	5	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	B	5.8	9:30	8.22	8.19	27.97	28	1.98	5	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	M	3.4	9:31	10.16	8.19	28.28	28.7	1.82	4	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	M	3.4	9:32	9.2	8.19	28.96	30	3.04	3	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:32	8.37	8.18	28.41	29.1	1.79	3	-	-	-
F1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:33	8.12	8.19	28.04	30.9	3.89	2	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	B	7.8	9:47	9.3	8.17	29.19	28	3.3	4	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	B	7.8	9:48	9.37	8.21	26.93	29.3	3.42	4	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	M	4.4	9:49	9.49	8.17	26.65	30.4	1.74	5	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	M	4.4	9:49	9.39	8.2	26.93	30	1.75	4	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:50	10.18	8.21	28.62	28.2	3.8	4	-	-	-
M1	5/9/2018	Fine	Calm	Mid-Ebb	S	1	9:51	8.14	8.19	27.92	31.2	4.07	4	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	B	6.6	1:33	8.14	8.17	27.01	30.1	1.85	14	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	B	6.6	1:34	9.14	8.21	26.7	30.8	2.26	12	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	1:34	10.19	8.23	26.59	30.9	4.13	11	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	1:35	10.11	8.2	27.11	28.1	3.86	12	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	1:36	9.06	8.21	27	27.9	4.2	14	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	1:36	8.2	8.22	26.8	29	2.82	13	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.3	1:49	9.04	8.19	27.89	28.1	3.06	7	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.3	1:49	8.05	8.21	29.16	29.9	3.13	8	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	1:50	8.19	8.18	27.75	30.2	2	7	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	1:51	8	8.21	28.94	30.3	4.14	9	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	2:00	9.36	8.21	26.95	29.3	3.1	7	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	2:01	9.01	8.17	27.19	30	4.26	6	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:02	8.31	8.22	29.33	28.7	3.99	13	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B3	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:02	9.09	8.17	26.78	28.2	2.47	11	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	B	14.9	2:13	10.12	8.18	27.62	30.1	2.92	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	B	14.9	2:13	10.23	8.18	27.88	29.9	1.57	8	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	M	8	2:14	10.21	8.23	28.88	28.9	3.08	4	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	M	8	2:15	8.12	8.18	29.22	31	2.07	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:15	9.18	8.2	28.01	27.8	3.84	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:16	10.36	8.23	27.61	28.8	3.71	7	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	B	10.2	2:28	9.34	8.16	27.79	28.7	2.29	4	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	B	10.2	2:29	8.03	8.23	28.34	28.1	2.8	6	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	M	5.6	2:30	9.3	8.23	26.97	28.2	4.12	6	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	M	5.6	2:30	10.31	8.23	27.03	30.2	3.1	9	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:31	9.41	8.2	27.71	28.9	2.22	10	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:32	8.08	8.2	27.94	28.8	3.77	12	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	B	10.9	2:44	8.32	8.2	26.95	29.1	2.24	6	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	B	10.9	2:45	10.25	8.19	27.82	29.9	1.95	4	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	M	6	2:45	10.19	8.22	29.21	31.2	2.18	7	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	M	6	2:46	10.18	8.18	26.83	28.2	1.74	5	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:47	10.23	8.22	28.64	30.1	1.71	4	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	2:47	10.19	8.18	26.89	29	2.59	3	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	B	5.3	3:00	8.37	8.23	29.18	31.2	2.89	13	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	B	5.3	3:00	10.48	8.18	27.26	31	4.36	10	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.2	3:01	9.3	8.24	28.22	28.6	4.03	10	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.2	3:02	9.27	8.24	29.22	27.9	4.13	9	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:02	9.14	8.2	26.78	30	4.15	11	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:03	9.11	8.22	27.88	28.2	4.35	9	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	B	7.7	3:17	8.09	8.18	29.21	27.8	2.02	9	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	B	7.7	3:17	10.5	8.19	28.36	28	3.89	9	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	M	4.4	3:18	8.32	8.22	26.95	29	1.67	8	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	M	4.4	3:18	8.2	8.24	26.73	31.1	3.03	9	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:19	9.21	8.2	27.88	28.3	2.14	15	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:20	9.07	8.21	28.03	27.9	3.6	17	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B2	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.1	3:33	9.46	8.21	29.01	27.8	4.21	8	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.1	3:34	8.22	8.2	29.36	31.2	3.23	8	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:34	9.01	8.21	29.02	28.2	3.94	8	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:35	10.06	8.18	29.04	31	1.78	10	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	3:45	9.35	8.2	29.31	30.4	4.36	10	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.7	3:45	10.25	8.22	27.92	27.6	3.16	9	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:46	8.29	8.22	27	28.7	2.94	12	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:47	10.28	8.24	27.22	28.2	3.95	12	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.9	3:58	9.02	8.22	26.75	30.6	1.98	8	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Flood	B	3.9	3:59	10.4	8.18	27.16	30.8	3.91	7	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	3:59	8.32	8.21	27.93	29.1	2.81	7	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:00	8.23	8.21	28.81	28.1	3.65	9	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	B	9.3	4:13	10.1	8.19	28	29.9	1.9	15	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	B	9.3	4:13	8.11	8.2	28.14	29	2.71	13	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	M	5.2	4:14	10.16	8.19	28.79	27.9	2.98	14	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	M	5.2	4:15	8.39	8.17	27.94	29.4	2.11	12	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:15	8.18	8.18	28.19	30	3.06	10	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:16	10.05	8.19	27.87	29.1	4.03	9	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	4:33	8.1	8.16	27.13	30.8	2.92	4	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	4:34	8.03	8.19	27.51	28.9	2.97	5	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	4:35	10.23	8.23	26.99	30.4	3.79	5	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	4:35	9.14	8.19	26.59	29.9	2.02	4	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:36	8.09	8.2	28.27	30.4	1.79	6	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:36	10.46	8.22	29.39	28.1	1.7	7	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	B	5.3	4:50	8.46	8.22	28.02	29	2.95	10	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	B	5.3	4:51	10.18	8.21	27.25	28.8	2.32	8	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.2	4:51	9.08	8.2	27.01	28.2	2.74	7	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	M	3.2	4:52	8.36	8.21	29.35	30.9	2.07	7	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:53	8.22	8.21	27.79	29.2	4.12	9	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:53	9.17	8.18	28.34	29	3.72	7	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	9.1	8:31	10.02	8.2	27.89	29.1	2.1	6	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	9.1	8:31	8.15	8.21	27.94	29	3.97	4	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.1	8:32	9.37	8.19	27.99	29.9	3.98	6	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.1	8:33	9.02	8.19	28.93	30	2	7	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	8:33	9.19	8.2	28.12	28.3	3.24	4	-	-	-
C1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	8:34	10.42	8.19	28.05	29.1	1.88	6	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.7	8:47	10.06	8.17	28.08	31	3.01	12	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.7	8:48	8.21	8.2	29.04	28.6	3.02	10	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	8:49	8.17	8.17	28.13	30.9	4.4	5	-	-	-
B1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	8:49	10.23	8.19	28.05	30.3	3.47	4	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.4	8:58	8.33	8.19	27.94	29.7	2.12	7	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.4	8:59	9.36	8.21	27.01	30	4.18	5	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	8:59	8.26	8.22	28.95	29.9	1.95	9	-	-	-
S1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:00	8.4	8.2	28.06	31	2.69	8	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	2.7	9:11	9.41	8.25	26.85	30.8	1.94	6	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	2.7	9:12	8.22	8.19	28.79	28	1.6	5	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:13	10.32	8.2	27.96	30	1.89	6	-	-	-
B2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:13	8.42	8.16	27.34	30.8	2.01	6	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	9:26	10.3	8.22	28.06	29.2	2	5	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	9:26	10.45	8.2	27.2	30.9	4.22	5	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	9:27	8.49	8.22	29.36	30.8	3.21	3	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	9:28	8.41	8.16	29.01	30.1	2.96	5	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:28	10.23	8.2	27.93	30	3.86	7	-	-	-
S2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:29	9.33	8.22	27.3	30.8	2.82	4	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	5.3	9:42	9.21	8.22	27.13	30.6	4.01	6	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	5.3	9:42	9.07	8.22	28.32	28.9	2.82	7	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.2	9:43	8.28	8.2	27.64	27.7	1.59	8	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.2	9:43	10.23	8.19	26.92	29.9	4.04	6	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:44	8.32	8.2	28.2	30.2	2.06	7	-	-	-
H1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:45	9.35	8.17	28.31	27.8	1.74	6	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	10.8	9:58	9.01	8.18	27.13	29.3	2.25	4	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	10.8	9:59	10.38	8.2	27.85	28.1	2.95	6	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.9	9:59	9.16	8.22	27.98	28	4.05	5	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.9	10:00	8.33	8.23	27.61	31.1	2.08	3	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:01	8.42	8.17	27.85	31	1.9	7	-	-	-
CR2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:01	8.14	8.23	27.96	27.8	3.66	5	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	B	10.1	10:15	9.2	8.2	29.23	28.1	4.17	5	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	B	10.1	10:16	8.19	8.22	28.73	30.8	3.8	6	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.6	10:16	8.16	8.2	29.16	28	3.66	7	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	M	5.6	10:17	9.33	8.21	27.98	30	2.04	9	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:17	9.46	8.19	26.95	28.7	2.78	8	-	-	-
S3	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:18	8.46	8.24	27.02	28	1.72	9	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	14.5	10:31	9.18	8.24	27.19	28.1	3.2	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	14.5	10:31	10.37	8.19	29.05	28.3	1.9	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	7.8	10:32	10.25	8.19	28.04	29.6	2.17	5	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	7.8	10:33	9.43	8.2	28.88	30.1	2.17	7	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:33	9.35	8.16	27.09	28.9	3.05	6	-	-	-
CR1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:34	10.47	8.19	27.1	30.8	2.08	6	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.5	10:43	8.4	8.22	26.86	31.2	1.91	6	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.5	10:44	8.2	8.21	28.88	28.3	3.16	7	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:45	9.4	8.18	27.18	30.3	1.51	7	-	-	-
B3	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:45	10.38	8.21	28.06	29.7	3.03	5	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.3	10:56	8.15	8.23	28.6	29.9	3.34	7	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Ebb	B	3.3	10:56	10.21	8.2	27.1	31.1	2.96	6	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:57	8.2	8.19	29.22	29.1	4.23	8	-	-	-
B4	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:58	9.15	8.2	27.8	30.9	4.06	9	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	6.5	11:11	9.28	8.21	29.03	27.8	4.2	8	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	B	6.5	11:12	10.01	8.2	28.03	30	1.95	6	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.8	11:13	10.4	8.23	28.09	30	4.03	6	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.8	11:13	9.04	8.21	28.14	29.1	3.9	6	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:14	10.04	8.18	27.1	31.2	4.22	6	-	-	-
C2	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:14	8.01	8.21	28.97	29.6	1.83	9	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	5.1	11:31	9.34	8.23	28.19	31	1.85	12	-	-	-

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	5.1	11:32	8.3	8.21	29.12	31	3.68	13	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	11:32	8.3	8.19	27.18	28	1.62	7	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	11:33	9.19	8.21	27.33	30.8	2.91	6	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:33	10.03	8.22	26.6	29.7	1.81	5	-	-	-
F1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:34	10.01	8.21	28.98	30	3.12	5	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	7.1	11:48	10.34	8.19	28.02	29.8	2.88	6	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	B	7.1	11:48	9.03	8.24	27.07	28.6	3.96	6	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	4.1	11:49	10.03	8.19	27.89	28.2	2.21	8	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	M	4.1	11:50	9.28	8.21	27.87	28.8	4.16	7	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:50	8.24	8.22	28.91	30	4.35	9	-	-	-
M1	7/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:51	8.48	8.18	28.59	30.2	3.1	8	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	B	6.5	4:28	10.32	8.2	28.27	27.87	4	8	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	B	6.5	4:29	10.34	8.21	28.44	27.89	3.99	8	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	4:30	10.37	8.22	28.41	27.91	4	8	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.8	4:30	10.43	8.21	28.48	27.8	4.01	7	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:31	10.46	8.22	28.5	27.67	4.01	6	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:31	10.48	8.22	28.68	27.82	4.03	7	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	B	8.2	4:51	7.96	8.19	27.05	28.1	3.92	7	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	B	8.2	4:52	7.82	8.19	27.03	27.99	3.94	8	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	4:52	7.95	8.19	27.03	28.05	3.94	6	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	4:53	7.88	8.2	26.98	27.99	3.91	6	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:54	8	8.22	26.98	28.09	3.93	5	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	4:54	8.07	8.22	26.95	28.18	3.93	5	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	B	5.6	5:11	8.55	8.2	27.59	28.09	1.91	8	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	B	5.6	5:11	8.69	8.2	27.72	28.21	1.89	9	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	5:12	8.69	8.22	27.82	28.29	1.89	5	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.3	5:13	8.81	8.22	28.08	28.2	1.92	5	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:13	8.8	8.24	27.95	28.27	1.94	3	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:14	8.94	8.25	28.04	28.27	1.91	4	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Flood	B	3.8	5:29	9.6	8.22	26.9	27.2	4.16	6	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Flood	B	3.8	5:30	9.57	8.22	26.92	27.12	4.17	6	-	-	-

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B4	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:31	9.69	8.22	26.89	27.23	4.16	3	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:31	9.82	8.22	26.9	27.26	4.19	4	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Flood	B	4.1	5:41	9.88	8.2	28.16	26.05	3.69	6	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Flood	B	4.1	5:42	10.03	8.2	28.24	26.01	3.75	6	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:42	10.19	8.22	28.24	26.01	3.75	3	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:43	10.3	8.22	28.13	25.99	3.79	3	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	B	15.1	5:55	8.15	8.19	28.89	26.75	1.02	8	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	B	15.1	5:56	8.33	8.21	29.03	26.69	1.03	8	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	M	8.1	5:57	8.53	8.23	29.04	26.8	1.07	7	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	M	8.1	5:57	8.52	8.24	29.18	26.98	1.08	7	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:58	8.7	8.25	29.25	27.03	1.08	5	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:59	8.85	8.26	29.49	27.07	1.12	5	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	B	11.1	6:13	8.74	8.23	27.21	26.15	4	9	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	B	11.1	6:14	8.84	8.25	27.07	26.09	4.01	9	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	6:14	8.96	8.26	27.11	26.1	3.99	8	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	6:15	9.13	8.28	27.08	26.04	4	8	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:16	9.2	8.29	27.12	25.99	3.98	7	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:16	9.28	8.29	27.09	26.26	3.99	7	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	B	5.7	6:32	8.92	8.23	27.11	28.04	1.72	5	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	B	5.7	6:32	8.9	8.24	27.36	28.13	1.73	5	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.4	6:33	8.81	8.23	27.34	28.18	1.75	5	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	M	3.4	6:34	8.81	8.24	27.44	28.05	1.78	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:34	8.91	8.25	27.47	28.24	1.75	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:35	8.84	8.25	27.46	28.26	1.79	4	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Flood	B	3.4	6:53	9.96	8.2	27.35	25.89	2.56	5	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Flood	B	3.4	6:53	9.96	8.21	27.34	25.85	2.57	6	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:54	9.93	8.2	27.3	26	2.6	3	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:54	9.88	8.22	27.27	25.85	2.6	4	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Flood	B	4.5	7:06	7.85	8.2	26.99	25.96	1.83	6	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Flood	B	4.5	7:07	7.74	8.22	27.09	26.18	1.83	6	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:07	7.79	8.23	27.23	26.26	1.86	4	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:08	8	8.23	27.16	26.23	1.86	4	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	B	9.7	7:22	9.1	8.19	27.35	27.75	2.85	7	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	B	9.7	7:23	9.19	8.22	27.38	27.88	2.85	7	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	M	5.4	7:24	9.33	8.23	27.43	28.15	2.89	6	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	M	5.4	7:24	9.38	8.22	27.31	28.28	2.9	5	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:25	9.51	8.23	27.26	28.35	2.9	5	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:26	9.59	8.22	27.52	28.45	2.93	5	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	9.3	10:58	8.09	8.24	29.14	25.98	1.63	4	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	9.3	10:59	8.11	8.26	29.2	26.06	1.65	4	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	5.2	10:59	8.05	8.26	29.07	26.28	1.66	3	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	5.2	11:00	8.23	8.25	29.18	26.27	1.64	3	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:01	8.25	8.26	29.23	26.4	1.67	3	-	-	-
C1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:01	8.32	8.26	29.33	26.49	1.69	3	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	4.2	11:18	9.22	8.23	28.26	25.99	1.81	7	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	4.2	11:18	9.11	8.23	28.15	25.99	1.86	6	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:19	9.18	8.24	28.09	25.96	1.91	4	-	-	-
B1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:20	9.43	8.23	28.05	25.9	1.87	5	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3	11:32	10.24	8.2	27.99	26.95	2.91	6	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3	11:33	10.42	8.2	27.93	26.94	2.91	7	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:34	10.37	8.21	27.95	27.14	2.91	5	-	-	-
B2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:34	10.48	8.19	28.02	27.11	2.89	6	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	5.2	11:45	9.14	8.21	27.31	27.88	4.37	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	5.2	11:45	9.14	8.2	27.35	27.93	4.37	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	11:46	9.22	8.21	27.56	27.89	4.39	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.1	11:47	9.1	8.24	27.5	27.93	4.43	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:47	9.34	8.25	27.6	27.85	4.39	4	-	-	-
H1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:48	9.55	8.27	27.77	27.93	4.39	4	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	11	12:02	10.05	8.21	28.31	26.99	2.92	4	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	11	12:03	10.09	8.2	28.37	26.92	2.94	4	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	M	6	12:04	9.99	8.2	28.43	26.99	2.9	2	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	M	6	12:04	10.16	8.2	28.48	27.1	2.88	2	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:05	10.12	8.18	28.48	27.19	2.85	2	-	-	-
CR2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:06	9.97	8.17	28.67	27.18	2.89	2	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	15	12:19	7.95	8.18	28.88	27.92	2.65	7	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	15	12:20	7.87	8.16	28.93	27.85	2.68	7	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	8	12:20	8.11	8.17	28.95	27.96	2.73	4	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	8	12:21	8.36	8.18	28.88	27.92	2.76	5	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:22	8.53	8.19	28.79	27.95	2.77	5	-	-	-
CR1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:22	8.78	8.2	28.82	27.91	2.74	5	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3.6	12:35	8.14	8.17	26.86	26.67	1.91	6	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3.6	12:36	7.97	8.17	26.91	26.81	1.92	6	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:36	7.97	8.17	27.14	26.86	1.92	4	-	-	-
B3	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:37	7.94	8.18	27.27	26.74	1.91	4	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3.2	12:46	9.24	8.21	29.13	25.99	3.11	7	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Ebb	B	3.2	12:47	9.17	8.2	29.1	25.91	3.11	7	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:48	9.03	8.2	29.15	25.96	3.13	5	-	-	-
B4	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:48	9.16	8.2	29.35	25.79	3.1	6	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	6	13:02	8.36	8.22	27.9	28.05	3.72	3	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	B	6	13:02	8.26	8.24	28	27.9	3.7	4	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.5	13:03	8.38	8.25	28.04	27.9	3.72	3	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.5	13:04	8.37	8.24	28.03	27.97	3.76	3	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:04	8.35	8.26	28.09	28.04	3.81	2	-	-	-
C2	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:05	8.42	8.28	28.13	27.96	3.83	3	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	5.4	13:35	10.38	8.2	27.07	28.09	1.63	4	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	5.4	13:35	10.64	8.19	26.89	28.19	1.62	4	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.2	13:36	10.66	8.21	27.03	28.16	1.64	3	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	3.2	13:36	10.72	8.22	26.9	28.12	1.6	4	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:37	10.71	8.22	27.04	28.19	1.6	3	-	-	-
F1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:38	10.86	8.22	27.22	28.35	1.62	3	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	13:53	10.17	8.21	27.82	27.12	1.02	7	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	13:54	10.35	8.21	27.96	27.21	1.07	7	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	13:54	10.39	8.22	27.93	27.2	1.09	6	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	13:55	10.4	8.22	27.92	27.18	1.09	6	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:56	10.37	8.24	27.93	27.33	1.09	4	-	-	-
M1	10/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:56	10.5	8.22	27.93	27.51	1.08	5	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	B	6.6	7:36	9.01	8.2	26.77	29	3.87	3	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	B	6.6	7:37	9.03	8.19	26.71	28.9	3.89	4	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	M	3.8	7:38	9.19	8.2	26.61	29	3.88	3	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	M	3.8	7:38	9.25	8.22	26.7	29	3.87	3	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	S	1	7:39	9.2	8.23	26.77	30	3.87	2	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Flood	S	1	7:39	9.16	8.25	26.68	29.2	3.87	2	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	B	8.3	7:57	7.77	8.19	26.8	27.7	4.62	9	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	B	8.3	7:58	7.75	8.19	26.88	27.9	4.61	10	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	M	4.7	7:58	7.81	8.21	26.83	28.1	4.62	9	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	M	4.7	7:59	7.8	8.22	26.8	28.1	4.62	9	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:00	7.72	8.22	26.91	28.3	4.61	6	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:00	7.76	8.21	27.09	28.1	4.57	6	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	B	5.7	8:18	8.67	8.22	28.74	29.3	3.26	4	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	B	5.7	8:18	8.76	8.23	28.91	29.4	3.24	4	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	M	3.4	8:19	8.68	8.23	28.88	29.6	3.22	4	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	M	3.4	8:20	8.85	8.24	29.06	29.7	3.24	4	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:20	9.05	8.25	29.1	29.5	3.29	3	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:21	9.21	8.27	29.18	29.5	3.25	2	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Flood	B	3.7	8:36	8.75	8.21	27.72	28.3	1.89	7	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Flood	B	3.7	8:37	8.77	8.22	27.85	28.5	1.88	6	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:38	8.97	8.21	27.94	28.6	1.88	4	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:38	8.91	8.24	28.12	28.9	1.87	4	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Flood	B	4	8:48	7.58	8.18	28.05	29.1	3.99	5	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Flood	B	4	8:49	7.58	8.17	28	29.2	4	5	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:49	7.6	8.17	28.2	29.2	3.99	4	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Flood	S	1	8:50	7.69	8.19	28.24	29.2	3.97	4	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Flood	B	15	9:02	8.87	8.18	29.01	28.2	3.81	6	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Flood	B	15	9:03	8.98	8.18	28.85	28.2	3.85	7	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR1	14/9/2018	Fine	Calm	Mid-Flood	M	8	9:04	9.08	8.2	28.92	28.3	3.84	6	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Flood	M	8	9:04	9.11	8.19	29.02	28.2	3.85	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:05	8.95	8.21	29.02	28.2	3.88	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:06	8.93	8.21	28.94	28.2	3.88	5	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	B	11	9:21	8.19	8.18	26.85	28	3.03	6	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	B	11	9:22	8.33	8.18	26.79	27.9	3.05	6	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	M	6	9:22	8.35	8.19	26.68	27.8	3.06	5	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	M	6	9:23	8.4	8.18	26.56	27.7	3.07	5	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:24	8.42	8.18	26.54	27.8	3.04	5	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:24	8.42	8.17	26.63	28	3.05	6	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	B	5.6	9:42	7.35	8.22	28.74	29	3.83	7	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	B	5.6	9:42	7.37	8.23	28.71	28.9	3.83	7	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	M	3.3	9:43	7.48	8.23	28.69	29	3.85	4	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	M	3.3	9:44	7.59	8.24	28.72	29	3.88	4	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:44	7.75	8.23	28.55	29.1	3.88	3	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Flood	S	1	9:45	7.82	8.24	28.64	29.1	3.89	3	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Flood	B	3.5	10:04	7.8	8.23	27.96	27.8	4.18	6	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Flood	B	3.5	10:04	7.83	8.22	28.21	27.8	4.2	6	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:05	7.76	8.21	28.1	27.8	4.22	3	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:05	7.69	8.22	28.06	27.9	4.21	3	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Flood	B	4.6	10:19	8.44	8.16	28.72	28.9	3.58	5	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Flood	B	4.6	10:20	8.46	8.15	28.86	29.1	3.63	5	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:20	8.51	8.15	29.04	29.1	3.64	5	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:21	8.64	8.16	29.24	29	3.62	4	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	B	9.8	10:36	7.83	8.22	28.89	28.1	3.94	5	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	B	9.8	10:37	7.87	8.24	29	28	3.94	5	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	M	5.4	10:38	7.94	8.23	29.11	28.2	3.91	4	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	M	5.4	10:38	8.14	8.24	28.97	28.2	3.86	5	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:39	8.23	8.22	29.17	28.3	3.82	3	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Flood	S	1	10:40	8.2	8.23	29.15	28.3	3.79	4	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Ebb	B	9.2	13:40	7.94	8.21	28.17	27.9	2.78	7	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C1	14/9/2018	Fine	Calm	Mid-Ebb	B	9.2	13:41	7.91	8.21	28.07	28	2.78	7	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Ebb	M	5.1	13:41	8.06	8.21	28.09	28.2	2.82	5	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Ebb	M	5.1	13:42	8.14	8.23	27.91	28.2	2.81	5	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	13:43	8.24	8.22	27.83	28.3	2.83	4	-	-	-
C1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	13:43	8.3	8.23	27.92	28.5	2.85	4	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Ebb	B	4.1	14:00	8.72	8.2	28.59	28	1.83	8	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Ebb	B	4.1	14:00	8.82	8.21	28.48	28.2	1.84	9	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:01	8.86	8.21	28.66	28.2	1.85	7	-	-	-
B1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:02	8.85	8.22	28.62	28.5	1.87	8	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Ebb	B	3.1	14:14	8.49	8.18	28.8	27.9	3.86	6	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Ebb	B	3.1	14:15	8.51	8.17	28.93	28	3.87	5	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:16	8.73	8.18	28.95	28	3.88	4	-	-	-
B2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:16	8.79	8.17	29.01	28	3.89	4	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	B	5.1	14:27	8.01	8.21	27.94	29	1.94	6	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	B	5.1	14:27	7.97	8.23	28.08	28.9	1.97	5	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	M	3.1	14:28	8.07	8.23	28.38	29.1	1.99	4	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	M	3.1	14:29	7.94	8.22	28.24	29.1	2.01	5	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:29	8.03	8.23	28.21	29.1	2	3	-	-	-
H1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:30	8.15	8.24	28.35	29.2	1.98	3	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	B	11.1	14:44	8.75	8.15	26.7	28.7	2.03	4	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	B	11.1	14:45	8.84	8.17	26.84	28.5	2.02	4	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	M	6.1	14:46	8.69	8.17	26.8	28.6	2.03	4	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	M	6.1	14:46	8.67	8.19	26.86	28.5	2	3	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:47	8.73	8.21	26.78	28.7	1.99	3	-	-	-
CR2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	14:48	8.97	8.23	26.77	28.7	1.99	3	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	B	15	15:01	8.12	8.23	27.24	27.9	1.65	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	B	15	15:02	8.29	8.25	27.19	28.1	1.68	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	M	8	15:02	8.27	8.26	27.2	27.9	1.67	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	M	8	15:03	8.32	8.25	27.25	28	1.65	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:04	8.17	8.26	27.23	28	1.66	5	-	-	-
CR1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:04	8.09	8.26	27.27	28.1	1.68	5	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B3	14/9/2018	Fine	Calm	Mid-Ebb	B	3.5	15:17	8.16	8.22	27.02	27.7	2.83	7	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Ebb	B	3.5	15:18	8.17	8.22	27.1	27.7	2.8	6	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:18	8.27	8.24	27.2	27.8	2.84	5	-	-	-
B3	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:19	8.39	8.24	27.2	27.9	2.82	4	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Ebb	B	3.2	15:28	8.06	8.23	27.22	27.8	3.02	8	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Ebb	B	3.2	15:29	8.13	8.23	27.42	27.8	3	8	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:30	8.37	8.21	27.56	28	2.97	5	-	-	-
B4	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:30	8.45	8.22	27.63	28.2	2.99	5	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	B	6.1	15:44	7.98	8.22	29.19	28.7	4.03	6	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	B	6.1	15:44	8.13	8.21	29.42	28.7	4.06	6	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	M	3.6	15:45	8.11	8.21	29.42	28.8	4.06	5	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	M	3.6	15:46	8.01	8.23	29.47	29.1	4.1	6	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:46	8.13	8.22	29.73	29.3	4.1	6	-	-	-
C2	14/9/2018	Fine	Calm	Mid-Ebb	S	1	15:47	8.05	8.24	29.74	29.4	4.13	5	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	B	5.3	16:17	8.55	8.19	28.81	27.8	3.46	7	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	B	5.3	16:17	8.51	8.21	28.89	27.9	3.46	8	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	M	3.2	16:18	8.57	8.22	28.95	28.1	3.46	5	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	M	3.2	16:18	8.6	8.23	29.01	28.1	3.48	5	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	16:19	8.66	8.23	28.94	28.2	3.45	2	-	-	-
F1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	16:20	8.6	8.26	29.18	28.3	3.47	3	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	B	7.7	16:35	9.4	8.2	27.85	28.8	4.16	4	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	B	7.7	16:36	9.53	8.21	27.83	28.6	4.2	3	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	M	4.4	16:36	9.35	8.23	27.88	28.6	4.19	3	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	M	4.4	16:37	9.41	8.22	27.96	28.8	4.17	4	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	16:38	9.51	8.21	27.81	28.7	4.14	3	-	-	-
M1	14/9/2018	Fine	Calm	Mid-Ebb	S	1	16:38	9.4	8.23	27.92	28.8	4.13	3	-	-	-
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	9.4	5:36	8.02	8.21	27.28	27.7	1.99	14	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	5.2	5:37	7.9	8.24	27.58	27.9	1.99	11	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	9.4	5:37	7.9	8.23	27.4	27.7	1.97	15	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	5.2	5:38	7.98	8.26	27.55	27.7	2.01	12	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	5:39	7.96	8.27	27.57	27.8	2.02	10	-	-	

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	5:39	7.86	8.26	27.7	27.7	2.02	11	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.9	5:56	7.8	8.21	28.27	28.9	2.03	12	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.9	5:56	7.9	8.22	28.26	29.1	2.03	12	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	5:57	7.87	8.23	28.36	29	2.07	10	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	5:58	7.86	8.24	28.41	28.9	2.09	10	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.3	6:10	9.23	8.19	28.83	29	3.29	11	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.3	6:11	9.43	8.19	28.92	29	3.32	12	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:12	9.41	8.2	28.94	29.1	3.34	10	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:12	9.5	8.2	28.79	29.1	3.35	11	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.2	6:23	8.84	8.22	26.93	28.2	3.94	15	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.2	6:23	8.88	8.22	26.9	28.1	3.95	16	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.1	6:24	9.05	8.22	26.99	28.2	3.94	10	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:25	9.29	8.21	26.9	28.3	3.91	10	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.1	6:25	9.04	8.21	26.99	28.2	3.91	10	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:26	9.25	8.22	27.05	28.3	3.92	10	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	11.9	6:40	9.25	8.21	29.23	28.3	3.89	10	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	11.9	6:41	9.38	8.23	29.1	28.4	3.89	10	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	M	6.5	6:42	9.28	8.23	28.99	28.4	3.88	9	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	M	6.5	6:42	9.47	8.23	28.92	28.4	3.9	9	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:43	9.48	8.25	28.9	28.4	3.93	7	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	6:44	9.52	8.26	28.88	28.7	3.92	7	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	15.5	6:57	7.98	8.18	29.36	28.7	4.11	9	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	8.3	6:58	8.29	8.2	29.39	29.1	4.1	8	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	15.5	6:58	8.05	8.18	29.42	29	4.14	10	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	8.3	6:59	8.3	8.2	29.39	29.1	4.13	9	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:00	8.5	8.19	29.25	29.2	4.17	8	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:00	8.59	8.2	29.13	29.1	4.15	9	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Ebb	B	4.1	7:13	8	8.22	27.13	28	2.18	10	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:14	8.19	8.22	26.97	28.1	2.17	9	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Ebb	B	4.1	7:14	8.11	8.21	27.02	27.9	2.17	9	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:15	8.31	8.22	26.89	28.1	2.15	8	-	-	

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B4	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.6	7:24	7.67	8.18	29.04	27.9	2.94	12	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Ebb	B	3.6	7:25	7.78	8.19	29.14	27.9	2.98	11	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:26	7.91	8.18	29.22	27.8	2.98	9	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:26	8.1	8.18	29.39	27.8	3	9	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.9	7:40	7.9	8.21	29.15	29.2	3.86	12	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.9	7:40	7.9	8.23	29.37	29.3	3.87	11	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.5	7:41	8.1	8.23	29.64	29.3	3.88	10	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:42	8.21	8.25	29.94	29.1	3.9	9	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.5	7:42	8.28	8.24	29.65	29.3	3.87	11	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	7:43	8.14	8.26	30.01	29	3.88	9	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.3	8:13	8.06	8.17	28.12	28.4	2.17	11	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	5.3	8:13	8.06	8.2	28.21	28.5	2.21	11	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.2	8:14	7.91	8.21	28.43	28.7	2.24	9	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	3.2	8:14	7.9	8.22	28.41	28.9	2.28	10	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	8:15	8.03	8.23	28.4	28.9	2.3	9	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	8:16	7.95	8.23	28.42	28.9	2.3	9	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	7.5	8:31	8.67	8.19	28.18	28.1	1.63	12	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	4.3	8:32	8.66	8.22	28.26	28.2	1.61	9	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	B	7.5	8:32	8.62	8.21	28.18	28.1	1.6	13	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	M	4.3	8:33	8.69	8.22	28.24	28.4	1.62	10	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	8:34	8.62	8.23	28.19	28.5	1.63	9	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Ebb	S	1	8:34	8.8	8.21	28.32	28.5	1.64	9	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	B	7	13:40	7.88	8.24	28.22	29.1	2.17	14	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	M	4	13:41	8.1	8.24	28.33	29.1	2.18	10	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	B	7	13:41	8.12	8.24	28.19	29.1	2.17	13	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	M	4	13:42	7.94	8.25	28.24	29	2.16	11	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	13:43	7.9	8.24	28.45	29.1	2.2	10	-	-	
C2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	13:43	7.74	8.25	28.33	29.3	2.18	11	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Flood	B	8.6	14:00	7.77	8.18	27.93	28.2	2.77	11	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Flood	B	8.6	14:00	7.78	8.19	27.96	28.4	2.79	11	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Flood	M	4.8	14:01	7.7	8.19	28.25	28.3	2.82	10	-	-	

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
M1	18/9/2018	Sunny	Moderate	Mid-Flood	M	4.8	14:02	7.57	8.18	28.19	28.3	2.82	9	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:14	7.56	8.18	28.3	28.5	2.85	8	-	-	
M1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:15	7.52	8.19	28.49	28.3	2.87	9	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	B	6.1	14:16	9.05	8.2	27.78	28.3	1.99	12	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	B	6.1	14:16	9.03	8.2	27.68	28.3	2.02	12	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	M	3.6	14:27	8.94	8.21	27.83	28.2	2.06	11	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	M	3.6	14:27	8.78	8.22	27.71	28.2	2.1	10	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:28	8.7	8.24	27.9	28.2	2.08	6	-	-	
F1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:29	8.84	8.23	28.04	28.2	2.06	7	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.3	14:29	8.96	8.22	29.2	28.1	3.7	13	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.3	14:30	8.87	8.23	29.12	28.2	3.74	14	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:44	8.83	8.23	29.09	28.2	3.7	10	-	-	
B4	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:45	9.03	8.22	29.22	28.3	3.7	11	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.7	14:46	7.82	8.2	27.92	27.9	3.79	8	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.7	14:46	7.92	8.22	28.02	27.9	3.75	9	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:47	8.01	8.24	28.11	28.1	3.76	8	-	-	
B3	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	14:48	7.98	8.26	28.17	28.1	3.77	7	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	B	15.6	15:01	7.88	8.17	29.37	28.4	3.08	16	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	M	8.3	15:02	8.04	8.2	29.45	28.3	3.08	14	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	B	15.6	15:02	7.95	8.19	29.56	28.4	3.08	17	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	M	8.3	15:03	7.92	8.19	29.55	28.3	3.1	13	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:04	8.1	8.17	29.63	28.3	3.11	12	-	-	
CR1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:04	8.02	8.17	29.84	28.3	3.13	12	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	B	12.1	15:17	8.3	8.22	27.14	27.6	1.84	8	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	M	6.6	15:18	8.49	8.23	27.24	27.9	1.83	8	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	B	12.1	15:18	8.37	8.22	27.07	27.8	1.84	9	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	M	6.6	15:19	8.62	8.22	27.11	27.9	1.85	8	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:28	8.59	8.24	27.18	28.1	1.9	6	-	-	
CR2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:29	8.72	8.24	27.2	28.3	1.93	6	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Flood	B	5.9	15:30	9.08	8.23	28.64	28.1	2.71	12	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Flood	B	5.9	15:30	9.14	8.24	28.61	28.1	2.71	12	-	-	

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	18/9/2018	Sunny	Moderate	Mid-Flood	M	3.5	15:44	9.31	8.25	28.62	28.4	2.72	11	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Flood	M	3.5	15:44	9.49	8.26	28.77	28.5	2.73	11	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:45	9.37	8.26	28.69	28.6	2.7	9	-	-	
H1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	15:46	9.38	8.26	28.79	28.7	2.71	10	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Flood	B	4	15:46	8.25	8.19	26.83	28.3	4.22	10	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Flood	B	4	15:47	8.34	8.2	26.88	28.3	4.19	10	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:17	8.38	8.2	26.98	28.3	4.22	9	-	-	
B2	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:17	8.41	8.21	26.98	28.3	4.23	10	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.3	16:18	9.01	8.2	28.74	28.8	3.8	11	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Flood	B	4.3	16:18	9.12	8.19	28.7	28.8	3.8	11	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:19	8.93	8.21	28.65	28.7	3.84	11	-	-	
B1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:20	8.97	8.21	28.83	28.5	3.89	11	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	B	10.7	16:35	8.15	8.24	28.08	28.1	3.38	13	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	M	5.9	16:36	8.33	8.24	28.14	28.2	3.4	9	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	B	10.7	16:36	8.29	8.24	28.07	28.1	3.41	14	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	M	5.9	16:37	8.43	8.24	28.34	28	3.41	10	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:38	8.42	8.23	28.5	28	3.37	9	-	-	
C1	18/9/2018	Sunny	Moderate	Mid-Flood	S	1	16:38	8.57	8.22	28.72	28.1	3.34	8	-	-	
C1	20/9/2018	Fine	Calm	Mid-Ebb	B	8.9	7:34	9.16	8.19	27.05	26	6.05	11	96	0.54	SE
C1	20/9/2018	Fine	Calm	Mid-Ebb	B	8.9	7:35	9.25	8.2	27.11	26.1	6.07	10	96	0.55	SE
C1	20/9/2018	Fine	Calm	Mid-Ebb	M	5	7:35	9.36	8.21	27.2	26.2	3.11	10	95	0.45	SE
C1	20/9/2018	Fine	Calm	Mid-Ebb	M	5	7:36	9.46	8.23	27.34	26.2	3.15	9	95	0.46	SE
C1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	7:37	9.43	8.25	27.42	26.3	1.16	9	96	0.29	E
C1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	7:37	9.52	8.25	27.31	26.4	1.15	8	96	0.29	E
B1	20/9/2018	Fine	Calm	Mid-Ebb	B	3.8	7:50	7.78	8.17	28.26	28.1	2.94	16	96	0.37	SE
B1	20/9/2018	Fine	Calm	Mid-Ebb	B	3.8	7:50	7.8	8.17	28.23	28.2	2.95	15	96	0.34	SE
B1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	7:51	7.81	8.19	28.12	28.4	2.98	11	96	0.15	SE
B1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	7:52	7.89	8.18	28.07	28.4	2.96	10	95	0.11	SE
S1	20/9/2018	Fine	Calm	Mid-Ebb	B	3.2	8:01	9.02	8.21	28.03	26.9	4.03	9	95	0.52	E
S1	20/9/2018	Fine	Calm	Mid-Ebb	B	3.2	8:02	9.14	8.21	28.13	26.9	4.08	9	97	0.51	E
S1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:03	9.02	8.21	28.25	26.9	4.04	6	94	0.16	E

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
S1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:03	8.99	8.22	28.35	27.1	4.06	7	95	0.16	E
B2	20/9/2018	Fine	Calm	Mid-Ebb	B	3	8:14	8.98	8.18	27.04	26	4.04	19	94	0.1	SE
B2	20/9/2018	Fine	Calm	Mid-Ebb	B	3	8:14	9.09	8.16	27.1	26.2	4	18	96	0.07	SE
B2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:15	9.01	8.16	27.26	26.4	4	14	95	0.55	SE
B2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:16	7.69	8.18	26.06	27.1	5.94	11	96	0.59	S
S2	20/9/2018	Fine	Calm	Mid-Ebb	B	7.2	8:28	9.16	8.16	27.36	26.3	5.98	14	94	0.13	SE
S2	20/9/2018	Fine	Calm	Mid-Ebb	B	7.2	8:29	7.6	8.18	26.1	27	3.98	12	96	0.12	SE
S2	20/9/2018	Fine	Calm	Mid-Ebb	M	4.1	8:29	7.63	8.19	26.06	27	3.99	9	97	0.24	SE
S2	20/9/2018	Fine	Calm	Mid-Ebb	M	4.1	8:30	7.77	8.19	26.22	27	4.03	10	95	0.23	SE
S2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:31	7.74	8.17	26.41	26.9	2	8	95	0.59	S
S2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:31	7.85	8.19	26.52	27	2.01	9	96	0.57	SE
H1	20/9/2018	Fine	Calm	Mid-Ebb	B	5.1	8:45	8.25	8.21	27.11	26.1	5.95	14	95	0.1	SW
H1	20/9/2018	Fine	Calm	Mid-Ebb	B	5.1	8:46	8.3	8.24	27.25	26.2	5.95	15	96	0.09	S
H1	20/9/2018	Fine	Calm	Mid-Ebb	M	3.1	8:46	8.52	8.24	27.38	26.5	3.96	14	96	0.37	SW
H1	20/9/2018	Fine	Calm	Mid-Ebb	M	3.1	8:47	8.55	8.23	27.31	26.6	3.99	14	97	0.33	SW
H1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:48	8.45	8.26	27.32	26.7	1.98	12	96	0.54	SW
H1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	8:48	8.42	8.27	27.29	26.7	1.97	13	97	0.53	SW
CR2	20/9/2018	Fine	Calm	Mid-Ebb	B	10	9:01	8.82	8.21	26.55	26	4.94	13	95	0.32	SE
CR2	20/9/2018	Fine	Calm	Mid-Ebb	B	10	9:01	8.83	8.23	26.75	26	4.93	12	96	0.33	SE
CR2	20/9/2018	Fine	Calm	Mid-Ebb	M	5.5	9:02	8.95	8.21	26.61	26.2	3.89	10	96	0.15	S
CR2	20/9/2018	Fine	Calm	Mid-Ebb	M	5.5	9:03	9.18	8.22	26.65	26.4	3.9	11	95	0.16	S
CR2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:03	9.33	8.21	26.73	26.7	2.95	9	95	0.13	SE
CR2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:04	9.27	8.21	26.85	26.6	2.95	10	96	0.16	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	B	9.8	9:18	8.82	8.18	28.26	27	5.98	15	96	0.47	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	B	9.8	9:18	8.86	8.19	28.38	27.2	5.97	15	97	0.45	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	M	5.4	9:19	8.96	8.19	28.32	27.4	2.97	13	95	0.57	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	M	5.4	9:19	9.18	8.22	28.21	27.3	3	12	96	0.59	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:20	9.29	8.22	28.41	27.3	1	11	95	0.29	SE
S3	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:21	9.42	8.22	28.52	27.5	0.99	10	96	0.34	SE
CR1	20/9/2018	Fine	Calm	Mid-Ebb	B	14.1	9:34	8.23	8.21	28.03	27	5.96	16	96	0.24	SE
CR1	20/9/2018	Fine	Calm	Mid-Ebb	B	14.1	9:35	8.12	8.22	28.07	27.2	5.98	17	96	0.22	SE

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR1	20/9/2018	Fine	Calm	Mid-Ebb	M	7.6	9:35	8.24	8.21	28.11	27.2	2.98	13	96	0.59	SE
CR1	20/9/2018	Fine	Calm	Mid-Ebb	M	7.6	9:36	8.31	8.23	28.2	27	2.94	13	97	0.62	SE
CR1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:36	8.27	8.23	28.2	26.9	1.95	12	96	0.25	SE
CR1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:37	8.36	8.22	28.16	26.9	1.97	12	97	0.24	SE
B3	20/9/2018	Fine	Calm	Mid-Ebb	B	3.3	9:46	8.21	8.21	27.96	26	2.94	15	95	0.48	E
B3	20/9/2018	Fine	Calm	Mid-Ebb	B	3.3	9:47	8.32	8.21	28.19	26	2.96	16	97	0.48	E
B3	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:48	8.33	8.21	28.07	26	2.96	12	96	0.35	E
B3	20/9/2018	Fine	Calm	Mid-Ebb	S	1	9:59	8.4	8.21	28.21	26.1	2.99	13	96	0.32	E
B4	20/9/2018	Fine	Calm	Mid-Ebb	B	3.1	10:00	8.37	8.22	28.12	28	3.98	11	95	0.4	S
B4	20/9/2018	Fine	Calm	Mid-Ebb	B	3.1	10:00	8.59	8.23	28.29	28.2	4.01	11	95	0.38	S
B4	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:01	8.61	8.24	28.32	28.2	4.06	9	96	0.38	S
B4	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:02	8.74	8.25	28.48	28.1	4.05	10	94	0.35	S
C2	20/9/2018	Fine	Calm	Mid-Ebb	B	6.8	10:14	8.94	8.22	27.18	27	4.94	11	96	0.38	S
C2	20/9/2018	Fine	Calm	Mid-Ebb	B	6.8	10:14	8.98	8.21	27.29	27	4.98	12	95	0.4	S
C2	20/9/2018	Fine	Calm	Mid-Ebb	M	3.9	10:15	9.02	8.22	27.29	27.2	3.95	9	97	0.56	SW
C2	20/9/2018	Fine	Calm	Mid-Ebb	M	3.9	10:16	9.12	8.21	27.49	27.4	3.95	10	95	0.54	SW
C2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:16	9.21	8.23	27.43	27.4	1.91	7	96	0.42	SW
C2	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:17	9.28	8.22	27.56	27.6	1.93	6	97	0.43	SW
F1	20/9/2018	Fine	Calm	Mid-Ebb	B	5.3	10:34	9.02	8.22	26.7	26	6.02	9	95	0.53	SE
F1	20/9/2018	Fine	Calm	Mid-Ebb	B	5.3	10:35	9.25	8.23	26.53	26.1	6.03	9	95	0.54	S
F1	20/9/2018	Fine	Calm	Mid-Ebb	M	3.2	10:36	9.25	8.23	26.57	26.1	4.03	6	95	0.36	SE
F1	20/9/2018	Fine	Calm	Mid-Ebb	M	3.2	10:36	9.49	8.22	26.65	26.1	3.99	7	95	0.34	SE
F1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:37	9.67	8.22	26.69	26.1	1.98	5	96	0.52	S
F1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:37	9.56	8.21	26.84	26.2	1.99	6	94	0.55	SE
M1	20/9/2018	Fine	Calm	Mid-Ebb	B	7.2	10:51	8.07	8.16	28.09	26.9	5.08	21	96	0.38	SE
M1	20/9/2018	Fine	Calm	Mid-Ebb	B	7.2	10:52	8.05	8.16	28.25	27	5.08	22	96	0.38	SE
M1	20/9/2018	Fine	Calm	Mid-Ebb	M	4.1	10:52	8.06	8.15	28.32	27	4.05	16	97	0.56	SE
M1	20/9/2018	Fine	Calm	Mid-Ebb	M	4.1	10:53	7.89	8.16	28.39	26.9	4.07	17	96	0.59	E
M1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:54	7.85	8.16	28.45	27.2	3.04	11	96	0.44	E
M1	20/9/2018	Fine	Calm	Mid-Ebb	S	1	10:54	8	8.17	28.6	27.1	3.03	11	96	0.46	E
C2	20/9/2018	Fine	Calm	Mid-Flood	B	7	15:01	8.06	8.21	26.28	27	6.02	10	97	0.5	NE

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	20/9/2018	Fine	Calm	Mid-Flood	B	7	15:02	8.16	8.22	26.39	27.2	6.02	10	97	0.48	NE
C2	20/9/2018	Fine	Calm	Mid-Flood	M	4	15:02	8.16	8.22	26.4	27.4	4.06	9	94	0.48	NE
C2	20/9/2018	Fine	Calm	Mid-Flood	M	4	15:03	8.18	8.22	26.58	27.4	4.07	9	98	0.49	NE
C2	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:04	8.27	8.22	26.75	27.4	2.09	7	97	0.12	NE
C2	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:04	8.18	8.22	26.71	27.3	2.06	8	97	0.1	NE
B4	20/9/2018	Fine	Calm	Mid-Flood	B	3.4	15:17	9.04	8.21	27.94	26	3	10	96	0.25	NW
B4	20/9/2018	Fine	Calm	Mid-Flood	B	3.4	15:17	8.9	8.22	27.88	25.9	3.02	9	97	0.26	N
B4	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:18	9.01	8.21	27.72	25.9	3.01	8	97	0.51	N
B4	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:19	9.09	8.23	27.77	25.9	3.06	8	97	0.5	NW
B3	20/9/2018	Fine	Calm	Mid-Flood	B	3.9	15:28	7.97	8.19	27.84	27	3.96	8	96	0.1	NW
B3	20/9/2018	Fine	Calm	Mid-Flood	B	3.9	15:29	8.15	8.19	27.77	27.1	3.94	9	97	0.1	NW
B3	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:30	8.22	8.18	27.69	27.1	3.91	5	95	0.13	N
B3	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:30	8.17	8.2	27.89	27.2	3.94	5	97	0.11	NW
CR1	20/9/2018	Fine	Calm	Mid-Flood	B	14.8	15:41	9.23	8.2	27.41	28	5.94	14	96	0.32	NW
CR1	20/9/2018	Fine	Calm	Mid-Flood	B	14.8	15:41	9.33	8.22	27.34	28.1	5.93	13	96	0.27	NW
CR1	20/9/2018	Fine	Calm	Mid-Flood	M	7.9	15:42	9.32	8.22	27.33	28.1	3.93	13	97	0.14	NW
CR1	20/9/2018	Fine	Calm	Mid-Flood	M	7.9	15:43	9.47	8.22	27.34	28.2	3.93	13	95	0.12	W
CR1	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:43	9.51	8.22	27.31	28.3	1.97	11	94	0.46	W
CR1	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:44	9.63	8.22	27.3	28.3	2	11	95	0.45	W
S3	20/9/2018	Fine	Calm	Mid-Flood	B	10.4	15:56	9.16	8.21	26.85	28	5.94	14	96	0.53	NW
S3	20/9/2018	Fine	Calm	Mid-Flood	B	10.4	15:57	9.4	8.22	26.8	27.8	5.95	14	96	0.54	NW
S3	20/9/2018	Fine	Calm	Mid-Flood	M	5.7	15:58	9.59	8.24	26.67	27.9	2.93	13	96	0.51	NW
S3	20/9/2018	Fine	Calm	Mid-Flood	M	5.7	15:58	9.56	8.23	26.74	27.9	2.95	12	95	0.51	NW
S3	20/9/2018	Fine	Calm	Mid-Flood	S	1	15:59	9.76	8.23	26.64	28.1	1.96	11	97	0.36	NW
S3	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:00	9.84	8.24	26.69	28.2	1.96	11	95	0.34	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	B	10.6	16:12	8.99	8.2	27.68	26	4.99	12	95	0.48	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	B	10.6	16:13	8.95	8.19	27.83	26.1	4.96	13	95	0.44	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	M	5.8	16:13	9.08	8.21	27.8	26.2	3.97	13	96	0.19	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	M	5.8	16:14	9.06	8.21	27.69	26.3	4	12	97	0.18	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:15	9.05	8.19	27.84	26.5	3.03	13	96	0.52	NW
CR2	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:15	8.95	8.18	28.01	26.7	3.01	12	95	0.53	NW

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	20/9/2018	Fine	Calm	Mid-Flood	B	5.5	16:28	7.91	8.17	26.92	26	6	12	96	0.24	SW
H1	20/9/2018	Fine	Calm	Mid-Flood	B	5.5	16:28	7.92	8.19	27.16	26	6.02	13	98	0.26	SW
H1	20/9/2018	Fine	Calm	Mid-Flood	M	3.3	16:29	7.87	8.19	27.14	26.1	4.02	10	97	0.14	SW
H1	20/9/2018	Fine	Calm	Mid-Flood	M	3.3	16:30	8.07	8.2	27.18	26.3	4.02	9	96	0.15	SW
H1	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:30	8.13	8.22	27.26	26.4	2.04	8	97	0.58	S
H1	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:31	8.29	8.24	27.4	26.3	2.03	8	95	0.59	SW
S2	20/9/2018	Fine	Calm	Mid-Flood	B	7.8	16:45	7.9	8.19	27.94	27	5.06	9	94	0.42	W
S2	20/9/2018	Fine	Calm	Mid-Flood	B	7.8	16:45	7.84	8.22	28.14	27	5.03	10	97	0.41	W
S2	20/9/2018	Fine	Calm	Mid-Flood	M	4.4	16:46	8.01	8.21	28.02	27	3.07	9	96	0.24	W
S2	20/9/2018	Fine	Calm	Mid-Flood	M	4.4	16:46	7.96	8.21	27.99	27	3.03	9	96	0.22	W
S2	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:47	7.93	8.21	28.01	26.9	2.04	8	96	0.55	SW
S2	20/9/2018	Fine	Calm	Mid-Flood	S	1	16:48	7.94	8.2	27.88	27	2.02	8	96	0.57	SW
B2	20/9/2018	Fine	Calm	Mid-Flood	B	3.5	17:01	7.69	8.21	26.98	26	2.96	10	95	0.18	NW
B2	20/9/2018	Fine	Calm	Mid-Flood	B	3.5	17:02	7.81	8.22	27.04	25.9	2.94	11	96	0.17	NW
B2	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:02	7.91	8.22	27.1	25.8	2.97	10	96	0.4	NW
B2	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:03	7.92	8.23	27.07	26	2.98	9	97	0.4	NW
S1	20/9/2018	Fine	Calm	Mid-Flood	B	3.6	17:13	8.95	8.2	26.18	27	3.01	12	94	0.52	NW
S1	20/9/2018	Fine	Calm	Mid-Flood	B	3.6	17:13	9.17	8.2	26.06	27	3.03	12	96	0.5	NW
S1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:14	9.41	8.2	26.17	27.3	3.07	5	96	0.11	NW
S1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:15	9.43	8.21	26.04	27.2	3.12	5	97	0.12	NW
B1	20/9/2018	Fine	Calm	Mid-Flood	B	4.1	17:26	8.08	8.2	28	26.1	3.92	14	96	0.26	SW
B1	20/9/2018	Fine	Calm	Mid-Flood	B	4.1	17:27	8.22	8.18	28.08	26.2	3.95	14	96	0.24	SW
B1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:27	8.29	8.19	28.11	26.2	3.96	11	95	0.57	SW
B1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:28	8.22	8.18	28.27	26.1	4	11	96	0.6	W
C1	20/9/2018	Fine	Calm	Mid-Flood	B	9.5	17:41	7.74	8.19	25.6	27	6.08	16	96	0.58	W
C1	20/9/2018	Fine	Calm	Mid-Flood	B	9.5	17:41	7.72	8.21	25.58	27	6.08	15	97	0.54	W
C1	20/9/2018	Fine	Calm	Mid-Flood	M	5.3	17:42	7.74	8.21	25.78	27.1	3.08	14	95	0.57	W
C1	20/9/2018	Fine	Calm	Mid-Flood	M	5.3	17:43	7.68	8.21	25.84	27	3.05	14	96	0.56	W
C1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:43	7.67	8.21	25.89	27.1	1.03	13	96	0.11	W
C1	20/9/2018	Fine	Calm	Mid-Flood	S	1	17:44	7.81	8.23	25.85	27.3	1.03	12	96	0.13	W
M1	20/9/2018	Fine	Calm	Mid-Flood	B	7.9	18:01	9.01	8.2	26.8	27	5.07	15	94	0.24	SW

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
M1	20/9/2018	Fine	Calm	Mid-Flood	B	7.9	18:02	9.09	8.2	27.06	27.1	5.1	14	96	0.25	SW
M1	20/9/2018	Fine	Calm	Mid-Flood	M	4.5	18:03	9.19	8.22	27.2	27.1	4.11	13	96	0.41	SW
M1	20/9/2018	Fine	Calm	Mid-Flood	M	4.5	18:03	9.1	8.21	27.1	27.1	4.13	14	96	0.4	SW
M1	20/9/2018	Fine	Calm	Mid-Flood	S	1	18:04	9.34	8.21	27.24	27.3	2.15	13	95	0.38	S
M1	20/9/2018	Fine	Calm	Mid-Flood	S	1	18:04	9.55	8.21	27.34	27.4	2.17	12	97	0.37	S
F1	20/9/2018	Fine	Calm	Mid-Flood	B	5.5	18:18	9.2	8.19	26.1	27	6.04	8	96	0.17	NW
F1	20/9/2018	Fine	Calm	Mid-Flood	B	5.5	18:19	9.17	8.21	26.19	27	6.03	9	96	0.14	NW
F1	20/9/2018	Fine	Calm	Mid-Flood	M	3.3	18:19	9.2	8.23	26.33	27.1	4.08	6	96	0.52	NW
F1	20/9/2018	Fine	Calm	Mid-Flood	M	3.3	18:20	9.19	8.23	26.22	27.1	4.05	7	96	0.55	NW
F1	20/9/2018	Fine	Calm	Mid-Flood	S	1	18:21	9.25	8.24	26.34	27.3	2.07	6	96	0.3	NW
F1	20/9/2018	Fine	Calm	Mid-Flood	S	1	18:21	9.21	8.24	26.39	27.3	2.06	5	97	0.29	NW
C1	22/9/2018	Sunny	Calm	Mid-Ebb	B	8.5	8:59	8.06	8.23	28.06	26.9	5.02	6	94	0.44	SE
C1	22/9/2018	Sunny	Calm	Mid-Ebb	B	8.5	8:59	8.18	8.24	27.98	27	5	5	93	0.41	SE
C1	22/9/2018	Sunny	Calm	Mid-Ebb	M	4.8	9:00	8.06	8.24	27.95	27.2	3.02	5	93	0.35	SE
C1	22/9/2018	Sunny	Calm	Mid-Ebb	M	4.8	9:01	7.96	8.24	28.08	27.4	3.03	4	93	0.32	SE
C1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:01	8.01	8.25	28.04	27.6	2.07	4	93	0.21	SE
C1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:02	7.94	8.27	28.05	27.5	2.07	5	94	0.21	SE
B1	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.5	9:15	8.94	8.16	27.73	27	3.07	8	95	0.16	SE
B1	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.5	9:16	8.86	8.18	27.68	27.1	3.11	9	95	0.17	SE
B1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:17	8.85	8.18	27.58	27.3	3.15	4	96	0.5	E
B1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:17	8.79	8.2	27.65	27.4	3.17	5	94	0.5	SE
S1	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.1	9:26	7.9	8.21	28.06	28	3.94	5	93	0.51	E
S1	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.1	9:27	8.04	8.2	28.27	27.9	3.94	5	93	0.52	E
S1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:27	8.08	8.19	28.29	28.1	3.97	3	95	0.12	SE
S1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:28	7.98	8.19	28.38	28.1	3.96	3	94	0.12	E
B2	22/9/2018	Sunny	Calm	Mid-Ebb	B	2.9	9:39	8.69	8.2	27.1	27	3	7	92	0.44	SE
B2	22/9/2018	Sunny	Calm	Mid-Ebb	B	2.9	9:40	8.61	8.2	27.04	27	2.96	8	93	0.45	SE
B2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:41	8.56	8.23	27.05	27.2	2.99	4	95	0.28	SE
B2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:41	8.42	8.22	27.14	27.3	3.01	5	93	0.3	S
S2	22/9/2018	Sunny	Calm	Mid-Ebb	B	7	9:54	7.72	8.19	26.9	27	3.99	4	93	0.42	SE
S2	22/9/2018	Sunny	Calm	Mid-Ebb	B	7	9:54	7.56	8.2	26.85	27.1	3.96	4	92	0.43	SE

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S2	22/9/2018	Sunny	Calm	Mid-Ebb	M	4	9:55	7.7	8.22	26.85	27.3	3.95	3	93	0.55	SE
S2	22/9/2018	Sunny	Calm	Mid-Ebb	M	4	9:56	7.8	8.21	26.72	27.3	3.92	4	93	0.51	SE
S2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:56	7.72	8.22	26.69	27.3	3.94	2	95	0.37	SE
S2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	9:57	7.84	8.21	26.73	27.5	3.99	3	93	0.35	SE
H1	22/9/2018	Sunny	Calm	Mid-Ebb	B	5.2	10:10	8.75	8.22	28.16	27	6.04	6	93	0.55	SW
H1	22/9/2018	Sunny	Calm	Mid-Ebb	B	5.2	10:10	8.74	8.2	28.06	27	6.04	6	93	0.53	SW
H1	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.1	10:11	8.69	8.19	28.17	27	4.04	5	94	0.48	SW
H1	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.1	10:11	8.64	8.2	28.38	27.2	4.05	5	94	0.47	SW
H1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:12	8.6	8.21	28.23	27.2	2.02	4	94	0.58	SW
H1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:13	8.68	8.2	28.16	27.3	1.99	5	94	0.6	SW
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	B	9.9	10:26	9.09	8.18	26.02	27	6.05	8	92	0.2	SE
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	B	9.9	10:27	9.11	8.19	26.15	27.2	5.07	7	93	0.17	SE
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	M	5.5	10:27	9.02	8.2	26.29	27.4	3.1	5	93	0.15	S
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	M	5.5	10:28	8.96	8.21	26.32	27.5	3.15	5	92	0.14	S
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:29	8.81	8.2	26.22	27.6	2.16	4	93	0.54	S
CR2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:29	8.87	8.22	26.38	27.8	2.17	5	92	0.53	S
S3	22/9/2018	Sunny	Calm	Mid-Ebb	B	9.8	10:43	8.95	8.23	25.77	27	5.94	5	95	0.46	SE
S3	22/9/2018	Sunny	Calm	Mid-Ebb	B	9.8	10:44	9.04	8.24	25.87	26.9	5.95	5	93	0.48	SE
S3	22/9/2018	Sunny	Calm	Mid-Ebb	M	5.4	10:44	9.11	8.26	26.02	26.9	2.96	5	93	0.58	SE
S3	22/9/2018	Sunny	Calm	Mid-Ebb	M	5.4	10:45	9.13	8.25	25.93	27.1	2.93	4	93	0.56	SE
S3	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:45	9.28	8.27	25.81	27.2	1.94	3	92	0.57	SE
S3	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	10:46	9.4	8.26	25.94	27.2	1.93	3	93	0.56	SE
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	B	14	10:59	8.06	8.16	26.78	27	5.98	6	94	0.59	SE
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	B	14	10:59	8.17	8.15	26.66	27	6.01	6	93	0.57	SE
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	M	7.5	11:00	8.14	8.16	26.67	27.2	3	5	91	0.32	SE
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	M	7.5	11:01	8.02	8.17	26.59	27.2	2.96	6	93	0.33	SE
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:01	8.07	8.17	26.61	27	1.95	3	93	0.44	S
CR1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:02	8.27	8.2	26.75	27.1	1.93	4	92	0.47	S
B3	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.2	11:11	9.09	8.19	27.27	26	3.02	7	92	0.5	E
B3	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.2	11:12	9.21	8.2	27.42	26.2	3.06	6	93	0.51	E
B3	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:13	9.27	8.19	27.26	26.5	3.09	6	94	0.32	SE

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B3	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:13	9.23	8.19	27.39	26.5	3.11	6	94	0.3	SE
B4	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.4	11:24	8.32	8.21	27.09	26	4.05	6	92	0.45	S
B4	22/9/2018	Sunny	Calm	Mid-Ebb	B	3.4	11:24	8.35	8.21	27.06	26.1	4.07	7	93	0.46	S
B4	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:25	8.32	8.24	27.15	26.3	4.07	6	94	0.18	S
B4	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:26	8.34	8.24	27.02	26.3	4.07	6	93	0.18	S
C2	22/9/2018	Sunny	Calm	Mid-Ebb	B	6.6	11:39	8.12	8.21	25.91	26	6.05	7	93	0.38	S
C2	22/9/2018	Sunny	Calm	Mid-Ebb	B	6.6	11:40	8.27	8.22	25.83	26.2	6.04	8	92	0.39	S
C2	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.8	11:41	8.26	8.25	25.85	26.2	3	6	92	0.51	S
C2	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.8	11:41	8.41	8.25	25.81	26.4	3.03	7	94	0.49	SW
C2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:42	8.42	8.25	25.91	26.4	3.02	5	93	0.39	SW
C2	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	11:42	8.51	8.26	25.81	26.4	2.03	5	94	0.38	SW
F1	22/9/2018	Sunny	Calm	Mid-Ebb	B	5.2	11:59	8.92	8.2	25.9	28	6	6	93	0.3	SE
F1	22/9/2018	Sunny	Calm	Mid-Ebb	B	5.2	12:00	8.93	8.21	25.85	28.1	6.99	7	94	0.28	SE
F1	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.1	12:00	8.93	8.22	25.82	28.3	4.04	5	94	0.31	SE
F1	22/9/2018	Sunny	Calm	Mid-Ebb	M	3.1	12:01	9.01	8.23	25.83	28.3	4.05	6	92	0.29	SE
F1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	12:01	9.17	8.23	26	28.2	1.05	3	93	0.53	SE
F1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	12:02	9.13	8.24	25.96	28.2	1.04	4	94	0.55	SE
M1	22/9/2018	Sunny	Calm	Mid-Ebb	B	7.3	12:16	8.97	8.17	28.04	27	5.97	6	93	0.28	SE
M1	22/9/2018	Sunny	Calm	Mid-Ebb	B	7.3	12:16	8.99	8.16	28.14	26.9	6.97	6	94	0.29	SE
M1	22/9/2018	Sunny	Calm	Mid-Ebb	M	4.2	12:17	9.08	8.15	28.11	27	2.96	5	93	0.35	SE
M1	22/9/2018	Sunny	Calm	Mid-Ebb	M	4.2	12:18	9.16	8.14	27.97	26.9	2.98	5	93	0.35	E
M1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	12:18	9.27	8.13	28.03	26.9	1.95	4	92	0.52	E
M1	22/9/2018	Sunny	Calm	Mid-Ebb	S	1	12:19	9.41	8.15	28.17	26.9	0.92	5	94	0.53	E
C2	22/9/2018	Sunny	Calm	Mid-Flood	B	7.3	16:02	9.04	8.21	27	27	6.01	11	94	0.43	NE
C2	22/9/2018	Sunny	Calm	Mid-Flood	B	7.3	16:03	9.16	8.23	26.96	27	6.02	12	94	0.42	NE
C2	22/9/2018	Sunny	Calm	Mid-Flood	M	4.2	16:03	9.3	8.23	27.01	27.2	3.04	7	95	0.27	NE
C2	22/9/2018	Sunny	Calm	Mid-Flood	M	4.2	16:04	9.42	8.25	27.06	27.2	3.08	8	92	0.28	NE
C2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:05	9.63	8.26	27.1	27.4	2.07	6	95	0.31	N
C2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:05	9.72	8.26	27.1	27.5	2.07	6	93	0.29	N
B4	22/9/2018	Sunny	Calm	Mid-Flood	B	3.2	16:18	8.15	8.16	25.94	27	4.02	7	93	0.32	NW
B4	22/9/2018	Sunny	Calm	Mid-Flood	B	3.2	16:18	8.16	8.18	25.93	27.1	4.03	7	93	0.32	NW

