

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Monthly EM&A Report April 2021

Client : Drainage Services Department

Project : Contract No. CM 14/2016
Environmental Team for Operational
Environmental Monitoring and Audit for Siu
Ho Wan Sewage Treatment Works

Report No.: : 0041/17/ED/0627A

Prepared by: Andy K. H. Choi

Reviewed by: Cyrus C. Y. Lai

Certified by:

A handwritten signature in black ink, appearing to be "Colin K. L. Yung", written over a horizontal line.

Colin K. L. Yung
Environmental Team Leader
Fugro Technical Services Limited

Our Ref. 1458/21-0020



Drainage Services Department
Projects and Development Branch
Consultants Management Division
42/F, Revenue Tower,
5 Gloucester Road
Wan Chai, Hong Kong

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399

www.asecg.com

Attn: Mr. LAU Ka Kin, Marcus (E/CM16)

12 May 2021

By Post and E-mail

Dear Sir,

RE: CONTRACT No. CM 13/2016
INDEPENDENT ENVIRONMENTAL CHECKER FOR OPERATIONAL ENVIRONMENTAL MONITORING
AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT WORKS (SHWSTW)
MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (APRIL 2021)

Reference is made to the submission of Monthly Environmental Monitoring and Audit (EM&A) Report for March 2021 (Report No.: 0041/17/ED/0627A) from the Environmental Team (ET), Fugro Technical Services Ltd., received on 11 May 2021 via email.

We would like to inform you that we have no adverse comment on the captioned submission and hereby verify the same in accordance with Condition 4.3 of the Environmental Permit (EP) for the captioned Project (Permit No.: EP-076/2000).

Should you have any queries, please feel free to contact the undersigned, or our Ms. Joanne NG at 2815 7028.

Yours faithfully,

For and on behalf of
Allied Environmental Consultants Ltd.

A handwritten signature in black ink, appearing to be 'Grace M. H. Kwok', written in a cursive style.

Grace M. H. KWOK
Independent Environmental Checker

GK/jn/cy

c.c. Fugro Technical Service (ET Leader)
AECOM

Attn: Mr. Colin YUNG
Attn: Ms. Joanne TSOI

(By E-mail)
(By E-mail)

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Report No.: 0041/17/ED/0627A

TABLE OF CONTENTS

	EXECUTIVE SUMMARY	1
1.	INTRODUCTION.....	3
2.	AIR QUALITY MONITORING	5
3.	WATER QUALITY MONITORING	10
4.	SEDIMENT QUALITY MONITORING AND BENTHIC SURVEY	21
5.	CHINESE WHITE DOLPHIN MONITORING	28
6.	ADVICE ON IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES	29
7.	ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS	30
8.	SUMMARY OF EXCEEDANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS	31
9.	SUMMARY OF ENVIRONMENTAL COMPLAINTS	32
10.	FUTURE KEY ISSUES	33
11.	CONCLUSION	34

FIGURE

- Figure 1 Monitoring Stations of Air Sensitive Receivers**
- Figure 2 Odour Patrol Points of Modified Odour Patrol**
- Figure 3 Monitoring Stations of Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey**
- Figure 4 Location of the Tide Gauge**

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Report No.: 0041/17/ED/0627A

APPENDICES

- Appendix A** Project Organization Chart
- Appendix B** Monitoring Schedule for Present and Next Reporting Period
- Appendix C** Event and Action Plan for Air Quality Monitoring
- Appendix D** Results and Graphical Presentation of Air Quality Monitoring
- Appendix E** Copy of the Calibration Certificates for Water Quality Monitoring Equipment
- Appendix F** Results and Graphical Presentation of Water Quality Monitoring
- Appendix G** Tidal Data obtained from Ma Wan Marine Traffic Station
- Appendix H** Results and Graphical Presentation of Laboratory Analysis for Sediment Quality Monitoring and Benthic Survey
- Appendix I** Benthic Survey Report
- Appendix J** Photos of Grab Samplers
- Appendix K** Environmental Complaints Log and Incident Report
- Appendix L** Environmental Mitigation Implementation Schedule (EMIS)



EXECUTIVE SUMMARY

This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract No. CM 14/2016 – “Environmental Monitoring and Audit for Operation of Siu Ho Wan Sewage Treatment Works” (hereafter referred to as “the Contract”) for the Drainage Services Department (DSD) of Hong Kong Special Administrative Region. Fugro Technical Services Limited (hereafter referred to as “FTS”) was appointed as the Environmental Team (ET) by DSD, to implement the Environmental Monitoring & Audit (EM&A) programme in accordance with the Operational EM&A Plan of the Contract.

The Contract is part of the “Upgrading of Siu Ho Wan Sewage Treatment Works” (hereinafter referred as “the Project”) which was classified as “Designated Project” under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) and Environmental Impact Assessment (EIA) Report (Register No. EIAR-124BC) was completed in September 1997. The current Environmental Permit (EP) No. EP-076/2000 was issued in August 2000 to DSD.

In accordance with the EP, an approved operational EM&A Plan was submitted. According to the approved EM&A plan, air quality monitoring (i.e. H₂S concentration monitoring, odour patrol monitoring and olfactometry analysis of H₂S), in addition, water quality monitoring, sediment quality monitoring, benthic survey, Chinese White Dolphin (CWD) monitoring and waste management are the key environmental concern of the Project.

This is the Forty-fifth Monthly EM&A Report for the Project which summarizes findings of the EM&A works during the reporting period from 1 April 2021 to 30 April 2021 (the “reporting period”).

Breaches of Action and Limit Levels

Odour patrol monitoring was resumed from January 2020 and carried out on 1, 7, 13, 19 and 30 April 2021. The modified odour patrol monitoring plan including updated Event and Action Plan was approved on March 2020, and modified odour patrol monitoring was commenced from 20 March 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) and odour patrol points were recorded and no non-compliance of odour monitoring at ASR were recorded in the reporting period.

Water quality monitoring, sediment quality monitoring and benthic survey were carried out on 16 April 2021. No specific Action/Limit level has to be followed since the purpose of the monitoring is to collect data for future purpose.

Complaint Log

There were no complaints received in relation to environmental impact during the reporting period.

Notifications of Summons and Successful Prosecutions

There were no notifications of summons or prosecutions received during the reporting period.

Summary of the Environmental Mitigations Measures

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Mitigation measures specified in the EP and EIA Report such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment unit prior to stack exhaust were implemented during the reporting period.

Future Key Issues

The key issues to be considered in the succeeding reporting month include:

Potential environmental impacts arising from the operations of Siu Ho Wan Sewage Treatment Works (SHWSTW) are mainly associated with air quality, water quality, sediment quality, benthic ecology, waste management and distribution and abundance of Chinese White Dolphins (CWDs).

According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). H₂S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD. Response to comment for updated alternative method on air quality monitoring was submitted to IEC on 30 April 2021.

1. INTRODUCTION

1.1 Background

- 1.1.1 The Project "Upgrading of Siu Ho Wan Sewage Treatment Works" is to upgrade SHWSTW from the preliminary treatment level to Chemically Enhanced Primary Treatment (CEPT) level with Ultraviolet (UV) disinfection facilities. The Project is required to comply with the Environmental Permit (EP) in respect of the construction and operation phases of the Plant.
- 1.1.2 Under the EIAO, the Project was classified as "Designated Project". The Environmental Impact Assessment (EIA) study was completed in September 1997 with the EIA Report of Register No. EIA-124BC, Operational Environmental Monitoring and Audit (EM&A) Plan and the EP of No. EP-076/2000 was issued in August 2000 to Drainage Services Department (DSD).
- 1.1.3 The CEPT part has been completed and was put into operation in March 2005. The UV disinfection works were substantially completed in December 2006. It is considered that the operation of the Project shall be deemed to start when the UV disinfection facilities have been completely installed and tested.

1.2 Project Description

- 1.2.1 The project proponent was DSD. AECOM was commissioned by DSD as the Engineer for the Project. Allied Environmental Consultants Limited (AEC) was commissioned by DSD as the Independent Environmental Checker (IEC) in the operation phase of the Project. FTS was appointed as the ET by DSD to implement the EM&A programme for the operation phase of the Project including air quality monitoring, water quality monitoring, sediment quality and benthic survey and CWDs monitoring.

1.3 Project Organization

- 1.3.1 The project organization for environmental works is shown in **Appendix A**. The contact person and telephone numbers of key personnel for the captioned project are shown in **Table 1.1**.

Table 1.1 Contact Persons and Telephone Numbers of Key Personnel

Organization	Role	Contact Person	Telephone No.	Fax No.
DSD	Project Proponent Representative	Mr. Marcus Lau	2594 7218	3104 6426
AECOM	Engineer Representative (ER)	Ms. Joanne Tsoi	3922 9423	3922 9797
AEC	Independent Environmental Checker (IEC)	Ms. Grace Kwok	2815 7028	2815 5399
FTS	ET Leader (ETL)	Mr. Colin Yung	3565 4114	2450 8032

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Fugro Development Centre,
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Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Page 4

1.4 Works Undertaken during the Reporting Period

1.4.1 During this reporting period, the principal work activities included:

- Perform comprehensive operation and maintenance services for the electrical, mechanical and electronic systems/equipment at SHWSTW.
- Alleviate as far as practicable the impact that the facilities and sewage systems imposed on the environment of Hong Kong.

2. AIR QUALITY MONITORING

2.1 Methodology of H₂S Concentration Monitoring

2.1.1 15-min H₂S concentration was measured using a Jerome 631-X analyzer. This analyzer is capable of measuring H₂S concentration in the range of 1 ppb to 50 ppm with a resolution of 1 ppb and operates within a temperature range of 0°C to 40°C at an air flow rate of 0.15 L/min. Odour gas samples were drawn by built-in a suction pump of the analyzer and passed through a gold film sensor. The trace level of H₂S of the samples were determined electrochemically on the gold film sensor. Meteorological conditions including temperature, wind speed, wind direction and relative humidity were also measured at the time of the monitoring. Table 2.1 summarizes the equipment used in H₂S monitoring.

Table 2.1 Equipment used for H₂S Concentration Monitoring

Equipment	Manufacturer / Model	Serial Number	Sensor Number
Gold Film Hydrogen Sulphide Analyzer	JEROME X631 0003	2966	14-11-23-R2D

2.2 Methodology of Modified Odour Patrol Monitoring

2.2.1 Due to the complaint case received on 28 November 2019, a modified version of odour patrol monitoring is proposed and approved on 13 March 2020. According to the approved proposal for odour patrol monitoring plan (0041/17/ED/0524G), a modified version of odour patrol monitoring was commenced on 20 March 2020 to ensure the mitigation measures are effectively implemented. The modified odour patrol conducted once per week by two independent trained personnel/competent persons (the "patrollists") patrolling and sniffing along the SHWSTW boundary and the air sensitive receivers (ASRs).

2.2.2 The odour monitoring should not be undertaken on rainy days. Subject to the prevailing weather forecast condition, odour patrol shall be conducted by two patrollists at the downwind locations. During the patrol, the sequence should start from less odourous locations to stronger odourous locations.

2.2.3 The two patrollists shall be satisfied the below requirements during odour patrol:

- Have their individual odour threshold of n-butanol in nitrogen gas in the range of 20 to 80 ppb/V required by the European Standard method: BS EN13725.
- Be free from any respiratory illnesses.
- Not be allowed to smoke, eat, drink (except water) or use chewing gum or sweets 30min before and during odour patrol.
- Take great care not to cause any interference with their own perception or that of others by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics.
- Not communicate with each other about the results of their choices.

2.2.4 During the odour patrol monitoring, the meteorological and surrounding information are recorded as follows:

- i. Prevailing Weather Condition;
- ii. Wind Direction;
- iii. Wind Speed;
- iv. Location where Odour is detected;
- v. Source of Odour detected;
- vi. Perceived intensity of Odour detected;
- viii. Duration of Odour detected; and
- ix. Characteristics of Odour detected

2.2.5 The perceived intensity is to be divided into 5 levels which are ranked in a descending order as follows:

Table 2.2 Categories of Odour Intensity for Modified Odour Patrol Monitoring

Odour Level	Odour Intensity	Classification Criteria
0	Not detected	No odour perceived or an odour so weak that it cannot be easily characterised or described.
1	Slight	Slight identifiable odour, and slight chance to have odour nuisance.
2	Moderate	Moderate identifiable odour, and moderate chance to have odour nuisance.
3	Strong	Strong identifiable, likely to have odour nuisance.
4	Extreme	Extreme severe odour, and unacceptable odour level.

2.3 Methodology of Odour Sampling and Olfactometry Analysis

- 2.3.1 Odour gas samples were collected in a Nalophan sampling bag placed inside a vacuum air-tight sampler using passive sampling technique. Approximately 60 liter of gas sample was collected at each sampling. All samples collected on the sampling day were returned to laboratory for olfactometry analysis within 24 hours and analyzed within 2 hours upon receiving.
- 2.3.2 ALS Technichem (HK) Pty Ltd. (HOKLAS Reg. No. 066), was the appointed laboratory for olfactometry analysis of the gas sample.
- 2.3.3 The odour concentration of the samples were determined by Forced-choice Dynamic Olfactometer in accordance with the European Standard Method: BS EN13725. Testing were also performed by a panel of six members who have been trained to comply with the requirement of European Standard Method: BS EN13725. All testing were completed within 24 hours upon sampling.

2.4 Monitoring Location

- 2.4.1 H₂S concentration monitoring and odour sampling at ASR, Cheung Tung Road near the Bus Depot at the west of the Siu Ho Wan Treatment Plant, were temporarily suspended from 14 May 2018. The location of ASR is shown in **Figure 1**.
- 2.4.2 9 odour patrol points is chosen to conduct the modified odour patrol for collecting more representative data and identify the particular source of odour in the site. The nine odour patrol points is as below:

Table 2.3 Odour Patrol Point

Odour Patrol Point	Description
OD1	Eastern Site Boundary
OD2	Southern Site Boundary
OD3	Western Site Boundary
OD4	Northern Site Boundary
OD5	Spur Road near Discovery Bay Tunnel Outlet
OD6	Cheung Tung Road near the Bus Depot
OD7	Cheung Tung Road near O-PARK1
OD8	Sham Shui Kok Dr near MTR Depot
OD9	Discovery Bay Tunnel Toll Plaza

Note:

As access permission from the company of Discovery Bay Tunnel is under requisition progress, OD5 (Spur Road near Discovery Bay Tunnel Outlet) was not covered in odour patrol monitoring in the reporting period temporarily.



2.4.3 The odour patrol points of modified odour patrol is shown in **Figure 2**.

2.5 Monitoring Frequency and Duration

2.5.1 The durations and frequencies of H₂S concentration measurement, odour patrolling and odour sampling are summarized in **Table 2.4** below.

Table 2.4 Durations and Frequencies of Air Quality Monitoring Programme

	Duration	Frequency
H ₂ S concentration monitoring	15 minutes	¹ Weekly basis for 6 months during the initial operation stage
Odour patrol		⁴ Weekly basis
Odour sampling for olfactometry analysis	³ 15 minutes	² First week of the odour patrol monitoring

Remark:

- 1) In case excessive odour nuisance was detected during the odour patrol monitoring or the standard of the 5 odour units cannot be complied with during the odour panel monitoring, the odour patrol monitoring and H₂S concentration monitoring shall be extended for a period of three months to cater for the warm-up period of the functioning of the additional mitigation measures.
- 2) In case the relationship between H₂S concentration (ppb) with the odour unit (OU/m³) cannot conclude from the correlation study carried out at the first week of the odour patrol monitoring due to invalid data, additional odour sampling for olfactometry analysis shall be carried out for the correlation study.
- 3) Sufficient air samples (approximate 60L) may be collected in less than 15 minutes during odour sampling.
- 4) As advice by EPD on the odour complaint received in November 2019, odour patrol monitoring was resumed on weekly basis from 15 January 2020.

2.5.2 The monitoring schedule for the present and next reporting period is provided in **Appendix B**.

2.6 Event and Action Plan

2.6.1 According to the approved proposal for odour patrol monitoring plan (0041/17/ED/0524G), updated Action and limit levels for air quality monitoring are presented in **Table 2.5**.

Table 2.5 Action and Limit Levels for Air Quality Monitoring

Parameter	Action	Limit
Odour Nuisance	One complaint received for specific odour event / Odour intensity of 2 or above is measured from odour patrol	Two or more independent complaints received for specific odour event in 3 months / Odour intensity of 3 or above is measured from odour patrol



2.6.2 The event and action plan for air quality monitoring is provided in **Appendix C**.

2.7 Quality Assurance and Quality Control

2.7.1 A control sample was collected by purging odour-free nitrogen gas from a certified gas cylinder on site at each sampling.

2.7.2 Calibration of the analyzer is conducted every year at the laboratory of the manufacturer.

2.7.3 In order to ensure the analyzer is functioning properly, manual sensor regeneration and zero adjustment were performed before each set of odour monitoring.

2.8 Monitoring Results and Observations

2.8.1 As advice by EPD on the odour complaint received in November 2019, odour patrol monitoring was resumed on weekly basis. The odour patrol monitoring was carried out on 1, 7, 13, 19 and 30 April 2021. As access permission from the company of Discovery Bay Tunnel is under requisition progress, OD5 (Spur Road near Discovery Bay Tunnel Outlet) was not covered in odour patrol monitoring in the reporting period temporarily.

2.8.2 The meteorological data including temperature, wind speed and direction of the reporting period at ASR is summarised in **Table 2.6**.

Table 2.6 Summary of Meteorological Data in Reporting Period

Date	Location	Temperature (°C)	Relative Humidity (%)	Wind Direction	Wind Speed (m/s)
1 April 2021	OD1	28.0	74	SE	0.2
	OD2			E	0.4
	OD3			E	0.2
	OD4			S	0.2
	OD6			E	0.4
	OD7			E	0.2
	OD8			SE	0.2
	OD9			E	0.2
	7 April 2021			OD1	23.3
OD2		NW	0.1		
OD3		NW	0.2		
OD4		NW	0.3		
OD6		NW	0.8		
OD7		NW	0.7		
OD8		NW	0.8		
OD9		NW	1.2		
13 April 2021		OD1	26.9	69	
	OD2	-			0.0
	OD3	NE			1.2
	OD4	NE			0.9
	OD6	-			0.0
	OD7	NE			0.6
	OD8	NE			0.3

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19 April 2021	OD9	23.5	57	NE	0.4
	OD1			S	0.6
	OD2			E	4.0
	OD3			E	3.1
	OD4			E	3.4
	OD6			E	4.5
	OD7			E	4.7
	OD8			E	3.0
	OD9			E	4.2
30 April 2021	OD1	26.2	62	-	0.0
	OD2			-	0.0
	OD3			-	0.0
	OD4			-	0.0
	OD6			NW	0.9
	OD7			-	0.0
	OD8			NW	0.8
	OD9			NW	0.4

2.8.3 The monitoring results in the reporting period are summarised in **Table 2.7**. Graphical pots of results and details of monitoring data are shown in **Appendix D**.

Table 2.7 Summary of Air Quality Monitoring Result in Reporting Period

Monitoring Location	Monitoring Parameter
	Odour Patrol [^] (Odour Level)
	Range
OD1	0 - 0
OD2	0 - 1
OD3	0 - 0
OD4	0 - 0
OD6	0 - 0
OD7	0 - 0
OD8	0 - 0
OD9	0 - 0

Remark:

[^]Odour Level: 0 – Not detected, 1 – Slight, 2 – Moderate, 3 – Strong, 4 – Extreme



- 2.8.4 According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). H₂S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD. Response to comment for updated alternative method on air quality monitoring was submitted to IEC on 30 April 2021.
- 2.8.5 No exceedances of Action/Limit levels at ASR were recorded as no complaint was received during the reporting period.
- 2.8.6 Odour mitigation measures such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment unit prior to stack exhaust were implemented during the reporting period.

3. WATER QUALITY MONITORING

3.1 Monitoring Station

3.1.1 In accordance with Section 5 of the EM&A Plan, water quality monitoring should be carried out at eight designated monitoring stations (two impact stations and six control stations) during the first five years of the operational phase of the Project. The monitoring stations shall be the same monitoring stations that were used for the baseline monitoring programme and have been approved by EPD. The coordinates of the monitoring stations are shown in **Table 3.1** and their locations are shown in **Figure 3**.

Table 3.1 Location of Water Quality Monitoring

Sampling Location		Easting	Northing
A	The Brothers, Control Station	816 100	822 500
B	The Brothers, Control Station	816 680	822 440
C	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
E	Cheung Sok, Control Station	819 817	821 655
F	Cheung Sok, Control Station	820 158	821 922
G	Tai Ching Chau, Control Station	822 214	822 692
H	Tai Ching Chau, Control Station	822 494	822 939

3.2 Monitoring Parameter

3.2.1 The monitoring parameters for water quality monitoring are summarized in **Table 3.2**.

Table 3.2 Parameters for Water Quality Monitoring

Monitoring Parameters	
In-situ Measurement	Laboratory Analysis
Dissolved oxygen (mg/L)	<i>E. coli</i> (cfu/100ml)
Temperature (degree Celsius)	5-day BOD (mg/l)
pH value	Suspended Solids (mg/l)
Water depth (m)	Ammonia as N (mg/l)
Salinity (ppt)	Nitrate as N (mg/l)
Turbidity (NTU)	Nitrite as N (mg/l)
Current Speed (m/s)	Total inorganic nitrogen (mg/l)
Current Direction (degree magnetic)	Total phosphorus (soluble and particulate) (mg/l)



3.2.2 Apart from the parameters listed in the **Table 3.2**, other relevant supplementary information such as monitoring location, time, weather conditions and any special phenomena will be also recorded.

3.2.3 The tidal data will be obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by the Hydrographic Office of Marine Department. Location of the tide gauge is shown in **Figure 4**.

3.3 Monitoring Equipment

3.3.1 A multifunctional meter (YSI 6920 V2/ Aqua TROLL 600) will be used to measure dissolved oxygen (DO), concentration, DO saturation, temperature, salinity, pH and turbidity, simultaneously at the same location and water depth. An Acoustic Doppler Current Profiler (ADCP) integrated with echo sounder function will be used to measure water depth, current velocity (speed and direction). The data measured by ADCP will then be downloaded on site to computer on-board. The water depth data measured by the ADCP shall be electronically logged and available for output. All measurement data from the multiparameter monitoring device and ADCP will be integrated with the GPS data from the DGPS logging device, so that data collected at a specific time and location can be shown. The water sampler will be equipped with a multiparameter monitoring device (with water depth probe to determine the exact sampling depth at which a sample is collected). The equipment employed for the monitoring and sampling and their specifications are presented in **Table 3.3**. **Table 3.4** summarizes the equipment used in water quality monitoring. Copy of the calibration certificates for water quality monitoring equipment are presented in **Appendix E**.

Table 3.3 Water Quality Monitoring and Sampling Equipment

Parameter	Equipment	Model	Range	Equipment Accuracy
Temperature, Dissolved Oxygen, salinity, pH, Turbidity, Sampling Depth	Water Quality Monitoring Device	1) YSI 6920V2-2-M Sonde 2) Aqua TROLL 600 Multiparameter Sonde	Temp: -5 to 50°C DO: 0-50mg/L DO%: 0-500% Sal: 0 to 70 ppt pH: 0 to 14 pH units Turb: 0-1000NTU Depth: 0-61 meters	Temp: ±0.15°C DO: ±0.1mg/L or 1% (whichever greater) for 0-20mg/L; ±15% for 20-50mg/L (with correction for salinity and temperature) Sal: ±1% or 0.1ppt (whichever greater) pH: ±0.2 units Turb: ±2% or 0.3NTU (whichever greater) Depth: ±0.12m
Water Depth, Current Speed, Current Direction	Acoustic Doppler Current Profiler	RiverSurveyor M9	Water Depth: 0-80m	Water Depth: 1% Current speed: ±0.25% of measured velocity or ±0.2cm/s Current direction: ±2degree magnetic
Positioning	DGPS	Simrad MX521B Smart Antenna with Simrad MX610 CDU	NA	GPS: ±1m
Water Sampling	Water Sampler	Aquatic Research Transparent PC Vertical Water Sampler 2.2L / 3L / 5L	NA	NA



Table 3.4 Equipment used for Water Quality Monitoring

Equipment	Manufacturer / Model	Serial Number
Water Quality Monitoring Device	Aqua TROLL 600 Multiparameter Sonde	525120
Acoustic Doppler Current Profiler	RiverSurveyor M9	5906

3.3.2 Apart from the equipment mentioned in Section 3.3.1, a Class III commercially licensed vessel will be used as survey vessel. DGPS logging device with accuracy of $\pm 1\text{m}$ at 95% confidence level will be installed on the survey vessel to ascertain that measurement can be made accurately on the specific transects. All GPS data collected during the whole survey will be automatically and electronically logged. Powered winch will be used on-board the Survey Vessel to assist the monitoring. Experienced supervisor will be present all throughout the monitoring activities on-board the survey vessel.

3.3.3 Water samples will be collected by water sampler and stored in high density polythene bottles and sterilized glass bottles (for bacterial analysis), packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory on the same day of collection for analysis. All sampling bottles will be pre-rinsed with the same water samples. The sampling bottles will then be taken to a HOKLAS accredited laboratory for analysis of *E. coli*, BOD₅, Suspended Solids, NH₃-N, NO₃-N, NO₂-N, Total inorganic nitrogen, Total phosphorus (soluble and particulate).

3.4 Laboratory Measurement and Analysis

3.4.1 ALS Technichem (HK) Pty Ltd (HOKLAS Reg. No. 066), is the appointed laboratory for analysis of water samples. The methods adopted by the laboratory and the reporting limits are detailed in **Table 3.5**.

Table 3.5 Laboratory Measurement/Analysis Methods and Reporting Limits

Analysis Description	Method	Reporting limits
<i>E. coli</i>	DoE Section 7.8, 7.9.4.2& 7.9.4.4 plus in situ urease test	1 cfu/100mL
5-day Biochemical Oxygen Demand	APHA 5210B	1 mg/L
Total Suspended Solid	APHA 2540D	0.5 mg/L
Ammonia as N	APHA 4500 NH3: G	0.005 mg/L
Nitrate as N	APHA 4500 NO3: I	0.005 mg/L
Nitrite as N	APHA 4500 NO2 B&H	0.005 mg/L
Total Inorganic Nitrogen	By Calculation	0.01 mg/L
Total phosphorus (soluble and particulate)	APHA 4500 P: J	0.01 mg/L



3.5 Monitoring Frequency and Duration

- 3.5.1 The water quality monitoring programme will be carried out once per two months for a period of five years of the operational phase of the Project.
- 3.5.2 Water quality monitoring for two tides at eight designated stations will be carried out for each monitoring event. For each station at each tide, duplicate samples for in-situ parameter and laboratory analysis at three designated water depths (1 m below water surface, mid-depth and 1 m above the seabed) will be taken and analyzed.
- 3.5.3 The monitoring schedule for the present and next reporting period is provided in **Appendix B**.