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B4	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:19	8.21	8.19	25.81	27.2	4.02	6	93	0.47	NW
B4	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:20	8.38	8.19	25.89	27.4	4.02	6	94	0.47	NW
B3	22/9/2018	Sunny	Calm	Mid-Flood	B	3.8	16:29	8.91	8.24	26.13	26	3.94	9	94	0.5	NW
B3	22/9/2018	Sunny	Calm	Mid-Flood	B	3.8	16:30	8.87	8.24	26.06	26.1	3.96	9	93	0.48	N
B3	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:31	9.03	8.24	25.89	26.1	3.97	7	92	0.47	NW
B3	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:31	8.98	8.25	25.93	26.2	3.99	8	93	0.46	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	B	14.6	16:42	8.35	8.21	25.82	26	5.01	5	94	0.38	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	B	14.6	16:42	8.23	8.2	25.89	26	5.01	5	94	0.42	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	M	7.8	16:43	8.26	8.22	25.81	26.1	4.04	4	94	0.36	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	M	7.8	16:44	8.22	8.25	25.92	26.2	4.06	4	96	0.37	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:44	8.14	8.24	25.77	26.2	1.07	4	95	0.1	NW
CR1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	16:45	8.11	8.23	25.84	26.4	1.06	3	94	0.1	W
S3	22/9/2018	Sunny	Calm	Mid-Flood	B	10.5	16:57	8.88	8.23	28.05	27	5.97	8	93	0.31	NW
S3	22/9/2018	Sunny	Calm	Mid-Flood	B	10.5	16:58	8.99	8.24	28.23	26.8	6.01	9	94	0.35	NW
S3	22/9/2018	Sunny	Calm	Mid-Flood	M	5.8	16:59	8.98	8.26	28.1	26.9	4.01	6	94	0.44	NW
S3	22/9/2018	Sunny	Calm	Mid-Flood	M	5.8	16:59	9.09	8.27	28.02	27.1	3.97	8	95	0.42	NW
S3	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:00	9.2	8.27	28.1	27.1	1.97	6	93	0.53	NW
S3	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:01	9.22	8.3	28.3	27.1	1.98	5	94	0.51	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	B	10.8	17:13	8.1	8.2	25.65	27	6.01	7	96	0.24	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	B	10.8	17:14	8.15	8.21	25.56	26.9	6.03	7	94	0.22	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	M	5.9	17:14	8.27	8.21	25.74	26.9	3.03	6	96	0.24	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	M	5.9	17:15	8.37	8.23	25.6	27	3.07	6	95	0.21	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:16	8.29	8.24	25.71	27	2.05	5	94	0.38	NW
CR2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:16	8.34	8.24	25.8	27	2.04	4	96	0.35	NW
H1	22/9/2018	Sunny	Calm	Mid-Flood	B	5.6	17:29	8.3	8.22	26.22	27	5.98	9	95	0.39	SW
H1	22/9/2018	Sunny	Calm	Mid-Flood	B	5.6	17:29	8.27	8.22	26.25	27.1	6	8	92	0.39	SW
H1	22/9/2018	Sunny	Calm	Mid-Flood	M	3.3	17:30	8.34	8.23	26.1	27.3	3	8	93	0.14	SW
H1	22/9/2018	Sunny	Calm	Mid-Flood	M	3.3	17:31	8.28	8.25	26.18	27.3	2.99	9	93	0.11	SW
H1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:31	8.29	8.24	26.28	27.6	1.99	7	94	0.51	SW
H1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:32	8.21	8.23	26.28	27.6	1.98	7	92	0.53	SW
S2	22/9/2018	Sunny	Calm	Mid-Flood	B	7.6	17:46	9.24	8.2	28.04	27	6.07	11	94	0.19	W

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
S2	22/9/2018	Sunny	Calm	Mid-Flood	B	7.6	17:46	9.17	8.19	28.08	27	6.08	10	96	0.17	W
S2	22/9/2018	Sunny	Calm	Mid-Flood	M	4.3	17:47	9.32	8.18	28.16	27.1	3.06	10	94	0.52	W
S2	22/9/2018	Sunny	Calm	Mid-Flood	M	4.3	17:47	9.25	8.19	28.39	27.3	3.08	9	92	0.53	W
S2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:48	9.33	8.2	28.44	27.4	1.12	8	93	0.21	W
S2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	17:49	9.54	8.22	28.47	27.7	1.17	7	94	0.17	SW
B2	22/9/2018	Sunny	Calm	Mid-Flood	B	3.5	18:02	8.09	8.16	27.8	27	3.05	7	94	0.17	NW
B2	22/9/2018	Sunny	Calm	Mid-Flood	B	3.5	18:03	8.01	8.16	27.98	27	3.09	8	92	0.21	NW
B2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:03	8.05	8.18	28.1	27	3.07	5	95	0.49	NW
B2	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:04	8.24	8.18	28.2	27.2	3.1	6	94	0.52	NW
S1	22/9/2018	Sunny	Calm	Mid-Flood	B	3.8	18:14	8.02	8.19	27.06	28	3.98	11	93	0.57	NW
S1	22/9/2018	Sunny	Calm	Mid-Flood	B	3.8	18:14	8.12	8.2	27.15	28.2	3.99	10	94	0.58	NW
S1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:15	8.4	8.19	27.34	28.4	4	7	95	0.55	NW
S1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:16	8.55	8.17	27.48	28.4	3.97	8	94	0.55	NW
B1	22/9/2018	Sunny	Calm	Mid-Flood	B	3.7	18:27	8.79	8.18	28.11	26	3.99	6	93	0.59	SW
B1	22/9/2018	Sunny	Calm	Mid-Flood	B	3.7	18:28	8.9	8.18	28.1	26.1	3.99	7	93	0.59	SW
B1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:28	8.86	8.18	28.37	26.2	3.96	6	94	0.36	SW
B1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:29	9	8.18	28.49	26	3.96	6	93	0.37	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	B	8.9	18:42	8.96	8.21	26.22	27	6.03	7	95	0.28	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	B	8.9	18:42	8.94	8.22	26.22	26.8	6.02	8	92	0.31	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	M	5	18:43	9.16	8.22	26.27	27	4.02	6	92	0.47	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	M	5	18:44	9.23	8.24	26.33	27.1	4.04	7	95	0.45	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:44	9.05	8.23	26.34	27.1	2.03	6	93	0.57	W
C1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	18:45	9.07	8.23	26.6	27.4	2.03	5	94	0.57	W
M1	22/9/2018	Sunny	Calm	Mid-Flood	B	7.7	19:02	8.13	8.17	27.59	28	4.97	8	95	0.22	SW
M1	22/9/2018	Sunny	Calm	Mid-Flood	B	7.7	19:03	8.25	8.19	27.59	27.9	5.97	8	96	0.2	SW
M1	22/9/2018	Sunny	Calm	Mid-Flood	M	4.4	19:04	8.29	8.19	27.65	28	3.98	5	96	0.53	S
M1	22/9/2018	Sunny	Calm	Mid-Flood	M	4.4	19:04	8.28	8.21	27.83	28	4.01	5	96	0.54	SW
M1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	19:05	8.36	8.21	27.83	28	1.06	4	94	0.22	SW
M1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	19:05	8.2	8.23	27.69	27.9	2.03	5	94	0.18	SW
F1	22/9/2018	Sunny	Calm	Mid-Flood	B	5.7	19:19	9.24	8.17	27.09	26.9	7.99	8	94	0.54	NW
F1	22/9/2018	Sunny	Calm	Mid-Flood	B	5.7	19:20	9.32	8.2	27.06	26.9	5.96	9	94	0.53	NW

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
F1	22/9/2018	Sunny	Calm	Mid-Flood	M	3.4	19:20	9.19	8.18	27.06	26.8	3.93	8	94	0.16	NW
F1	22/9/2018	Sunny	Calm	Mid-Flood	M	3.4	19:21	9.41	8.17	27.03	26.8	3.96	8	94	0.16	NW
F1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	19:22	9.37	8.19	27.17	26.7	0.92	7	95	0.15	NW
F1	22/9/2018	Sunny	Calm	Mid-Flood	S	1	19:22	9.3	8.2	27.12	26.9	0.96	7	93	0.15	NW
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	11	9:15	7.59	8.03	30.69	28.1	3.69	10	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	11	9:16	7.62	8.04	30.6	28.2	3.65	9	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	6	9:16	7.56	8	30.62	28	4.23	11	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	6	9:17	7.55	8.02	30.57	28.1	4.25	8	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:18	7.14	8.06	30.57	28.1	3.87	8	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:18	7.13	8.03	30.67	28	3.86	7	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.5	9:35	7.23	8.02	30.65	28	2.5	10	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.5	9:35	7.23	8.02	30.57	28	2.49	10	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:36	7.53	8.05	30.51	28.1	4.33	8	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:37	7.5	8.04	30.69	28.1	4.29	7	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.6	9:49	7.11	8.06	30.61	28.1	5.04	9	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.6	9:50	7.1	8.1	30.53	28	5.02	10	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:51	7.39	8.1	30.56	28.1	3.21	8	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	9:51	7.4	8.05	30.64	28.2	3.21	8	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	10:02	7.58	8.04	30.66	28.1	2.57	14	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	10:02	7.6	8.06	30.63	28.2	2.59	14	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	10:03	7.11	8.01	30.54	28.1	3.75	12	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	10:04	7.14	8.05	30.67	28.1	3.72	8	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:04	7.27	8.06	30.53	28	3.18	12	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:05	7.28	8.07	30.52	28.2	3.21	9	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	8	10:19	7.5	8.06	30.51	28.2	3.29	13	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	8	10:20	7.52	8.02	30.68	28.2	3.28	12	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	10:21	7.27	8.04	30.6	28.2	4.14	10	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	10:21	7.28	8.07	30.64	28.2	4.14	10	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:22	7.57	8.04	30.56	28	4.82	8	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:23	7.56	8	30.68	28.2	4.8	8	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	8.3	10:36	7.41	8.02	30.57	28.2	2.83	8	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	8.3	10:37	7.44	8.02	30.58	28.1	2.85	8	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.7	10:37	7.21	8.02	30.52	28.1	5.75	10	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.7	10:38	7.23	8.05	30.54	28	5.76	9	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:39	7.58	8.04	30.69	28.1	3.27	6	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:39	7.57	8.05	30.5	28.1	3.27	6	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.3	10:52	7.28	8.02	30.67	28	2.24	9	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4.3	10:53	7.26	8.09	30.64	28.1	2.27	9	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:53	7.39	8.08	30.64	28.1	3.59	10	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	10:54	7.4	8.07	30.56	28.1	3.61	8	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4	11:03	7.24	8.06	30.68	28.2	3.78	10	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Ebb	B	4	11:04	7.22	8.08	30.68	28.1	3.76	11	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:05	7.21	8.05	30.53	28.1	4.73	7	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:05	7.18	8.08	30.55	28.1	4.73	7	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.4	11:19	7.46	8	30.61	28	2.53	10	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.4	11:19	7.46	8.01	30.56	28.2	2.53	11	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	11:20	7.15	8.02	30.67	28.1	4.21	9	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	11:21	7.16	8.1	30.6	28.1	4.17	8	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:21	7.27	8.1	30.59	28.1	2.73	10	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:22	7.24	8.05	30.62	28.1	2.72	8	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	11:52	7.25	8.03	30.66	28	3.65	9	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	11:52	7.25	8.07	30.57	28.2	3.66	10	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	11:53	7.4	8.06	30.56	28.1	2.13	9	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	11:53	7.4	8.08	30.61	28.1	2.09	8	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:54	7.5	8.01	30.52	28	4.24	9	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:55	7.49	8.04	30.69	28.1	4.25	8	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	12:10	7.42	8.07	30.64	28.1	5.09	8	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	12:11	7.42	8.05	30.6	28.1	5.12	9	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	12:11	7.4	8.05	30.68	28.1	2.69	10	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	12:12	7.37	8.08	30.63	28.1	2.65	9	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:13	7.11	8.01	30.65	28.1	3.04	7	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:13	7.08	8.05	30.55	28.1	3.06	7	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	24/9/2018	Cloudy	Calm	Mid-Flood	B	7.5	16:35	7.51	8.07	30.59	28.2	4.01	8	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Flood	B	7.5	16:36	7.54	8.09	30.51	28.1	4	8	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	16:36	7.36	8.06	30.65	28	3.4	5	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	16:37	7.35	8.01	30.52	28	3.41	6	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	16:38	7.42	8.1	30.51	28.1	3.2	5	-	-	-
C2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	16:38	7.45	8.03	30.67	28.2	3.17	6	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.2	16:55	7.4	8.01	30.55	28.1	2.99	10	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.2	16:55	7.39	8.02	30.59	28.2	2.96	9	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	16:56	7.21	8.05	30.64	28.2	2.69	8	-	-	-
B4	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	16:57	7.19	8.08	30.61	28.1	2.71	9	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.5	17:09	7.5	8.05	30.69	28	4.67	8	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.5	17:10	7.49	8.09	30.52	28.1	4.67	8	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:11	7.32	8.1	30.67	28.2	3.5	8	-	-	-
B3	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:11	7.3	8.08	30.56	28.1	3.52	8	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.8	17:22	7.27	8.06	30.6	28.1	6	8	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.8	17:22	7.27	8.08	30.56	28.1	6	4	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.9	17:23	7.36	8.09	30.65	28.2	3.94	7	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.9	17:24	7.38	8.1	30.53	28	3.95	6	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:24	7.19	8.07	30.58	28.1	4.6	7	-	-	-
CR1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:25	7.19	8.02	30.59	28.1	4.61	8	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.4	17:39	7.14	8.07	30.65	28.1	2.22	7	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.4	17:40	7.15	8.04	30.57	28.1	2.22	7	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	17:41	7.29	8.04	30.52	28.2	2.93	9	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	17:41	7.33	8.03	30.61	28.2	2.93	6	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:42	7.38	8.02	30.6	28.1	3.36	9	-	-	-
CR2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:43	7.36	8.1	30.59	28.1	3.33	6	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.2	17:56	7.25	8.03	30.56	28.1	3.58	10	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8.2	17:57	7.25	8.01	30.65	28.2	3.61	11	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	17:57	7.48	8.02	30.69	28.1	2.67	9	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.6	17:58	7.49	8.1	30.65	28.2	2.68	8	-	-	-
H1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:59	7.18	8.03	30.53	28.1	5.92	6	-	-	-

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	17:59	7.22	8.02	30.61	28	5.92	5	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	18:12	7.32	8.08	30.56	28.2	3.74	8	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	18:13	7.3	8.06	30.65	28.1	3.74	8	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:13	7.29	8.01	30.65	28	4.16	9	-	-	-
B2	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:14	7.29	8.04	30.63	28	4.16	8	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	18:23	7.42	8.01	30.61	28.1	4.34	6	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	18:24	7.38	8.01	30.61	28.2	4.39	7	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:25	7.42	8.05	30.51	28.2	5.58	9	-	-	-
B1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:25	7.45	8.02	30.56	28.1	5.57	8	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8	18:39	7.11	8.04	30.62	28.2	4.79	9	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	B	8	18:39	7.08	8.09	30.6	28	4.8	6	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	18:40	7.29	8.09	30.62	28.2	4.64	8	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	18:41	7.29	8.01	30.64	28	4.61	7	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:41	7.44	8.09	30.66	28	5.55	8	-	-	-
M1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	18:42	7.45	8.03	30.59	28.1	5.55	8	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	19:12	7.36	8.03	30.69	28	2.6	4	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	19:12	7.38	8.05	30.53	28	2.56	4	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	19:13	7.53	8.04	30.61	28.2	3.86	8	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	19:13	7.52	8.06	30.69	28.1	3.86	4	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	19:14	7.48	8.1	30.68	28	4.3	8	-	-	-
F1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	19:15	7.51	8.08	30.64	28.1	4.31	4	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	B	11.2	19:30	7.29	8.04	30.58	28.1	4.69	8	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	B	11.2	19:31	7.3	8.02	30.6	28.1	4.67	8	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	19:31	7.13	8.09	30.51	28.1	2.33	7	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	19:32	7.14	8.05	30.66	28.1	2.33	8	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	19:33	7.3	8.07	30.65	28.1	5.25	6	-	-	-
C1	24/9/2018	Cloudy	Calm	Mid-Flood	S	1	19:33	7.29	8.02	30.55	28.1	5.25	7	-	-	-
C2	27/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	5:45	7.34	8	30.55	28.2	3.51	8	92	0.16	SE
C2	27/9/2018	Cloudy	Calm	Mid-Flood	B	7.6	5:46	7.34	8.1	30.62	28	3.52	7	94	0.17	SE
C2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	5:46	7.33	8.03	30.54	28	2.35	8	93	0.23	SE
C2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.3	5:47	7.34	8.07	30.62	28	2.32	8	93	0.19	SE

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:48	7.57	8.02	30.61	28	4.11	6	92	0.14	SE
C2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	5:48	7.55	8.07	30.65	28.1	4.13	7	92	0.11	SE
B4	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.3	6:01	7.23	8.1	30.55	28	4.56	4	93	0.17	SE
B4	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.3	6:01	7.24	8.09	30.54	28	4.57	6	92	0.16	SE
B4	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:02	7.18	8.06	30.55	28	3.92	5	92	0.1	SE
B4	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:03	7.21	8.03	30.54	28	3.9	6	92	0.11	SE
B3	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.3	6:12	7.59	8.05	30.64	28	3.54	4	92	0.37	E
B3	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.3	6:13	7.6	8.07	30.66	28	3.51	4	92	0.35	E
B3	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:14	7.5	8.08	30.64	28.2	5.22	4	93	0.24	E
B3	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:14	7.46	8.09	30.6	28.1	5.2	4	93	0.23	E
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.9	6:25	7.18	8.03	30.52	28	3.7	6	92	0.3	SE
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.9	6:25	7.18	8.07	30.58	28	3.72	7	93	0.32	SE
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	M	5	6:26	7.19	8.06	30.68	28	2.36	4	92	0.19	SE
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	M	5	6:27	7.19	8.02	30.64	28.1	2.37	4	93	0.2	S
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:27	7.6	8.06	30.69	28.1	2.92	5	94	0.23	SW
CR1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:28	7.58	8.03	30.68	28.1	2.87	4	93	0.2	S
S3	27/9/2018	Cloudy	Calm	Mid-Flood	B	12.2	6:40	7.48	8.03	30.6	28	2.99	5	93	0.28	SW
S3	27/9/2018	Cloudy	Calm	Mid-Flood	B	12.2	6:41	7.51	8.09	30.54	28.1	2.96	6	93	0.31	SW
S3	27/9/2018	Cloudy	Calm	Mid-Flood	M	6.6	6:42	7.53	8.01	30.64	28.1	2.34	5	91	0.37	SW
S3	27/9/2018	Cloudy	Calm	Mid-Flood	M	6.6	6:42	7.54	8.1	30.65	28.2	2.34	5	94	0.36	SW
S3	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:43	7.31	8.09	30.63	28.1	4.24	5	92	0.16	SE
S3	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:44	7.34	8.03	30.56	28.2	4.25	4	94	0.15	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.5	6:56	7.39	8.06	30.61	28.2	3.99	6	93	0.35	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.5	6:57	7.4	8.01	30.65	28.1	4.02	6	91	0.32	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.8	6:57	7.24	8.07	30.51	28.1	4.97	6	91	0.2	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.8	6:58	7.25	8.07	30.6	28	4.96	6	93	0.2	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:59	7.21	8.06	30.54	28.1	2.91	4	93	0.12	SE
CR2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	6:59	7.22	8.02	30.7	28.1	2.94	4	92	0.11	SE
H1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.4	7:12	7.48	8	30.66	28	3	8	91	0.34	SE
H1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.4	7:12	7.44	8.03	30.58	28.2	2.99	8	92	0.34	SE
H1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	7:13	7.23	8.03	30.6	28.1	2.69	5	91	0.31	SE

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
H1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	7:14	7.21	8.06	30.61	28.1	2.65	5	92	0.28	SE
H1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:14	7.3	8.08	30.57	28.1	5.93	6	92	0.3	SE
H1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:15	7.29	8.02	30.53	28.1	5.9	5	92	0.33	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.3	7:29	7.48	8.08	30.7	28.1	5.91	4	92	0.26	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	B	8.3	7:29	7.51	8.02	30.62	28	5.9	5	92	0.26	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	7:30	7.37	8.08	30.55	28.2	3.25	4	93	0.38	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.7	7:30	7.37	8.02	30.59	28.1	3.26	4	92	0.36	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:31	7.19	8.02	30.53	28.2	4.11	4	94	0.33	SE
S2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:32	7.21	8.03	30.57	28.2	4.07	4	93	0.33	SE
B2	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	7:45	7.49	8.08	30.7	28.1	5.87	5	93	0.4	SE
B2	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.8	7:46	7.48	8.02	30.68	28.1	5.87	5	93	0.37	SE
B2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:46	7.32	8	30.57	28	5.75	4	93	0.23	S
B2	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:47	7.31	8.09	30.62	28.1	5.72	5	91	0.24	SE
S1	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.6	7:57	7.5	8.01	30.63	28.2	3.93	6	92	0.24	E
S1	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.6	7:57	7.53	8.07	30.56	28.1	3.94	6	92	0.26	E
S1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:58	7.57	8.09	30.57	28.1	4.07	5	91	0.35	E
S1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	7:59	7.56	8.01	30.59	28.2	4.05	5	93	0.36	E
B1	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.7	8:10	7.1	8.07	30.5	28.1	3.06	5	93	0.18	S
B1	27/9/2018	Cloudy	Calm	Mid-Flood	B	4.7	8:11	7.07	8.06	30.53	28	3.04	4	93	0.18	S
B1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:11	7.39	8.07	30.56	28	2.57	5	92	0.24	S
B1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:12	7.41	8.03	30.54	28.2	2.58	5	92	0.28	S
C1	27/9/2018	Cloudy	Calm	Mid-Flood	B	11.1	8:25	7.15	8.07	30.58	28	4.76	8	92	0.14	S
C1	27/9/2018	Cloudy	Calm	Mid-Flood	B	11.1	8:25	7.16	8.03	30.51	28	4.74	8	91	0.14	S
C1	27/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	8:26	7.42	8.06	30.52	28.1	3.68	7	94	0.18	SW
C1	27/9/2018	Cloudy	Calm	Mid-Flood	M	6.1	8:27	7.38	8.1	30.67	28.1	3.68	7	92	0.14	SW
C1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:27	7.33	8.02	30.68	28.2	3.93	7	91	0.31	SW
C1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:28	7.32	8.03	30.61	28.1	3.96	6	93	0.32	SW
M1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8	8:45	7.11	8.02	30.67	28.1	2.77	9	92	0.36	SE
M1	27/9/2018	Cloudy	Calm	Mid-Flood	B	8	8:46	7.08	8.02	30.65	28.2	2.8	8	93	0.34	SE
M1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	8:47	7.36	8.07	30.68	28.1	3.88	6	91	0.16	SE
M1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.5	8:47	7.4	8.07	30.63	28	3.9	7	90	0.14	SE

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
M1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:48	7.42	8.07	30.69	28.2	2.66	5	92	0.26	SE
M1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	8:48	7.42	8.04	30.61	28.1	2.67	6	93	0.25	SE
F1	27/9/2018	Cloudy	Calm	Mid-Flood	B	7.7	9:02	7.23	8.04	30.52	28	2.17	7	92	0.39	SE
F1	27/9/2018	Cloudy	Calm	Mid-Flood	B	7.7	9:03	7.24	8.01	30.63	28	2.18	7	94	0.37	SE
F1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.4	9:03	7.12	8.03	30.52	28.1	4.62	8	93	0.12	E
F1	27/9/2018	Cloudy	Calm	Mid-Flood	M	4.4	9:04	7.11	8.02	30.63	28.1	4.59	7	93	0.14	E
F1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	9:05	7.17	8.09	30.52	28.2	5.47	6	93	0.21	E
F1	27/9/2018	Cloudy	Calm	Mid-Flood	S	1	9:05	7.14	8.05	30.57	28	5.46	7	91	0.19	E
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	11.1	11:52	7.53	8.09	30.61	28.2	3.9	8	94	0.35	NE
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	11.1	11:53	7.51	8.07	30.6	28.1	3.91	7	95	0.37	NE
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	6.1	11:53	7.36	8	30.67	28.1	2.22	9	95	0.16	NE
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	6.1	11:54	7.39	8.02	30.66	28	2.21	7	95	0.15	NE
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:55	7.47	8.02	30.5	28.1	2.77	6	95	0.1	NE
C1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	11:55	7.49	8.01	30.63	28.1	2.77	7	94	0.13	NE
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	12:10	7.41	8.09	30.6	28.1	3.29	6	94	0.11	NW
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.9	12:11	7.4	8.02	30.5	28.2	3.3	6	94	0.09	NW
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	12:11	7.27	8.09	30.55	28.2	2.61	6	94	0.34	NW
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	12:12	7.26	8.03	30.56	28	2.6	5	95	0.3	NW
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:12	7.16	8.09	30.53	28	5.94	4	95	0.26	NW
CR2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:13	7.16	8.05	30.67	28.1	5.94	4	94	0.29	NW
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8.2	12:24	7.29	8.01	30.67	28.1	3.71	6	95	0.12	S
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8.2	12:25	7.31	8	30.54	28.2	3.69	6	94	0.13	SW
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.6	12:25	7.16	8.06	30.66	28.1	5.65	6	94	0.22	W
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.6	12:26	7.15	8.02	30.64	28.2	5.65	4	94	0.23	W
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:26	7.13	8.03	30.63	28.1	4.85	6	95	0.31	W
CR1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:27	7.17	8	30.56	28	4.87	4	95	0.32	W
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8	12:36	7.36	8	30.55	28.1	2.78	6	93	0.24	NW
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8	12:37	7.37	8.04	30.55	28.1	2.77	6	94	0.2	NW
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	12:37	7.5	8.06	30.53	28.1	2.29	6	94	0.29	SW
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.5	12:38	7.5	8.01	30.55	28.2	2.32	5	95	0.28	SW
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:39	7.35	8.09	30.62	28.2	3.12	6	94	0.16	SW

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
S3	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:39	7.35	8.07	30.68	28.2	3.11	5	94	0.18	SW
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	12:52	7.14	8.08	30.69	28.2	4.23	8	95	0.14	W
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.8	12:52	7.11	8	30.6	28	4.23	7	94	0.14	W
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	12:53	7.32	8.08	30.61	28.2	5.92	9	95	0.35	NW
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.4	12:54	7.35	8.02	30.54	28.2	5.91	8	94	0.38	NW
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:54	7.2	8.04	30.51	28.2	2.45	6	94	0.12	NW
H1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	12:55	7.18	8.03	30.53	28.1	2.44	7	95	0.13	NW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8.3	13:05	7.37	8.01	30.52	28.1	4.2	11	93	0.31	SW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	8.3	13:05	7.37	8.02	30.63	28.1	4.22	9	93	0.33	SW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.7	13:06	7.54	8.05	30.52	28.2	5.25	11	94	0.4	NW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.7	13:07	7.53	8.06	30.61	28.2	5.25	8	94	0.36	NW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:07	7.11	8.01	30.62	28.2	2.52	8	94	0.27	NW
S2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:08	7.12	8.07	30.69	28.2	2.55	8	94	0.27	NW
B1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.4	13:22	7.13	8.01	30.59	28.1	2.49	12	94	0.36	NW
B1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.4	13:24	7.14	8.04	30.68	28.1	2.5	11	94	0.32	NW
B1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:24	7.18	8.03	30.58	28.1	6.03	8	94	0.23	NW
B1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:25	7.18	8.09	30.55	28.2	6.02	8	95	0.26	NW
S1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.7	13:33	7.13	8.07	30.63	28.1	4.83	12	94	0.12	NW
S1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.7	13:34	7.11	8.02	30.6	28	4.8	13	93	0.13	NW
S1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:34	7.2	8.04	30.54	28.2	4.28	9	93	0.37	N
S1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:35	7.23	8.06	30.62	28.2	4.29	10	93	0.38	NW
B2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.5	13:45	7.36	8.03	30.63	28.1	3.89	9	94	0.11	NW
B2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.5	13:45	7.33	8.04	30.54	28.1	3.88	8	94	0.09	NW
B2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:46	7.26	8.02	30.5	28	3.43	6	95	0.26	NW
B2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	13:47	7.23	8.03	30.6	28	3.43	7	94	0.24	NW
B3	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.2	13:59	7.28	8.04	30.63	28.2	2.93	8	95	0.13	NW
B3	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.2	14:00	7.31	8.09	30.69	28.1	2.95	7	94	0.11	NW
B3	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:00	7.32	8.07	30.64	28.1	4.95	6	94	0.36	NW
B3	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:01	7.29	8.02	30.53	28	4.93	6	94	0.38	NW
B4	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.1	14:10	7.31	8.05	30.64	28.1	3.63	7	94	0.39	SW
B4	27/9/2018	Cloudy	Calm	Mid-Ebb	B	4.1	14:11	7.29	8.09	30.62	28.1	3.63	8	95	0.39	SW

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B4	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:12	7.36	8.08	30.61	28.2	5.18	7	94	0.11	SW
B4	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:12	7.38	8.1	30.65	28.1	5.14	7	95	0.1	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.2	14:23	7.43	8.08	30.7	28	5	10	94	0.28	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.2	14:24	7.44	8.08	30.66	28.2	5.01	10	94	0.26	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.1	14:24	7.52	8.09	30.56	28.2	2.17	9	94	0.34	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.1	14:25	7.52	8.1	30.51	28	2.15	6	94	0.32	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:26	7.34	8.07	30.63	28	5.91	10	94	0.24	W
C2	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:27	7.33	8.03	30.67	28	5.9	5	94	0.24	W
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.6	14:40	7.27	8.02	30.55	28.1	5.03	7	93	0.15	NW
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.6	14:41	7.27	8.01	30.62	28	5.03	6	94	0.12	NW
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.3	14:41	7.54	8.09	30.5	28.1	4.84	8	94	0.29	NW
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.3	14:42	7.56	8.04	30.56	28	4.83	6	94	0.27	NW
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:43	7.58	8.03	30.65	28	3.43	6	93	0.19	NW
M1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	14:44	7.58	8.03	30.66	28	3.43	6	94	0.2	NW
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	15:01	7.11	8.01	30.64	28.1	2.67	10	95	0.18	SW
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	B	7.3	15:02	7.09	8.1	30.54	28.2	2.7	10	94	0.22	SW
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	15:04	7.29	8.04	30.69	28.1	5.64	7	95	0.19	SW
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	M	4.2	15:04	7.28	8.08	30.63	28.1	5.62	8	95	0.2	SW
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	15:05	7.15	8.04	30.54	28.2	6.03	6	94	0.25	S
F1	27/9/2018	Cloudy	Calm	Mid-Ebb	S	1	15:06	7.16	8.07	30.52	28.2	6.04	7	94	0.29	S
C2	29/9/2018	Fine	Moderate	Mid-Flood	B	7.6	7:16	7.46	8	30.66	28.1	5.82	10	105	0.16	SW
C2	29/9/2018	Fine	Moderate	Mid-Flood	B	7.6	7:17	7.43	8.02	30.61	28	5.84	11	105	0.17	SW
C2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.3	7:17	7.39	8.08	30.54	28.2	3.22	8	104	0.24	W
C2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.3	7:18	7.42	8	30.64	28.2	3.22	8	107	0.22	SW
C2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:19	7.48	8	30.59	28	5.06	8	107	0.11	NW
C2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:19	7.46	8.09	30.5	28.1	5.04	8	106	0.13	NW
M1	29/9/2018	Fine	Moderate	Mid-Flood	B	8.2	7:35	7.55	8.04	30.67	28.1	2.46	7	107	0.19	NW
M1	29/9/2018	Fine	Moderate	Mid-Flood	B	8.2	7:36	7.55	8.06	30.68	28.1	2.44	8	108	0.18	NW
M1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.6	7:37	7.57	8.08	30.64	28	5.61	6	105	0.39	NW
M1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.6	7:37	7.59	8.03	30.64	28.1	5.63	6	107	0.35	NW
M1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:38	7.52	8.01	30.58	28	3.45	5	106	0.23	NW

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
M1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:38	7.5	8.06	30.68	28.1	3.47	6	104	0.19	N
F1	29/9/2018	Fine	Moderate	Mid-Flood	B	8	7:55	7.26	8.08	30.69	28.1	2.27	10	108	0.13	NW
F1	29/9/2018	Fine	Moderate	Mid-Flood	B	8	7:56	7.27	8.09	30.67	28.1	2.3	9	107	0.13	NW
F1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.5	7:56	7.12	8.02	30.59	28	5.13	9	106	0.23	NW
F1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.5	7:57	7.09	8.06	30.62	28.1	5.16	9	105	0.19	NW
F1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:58	7.36	8.02	30.55	28	2.5	8	106	0.11	W
F1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	7:58	7.32	8.07	30.53	28.1	2.49	8	107	0.08	W
B4	29/9/2018	Fine	Moderate	Mid-Flood	B	4.7	8:10	7.57	8.09	30.7	28	5.94	9	105	0.15	W
B4	29/9/2018	Fine	Moderate	Mid-Flood	B	4.7	8:11	7.54	8.08	30.62	28.1	5.94	10	108	0.18	W
B4	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:12	7.41	8.05	30.6	28	4.8	8	105	0.25	W
B4	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:13	7.4	8	30.68	28.1	4.83	6	105	0.26	W
B3	29/9/2018	Fine	Moderate	Mid-Flood	B	4.6	8:21	7.12	8.04	30.7	28.1	5.55	7	105	0.21	NE
B3	29/9/2018	Fine	Moderate	Mid-Flood	B	4.6	8:22	7.12	8.03	30.56	28.2	5.53	8	105	0.19	N
B3	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:22	7.36	8.05	30.64	28.2	5.83	5	106	0.23	NE
B3	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:23	7.36	8.08	30.62	28.1	5.79	6	106	0.23	NE
H1	29/9/2018	Fine	Moderate	Mid-Flood	B	9	8:34	7.45	8.02	30.59	28.2	4.17	14	106	0.22	NE
H1	29/9/2018	Fine	Moderate	Mid-Flood	B	9	8:35	7.45	8.06	30.6	28.1	4.17	14	106	0.22	NE
H1	29/9/2018	Fine	Moderate	Mid-Flood	M	5	8:36	7.3	8.1	30.7	28	3.29	10	105	0.21	S
H1	29/9/2018	Fine	Moderate	Mid-Flood	M	5	8:37	7.29	8.04	30.52	28	3.28	11	105	0.2	SW
H1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:37	7.22	8.01	30.59	28.1	2.57	10	106	0.2	S
H1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:38	7.21	8.01	30.65	28.1	2.56	10	110	0.15	S
CR1	29/9/2018	Fine	Moderate	Mid-Flood	B	8.4	8:52	7.34	8.02	30.67	28.1	3.31	7	106	0.35	SW
CR1	29/9/2018	Fine	Moderate	Mid-Flood	B	8.4	8:52	7.35	8.03	30.51	28.1	3.31	6	109	0.33	SW
CR1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.7	8:53	7.32	8.06	30.63	28.1	3.43	6	106	0.15	NW
CR1	29/9/2018	Fine	Moderate	Mid-Flood	M	4.7	8:53	7.29	8.01	30.64	28.1	3.44	6	107	0.17	NW
CR1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:54	7.57	8.07	30.63	28.1	4.3	6	105	0.15	NW
CR1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	8:55	7.56	8.1	30.53	28.2	4.31	6	108	0.15	NW
CR2	29/9/2018	Fine	Moderate	Mid-Flood	B	8.6	9:05	7.3	8.06	30.52	28	2.22	6	104	0.15	NW
CR2	29/9/2018	Fine	Moderate	Mid-Flood	B	8.6	9:06	7.34	8.07	30.62	28	2.26	7	106	0.14	NW
CR2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.8	9:07	7.24	8.09	30.53	28.1	3.39	6	105	0.23	N
CR2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.8	9:07	7.23	8.02	30.6	28	3.42	6	104	0.21	N

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Baseline Water Quality Monitoring Data

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
CR2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:08	7.22	8.02	30.6	28.1	2.68	4	104	0.33	NW
CR2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:08	7.22	8.05	30.59	28.1	2.69	4	106	0.36	N
S3	29/9/2018	Fine	Moderate	Mid-Flood	B	12.6	9:19	7.55	8.06	30.65	28.1	4.67	9	106	0.34	NW
S3	29/9/2018	Fine	Moderate	Mid-Flood	B	12.6	9:19	7.53	8.04	30.58	28	4.68	9	108	0.35	NW
S3	29/9/2018	Fine	Moderate	Mid-Flood	M	6.8	9:20	7.19	8.03	30.59	28	5.66	8	105	0.1	NW
S3	29/9/2018	Fine	Moderate	Mid-Flood	M	6.8	9:20	7.18	8.05	30.52	28	5.65	9	106	0.1	W
S3	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:21	7.26	8.03	30.67	28.1	4.05	8	105	0.33	NW
S3	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:22	7.27	8.07	30.67	28	4.05	8	107	0.34	NW
S2	29/9/2018	Fine	Moderate	Mid-Flood	B	8.7	9:40	7.32	8.09	30.58	28.1	2.27	10	109	0.17	NW
S2	29/9/2018	Fine	Moderate	Mid-Flood	B	8.7	9:41	7.34	8	30.54	28.1	2.28	11	105	0.18	NW
S2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.9	9:41	7.4	8.03	30.6	28.1	5.67	9	110	0.2	SW
S2	29/9/2018	Fine	Moderate	Mid-Flood	M	4.9	9:42	7.4	8.07	30.51	28.1	5.65	10	107	0.24	SW
S2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:43	7.5	8.04	30.52	28	5.94	9	106	0.27	S
S2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:43	7.51	8.07	30.6	28.1	5.93	8	106	0.28	SW
B2	29/9/2018	Fine	Moderate	Mid-Flood	B	4.9	9:57	7.28	8.05	30.66	28	4.45	7	105	0.18	SW
B2	29/9/2018	Fine	Moderate	Mid-Flood	B	4.9	9:58	7.28	8.08	30.67	28	4.46	7	105	0.16	SW
B2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:59	7.18	8.05	30.65	28.2	3.84	5	105	0.38	NW
B2	29/9/2018	Fine	Moderate	Mid-Flood	S	1	9:59	7.15	8.02	30.57	28.2	3.81	5	109	0.39	NW
S1	29/9/2018	Fine	Moderate	Mid-Flood	B	4.6	10:08	7.33	8.05	30.53	28.1	3.11	5	105	0.11	N
S1	29/9/2018	Fine	Moderate	Mid-Flood	B	4.6	10:09	7.29	8.08	30.5	28.2	3.09	6	107	0.1	N
S1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:10	7.59	8.08	30.6	28.1	3.13	4	105	0.38	W
S1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:10	7.59	8.04	30.69	28.1	3.11	5	106	0.37	SW
B1	29/9/2018	Fine	Moderate	Mid-Flood	B	4.8	10:18	7.16	8.06	30.67	28.1	4.07	4	106	0.37	W
B1	29/9/2018	Fine	Moderate	Mid-Flood	B	4.8	10:19	7.19	8.09	30.59	28.1	4.08	4	105	0.38	W
B1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:19	7.58	8.09	30.52	28	2.2	3	105	0.13	W
B1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:20	7.59	8.04	30.56	28	2.22	3	104	0.11	W
C1	29/9/2018	Fine	Moderate	Mid-Flood	B	11.5	10:35	7.49	8.04	30.53	28.1	5.27	11	105	0.26	NW
C1	29/9/2018	Fine	Moderate	Mid-Flood	B	11.5	10:36	7.52	8	30.53	28.1	5.26	11	106	0.26	NW
C1	29/9/2018	Fine	Moderate	Mid-Flood	M	6.3	10:37	7.46	8.1	30.56	28.2	5.43	10	105	0.15	NW
C1	29/9/2018	Fine	Moderate	Mid-Flood	M	6.3	10:37	7.44	8.02	30.66	28.2	5.44	10	105	0.17	NW
C1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:38	7.3	8.09	30.65	28.1	3.14	9	109	0.2	NW

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C1	29/9/2018	Fine	Moderate	Mid-Flood	S	1	10:39	7.28	8.06	30.54	28	3.15	10	109	0.16	NW
C1	29/9/2018	Fine	Moderate	Mid-Ebb	B	10.8	13:08	7.57	8.08	30.53	28	4.6	7	105	0.36	E
C1	29/9/2018	Fine	Moderate	Mid-Ebb	B	10.8	13:08	7.56	8.01	30.66	28.1	4.6	7	105	0.4	SE
C1	29/9/2018	Fine	Moderate	Mid-Ebb	M	5.9	13:09	7.48	8.09	30.67	28.1	2.19	6	106	0.33	SE
C1	29/9/2018	Fine	Moderate	Mid-Ebb	M	5.9	13:10	7.48	8.04	30.59	28.1	2.22	7	106	0.34	SE
C1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:10	7.49	8.06	30.57	28.1	4.7	6	105	0.2	SE
C1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:11	7.5	8.07	30.55	28.2	4.72	6	104	0.19	S
B1	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.3	13:24	7.1	8	30.51	28.2	3.14	12	105	0.14	SE
B1	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.3	13:25	7.09	8.07	30.7	28.1	3.12	11	105	0.15	SE
B1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:26	7.41	8.02	30.68	28.1	4.77	8	105	0.16	SE
B1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:26	7.42	8.09	30.55	28	4.79	7	105	0.16	SE
S1	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.7	13:35	7.4	8.03	30.64	28.1	5.04	9	107	0.3	E
S1	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.7	13:36	7.42	8.09	30.57	28.1	5.04	10	107	0.29	S
S1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:36	7.32	8.04	30.58	28.1	5.69	8	107	0.17	E
S1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:37	7.3	8.05	30.65	28.1	5.68	8	108	0.17	S
B2	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.3	13:48	7.13	8.02	30.57	28.1	2.35	10	107	0.1	S
B2	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.3	13:49	7.12	8.06	30.58	28.1	2.36	9	105	0.1	S
B2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:50	7.35	8.06	30.58	28.1	5.57	7	107	0.29	SE
B2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	13:50	7.32	8.06	30.62	28	5.57	6	105	0.28	SE
S2	29/9/2018	Fine	Moderate	Mid-Ebb	B	8	14:03	7.37	8.05	30.65	28.2	3.05	10	108	0.14	SE
S2	29/9/2018	Fine	Moderate	Mid-Ebb	B	8	14:03	7.38	8.06	30.62	28	3.06	11	107	0.16	SE
S2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	14:04	7.13	8.04	30.66	28	3.01	9	107	0.26	SE
S2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	14:05	7.13	8.09	30.56	28.1	3.02	9	108	0.29	SW
S2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:05	7.49	8.01	30.58	28.1	5.11	7	107	0.32	SE
S2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:06	7.49	8.04	30.54	28.1	5.12	8	107	0.29	SW
B3	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.1	14:15	7.13	8.03	30.54	28	5.22	8	107	0.15	S
B3	29/9/2018	Fine	Moderate	Mid-Ebb	B	4.1	14:15	7.12	8.02	30.52	28.1	5.23	9	104	0.14	SW
B3	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:16	7.37	8.01	30.6	28.1	2.91	8	107	0.27	S
B3	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:16	7.32	8.08	30.53	28.1	2.93	7	105	0.27	S
B4	29/9/2018	Fine	Moderate	Mid-Ebb	B	4	14:24	7.32	8.07	30.65	28.2	4.33	6	105	0.22	S
B4	29/9/2018	Fine	Moderate	Mid-Ebb	B	4	14:24	7.36	8.06	30.61	28	4.37	7	103	0.19	S

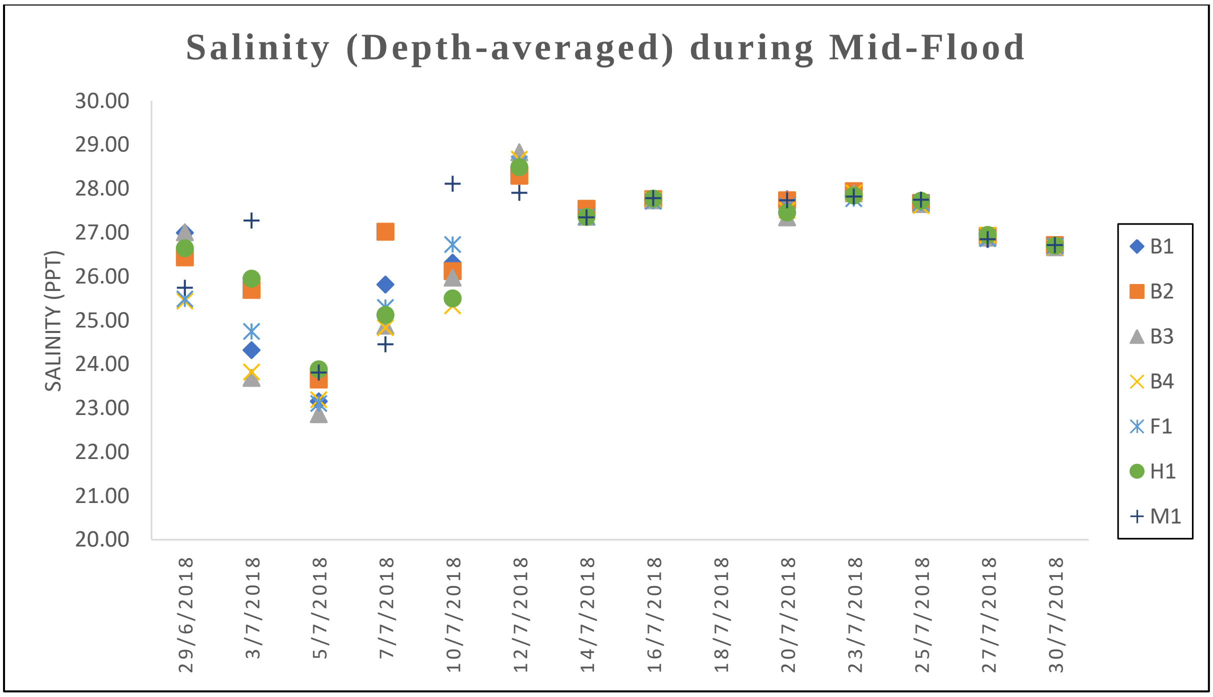
Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
B4	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:25	7.26	8.07	30.68	28	4.12	5	106	0.24	S
B4	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:25	7.25	8	30.69	28	4.14	6	106	0.23	S
H1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.5	14:38	7.2	8.04	30.61	28.2	4.92	10	104	0.32	SE
H1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.5	14:38	7.18	8.04	30.65	28.2	4.91	10	105	0.29	SE
H1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.3	14:39	7.39	8.02	30.65	28	6.03	9	105	0.19	S
H1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.3	14:39	7.41	8.03	30.58	28.1	6.06	10	106	0.21	S
H1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:40	7.52	8	30.52	28	4.64	8	106	0.2	SE
H1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:40	7.54	8.06	30.62	28.2	4.63	8	104	0.23	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.9	14:50	7.33	8.06	30.52	28.1	4.62	9	107	0.37	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.9	14:50	7.34	8.1	30.51	28.1	4.63	9	109	0.4	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	14:51	7.29	8.08	30.6	28.2	5.73	7	110	0.2	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	14:51	7.3	8.04	30.67	28.1	5.74	8	108	0.2	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:52	7.23	8.1	30.61	28.1	3.37	8	108	0.4	SE
CR1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	14:52	7.23	8.03	30.68	28	3.34	7	106	0.37	SE
S3	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.7	15:05	7.51	8.06	30.53	28.2	4.83	8	109	0.27	SE
S3	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.7	15:06	7.5	8.06	30.58	28.2	4.84	9	106	0.25	SW
S3	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.4	15:06	7.32	8.1	30.5	28.1	2.2	7	108	0.17	SE
S3	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.4	15:07	7.32	8	30.68	28.2	2.18	7	107	0.14	SW
S3	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:07	7.14	8.06	30.68	28.1	4.03	7	111	0.33	SW
S3	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:07	7.13	8.07	30.56	28.2	4	7	106	0.33	SW
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.9	15:16	7.29	8.06	30.58	28	5.91	9	108	0.19	SW
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.9	15:16	7.25	8.09	30.67	28.1	5.88	8	108	0.19	SW
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	15:17	7.49	8.09	30.64	28.2	3.95	8	109	0.37	SE
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.5	15:17	7.45	8.07	30.65	28.1	3.9	8	105	0.41	SE
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:18	7.22	8.08	30.69	28.1	3.31	6	109	0.27	SE
CR2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:18	7.19	8.05	30.57	28	3.3	6	108	0.29	SE
C2	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.3	15:48	7.34	8.09	30.52	28.2	5.95	9	109	0.3	SE
C2	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.3	15:49	7.33	8.03	30.63	28.1	5.94	8	109	0.3	SE
C2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.2	15:50	7.53	8.06	30.62	28.1	4.46	7	106	0.37	SE
C2	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.2	15:50	7.53	8.09	30.6	28.1	4.43	7	107	0.38	E
C2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:51	7.13	8.1	30.66	28.1	2.83	6	107	0.3	E

Location	Date	Weather	Sea Condition	Tidal	Water Level note 1	Depth (m)	Time	DO (mg/L)	pH	Sal (ppt)	Temp (°C)	Turbidity (NTU)	SS (mg/L)	Total Alkalinity (mg/L) note 2	Current Velocity note 2	Direction in NESW note 2
C2	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	15:51	7.13	8.03	30.51	28.1	2.86	5	106	0.34	E
F1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.2	16:08	7.16	8.1	30.67	28.1	4.56	8	107	0.22	SE
F1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.2	16:09	7.16	8.09	30.63	28	4.56	7	108	0.22	SE
F1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.1	16:09	7.57	8.03	30.68	28.1	2.72	7	106	0.12	SE
F1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.1	16:10	7.54	8.04	30.53	28.2	2.73	6	106	0.11	SE
F1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	16:10	7.59	8.06	30.63	28.1	5.76	6	107	0.28	SE
F1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	16:11	7.61	8.1	30.64	28.1	5.77	6	108	0.28	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.7	16:25	7.56	8	30.68	28	4.41	9	109	0.35	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	B	7.7	16:25	7.52	8.03	30.53	28.2	4.41	10	107	0.38	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.4	16:26	7.19	8.07	30.54	28.1	3.03	8	106	0.27	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	M	4.4	16:27	7.19	8.04	30.62	28	3.04	8	108	0.25	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	16:27	7.59	8.06	30.58	28	4.49	8	107	0.24	SE
M1	29/9/2018	Fine	Moderate	Mid-Ebb	S	1	16:28	7.59	8	30.67	28.2	4.47	8	106	0.23	SE

Remarks:

note 1: S – Surface M – Middle B – Bottom

note 2: Measurements of current velocity, total alkalinity tests and detections of current direction were only conducted during DCM work period on 20/09/2018, 22/09/2018, 27/09/2018 and 29/09/2018.



Salinity (Depth-averaged) during Mid-Flood
SALINITY (PPT)
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
29/6/2018
3/7/2018
5/7/2018
7/7/2018
10/7/2018
12/7/2018
14/7/2018
16/7/2018
18/7/2018
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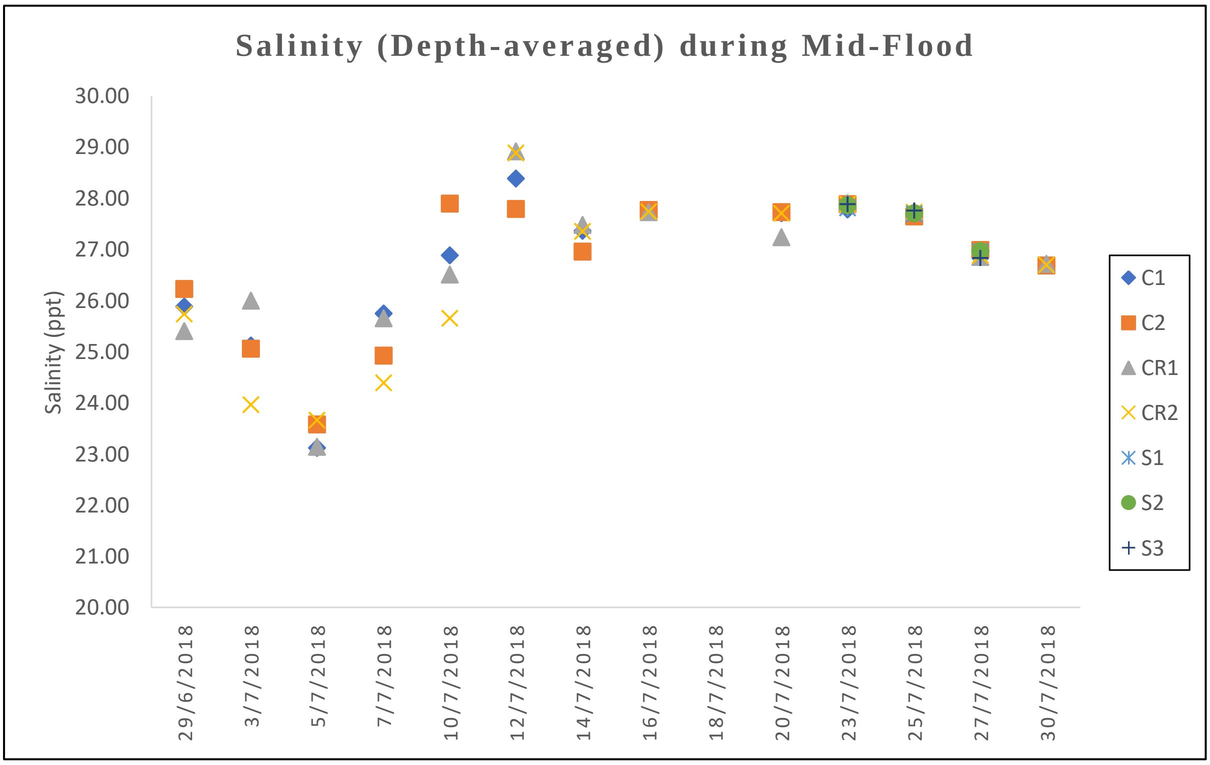
27/7/2018
30/7/2018
B1
B2
B3
B4
F1
H1
M1



Salinity (Depth-averaged) during Mid-Flood
Salinity (ppt)
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
29/6/2018
3/7/2018
5/7/2018
7/7/2018
10/7/2018
12/7/2018
14/7/2018
16/7/2018
18/7/2018
20/7/2018
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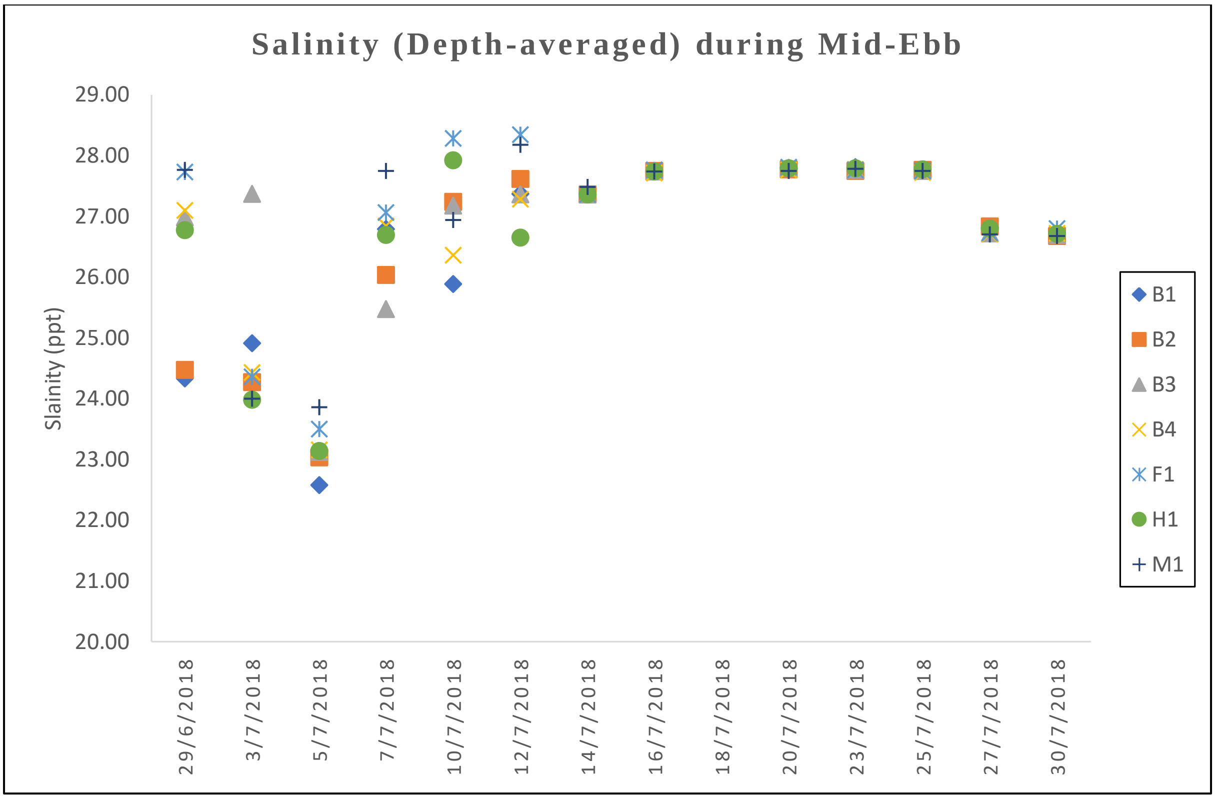
27/7/2018
30/7/2018
C1
C2
CR1
CR2
S1
S2
S3


Salinity (Depth-averaged) during Mid-Ebb
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
Slainity (ppt)
29/6/2018
3/7/2018
5/7/2018
7/7/2018
10/7/2018
12/7/2018
14/7/2018
16/7/2018
18/7/2018
20/7/2018
23/7/2018
25/7/2018
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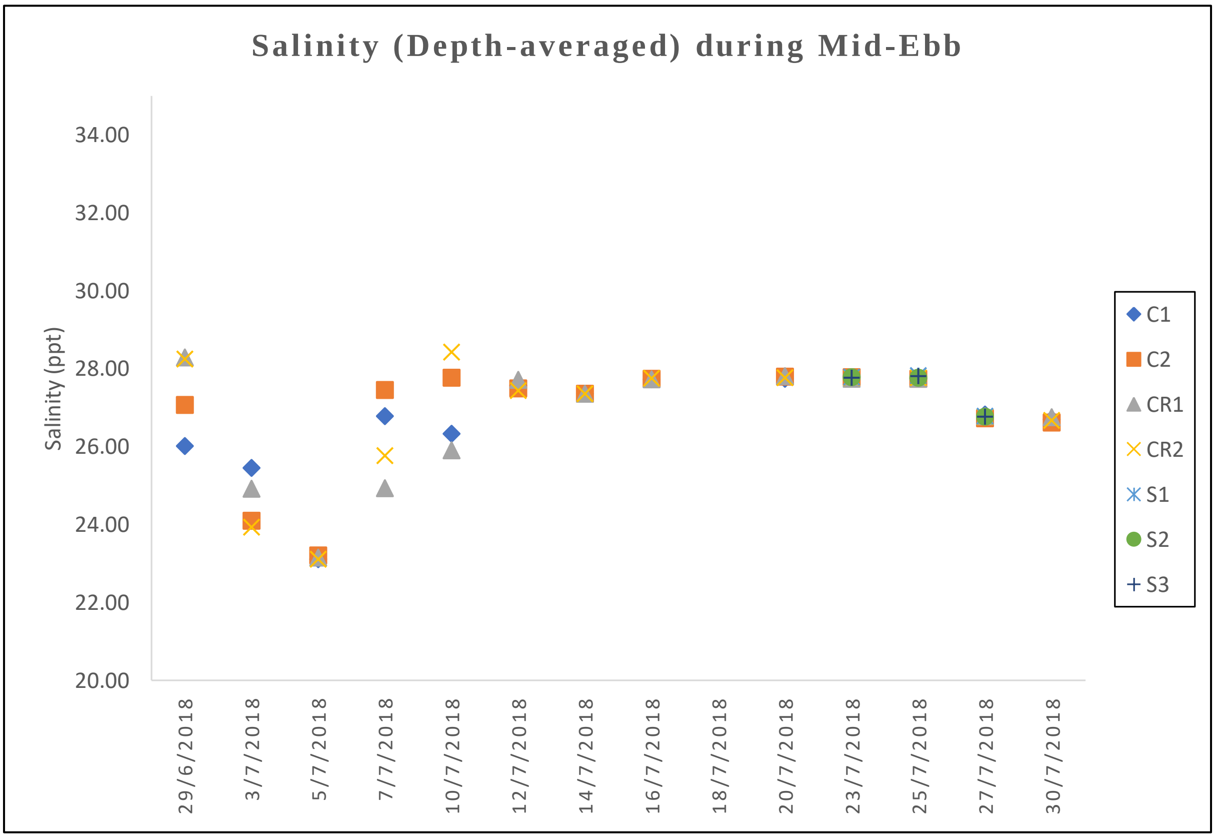
30/7/2018
B1
B2
B3
B4
F1
H1
M1


Salinity (Depth-averaged) during Mid-Ebb
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
Salinity (ppt)
29/6/2018
3/7/2018
5/7/2018
7/7/2018
10/7/2018
12/7/2018
14/7/2018
16/7/2018
18/7/2018
20/7/2018
23/7/2018
25/7/2018
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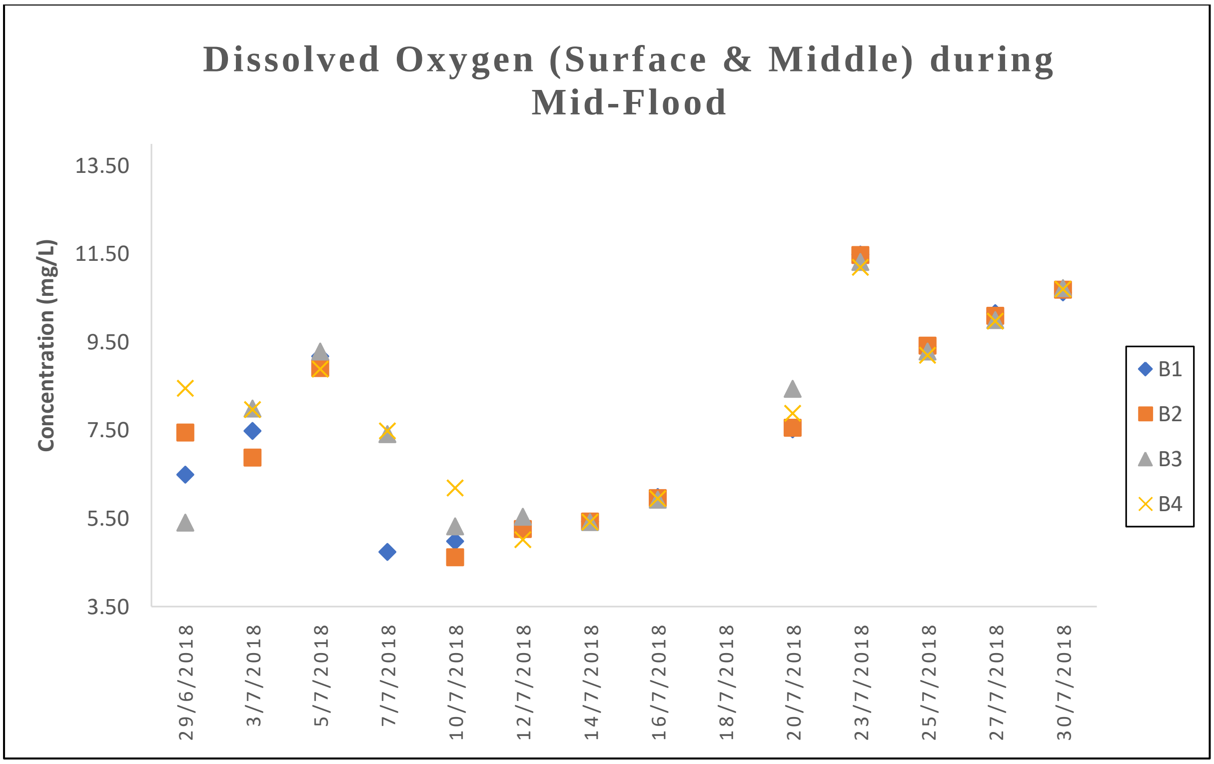
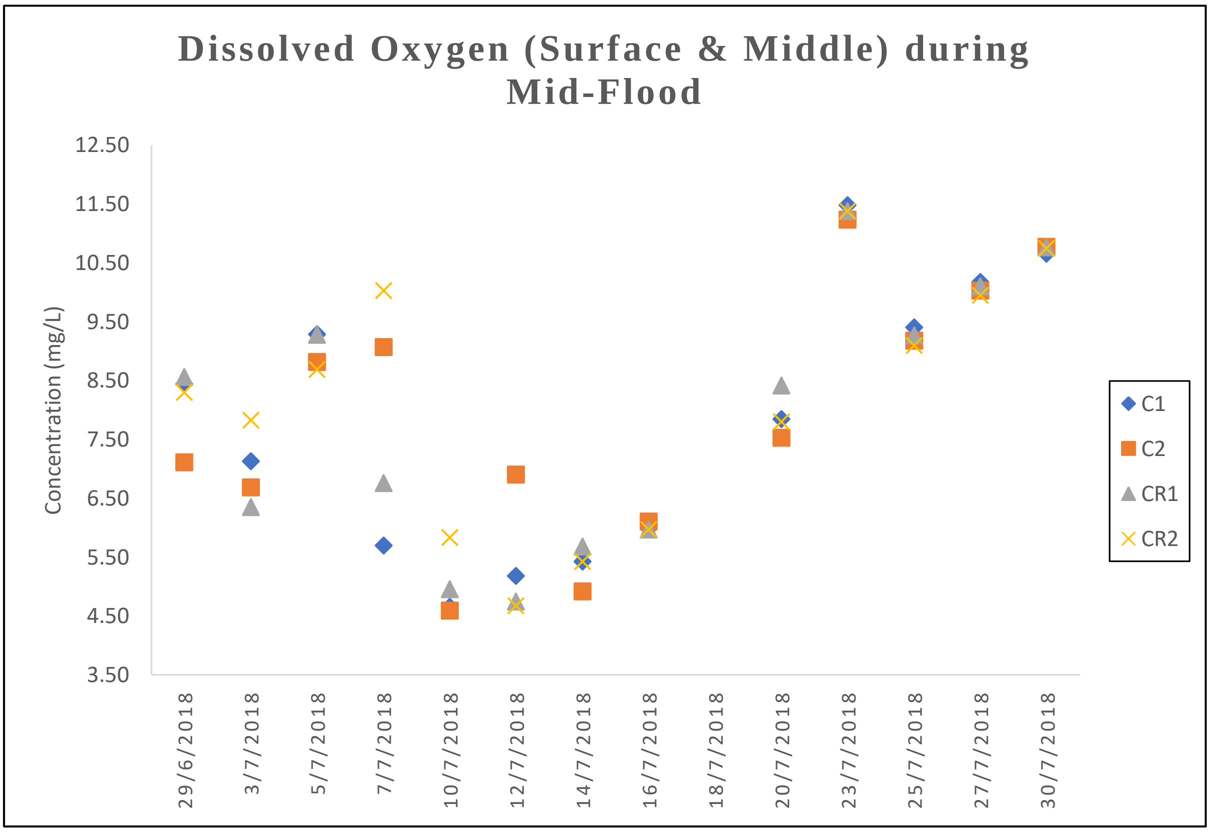
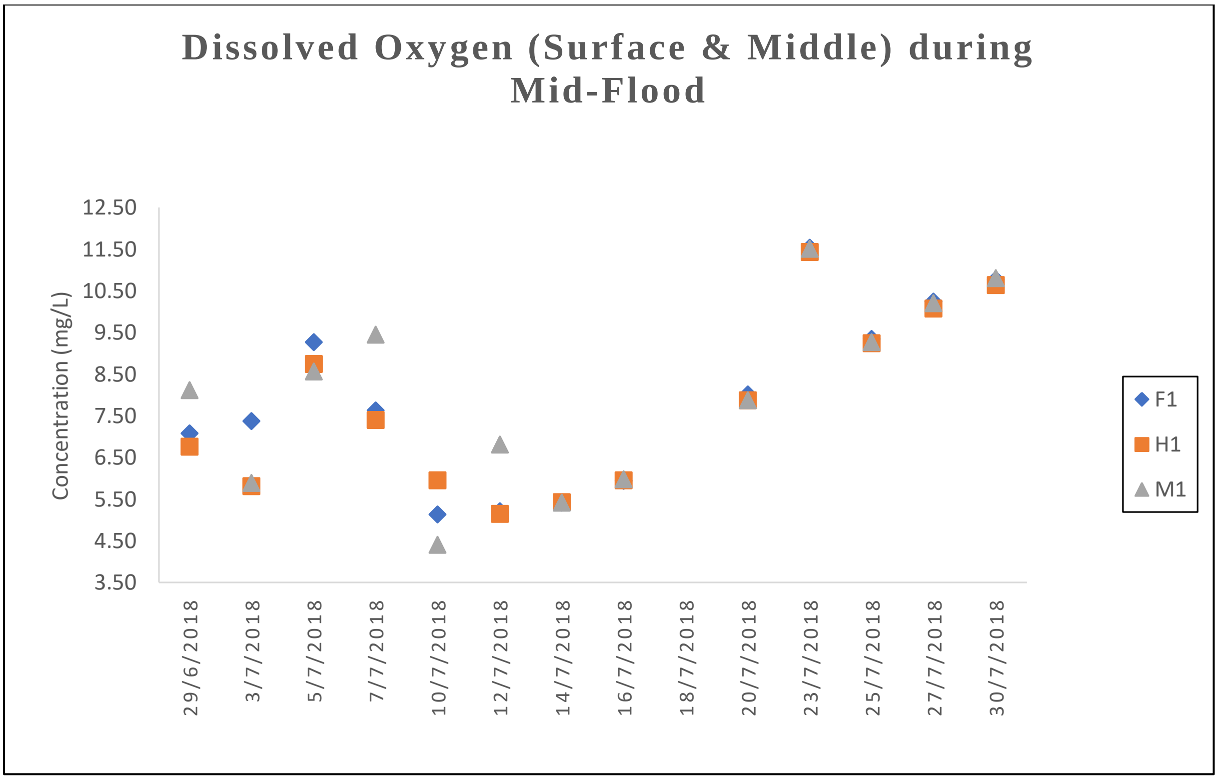
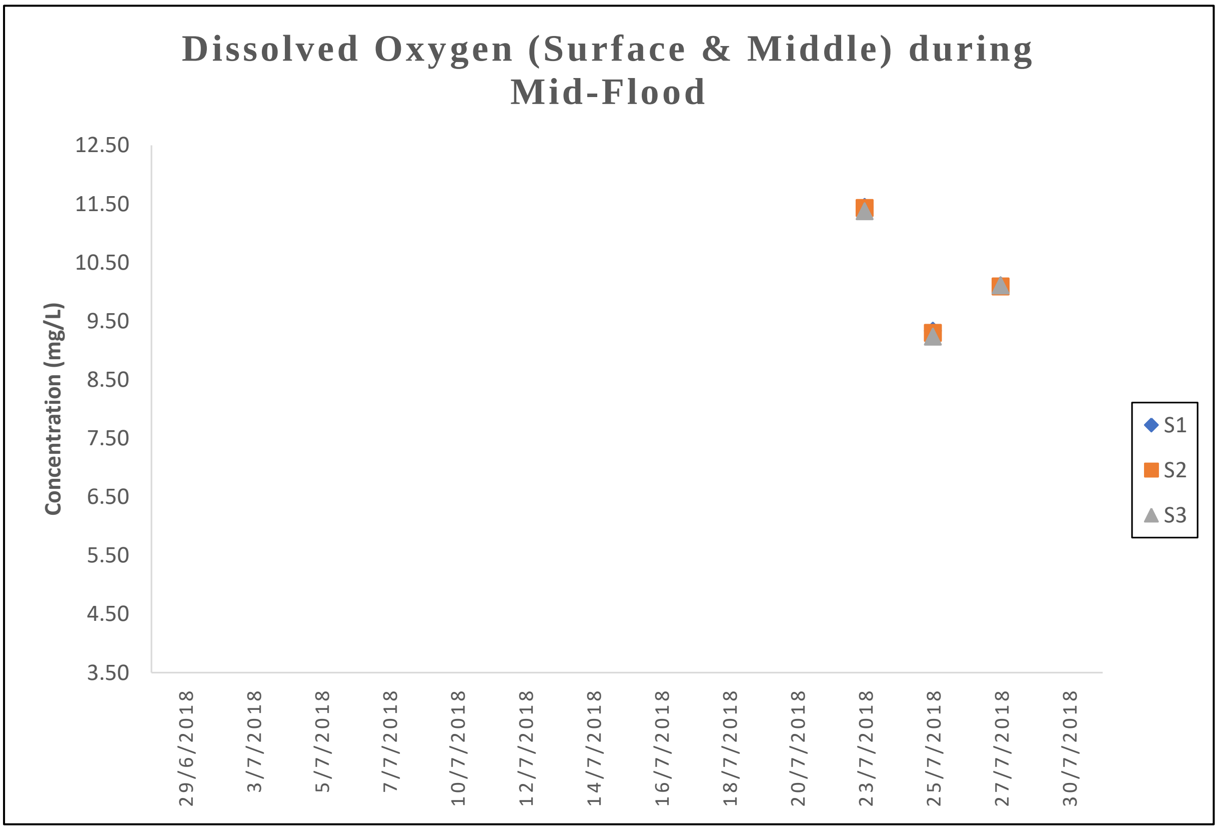
C1
C2
CR1
CR2
S1
S2
S3



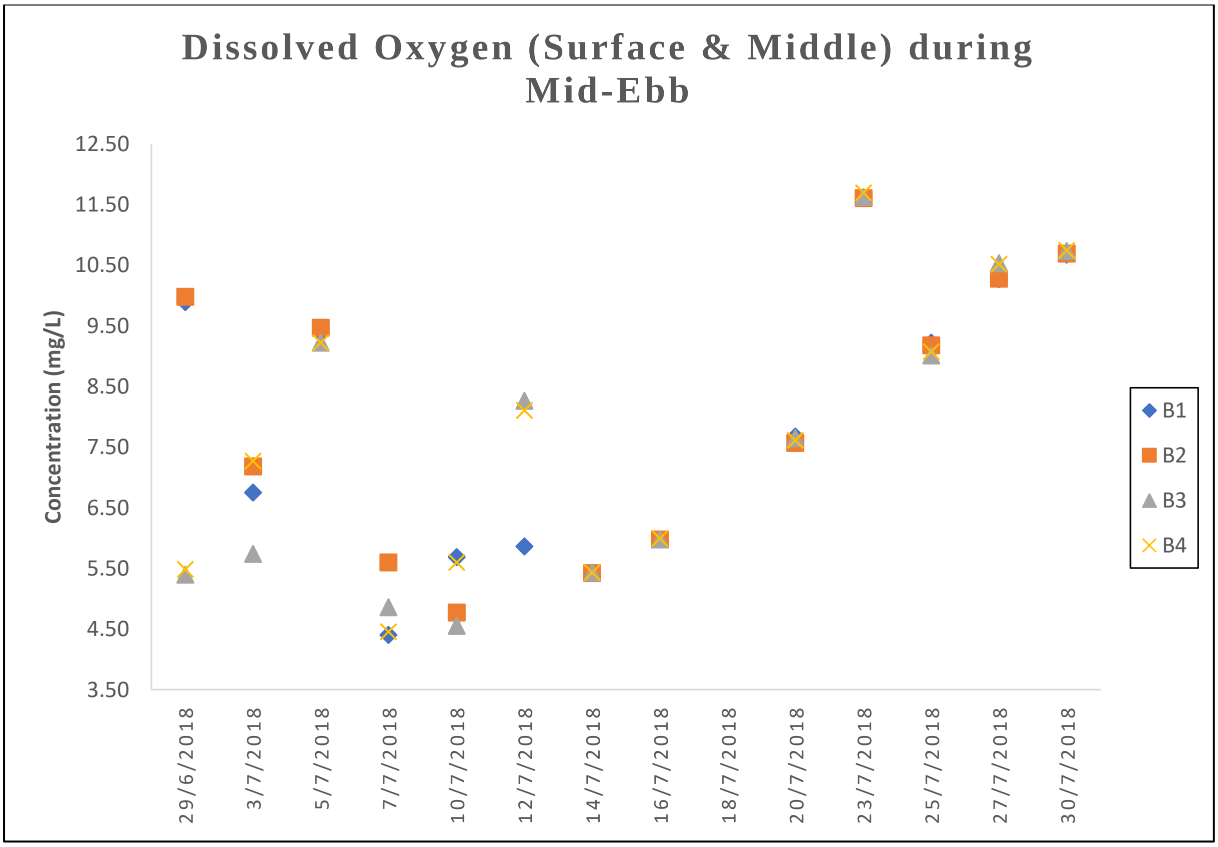


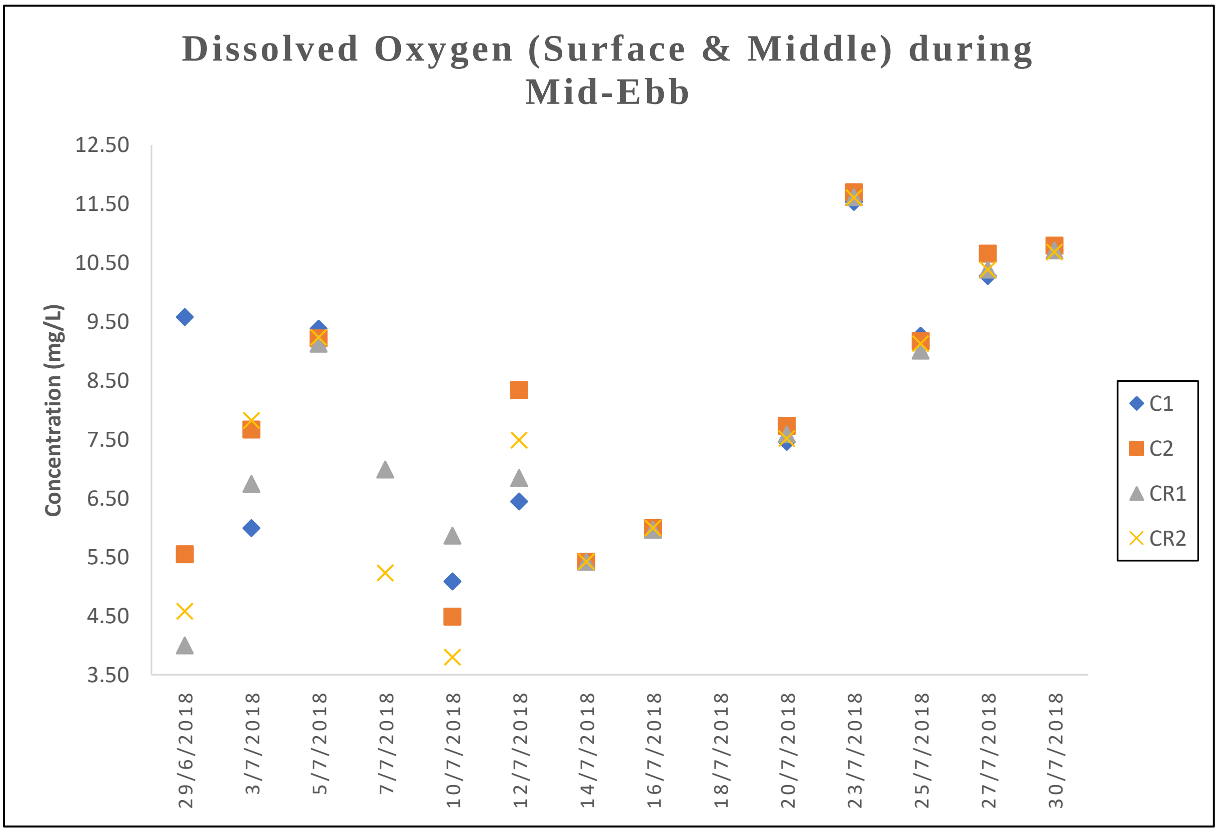
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



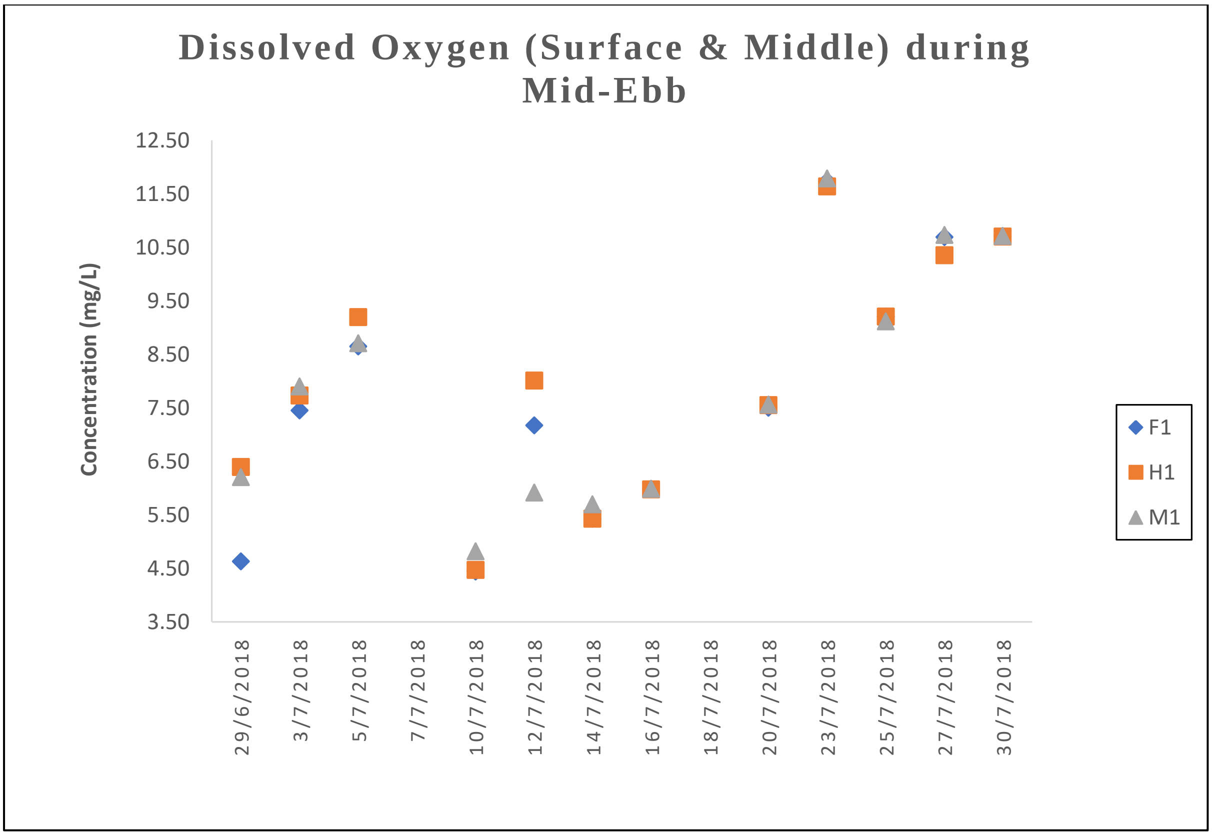


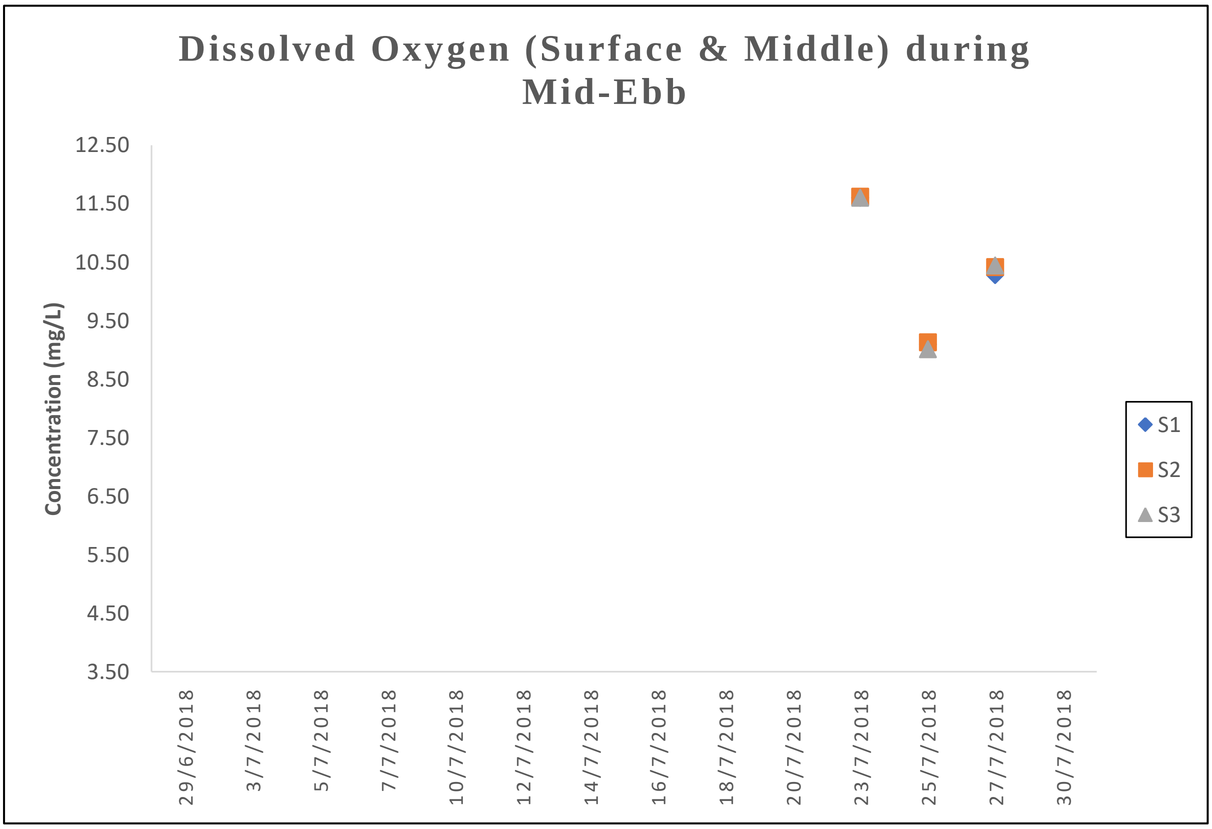
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



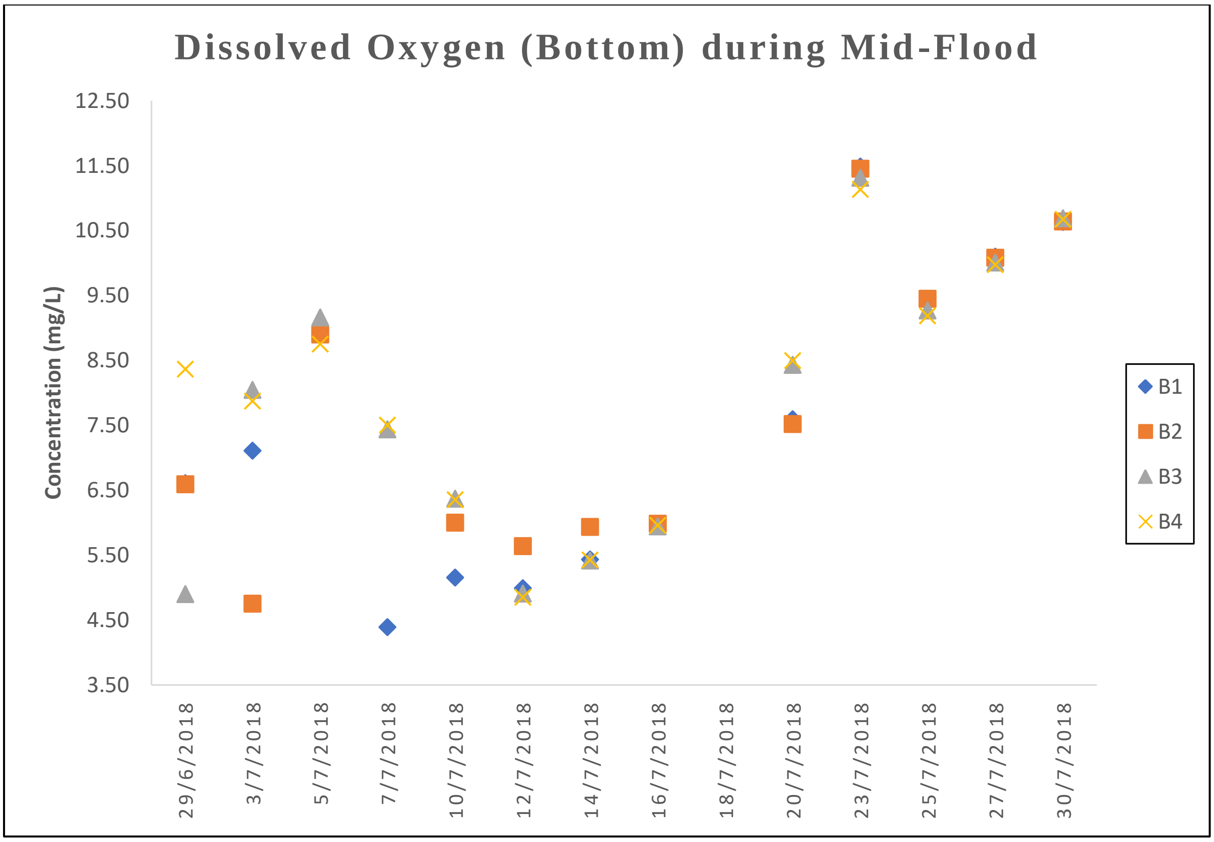


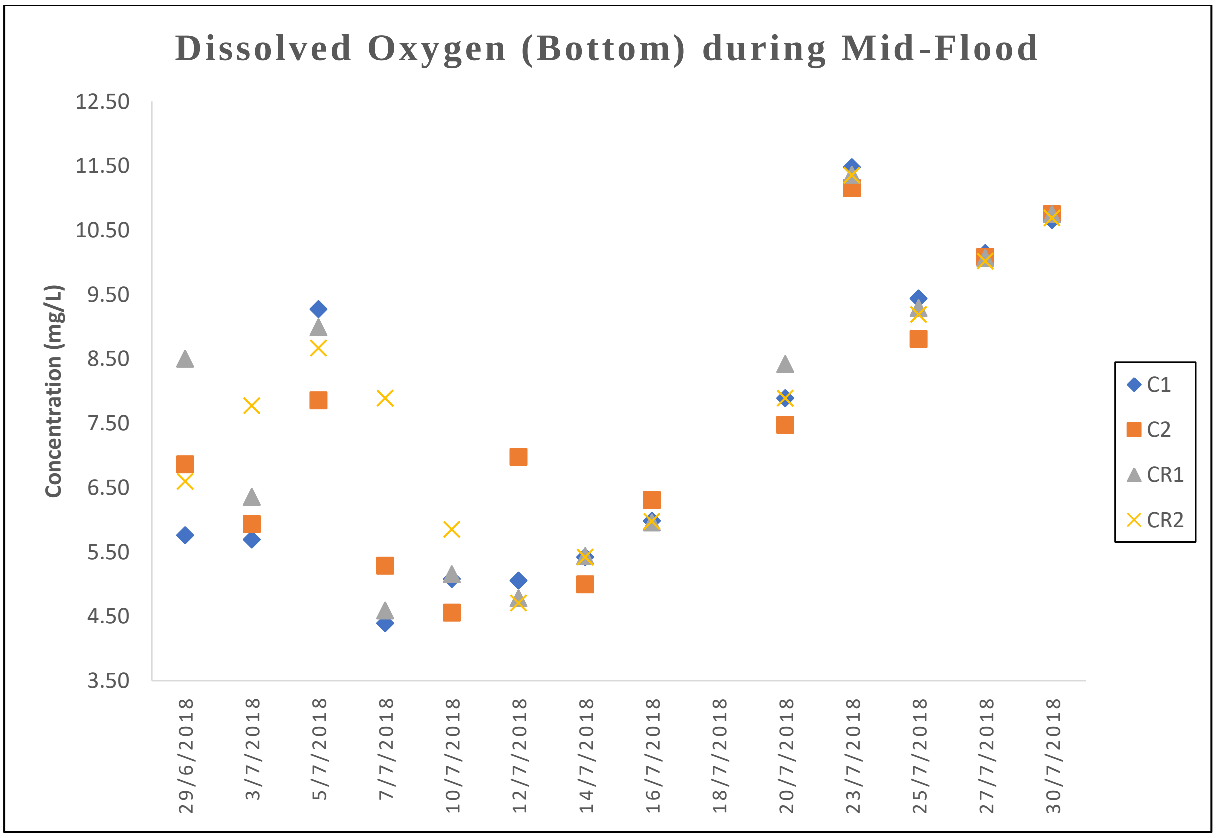
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



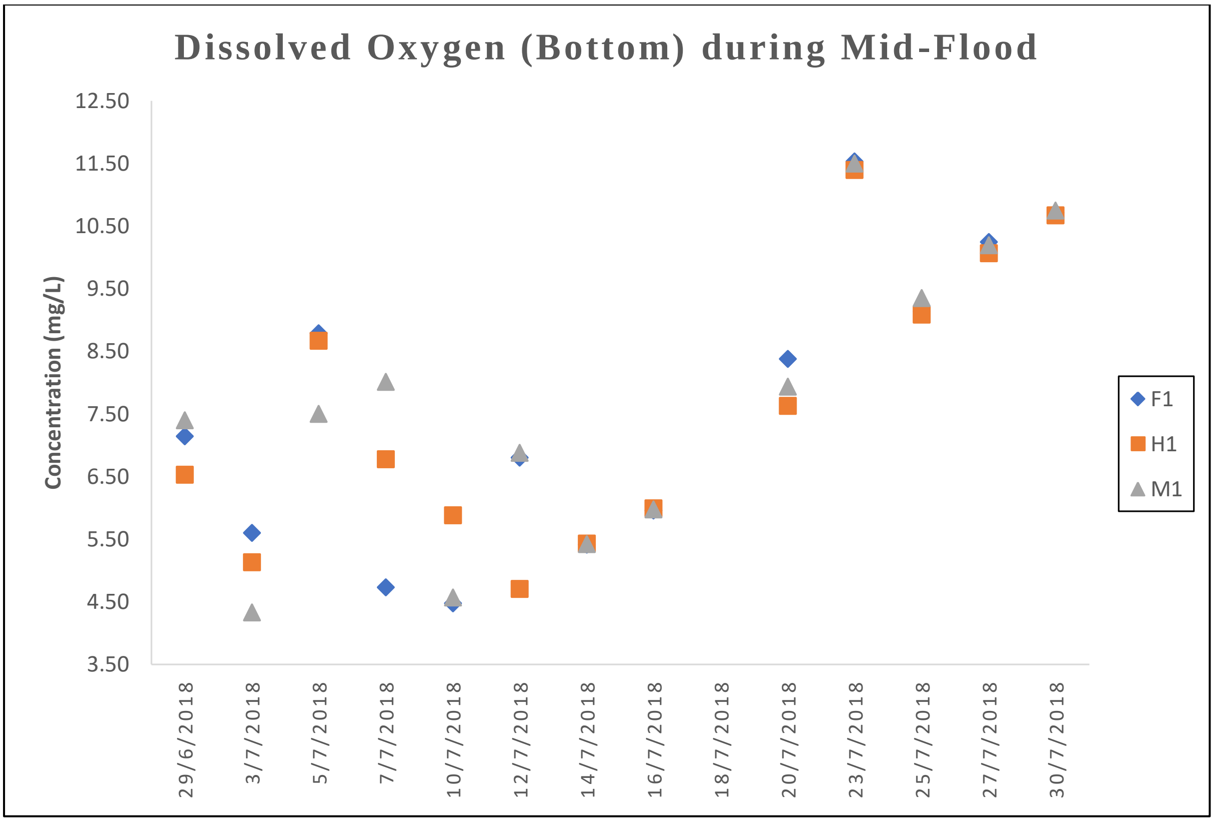


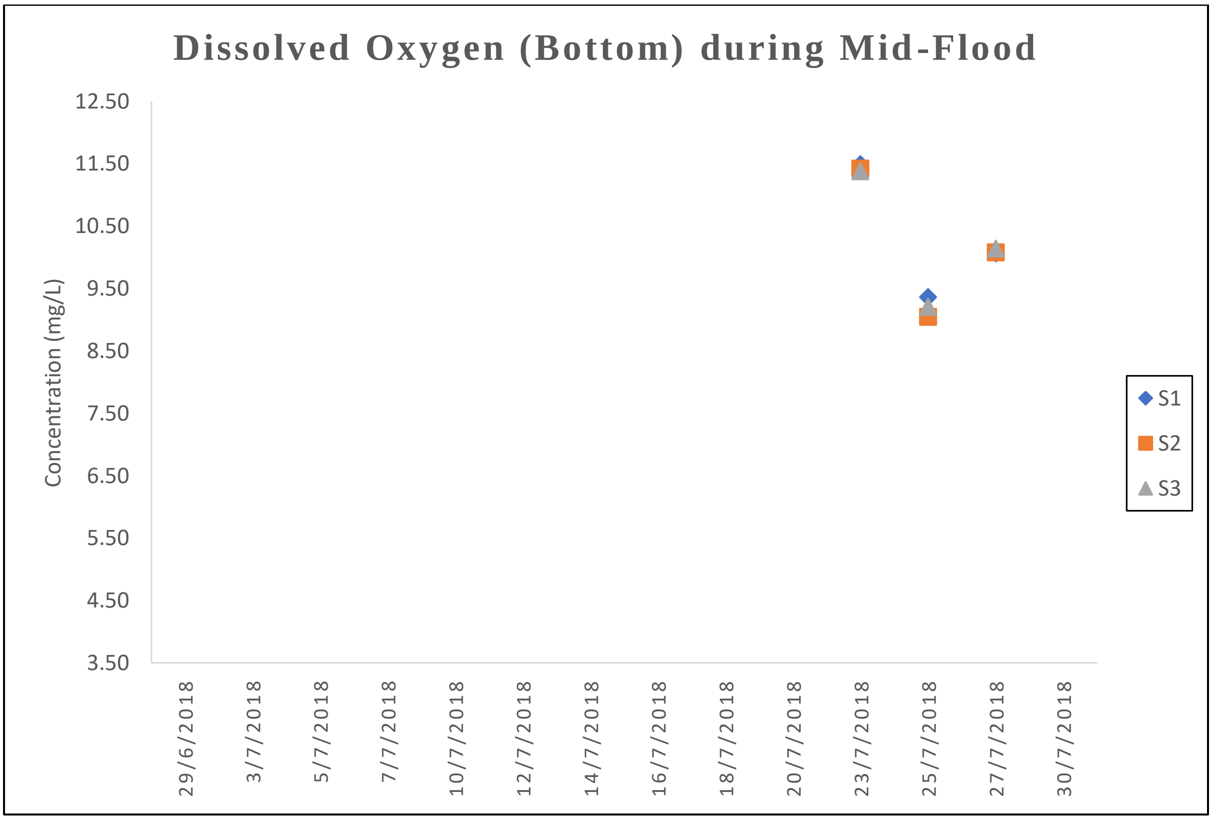
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



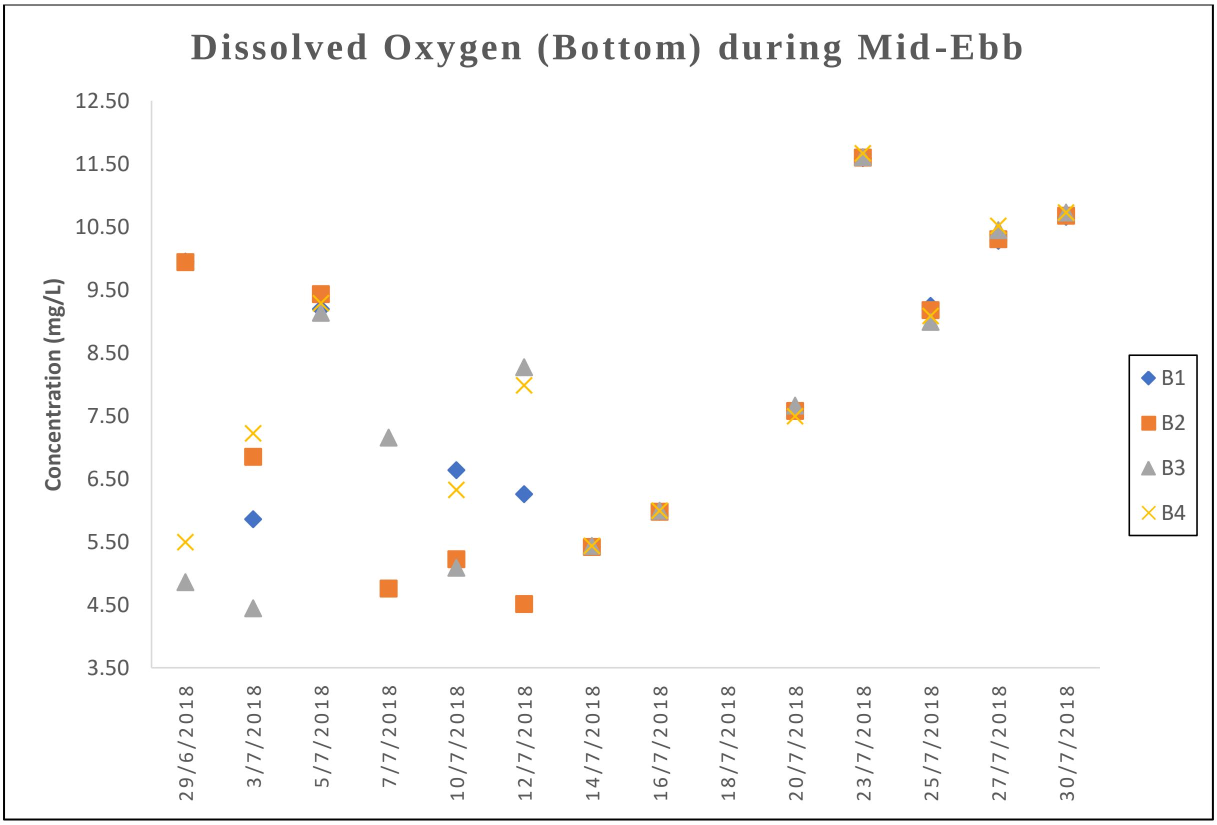


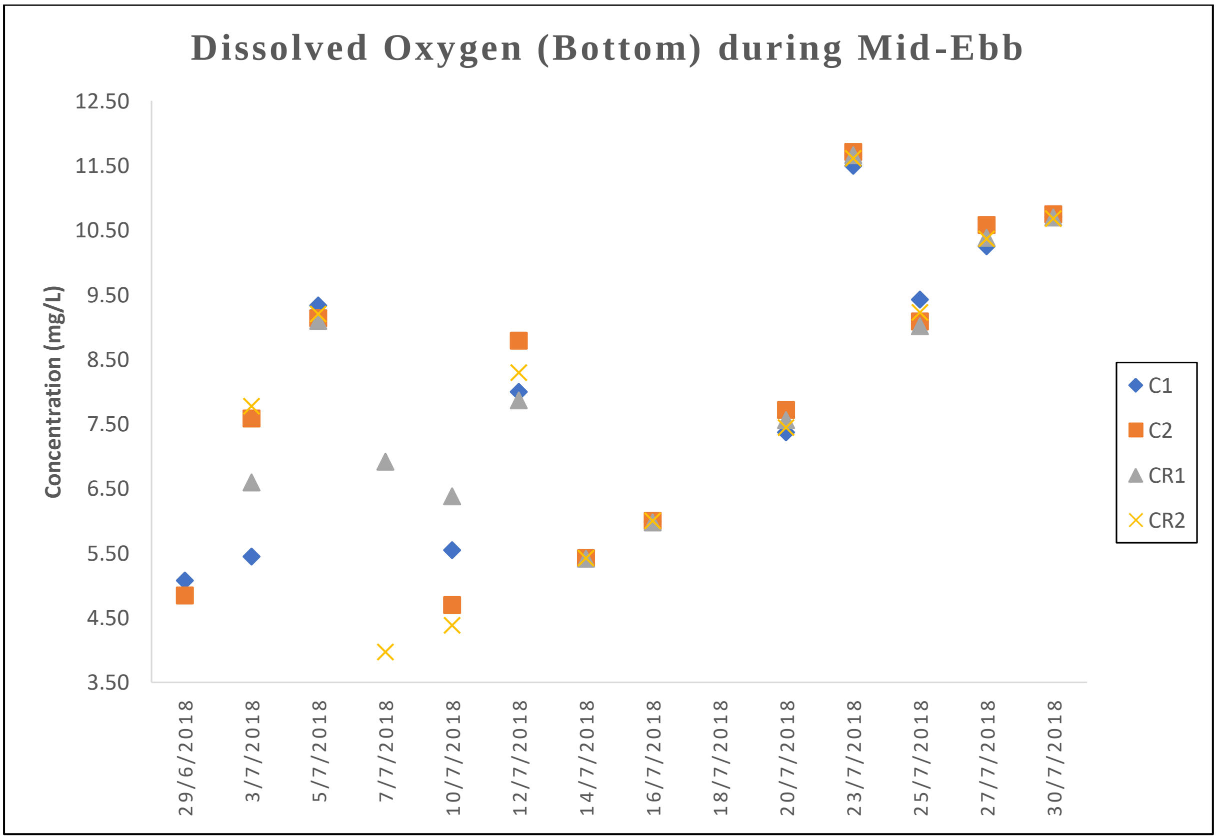
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



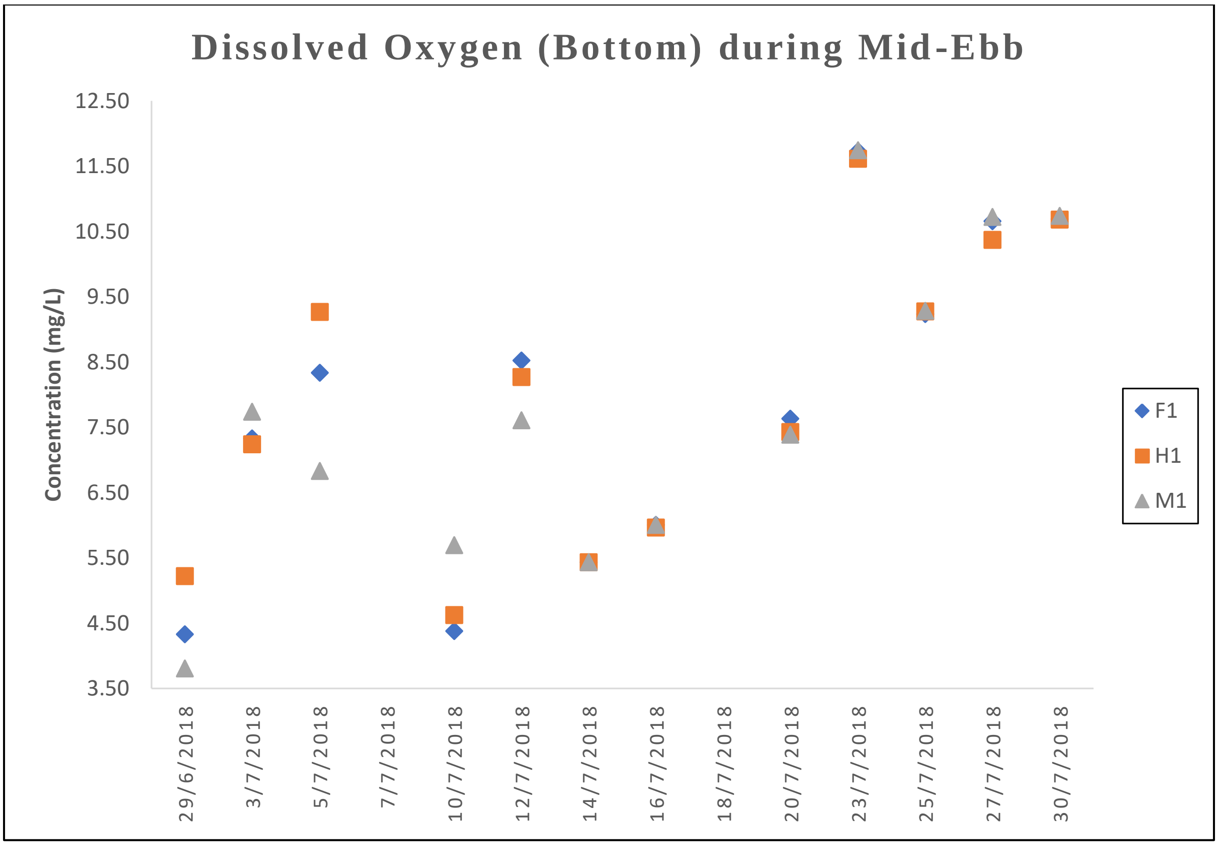


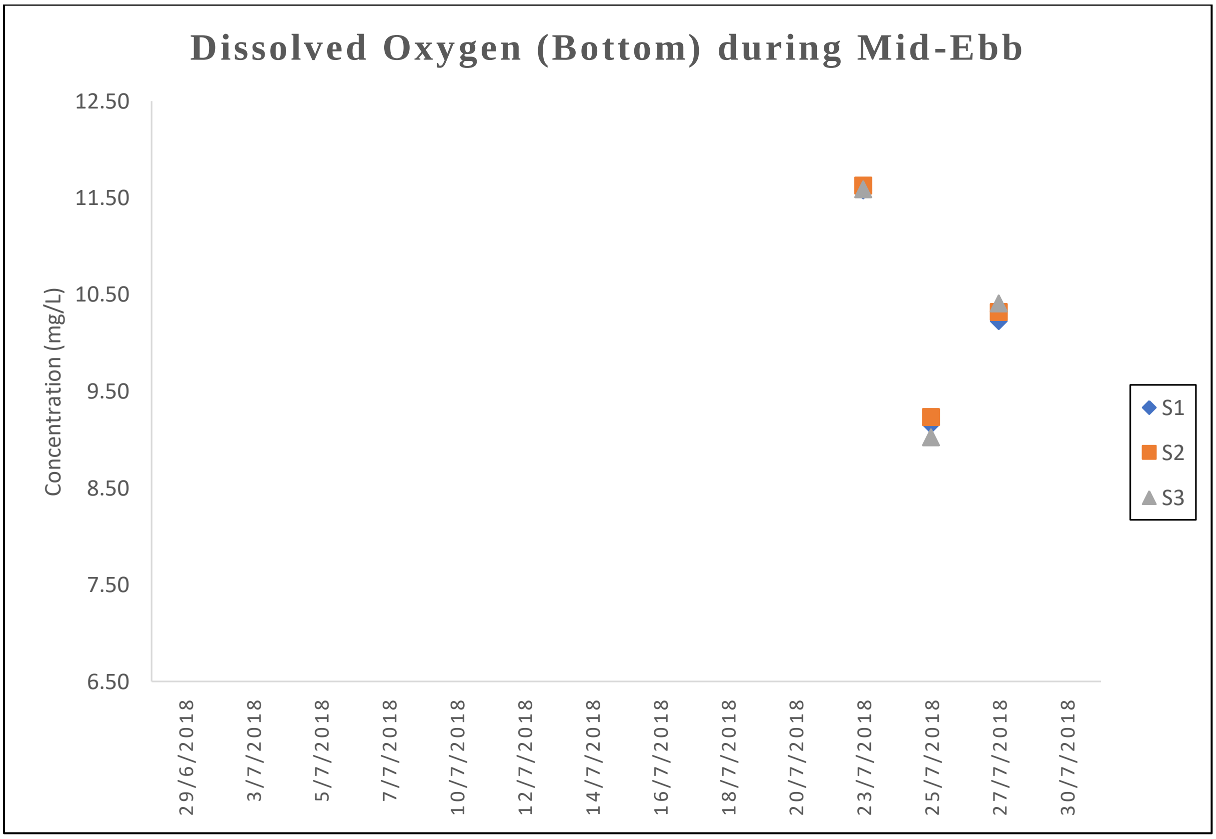
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



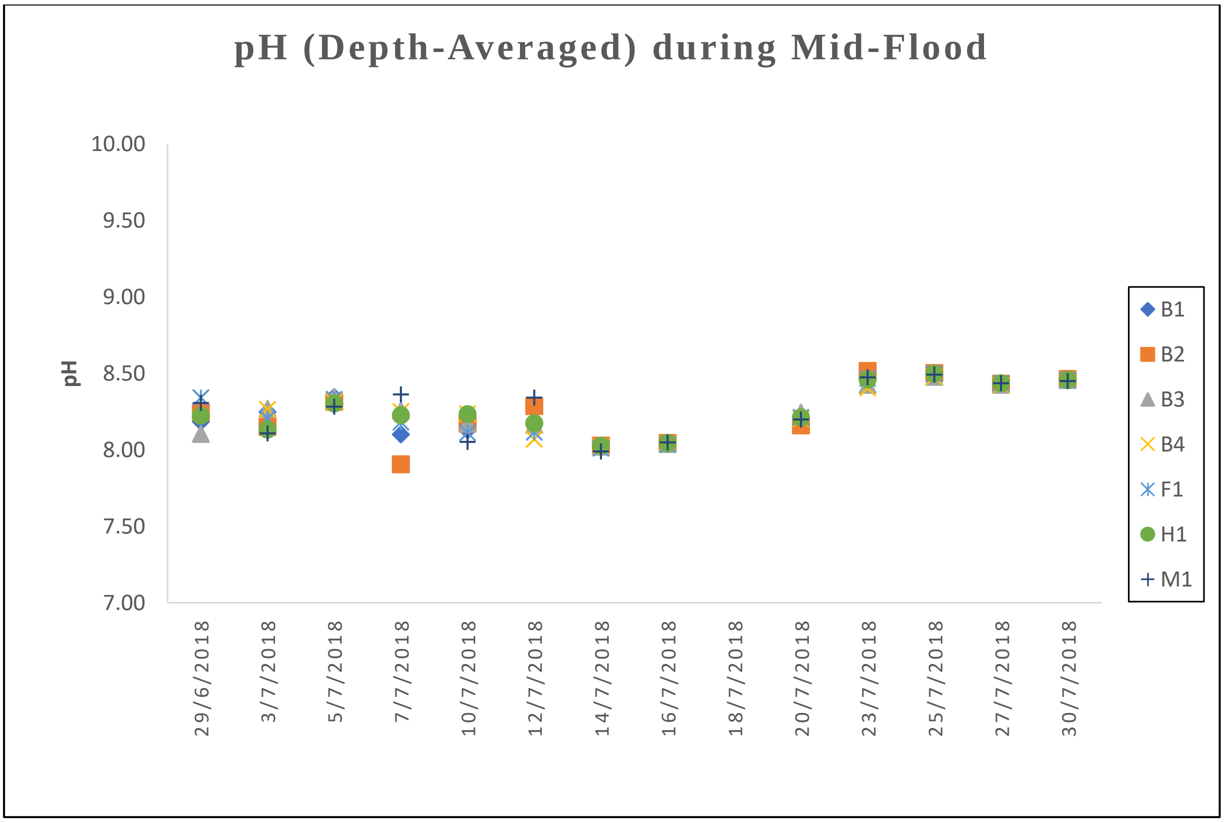


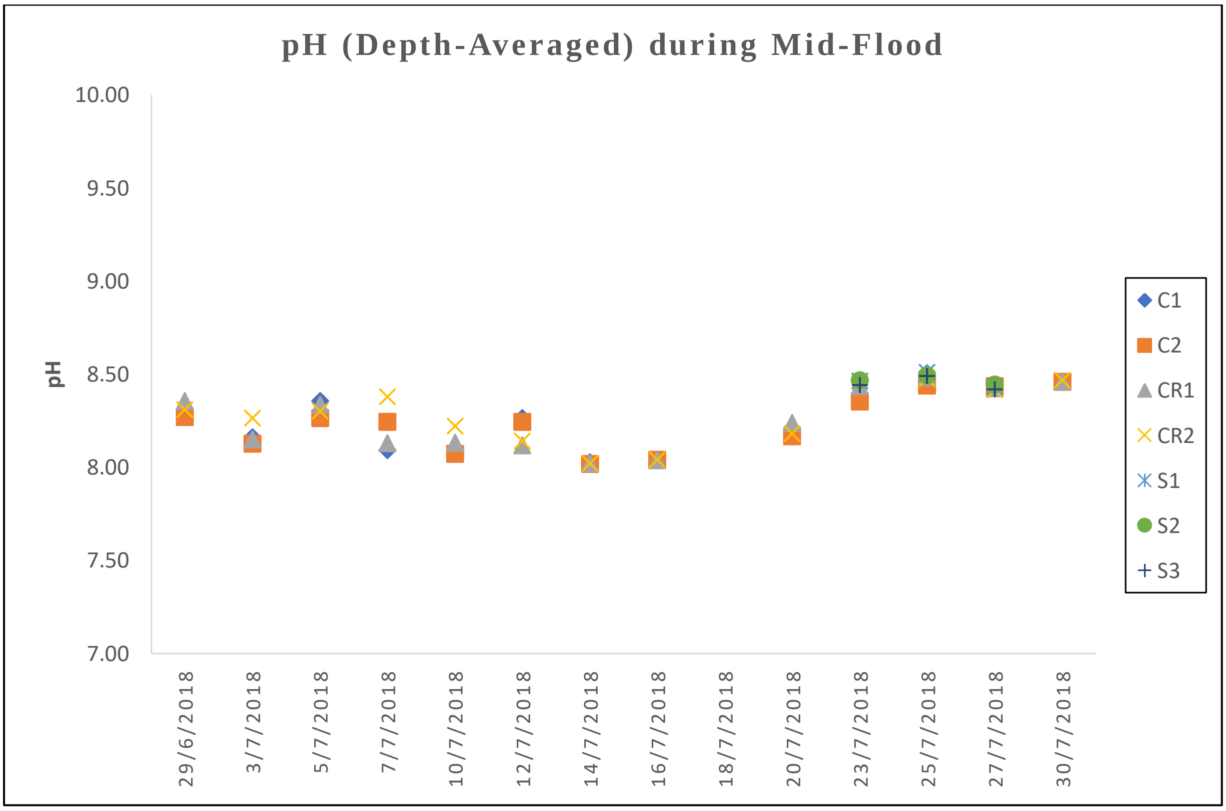
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



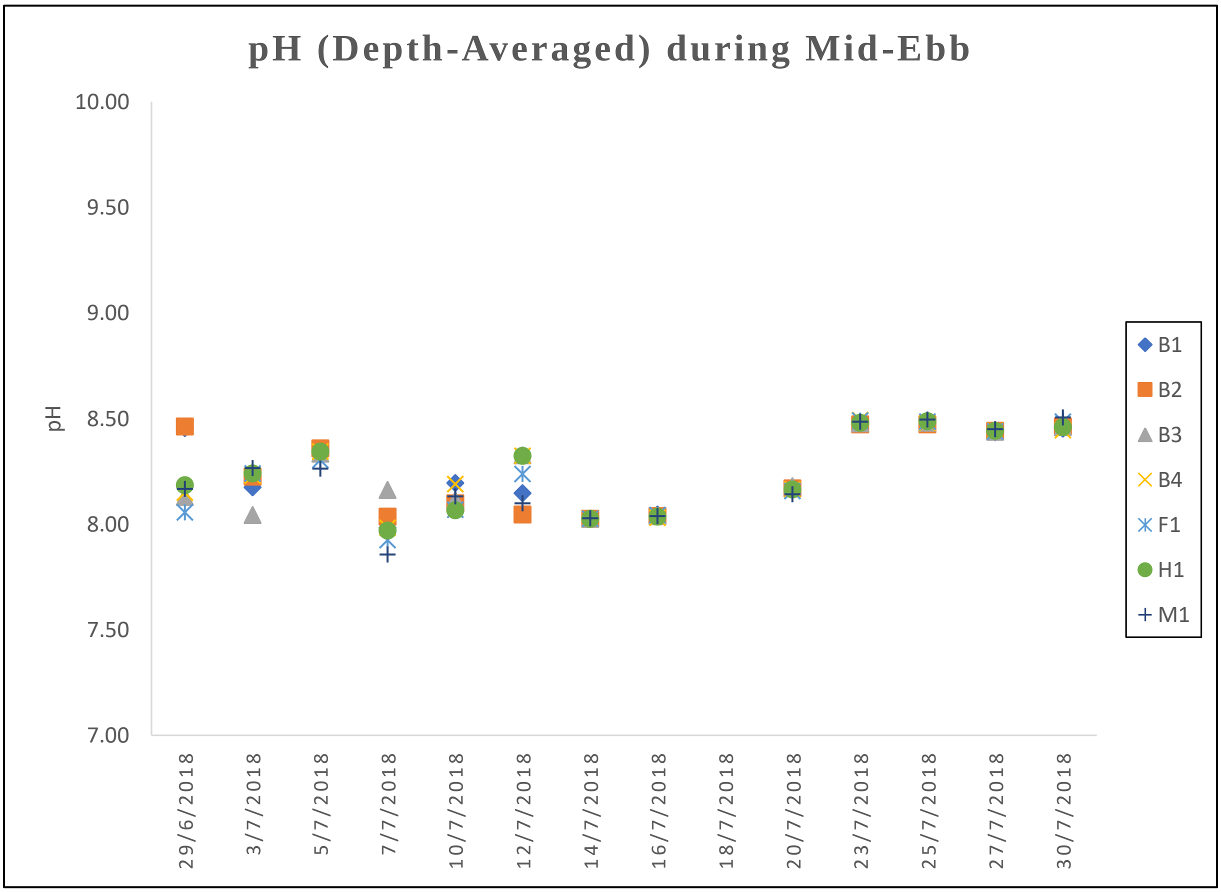


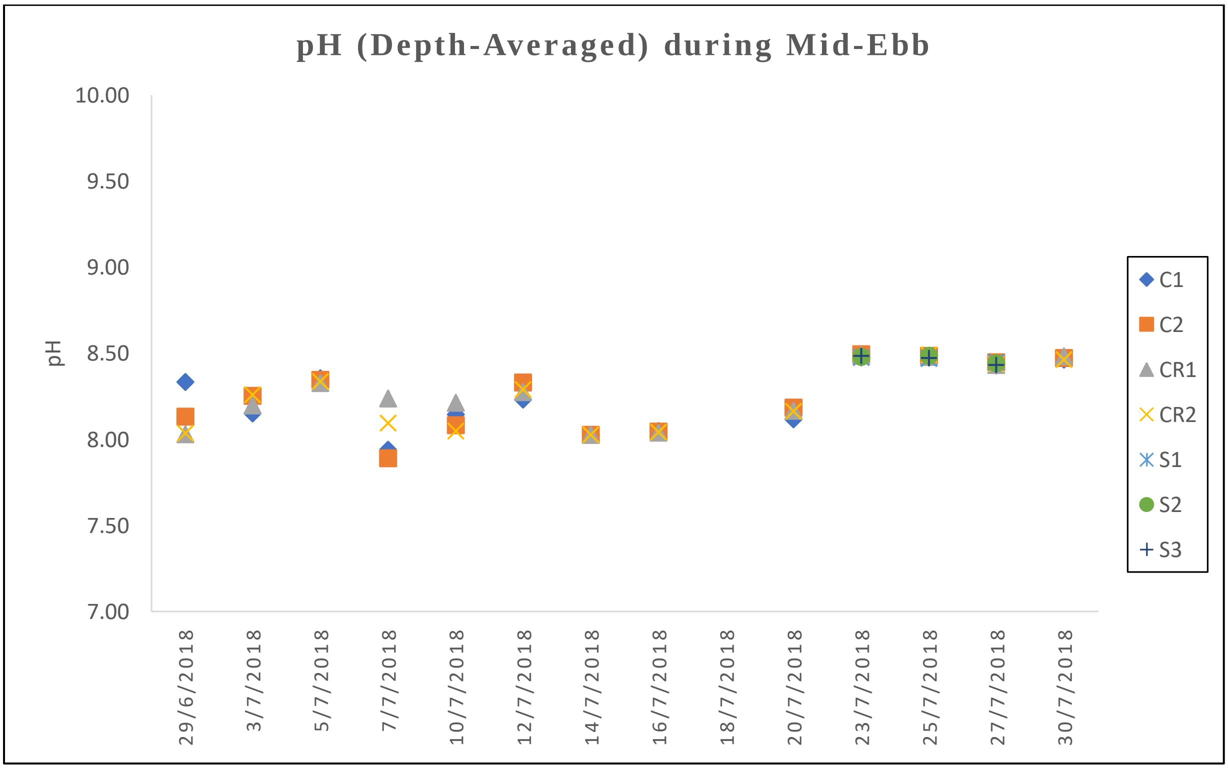
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



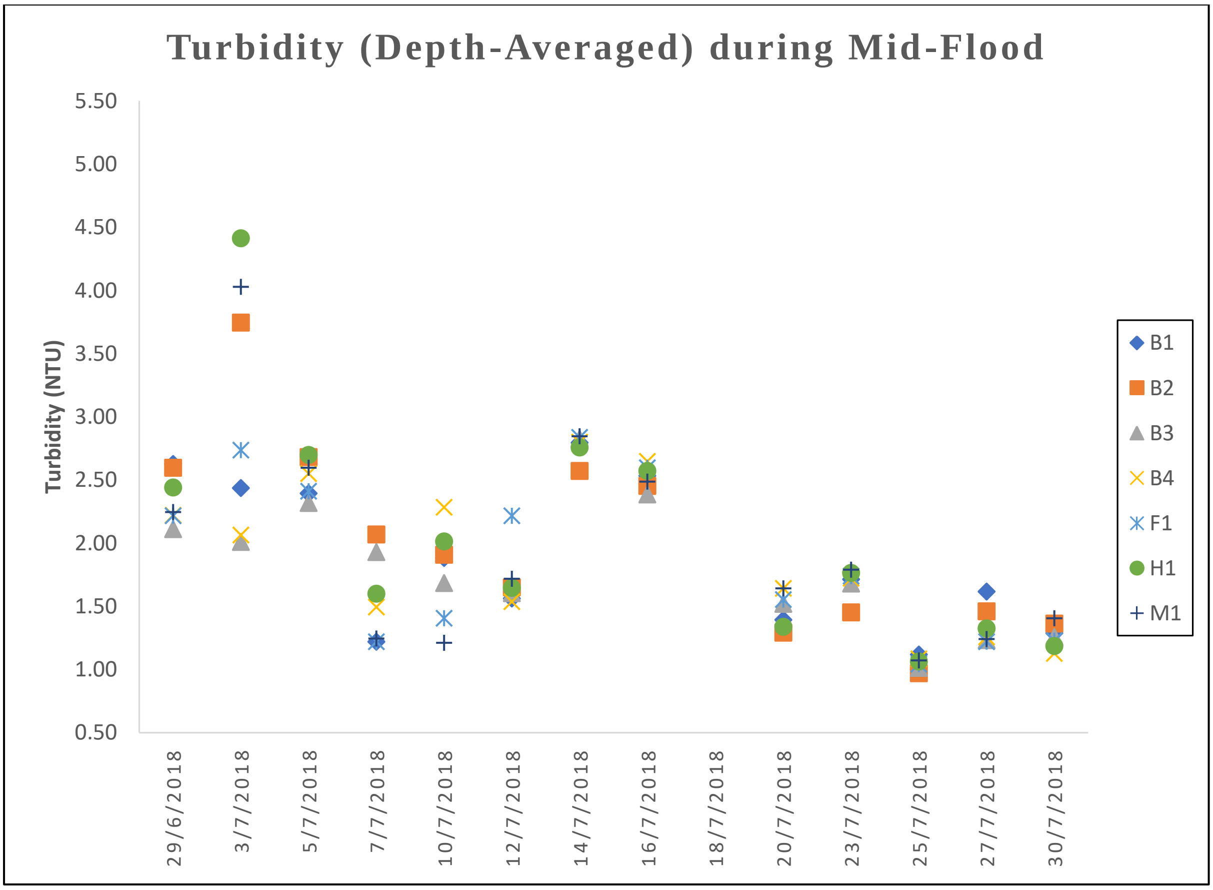


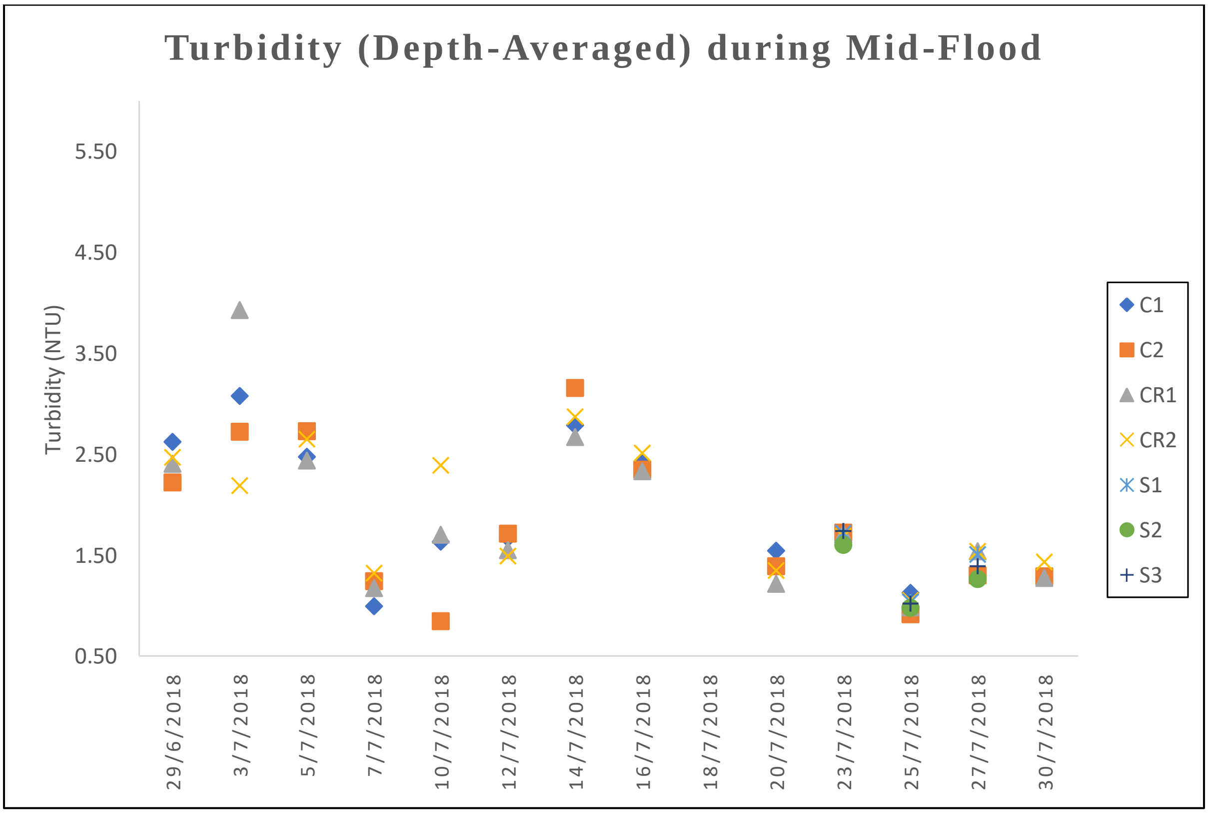
Note: The Action and Limit Level of pH can be referred to **Table 2.7** of the monthly EM & A report.



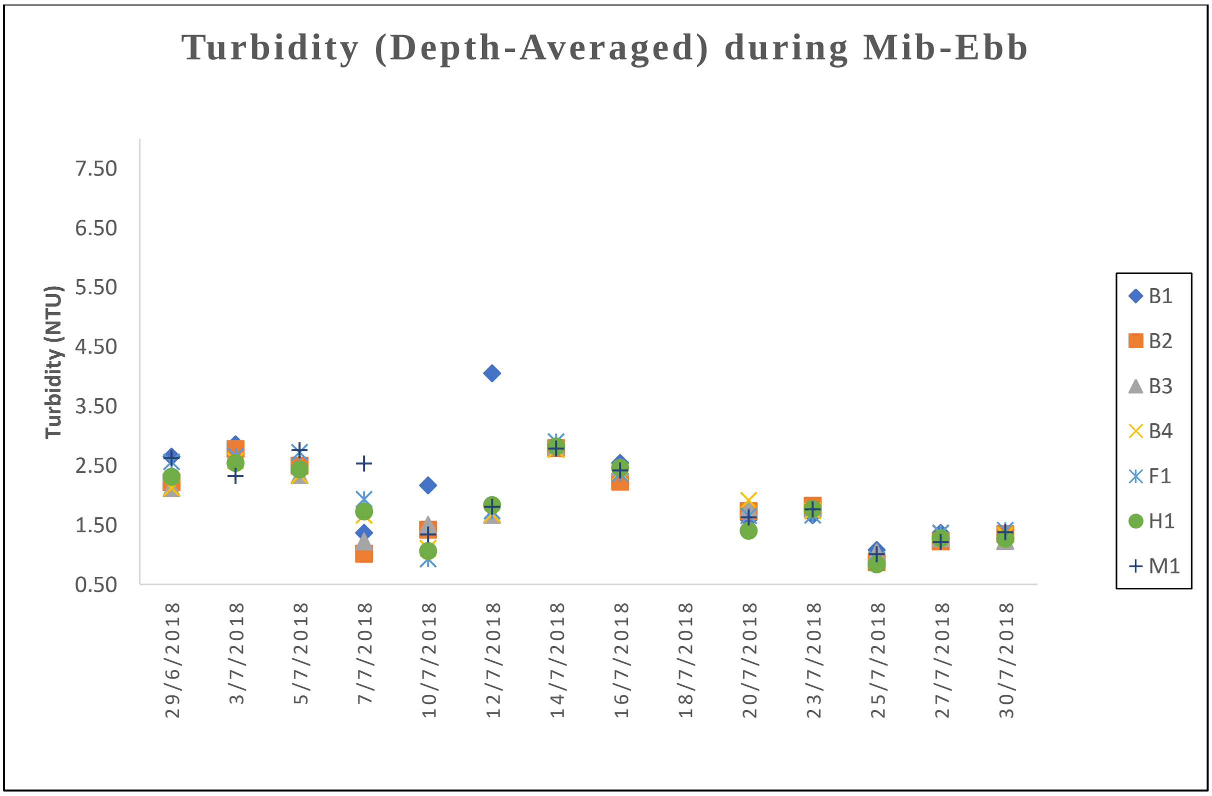


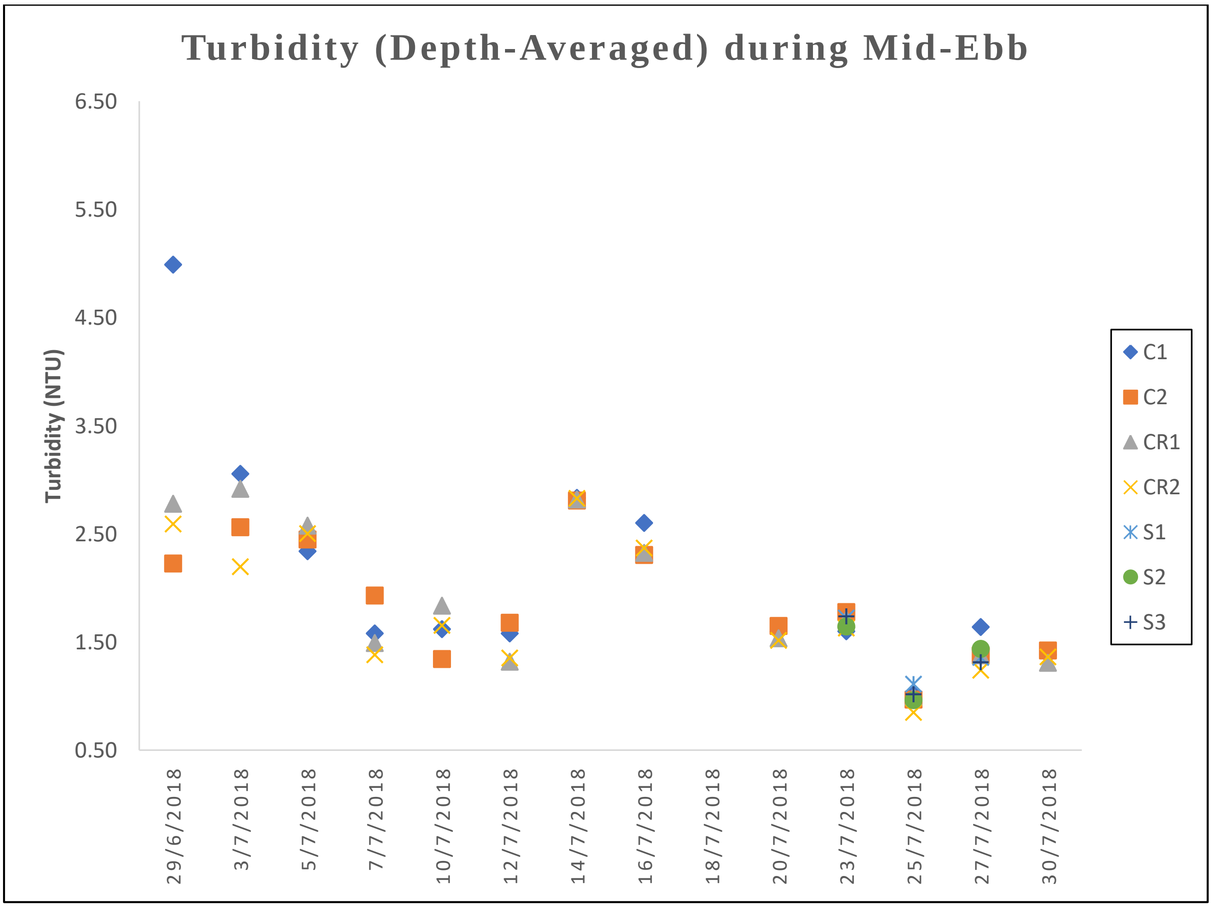
Note: The Action and Limit Level of pH can be referred to **Table 2.7** of the monthly EM & A report.