3.6 Quality Assurance / Quality Control

- 3.6.1 The equipment is in compliance with the requirements set out in the EM&A Plan. All in-situ monitoring instruments were calibrated by a HOKLAS-accredited laboratory or by standard solutions. Calibration of temperature, DO, salinity, pH and turbidity is conducted in three month interval.
- 3.6.2 During the measurements of DO concentration, DO saturation, salinity, turbidity, pH and temperature, duplicate readings will be taken. If the difference 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 will be taken.
- 3.6.3 The laboratory incorporates a variety of QA/QC monitoring programme into their testing system. Where applicable or available, the quality of the analysis will be monitored by conducting the following QC analysis:

For each batch of 20 samples:

- A minimal of 1 laboratory method blank will be analyzed;
- A minimal of 1 sample duplicate will be analyzed;
- A minimal of 1 sample matrix spike will be analyzed.

3.7 Event and Action Plan

- 3.7.1 Since the purpose of the water quality monitoring is to collect data for future propose, no specific event and action has to be followed.

3.8 Monitoring Results and Observations

- 3.8.1 Water quality monitoring is carried out was 16 April 2021. A summary of the in-situ water quality monitoring results are presented in **Table 3.6** (Mid-ebb) and **Table 3.7** (Mid-flood) respectively. The complete record and graphical presentation of the in-situ water quality monitoring results is given in **Appendix F**.

Table 3.6 Summary of In-situ Monitoring Results (Mid-ebb)

Monitoring Station	Water Depth (m)	Sampling Depth (m)	Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
A	17	S 1	7.03	24.95	8.54	32.02	6.9	0.30	17.4

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Page 16

Monitoring Station	Water Depth (m)	Sampling Depth (m)	Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
		S 1	7.01	24.95	8.56	32.01	6.4	0.31	17.6
		M 8.5	6.99	24.64	8.57	32.09	6.5	0.31	18.1
		M 8.5	6.97	24.67	8.54	32.10	6.7	0.32	18.2
		B 16	6.69	24.45	8.53	32.74	3.8	0.31	21.4
		B 16	6.67	24.43	8.54	32.77	3.7	0.39	21.3
B	14	S 1	6.93	24.77	8.48	32.22	8.8	0.18	321.4
		S 1	6.90	24.75	8.48	32.25	8.4	0.16	314.5
		M 7	6.75	24.58	8.54	32.71	10.7	0.19	336.7
		M 7	6.74	24.59	8.55	32.74	10.8	0.17	330.5
		B 13	6.41	24.39	8.54	32.76	12.3	0.16	5.9
		B 13	6.43	24.37	8.58	32.74	12.4	0.14	6.7
C	12	S 1	6.85	25.09	7.92	29.04	10.7	0.11	53.2
		S 1	6.83	25.08	7.96	29.01	10.3	0.15	53.1
		M 6	6.78	24.62	7.94	29.49	11.2	0.18	48.1
		M 6	6.76	24.68	7.91	29.48	11.4	0.14	47.9
		B 11	6.74	24.69	7.99	29.51	11.6	0.10	43.6
		B 11	6.75	24.67	7.98	29.54	11.9	0.18	43.4
D	13	S 1	7.14	24.84	8.55	29.45	13.8	0.14	97.2
		S 1	7.18	24.81	8.59	29.41	13.9	0.15	98.4
		M 6.5	7.06	24.69	8.54	29.58	15.7	0.26	103.2
		M 6.5	7.07	24.70	8.59	29.57	15.6	0.27	101.4
		B 12	6.89	24.72	8.56	29.61	14.3	0.24	133.5
		B 12	6.88	24.78	8.57	29.62	14.8	0.22	132.6
E	16	S 1	7.23	24.94	8.59	29.45	5.7	0.05	337.4
		S 1	7.24	24.92	8.57	29.54	5.8	0.08	336.1
		M 8	7.05	24.56	8.56	30.40	4.3	0.12	314.1
		M 8	7.12	24.55	8.59	30.41	4.6	0.14	312.3
		B 15	6.54	24.51	8.42	30.67	4.9	0.09	357.2
		B 15	6.52	24.52	8.41	30.66	4.4	0.10	346.3
F	23	S 1	6.98	24.88	8.58	30.13	7.3	0.12	9.8
		S 1	7.01	24.89	8.57	30.16	7.5	0.13	9.9
		M 11.5	6.72	24.59	8.56	30.55	9.3	0.05	64.1
		M 11.5	6.73	24.58	8.57	30.52	9.5	0.04	65.3
		B 22	6.49	24.57	8.56	30.66	10.1	0.15	44.2
		B 22	6.51	24.55	8.59	30.67	10.4	0.14	43.6
G	22	S 1	7.14	24.57	8.59	32.76	3.4	0.28	315.2
		S 1	7.15	24.58	8.58	32.71	3.6	0.26	314.7
		M 11	6.64	24.47	8.57	32.90	3.2	0.14	317.2
		M 11	6.67	24.48	8.56	32.95	3.1	0.18	318.4
		B 21	6.54	24.58	8.57	32.72	3.5	0.13	294.7
		B 21	6.58	24.77	8.59	32.74	3.9	0.14	296.1
H	19	S 1	6.79	24.69	8.58	32.54	4.3	0.14	311.8
		S 1	6.81	24.68	8.59	32.58	4.9	0.17	319.2
		M 9.5	6.74	24.59	8.59	32.74	4.6	0.05	292.8
		M 9.5	6.75	24.51	8.58	32.79	4.8	0.06	294.7
		B 18	6.61	24.46	8.59	33.57	5.0	0.03	341.8
		B 18	6.59	24.47	8.57	33.18	5.1	0.04	342.5



Table 3.7 Summary of In-situ Monitoring Results (Mid-flood)

Monitoring Station	Water Depth (m)	Sampling Depth (m)	Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
A	15	S 1	6.84	24.57	8.59	28.57	2.2	0.16	193.4
		S 1	6.83	24.58	8.51	28.54	2.1	0.14	187.1
		M 7.5	6.48	24.49	8.58	29.79	5.4	0.19	205.1
		M 7.5	6.49	24.44	8.53	29.88	5.3	0.13	212.4
		B 14	6.42	24.47	8.58	29.89	6.2	0.14	177.5
		B 14	6.41	24.43	8.54	29.86	6.0	0.18	176.4
B	14	S 1	6.85	24.56	8.59	28.47	1.8	0.14	144.7
		S 1	6.84	24.54	8.58	28.41	1.9	0.15	143.2
		M 7	6.50	24.53	8.60	29.18	5.4	0.19	218.5
		M 7	6.40	24.58	8.61	29.14	5.1	0.15	226.4
		B 13	6.47	24.46	8.53	29.87	5.9	0.21	204.5
		B 13	6.45	24.48	8.52	29.88	5.5	0.23	207.1
C	12	S 1	6.86	24.57	8.05	29.36	2.4	0.21	174.9
		S 1	6.84	24.54	8.09	29.28	2.3	0.20	189.8
		M 6	6.61	24.62	8.06	29.71	3.1	0.23	198.4
		M 6	6.60	24.61	8.05	29.73	3.4	0.13	230.9
		B 11	6.56	24.67	8.05	29.73	7.2	0.15	210.8
		B 11	6.55	26.68	8.01	29.75	7.3	0.15	220.1
D	14	S 1	6.81	24.56	8.58	29.36	2.5	0.15	205.8
		S 1	6.85	24.58	8.58	29.34	2.7	0.15	188.4
		M 7	6.58	24.63	8.57	29.72	2.7	0.18	226.3
		M 7	6.59	24.66	8.54	29.71	2.6	0.15	268.7
		B 13	6.56	24.67	8.56	29.75	6.7	0.19	258.6
		B 13	6.55	24.68	8.54	29.74	6.8	0.18	256.0
E	14	S 1	6.83	24.56	8.53	31.65	1.8	0.12	124.5
		S 1	6.82	24.70	8.54	31.66	1.9	0.13	122.9
		M 7	6.82	24.51	8.56	31.67	2.4	0.16	148.1
		M 7	6.86	24.52	8.54	31.69	2.6	0.15	147.4
		B 13	6.56	24.61	8.57	30.54	4.1	0.09	142.8
		B 13	6.58	24.66	8.54	30.51	4.2	0.10	142.3
F	18	S 1	6.78	24.53	8.33	31.86	6.5	0.21	166.3
		S 1	6.71	24.57	8.27	31.84	6.4	0.23	164.9
		M 9	6.78	24.54	8.14	31.90	8.6	0.27	153.1
		M 9	6.77	24.53	8.16	31.93	8.3	0.25	156.3
		B 17	6.78	24.61	8.28	31.97	8.1	0.25	192.4
		B 17	6.79	24.62	8.27	31.93	8.4	0.26	191.7
G	13	S 1	6.70	24.54	7.92	32.12	9.7	0.13	249.3
		S 1	6.68	24.55	7.91	32.14	9.4	0.16	244.1
		M 6.5	6.62	24.52	7.94	32.35	10.6	0.11	263.7
		M 6.5	6.61	24.51	7.94	32.36	10.9	0.15	266.9
		B 12	6.51	24.47	7.99	32.57	13.7	0.14	233.5
		B 12	6.54	24.46	7.99	32.56	13.8	0.17	234.1
H	19	S 1	7.12	24.41	7.79	31.46	8.1	0.14	310.9
		S 1	6.80	24.51	7.78	31.44	8.2	0.16	312.7
		M 9.5	6.61	24.53	7.74	32.23	9.5	0.13	304.8
		M 9.5	6.62	24.53	7.75	32.24	9.1	0.17	305.5
		B 18	6.43	24.50	7.82	32.38	10.3	0.13	319.2
		B 18	6.41	24.51	7.81	32.37	10.1	0.14	314.1



3.8.2 Results of laboratory analysis of water quality are presented in **Table 3.8** (Mid-ebb) and **Table 3.9** (Mid-flood) respectively. The complete record and graphical presentation of laboratory analysis results are given in **Appendix F**.

Table 3.8 Summary of Laboratory Analysis Results (Mid-ebb)

Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH ₃ as N (mg/L)	NO ₂ ⁻ as N (mg/L)	NO ₃ ⁻ as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD ₅ (mg/L)
A	17	S 1	3.4	0.055	0.027	0.274	0.355	1	0.01	1.4
		S 1	3.5	0.047	0.017	0.270	0.334	ND	0.01	<1.0
		M 8.5	3.5	0.050	0.018	0.269	0.338	1	0.01	2.1
		M 8.5	3.6	0.045	0.020	0.268	0.333	ND	0.01	2.2
		B 16	5.2	0.052	0.025	0.266	0.342	ND	0.01	1.4
		B 16	4.4	0.056	0.035	0.255	0.347	ND	0.02	1.3
B	14	S 1	11.7	0.051	0.025	0.246	0.323	ND	0.02	1.2
		S 1	10.6	0.049	0.022	0.251	0.321	1	0.02	1.2
		M 7	10.5	0.052	0.024	0.250	0.326	1	0.02	1.1
		M 7	11	0.053	0.011	0.264	0.328	ND	0.02	1.2
		B 13	10.6	0.054	0.016	0.260	0.330	ND	0.02	1.5
		B 13	10.2	0.058	0.016	0.261	0.335	ND	0.02	1.2
C	12	S 1	9.3	0.050	0.022	0.281	0.354	2	0.01	1.2
		S 1	8.5	0.049	0.022	0.285	0.356	3	0.02	1.0
		M 6	8.1	0.051	0.023	0.281	0.354	ND	0.02	1.8
		M 6	9.0	0.048	0.019	0.283	0.350	ND	0.02	2.0
		B 11	7.2	0.049	0.024	0.281	0.354	ND	0.03	2.0
		B 11	8.3	0.051	0.019	0.285	0.355	ND	0.02	1.4
D	13	S 1	11.2	0.039	0.028	0.285	0.352	68	0.02	2.2
		S 1	10.1	0.043	0.032	0.285	0.360	64	0.02	1.9
		M 6.5	6.1	0.041	0.028	0.281	0.350	72	0.02	1.8
		M 6.5	5.2	0.042	0.031	0.279	0.352	76	0.02	1.4
		B 12	5.1	0.042	0.025	0.285	0.353	56	0.02	1.2
		B 12	5.1	0.040	0.014	0.297	0.351	58	0.02	1.4
E	16	S 1	6.2	0.048	0.013	0.301	0.362	50	0.02	1.3
		S 1	6.2	0.042	0.028	0.287	0.357	36	0.02	1.0
		M 8	5.5	0.046	0.013	0.297	0.356	34	0.02	1.2
		M 8	6.0	0.040	0.016	0.297	0.353	46	0.01	1.8
		B 15	5.2	0.052	0.027	0.285	0.364	24	0.02	1.2
		B 15	5.8	0.046	0.028	0.283	0.357	28	0.02	1.1
F	23	S 1	5.6	0.064	0.016	0.284	0.365	24	0.02	<1.0
		S 1	4.5	0.052	0.025	0.288	0.365	38	0.01	1.4
		M 11.5	4.9	0.047	0.030	0.277	0.354	49	0.01	1.2
		M 11.5	5.6	0.051	0.027	0.269	0.347	46	0.01	<1.0
		B 22	5.3	0.053	0.024	0.272	0.350	30	0.01	1.6
		B 22	6.7	0.052	0.016	0.299	0.367	37	0.02	1.5
G	22	S 1	5.8	0.047	0.019	0.289	0.355	47	<0.01	1.1
		S 1	4.5	0.068	0.012	0.243	0.322	18	0.01	<1.0
		M 11	5.8	0.073	0.017	0.226	0.315	29	0.01	1.2
		M 11	6.8	0.077	0.021	0.226	0.324	28	0.02	1.0
		B 21	7.2	0.069	0.025	0.248	0.342	19	0.02	1.0
		B 21	8.6	0.064	0.025	0.282	0.370	19	0.02	<1.0
H	19	S 1	4.7	0.077	0.024	0.221	0.322	11	0.01	1.4
		S 1	4.4	0.080	0.013	0.230	0.323	14	0.01	1.2
		M 9.5	4.8	0.073	0.014	0.228	0.315	10	0.01	<1.0