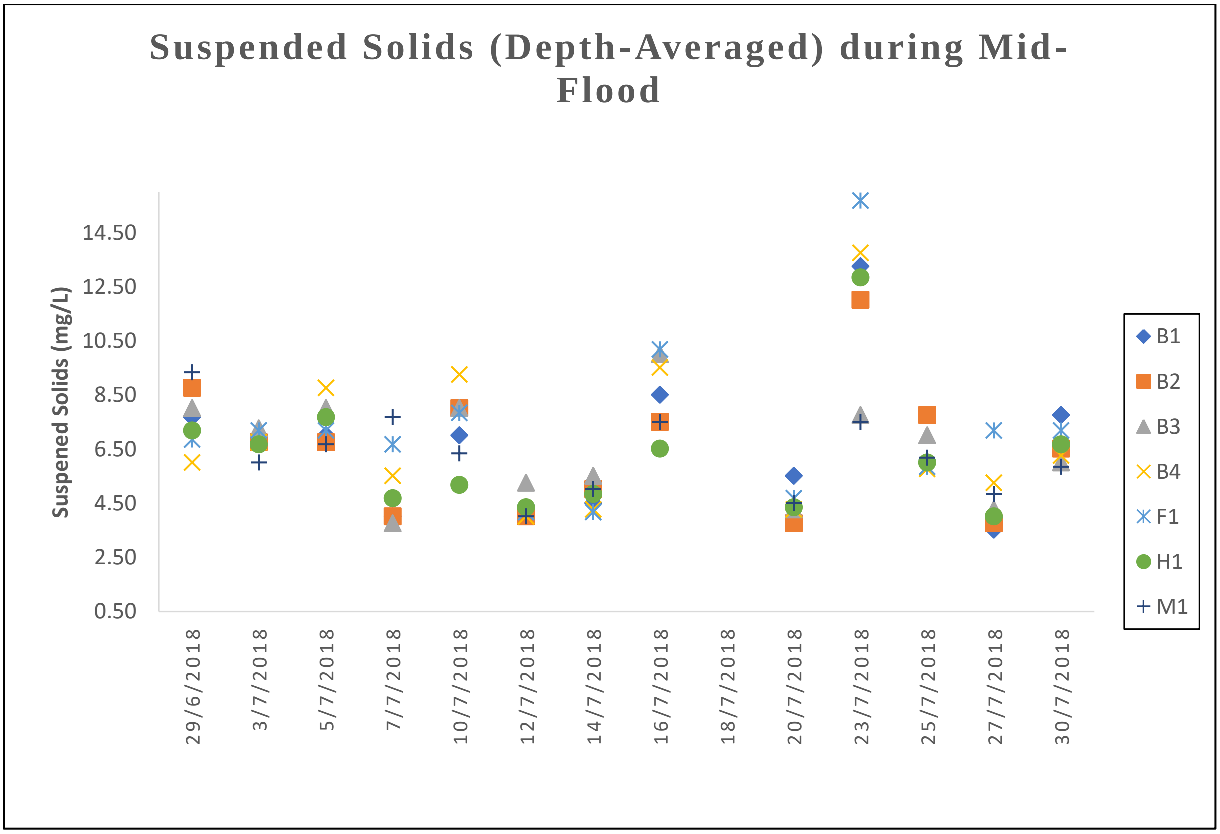


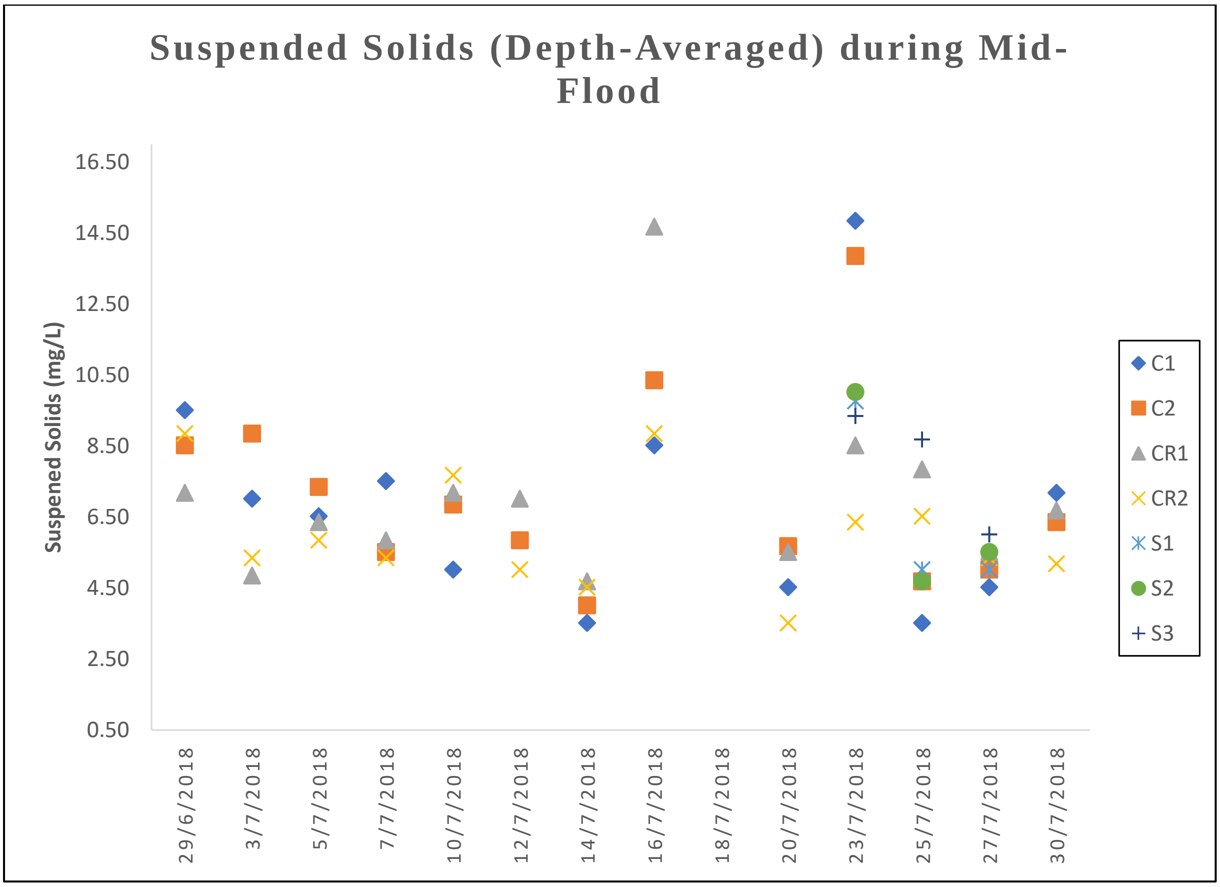
Note: The Action and Limit Level of turbidity can be referred to **Table 2.7** of the monthly EM & A report.



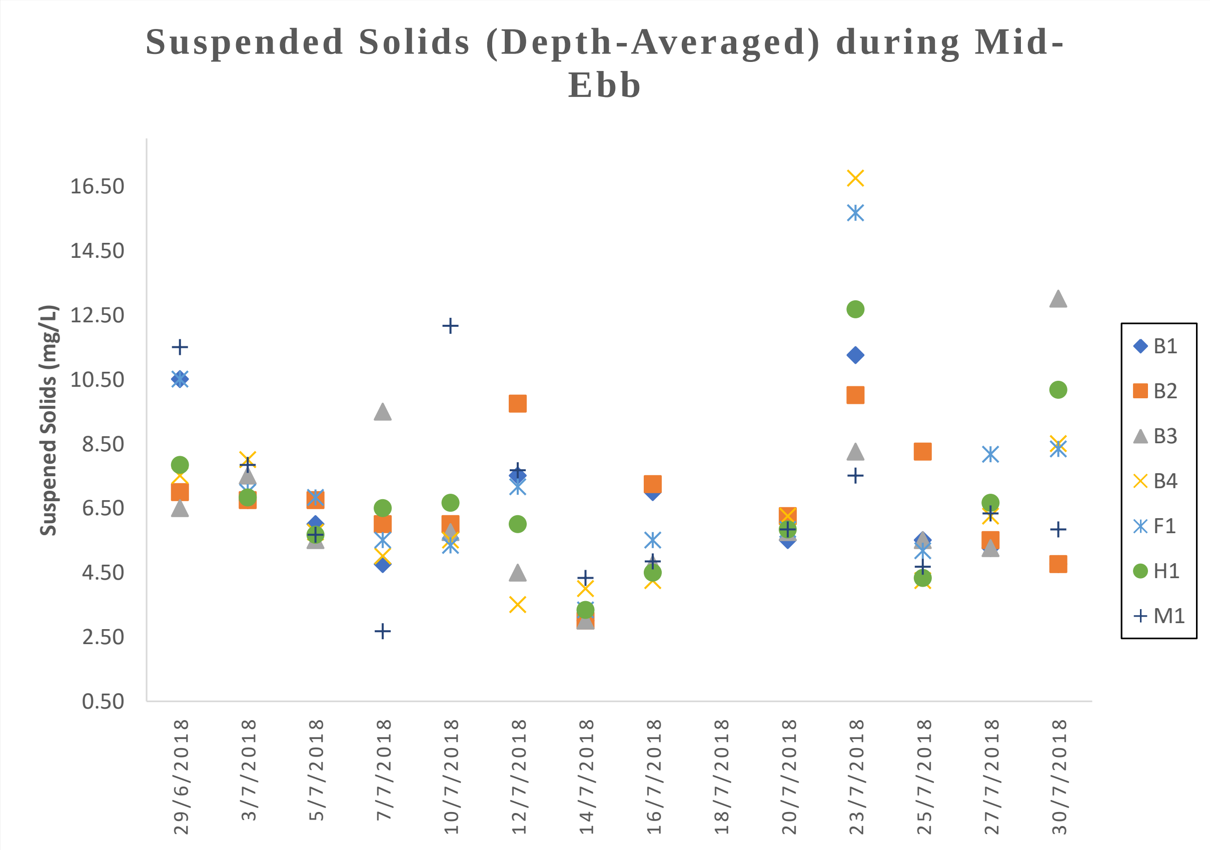


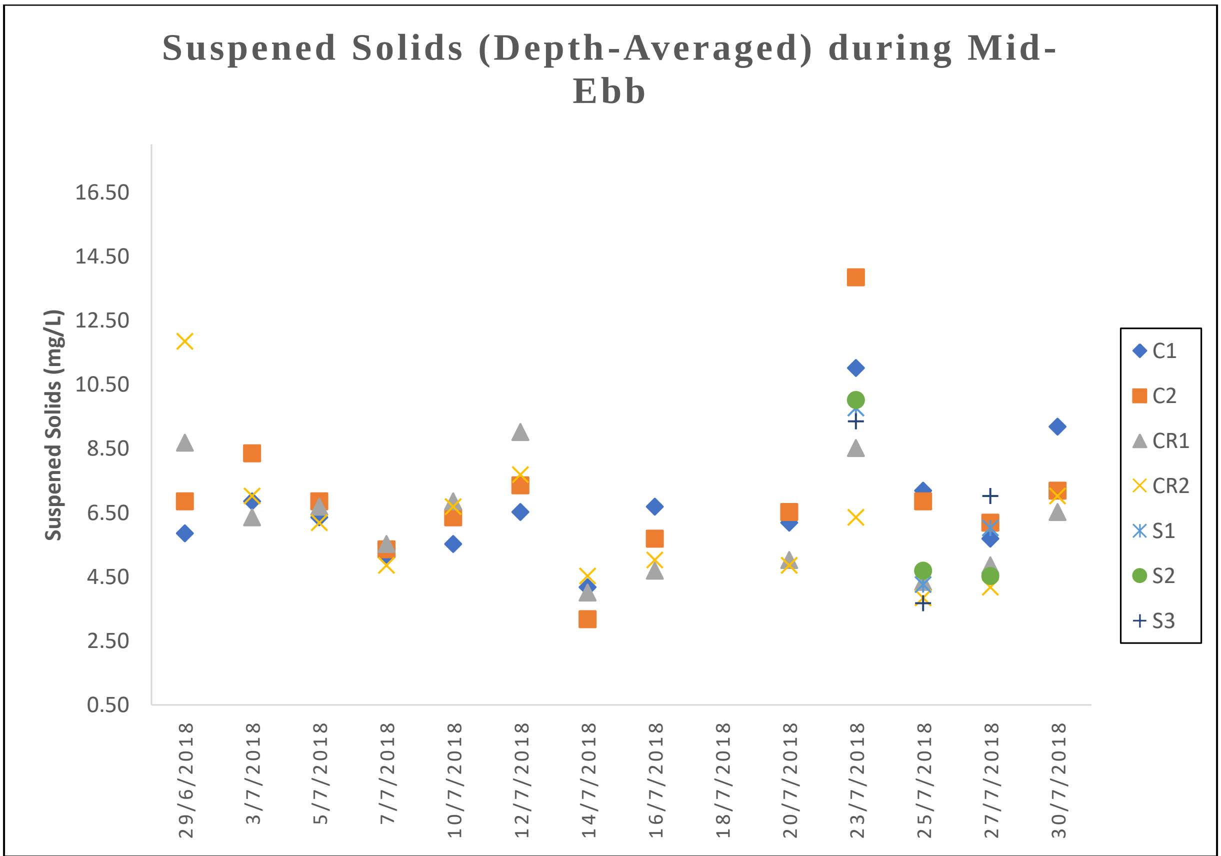
Note: The Action and Limit Level of turbidity can be referred to **Table 2.7** of the monthly EM & A report.



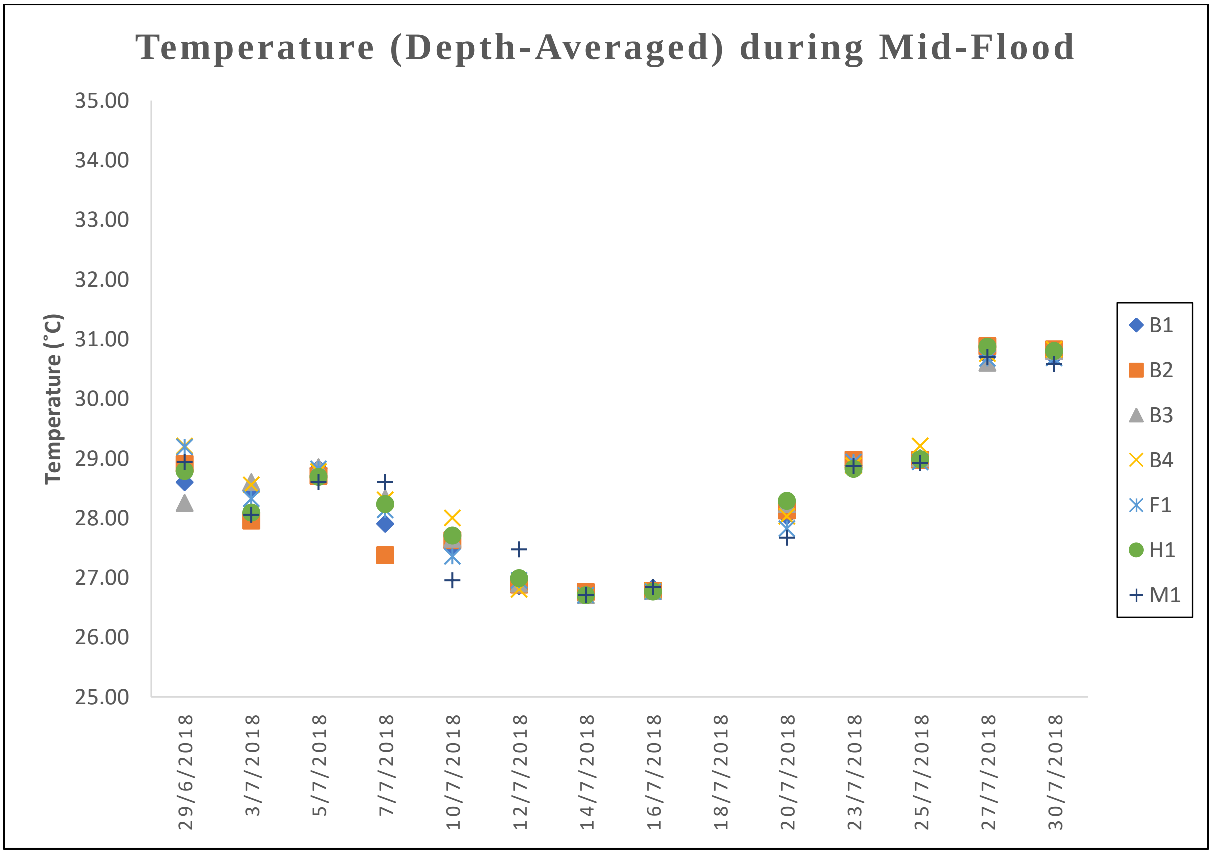


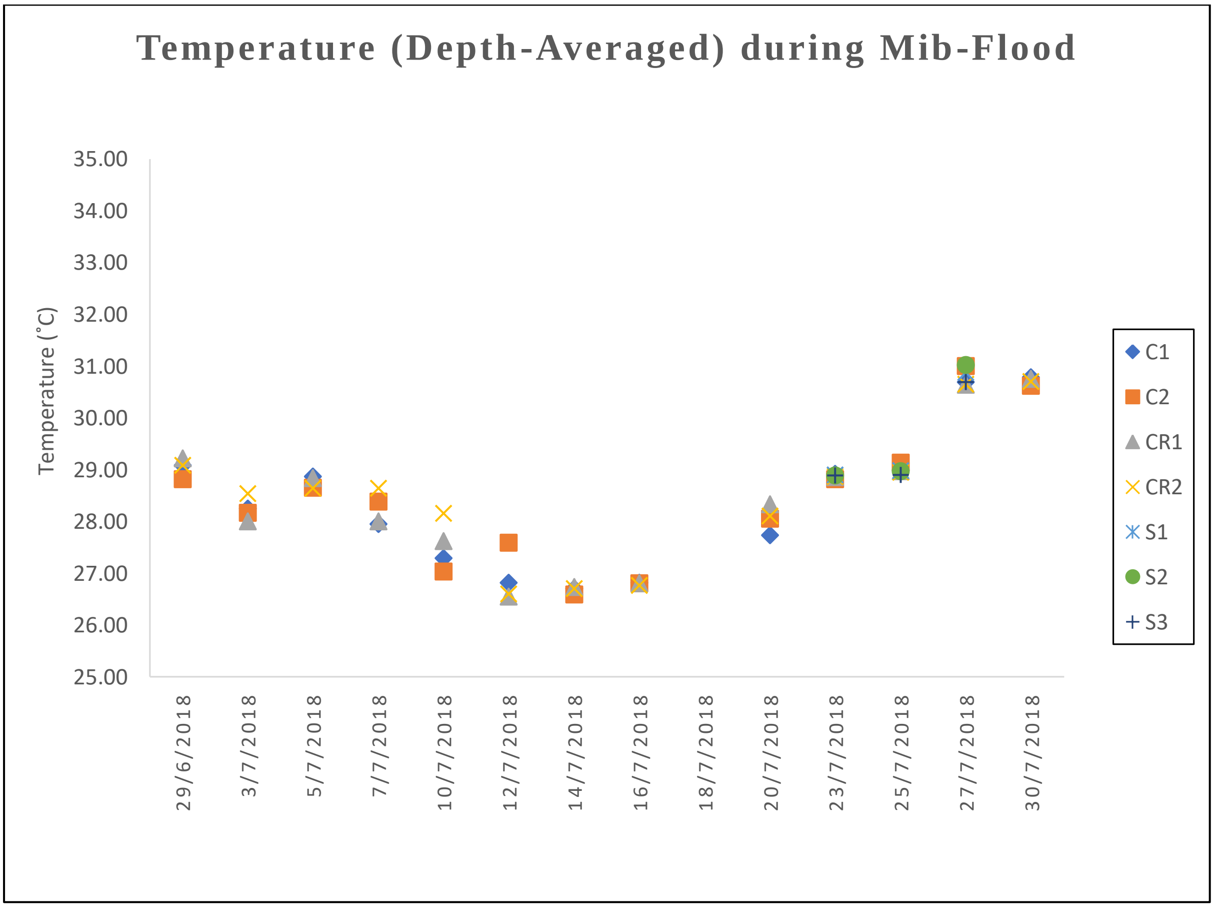
Note: The Action and Limit Level of suspened solids can be referred to **Table 2.7** of the monthly EM & A report.



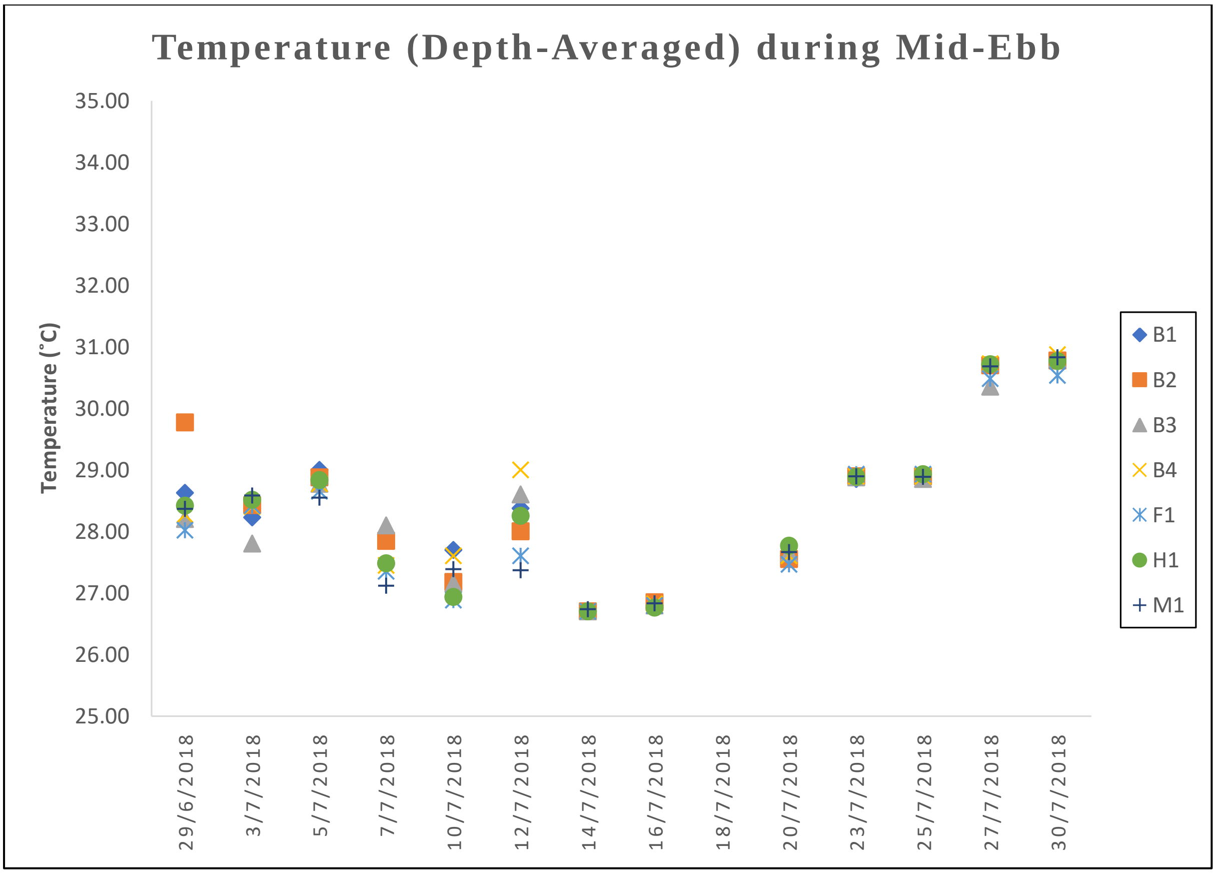


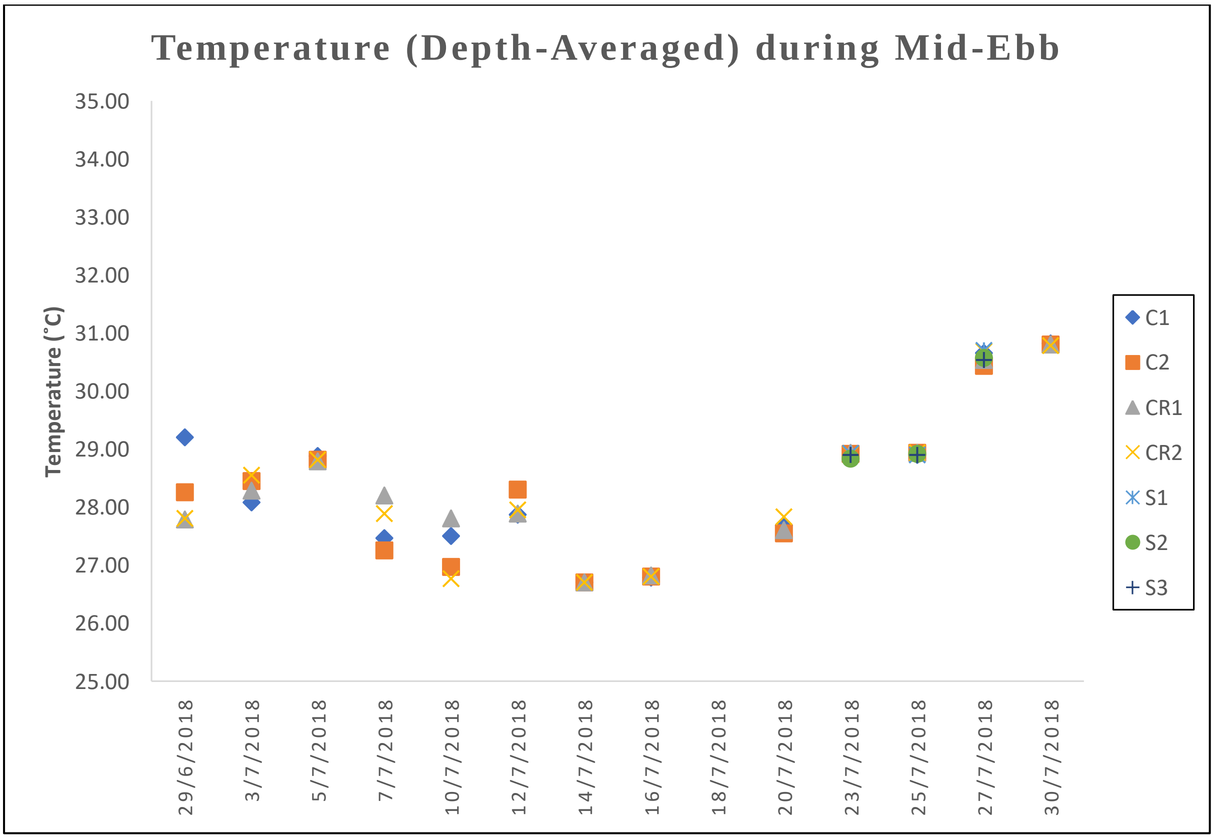
Note: The Action and Limit Level of suspened solids can be referred to **Table 2.7** of the monthly EM & A report.



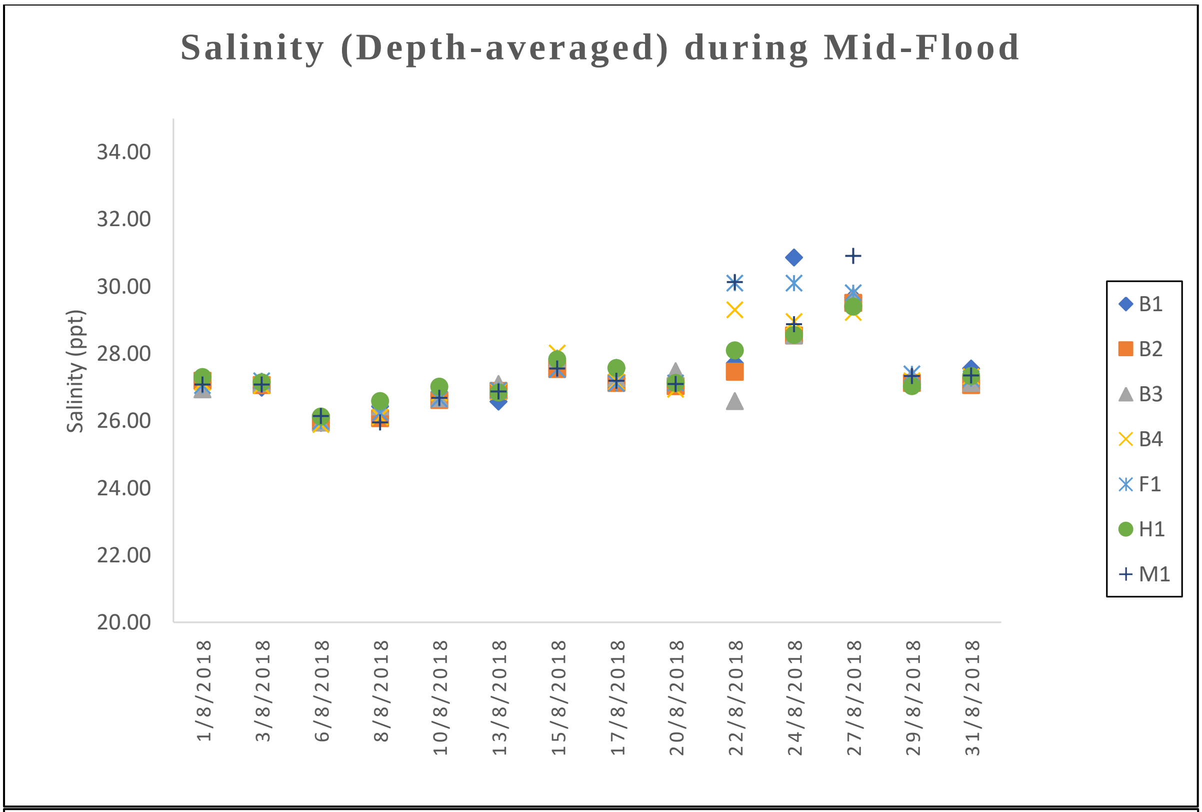


Note: The Action and Limit Level of temperature can be referred to **Table 2.7** of the monthly EM & A report.





Note: The Action and Limit Level of temperature can be referred to **Table 2.7** of the monthly EM & A report.



Salinity (Depth-averaged) during Mid-Flood
Salinity (ppt)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
1/8/2018
3/8/2018
6/8/2018
8/8/2018
10/8/2018
13/8/2018
15/8/2018
17/8/2018
20/8/2018
22/8/2018
24/8/2018
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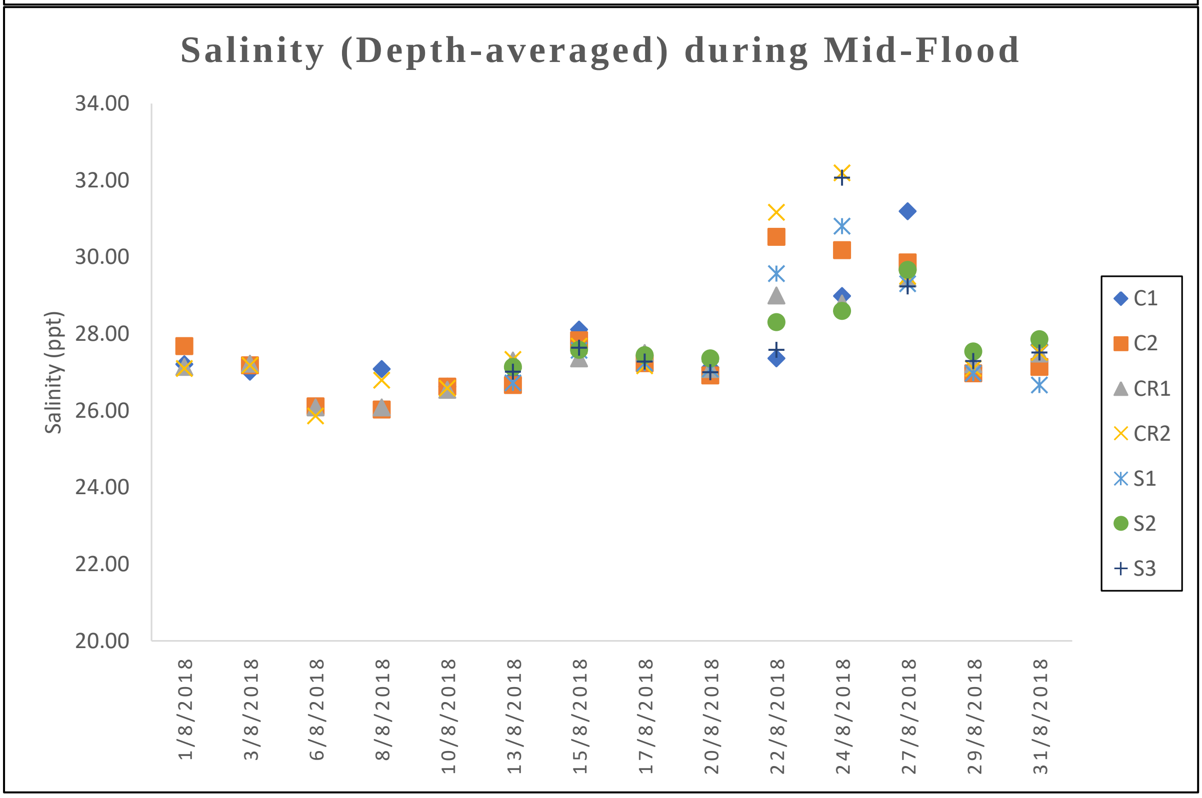
29/8/2018
31/8/2018
B1
B2
B3
B4
F1
H1
M1



Salinity (Depth-averaged) during Mid-Flood
Salinity (ppt)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
1/8/2018
3/8/2018
6/8/2018
8/8/2018
10/8/2018
13/8/2018
15/8/2018
17/8/2018
20/8/2018
22/8/2018
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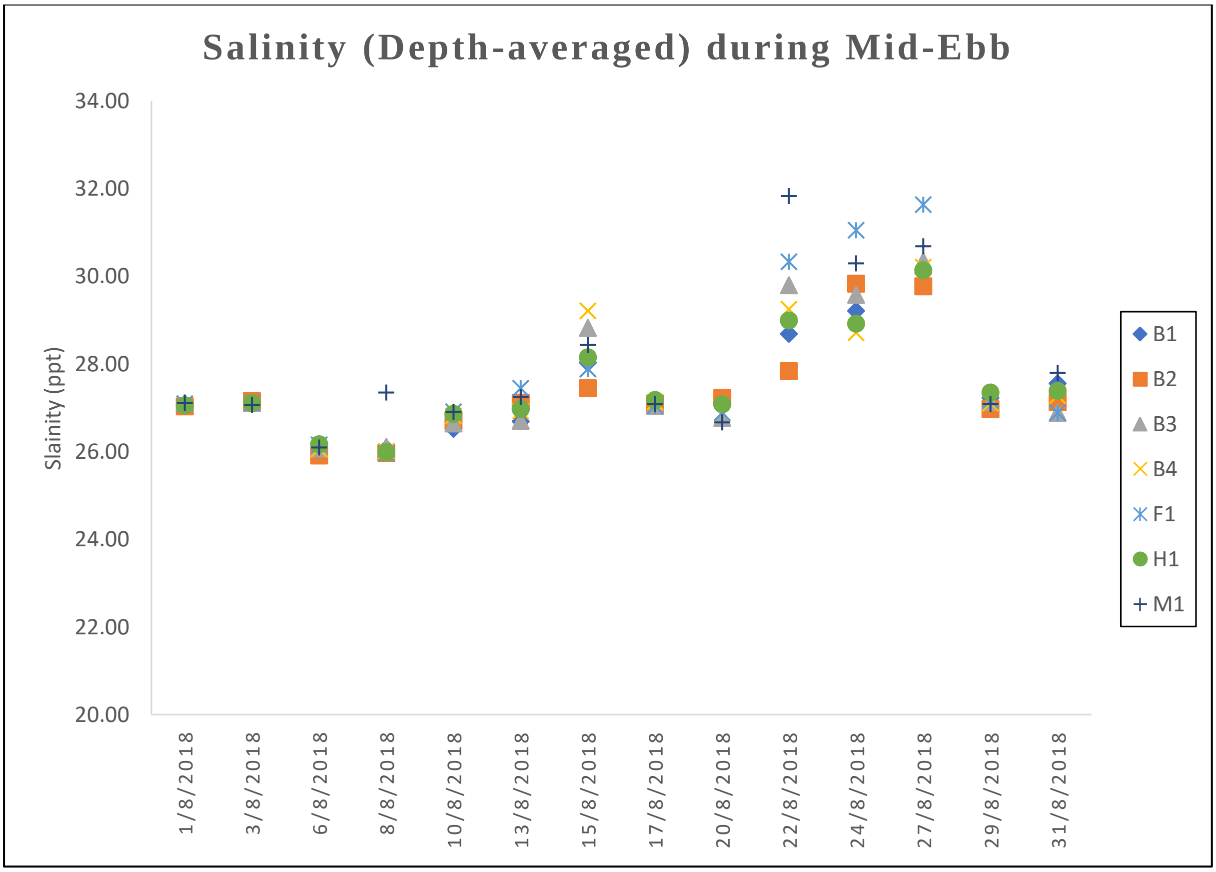
C1
C2
CR1
CR2
S1
S2
S3


Salinity (Depth-averaged) during Mid-Ebb
Slainity (ppt)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
1/8/2018
3/8/2018
6/8/2018
8/8/2018
10/8/2018
13/8/2018
15/8/2018
17/8/2018
20/8/2018
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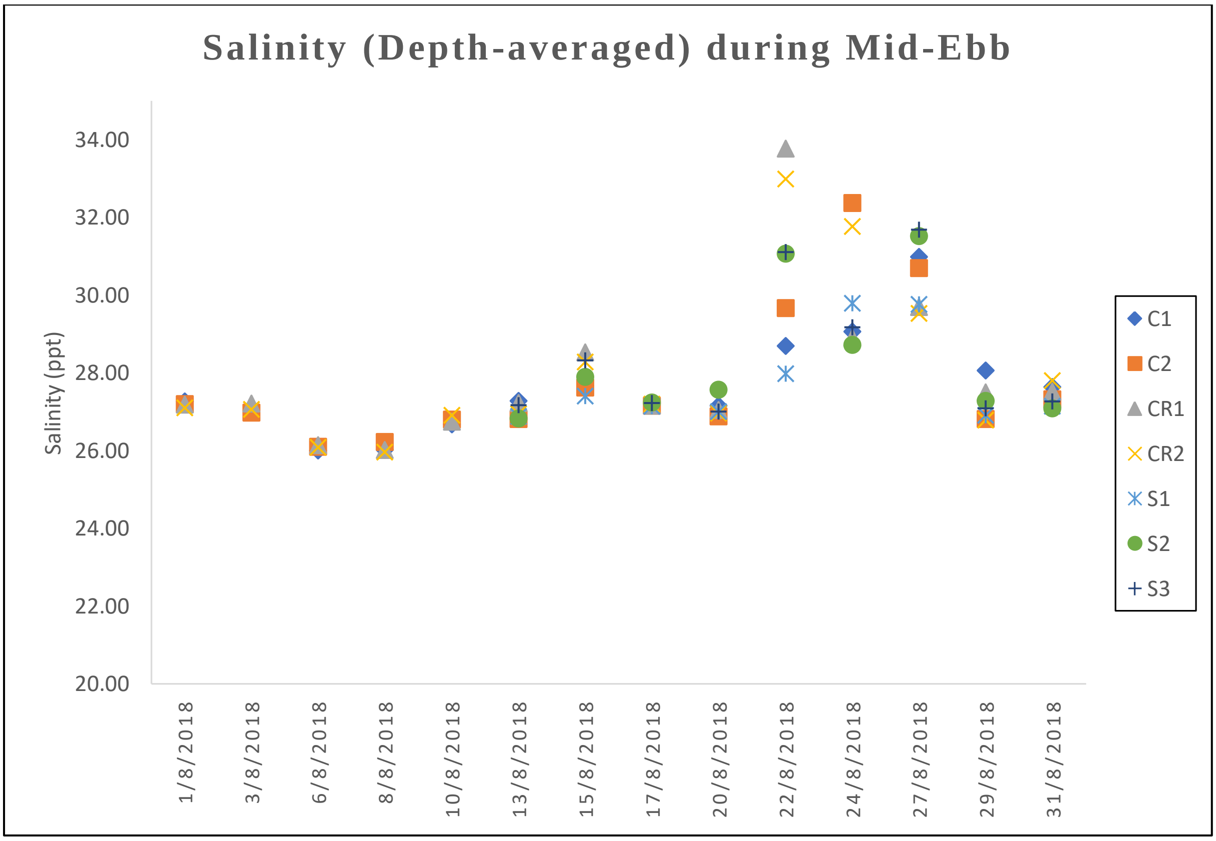
B4
F1
H1
M1


Salinity (Depth-averaged) during Mid-Ebb
Salinity (ppt)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
1/8/2018
3/8/2018
6/8/2018
8/8/2018
10/8/2018
13/8/2018
15/8/2018
17/8/2018
20/8/2018
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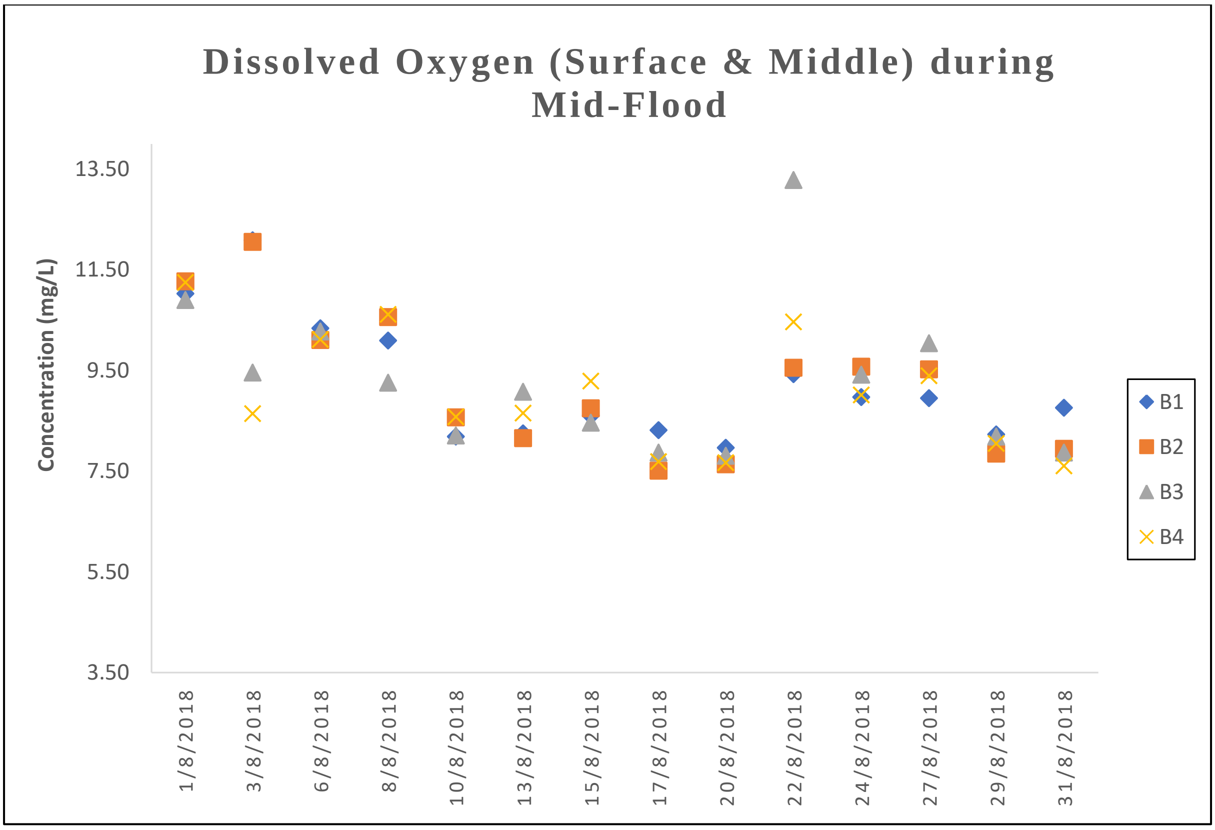
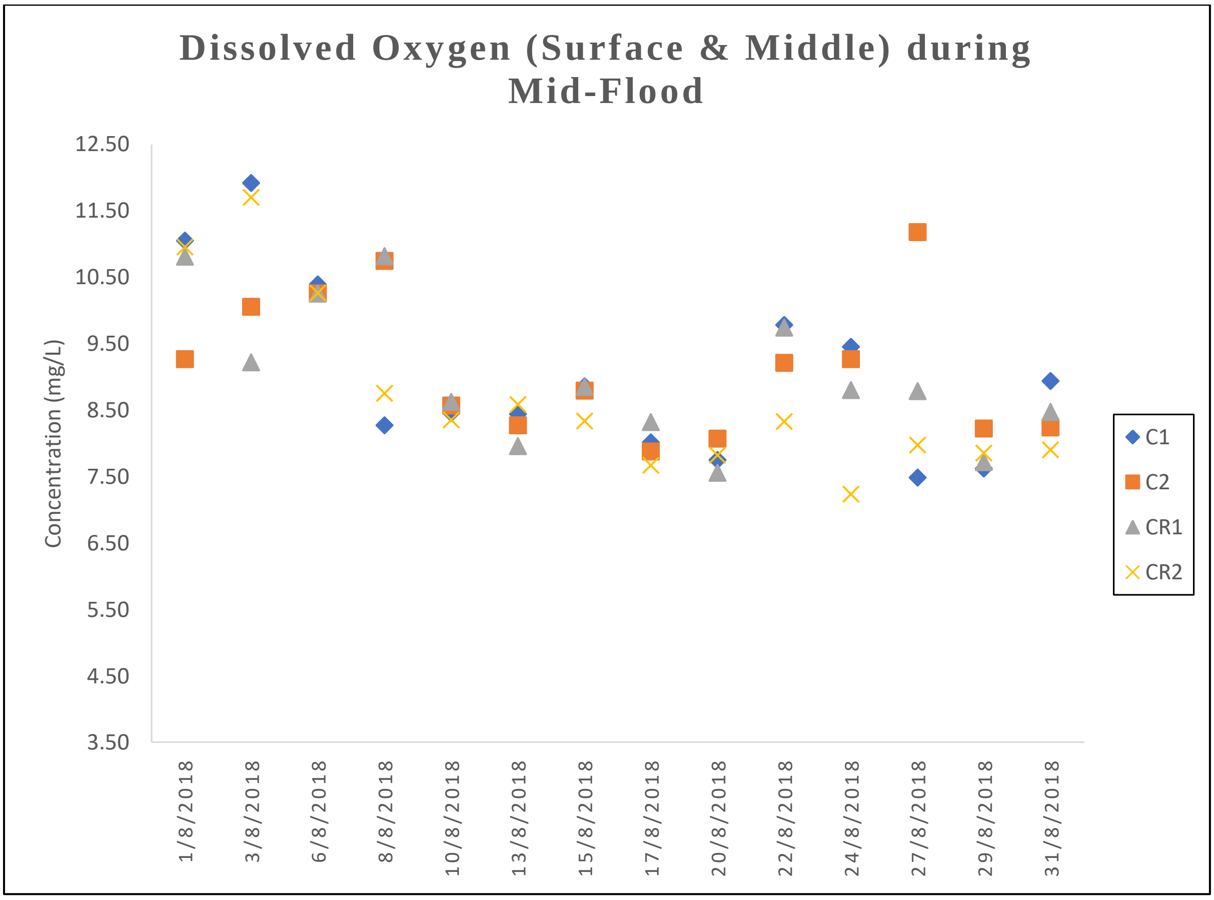
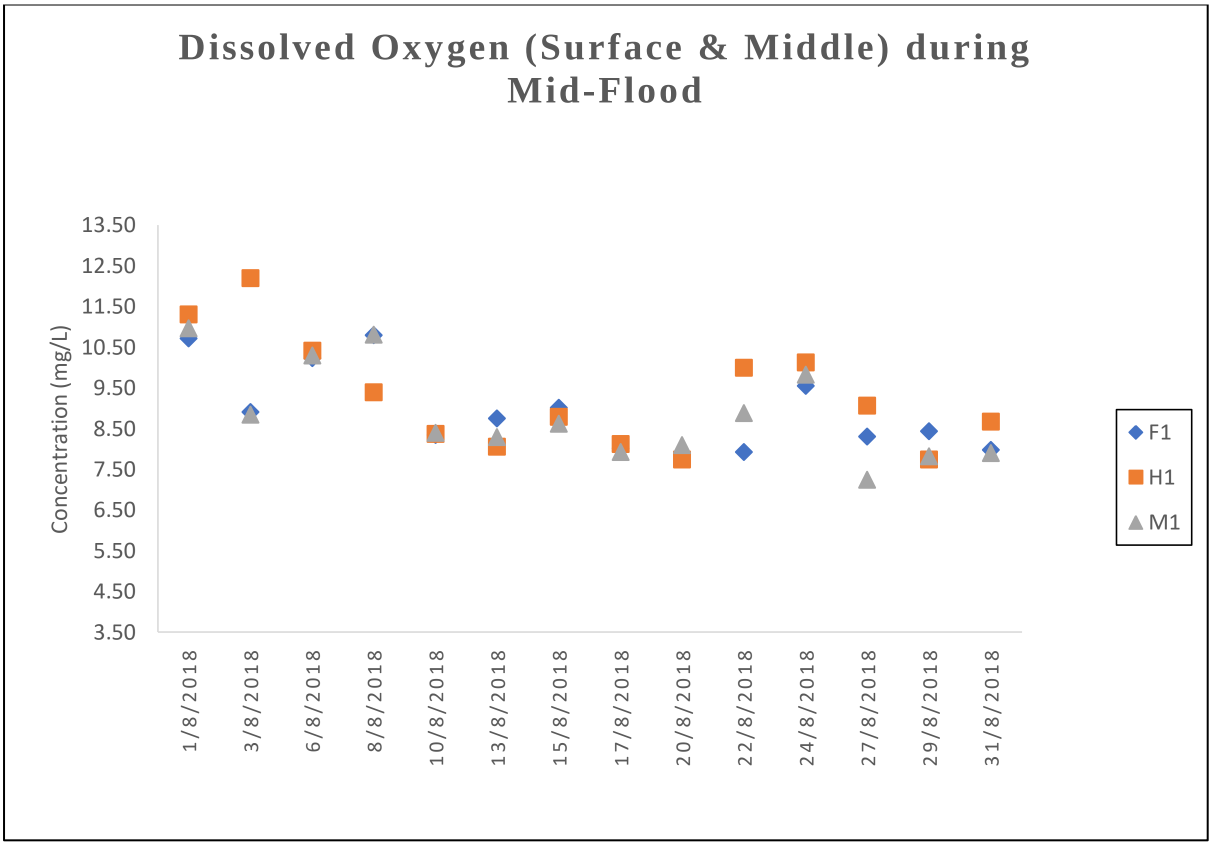
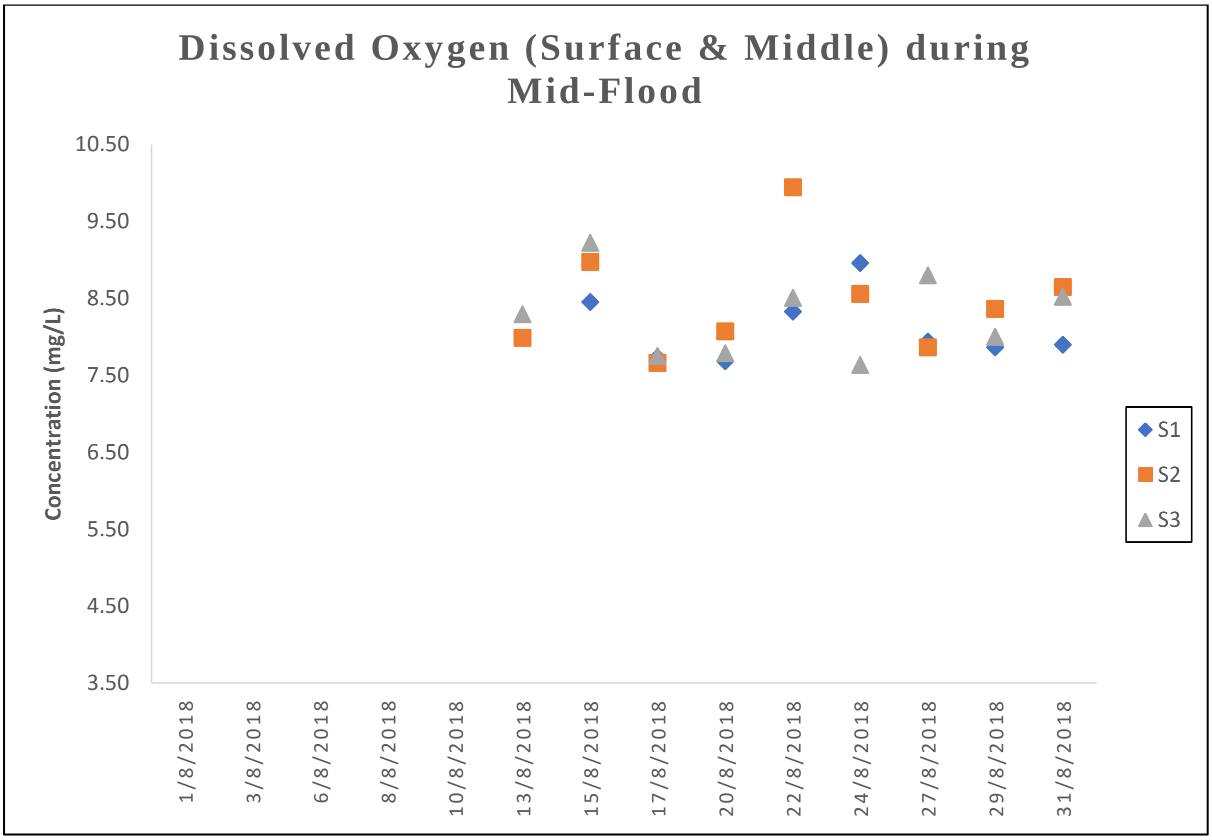
C2
CR1
CR2
S1
S2
S3



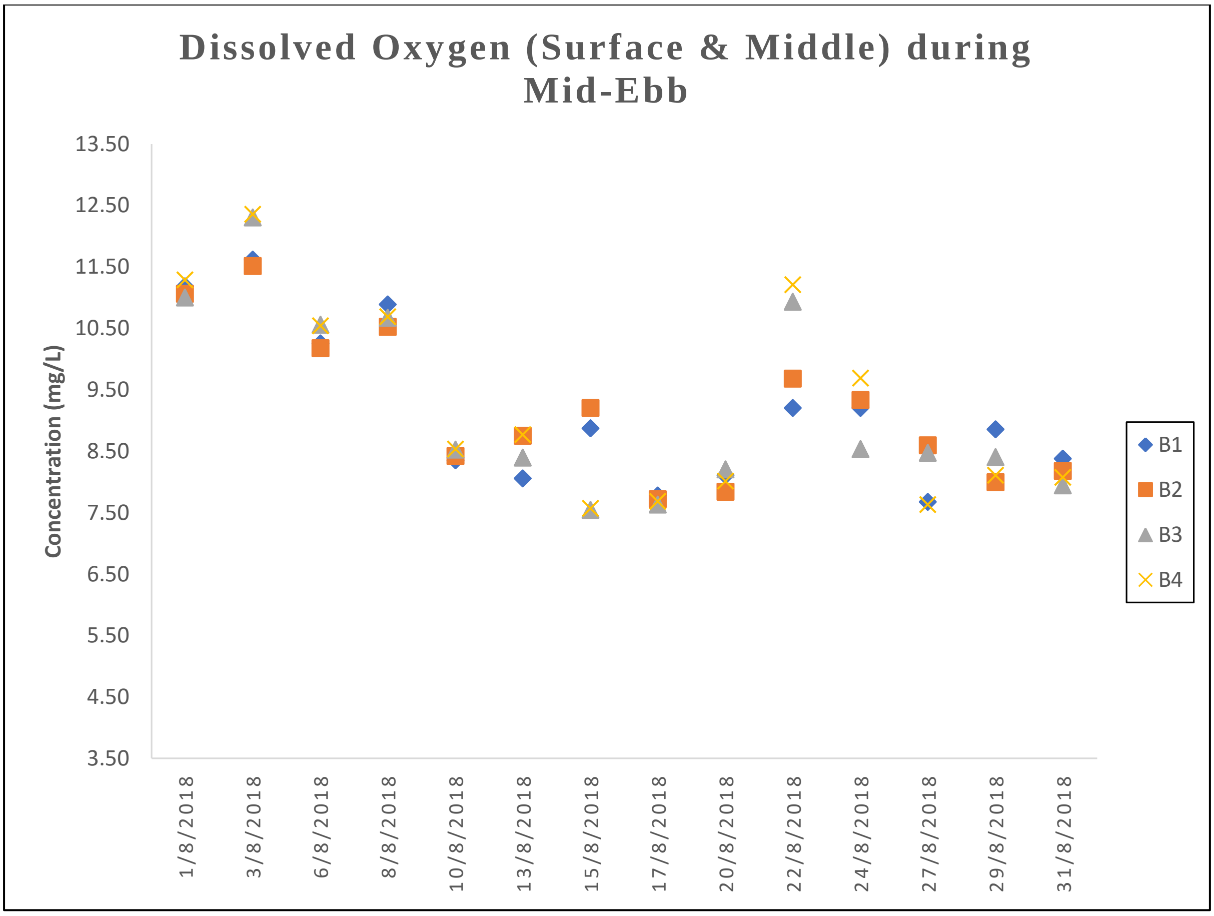


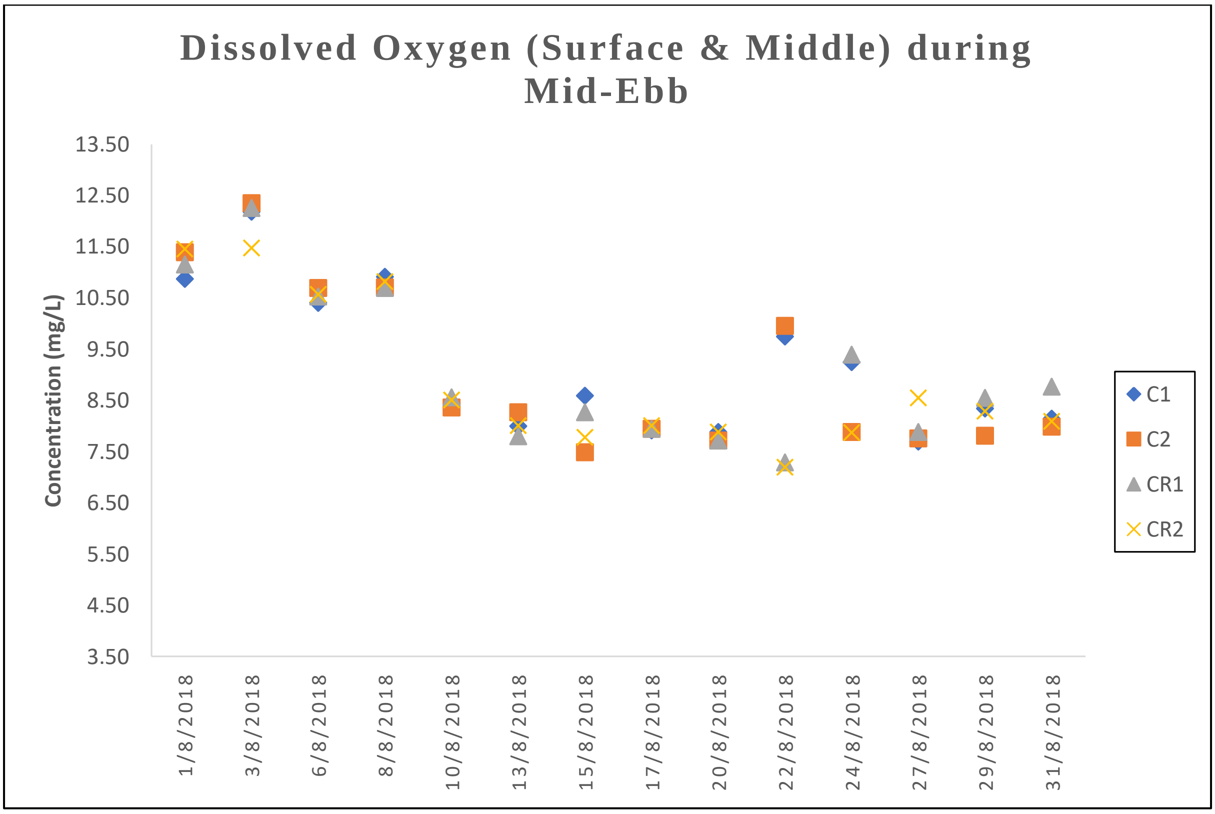
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



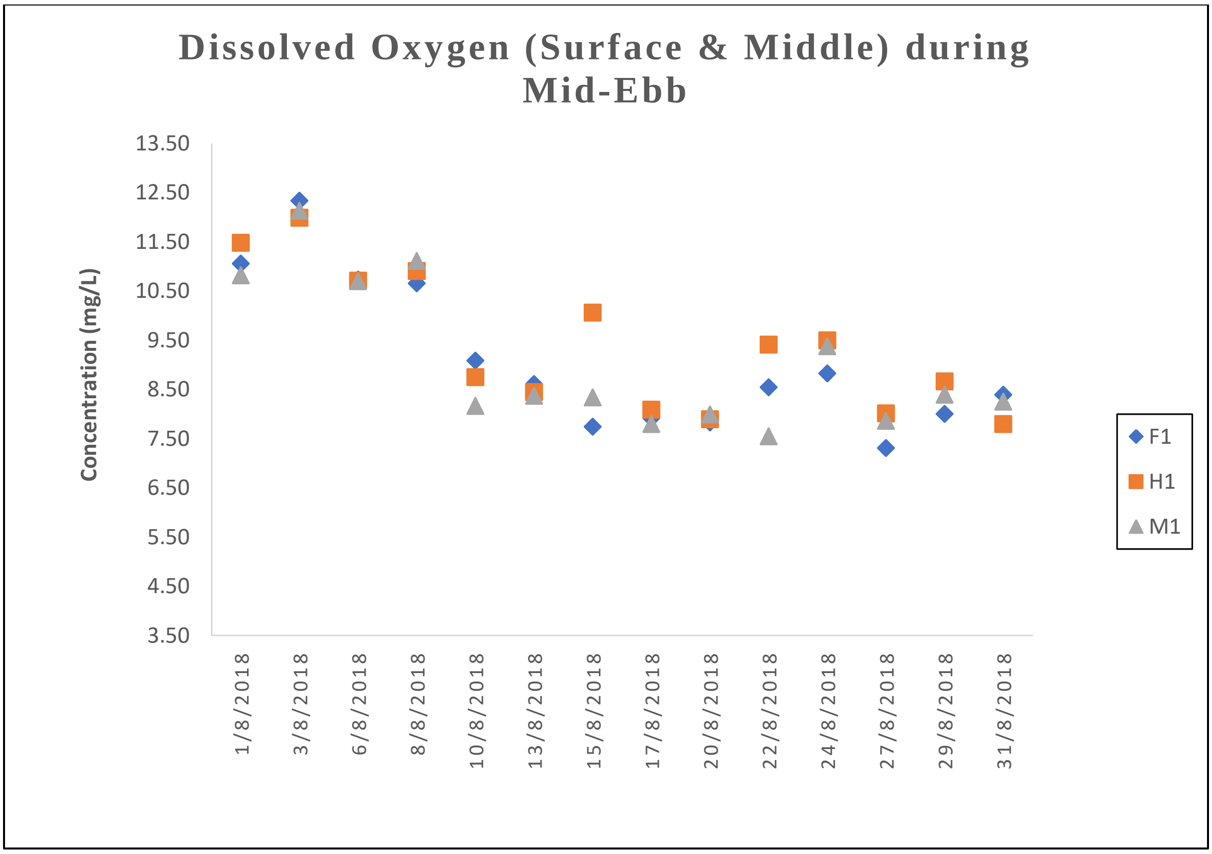


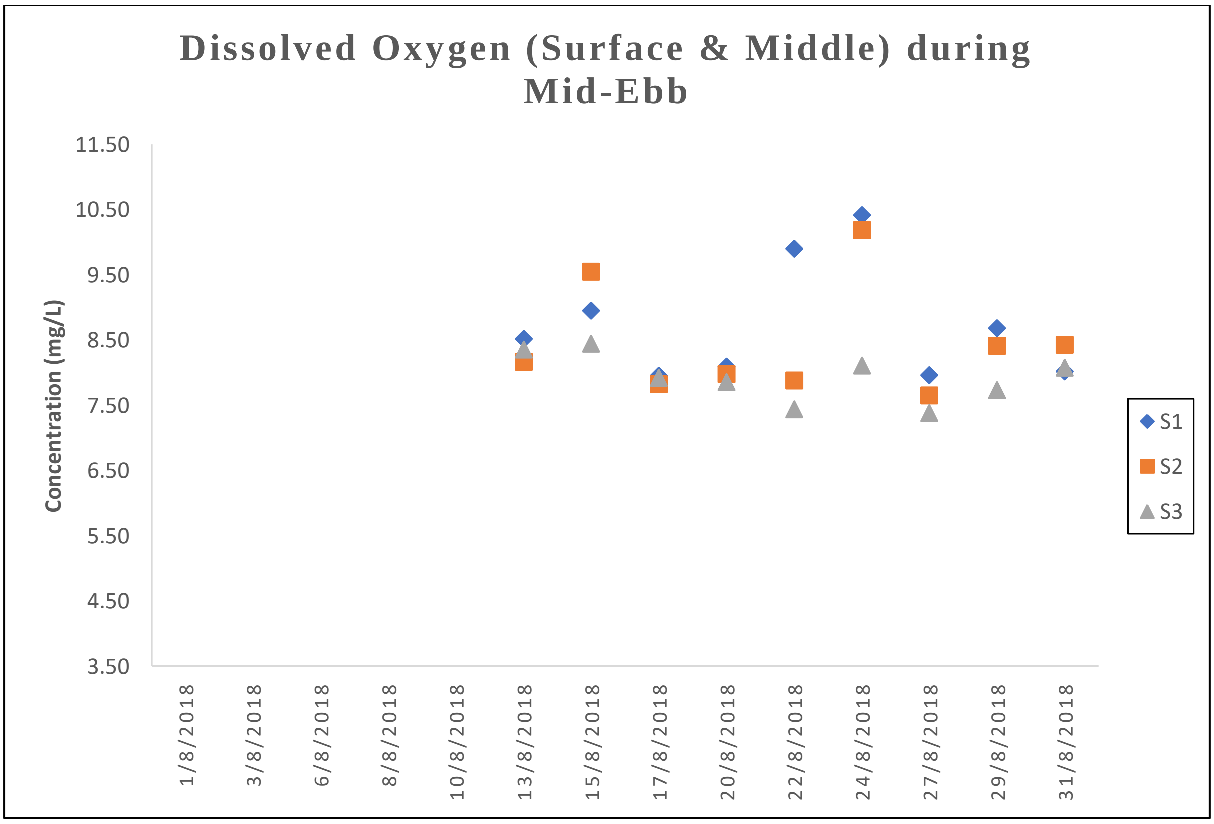
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



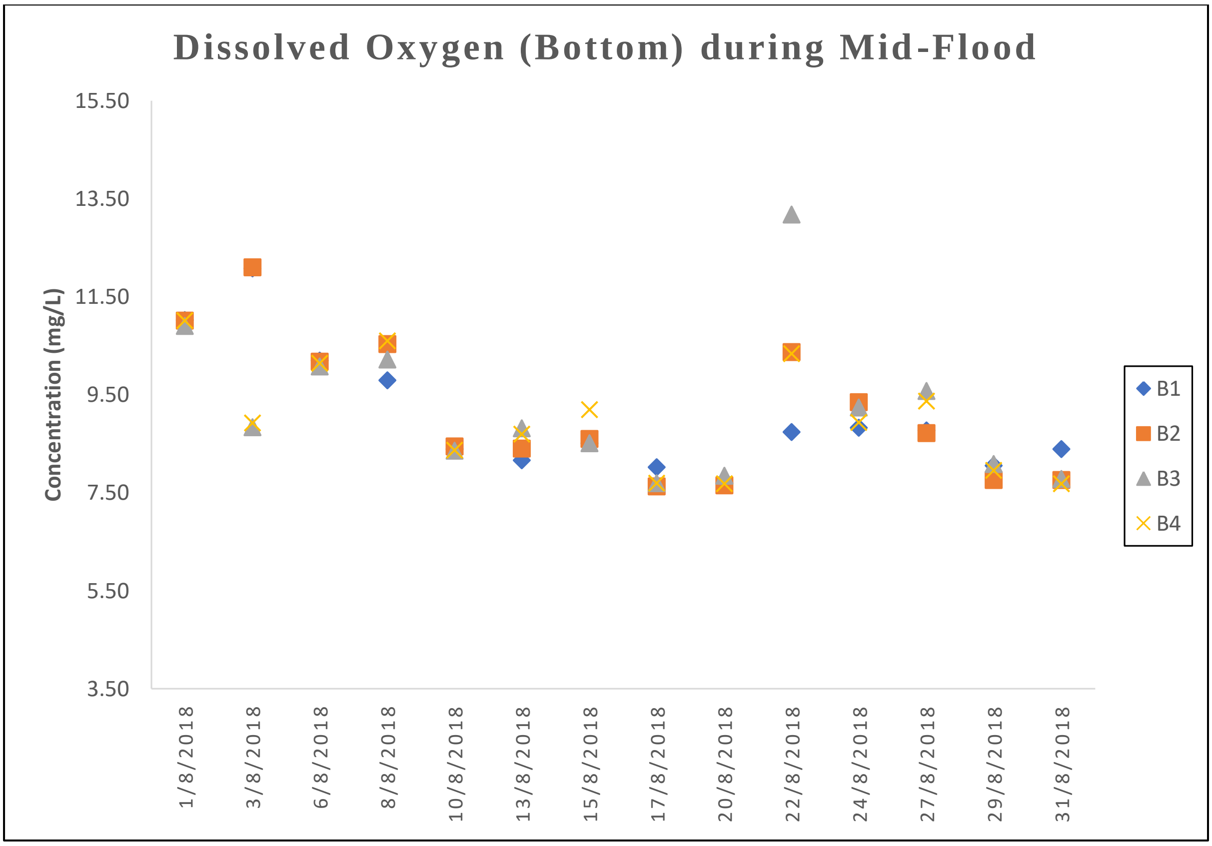


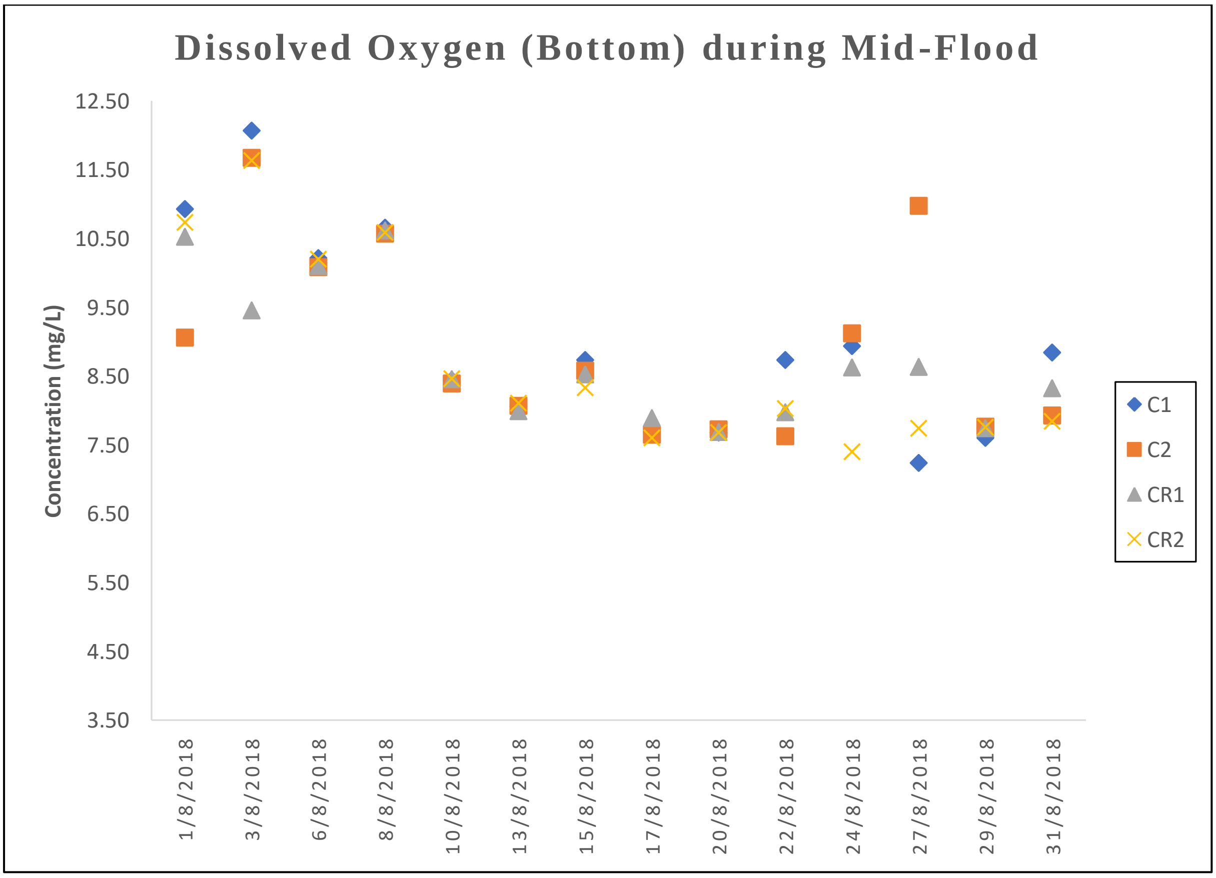
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



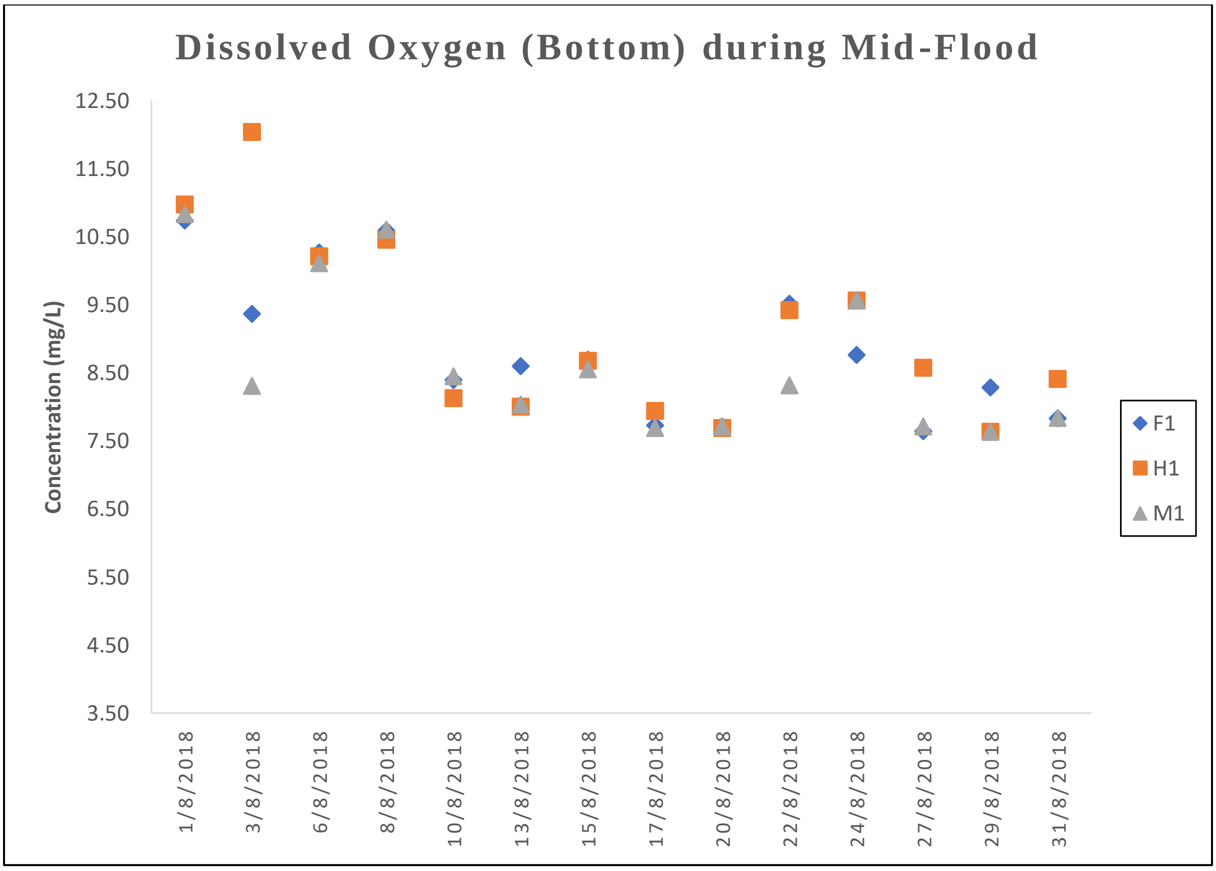


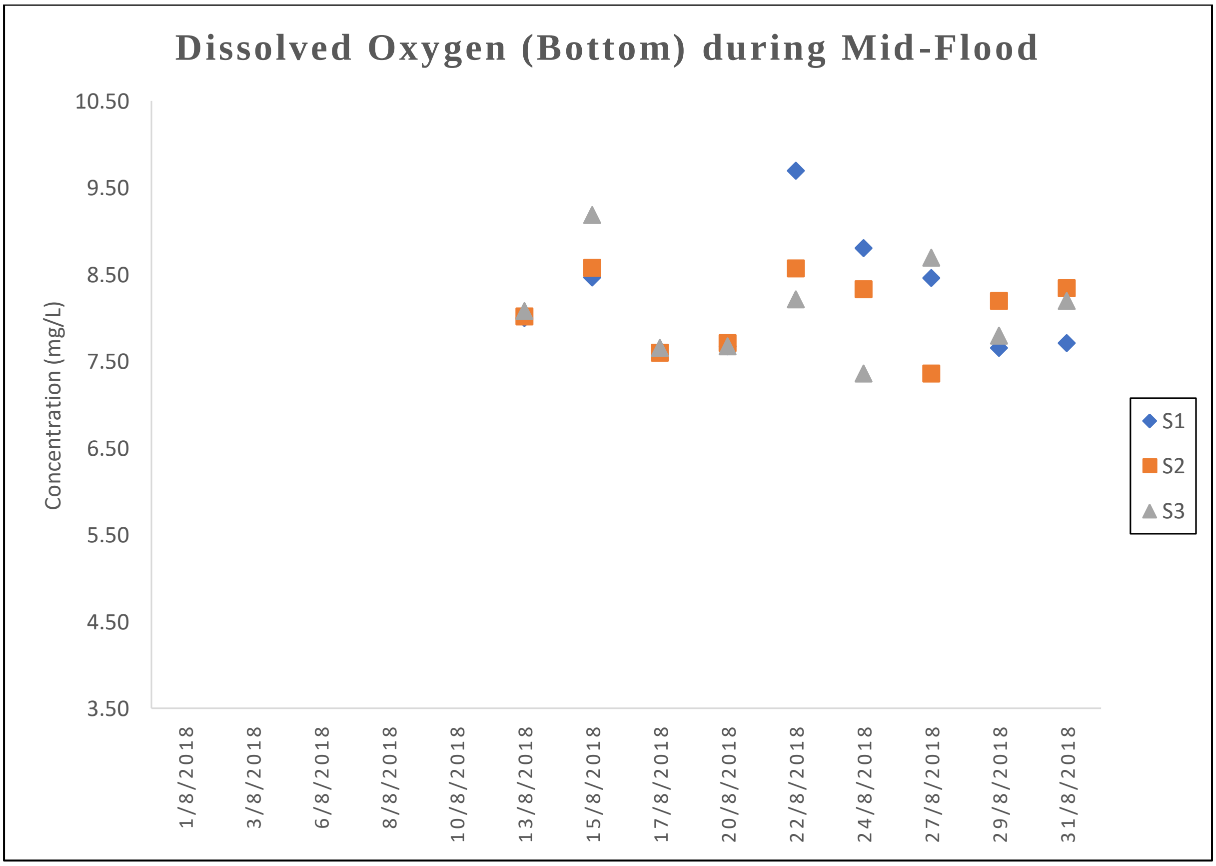
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



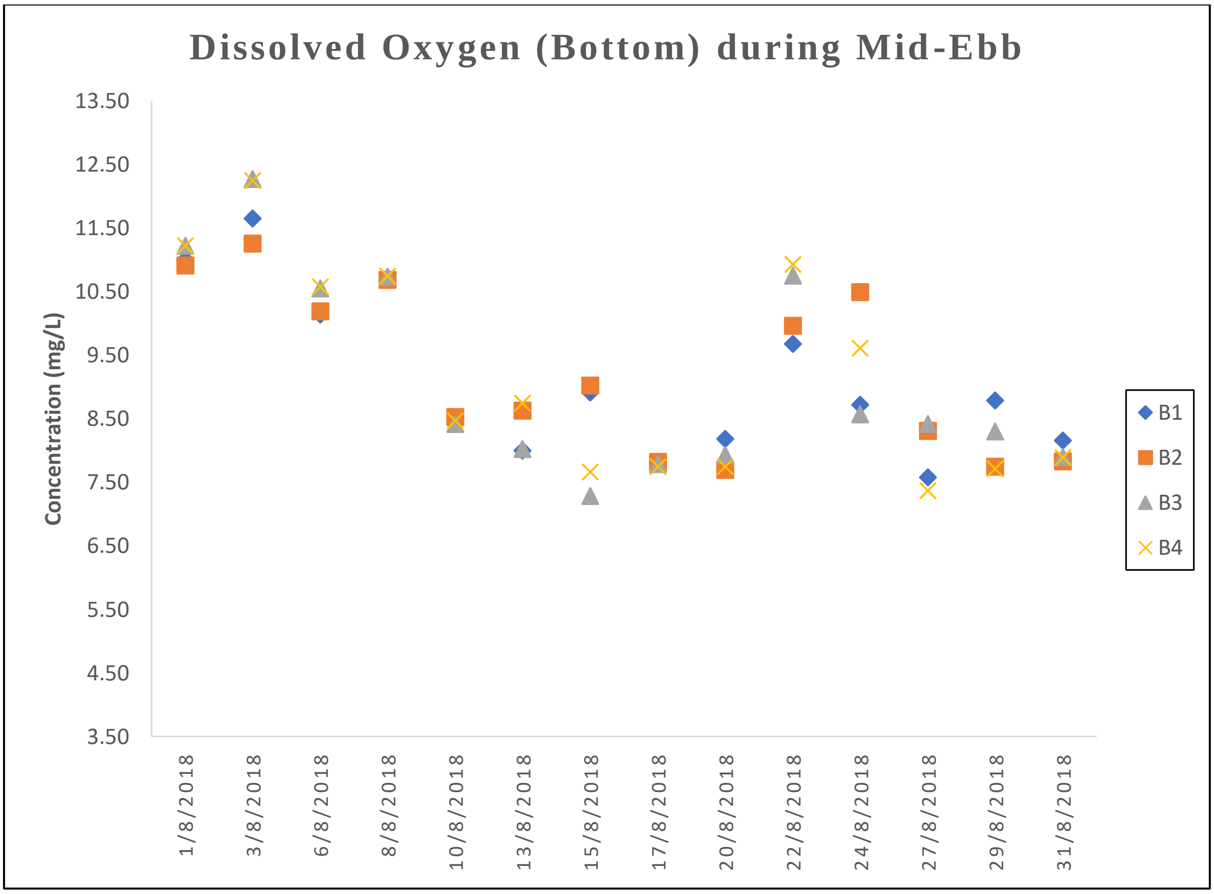


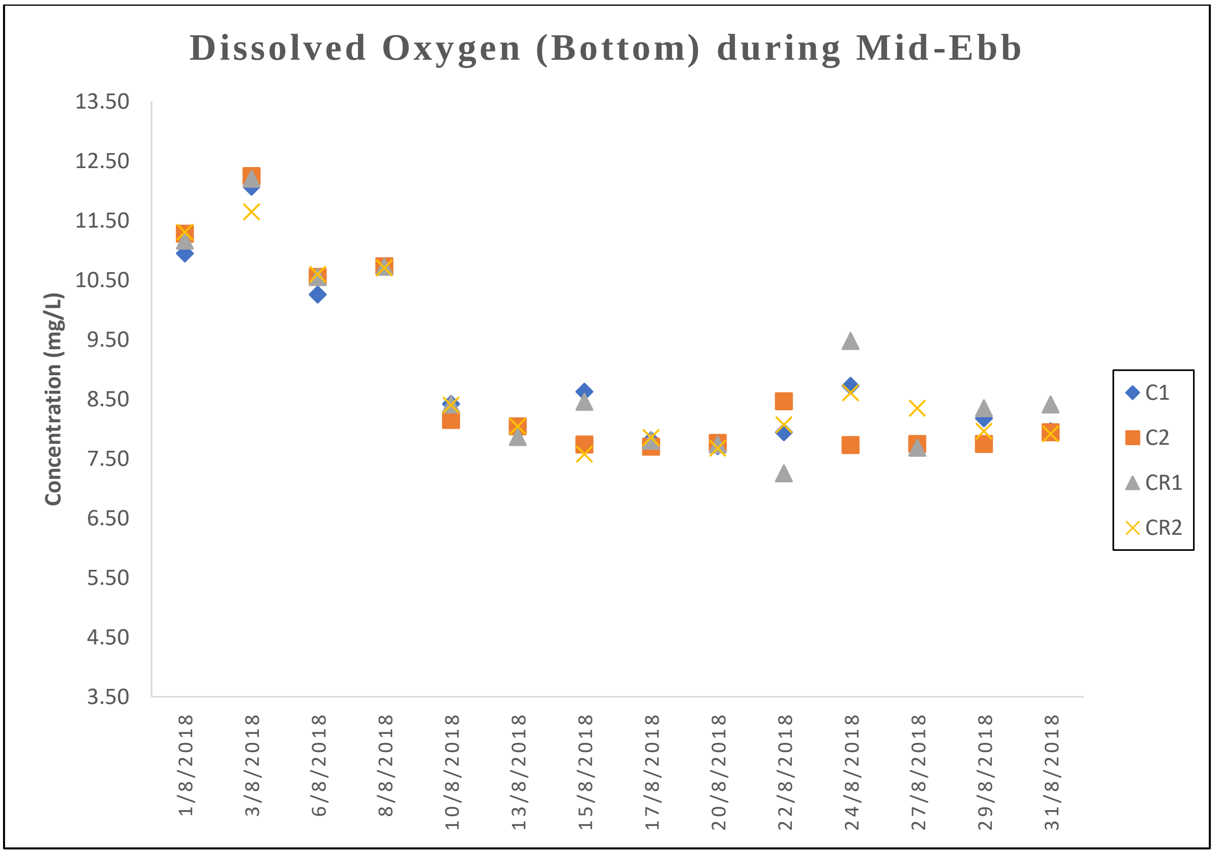
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



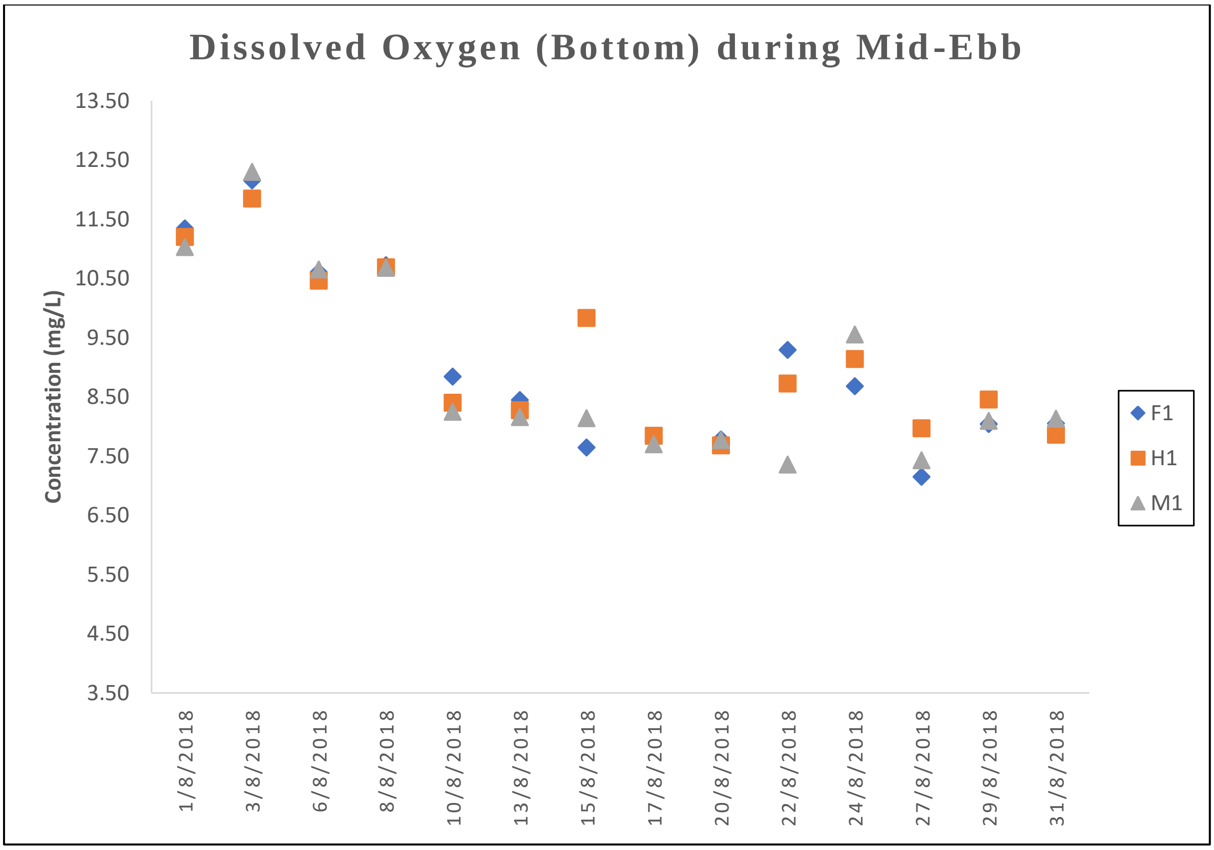


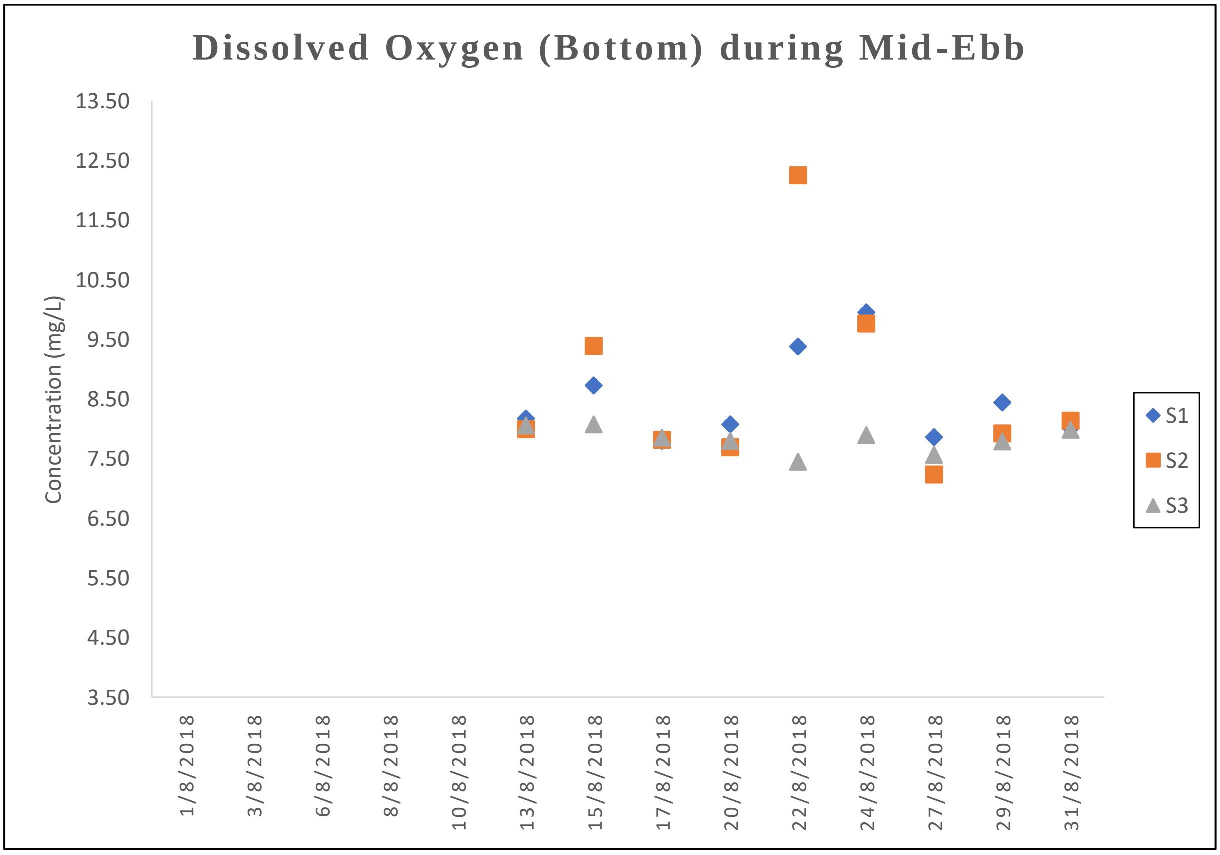
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



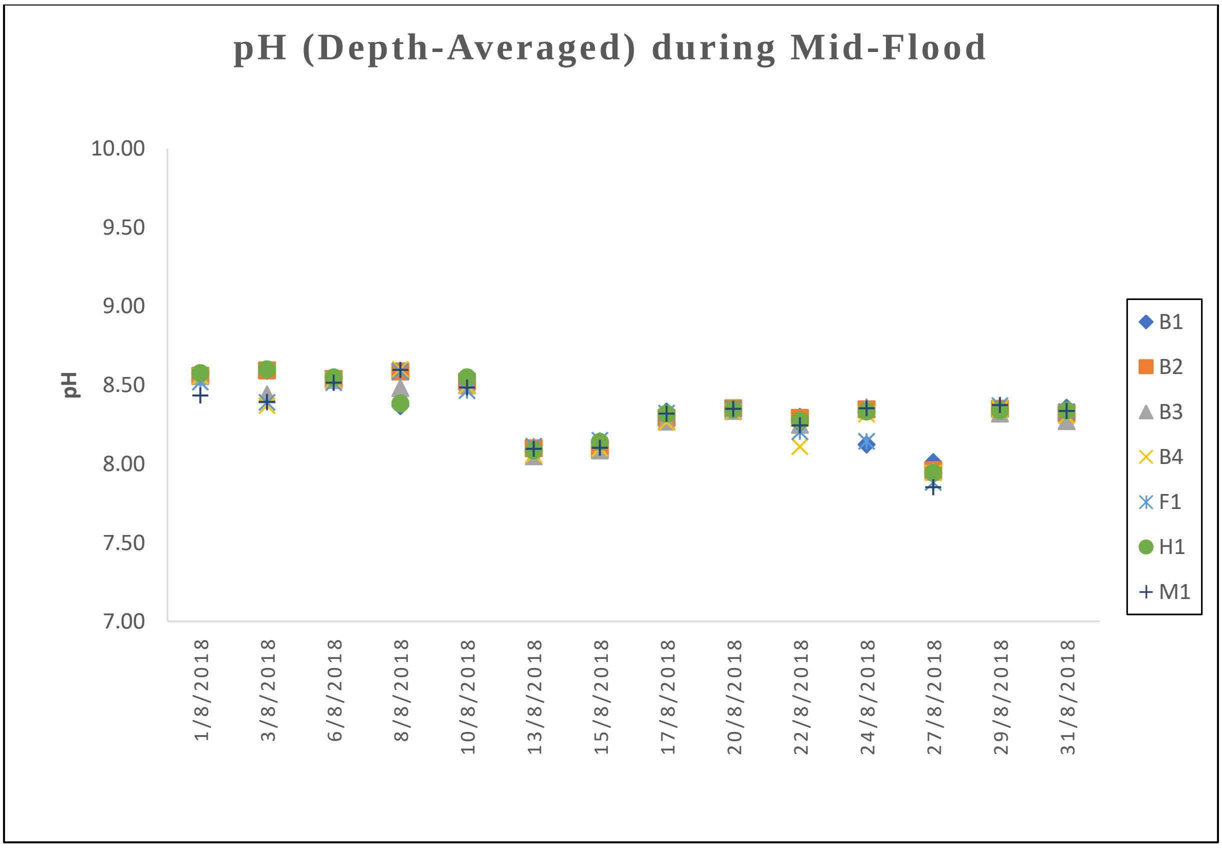


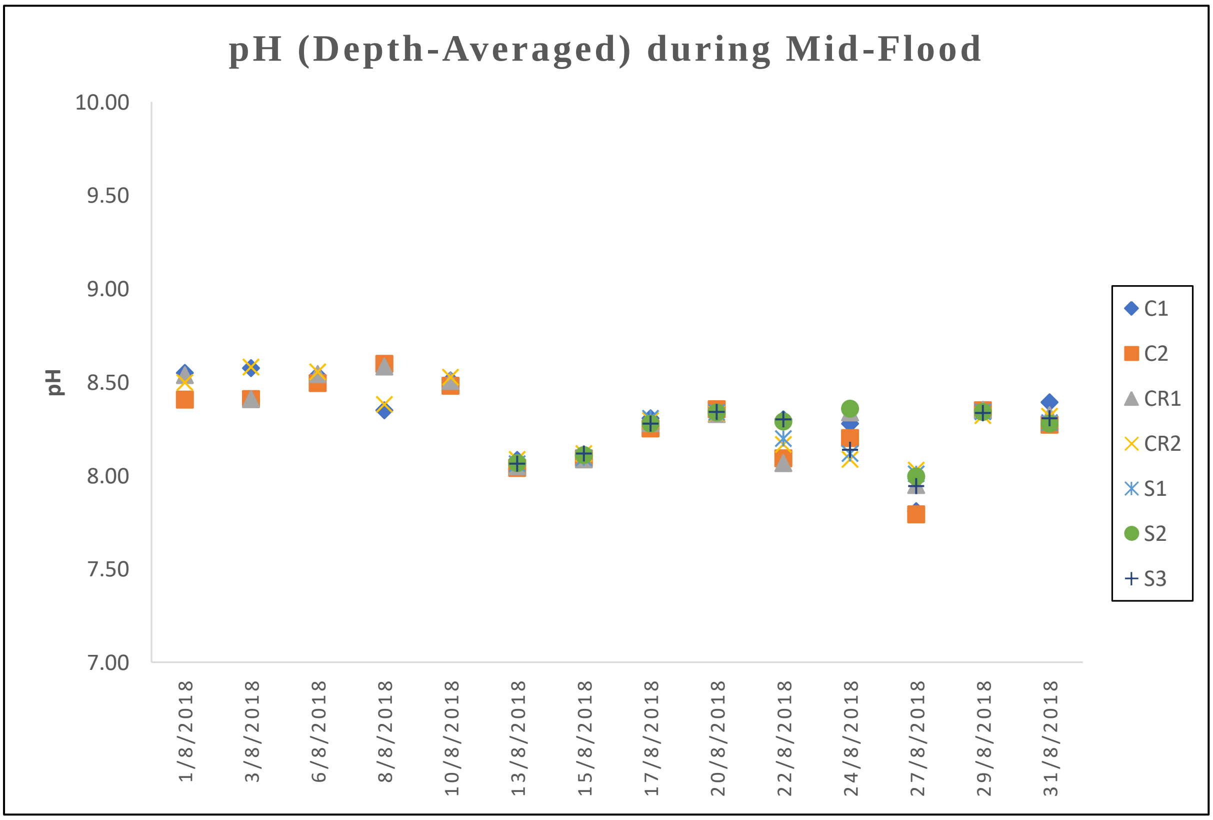
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



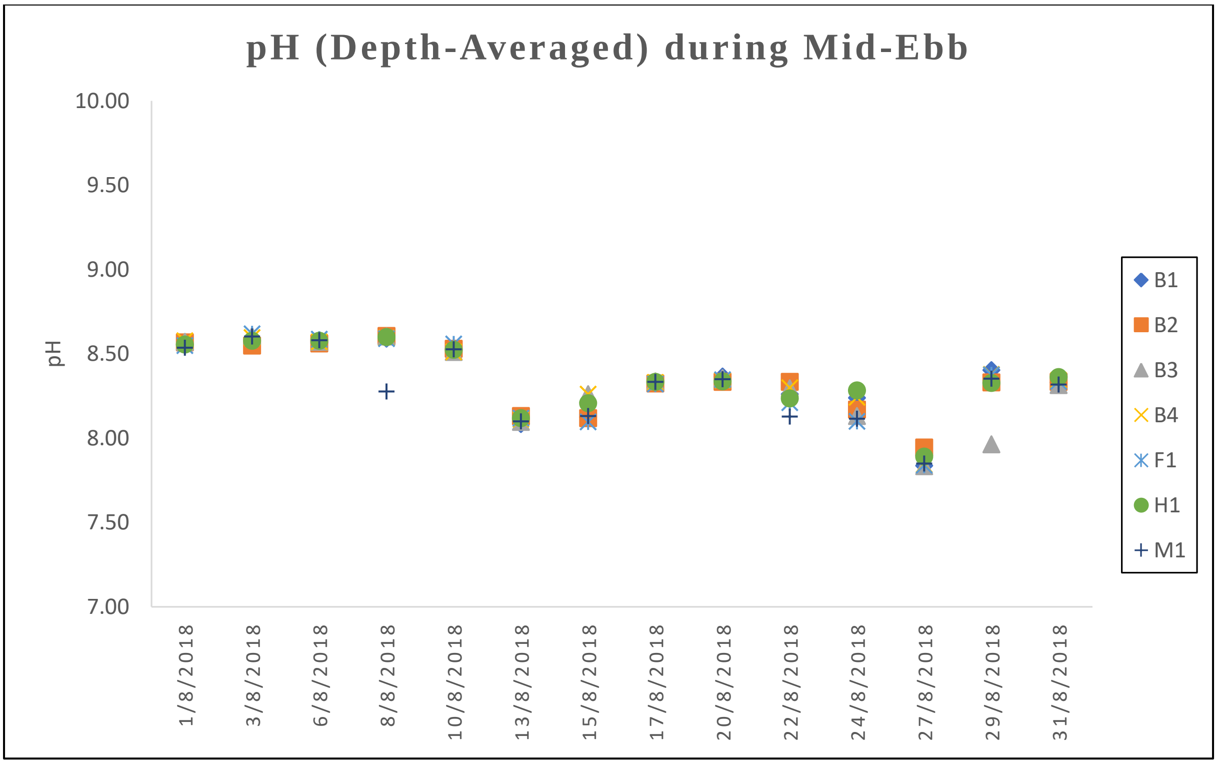


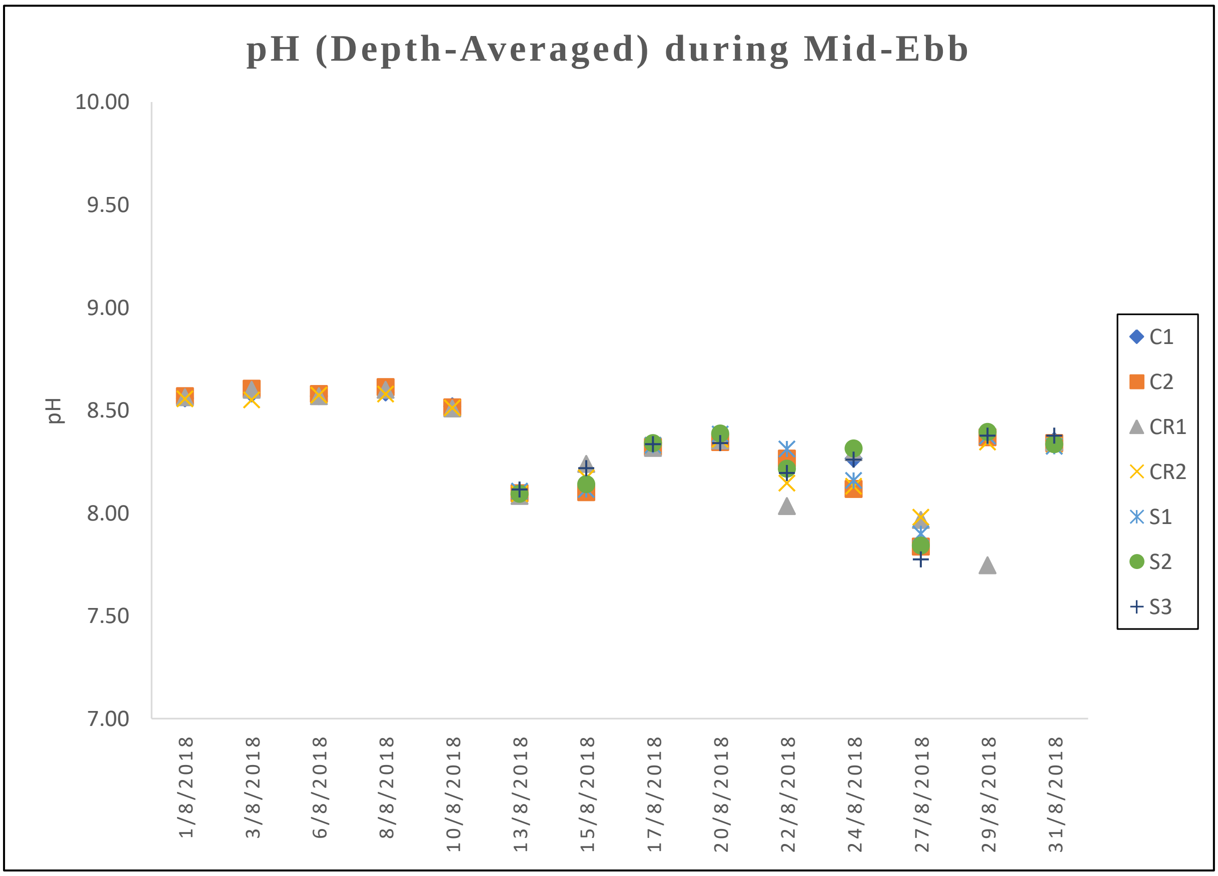
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.



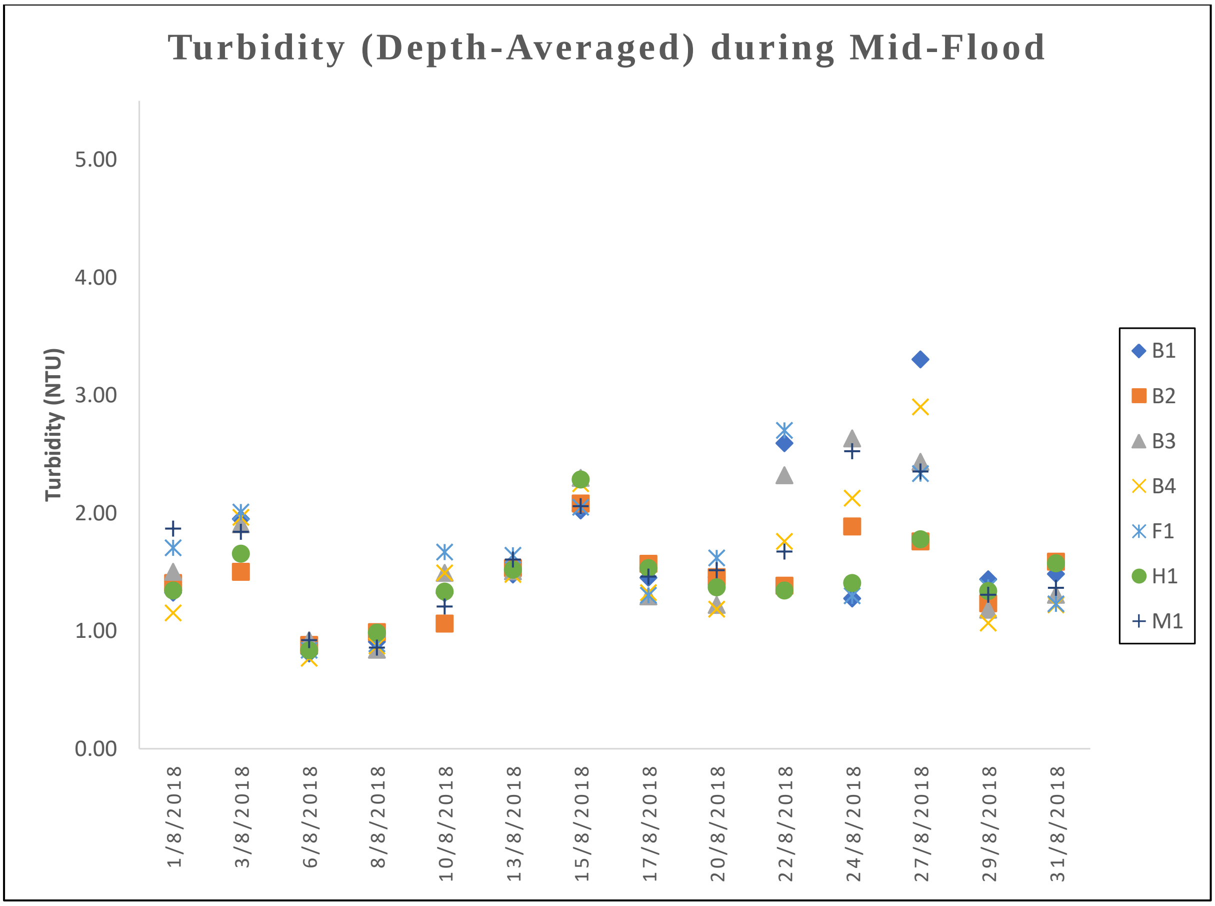


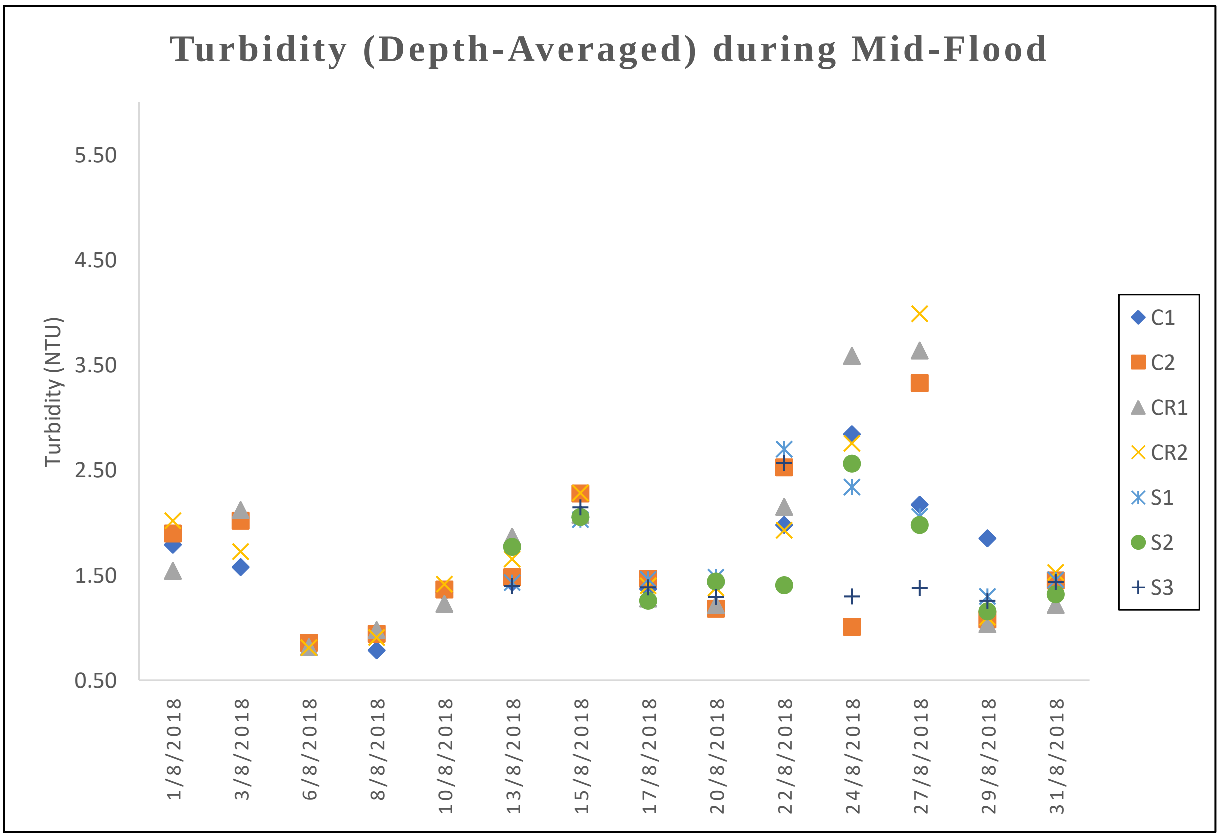
Note: The Action and Limit Level of pH can be refered to **Table 2.7** of the monthly EM & A report.



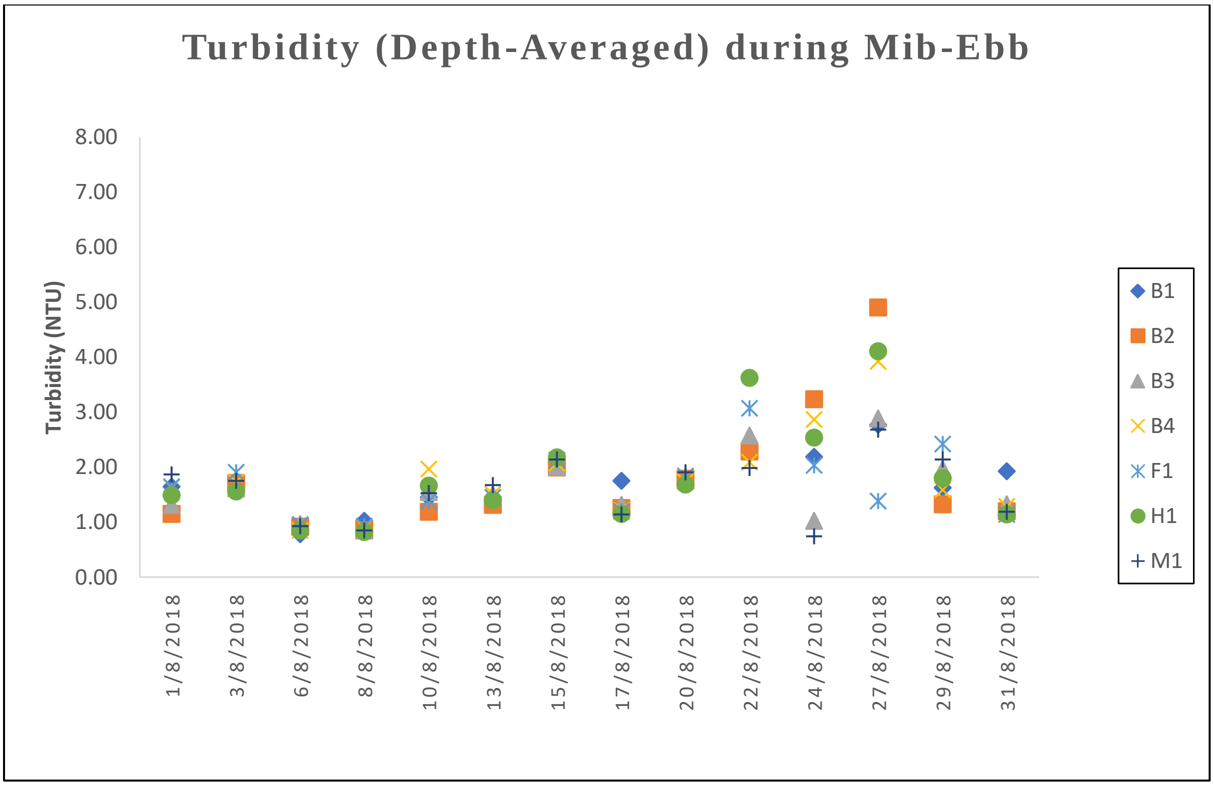


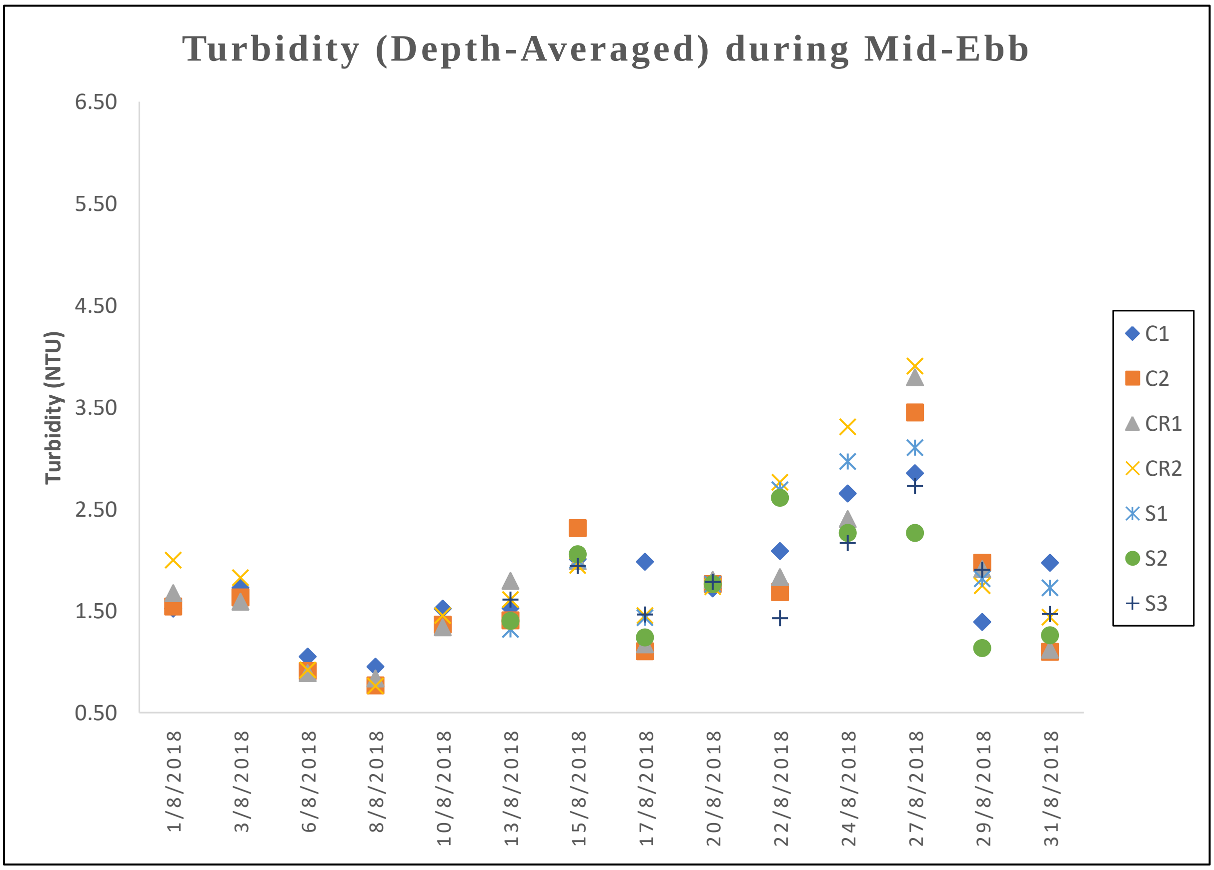
Note: The Action and Limit Level of pH can be referred to **Table 2.7** of the monthly EM & A report.



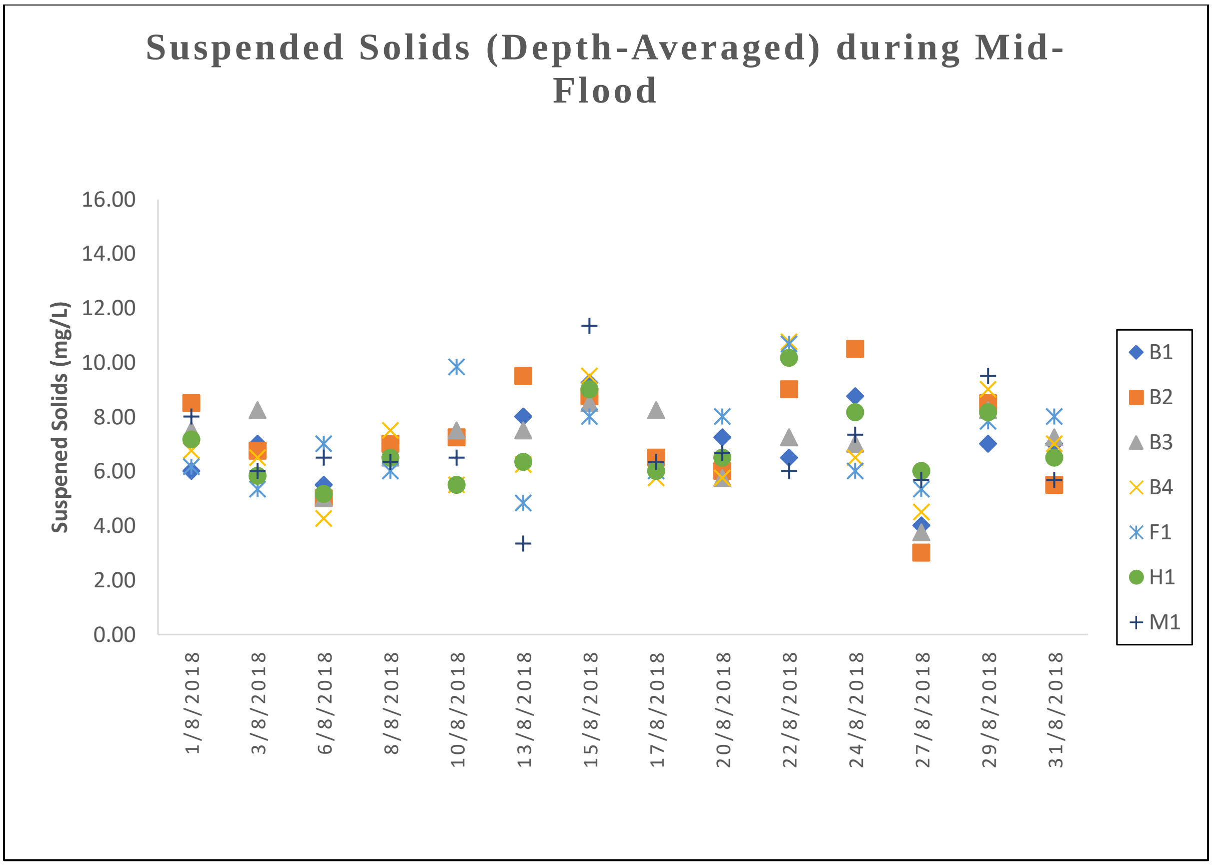


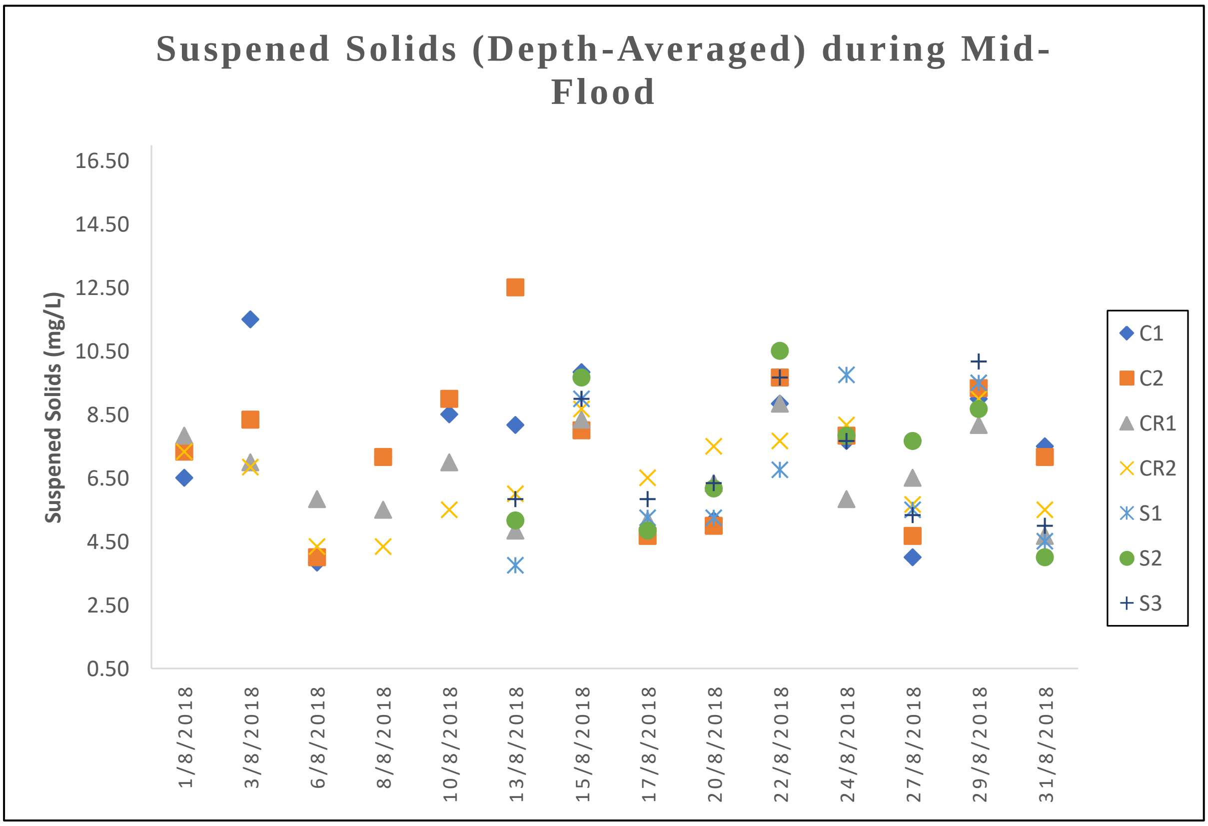
Note: The Action and Limit Level of turbidity can be referred to **Table 2.7** of the monthly EM & A report.



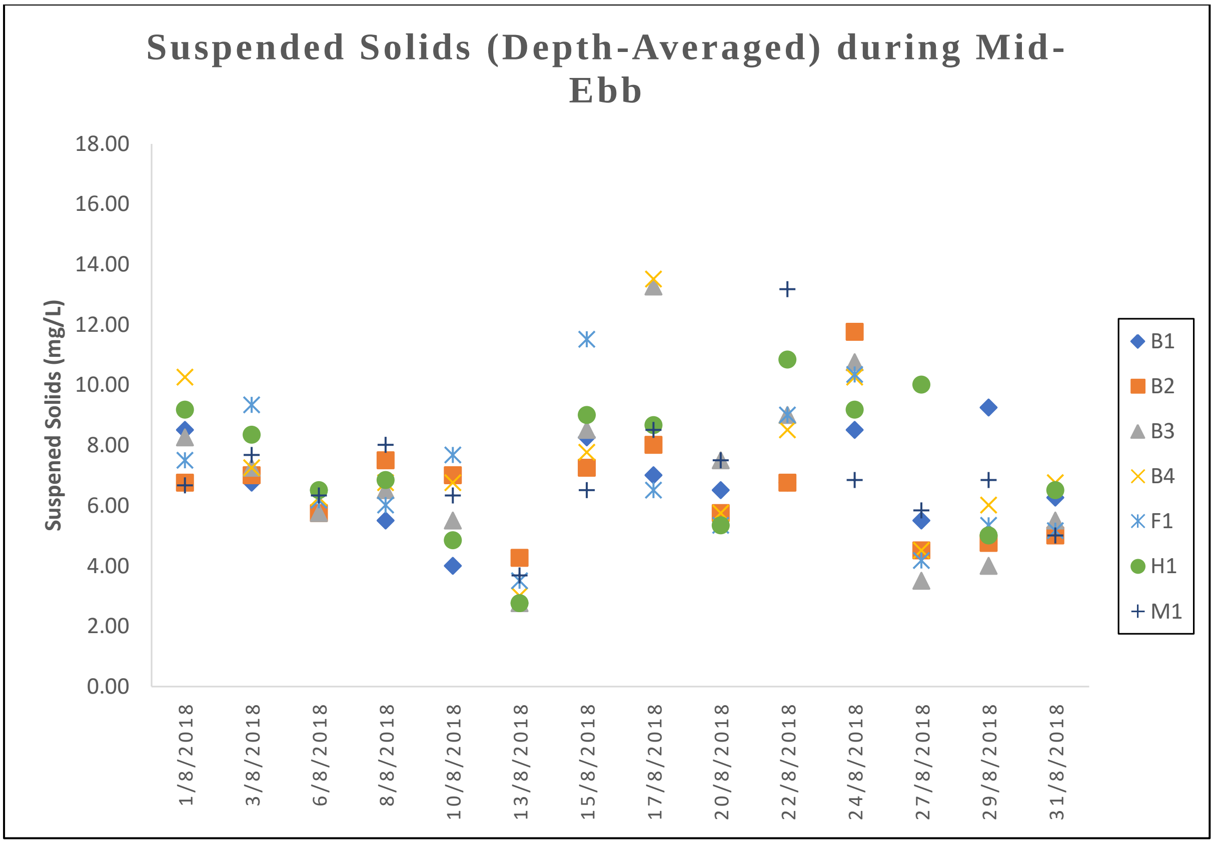


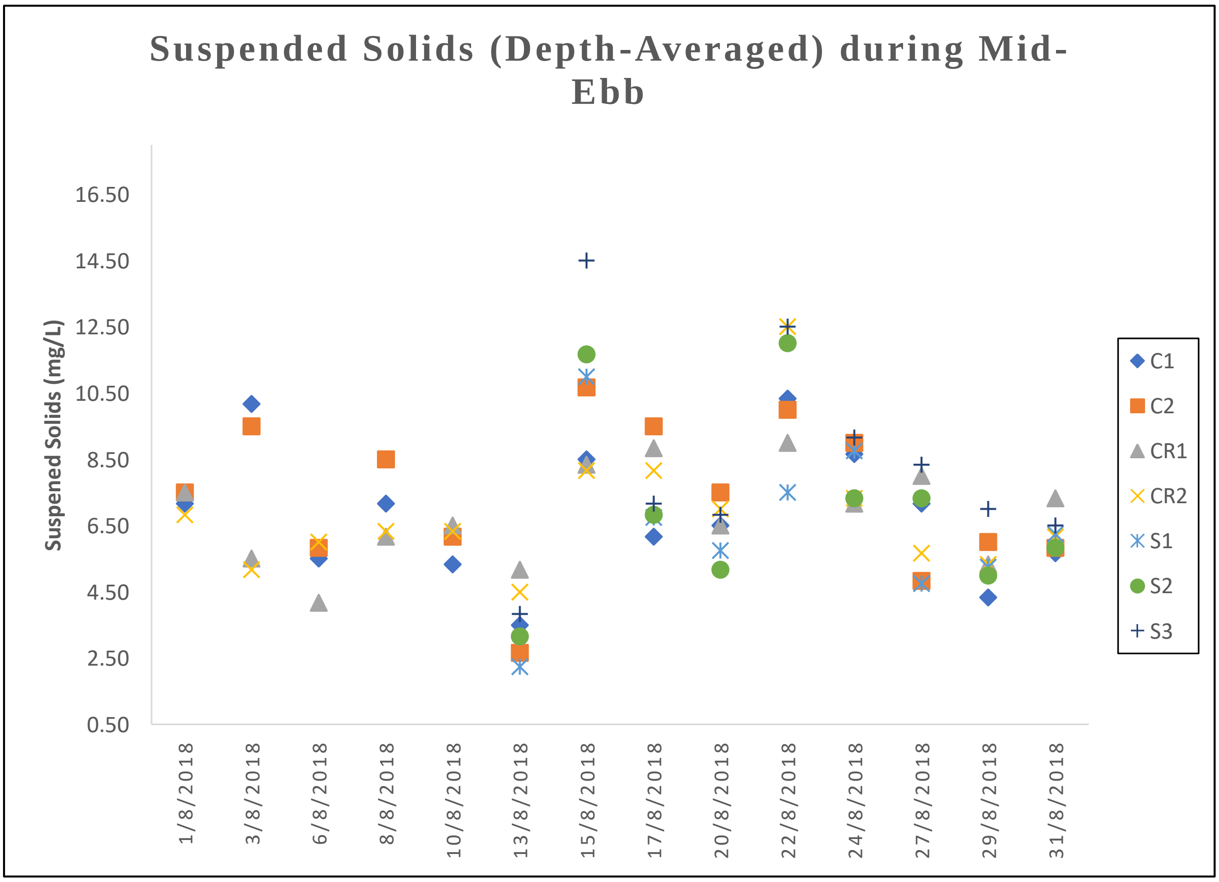
Note: The Action and Limit Level of turbidity can be referred to **Table 2.7** of the monthly EM & A report.



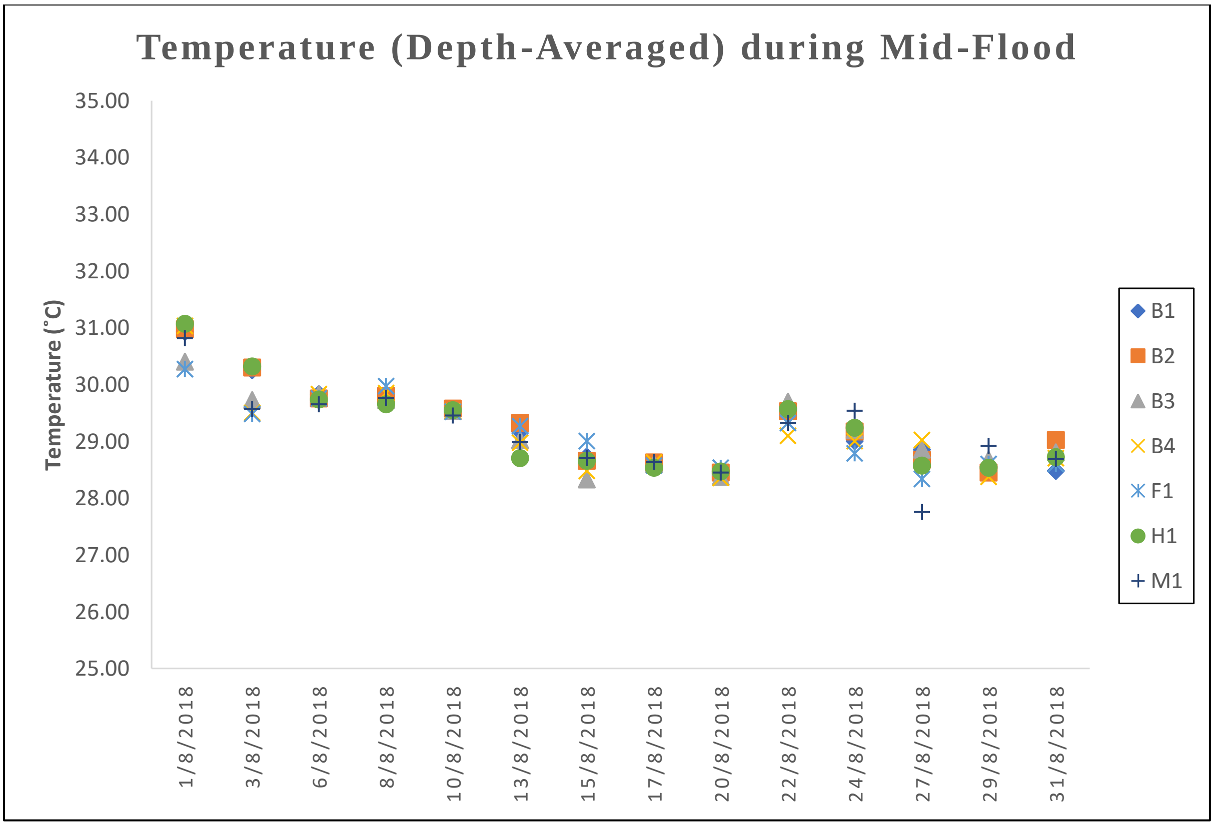


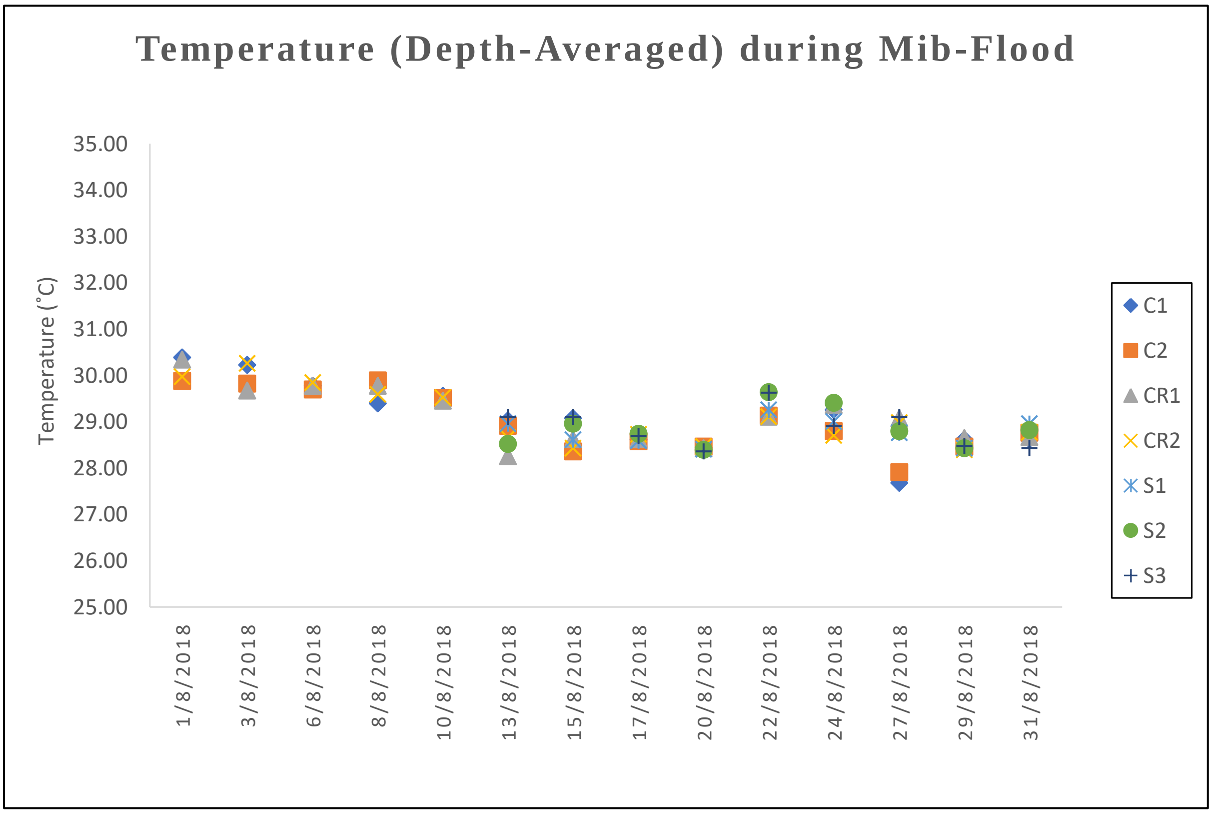
Note: The Action and Limit Level of suspened solids can be referred to **Table 2.7** of the monthly EM & A report.