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH ₃ as N (mg/L)	NO ₂ ⁻ as N (mg/L)	NO ₃ ⁻ as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD ₅ (mg/L)
		M 9.5	4.2	0.074	0.022	0.222	0.318	10	0.01	<1.0
		B 18	5.4	0.077	0.014	0.229	0.320	5	0.01	<1.0
		B 18	6.5	0.071	0.014	0.240	0.324	6	0.02	1.1

Table 3.9 Summary of Laboratory Analysis Results (Mid-flood)

Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH ₃ as N (mg/L)	NO ₂ ⁻ as N (mg/L)	NO ₃ ⁻ as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD ₅ (mg/L)
A	15	S 1	3.3	0.057	0.016	0.285	0.358	8	0.02	1.6
		S 1	3.8	0.068	0.021	0.281	0.370	10	0.04	1.7
		M 7.5	2.8	0.057	0.029	0.269	0.356	7	<0.01	1.4
		M 7.5	3.1	0.062	0.030	0.270	0.362	5	0.02	1.5
		B 14	3.5	0.061	0.023	0.275	0.358	4	0.04	1.0
		B 14	3.2	0.068	0.024	0.277	0.368	10	<0.01	1.6
B	14	S 1	4.2	0.066	0.018	0.283	0.368	5	0.02	1.7
		S 1	4.2	0.059	0.012	0.290	0.360	7	0.04	1.8
		M 7	3.8	0.071	0.016	0.286	0.374	8	0.04	2.0
		M 7	2.7	0.064	0.02	0.282	0.367	5	0.02	1.7
		B 13	3.1	0.063	0.024	0.275	0.362	4	0.02	1.8
		B 13	2.9	0.057	0.024	0.277	0.359	3	0.01	1.5
C	12	S 1	3.2	0.062	0.014	0.281	0.357	5	0.02	1.3
		S 1	2.2	0.067	0.016	0.286	0.369	7	0.02	1.2
		M 6	2.1	0.060	0.017	0.282	0.359	6	0.02	1.2
		M 6	4.0	0.060	0.016	0.281	0.357	3	0.01	<1.0
		B 11	4.4	0.064	0.021	0.276	0.361	7	0.02	1.1
		B 11	3.5	0.060	0.023	0.278	0.360	5	0.02	1.2
D	14	S 1	3.2	0.060	0.023	0.276	0.360	4	0.02	1.8
		S 1	3.0	0.061	0.025	0.278	0.364	3	0.02	2.1
		M 7	3.5	0.064	0.019	0.283	0.365	9	0.02	2.1
		M 7	3.0	0.072	0.018	0.284	0.374	5	0.02	2.1
		B 13	4.8	0.067	0.018	0.283	0.368	4	0.03	2.1
		B 13	4.1	0.066	0.018	0.286	0.370	5	0.02	1.8
E	14	S 1	2.1	0.074	0.018	0.275	0.366	6	0.02	1.0
		S 1	2.6	0.072	0.023	0.268	0.364	8	0.01	<1.0
		M 7	2.8	0.067	0.016	0.281	0.364	8	0.02	1.0
		M 7	3.1	0.068	0.017	0.279	0.365	6	0.02	1.8
		B 13	3.9	0.065	0.019	0.274	0.358	9	0.01	<1.0
		B 13	3.0	0.068	0.018	0.275	0.360	6	0.01	<1.0
F	18	S 1	5.1	0.079	0.020	0.282	0.380	7	0.03	1.6
		S 1	4.6	0.070	0.021	0.285	0.376	9	0.01	1.1
		M 9	4.6	0.072	0.015	0.284	0.371	14	0.04	1.5
		M 9	5.7	0.063	0.020	0.271	0.354	15	0.01	1.1
		B 17	6.3	0.070	0.015	0.286	0.371	7	0.02	2.0
		B 17	6.5	0.071	0.012	0.288	0.372	9	0.02	1.5
G	13	S 1	4.1	0.071	0.016	0.275	0.361	11	0.02	1.3
		S 1	4.9	0.082	0.024	0.275	0.381	16	0.02	1.9
		M 6.5	5.8	0.082	0.022	0.289	0.394	22	<0.01	1.6
		M 6.5	5.0	0.080	0.019	0.282	0.381	16	<0.01	1.2
		B 12	6.0	0.074	0.020	0.269	0.363	7	0.01	1.1
		B 12	5.3	0.070	0.025	0.263	0.358	9	0.02	1.4

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH ₃ as N (mg/L)	NO ₂ ⁻ as N (mg/L)	NO ₃ ⁻ as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD ₅ (mg/L)	
H	19	S	1	4.3	0.065	0.026	0.264	0.355	8	<0.01	1.3
		S	1	4.9	0.070	0.023	0.265	0.359	11	0.01	1.3
		M	9.5	5.0	0.062	0.026	0.264	0.351	14	0.02	<1.0
		M	9.5	4.3	0.070	0.025	0.261	0.355	22	0.01	1.2
		B	18	5.2	0.069	0.017	0.274	0.360	9	0.01	1.1
		B	18	4.6	0.063	0.015	0.287	0.365	14	0.01	1.8

3.8.3 The tidal data is obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by Hydrographic Office of Marine Department. Tidal data obtained from Ma Wan Marine Traffic Station is present in **Appendix G**.

3.8.4 Heavy marine traffic was observed nearby the Project site and its vicinity and may affect the water quality. The above conditions may affect monitoring results. The weather condition is summarized and presented in **Table 3.10**.

Table 3.10 Weather condition of water quality monitoring

Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
16 April 2021	25.1	22.8	21.5	88	1.5

Source: Hong Kong Observatory



4. SEDIMENT QUALITY MONITORING AND BENTHIC SURVEY

4.1 Monitoring Station

4.1.1 In accordance with Section 6 of the EM&A Plan, sediment quality monitoring and benthic survey should be carried out at eight designated monitoring stations (two impact stations and six control stations) during the first five years of the operational phase of the Project. The proposed monitoring stations shall be the same monitoring stations that were used for the baseline monitoring programme and have been approved by EPD. The coordinates of the monitoring stations are shown in **Table 4.1** and their locations are shown in **Figure 3**.

Table 4.1 Location of Sediment Quality Monitoring and Benthic Survey

Sampling Location		Easting	Northing
A	The Brothers, Control Station	816 100	822 500
B	The Brothers, Control Station	816 680	822 440
C	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
E	Cheung Sok, Control Station	819 817	821 655
F	Cheung Sok, Control Station	820 158	821 922
G	Tai Ching Chau, Control Station	822 214	822 692
H	Tai Ching Chau, Control Station	822 494	822 939

4.2 Monitoring Parameter

4.2.1 The monitoring parameters for sediment quality monitoring and benthic survey are summarized in **Table 4.2**.

Table 4.2 Parameters for Sediment Quality Monitoring and Benthic Survey

Monitoring Parameters	
Sediment Quality Monitoring	Rinsate Blank for Benthic Survey
Grain size profile* (i.e. Particle Size Distribution) (%)	Cadmium (µg/L)
Total organic carbon* (%)	Chromium (µg/L)
pH value	Copper (µg/L)
Ammonia as N (mg-N/kg)	Lead (µg/L)
Total nitrogen (mg-N/kg)	Mercury ((µg/L)
Total phosphorus (mg-N/kg)	Nickel (µg/L)
Cadmium (mg/kg)	Zinc (µg/L)
Chromium (mg/kg)	Arsenic (µg/L)
Copper (mg/kg)	Silver (µg/L)
Lead (mg/kg)	
Mercury (mg/kg)	
Nickel (mg/kg)	
Zinc (mg/kg)	
Arsenic (mg/kg)	
Silver (mg/kg)	

*Grain size profile and total organic carbon is determined from the sediment sampled collected for benthic survey.

4.2.2 Apart from the parameters listed in the Table 4.2, other relevant supplementary information such as monitoring location, time, weather conditions and any special phenomena will be also recorded.

4.2.3 The tidal data will be obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by the Hydrographic Office of Marine Department. Location of the tide gauge is shown in **Figure 4**.

4.3 Sampling Equipment

4.3.1 Ponar grab sampler (capacity of ~ 1 litre) will be used for collection of samples for sediment analysis. The grab will be capable of collecting sufficient amount of surficial (top 5 cm) sediment for the required analysis in a single deployment at each sampling location. The grab will be constructed with non-contaminating material to prevent sample contamination. Photos of ponar grab sampler are shown in **Appendix J**.

4.3.2 A modified Van Veen grab sampler (capacity of ~ 11.3 litres) will be used for collecting sediment samples for benthic survey. The top of the grab will have openings to allow the easy flow of water through the grab as it descends. The openings will be covered with 0.5 mm mesh to prevent the loss of any benthic fauna once sediment samples are taken. In addition the top openings will be sealable by movable flaps which will close when the grab is hauled to surface. Photos of modified Van Veen grab sampler are shown in **Appendix J**.

4.3.3 Class III commercially licensed vessel will be used as survey vessel. DGPS logging device in the ADCP with accuracy of $\pm 1\text{m}$ at 95% confidence level will be installed on the survey vessel to ascertain that measurement can be made accurately on the specific transects. All GPS data collected during the whole survey will be automatically and electronically logged. Powered winch will be used on-board the survey vessel to assist the monitoring. 4 fixed sieve stations will be equipped on survey vessel. Experienced supervisor will be present all throughout the monitoring activity on-board the survey vessel.

4.4 Sampling Procedure

Benthic Survey, Particle Size Distribution and TOC Analysis

4.4.1 A modified Van Veen grab sampler (capacity of ~ 11.3 litres) will be deployed using a winch at each of the benthic survey stations to collect single grab sample at each station. The grab sampler will be lowered through the water column slowly at a constant rate (approximately 30 cm/s) to prevent the formation of a pressure wave that may disturb surficial deposits. The grab will then be retrieved and evaluated on board of the survey vessel. Any sample showing uneven penetration or only partially filled with sediment shall be rejected. Samples will be placed in a plastic box with an identification card. Sub-samples (approximately 1 kg) will be splitted up for analysis of particle size distribution and TOC. The remaining sediment samples will be washed gently to separate the benthic organisms and the sediment using a watering hose with marine seawater supply, by a sieve stack (comprising 1 mm and 0.5 mm meshes). Benthic organisms remaining on the sieve will be removed into pre-labeled ziplock plastic bags. A 10% solution of buffered formalin containing Rose Bengal in seawater will be added to the bag to ensure tissue preservation. Samples will be sealed in plastic containers for transport to the laboratory for sorting and identification of benthic organisms.



Sediment Quality Monitoring (Except Particle Size Distribution and TOC Analysis)

4.4.2 Ponar grab sampler (capacity of ~ 1 litres) will be deployed at each of the benthic survey stations to collect single grab sample at each station. The grab sampler should be lowered through the water column slowly at a constant rate (approximately 30 cm/s) to prevent the formation of a pressure wave that may disturb surficial deposits. The grab will then be retrieved and evaluated on board of the survey vessel. Any sample showing uneven penetration or only partially filled with sediment will be rejected. Samples will be placed in a plastic box with an identification card. Sediment samples will be then transferred into brand new soil jars with QA/QC monitoring for laboratory analysis. Samples will be preserved and stored in accordance with approved SOP of HOKLAS accredited laboratory and the recommendations stipulated in ETWB TC (W) No. 34/2002.

4.4.3 Sediment samples shall be collected and packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory on the same day of collection for analysis.

4.5 Laboratory Measurement and Analysis

4.5.1 ALS Technichem (HK) Pty Ltd (HOKLAS Reg. No. 066), is the appointed laboratory for analysis of sediment samples. The methods adopted by the laboratory and the reporting limits are detailed in **Table 4.3**.

Table 4.3 Laboratory Measurement/Analysis Methods and Reporting Limits

Analysis Description	Method	Reporting limits
Particle Size Distribution	Geospec 3: 2001 Test method 8.1, 8.5 and 8.7 (Wet Sieve and Hydrometer Method)	1%
Total Organic Carbon	APHA 5310B	0.05%
pH value	APHA 4500H: B	0.1 pH unit
Ammonia as N	APHA 4500 NH3: B&G	0.5 mg/kg
Total Nitrogen	APHA 4500 Norg: D & APHA 4500 NO3: I	10 mg/kg
Total Phosphorus	APHA 4500P: B&H	10 mg/kg
Cadmium	USEPA 6020A Digestion method: 3051A	0.1 mg/kg
Chromium		0.5 mg/kg
Copper		0.2 mg/kg
Lead		0.2 mg/kg
Mercury		0.05 mg/kg
Nickel		0.2 mg/kg
Zinc		0.5 mg/kg
Arsenic		0.5 mg/kg
Silver		0.1 mg/kg

4.6 Taxonomic Identification of Benthic Organism

4.6.1 Taxonomic identification of benthic organisms will be performed using stereo dissecting and high-power compound microscopes where it is necessary. Benthic organisms will be counted and identified to lower taxonomic levels as far as practicable with biomass (wet weight, to 0.01gram) of each individual recorded. If breakage of soft-bodied organism occurs, only anterior portions of fragments will be counted, although all fragments will be retained and

weighted for biomass determinations (wet weight, to 0.01gram). Data of species abundance and biomass will be recorded.

4.6.2 Data collected during surveys will be presented and summarized in tables and graphics. Species/taxon richness and abundance of marine benthic fauna communities will be analyzed by Shannon-Weiner diversity and Pielou's Evenness.

4.7 Monitoring Frequency and Duration

4.7.1 The sediment quality monitoring and benthic survey programmed shall be carried out once per two months for a period of five years of the operational phase of the Project. Since the purpose of the sediment quality monitoring and benthic survey is to collect data for future reference, only a single round of sediment quality monitoring and benthic survey at 8 designated locations will be carried out for each monitoring event. For each location, only a single sample will be taken and analyzed.

4.8 Quality Assurance / Quality Control

4.8.1 A rinsate blank will be collected in each monitoring location before each sediment sampling for benthic survey, so as to monitor the effectiveness of field decontamination procedure.

4.8.2 The laboratory incorporates a variety of QA/QC monitoring programme into their testing system. Where applicable or available, the quality of the analysis will be monitored by conducting the following QC analysis:

For each batch of 20 samples:

- A minimal of 1 laboratory method blank will be analyzed;
- A minimal of 1 sample duplicate will be analyzed;
- A minimal of 1 sample matrix spike will be analyzed.

4.9 Event and Action Plan

4.9.1 Since the purpose of the sediment quality monitoring and benthic survey is to collect data for future purpose, no specific event and action has to be followed.

4.10 Monitoring Results and Observations

4.10.1 Sediment quality monitoring and benthic survey is carried out on 16 April 2021. A summary of laboratory analysis results for the sediment quality monitoring and benthic survey are presented in **Table 4.4** and **Table 4.5** respectively. The complete record and graphical presentation of the sediment quality monitoring results is given in **Appendix H**.

Table 4.4 Summary of laboratory analysis results for sediment monitoring

Monitoring Station	pH value	NH ₃ as N (mg/L)	Total N (mg-N/kg)	Total P (mg-P/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	As (mg/kg)	Ag (mg/kg)
A	8.6	3.4	1270	459	<0.10	34.6	28.0	37.1	0.12	20.0	97.2	15.2	0.21
B	8.5	5.8	1970	526	0.11	39.5	37.8	39.5	0.12	23.4	106	12.7	0.34
C	8.6	2.3	1180	433	<0.10	35.8	29.6	37.6	0.11	21.9	97.7	10.6	0.25
D	8.5	3.2	1320	491	0.12	40.4	35.0	41.7	0.12	24.7	114	11.5	0.30
E	8.4	9.3	2050	615	<0.10	40.2	35.9	42.2	0.13	24.9	114	10.5	0.33
F	8.2	6.8	1880	654	0.10	46.3	41.2	47.6	0.16	28.9	130	11.9	0.38
G	8.4	6.6	1540	570	0.11	42.3	50.3	45.0	0.14	25.7	124	11.7	0.48
H	8.5	8.2	1500	548	0.13	47.1	48.3	49.4	0.14	29.0	149	13.6	0.55

Table 4.5 Summary of laboratory analysis results for benthic survey

Monitoring Station	Total organic carbon (%)	Grain size profile (%)				Description
		Gravel	Sand	Silt	Clay	
A	0.76	1	44	29	26	Dark grey, sandy SILT/CLAY with shell fragments
B	1.01	0	17	46	37	Dark grey, slightly sandy SILT/CLAY with shell fragments
C	0.83	5	34	32	29	Dark grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments
D	0.90	1	15	47	37	Dark grey, slightly sandy SILT/CLAY with shell fragments
E	1.07	0	8	46	46	Dark grey, slightly sandy SILT/CLAY with
F	1.09	0	3	53	44	Dark grey, SILT/CLAY with shell fragments
G	1.11	0	8	46	46	Dark grey, slightly sandy SILT/CLAY with shell fragments
H	0.96	1	5	45	49	Dark grey, slightly sandy SILT/CLAY with shell fragments

4.10.2 Rinsate blank was collected for chemical analysis. The laboratory data results are provided in **Appendix H**.

4.10.3 Construction works from expansion of Hong Kong International Airport was observed nearby the Project site and its vicinity and may affect the sediment quality. The above conditions may affect monitoring results. The weather condition is summarized and presented in **Table 4.6**.

Table 4.6 Weather condition of water quality monitoring

Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
16 April 2021	25.1	22.8	21.5	88	1.5

Source: Hong Kong Observatory

4.10.4 The benthic survey data are summarized and presented in **Table 4.7**.

Table 4.7 Summary of benthic survey data on 16 April 2021

Monitoring Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	168	3.31	16	1.49	0.54
B	72	1.23	13	1.70	0.66
C	113	5.29	13	1.88	0.76
D	76	10.47	12	1.90	0.76
E	81	10.1	15	1.61	0.59
F	28	0.19	5	1.48	0.92
G	253	6.16	14	1.02	0.38
H	117	4.38	9	1.50	0.68
TOTAL	908	41.13			

4.10.5 The benthic survey results are analyzed and presented as below:

i) Abundance

A total of 908 macrobenthic organisms was recorded from the eight monitoring stations during April 2021 monitoring period. Current result showed higher total abundance as compared to both dry (March 2004) and wet (August 2004) seasons baseline data but was lower compared to the February 2021 results. The decrease in total abundance was due to the decrease in abundance particularly at reference stations A, B, E and F with respect to the previous monitoring period (February 2021). The arthropod *Gammarus* had lower abundance during the current monitoring period compared to February 2021 results. Members of this genus usually favour high concentration of dissolved oxygen (DO) and low water temperature for survival (Zadereev et. al, 2010). The current monitoring period was recorded with lower DO levels that ranged from 6.41 mg/L to 7.24 mg/L; and higher water temperatures that ranged from 24.50°C to 24.61°C relative to February 2021. The change in season with higher temperatures and lower levels of dissolved oxygen in the water column could have caused the lower abundance of *Gammarus* during the current monitoring period compared as to the February 2021 results.

A significant seasonal variation of the macrobenthic abundances was noted during the current monitoring period (F-value = 4.24; F-crit = 1.64; P-value = 0.0000001).

The lowest abundance of 28 individuals (ind.) was recorded at Station F while the highest (253 ind.) was noted at Station G, both as reference stations. Current abundances in the impact stations C and D also increased relative to February 2021 monitoring results. Stations A, B, E and F were observed with decreased abundances as compared to February 2021 results while the rest of the remaining stations were noted with increased abundances. Same with the previous monitoring periods, differences in the total abundance across the monitoring stations were still statistically significant (F-value = 2.92; F-crit = 2.07; P-value = 0.01).

ii) Biomass

The total wet biomass recorded in the eight monitoring stations was 41.13 g with the highest biomass at the impact site Station D (10.47 g) and in reference Station E

(10.1 g). Among the different genera observed in these two stations, the bivalve *Paphia* (9.47 g) at Station D and the bivalve *Meretrix* (4.79 g) at Station E, contributed to the current high recorded biomass. Meanwhile, it was in the reference Station F that the lowest (0.19 g) biomass was noted. Low biomass values were also observed in Stations B (1.23 g) and A (3.31 g). Furthermore, relative to the February 2021 period, a general decrease in biomass was observed during the current monitoring period.

iii) Taxonomic Composition

A total of four phyla comprising of 23 families and 30 genera were identified. During the current survey, the arthropods (56%) dominated the macrobenthic assemblage followed by the annelids (32%) and molluscs (11%) while the group with the lowest dominance was the echinoderms (1.43%). Even though arthropods were still the most abundant within this monitoring period, the percent composition was still lesser compared to February 2021 results. Meanwhile, the composition of annelids increased on this monitoring period relative to the February 2021 results.

There was no dominant genera (member species > 10) recorded during the current monitoring activity.

iv) Diversity

Benthic diversity index (H') ranged from 1.88 to 1.90 in the impact stations while its values ranged from 1.02 to 1.70 among the different reference stations. Impact stations had relatively higher diversity values as compared to reference stations.

Meanwhile, in terms of evenness index (J) values, reference Station G had the lowest value (0.38) and followed by another reference Station A (0.54). Current results showed that both the impact Stations C and D were able to maintain high evenness index relative to the December 2020 results but were little lower compared to February 2021 monitoring results. Current results indicated an overall increase in diversity and evenness values from the baseline survey condition.

The detailed benthic survey results are provided in **Appendix I**.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Page 28

5. CHINESE WHITE DOLPHIN MONITORING

5.1 Data Interpretation

- 5.1.1 In accordance with Section 4.1 of the EM&A Plan, relevant information on the distribution and abundance of CWDs in Hong Kong should be obtained from the Agriculture, Fisheries and Conservation Department (AFCD), and be reviewed on a bimonthly basis during the operational phase of the Project for a period of 5 years.
- 5.1.2 The latest AFCD's report dated 21 July 2020, "*Monitoring of Marine Mammals in Hong Kong Waters (2019-20)*", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in July 2020. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The updated status of the distribution and abundance of CWDs will be provided once the annual report (2020-21) is uploaded to AFCD's webpage.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Page 29

6. ADVICE ON IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

6.1 Implementation Status

- 6.1.1 Although no site inspection is prescribed during the operation of the Plant in accordance with the approved EM&A Plan, SHWSTW is reminded to fully and properly implement the mitigation measures specified in the EP and EIA Report. Mitigation measures such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment prior to stack exhaust was implemented in the reporting period. A summary of mitigation measures implementation schedule is provided in **Appendix L**.



7. ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

7.1.1 SHWSTW is reminded to fully comply with EP conditions. All measures and recommendations in the EP, EIA Report and approved Waste Management Plan (WMP) shall be fully and properly implemented. During the reporting period, following measures in related to solid and liquid waste management were implemented:

- The influent of waste water shall be treated by CEPT with UV disinfection;
- Trip-ticket system shall be implemented for sludge and sediment;
- The acceptance criteria for Landfill disposal should be followed;
- Chemical waste should be properly handled and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

7.1.2 A summary of mitigation measures implementation schedule is provided in **Appendix L**.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Page 31

8. SUMMARY OF EXCEEDANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

- 8.1.1 Odour patrol monitoring was resumed and carried out on 1, 7, 13, 19 and 30 April 2021. No exceedances of Action/Limit levels at ASRs were recorded.
- 8.1.2 Water quality monitoring, sediment quality monitoring and benthic survey were carried out on 16 April 2021. No specific Action/Limit level has to be followed since the purpose of the monitoring is to collect data for future purpose.



9. SUMMARY OF ENVIRONMENTAL COMPLAINTS

9.1.1 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to environmental impact during the report period. Summaries of complaints, notification of summons and successful prosecutions are presented in **Table 9.1** and **Table 9.2**.

Table 9.1 Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	0	0	1
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

Table 9.2 Cumulative Statistics on Notification of Summons and Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Notification of Summons and Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

9.1.2 The cumulative complaint log and summaries of complaints are presented in **Appendix K**.



10. FUTURE KEY ISSUES

10.1.1 The key issues to be considered in the coming reporting month include:

- i. Potential environmental impacts arising from the operation of SHWSTW are mainly associated with air quality, water quality, sediment quality, benthic ecology, waste management and distribution and abundance of CWDs.
- ii. According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). H₂S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD. Response to comment for updated alternative method on air quality monitoring was submitted to IEC on 30 April 2021.

11. CONCLUSION

- 11.1.1 Odour patrol monitoring was resumed from January 2020 and carried out on 1, 7, 13, 19 and 30 April 2021. The modified odour patrol monitoring plan including updated Event and Action Plan was approved on March 2020, and odour patrol monitoring was commenced from 20 March 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) and odour patrol points were recorded and no non-compliance of odour monitoring at odour patrol points were recorded in the reporting period.
- 11.1.2 According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). H₂S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H₂S concentration (ppb) with the odour unit (OU/m³). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD. Response to comment for updated alternative method on air quality monitoring was submitted to IEC on 30 April 2021.
- 11.1.3 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 16 April 2021 to collect data for future reference in accordance with Section 5.5 and 6.5 of the Operational EM&A Plan. The details of methodology and results collected of the monitoring were presented in Section 3 and Section 4. Heavy marine traffic and construction works from expansion of Hong Kong International Airport were observed nearby the Project site and its vicinity and may affect the water and sediment quality The above conditions may affect monitoring results.
- 11.1.4 The latest AFCD's report dated 21 July 2020, "*Monitoring of Marine Mammals in Hong Kong Waters (2019-20)*" in terms of the distribution and abundance of CWDs was reviewed in the Monthly EM&A report in July 2020. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The updated status of the distribution and abundance of CWDs will be provided once the annual report (2020-21) is uploaded to AFCD's webpage.
- 11.1.5 SHWSTW is reminded to fully *comply with EP conditions. All environmental mitigation measures* and recommendations in the EP, EIA Report and approved waste management plan shall be fully and properly implemented.
- 11.1.6 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to environmental impact during the report period.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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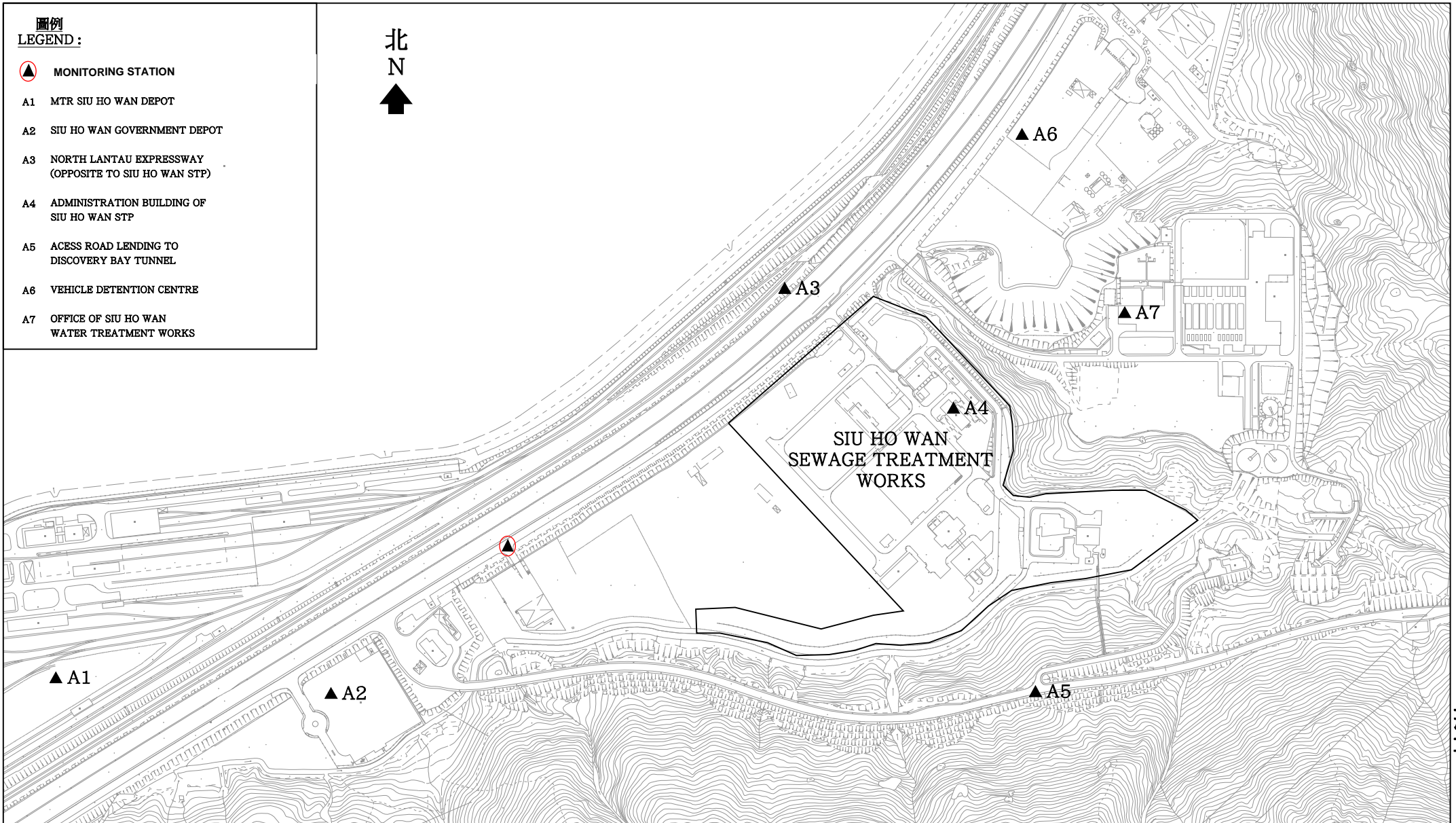
Report No.: 0041/17/ED/0627A