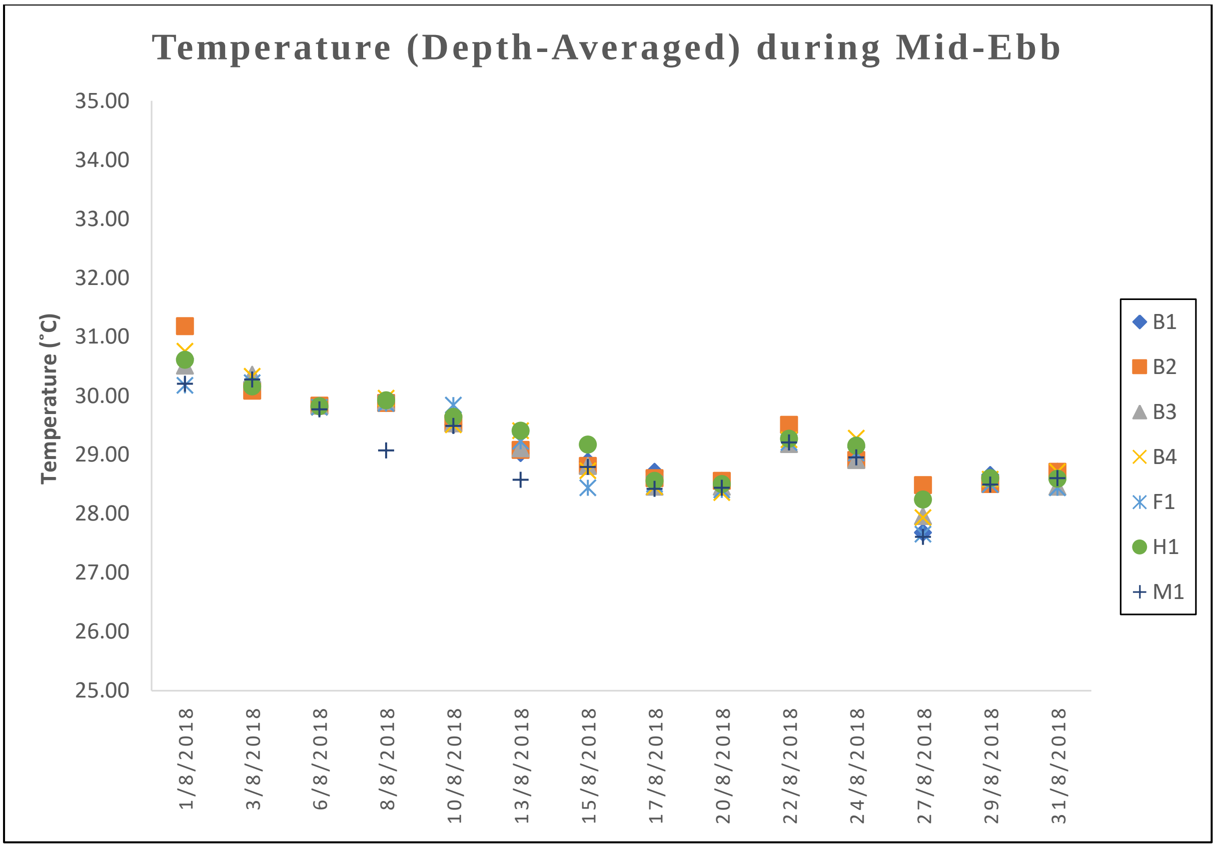


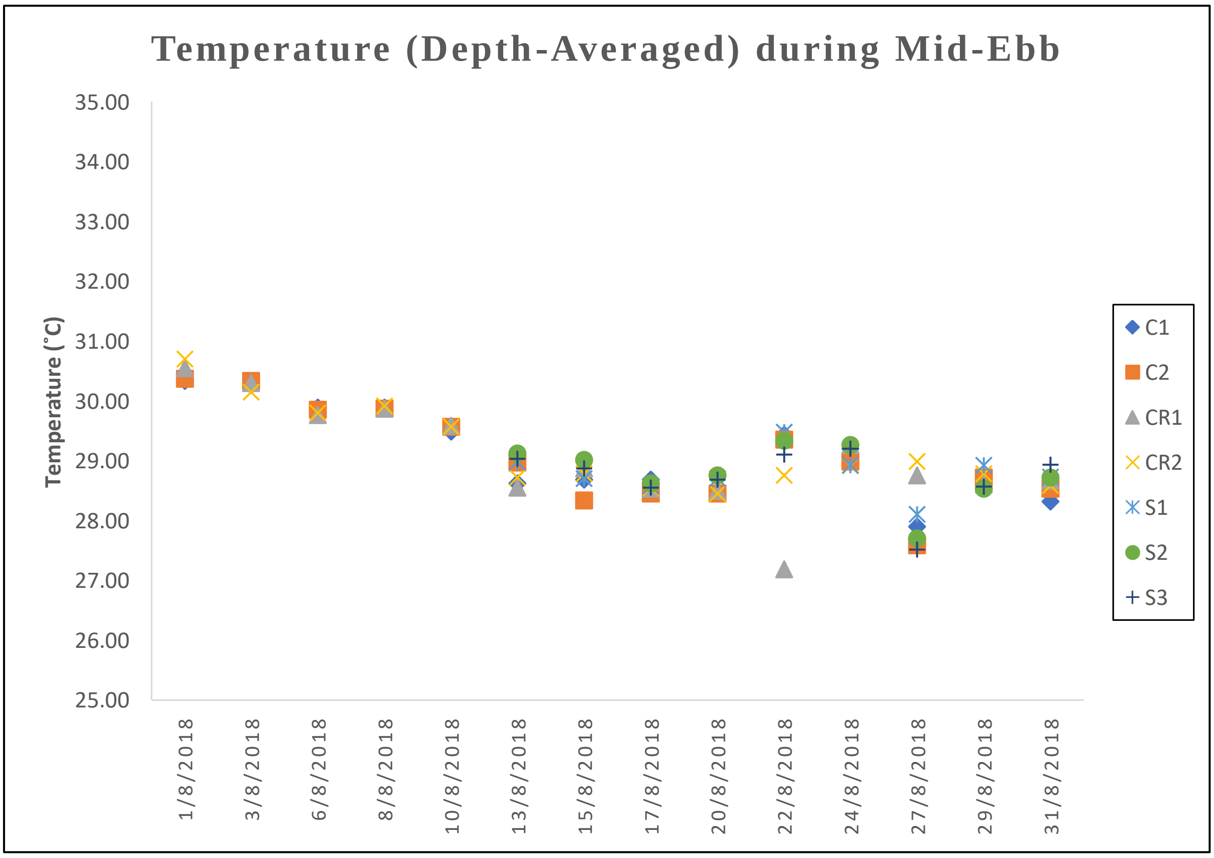
Note: The Action and Limit Level of suspened solids can be referred to **Table 2.7** of the monthly EM & A report.



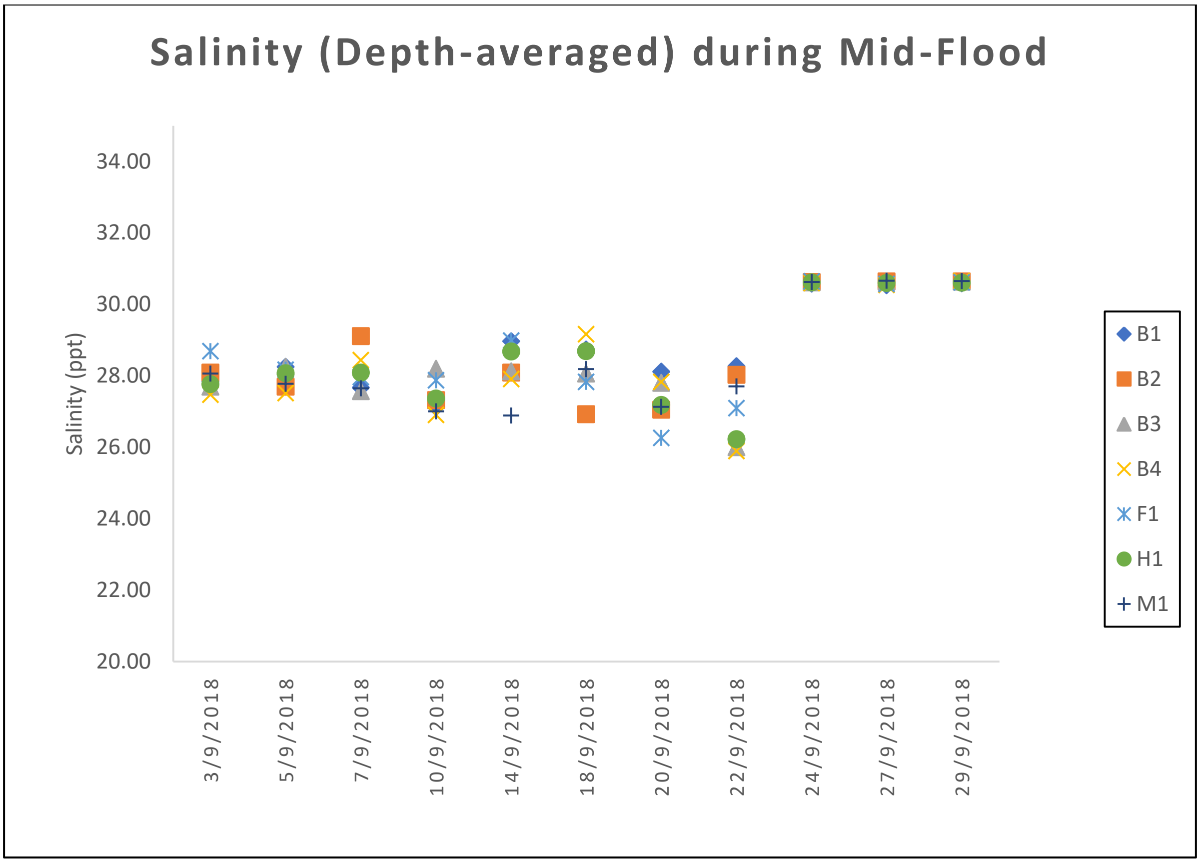


Note: The Action and Limit Level of temperature can be referred to **Table 2.7** of the monthly EM & A report.





Note: The Action and Limit Level of temperature can be referred to **Table 2.7** of the monthly EM & A report.



Salinity (Depth-averaged) during Mid-Flood
Salinity (ppt)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
3/9/2018
5/9/2018
7/9/2018
10/9/2018
14/9/2018
18/9/2018
20/9/2018
22/9/2018
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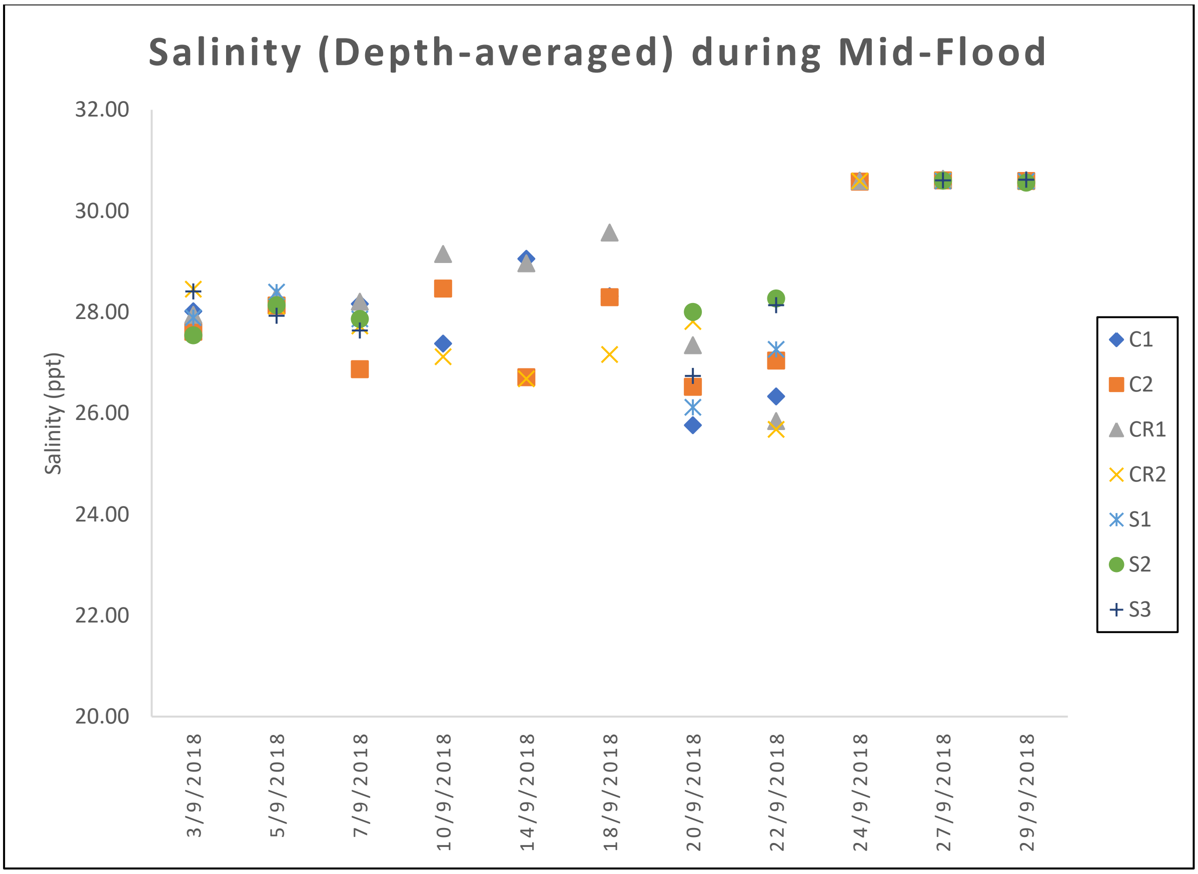
29/9/2018
B1
B2
B3
B4
F1
H1
M1



Salinity (Depth-averaged) during Mid-Flood
Salinity (ppt)
32.00
30.00
28.00
26.00
24.00
22.00
20.00
3/9/2018
5/9/2018
7/9/2018
10/9/2018
14/9/2018
18/9/2018
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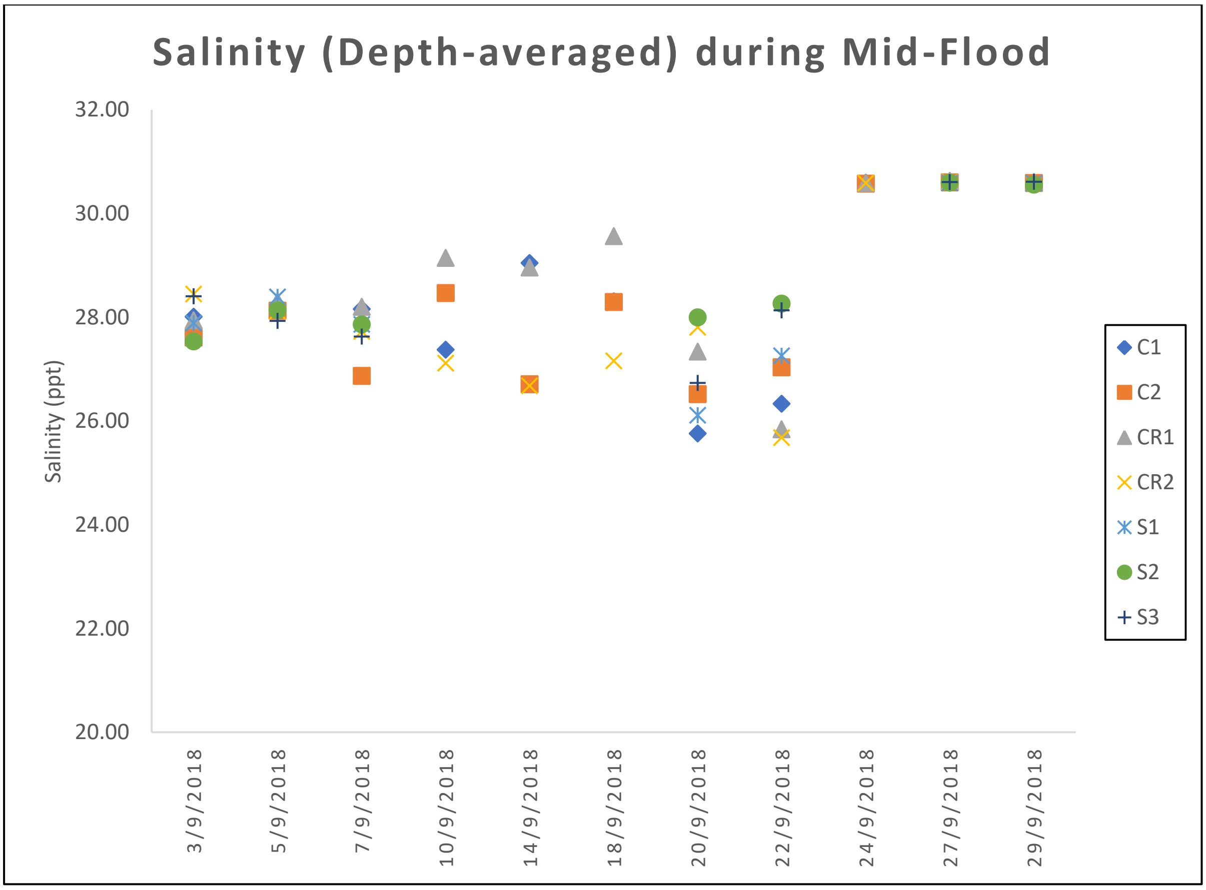
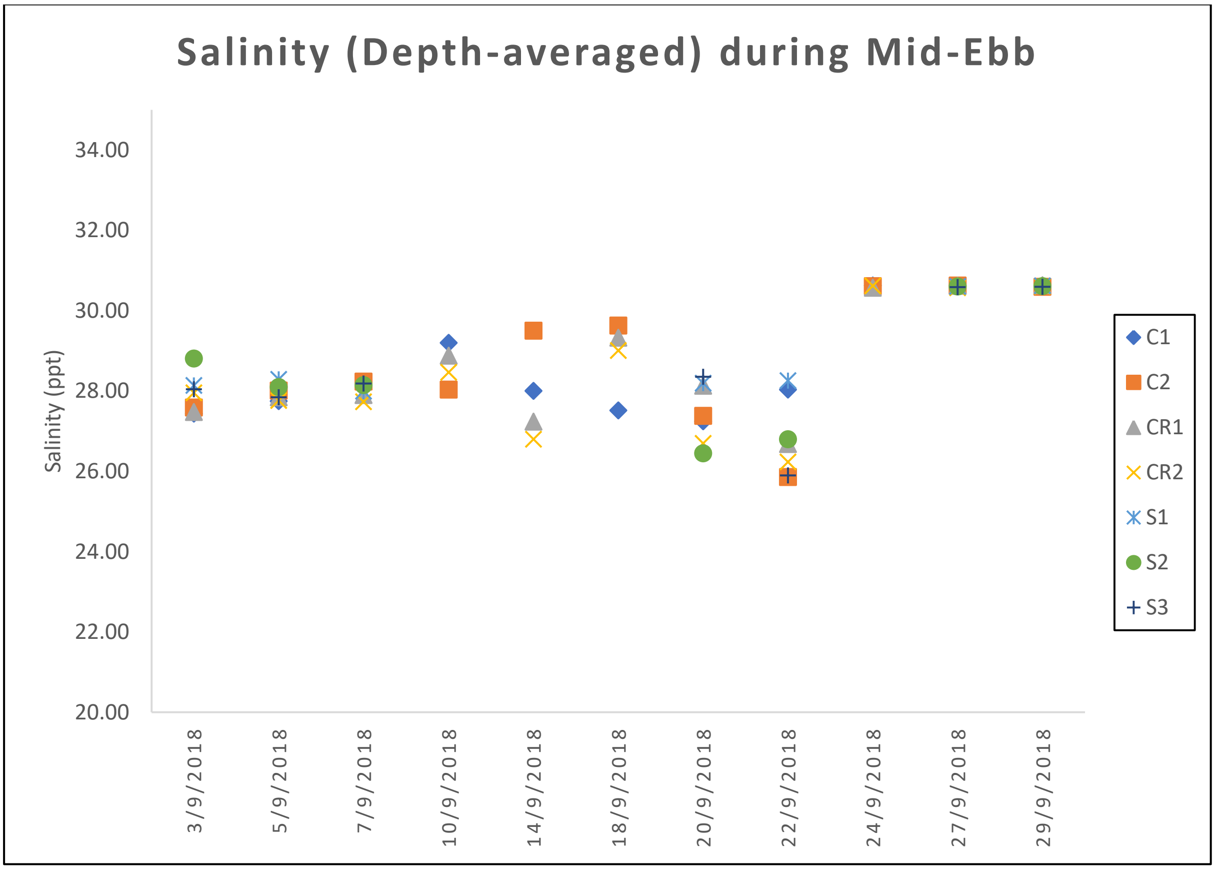
C1
C2
CR1
CR2
S1
S2
S3



Salinity (Depth-averaged) during Mid-Flood
32.00
30.00
28.00
26.00
24.00
22.00
20.00
Salinity (ppt)
3/9/2018
5/9/2018
7/9/2018
10/9/2018
14/9/2018
18/9/2018
20/9/2018
22/9/2018
24/9/2018
27/9/2018
29/9/2018
C1
C2
CR1
CR2
S1
S2
S3



Salinity (Depth-averaged) during Mid-Ebb
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
Salinity (ppt)
3/9/2018
5/9/2018
7/9/2018
10/9/2018
14/9/2018
18/9/2018
20/9/2018
22/9/2018
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C2
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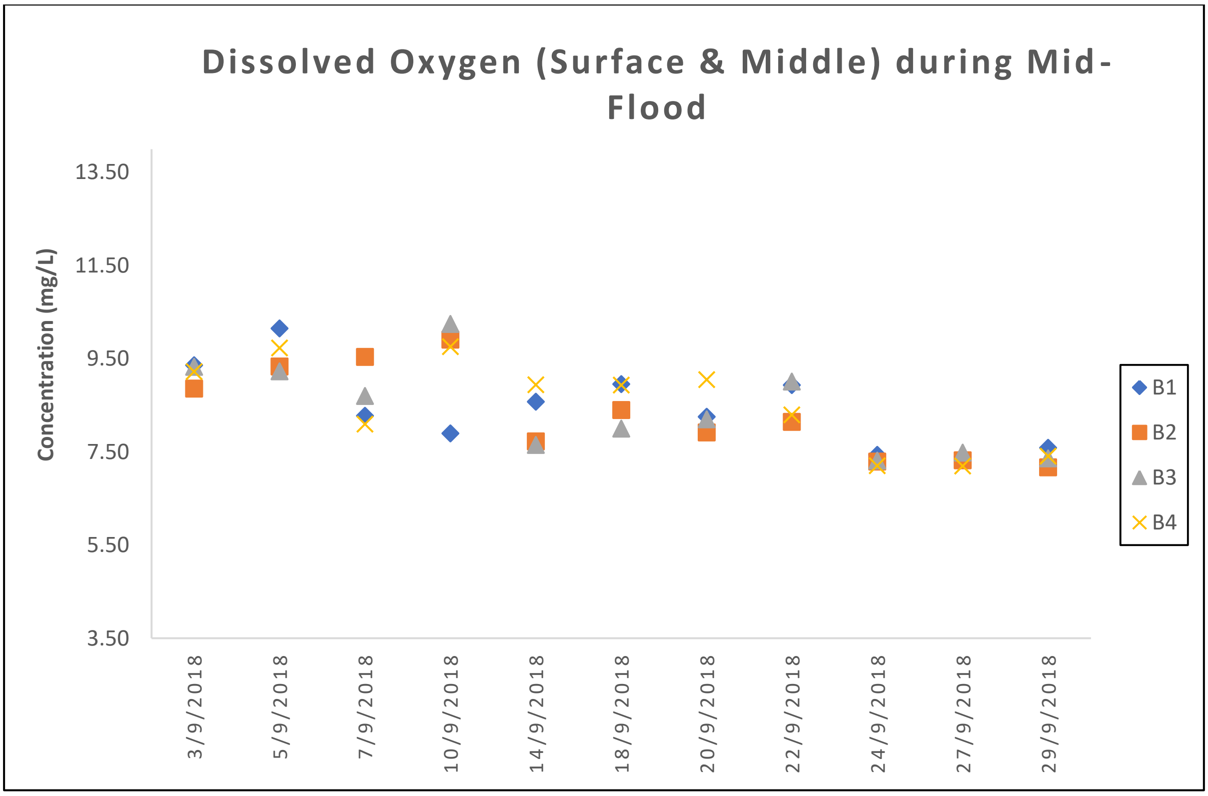
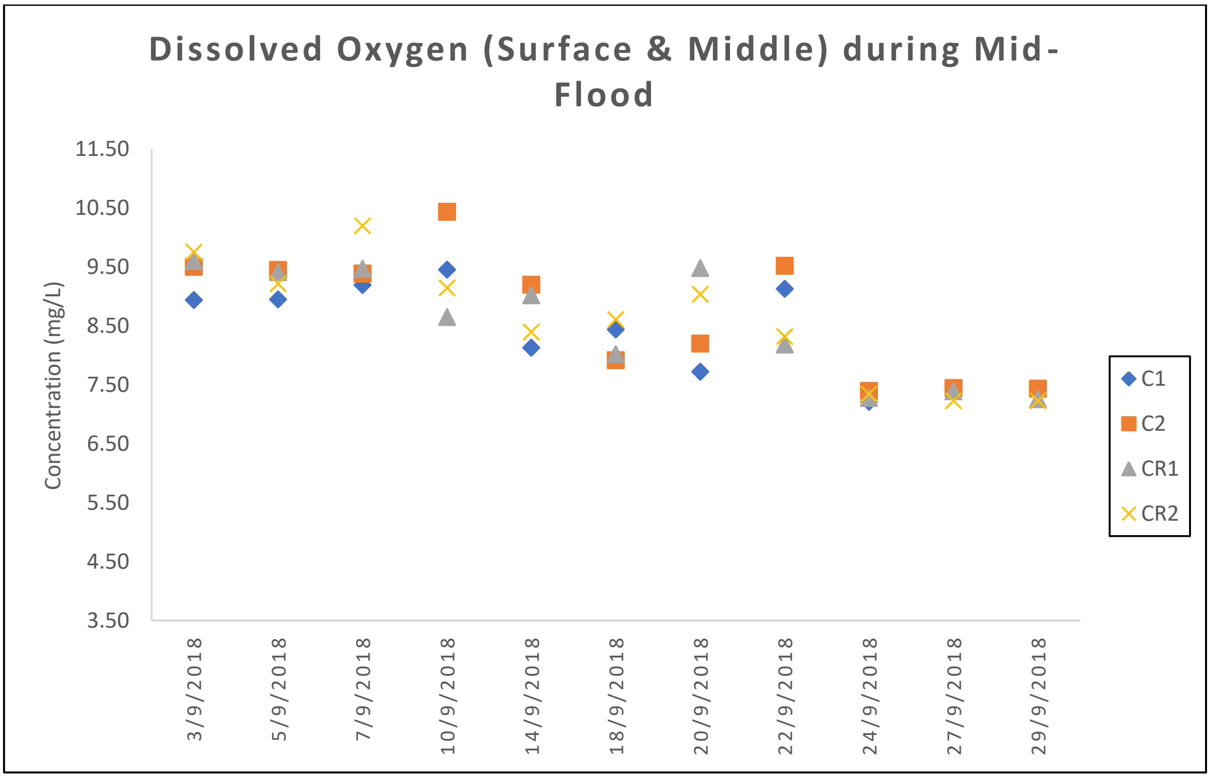
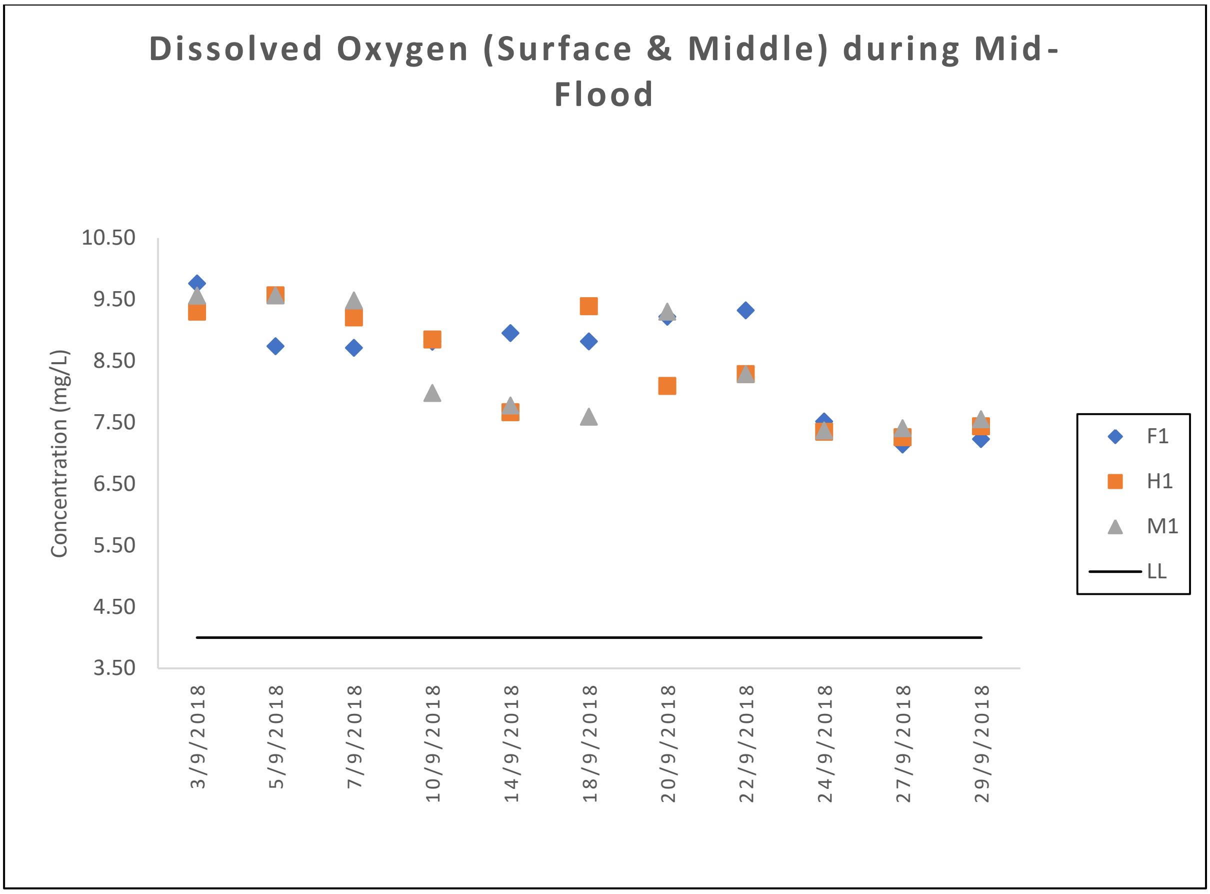
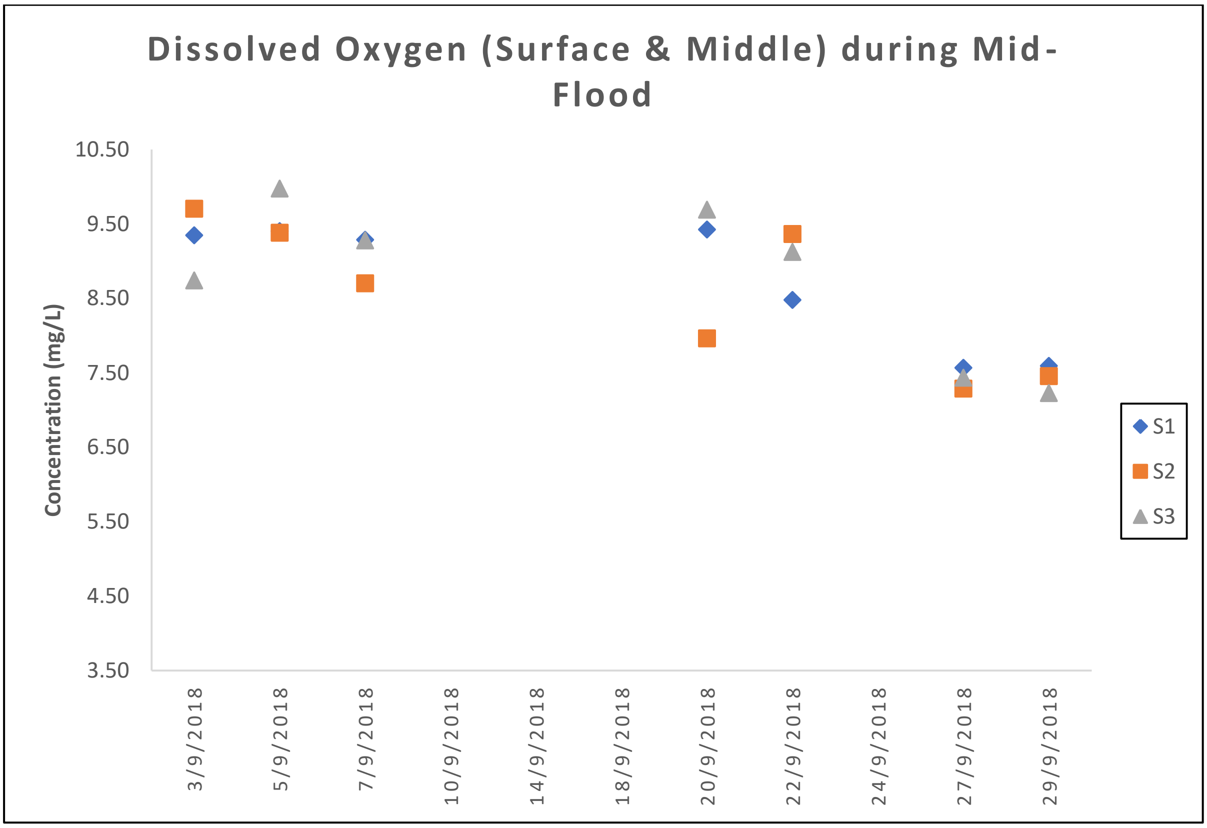
CR2
S1
S2
S3



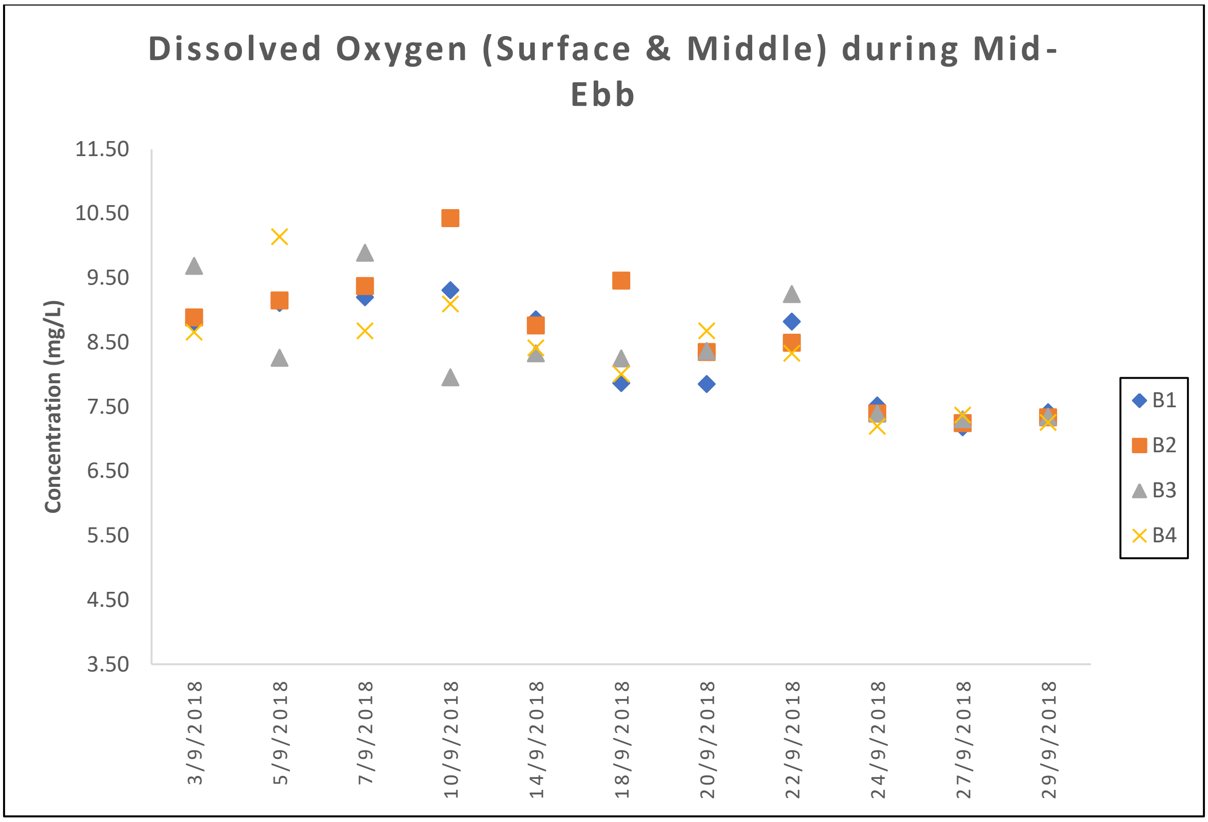


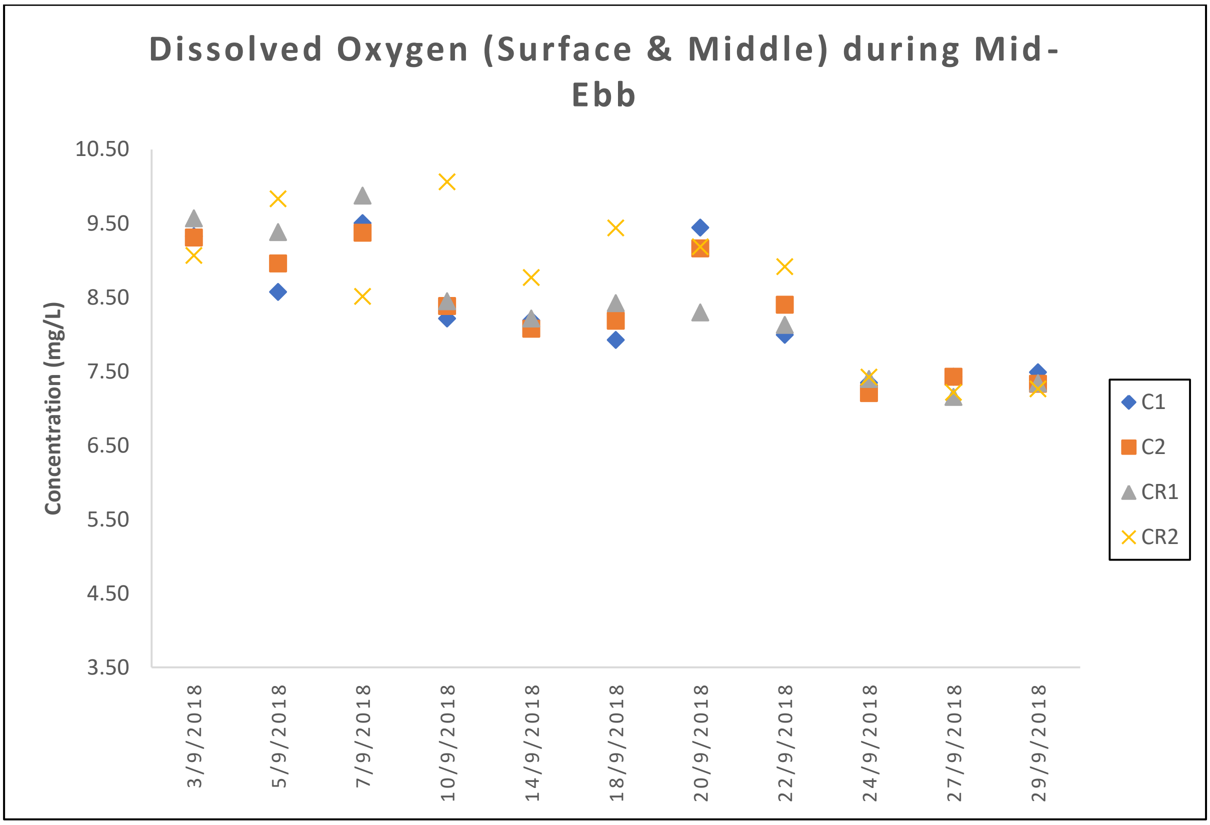
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





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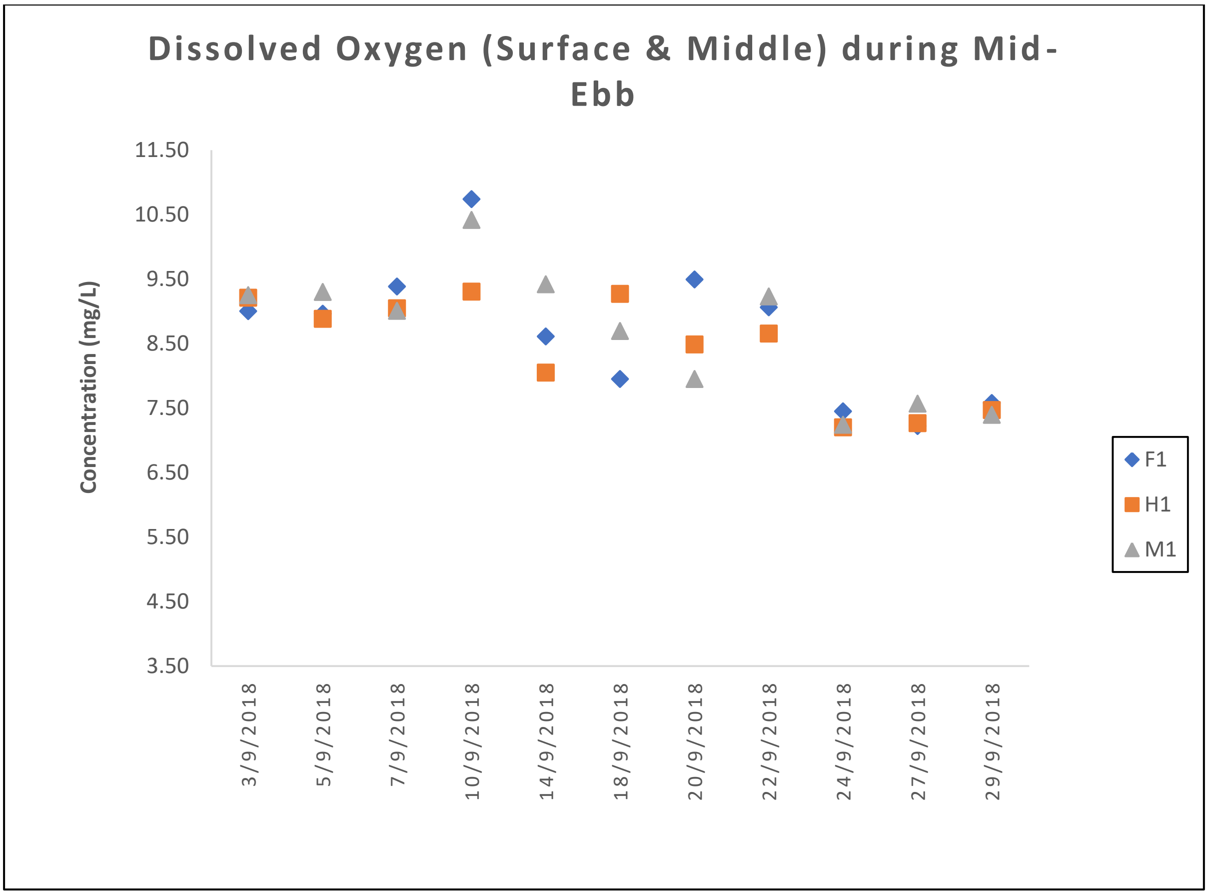
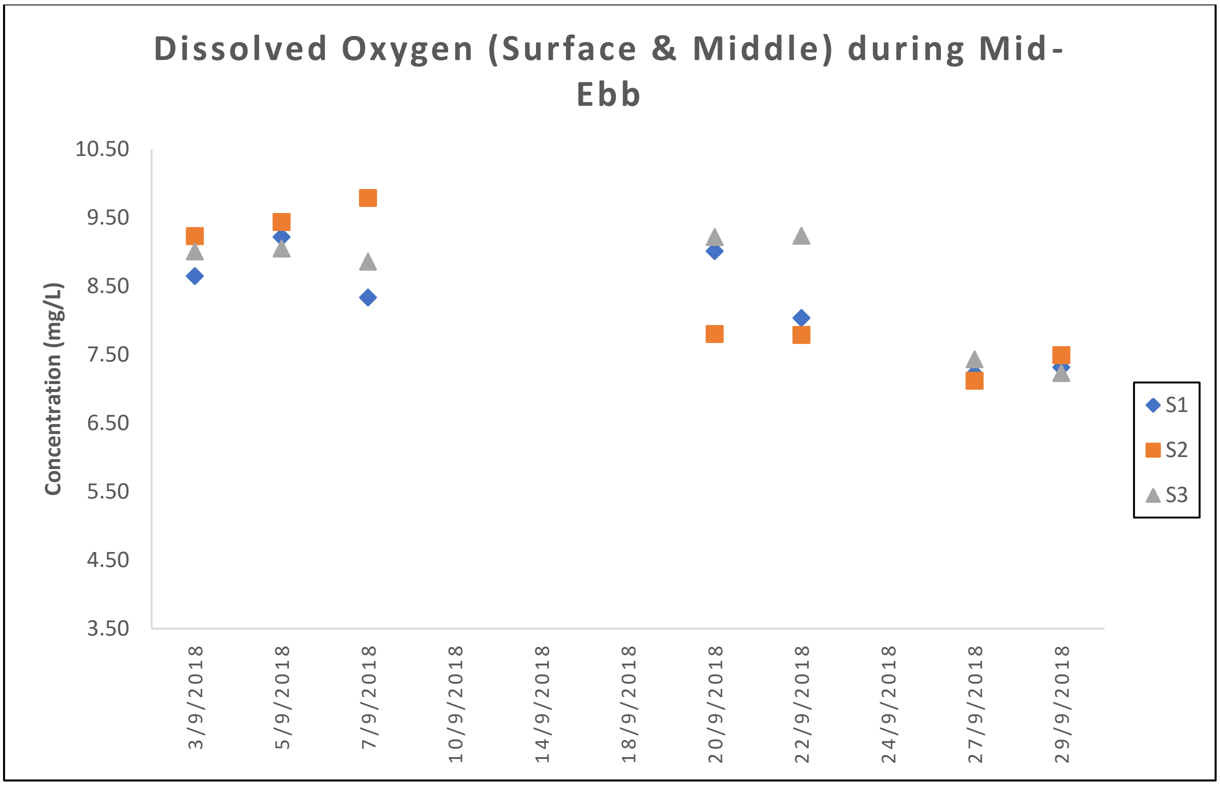
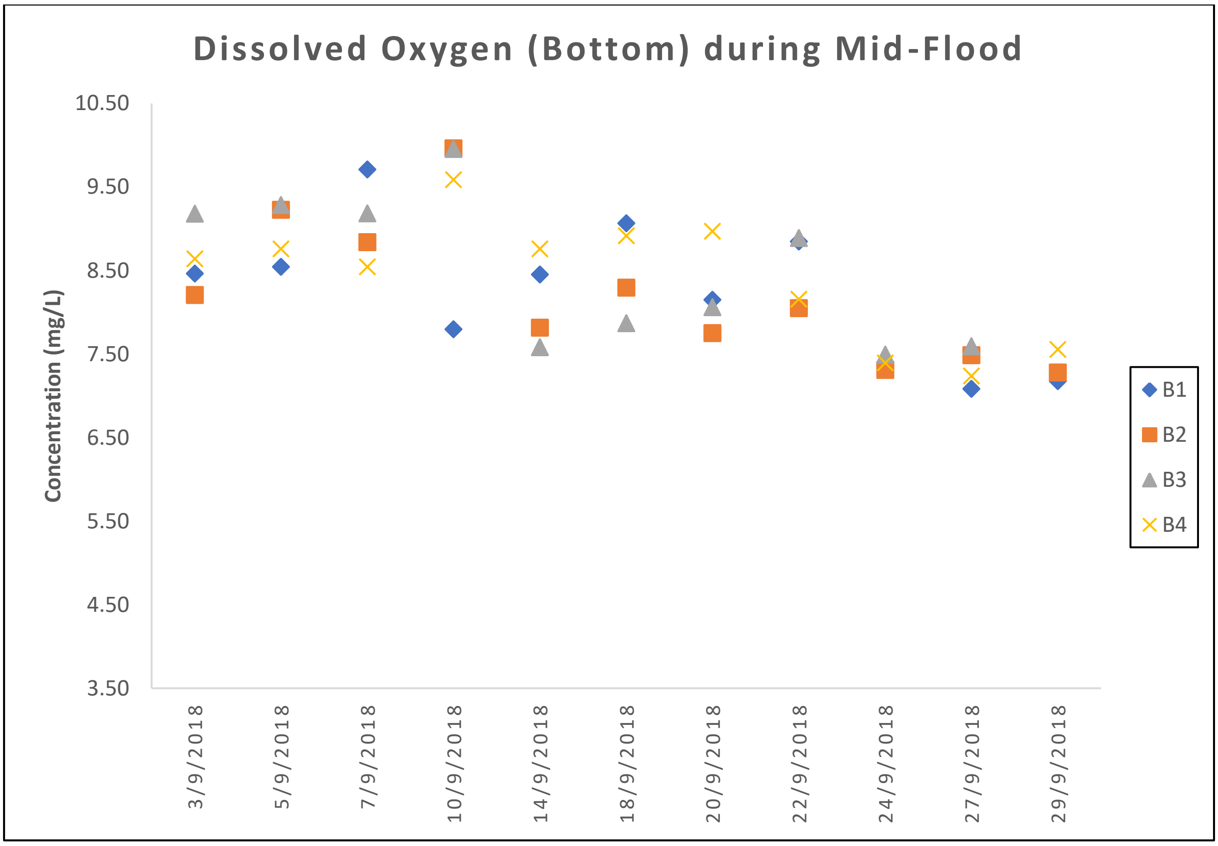
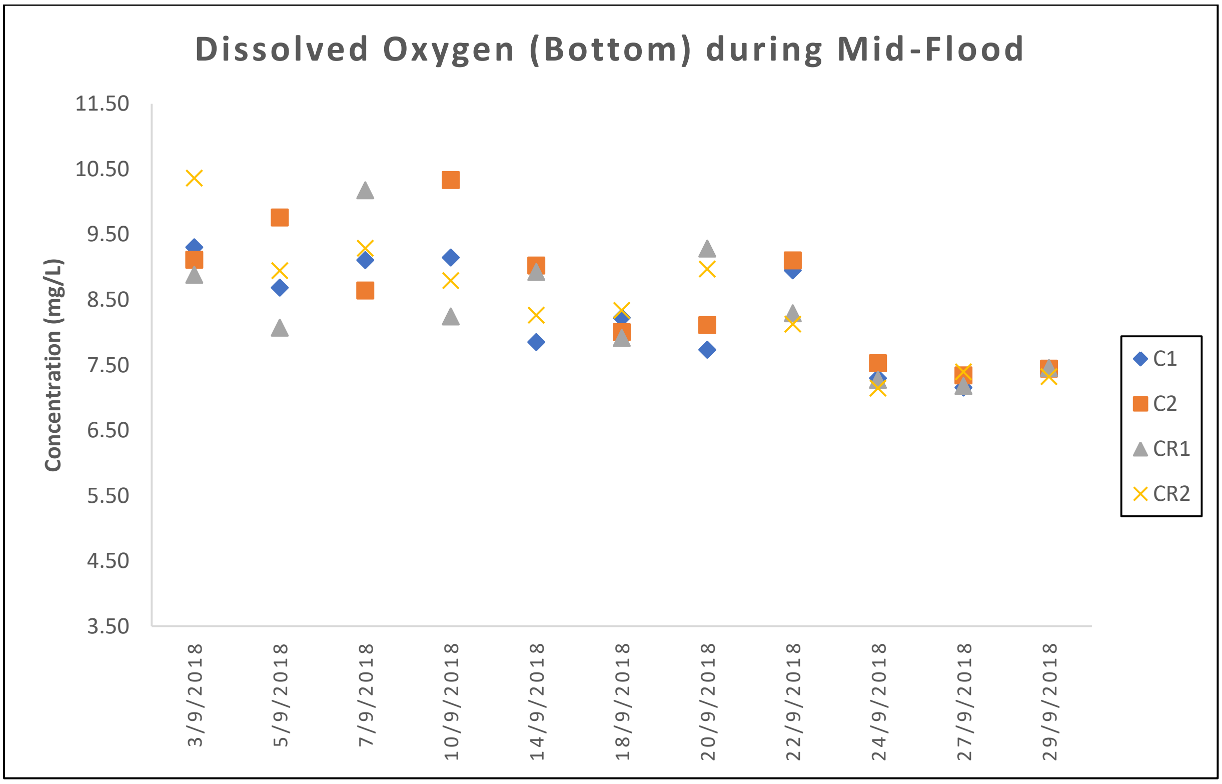




Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





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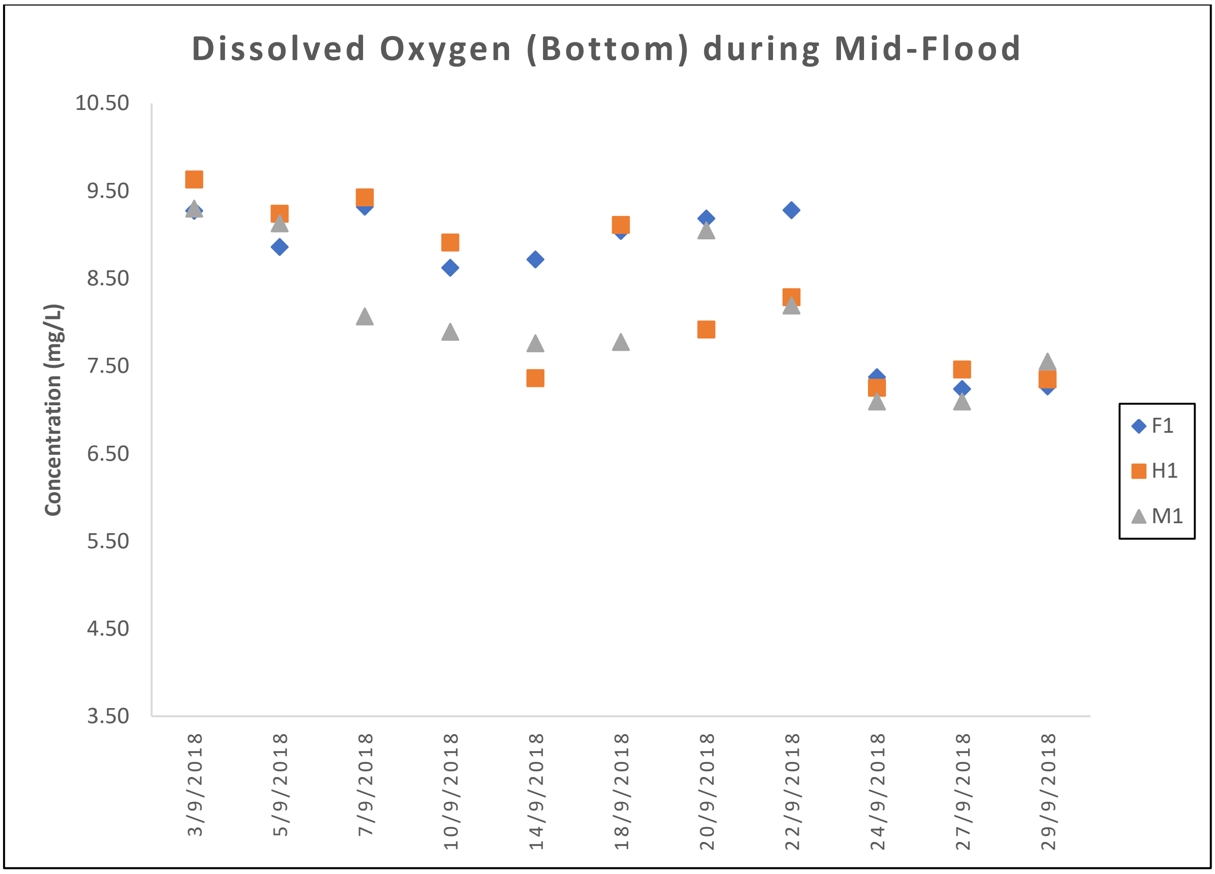

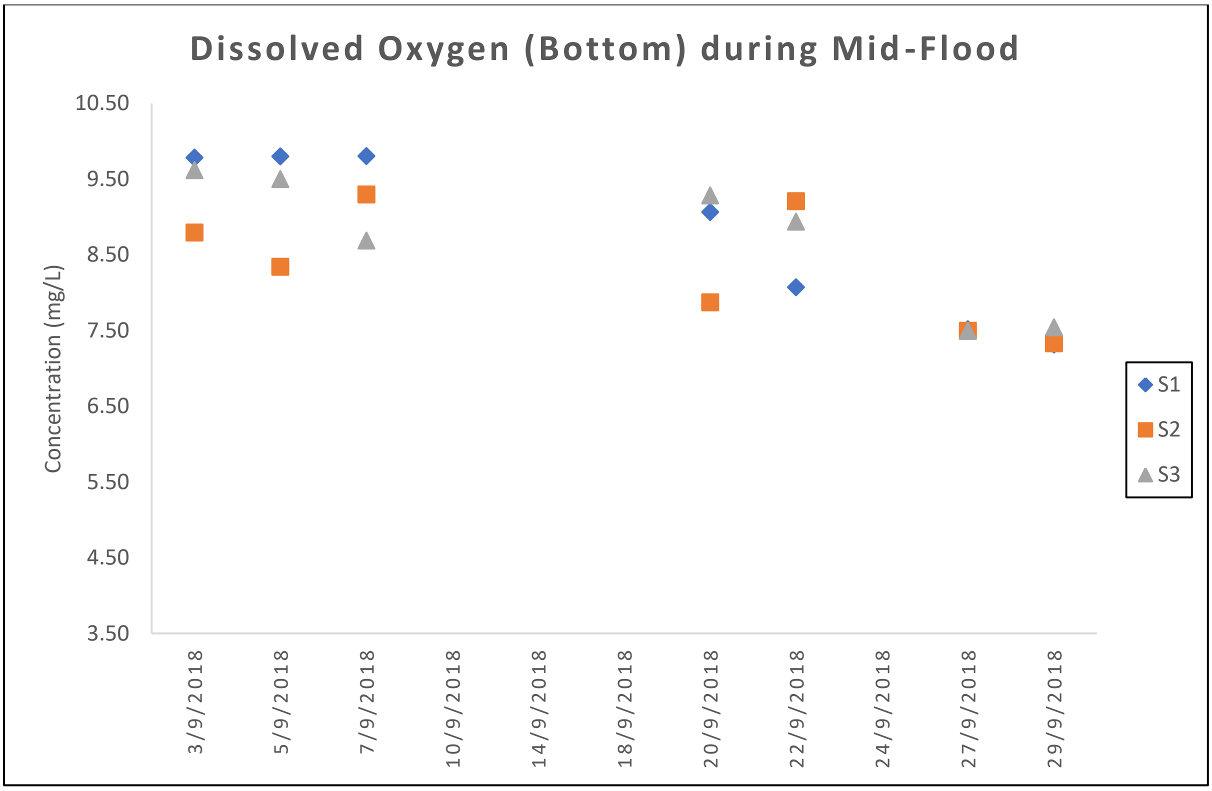

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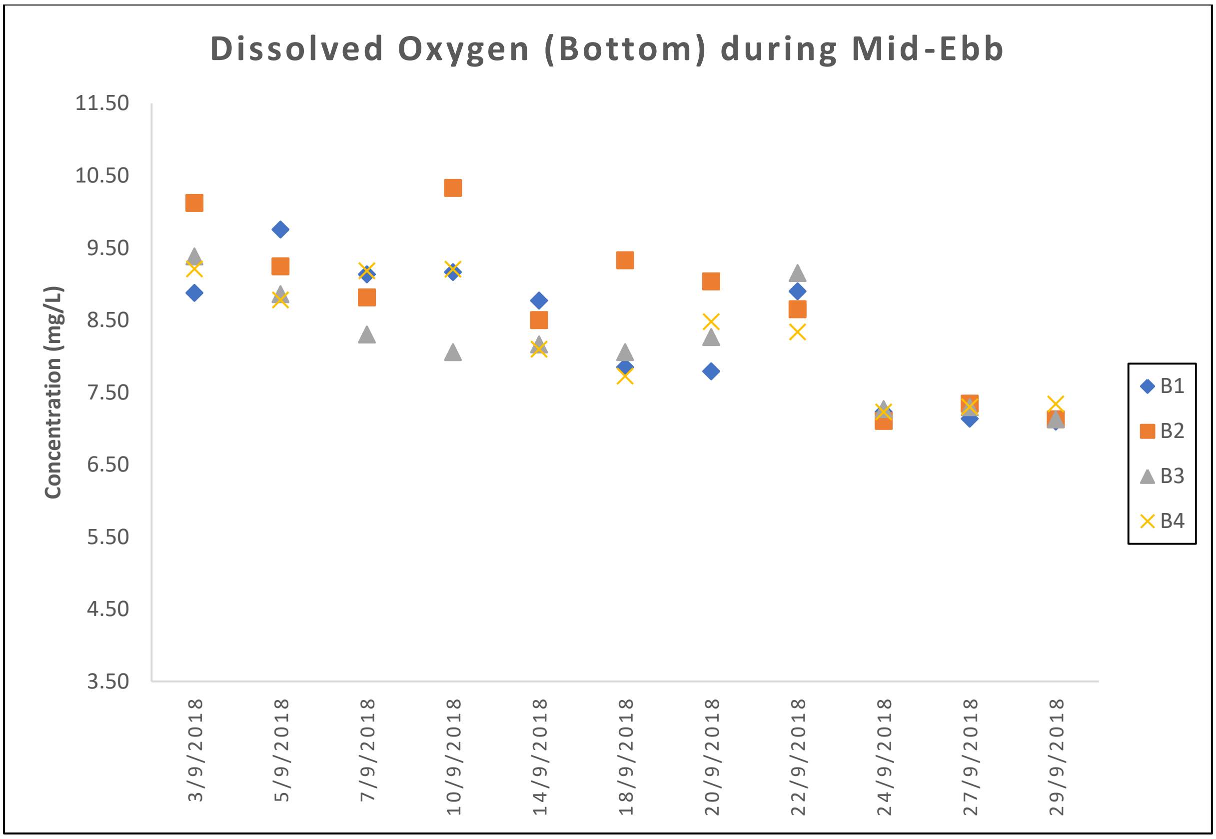