Figure 1

Monitoring Stations of Air Sensitive Receivers

圖例
LEGEND :

-  **MONITORING STATION**
- A1** MTR SIU HO WAN DEPOT
- A2** SIU HO WAN GOVERNMENT DEPOT
- A3** NORTH LANTAU EXPRESSWAY
(OPPOSITE TO SIU HO WAN STP)
- A4** ADMINISTRATION BUILDING OF
SIU HO WAN STP
- A5** ACCESS ROAD LENDING TO
DISCOVERY BAY TUNNEL
- A6** VEHICLE DETENTION CENTRE
- A7** OFFICE OF SIU HO WAN
WATER TREATMENT WORKS



<p>圖則名稱 drawing title</p> <p>UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT OPTIONAL ENVIRONMENTAL MONITORING AND AUDIT PLAN ODOUR PATROL MONITORING STATIONS</p>	繪畫 drawn	C.W. CHAN	日期 date	16-08-2006
	核對 checked	C.K. LAM	日期 date	16-08-2006
	批核 approved	S.K. WONG	日期 date	16-08-2006
	部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		
			圖則編號 drawing no.	DCM/2006/063
			比例 scale N.T.S.	
保留版權 COPYRIGHT RESERVED				
		 <p>香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION</p>		

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Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
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Fax : +852 2450 6138
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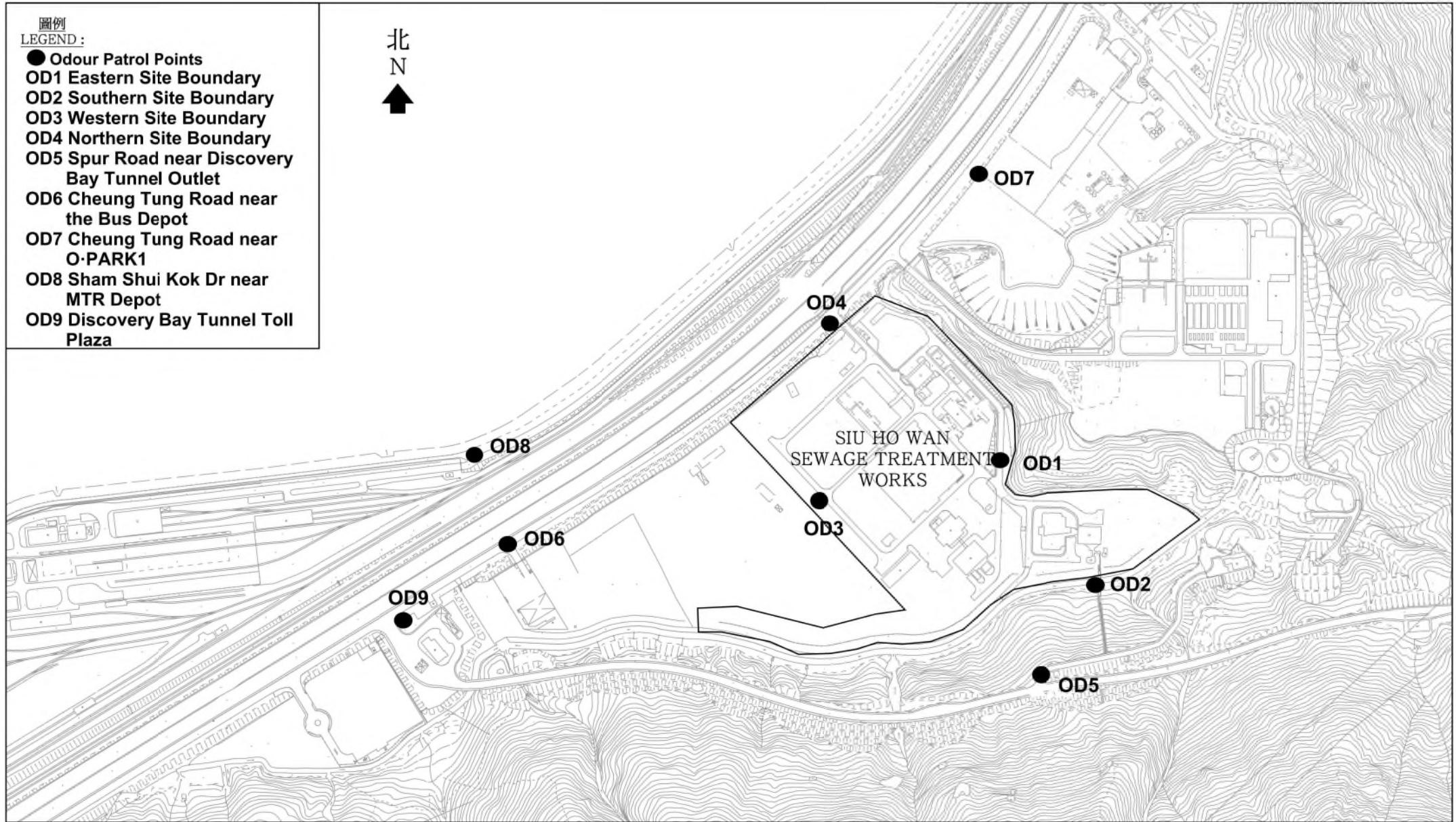
Report No.: 0041/17/ED/0627A

Figure 2

Odour Patrol Points of Modified Odour Patrol

圖例
LEGEND:

- Odour Patrol Points
- OD1 Eastern Site Boundary
- OD2 Southern Site Boundary
- OD3 Western Site Boundary
- OD4 Northern Site Boundary
- OD5 Spur Road near Discovery Bay Tunnel Outlet
- OD6 Cheung Tung Road near the Bus Depot
- OD7 Cheung Tung Road near O-PARK1
- OD8 Sham Shui Kok Dr near MTR Depot
- OD9 Discovery Bay Tunnel Toll Plaza



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Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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Figure 3

Monitoring Stations of Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey



816000E

818000E

820000E

822000E

822000N

大小磨刀
BROTHERS

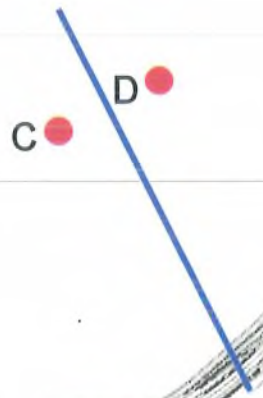
820000N

CO-ORDINATES OF CONTROL STATIONS :

CONTROL STATION No.	CO-ORDINATES	
	NORTHING	EASTING
A	822500	816100
B	822440	816680
E	821655	819817
F	821922	820158
G	822692	822214
H	822939	822494

CO-ORDINATES OF IMPACT STATIONS :

IMPACT STATION No.	CO-ORDINATES	
	NORTHING	EASTING
C	820180	816800
D	820360	817160



圖例
LEGEND :

- IMPACT STATION
- ⊕ CONTROL STATION
- SUBMARINE OUTFALL

繪畫 drawn H.K. LAI	日期 date 06-02-2004	圖則編號 drawing no. DCM/2004/002	比例 scale N.T.S.
核對 checked C.K. LAM	日期 date 04-03-2004	保留版權 COPYRIGHT RESERVED	
批核 approved S.K. WONG	日期 date 04-03-2004	香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	
部門 office 顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION			

圖則名稱 drawing title

**UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT
BASELINE MONITORING - LOCATION OF MONITORING STATIONS**

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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Figure 4

Location of the Tide Gauge

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5 Lok Yi Street, Tai Lam,
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Location of the Tide Gauge

Source: Google Maps

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Report No.: 0041/17/ED/0627A

Appendix A Project Organization Chart

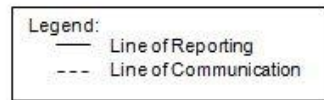
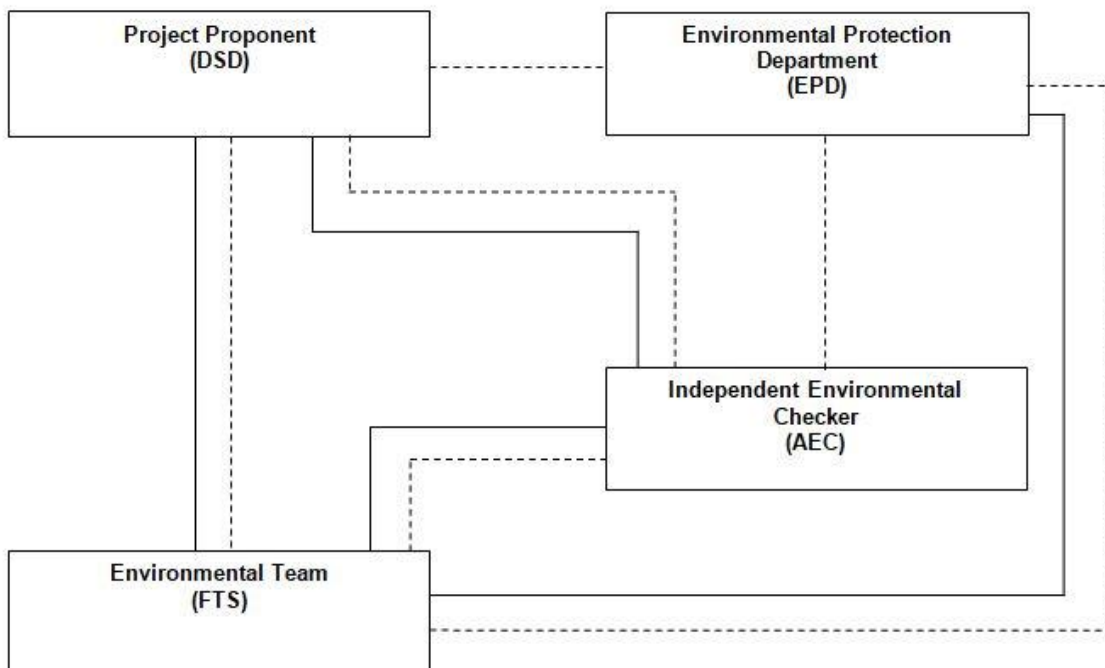
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Fugro Development Centre,
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Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
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Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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Appendix B

Monitoring Schedule for Present and Next Reporting Period

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Monitoring Schedule for the Present Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
				1 April Odour Patrol	2	3
4	5	6	7 Odour Patrol	8	9	10
11	12	13 Odour Patrol	14	15	16 Water Quality Monitoring and Sediment Quality Monitoring and Benthic Survey Mid-Flood (08:05) Mid-Ebb (14:49)	17
18	19 Odour Patrol	20	21	22	23	24
25	26	27	28	29	30 Odour Patrol	

Remarks

- Actual monitoring will be subjected to change due to any safety concern or adverse weather condition.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Monitoring Schedule for the Next Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
						1 May
2	3	4	5	6 Odour Patrol	7	8
9	10	11	12 Odour Patrol	13	14	15
16	17	18 Odour Patrol	19	20	21	22
23	24 Odour Patrol	25	26	27	28	29
30	31					

Remarks

- Actual monitoring will be subjected to change due to any safety concern or adverse weather condition.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix C

Event and Action Plan for Air Quality Monitoring

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
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EVENT	ACTION		
	ET	IEC	*Operator
Action Level			
One complaint received for specific odour event / Odour intensity of 2 or above is measured from odour patrol	<ol style="list-style-type: none"> 1. Identify source/reason of exceedance or odour complaints; 2. Notify the IEC and Operator of exceedance; 3. Repeat odour patrol to confirm finding; 4. If exceedance continues, notify the IEC and Operator; 5. Carry out investigation to identify the source/reason of exceedance or complaints; 6. Check Operator's working methods; and 7. Discuss with Operator on required remedial actions. 	<ol style="list-style-type: none"> 1. Check odour patrol results submitted by ET; 2. Discuss with ET and Operator on the possible remedial actions; 3. Advise the Operator on the effectiveness of the proposed remedial measures; 4. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify the ET and IEC when receipt of odour complaint; 2. Confirm receipt of notification of exceedance in writing; 3. Identify/ confirm source with ET; 4. Discuss with ET for remedial actions required; 5. Ensure remedial actions properly implemented 6. Rectify any unacceptable practice; and 7. Amend operation methods if appropriate.
Limit Level			
More than one complaint in 3 months / Odour intensity of 3 or above is measured from odour patrol	<ol style="list-style-type: none"> 1. Identify source/reason of exceedance or odour complaints; 2. Notify the IEC and Operator of exceedance; 3. Repeat odour patrol to confirm finding; 4. If exceedance continues, notify the IEC and Operator; 5. Carry out investigation to identify the source/reason of exceedance or complaints; 6. Check Operator's working methods; 7. Carry out analysis of Operator's working procedures to determine possible mitigation to be implemented; 8. Arrange meeting with ET and EPD to discuss the remedial actions to be taken; 9. Discuss with EPD and the 	<ol style="list-style-type: none"> 1. Check odour patrol results submitted by ET; 2. Discuss amongst ET and the Operator on the potential remedial actions; 3. Review the proposed remedial actions whenever necessary to assure their effectiveness and advise the Operator accordingly; 4. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify the ET and IEC when receipt of odour complaint; 2. Confirm receipt of notification of exceedance in writing; 3. Identify/ confirm source with ET; 4. Inform ET, IEC and EPD; 5. Discuss with EPD and ET on the required remedial actions; 6. Ensure remedial actions properly implemented; 7. Take immediate action to avoid further exceedance; 8. Implement the agreed proposals.

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Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

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Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

	<p>Operator on the required remedial actions;</p> <p>10. Submit proposals for remedial actions within 3 working days of notification;</p> <p>11. Assess effectiveness of Operator's remedial actions and keep EPD informed of the results;</p> <p>12. Amend proposal if appropriate; and</p> <p>13. Resubmit proposal if problem still not under control.</p>		
--	---	--	--

* The operator who is the constructor responsible for the operation during the maintenance period.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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Appendix D

Results and Graphical Presentation of Air Quality Monitoring

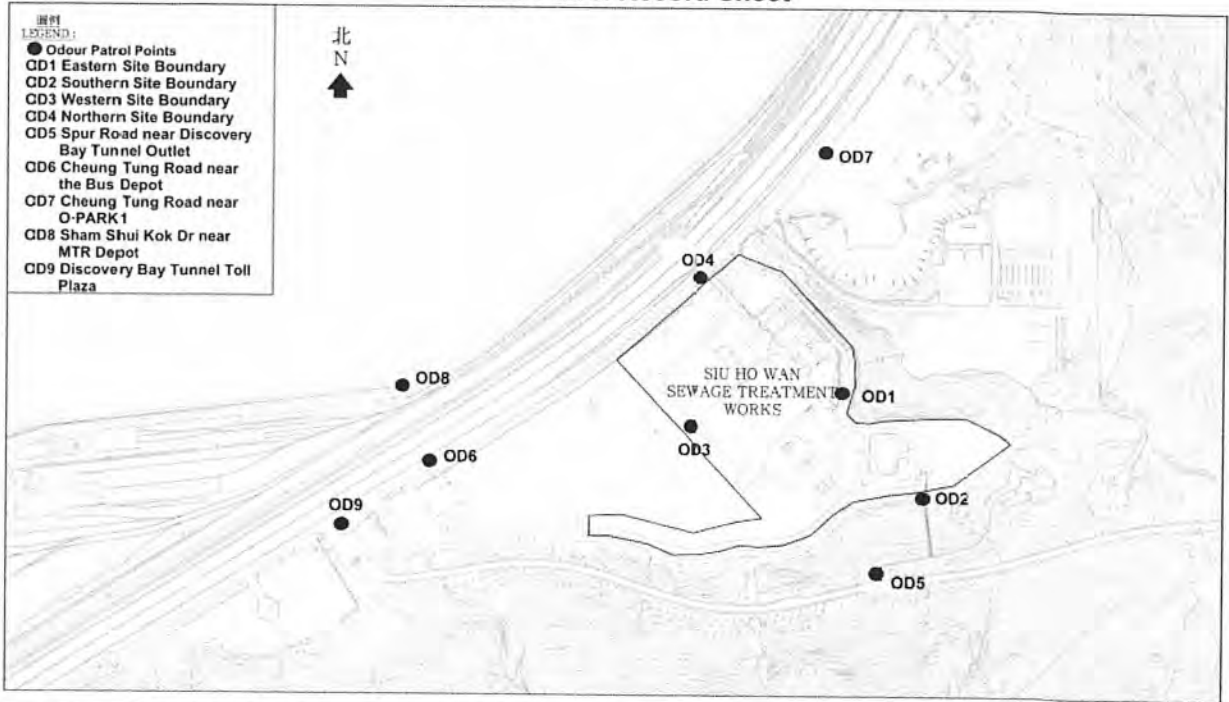
FUGRO TECHNICAL SERVICES LIMITED

Room 723 - 726, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent, Kwai Fong,
Hong Kong.

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



Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works Odour Patrol Record Sheet



Date		1-4-2021		Weather	Fine		Temperature	28.0°C		Humidity	74%	
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics						
OD1	Eastern Site Boundary	10:33	SE	0.2	0	/						
OD2	Southern Site Boundary	10:35	E	0.4	0	/						
OD3	Western Site Boundary	10:31	E	0.2	0	/						
OD4	Northern Site Boundary	10:28	S	0.2	0	/						
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/						
OD6	Cheung Tung Road near the Bus Depot	10:11	E	0.4	0	/						
OD7	Cheung Tung Road near O-PARK1	10:14	E	0.2	0	/						
OD8	Sham Shui Kok Dr near MTR Depot	10:04	SE	0.2	0	/						
OD9	Discovery Bay Tunnel Toll Plaza	10:09	E	0.2	0	/						

***Classification Criteria:**

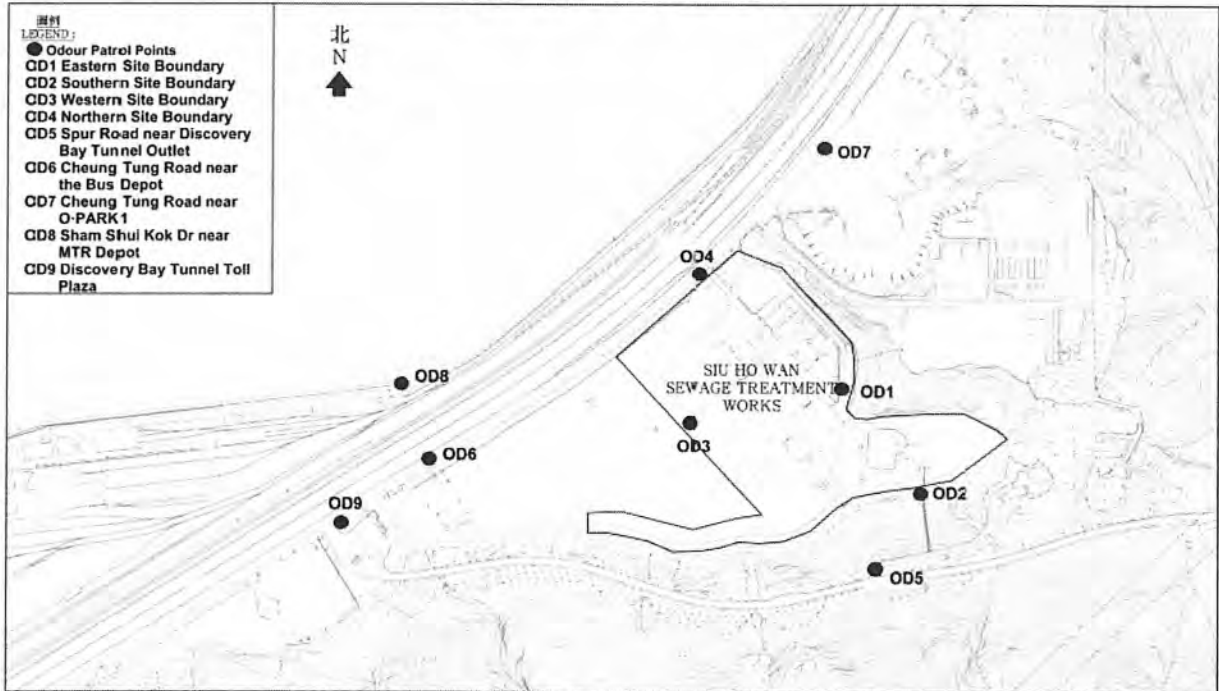
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: [Signature]
Name: LOW YEE CHANG
Date: 1.4.2021

Checked by: [Signature]
Name: CHOI KAM HO
Date: 1 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date	7/4/2021		Weather	Cloudy		Temperature	23.3°C		Humidity	68%	
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics					
OD1	Eastern Site Boundary	10:58	NW	0.2	0	/					
OD2	Southern Site Boundary	11:00	NW	0.1	0	/					
OD3	Western Site Boundary	10:56	NW	0.2	0	/					
OD4	Northern Site Boundary	10:53	NW	0.3	0	/					
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/					
OD6	Cheung Tung Road near the Bus Depot	10:40	NW	0.9	0	/					
OD7	Cheung Tung Road near O-PARK1	10:42	NW	0.7	0	/					
OD8	Sham Shui Kok Dr near MTR Depot	10:31	NW	0.8	0	/					
OD9	Discovery Bay Tunnel Toll Plaza	10:37	NW	1.2	0	/					

***Classification Criteria:**

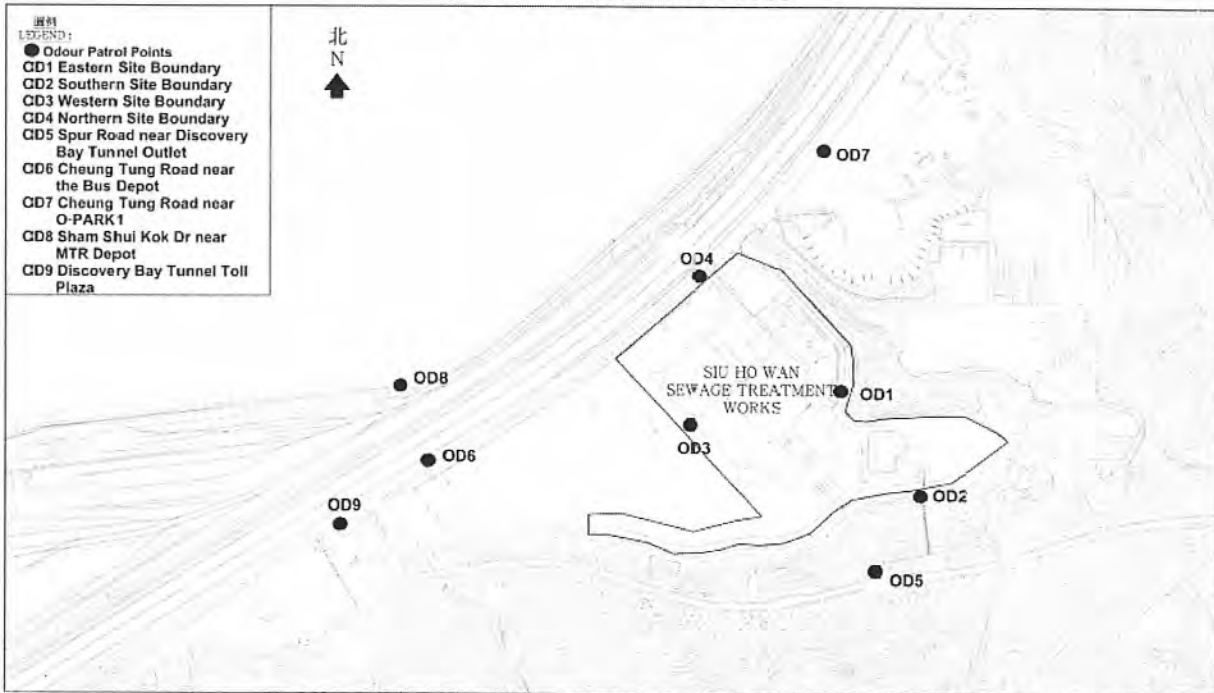
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: Woo
Name: Woo Ka Ho
Date: 7/4/2021

Checked by: M
Name: CHOI KAM HO
Date: 7 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date	13/4/2021	Weather	Fine	Temperature	26.9°C	Humidity	69%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	10:49	NE	1.8	0	/	
OD2	Southern Site Boundary	10:52	/	0	1	Effluent	
OD3	Western Site Boundary	10:47	NE	1.2	0	/	
OD4	Northern Site Boundary	10:44	NE	0.9	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	10:31	/	0	0	/	
OD7	Cheung Tung Road near O-PARK1	10:33	NE	0.6	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	10:24	NE	0.3	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	10:29	NE	0.4	0	/	