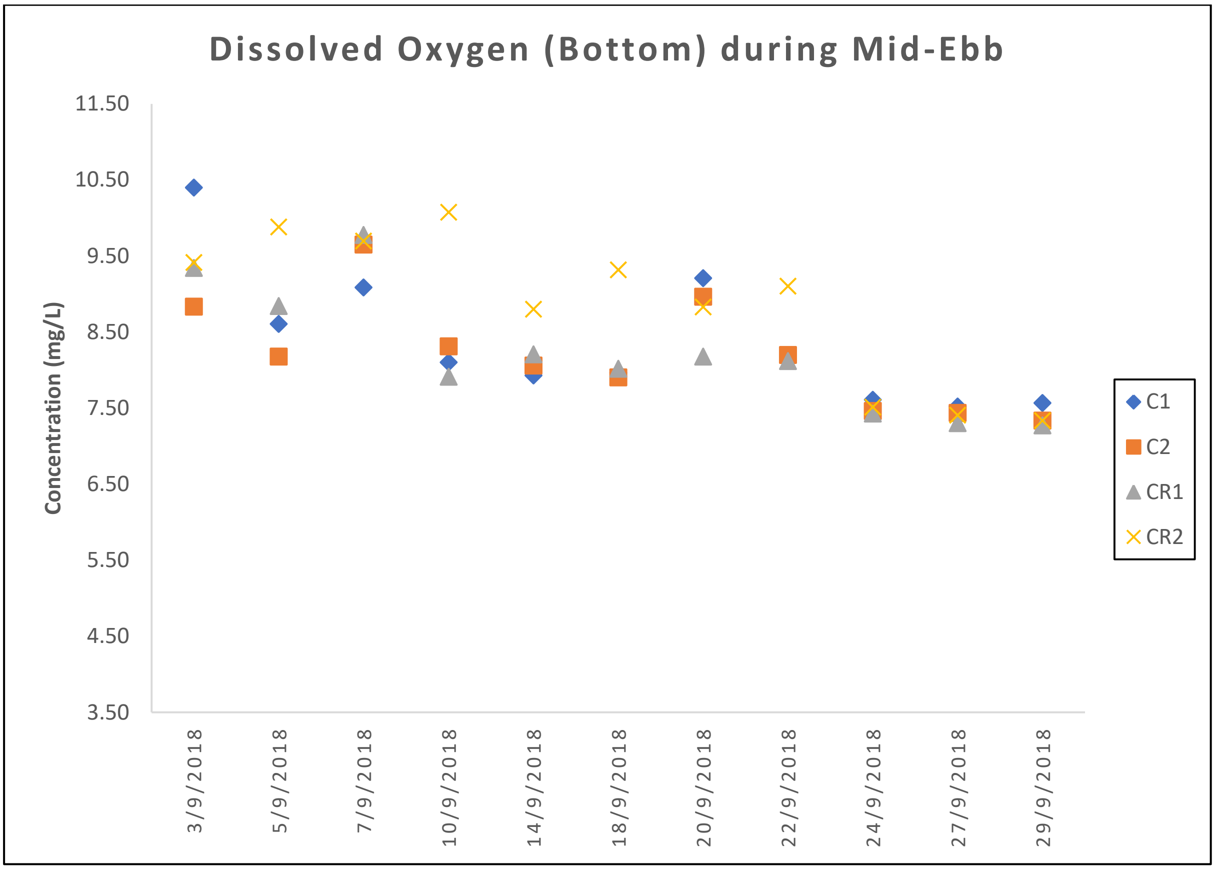

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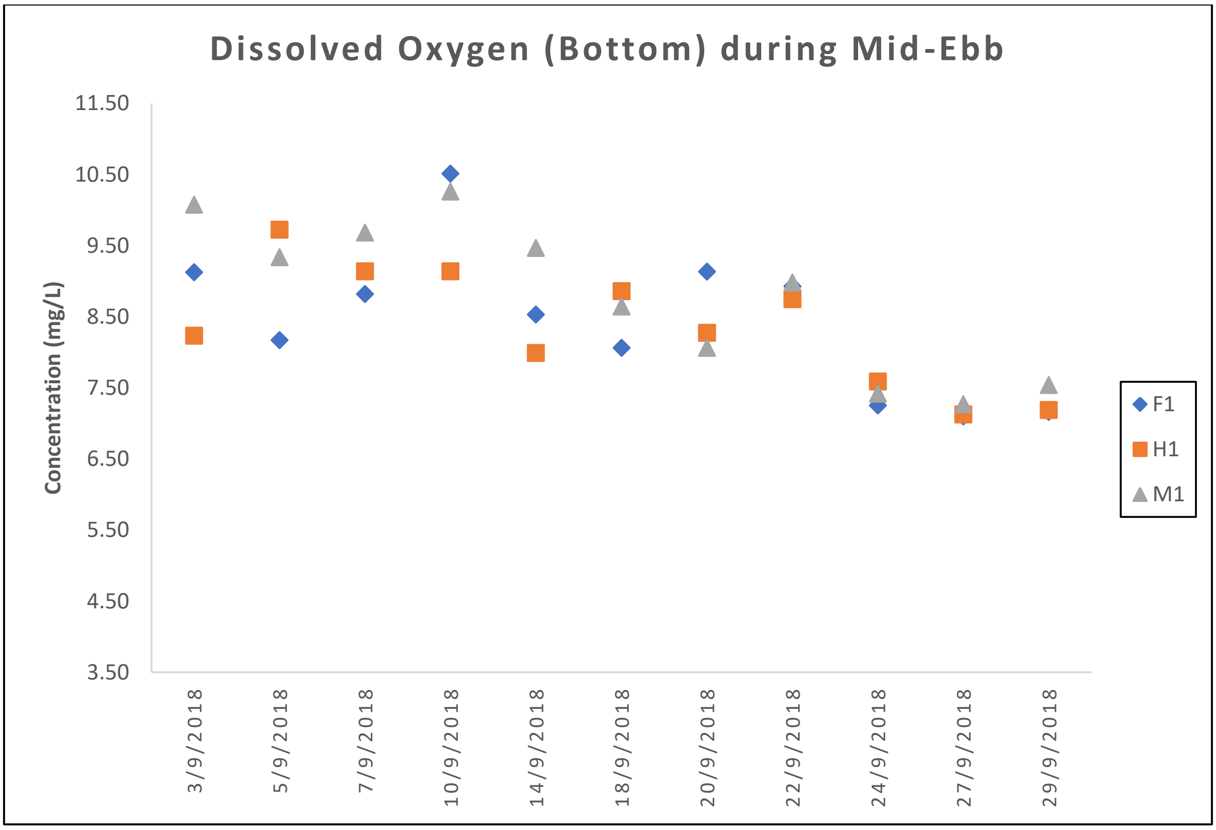
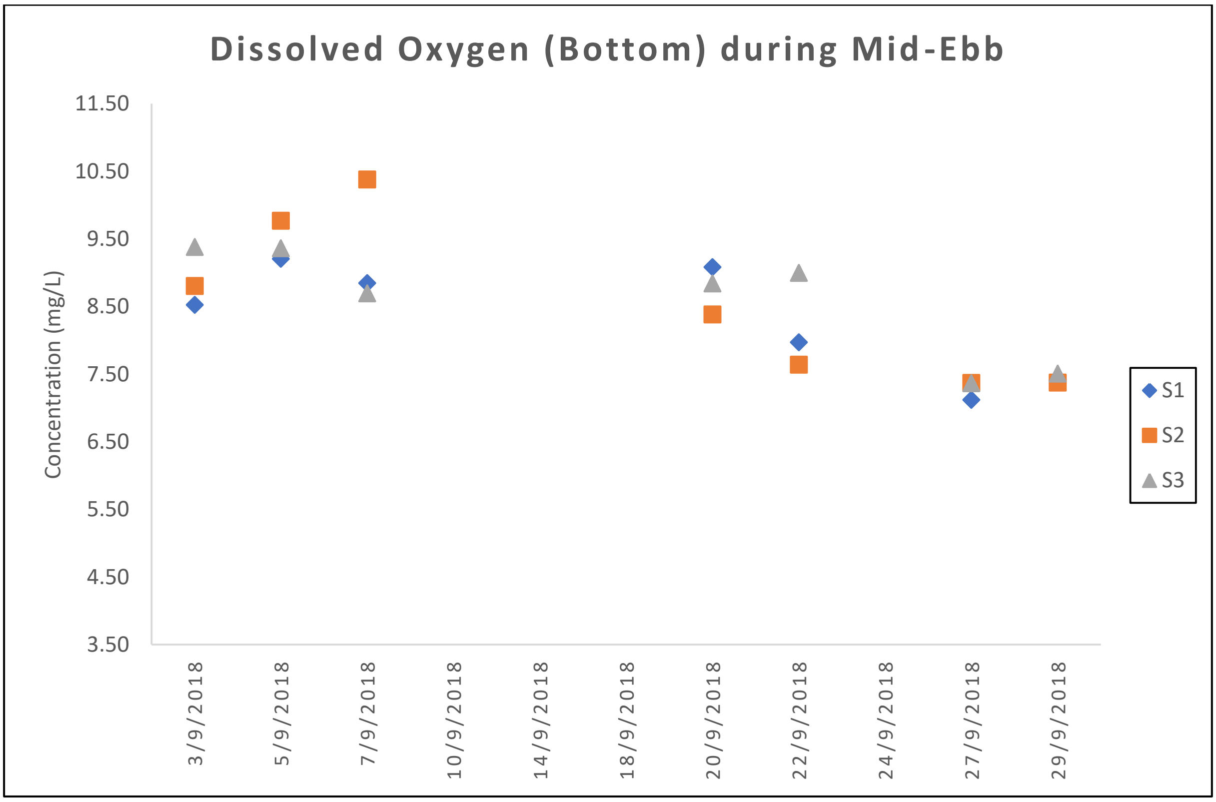
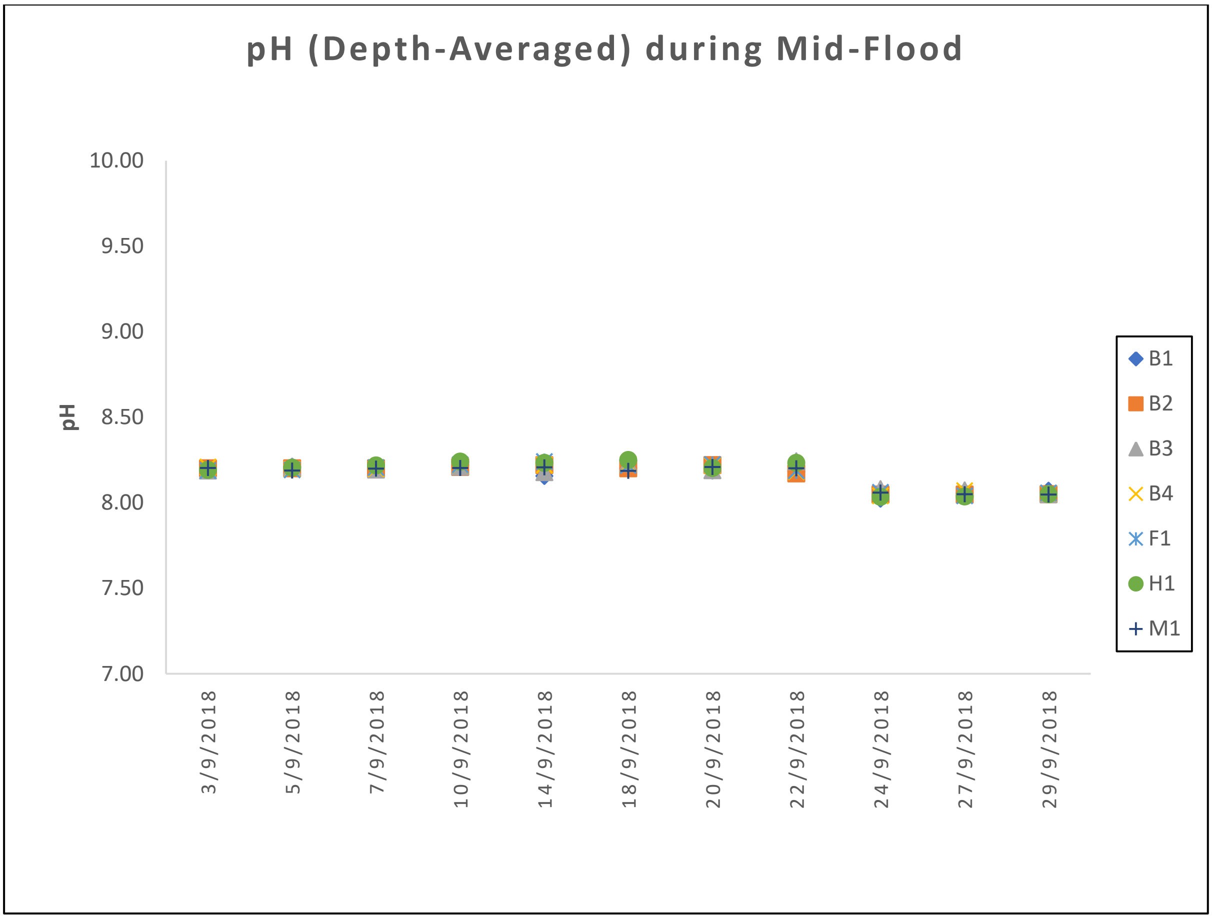
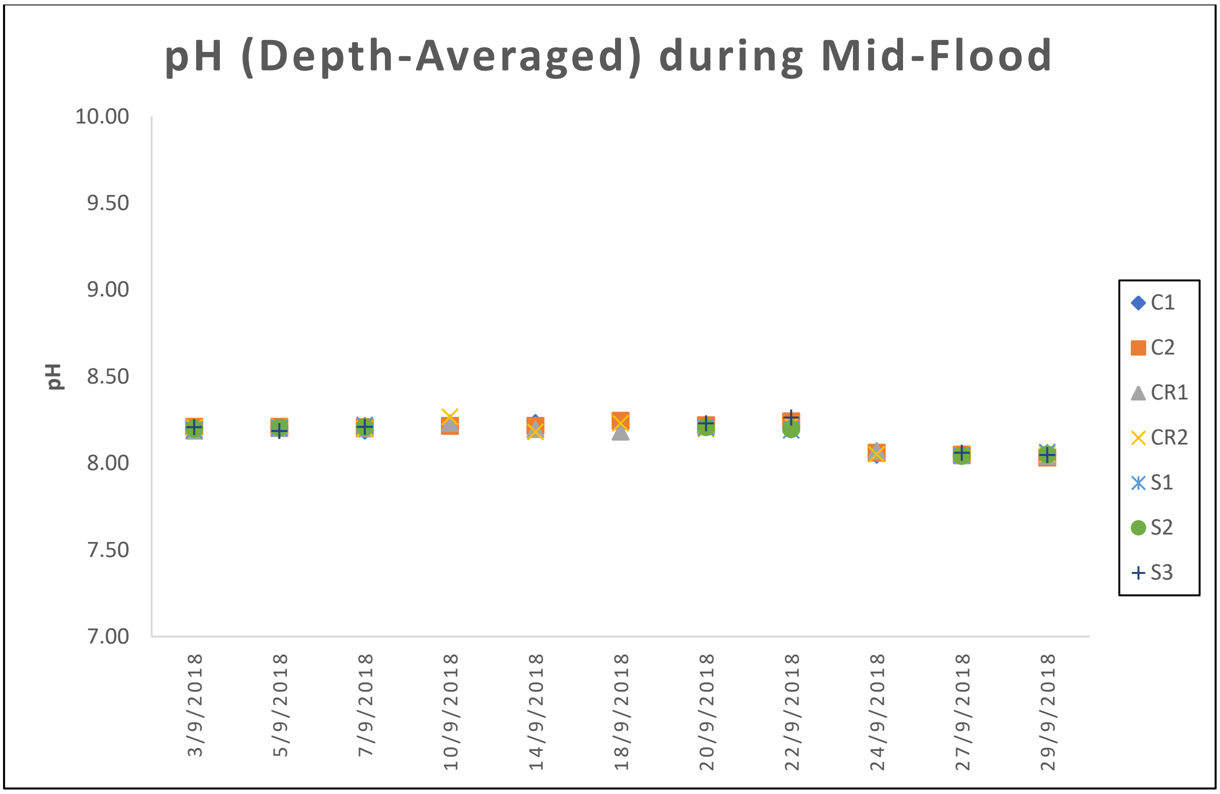




Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





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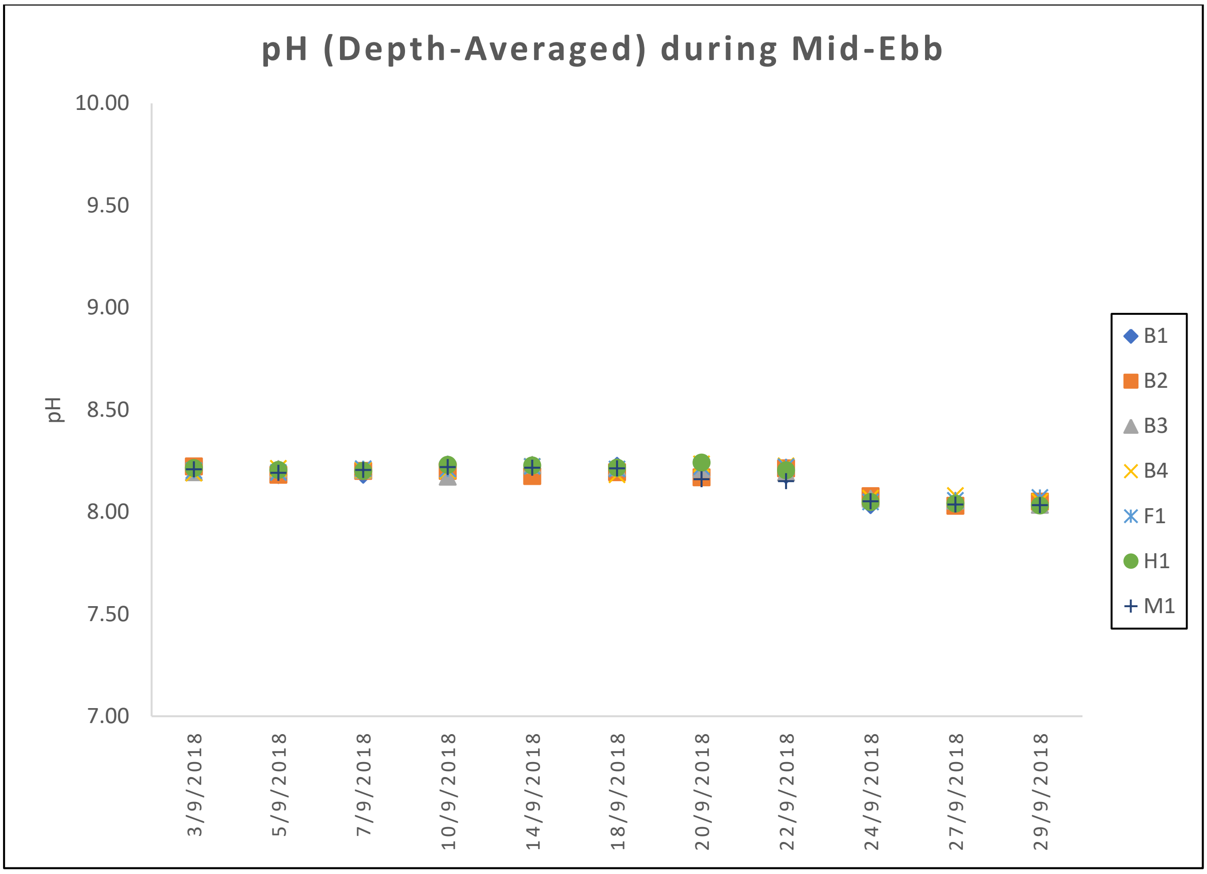

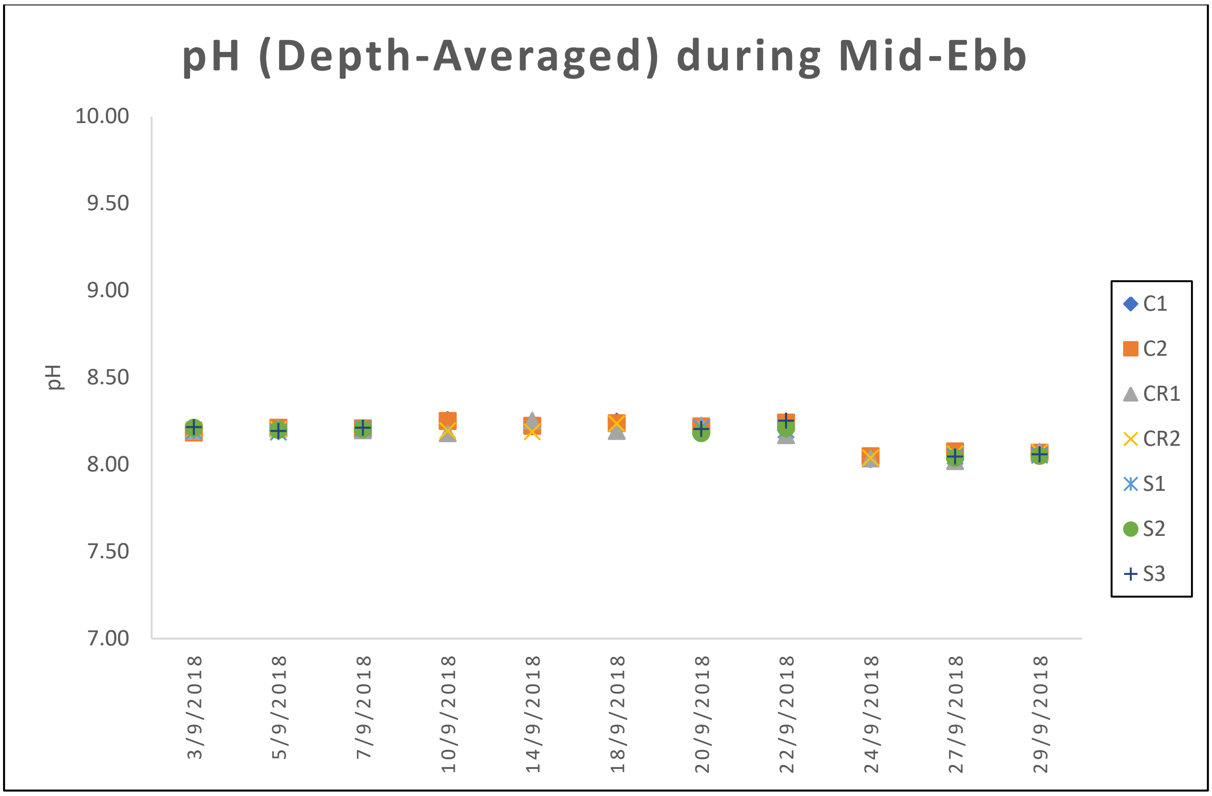

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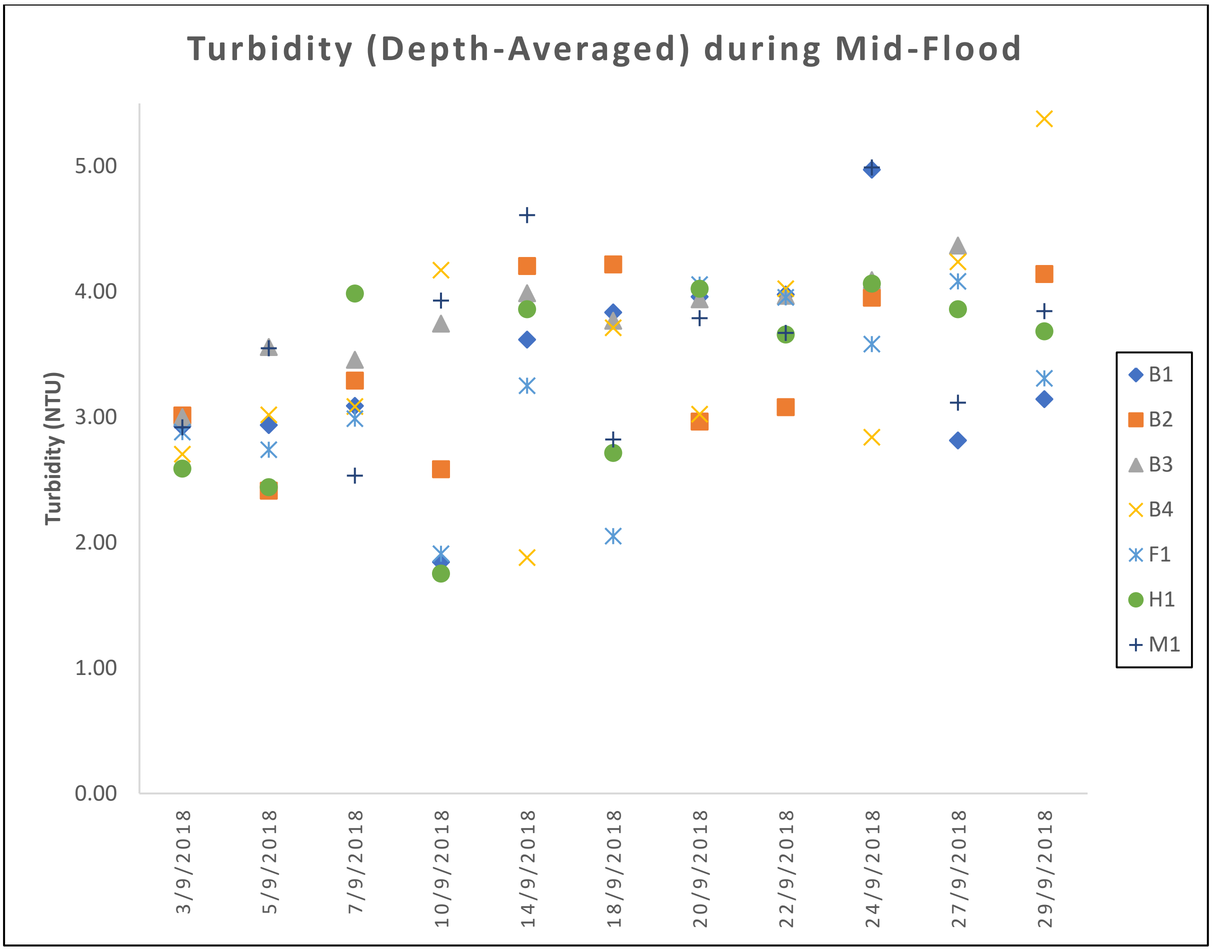
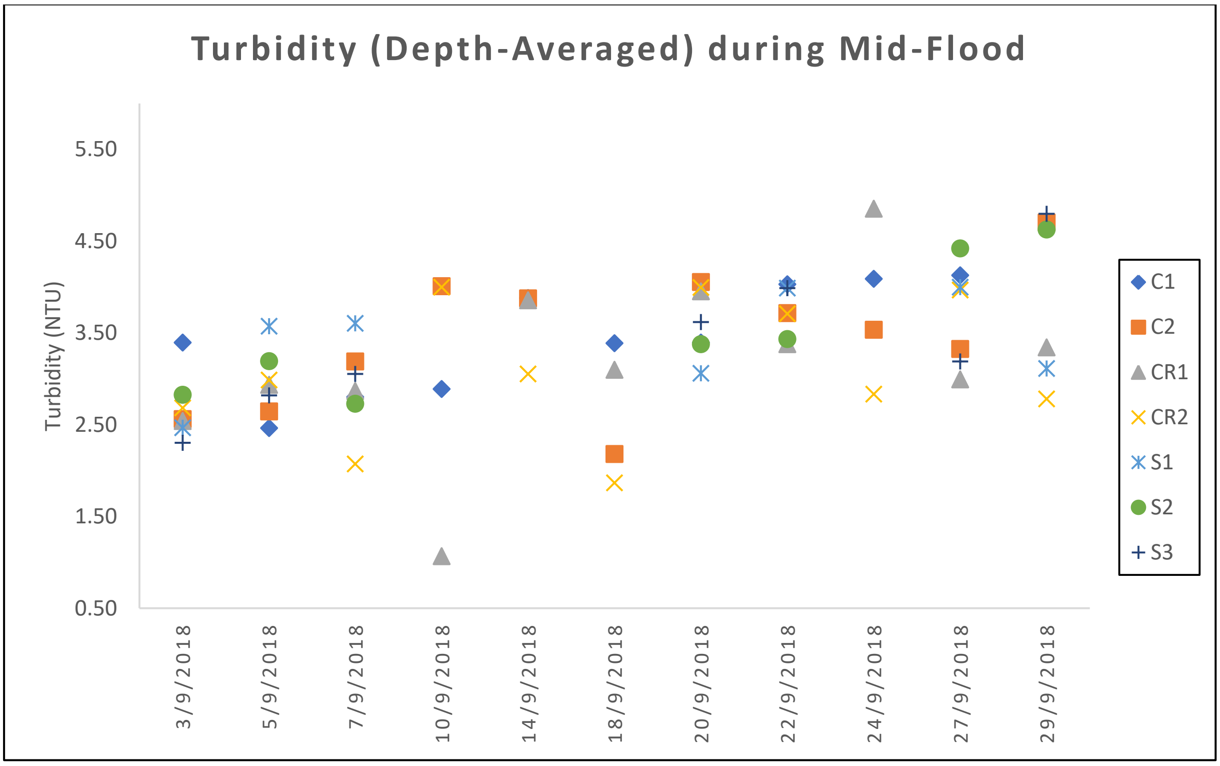
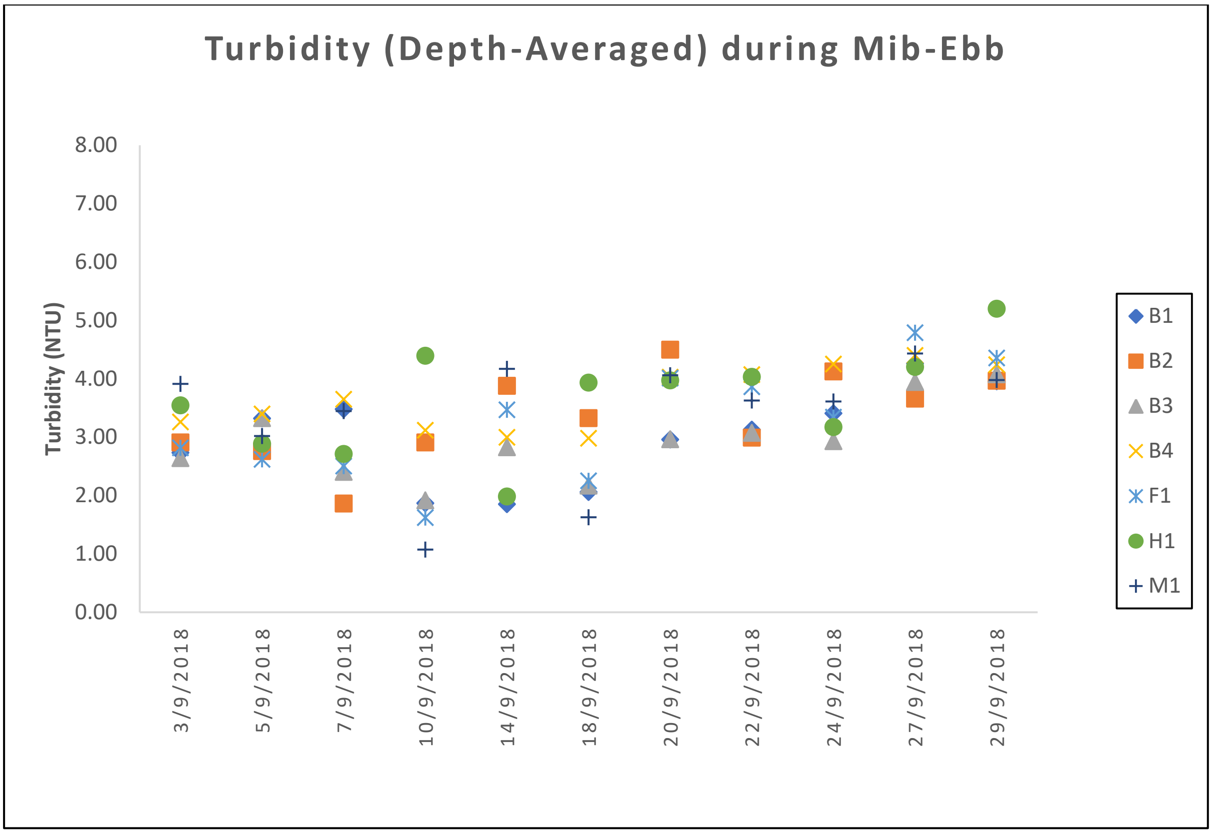
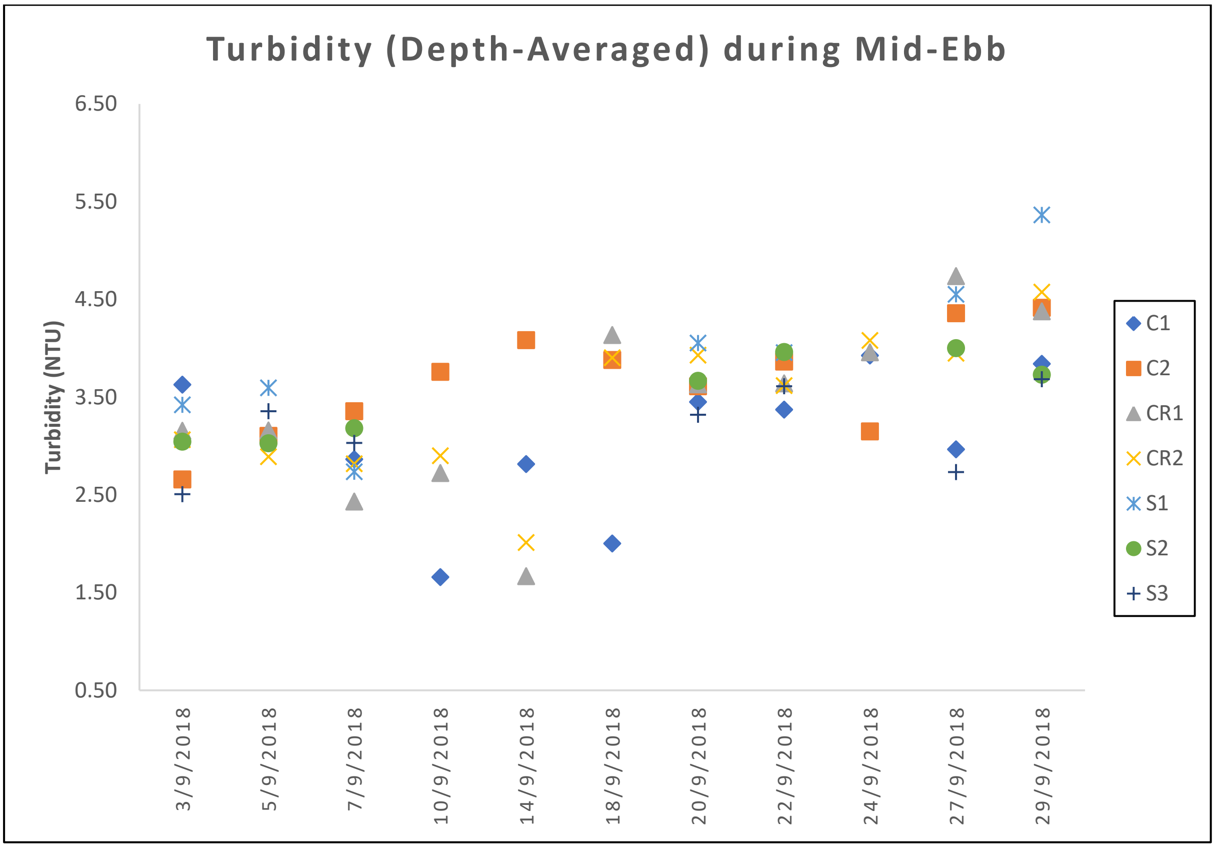




Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





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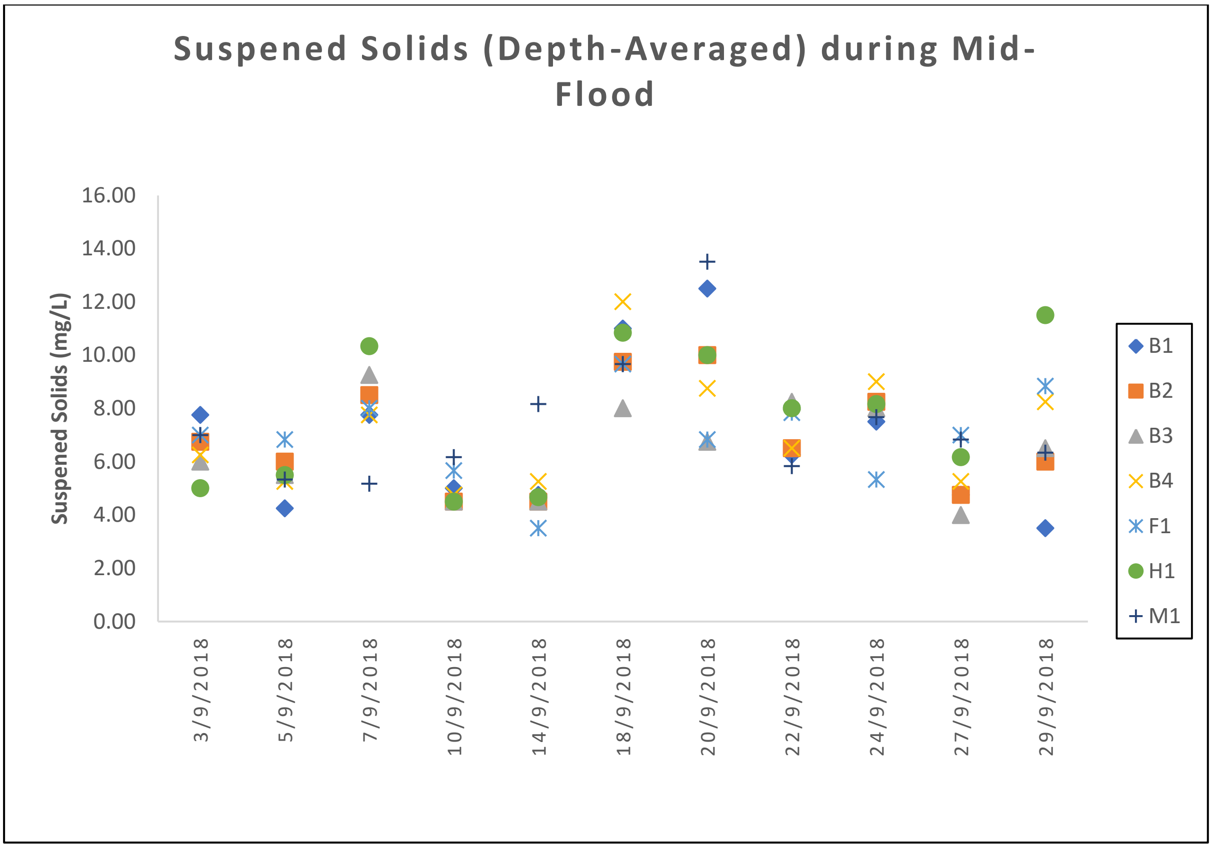

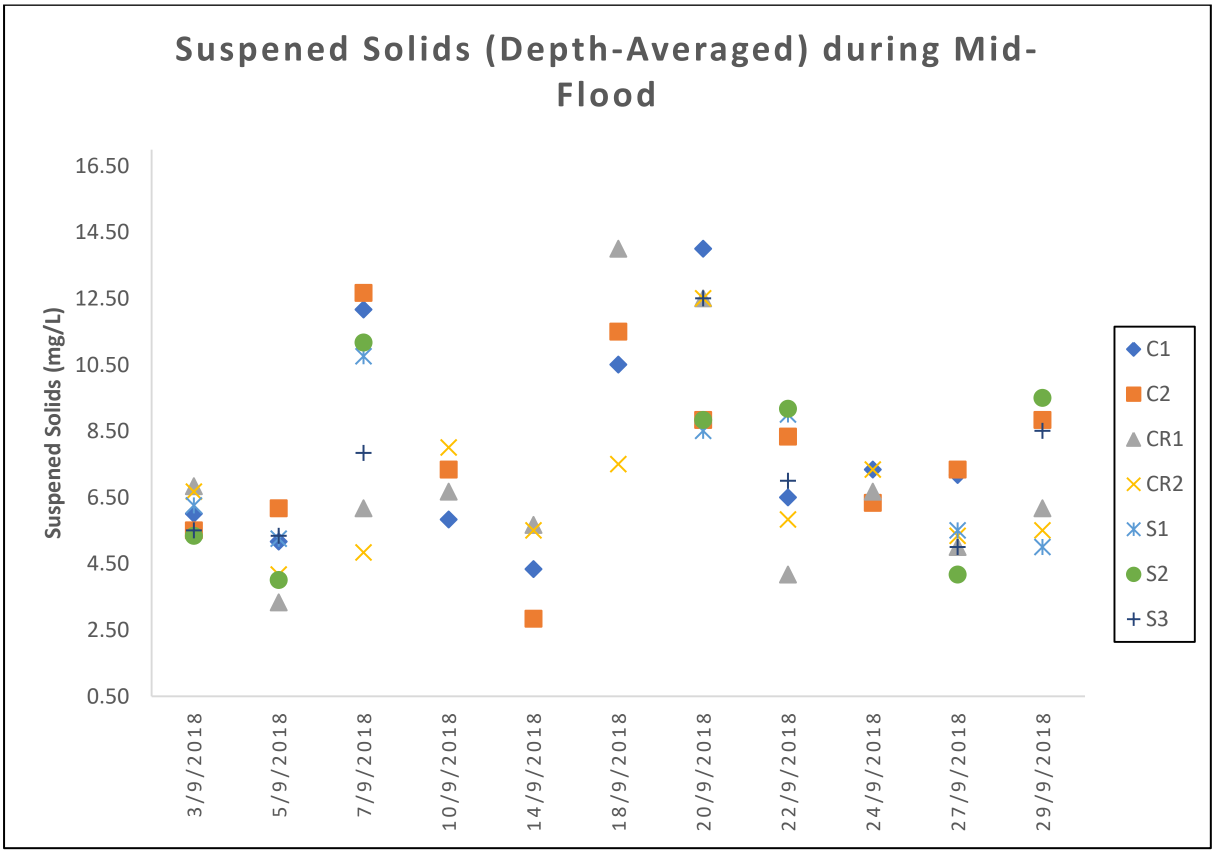

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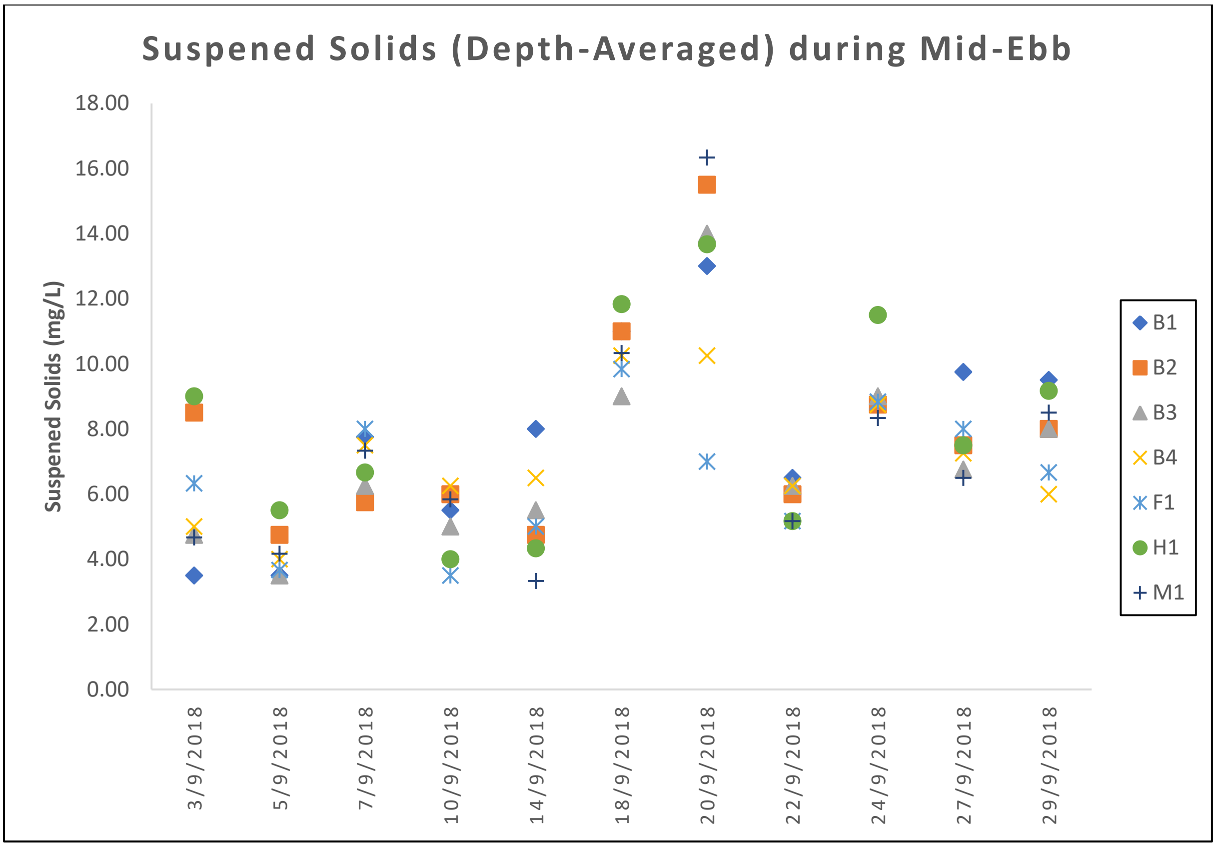
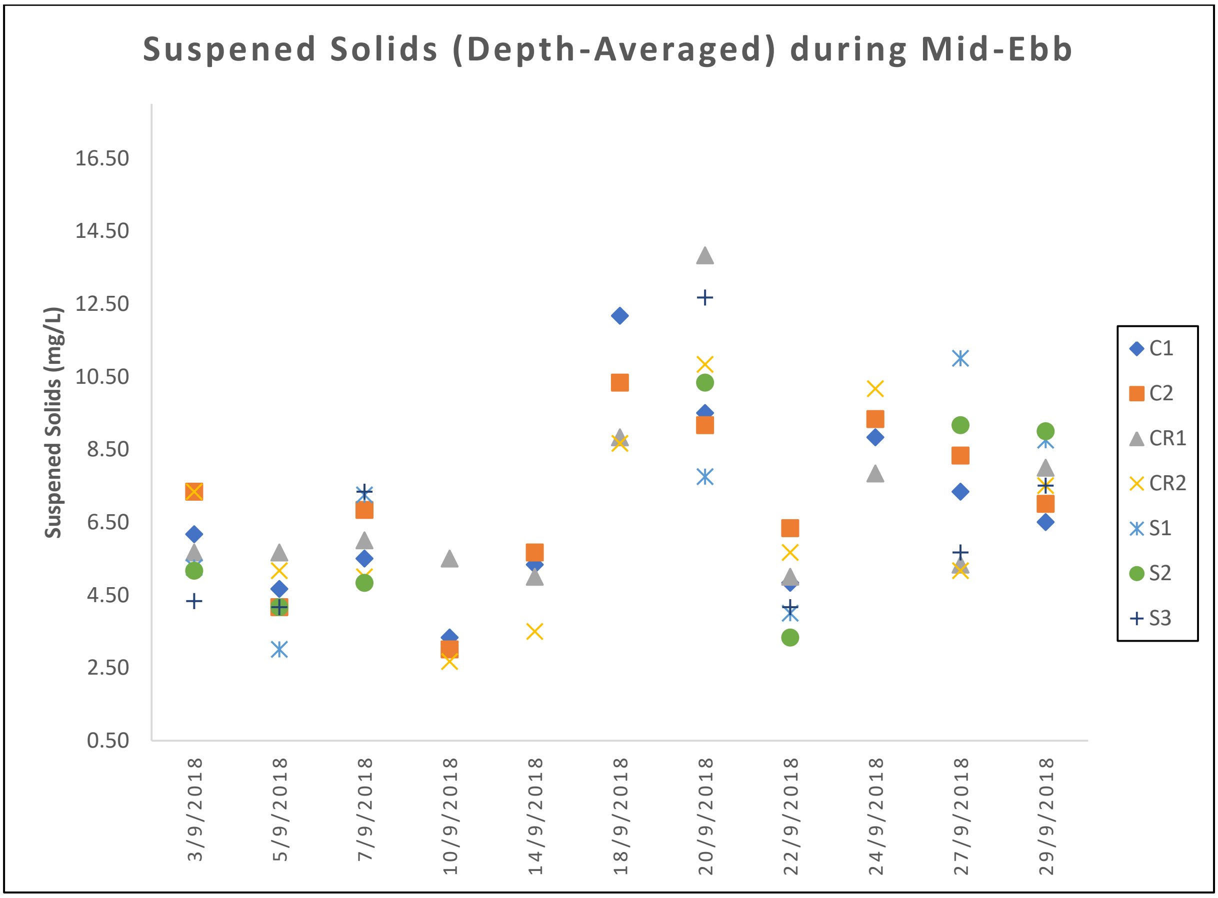
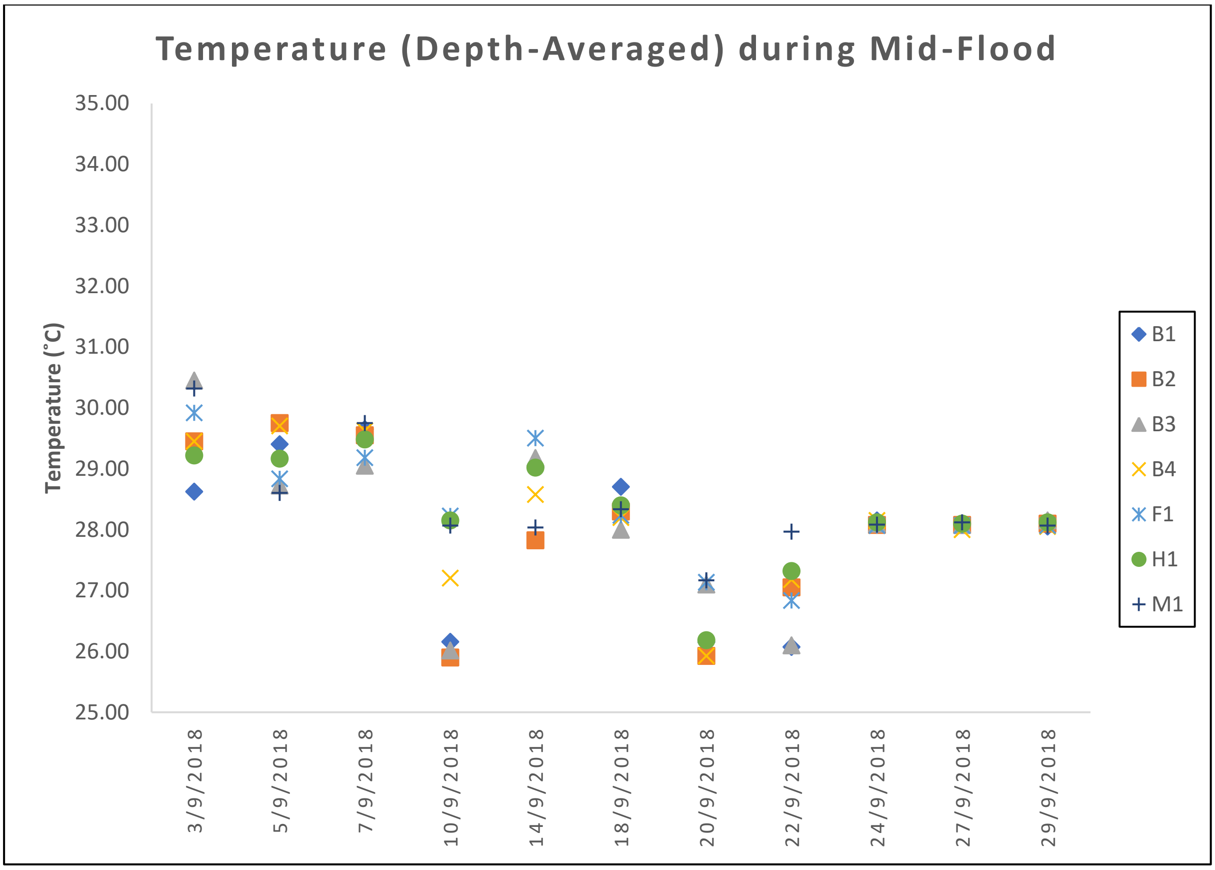
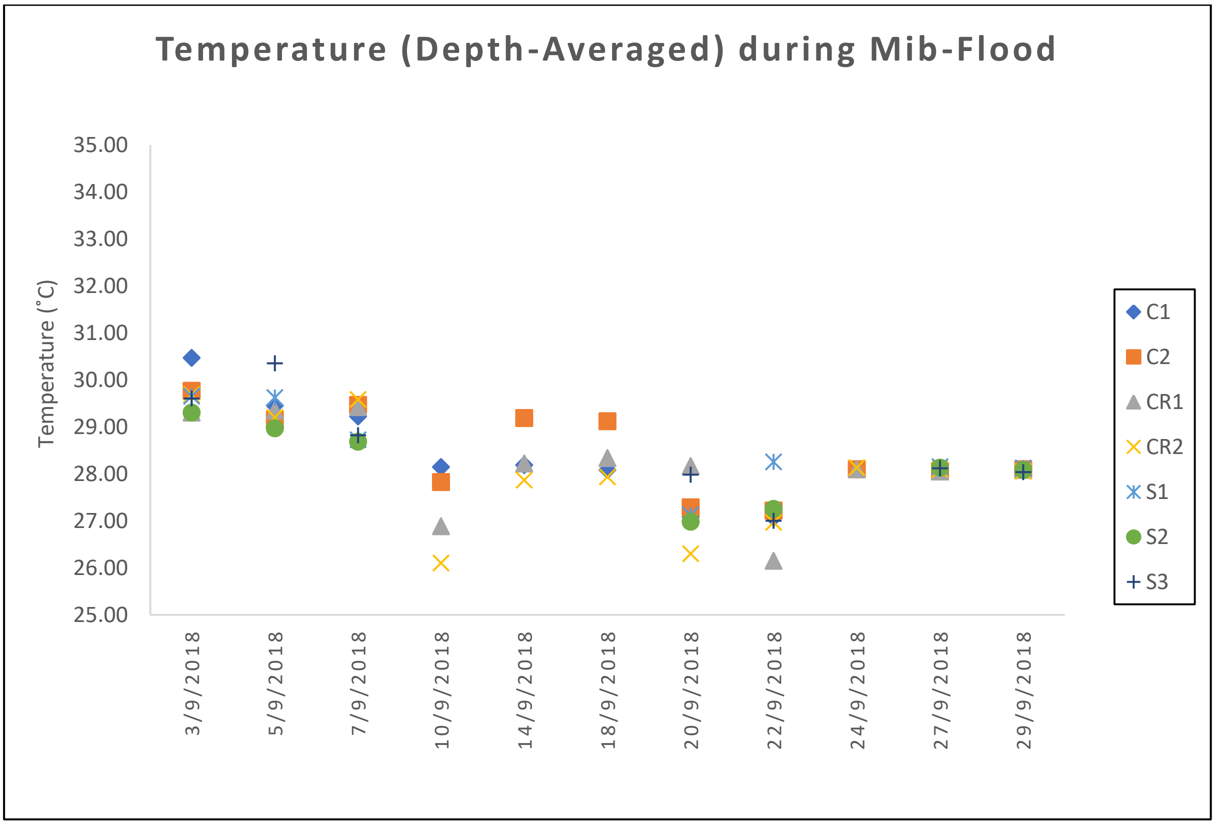


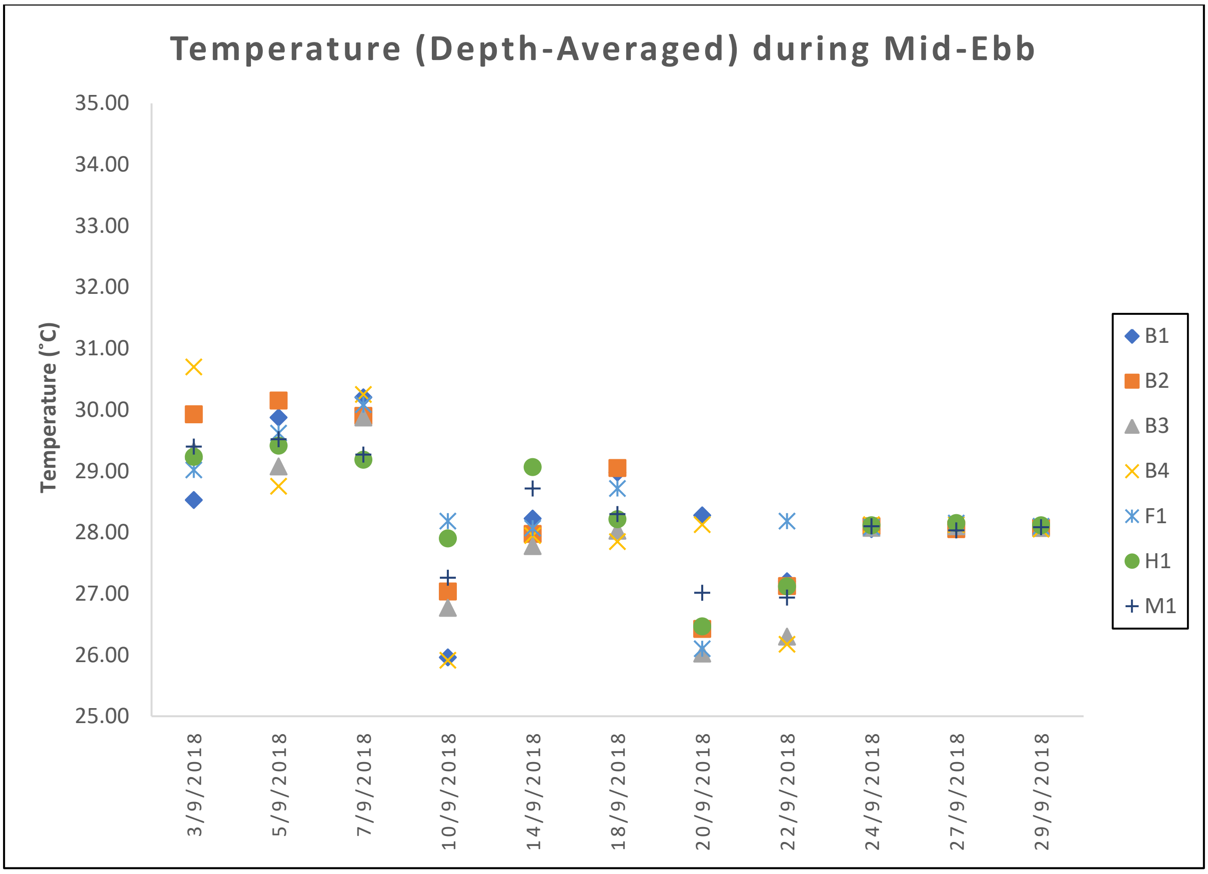


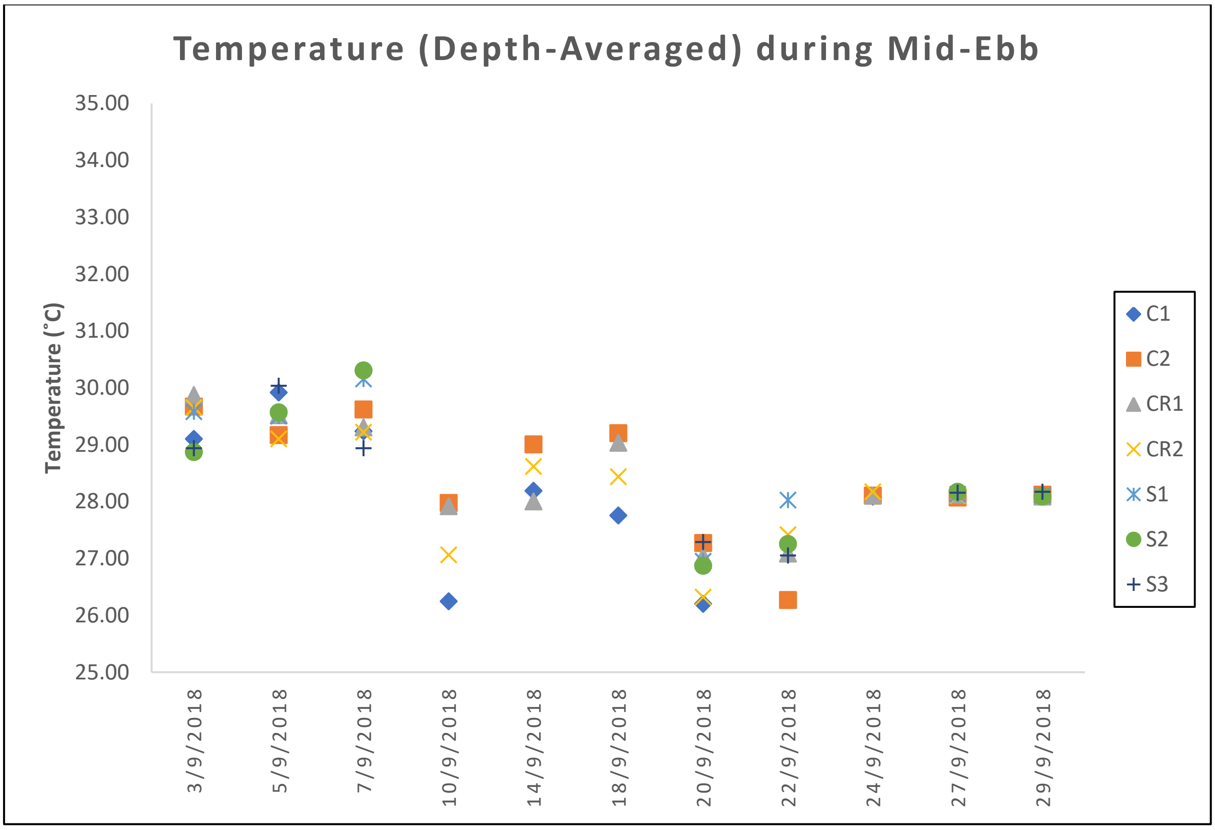
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.





Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.7** of the monthly EM & A report.

Appendix E HOKLAS Laboratory Certificate

Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a
為香港認可處執行機關根據認可諮詢委員會建議而接受的

HOKLAS Accredited Laboratory
「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO / IEC 17025 : 2005 – General requirements for the competence
此實驗所符合ISO / IEC 17025 : 2005 –《測試及校正實驗所能力的通用規定》所訂的要求，
of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as
獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定
listed in the HOKLAS Directory of Accredited Laboratories within the test category of
測試或校正工作

Environmental Testing
環境測試

This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作
quality management system (see joint IAF-ILAC-ISO Communiqué).
（見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報）。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator
執行幹事 陳成城
Issue Date : 5 May 2009
簽發日期：二零零九年五月五日

Registration Number : HOKLAS 066
註冊號碼：

Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日

This certificate is issued subject to the terms and conditions laid down by HKAS
本證書按照香港認可處訂立的條款及條件發出

L 000552

Invalid if printed

Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ACUMEN LABORATORY AND TESTING LIMITED
浩科檢測中心有限公司

Lot 12, Tam Kon Shan Road, North Tsing Yi, New Territories, Hong Kong
香港新界青衣北担杆山路12路段

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a
在認可諮詢委員會的建議下獲香港認可處執行機關接受為

HOKLAS Accredited Laboratory
「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO/IEC 17025:2005 and it has been accredited for performing specific tests or calibrations as listed in the scope of accreditation within the test category of

Environmental Testing

此實驗所符合ISO/IEC 17025:2005所訂的要求
並獲認可進行載於認可範圍內下述測試類別中的指定測試或校正工作

環境測試

This accreditation to ISO/IEC 17025:2005 demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).
此項 ISO/IEC 17025:2005 的認可資格證明此實驗所具備指定範疇內所須的技術能力並實施一套實驗所質量管理體系(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive
現經香港認可處執行機關授權在此蓋上香港認可處的印章

WONG Wang-wah, Executive Administrator
執行幹事 黃宏華
Issue Date : 16 July 2014
簽發日期：二零一四年七月十六日

Registration Number : HOKLAS 241
註冊號碼：

Date of First Registration : 16 July 2014
首次註冊日期：二零一四年七月十六日

This certificate is issued subject to the terms and conditions laid down by HKAS
本證書按照香港認可處訂立的條款及條件發出

L 001195

Invalid if printed

Appendix F Water Quality Equipment Calibration Certificate

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR NELSON TSUI	**WORK ORDER:**	HK1835956
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD		
ADDRESS:	LOT 11, TAM KON SHAN ROAD, TSING YI (NORTH), N.T. HONG KONG	**SUB-BATCH:** **LABORATORY:** **DATE RECEIVED:** **DATE OF ISSUE:**	0 HONG KONG 26-Jun-2018 13-Aug-2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen, pH Value, Turbitidy, Salinity, Redox Potential and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	HORIBA Water Quality Monitor
Model No.:	U-5000
Serial No.:	BGYP9CKD
Equipment No.:	--
Date of Calibration:	04 July, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu
Assistant Manager - Inorganic

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1835956

SUB-BATCH: 0
DATE OF ISSUE: 13-Aug-2018
CLIENT: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter
Brand Name: HORIBA Water Quality Monitor
Model No.: U-5000
Serial No.: BGYP9CKD
Equipment No.: --
Date of Calibration: 25 July, 2018 Date of Next Calibration: 04 October, 2018

PARAMETERS:

Dissolved Oxygen **Method Ref: APHA (21st edition), 4500-O: G**

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.90	3.09	+0.19
5.35	5.51	+0.16
7.56	7.62	+0.06
	Tolerance Limit (mg/L)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1835956

SUB-BATCH: 0
DATE OF ISSUE: 13-Aug-2018
CLIENT: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter
Brand Name: HORIBA Water Quality Monitor
Model No.: U-5000
Serial No.: BGYP9CKD
Equipment No.: --
Date of Calibration: 04 July, 2018 Date of Next Calibration: 04 October, 2018

PARAMETERS:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.95	-0.05
7.0	6.84	-0.16
10.0	10.08	+0.08
	Tolerance Limit (pH unit)	±0.20

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.78	--
4	4.06	+1.5
40	36.1	-9.8
80	78.9	-1.4
400	409	+2.3
800	809	+1.1
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1835956

SUB-BATCH: 0
DATE OF ISSUE: 13-Aug-2018
CLIENT: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter
Brand Name: HORIBA Water Quality Monitor
Model No.: U-5000
Serial No.: BGYP9CKD
Equipment No.: --
Date of Calibration: 04 July, 2018 Date of Next Calibration: 04 October, 2018

PARAMETERS:

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.90	-1.0
20	19.50	-2.5
30	28.30	-5.7
	Tolerance Limit (%)	±10.0

Redox Potential

Method Ref: APHA (21st edition), 2580B
Method Ref: Orion Research Instruction Manual and the Laboratory Manual the Environmental of Water, Wastewater and Soil (2nd edition), Rump & Krist (1992)

Expected Reading (mV)	Displayed Reading (mV)	Difference of A and B (mV)
Solution A (~234mV)	188	
Solution B (~300mV)	272	+84
	Tolerance Limit (mV)	>66

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	11.27	+0.8
21.0	21.64	+0.6
40.0	39.43	-0.6
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1835956

SUB-BATCH: 0
DATE OF ISSUE: 13-Aug-2018
CLIENT: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter
Brand Name: HORIBA Water Quality Monitor
Model No.: U-5000
Serial No.: BGYP9CKD
Equipment No.: --
Date of Calibration: 04 July, 2018

PARAMETERS:

Dissolved Oxygen **Method Ref: APHA (21st edition), 4500-O: G**

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (%)
3.30	no readable reading	N/A
5.49	no readable reading	N/A
7.80	no readable reading	N/A
	Tolerance Limit (mg/L)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu
Assistant Manager - Inorganic

Appendix G Event / Action Plan for Water Quality Exceedance

Event	Action			
	ET	IEC	SO	Contractor
Action level being exceeded by one sampling day	Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Repeat measurement on next day of exceedance. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SO accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the SO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and SO within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)
Action level being exceeded by more than one consecutive sampling days	Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next working day of exceedance. (The above actions should be taken within 1 working day after Action Level being exceeded by two consecutive sampling days)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SO accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after Action Level being exceeded by two consecutive sampling days)	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented. Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after Action Level being exceeded by two consecutive sampling days)	Inform the SO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and SO within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after Action Level being exceeded by two consecutive sampling days)

Event	Action			
	ET	IEC	SO	Contractor
Limit level being exceeded by one sampling day	Inform the SO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with Contractor, IEC and SO and propose mitigation measures to IEC and SO within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SO accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented. Assess the effectiveness of the implemented measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the SO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and SO and propose mitigation measures to IEC and SO within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)

Event	Action			
	ET	IEC	SO	Contractor
Limit level being exceeded by more than one consecutive sampling days	Identify source(s) of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods. Discuss mitigation measures with IEC, SO and Contractor. Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. (The above actions should be taken within 1 working day after Limit Level being exceeded by two consecutive sampling days)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SO accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after Limit Level being exceeded by two consecutive sampling days)	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented. Assess the effectiveness of the implemented measures. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit level. (The above actions should be taken within 1 working day after Limit Level being exceeded by two consecutive sampling days)	Inform the SO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and SO and propose mitigation measures to IEC and SO within 3 working days; Implement the agreed mitigation measures; As directed by the SOR, to slow down or to stop all or part of the marine work or construction activities. (The above actions should be taken within 1 working day after Limit Level being exceeded by two consecutive sampling days)

Appendix H Noise Monitoring Equipment Calibration Certificate

輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C176148
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1542) Date of Receipt / 收件日期 : 26 October 2017

Description / 儀器名稱	:	Audio Analyzer
Manufacturer / 製造商	:	NTi
Model No. / 型號	:	XL2
Serial No. / 編號	:	A2A-09696-E0
Supplied By / 委託者	:	Acumen Environmental Engineering and Technologies Co., Ltd. Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 3 November 2017

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : K C Lee
測試 Engineer

Certified By : H C Chan
核證 Engineer

Date of Issue : 7 November 2017
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C176148
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration using the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.

3. The results presented are the mean of 3 measurements at each calibration point.

4 Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6 Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting			Applied Value		UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	A	FAST	94.00	1	93.9

6.1.1.2 After Self-calibration

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	A	FAST	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting			Applied Value		UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	A	FAST	94.00	1	94.0 (Ref.)
			104.00		104.0
			114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
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Certificate No. : C176148
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6.2 Time Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	A	FAST	94.00	1	94.0	Ref.
		SLOW			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	A	FAST	94.00	63 Hz	67.7	-26.2 ± 1.5
				125 Hz	77.8	-16.1 ± 1.5
				250 Hz	85.3	-8.6 ± 1.4
				500 Hz	90.7	-3.2 ± 1.4
				1 kHz	94.0	Ref.
				2 kHz	95.2	+1.2 ± 1.6
				4 kHz	95.0	+1.0 ± 1.6
				8 kHz	92.9	-1.1 (+2.1; -3.1)
				12.5 kHz	89.7	-4.3 (+3.0; -6.0)

6.3.2 C-Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	C	FAST	94.00	63 Hz	93.1	-0.8 ± 1.5
				125 Hz	93.8	-0.2 ± 1.5
				250 Hz	94.0	0.0 ± 1.4
				500 Hz	94.0	0.0 ± 1.4
				1 kHz	94.0	Ref.
				2 kHz	93.8	-0.2 ± 1.6
				4 kHz	93.2	-0.8 ± 1.6
				8 kHz	91.0	-3.0 (+2.1; -3.1)
				12.5 kHz	87.7	-6.2 (+3.0; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
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Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C176148
證書編號

Remarks : - Mfr's Spec. : IEC 61672 Class 2

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- UUT Microphone Model No. : MA220 (ACO7052) & S/N : 62324

- The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Sun Creation Engineering Limited Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C183253
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-1199) Date of Receipt / 收件日期 : 11 June 2018

Description / 儀器名稱	:	Acoustic Calibrator
Manufacturer / 製造商	:	Pulsar
Model No. / 型號	:	105
Serial No. / 編號	:	70396
Supplied By / 委託者	:	Acumen Environmental Engineering and Technologies Co., Ltd. Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 18 June 2018

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試 :

H T Wong
Technical Officer

Certified By
核證 :

K C Lee
Engineer

Date of Issue
簽發日期 : 20 June 2018

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
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c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C183253
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
TST150A	Measuring Amplifier	C181288
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	IEC60942:2003 Class 1 Spec.	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.8	± 0.4 dB	± 0.2

Mfr's Spec. : IEC60942:2003 Class 1

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Appendix I Event / Action Plan for Noise Exceedance

Event	Actions to be taken by Environmental Team as immediate as practicable	Actions to be taken by Independent Environmental Checker as immediate as practicable	Actions to be taken by Supervising Officer's Representative as immediate as practicable	Actions to be taken by Contractor as immediate as practicable
Action Level being exceeded	1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, SO and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness. (The above actions should be taken within 2 working .days after the exceedance is identified)	1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the SO accordingly; 3. Advise the SO on the effectiveness of the proposed remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified).	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified).	1. Submit noise mitigation proposals to IEC and SO; 2. Implement noise mitigation proposals. (The above actions should be taken within 2 working days after the exceedance is identified)
Limit Level being exceeded	1. Inform IEC, SO, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and SO on remedial measures required; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results; 8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; (The above actions should be taken within 2 working days after the exceedance is identified)	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and SO within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the SO until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified)

Appendix J Noise Monitoring Data

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1 (M1 / N_S1)
Monitoring date:	3, 10, 18 and 24 September 2018
Parameter:	$L_{eq\ 30min}$
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A)
03-09-2018	11:24	-	11:54	Cloudy	50.4
10-09-2018	11:30	-	12:00	Cloudy	49.3
18-09-2018	11:15	-	11:45	Sunny	48.2
24-09-2018	11:34	-	12:04	Cloudy	53.3

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2 (M2 / N_S2)
Monitoring date:	3, 10, 18 and 24 September 2018
Parameter :	$L_{eq\ 30min}$
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A)
03-09-2018	10:52	-	11:22	Cloudy	59.0
10-09-2018	10:58	-	11:28	Cloudy	59.3
18-09-2018	10:42	-	11:12	Sunny	55.7
24-09-2018	11:00	-	11:30	Cloudy	59.0

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3 (M3 / N_S3)
Monitoring date:	3, 10, 18 and 24 September 2018
Parameter :	$L_{eq\ 30min}$
Noise source other than construction activities from the Project:	Air-conditioning units nearby

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A)
03-09-2018	10:06	-	10:36	Cloudy	50.0
10-09-2018	10:11	-	10:41	Cloudy	46.9
18-09-2018	09:58	-	10:28	Sunny	49.0
24-09-2018	09:45	-	10:15	Cloudy	51.7

Appendix K Waste Flow Table

吉寶西格斯 - 振華聯營公司
Keppel Seghers - Zhen Hua Joint Venture

Monthly Summary Waste Flow Table for 2018

Project : Integrated Waste Management Facilities, Phase I — Contract No.: EP/SP/66/12

Month	Actual Quantities of Inert C&D Materials Generated Monthly								Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill Sand	Imported Fill Public fill	Imported Fill Rock	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste		Others, e.g. general refuse
	(in '000m³)	(in '000m³)	(in '000m³)	(in '000m³)	(in '000m³)	(in '000m³)			(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000L)	(in '000kg)
Jan	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2
Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct														
Nov														
Dec														
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2

Notes:
(1) Broken concrete for recycling into aggregates.
(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.

Appendix L Event / Action Plan for Coral Monitoring

Event	Action			
	ET Leader	IEC	SO	Contractor
Action Level Exceedance	1. Check monitoring data 2. Inform the IEC, SO ,and Contractor of the findings; 3. Increase the monitoring to at least once a month to confirm findings; 4. Propose mitigation measures for consideration	1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the SO accordingly.	1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make the agreement on the measures to be implemented.	1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.
Limit Level Exceedance	1. Undertake Steps 1-4 as in the Action Level Exceedance. If further exceedance of Limit Level, propose enhancement measures for consideration.	1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the SO accordingly.	1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make the agreement on the measures to be implemented.	1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

Appendix M Event / Action Plan for White-Bellied Sea Eagle

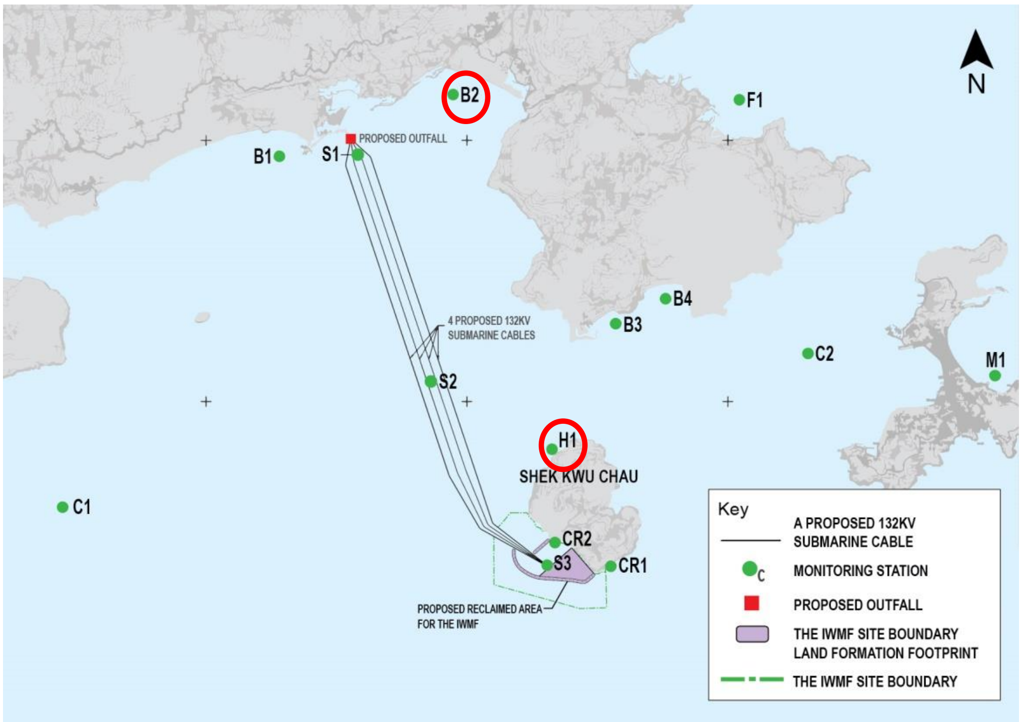
Event	Action		
	Environmental Team	**Audit Team**	**Contractor**
Absence of White-bellied Sea Eagle during a whole day of monitoring.	Inform audit team. Increase monitoring frequency to daily.	Inform site engineer and contractor. If the absence remains: • Review construction activities and noise monitoring records of the associated period; • Identify potential causes of the absence; • Propose remedial measures, such as change of construction method and sequence; • Confirm the feasibility of the proposed remedial measures with site engineer and contractor; • Discuss with environmental team about the effectiveness of the proposed remedial measures.	Implement the agreed remedial measures.

Appendix N Exceedance Report

Statistical Summary of Exceedances in the Reporting Period

Water Quality			
Location	**Action Level**	**Limit Level**	**Total**
B1	2	2	4
B2	2	1	3
B3	1	1	2
B4	0	0	0
CR1	2	2	4
CR2	0	1	1
F1	0	0	0
H1	3	2	5
S1	2	0	2
S2	2	0	2
S3	0	2	2
M1	2	2	4
Noise			
Location	**Action Level**	**Limit Level**	**Total**
M1 / N_S1	0	0	0
M2 / N_S2	0	0	0
M3 / N_S3	0	0	0

Incident Report on Action Level or Limit Level Non-compliance

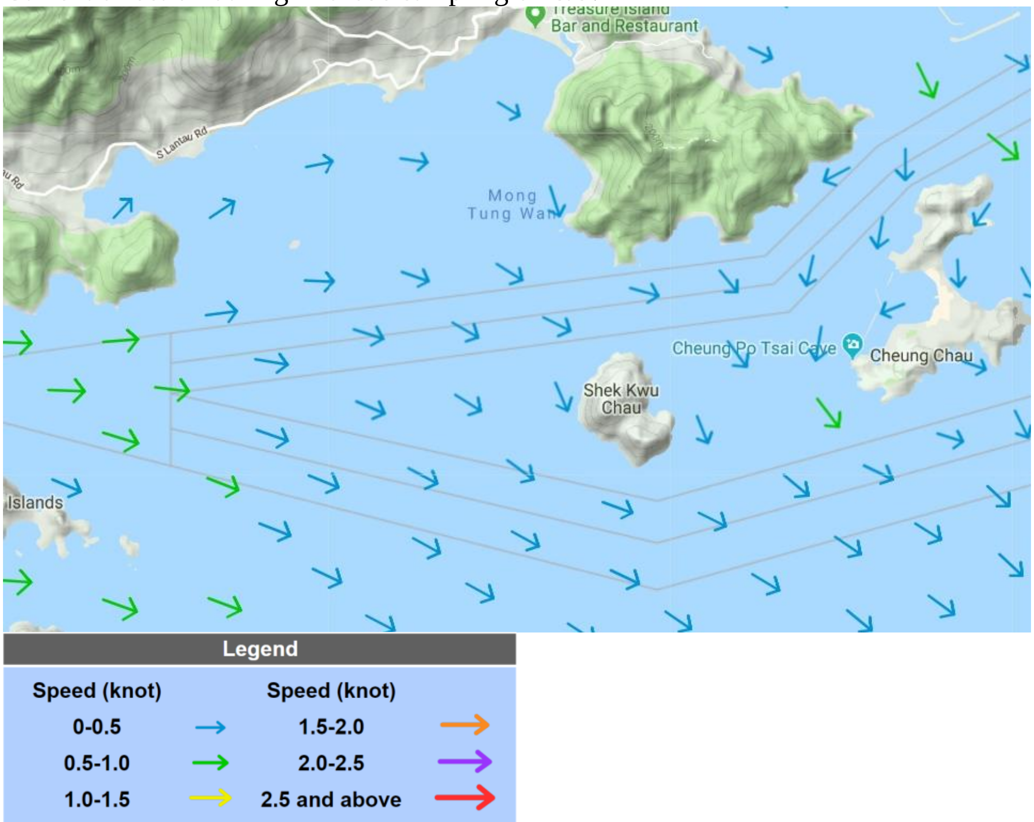
<table>
<tr><td>Project</td><td colspan="4">Integrated Waste Management Facilities, Phase 1</td></tr>
<tr><td>Date</td><td colspan="4">3 September 2018 (Lab result received on 7 September 2018)</td></tr>
<tr><td>Time</td><td colspan="4">03:25 - 07:55 (Mid-Ebb)</td></tr>
<tr><td>Monitoring Location</td><td colspan="4">B2 & H1

</td></tr>
<tr><td>Parameter</td><td colspan="4">Suspended Solid (SS)</td></tr>
<tr><td rowspan="2">Action & Limit Levels</td><td colspan="2">Action Level</td><td colspan="2">Limit Level</td></tr>
<tr><td colspan="2">≥ 8.0 mg/L</td><td colspan="2">≥ 10.0 mg/L</td></tr>
<tr><td rowspan="2">Measurement Level</td><td>Impact Station(s) with Exceedance</td><td colspan="2">Control Stations</td><td>Impact Station(s) without Exceedance</td></tr>
<tr><td>8.5 mg/L (B2)
9.0 mg/L (H1)</td><td colspan="2">6.1 mg/L (C1)
7.3 mg/L (C2)</td><td>3.5 mg/L (B1)
4.8 mg/L (B3)
5.0 mg/L (B4)
6.3 mg/L (F1)
4.7 mg/L (M1)
5.7 mg/L (CR1)
7.3 mg/L (CR2)
5.3 mg/L (S1)
5.2 mg/L (S2)
4.3 mg/L (S3)</td></tr>
<tr><td>Possible reason for Action or Limit Level Non-compliance</td><td colspan="4">Works scheduled on site on 3/9 include ground investigation (GI) works of 3 small borehole drilling and 2 sample coring, which shall not be a major source of SS concentration increase considering the limited scale and nature of works.

Dominating sea current direction was found to be from Northwest to Southeast at waters around Shek Kwu Chau.

B2 is located at unrelated stream direction (neither upstream nor downstream, far away) and H1 is located at upstream direction to the works location, exceedance of this monitoring location is deemed to be unrelated to the Project at the sampling period.

Site tidiness in the present barges in the Project site were checked during weekly site</td></tr>
</table>

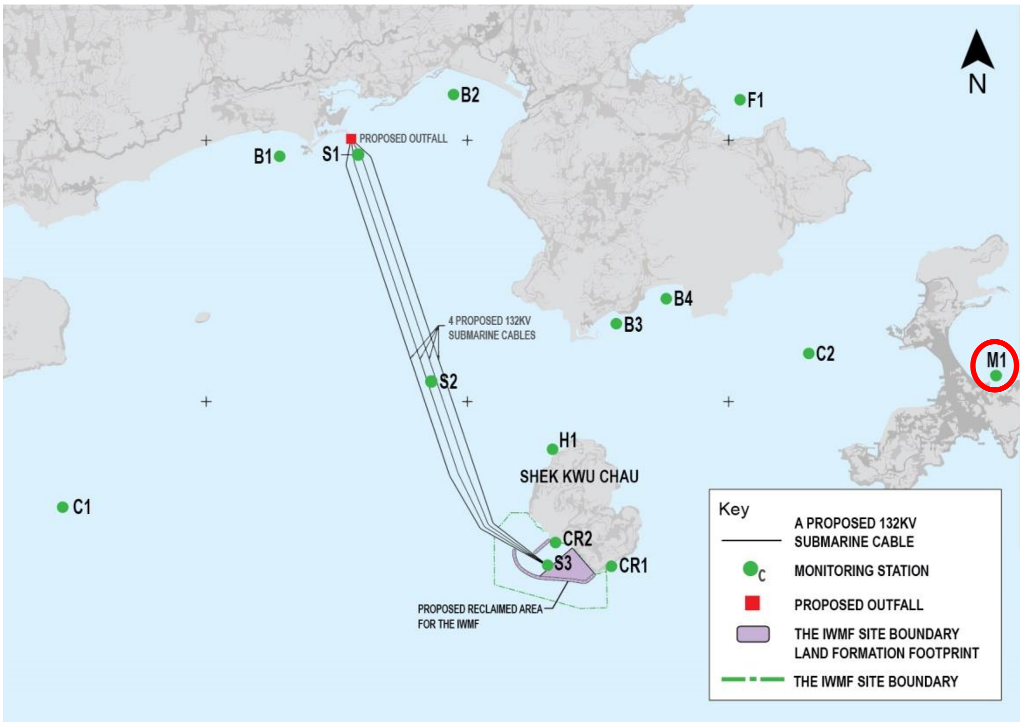
	inspection on 4/9, where applicable mitigation measures on water quality were found implemented and no improper site practice that might contribute to the increase in SS level was observed during the inspection.
Actions taken / to be taken	Examination of environmental performance of the Project will be continued during the weekly inspection, and the Contractor is reminded to implement all applicable mitigation measures as per the Updated EM&A Manual.
Remarks	Current direction during mid-ebb sampling on 3/9:



(Sourced from http://current.hydro.gov.hk/en/map.html)

Prepared by	Nelson Tsui
Date	10 September 2018

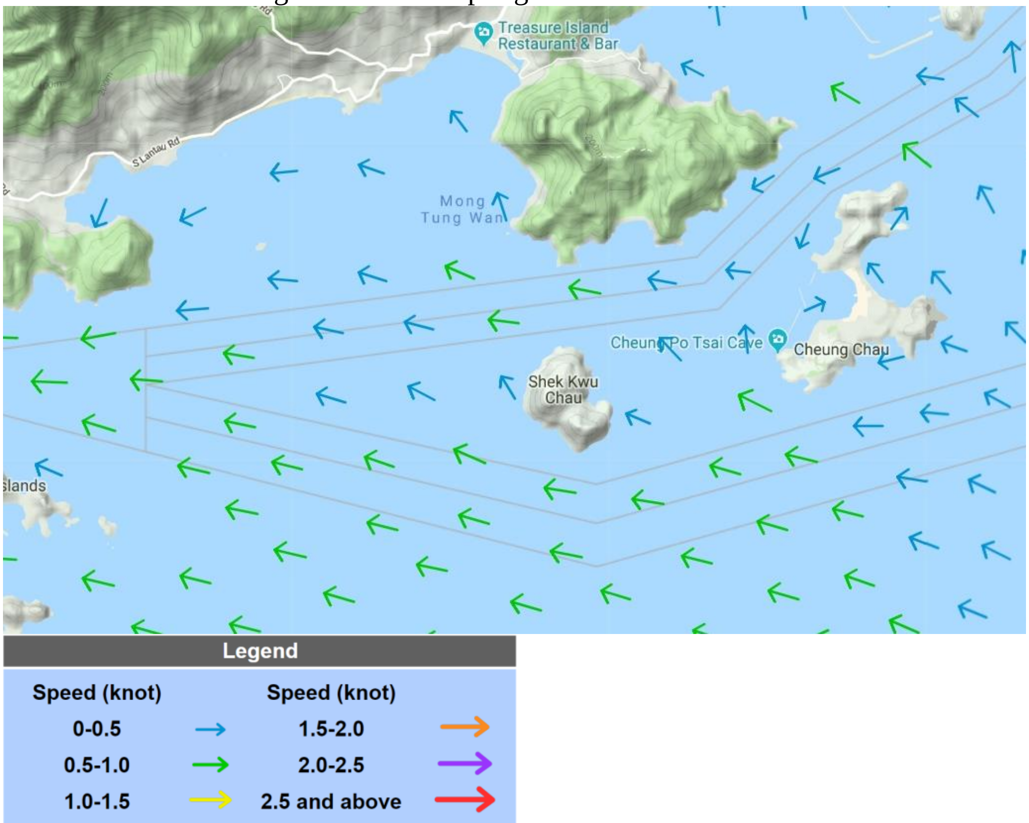
Incident Report on Action Level or Limit Level Non-compliance

<table>
<tr><td>Project</td><td colspan="3">Integrated Waste Management Facilities, Phase 1</td></tr>
<tr><td>Date</td><td colspan="3">14 September 2018 (Lab result received on 20 September 2018)</td></tr>
<tr><td>Time</td><td colspan="3">07:36 – 11:06 (Mid-Flood)</td></tr>
<tr><td>Monitoring Location</td><td colspan="3">M1

</td></tr>
<tr><td>Parameter</td><td colspan="3">Suspended Solid (SS)</td></tr>
<tr><td rowspan="2">Action & Limit Levels</td><td colspan="2">Action Level</td><td>Limit Level</td></tr>
<tr><td colspan="2">≥ 8.0 mg/L</td><td>≥ 10.0 mg/L</td></tr>
<tr><td rowspan="2">Measurement Level</td><td>Impact Station(s) with Exceedance</td><td>Control Stations</td><td>Impact Station(s) without Exceedance</td></tr>
<tr><td>8.2 mg/L (M1)</td><td>4.3 mg/L (C1)
2.8 mg/L (C2)</td><td>4.8 mg/L (B1)
4.5 mg/L (B2)
4.5 mg/L (B3)
5.3 mg/L (B4)
3.5 mg/L (F1)
4.7 mg/L (H1)
5.7 mg/L (CR1)
5.5 mg/L (CR2)</td></tr>
<tr><td>Possible reason for Action or Limit Level Non-compliance</td><td colspan="3">All works scheduled on site on 14/9 were suspended due to the upcoming typhoon MANGKHUT.

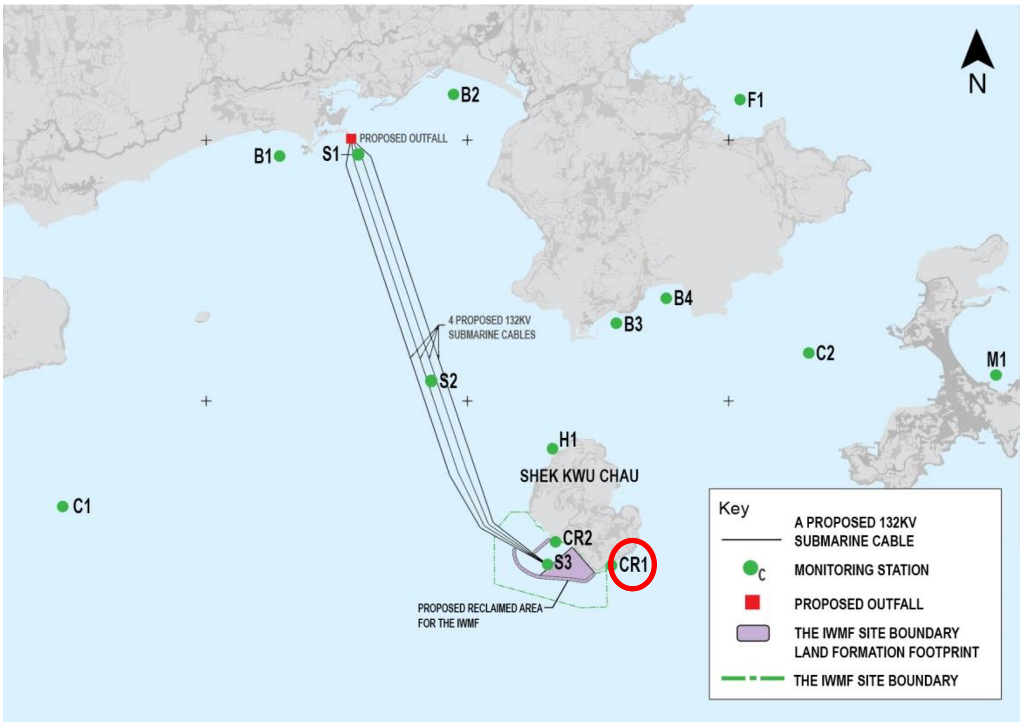
Dominating sea current direction was found to be from Southeast to Northwest at waters around Shek Kwu Chau.

M1 is located at unrelated stream direction (neither upstream nor downstream, far away) and exceedance of this monitoring location is deemed to be unrelated to the Project at the sampling period.

Site tidiness in the present barges in the Project site were checked during weekly site inspection on 11/9, where applicable mitigation measures on water quality were found implemented and no improper site practice that might contribute to the increase in SS level was observed during the inspection.</td></tr>
<tr><td>Actions taken / to be taken</td><td colspan="3">Examination of environmental performance of the Project will be continued during the</td></tr>
</table>

	weekly inspection, and the Contractor is reminded to implement all applicable mitigation measures as per the Updated EM&A Manual.
Remarks	Current direction during mid-flood sampling on 14/9:  (Sourced from http://current.hydro.gov.hk/en/map.html)
Prepared by	Nelson Tsui
Date	21 September 2018

Incident Report on Action Level or Limit Level Non-compliance

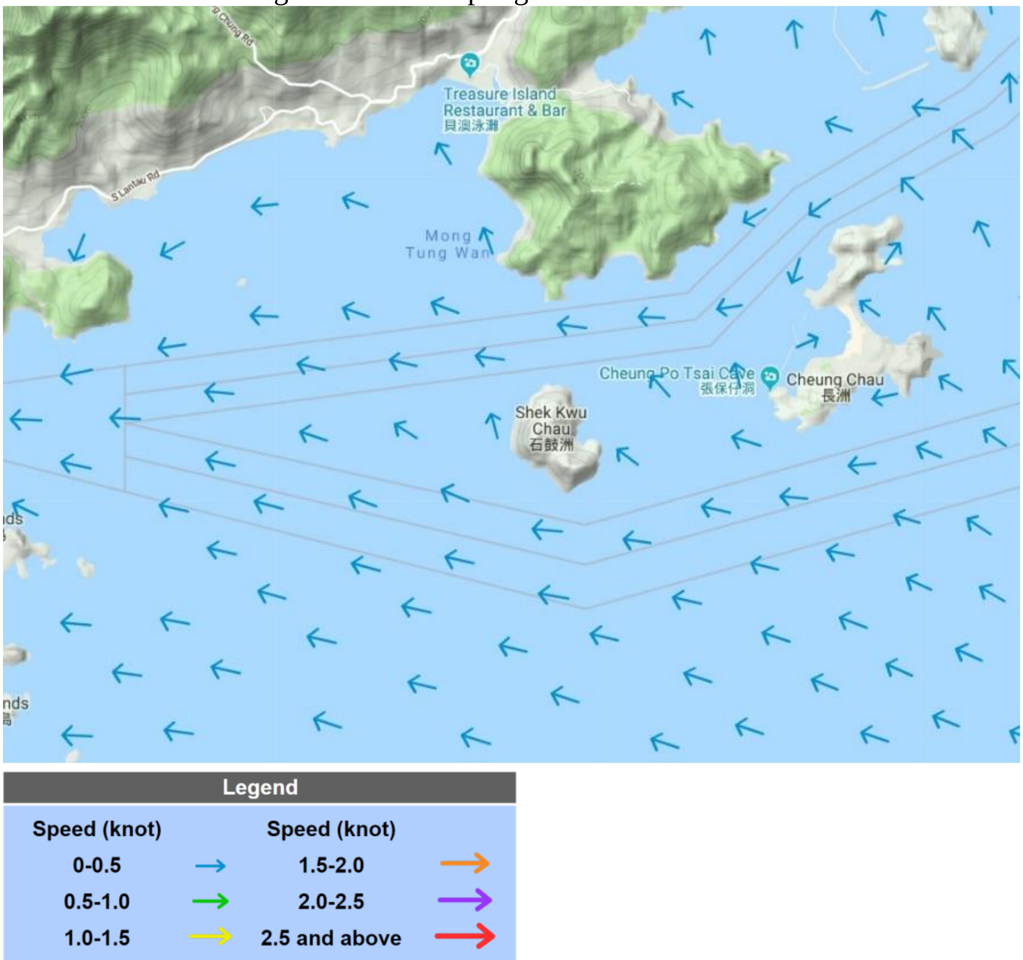
<table>
<tr><td>Project</td><td colspan="3">Integrated Waste Management Facilities, Phase 1</td></tr>
<tr><td>Date</td><td colspan="3">18 September 2018 (Lab result received on 24 September 2018)</td></tr>
<tr><td>Time</td><td colspan="3">13:40 – 17:10 (Mid-Flood)</td></tr>
<tr><td>Monitoring Location</td><td colspan="3">CR1

</td></tr>
<tr><td>Parameter</td><td colspan="3">Suspended Solid (SS)</td></tr>
<tr><td rowspan="2">Action & Limit Levels</td><td colspan="2">Action Level</td><td>Limit Level</td></tr>
<tr><td colspan="2">≥ 13.8 mg/L (120% of C2)</td><td>≥ 15.0 mg/L (130% of C2)</td></tr>
<tr><td rowspan="2">Measurement Level</td><td>Impact Station(s) with Exceedance</td><td>Control Stations</td><td>Impact Station(s) without Exceedance</td></tr>
<tr><td>14.0 mg/L (CR1)</td><td>10.5 mg/L (C1)
11.5 mg/L (C2)</td><td>11.0 mg/L (B1)
9.8 mg/L (B2)
8.0 mg/L (B3)
12.0 mg/L (B4)
9.7 mg/L (F1)
10.8 mg/L (H1)
9.7 mg/L (M1)
7.5 mg/L (CR2)</td></tr>
<tr><td>Possible reason for Action or Limit Level Non-compliance</td><td colspan="3">All works scheduled on site on 18/9 were suspended due to the yet to recover progress from typhoon MANGKHUT.

Dominating sea current direction was found to be from Southeast to Northwest at waters around Shek Kwu Chau.

CR2 and S3, the closer downstream monitoring stations to CR1 (upstream monitoring station), exhibited a much lower SS level. The above and absent of works suggest that the exceedance at CR1 should be unrelated to the Project.

Site tidiness in the present barges in the Project site were checked during weekly site inspection on 11/9, where applicable mitigation measures on water quality were found implemented and no improper site practice that might contribute to the increase in SS level was observed during the inspection.</td></tr>
<tr><td>Actions taken / to be taken</td><td colspan="3">Examination of environmental performance of the Project will be continued during the</td></tr>
</table>

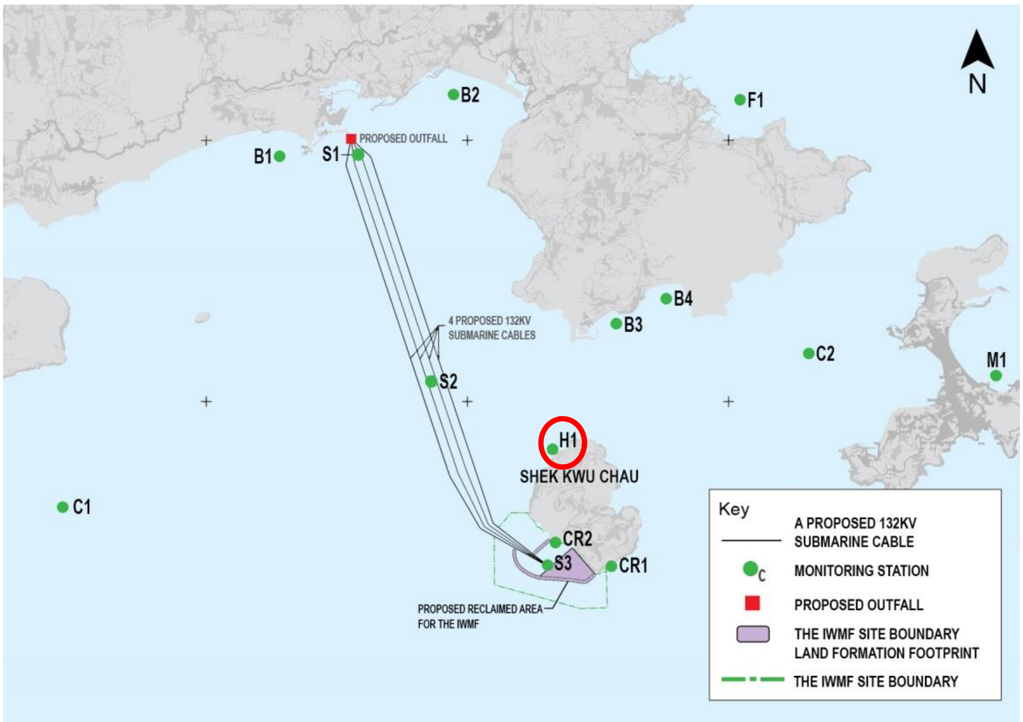
	weekly inspection, and the Contractor is reminded to implement all applicable mitigation measures as per the Updated EM&A Manual.
Remarks	Current direction during mid-flood sampling on 18/9:



(Sourced from http://current.hydro.gov.hk/en/map.html)

Prepared by	Nelson Tsui
Date	26 September 2018

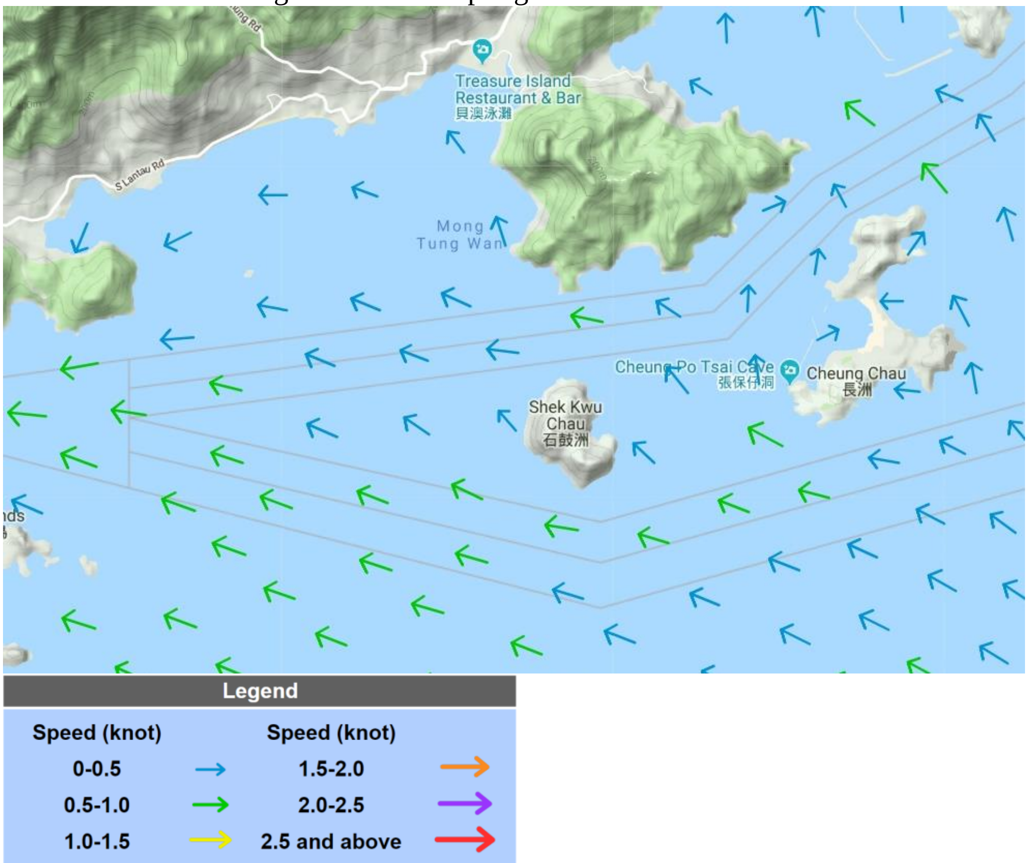
<u>Incident Report on Action Level or Limit Level Non-compliance</u>

<table>
<tr><td>Project</td><td colspan="6">Integrated Waste Management Facilities, Phase 1</td></tr>
<tr><td>Date</td><td colspan="6">24 September 2018 (Lab result received on 2 October 2018)</td></tr>
<tr><td>Time</td><td colspan="6">16:35 – 20:05 (Mid-Flood)</td></tr>
<tr><td>Monitoring Location</td><td colspan="6">H1

</td></tr>
<tr><td>Parameter</td><td colspan="6">Suspended Solid (SS)</td></tr>
<tr><td rowspan="2">Action & Limit Levels</td><td colspan="3">Action Level</td><td colspan="3">Limit Level</td></tr>
<tr><td colspan="3">≥ 11.2 mg/L (120% of C2)</td><td colspan="3">≥ 12.1 mg/L (130% of C2)</td></tr>
<tr><td rowspan="2">Measurement Level</td><td colspan="2">Impact Station(s) with Exceedance</td><td colspan="2">Control Stations</td><td colspan="2">Impact Station(s) without Exceedance</td></tr>
<tr><td colspan="2">11.5 mg/L (H1)</td><td colspan="2">8.8 mg/L (C1)
9.3 mg/L (C2)</td><td colspan="2">8.8 mg/L (B1)
8.8 mg/L (B2)
9.0 mg/L (B3)
8.8 mg/L (B4)
8.8 mg/L (F1)
8.3 mg/L (M1)
7.8 mg/L (CR1)
10.2 mg/L (CR2)</td></tr>
<tr><td>Possible reason for Action or Limit Level Non-compliance</td><td colspan="6">Works scheduled on site on 24/9 include ground investigation (GI) works of 3 small borehole drilling, which shall not be a major source of SS concentration increase considering the limited scale and nature of works.

Dominating sea current direction was found to be from Southeast to Northwest at waters around Shek Kwu Chau.

CR2, the closest downstream monitoring stations to H1, exhibited a lower SS level. It may suggest that the exceedance at H1 should be unrelated to the Project.

Site tidiness in the present barges in the Project site were checked during weekly site inspection on 26/9, where applicable mitigation measures on water quality were found implemented and no improper site practice that might contribute to the increase in SS level was observed during the inspection.</td></tr>
<tr><td>Actions taken / to be taken</td><td colspan="6">Examination of environmental performance of the Project will be continued during the</td></tr>
</table>

	weekly inspection, and the Contractor is reminded to implement all applicable mitigation measures as per the Updated EM&A Manual.
Remarks	Current direction during mid-flood sampling on 24/9:  (Sourced from http://current.hydro.gov.hk/en/map.html)
Prepared by	Nelson Tsui
Date	3 October 2018

Appendix O Complaint Log

Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 Sep 2018- 30 Sep 2018	0	0	N/A

Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Details
1 Sep 2018- 30 Sep 2018	0	0	N/A

Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Details
1 Sep 2018- 30 Sep 2018	0	0	N/A

Appendix P Impact Monitoring Schedule of Next Reporting Month

Impact Monitoring Schedule for IWMF

Oct-18

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 00:39-08:59 Flood Tide: 8:59-18:26 Monitoring Time: Mid-ebb: 3:04-6:34 Mid-flood: 11:57-15:27 Daytime Noise monitoring for M1, M2 & M3	3	4 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 04:04-11:38 Flood Tide: 11:38-19:36 Monitoring Time: Mid-ebb: 6:06-9:36 Mid-flood: 13:52-17:22	5	6 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 06:37-13:29 Flood Tide: 13:29-20:33 Monitoring Time: Mid-ebb: 08:18-11:48 Mid-flood: 15:16-18:46
7	8 Impact Daytime Noise monitoring for M1, M2 & M3	9 Impact Ecology monitoring for Marine Mammals by Vessel-based Line-transect Survey Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 09:24-15:23 Flood Tide: 02:49-09:24 Monitoring Time: Mid-ebb: 10:38-14:08 Mid-flood: 04:21-07:51	10	11 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 11:00-16:27 Flood Tide: 04:18-11:00 Monitoring Time: Mid-ebb: 11:58-15:28 Mid-flood: 05:54-09:24	12	13 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 12:46-17:25 Flood Tide: 05:46-12:46 Monitoring Time: Mid-ebb: 13:20-16:50 Mid-flood: 07:31-11:01
14	15 Impact Daytime Noise monitoring for M1, M2 & M3	16 Impact Ecology monitroing for WBSE Tagged Coral Monitoring Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 00:46-08:52 Flood Tide: 08:52-15:11 Monitoring Time: Mid-ebb: 03:04-06:34 Mid-flood: 10:16-13:46	17	18 Impact *Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 2:56-12:00 Flood Tide: 12:00-20:02 Monitoring Time: Mid-ebb: 5:43-9:13 Mid-flood: 14:16-17:46	19	20 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 05:20-13:18 Flood Tide: 13:18-20:16 Monitoring Time: Mid-ebb: 07:34-11:04 Mid-flood: 15:02-18:32
21	22 Impact Daytime Noise monitoring for M1, M2 & M3	23 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 08:13-14:27 Flood Tide: 02:10-08:13 Monitoring Time: Mid-ebb: 09:35-13:05 Mid-flood: 03:26-06:56 Daytime Noise monitoring for M1, M2 & M3	24	25 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 09:50-15:25 Flood Tode: 03:28-09:50 Monitoring Time: Mid-ebb: 10:52-14:22 Mid-flood: 04:54-08:24	26	27 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 11:27-16:24 Flood Tide: 04:52-11:27 Monitoring Time: Mid-ebb: 12:10-15:40 Mid-flood: 06:24-09:54
28	29 Impact Daytime Noise monitoring for M1, M2 & M3	30 Impact Water Quality monitoring for B1, B2, B3, B4, H1, C1, C2, F1, CR1, CR2 & M1 Tidal Period: Ebb Tide: 00:00-07:32 Flood Tide: 07:32-14:53 Monitoring Time: Mid-ebb: 02:01-05:31 Mid-flood: 09:27-12:57	31			

Remarks:
1. Daytime Noise Monitoring (07:00-1900), Evening Time Noise Monitoring (1900-2300), Night Time Noise Monitoring (2300-0700)
2. Water Quality Monitoring for S1,S2 and S3 will only conduct during DCM works, refer to Detailed DCM Plan

Appendix Q Proposal for Review Baseline Marine Water Quality

本署檔號
OUR REF: (19) in EP2/G/G/131 Pt.15
來函檔號
YOUR REF: KSZHJV/OUT/2018/07/03.01/000896
電 話
TEL. NO.: 2835 1127
圖文傳真
FAX NO: 2591 0558
電子郵件
E-MAIL:
網 址
HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department
Branch Office
28th Floor, Southorn Centre,
130 Hennessy Road,
Wan Chai, Hong Kong.

環境保護署分處
香港灣仔
軒尼詩道
一百三十號
修頓中心廿八樓

RECEIVED
2 . AUG 2018
BY: 000763

22 August 2018
By Fax 2512 0427

Keppel Seghers – Zhen Hua Joint Venture
19/F China Harbour Building
370-374 King's Road
North Point, Hong Kong
(Attn: Mr. CHUNG Tai Tung, Peter)

Dear Mr. CHUNG

Contract No. EP/SP/66/12
Integrated Waste Management Facilities Phase 1
Proposal for Review Baseline Marine Water Quality

I refer to your above referenced letter dated 14 August 2018 sending us the subject revised Proposal for Review Baseline Marine Water Quality.

Please note that we have no further comment on the Proposal.

The above is advisory and administrative in nature and shall not pre-empt any statutory decision under the EIA Ordinance. As pointed out to you previously, please be reminded to follow any necessary procedures and submission requirements under the EM&A programme controlled by the Further Environmental Permit No. FEP-01/429/2012/A for the IWMF Phase 1 project.

Yours sincerely,

(Raymond L. Y. LAI)
Environmental Protection Officer
for Director of Environmental Protection

c.c.

SFG/EPD	(Attn: Mr. T. H. MAN)	Fax: 2411 3073
DAFC	(Attn: Dr. Y. M. Mak)	Fax: 2377 4427

c.c. Internal – E(RA)15, S(RS)5

環境保護署
Environmental Protection Department

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1

Keppel Seghers

吉寶西格斯－振華聯營公司
KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

PROPOSAL FOR REVIEW BASELINE MARINE WATER QUALITY

Document No.

KSZHJV	/	312	/		/	0001	/	B
Issuer		Project Code		Type of Document		Sequential No.		Revision Index

	Prepared by:	Approved by:	Certified by:	Verified by:
Name	Leo Chow	Peter Chung	Gabriel Lam	Mandy To
Position	Environmental Monitoring Manager (KSZHJV)	Project Manager (KSZHJV)	ETL (Acuity)	IEC (ERM)
Signature				
Date:	10 August 2018	10 August 2018	14 August 2018	14 August 2018

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Revision History

B	Revised as per EPD's comment issued on 8 August 2018	10 August 2018
A	First Issue	11 July 2018
Rev.	**Description of Modification**	**Date**

Contract No. EP/SP/66/12

Integrated Waste Management Facilities, Phase 1

Response to Comment issued by EPD on 8/8/18

Query	EPD's Comment	KSZHJV's Response
1	Suggest deleting the word "impact" in front of "marine water quality monitoring data" for the last para. of S.2 and S.4.2.	Revised.
2	The DO measuring equipment should be capable of measuring a DO level in the range of 0-50mg/L not 0-20mg/L so as to consistent to the original baseline monitoring (i.e. dry season).	Revised in Section 3.2.
3	Please clarify if measurement of salinity in wet season will be carried out to derive action and limit levels of salinity for brine water monitoring in operational phase as the same exercise had been performed in dry season. If affirmative, relevant paras. about salinity should be added in the proposal.	Revised in Section 3.1, 3.2, 4.3 and Appendix A.

Table of Contents

APPENDICES

FIGURE

1 INTRODUCTION

The Government of Hong Kong SAR will develop the Integrated Waste Management Facilities (IWMF) Phase 1 (hereafter "the Project") with incineration to achieve substantial bulk reduction of unavoidable municipal solid waste (MSW) and to recover energy from the incineration process. The IWMF will be on an artificial island to be formed by reclamation at the south-western coast of Shek Kwu Chau. Keppel Seghers – Zhen Hua Joint Venture (KSZHJV) was awarded the contract under Contract No. EP/SP/66/12 Integrated Waste Management Facilities Phase 1 to construct and operate the Project.

An environmental impact assessment (EIA) study for the Project have been conducted and the EIA Report was approved under the Environmental Impact Assessment Ordinance on 17 January 2012. An Environmental Permit (EP) (EP No.: EP-429/2012) was granted to EPD on 19 January 2012 for the construction and operation of the Project. Subsequently, the EP was amended (EP No.: EP-429/2012/A) and a further EP (FEP) (EP No.: FEP-01/429/2012/A) was granted to the Keppel Seghers – Zhen Hua Joint Venture (KSZHJV) on 27 December 2017.

Baseline marine water quality monitoring was undertaken in accordance with the requirements provided in the EM&A Manual between 26 February and 26 March 2018. A Baseline Monitoring Report was submitted on 14 June 2018 to fulfill Condition 3.3 of the FEP. It is proposed to supplement the marine water quality monitoring data in wet season (April – September) so as to further improve the baseline data to take into account potential variations within a year due to natural fluctuations and also enhance the representativeness of the water quality monitoring parameters.

2 PURPOSE AND SCOPE

As the baseline marine water quality monitoring was undertaken during the dry season (October – March), it is proposed to supplement the marine water quality monitoring data in wet season (April – September) so as to further improve the baseline data to take into account potential variations within a year due to natural fluctuations and also enhance the representativeness of the water quality monitoring parameters.

Under the latest construction programme, DCM site trial shall be carried out in the designated location as shown in **Figure 1**.

The construction sequence of DCM site trial is summarized as below:

1. Carrying out site investigation to determine the property, grading, chemical composition of the sediment;
2. Obtaining sediment samples for laboratory investigation to produce design mix of cement slurry;
3. Laying geotextile and placing of sand blanket, with at least 2m thickness, to cover the seabed at the area where DCM site trial would be carried out;
4. Positioning of marine DCM barge;
5. Inserting piling pile of mixing treatment equipment into the soft layer at the designated level;
6. Pulling up of piling pipe together with the injection of cement slurry and mixing of soft material by the agitator;
7. Monitor, control, review and adjust the cement slurry content during mixing;
8. Repositioning of the marine DCM barge and repeat the mixing procedure until the required pattern of strengthened material is formed;
9. Wait for 28 days to allow cement mixed marine sediment to grow strength prior to conducting Unconfined Compressive Strength (UCS) Test; and
10. Coring out the cement mixed marine sediment to carry out UCS test and determine the mixing ratio of cement: marine sediment.

After obtaining the results from the UCS test, KSZHJV will conduct the static loading test at the designated location as shown in **Figure 1** and the construction sequence of static loading test is summarized as below:

1. Laying Geotextile at seabed;
2. Laying of sand blankets with at least 2m thickness on top of geotextile, cage type silt curtain shall be deployed while laying sand blanket;
3. Conduct DCM work, procedures as stated in Points 4 -8 of the construction sequence of DCM site trial, using the cement mixing ratio as determined by DCM site trial;
4. Laying Grade 400 aggregate on top of sand blanket to form a rubble mound, cage type silt curtain shall also be deployed while laying of Grade 400 aggregate; and
5. Placing concrete blocks on top of rubble mound to form a platform to install the survey monitoring equipment.

Therefore, it is proposed to make use of the marine water quality monitoring data to be collected in the period during cement mixed marine sediment to grow 28 days strength prior to conducting UCS test to represent the baseline monitoring data for wet season. At that period of time, the key construction activities will be operating at most 3 nos. of drill rigs for site investigation works. No marine construction works will be undertaken.

3 WATER QUALITY MONITORING REQUIREMENTS

3.1 Water Quality Parameters to be Monitored

The following water quality parameters to be monitored are summarized in **Table 1**.

Table 1 – Water Quality Parameters

Water Quality Parameters	Baseline Monitoring for Wet Season
Dissolved Oxygen (DO) / Dissolved Oxygen Saturation (DO%)	x
pH	x
Temperature	x
Turbidity	x
Suspended Solids (SS)	x
Water depth	x
Salinity	x

x – Parameters to be tested

3.2 Monitoring Equipment and Procedures

Monitoring of DO, DO%, pH, temperature, turbidity, water depth and salinity should be measured in-situ whereas SS should be sampled and then determined by laboratory. The equipment required for each type of monitoring are specified below.

Data record sheets shall be completed for each monitoring location. Sample data record sheets based on the one presented in the "EM&A Guideline for Development Projects in Hong Kong" are shown in **Appendix A**.

In-situ Monitoring

- Dissolved Oxygen Measuring Equipment – the instrument should be portable and weatherproof using a DC power source. It should be capable of measuring a dissolved oxygen level in the range of 0-50mg/L and 0-200% saturation.
- pH Measuring Equipment – a portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions according to the Standard Methods, APHA.
- Temperature Measuring Equipment – the instrument should be portable and weatherproof using a DC power source. It should be capable of measuring a temperature of 0-45 degree

Celsius with a capability of measuring to ±0.1 degree Celsius.

- Turbidity Measuring Equipment – the instrument should be portable and weatherproof using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000NTU.
- Positioning Device – a hand held or boat fixed type differential Global Positioning System (dGPS) with way point bearing indication or other equivalent instrument of similar accuracy should be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements
- Water Depth Detector – a portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. The unit would either be handheld or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.
- Salinity - the instrument should be portable and weatherproof using a DC power source. It should be capable of measuring salinity in the range 0-40ppt.

Calibration of In-situ Instruments

All in-situ monitoring instrument should be checked, calibrated and certified by a laboratory accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or other international accreditation scheme that is HOKLAS-equivalent before use, and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use.

For the on-site calibration of field equipment, the BS 1427:2009, Guide to on-site test methods for the analysis of waters should be observed.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment should also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration etc.

Water Samples for Laboratory Testing

Collection of Water Samples

Water samples for all monitoring parameters should be collected, stored, preserved and analysis according to the Standard Methods, APHA 22nd ed. and/or other methods as agreed by the EPD.

A water sampler comprises a transparent PVC cylinder, with a capacity of not less than two litres, and could be effectively sealed with latex cups at both ends should be used. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth. Kahlsico Water Sampler or a similar instrument approved by the ET and SO should be used.

Water samples should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4 °C without being frozen), delivered to the laboratory within 24 hours of collection.

Laboratory Measurement / Analysis
Analysis of SS should be carried out in a HOKLAS accredited laboratory (or other international accredited laboratory that is HOKLAS-equivalent). Sufficient water samples should be collected at the monitoring stations for carrying out the laboratory determination. The laboratory determination work should start within 24 hours after receipt of the water samples. The analysis should follow the standard methods summarised in **Table 2**.

Table 2: Laboratory analysis for SS

Parameters	**Instrumentation**	**Analytical Method**	**Reporting Limit**
Suspended Solids (SS)	Analytical Balance	APHA 2540D	1 mg/L

Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis should be kept by the laboratory for three months in case repeat analysis is required.

4 BASELINE MONITORING FOR WET SEASON

4.1 Purpose

The purpose of the baseline monitoring for wet season is to supplement the baseline data to take into account the potential variations within a year due to natural fluctuations and to enhance the representativeness of the water quality monitoring parameters. These baseline conditions shall be established by measuring DO, DO%, pH, temperature, turbidity, salinity and SS at designated monitoring stations.

4.2 Timing

It is proposed to make use of the marine water quality monitoring data to be collected in the period during cement mixed marine sediment to grow 28 days strength prior to conducting UCS test to represent the baseline monitoring data for wet season. At that period of time, the key construction activities will be operating approximately 3 nos. of drill rigs for site investigation works. No marine construction works will be undertaken.

4.3 Monitoring Locations

Baseline water quality for wet season will be measured at the monitoring stations as listed in **Table 3** and illustrated in **Figure 2**. The monitoring stations will be the same as those for the IWMF's marine water quality monitoring stations during construction phase. DO, DO%, pH, temperature, turbidity, salinity and SS are measured at all monitoring stations.

Table 3 – Proposed Monitoring Stations

Station	Description	Easting	Northing	Parameters
B1	Beach – Cheung Sha Lower	813342	810316	DO, DO%, pH, Temperature, Turbidity, SS, Salinity
B2	Beach – Pui O	815340	811025	
B3	Beach – Yi Long Wan	817210	808395	
B4	Beach – Tai Long Wan	817784	808682	
H1	Horseshoe Crab – Shek Kwu Chau	816477	806953	
C1	Control Station	810850	806288	
C2	Control Station	819421	808053	
F1	Cheung Sha Wan Fish Culture Zone	818631	810966	
S1	Submarine Cable Landing Site	814245	810335	
S2	Submarine Cable	815076	807747	
S3	Submarine Cable Landing Site	816420	805621	
CR1	Coral	817144	805597	
CR2	Coral	816512	805882	
M1	Tung Wan	821572	807799	

4.4 Monitoring Procedures

The measurements will be taken three days per week, at mid-flood and mid-ebb tides, for a period of four weeks when there are no marine construction activities to be carried out. The interval between two sets of monitoring will be not less than 36 hours.

Samples will be taken at three depths (at 1m below surface, at mid-depth, and at 1m above bottom) for locations with water depth >6m. For locations with water depth between 3m and 6m, two depths (surface and bottom) were taken. Locations with water depth< 3m, only surface depth will be taken. Duplicate water samples will be taken and analysed.

4.5 Action and Limit Levels

The Action and Limit levels are defined in **Table 4** in accordance with the Updated EM&A Manual.

Table 4 - Action and Limit Levels for Water Quality Parameters

Parameters	**Action Level**	**Limit Level**
Construction Phase Impact Monitoring		
DO in mg/L	≦5 percentile of baseline data	≦4mg/L
Suspended Solids (SS) in mg/L	95 percentile of baseline data or 120% of upstream control station at the same tide at the same day, whichever is higher	99 percentile of baseline data or 130% of upstream control station at the same tide of the same day, whichever is higher
Turbidity in NTU	95 percentile of baseline data or 120% of upstream control station at the same tide at the same day, whichever is higher	99 percentile of baseline data or 130% of upstream control station at the same tide of the same day, whichever is higher
Operational Phase Impact Monitoring		
Salinity in ppm	95 percentile of baseline data or 105% of upstream control station at the same tide at the same day, whichever is higher	99 percentile of baseline data or 109% of upstream control station at the same tide of the same day, whichever is higher

Notes:
1. For DO, non-compliance of water quality results when monitoring results are lower than the limits.
2. Depth-averaged results are used unless specified otherwise
3. For SS and Turbidity, non-compliance of water quality results when monitoring results are higher than the limits.
4. Baseline data to be adopted in the marine water quality monitoring are specified in the Baseline Monitoring Report.
5. With reference to Plate 5b.8 of the approved EIA report EIA-201/2011, the upstream control station shall be C2 during flood tide and C1 during ebb tide.

4.6 Event and Action Plan

The actions in accordance with the Event and Action Plan in **Table 5** should be carried out if the water quality assessment criteria are exceeded at the impact monitoring stations.

Table 5 - Event and Action Plan for Marine Water Quality Monitoring

	Action			
Event	**Environmental Team (ET)**	**Independent Environmental Checker (IEC)**	**Supervising Officer (SO)**	**KSZHJV**
Action level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and KSZHJV; 4. Check monitoring data, all plant, equipment and KSZHJV's working methods; 5. Discuss mitigation measures with IEC and KSZHJV; 6. If not already undertaking daily monitoring, increase monitoring frequency.	1. Discuss with ET and KSZHJV on the mitigation measures; 2. Review proposals on mitigation measures submitted by KSZHJV and advise SO accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform SO and confirm receipt of ET's notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Provide report of the status and condition of plant, equipment and mitigation measures to ET; 5. Consider changes of working methods; 6. Discuss with ET and IEC and propose mitigation measures.

	Action			
Event	**Environmental Team (ET)**	**Independent Environmental Checker (IEC)**	**Supervising Officer (SO)**	**KSZHJV**
Action Level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and KSZHJV; 4. Check monitoring data, all plant, equipment and KSZHJV's working methods; 5. Discuss mitigation measures with IEC and KSZHJV; 6. Ensure mitigation measures are implemented; 7. If not already undertaking daily monitoring, increase monitoring frequency.	1. Discuss with ET and KSZHJV on the mitigation measures; 2. Review proposals on mitigation measures submitted by KSZHJV and advise SO accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform SO and confirm receipt of ET's notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Provide report of the status and condition of plant, equipment and mitigation measures to ET; 5. Consider changes of working methods; 6. Discuss with ET and IEC and propose mitigation measures to IEC and SO within 3 working days; 7. Implement the agreed mitigation measures. 8. As directed by SO, to slow down all or part of the construction activities.

	Action			
Event	**Environmental Team (ET)**	**Independent Environmental Checker (IEC)**	**Supervising Officer (SO)**	**KSZHJV**
Limit Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, KSZHJV and EPD; 4. Check monitoring data, all plant, equipment and KSZHJV's working methods; 5. Discuss mitigation measures with IEC, SO and KSZHJV; 6. Ensure mitigation measures are implemented; 7. If not already undertaking daily monitoring, increase monitoring frequency.	1. Discuss with ET and KSZHJV on the mitigation measures; 2. Review proposals on mitigation measures submitted by KSZHJV and advise SO accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and KSZHJV on the proposed mitigation measures; 2. Request KSZHJV to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures.	1. Inform SO and confirm receipt of ET's notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Provide report of the status and condition of plant, equipment and mitigation measures to ET; 5. Consider changes of working methods; 6. Discuss with ET, IEC and SO and propose mitigation measures to IEC and SO within three working days; 7. Implement the agreed mitigation measures.

	Action			
Event	**Environmental Team (ET)**	**Independent Environmental Checker (IEC)**	**Supervising Officer (SO)**	**KSZHJV**
Limit Level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, KSZHJV and EPD; 4. Check monitoring data, all plant, equipment and KSZHJV's working methods; 5. Discuss mitigation measures with IEC, SO and KSZHJV; 6. Ensure mitigation measures are implemented; 7. If not already undertaking daily monitoring, increase monitoring frequency.	1. Discuss with ET and KSZHJV on the mitigation measures; 2. Review proposals on mitigation measures submitted by KSZHJV and advise SO accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and KSZHJV on the proposed mitigation measures; 2. Request KSZHJV to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the KSZHJV to slow down or to stop all or part of the construction activities until no exceedance of limit level.	1. Inform SO and confirm receipt of ET's notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Provide report of the status and condition of plant, equipment and mitigation measures to ET; 5. Consider changes of working methods; 6. Discuss with ET, IEC and SO and propose mitigation measures to IEC and SO within three working days; 7. Implement the agreed mitigation measures; 8. As directed by SO, to stop all or part of the construction activities.

4.7 Reporting

The monitoring data to be collected at the baseline monitoring for wet season shall be used to supplement the baseline monitoring data to be collected between 26 February 2018 and 26 March 2018 so as to further improve the baseline data to take into account potential variations within a year due to natural fluctuations and also enhance the representativeness of the water quality monitoring parameters. Baseline Monitoring Report shall follow the relevant reporting requirements as specified in the EM&A Manual. The Baseline Monitoring Report shall be certified by ET leader and verified by the IEC.

Appendix A

Sample Record Sheet

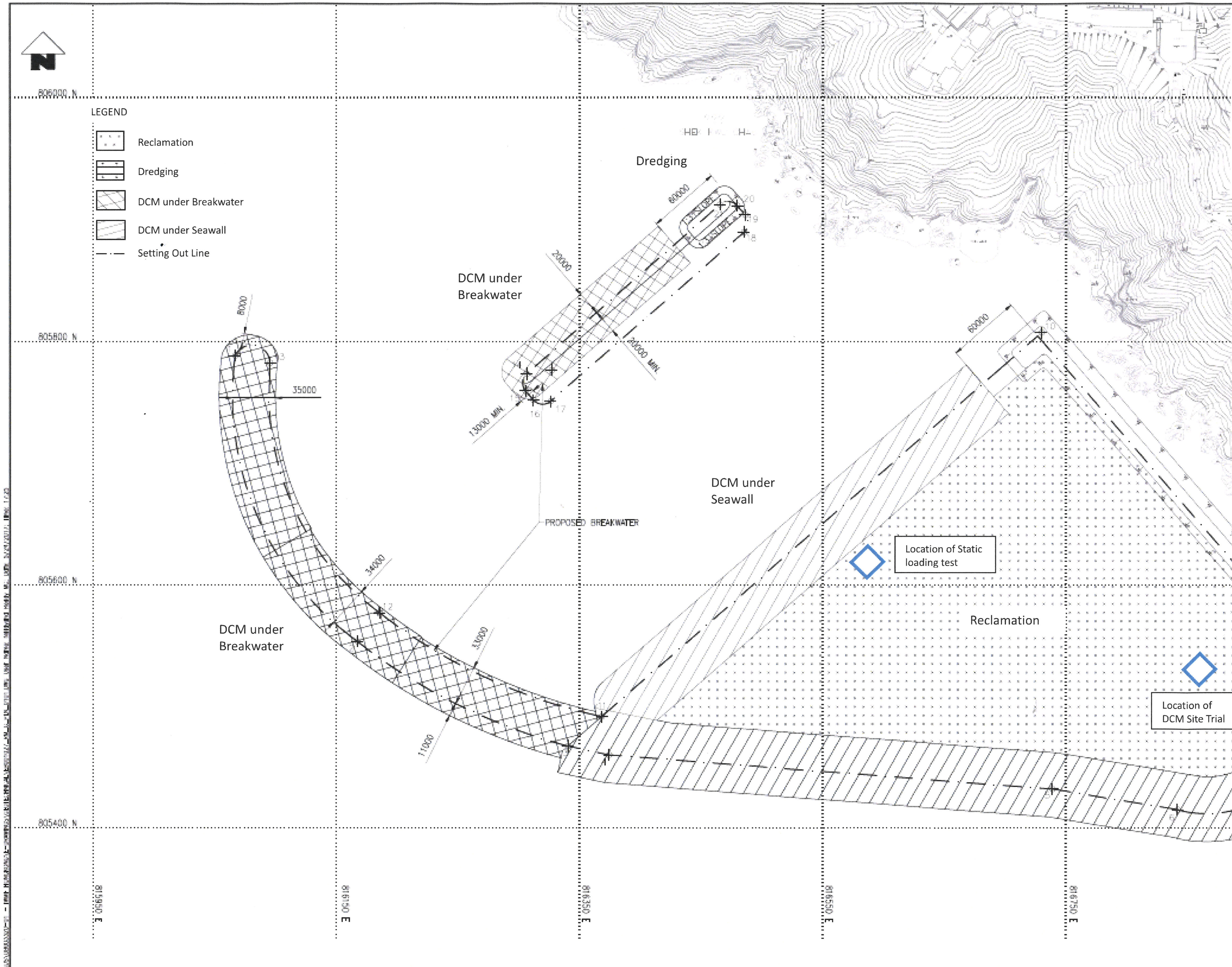
Water Quality Monitoring Data Record Sheet

Location			
Date			
Start Time (hh:mm)			
Weather			
Sea Conditions			
Tidal Mode			
Water Depth (m)			
Monitoring Results		1st reading	2nd reading or Duplicate
Dissolved Oxygen	mg/L		
Dissolved Oxygen Saturation	%		
pH			
Turbidity	NTU		
Temperature	°C		
Suspended Solids	mg/L		
Salinity	ppt		
Observed construction activities	<100m from location		
	>100m from location		
Other Observations			

	Name & Designation	Signature	Date
Recorded by:	____________	____________	____________
Checked by:	____________	____________	____________

Figure 1

Location Plan for Static Loading Test and DCM Site Trial



NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NOS. EB001027/RM/G SERIES.
2. AT THE INTERFACE BETWEEN PVD ZONE AND DREDGING ZONE, DREDGING SHALL BE CARRIED OUT BEFORE INSTALLATION OF PVD.
3. COORDINATE OF SETTING OUT POINTS SHALL REFER TO EMPLOYER'S TENDER DRAWING NO. 60236239/EP/1008.
4. THE DREDGING EXTENT IS BASED ON CONSERVATIVE ASSUMPTIONS AND ARE INDICATIVE ONLY. ACTUAL DREDGING EXTENT SHALL BE REVISED CONSIDERING RESULTS OF PROPOSED GEOTECHNICAL INVESTIGATION AS PER DRAWING EB001027/GI/G/PLN/0107 AND AGREED BY THE SUPERVISING OFFICER.

DRAWN	AMIT.G
DATE	MAY/24/2017

CLIENT: 環境保護署 Environmental Protection Department

ORIGINATOR: Keppel Seghers – Zhen Hua Joint Venture

DESIGNER: ARCADIS, DLN

DESIGN CHECKER: SMEC

PROJECT: Contract EP/SP/66/12 Integrated Waste Management Facilities Phase 1

TITLE: Layout Plan for Static Loading Test and DCM Site Trial

SCALE: 1 : 3000

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Figure 2

Monitoring Stations for Marine Water Quality

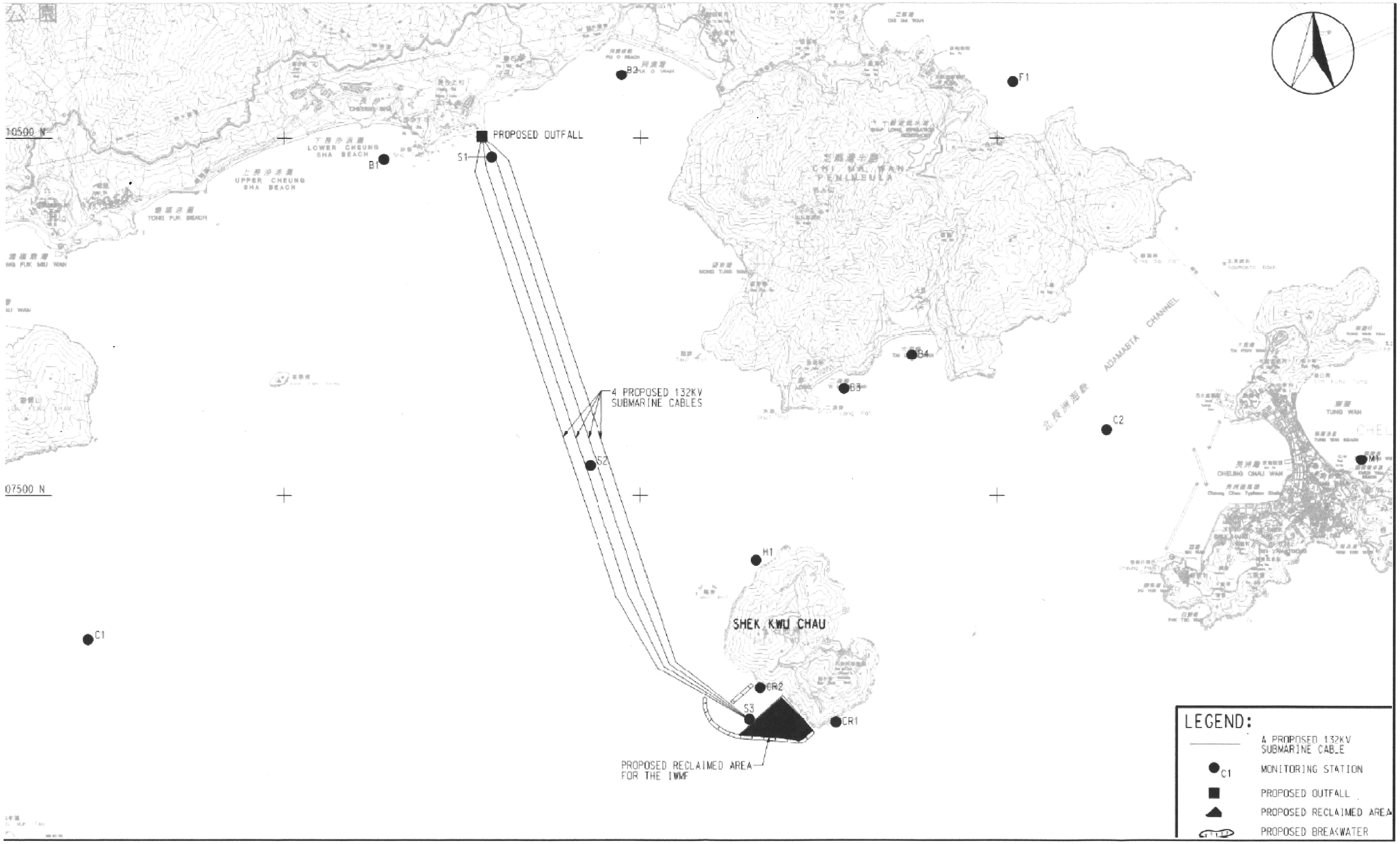

Figure 2 Monitoring Stations for Marine Water Quality