***Classification Criteria:**

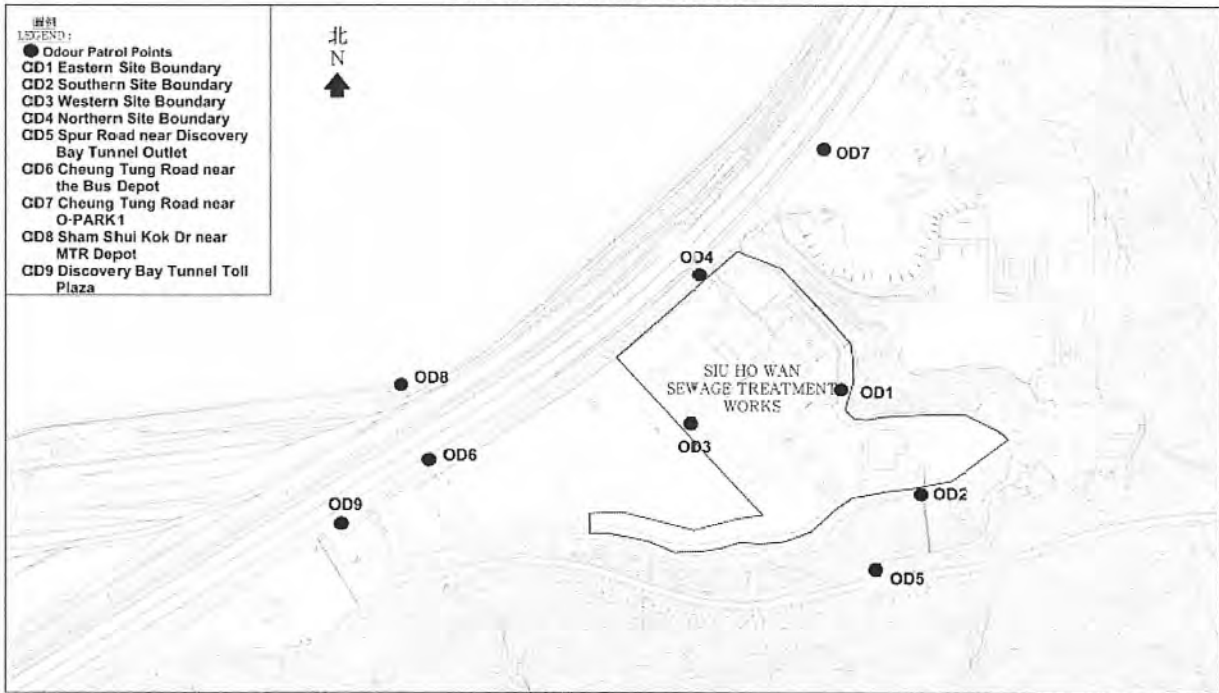
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: [Signature]
Name: [Signature]
Date: 13/4/2021

Checked by: [Signature]
Name: CHIE KAM HO
Date: 13 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date	13/4/2021	Weather	Fine	Temperature	26.9°C	Humidity	69%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	10:49	NE	1.8	0	/	
OD2	Southern Site Boundary	10:52	/	0	1	Effluent	
OD3	Western Site Boundary	10:47	NE	1.2	0	/	
OD4	Northern Site Boundary	10:44	NE	0.9	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	10:31	/	0	0	/	
OD7	Cheung Tung Road near O-PARK1	10:33	NE	0.6	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	10:24	NE	0.3	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	10:29	NE	0.4	0	/	

***Classification Criteria:**

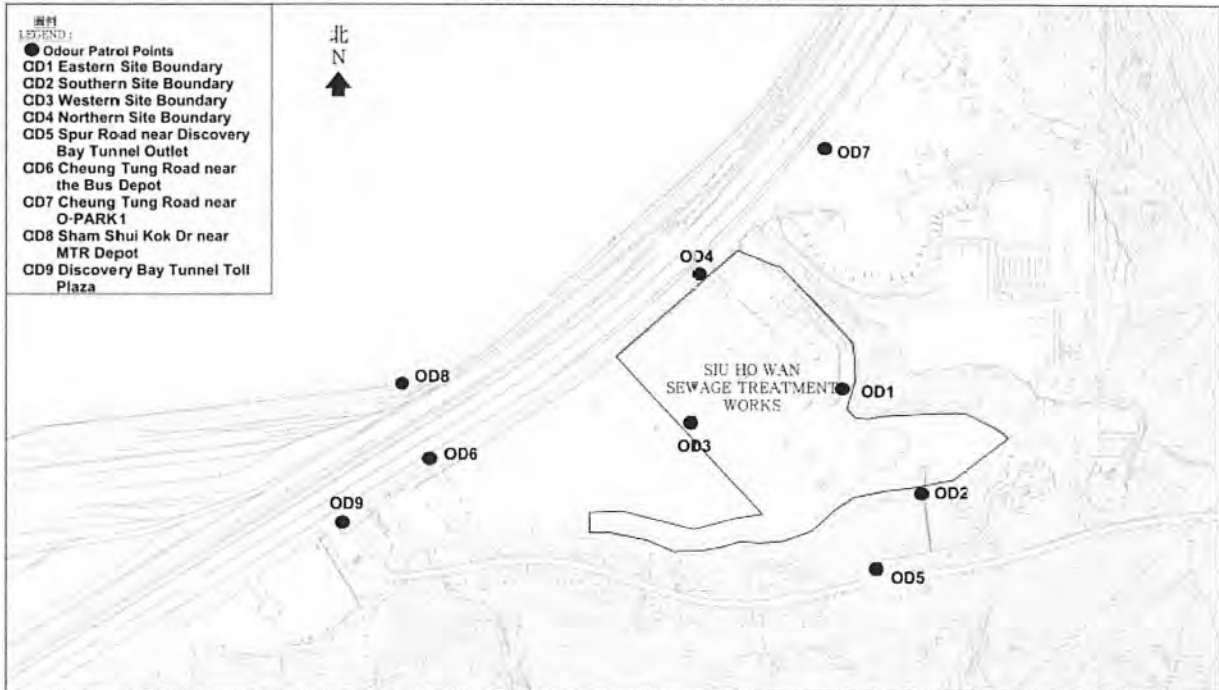
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: Chan Ho Wai
Name: Chan Ho Wai
Date: 13/4/2021

Checked by: Choi Kam Ho
Name: CHOI KAM HO
Date: 13 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date	19.4.2021		Weather	Cloudy	Temperature	23.5°C	Humidity	57%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics		
OD1	Eastern Site Boundary	1041	S	0.6	0	/		
OD2	Southern Site Boundary	1043	E	4.0	1	EFFLUENT		
OD3	Western Site Boundary	1039	E	3.1	0	/		
OD4	Northern Site Boundary	1036	E	3.4	0	/		
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/		
OD6	Cheung Tung Road near the Bus Depot	1021	E	4.5	0	/		
OD7	Cheung Tung Road near O-PARK1	1024	E	4.7	0	/		
OD8	Sham Shui Kok Dr near MTR Depot	1015	E	3.0	0	/		
OD9	Discovery Bay Tunnel Toll Plaza	1020	E	4.2	0	/		

***Classification Criteria:**

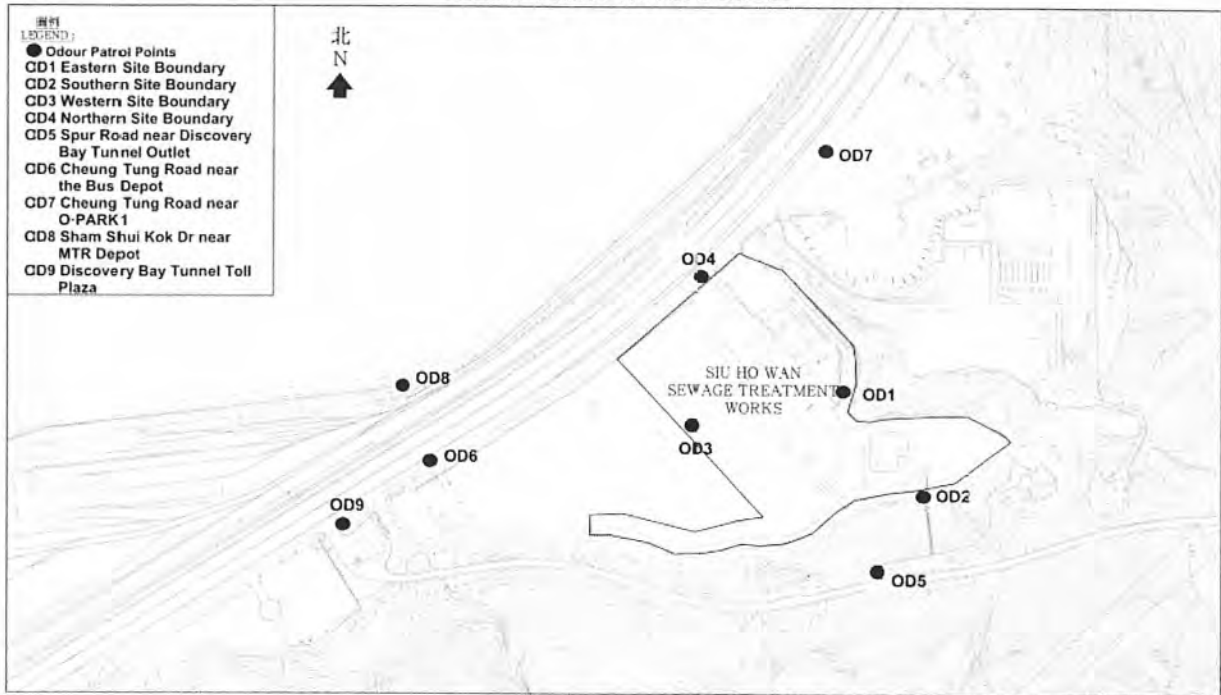
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: Law Yee Chung
Name: LAW YEE CHUNG
Date: 19.4.2021

Checked by: Choi Kam Ho
Name: CHOI KAM HO
Date: 19 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date		19-4-2021	Weather		Cloudy	Temperature		23.5°C	Humidity		57%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics					
OD1	Eastern Site Boundary	10:41	S	0.6	0	/					
OD2	Southern Site Boundary	10:43	E	4.0	1	Effluent					
OD3	Western Site Boundary	10:39	E	3.1	0	/					
OD4	Northern Site Boundary	10:36	E	3.4	0	/					
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/					
OD6	Cheung Tung Road near the Bus Depot	10:21	E	4.5	0	/					
OD7	Cheung Tung Road near O-PARK1	10:24	E	4.7	0	/					
OD8	Sham Shui Kok Dr near MTR Depot	10:15	E	3.0	0	/					
OD9	Discovery Bay Tunnel Toll Plaza	10:20	E	4.2	0	/					

***Classification Criteria:**

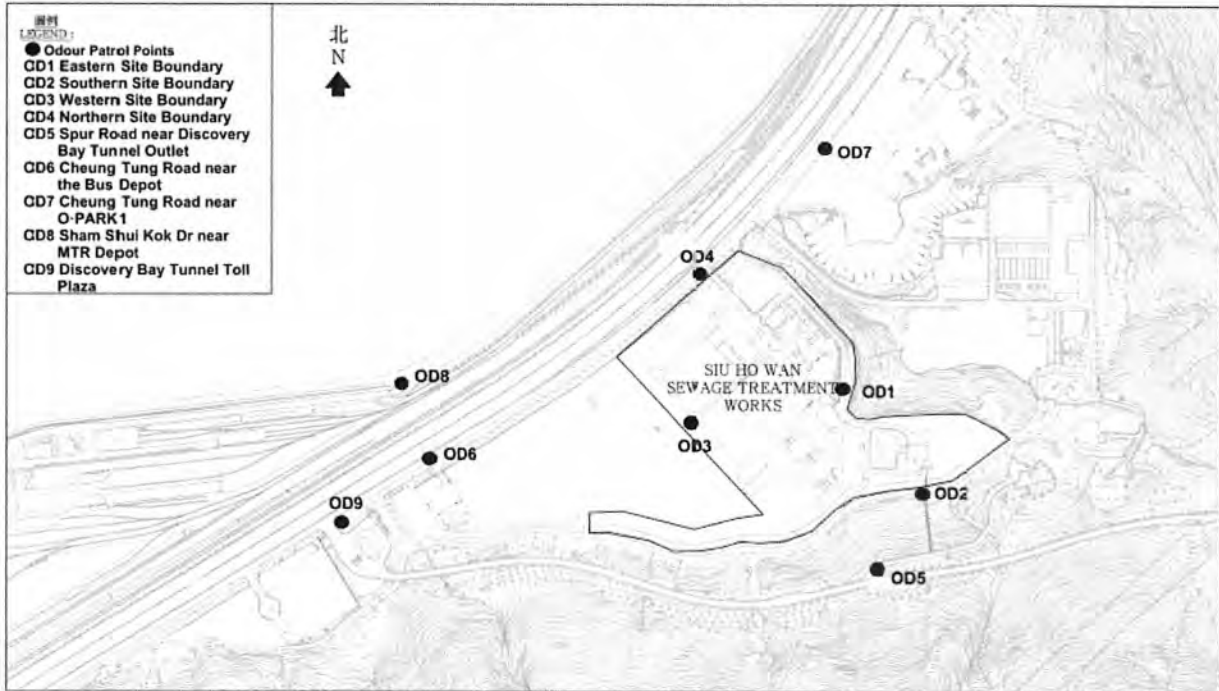
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: [Signature]
Name: Chan Sun Fung
Date: 19-4-2021

Checked by: [Signature]
Name: CHUI KAM HO
Date: 19 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



Date	30-4-2021	Weather	Fine	Temperature	26.2°C	Humidity	62%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	10:54	/	0	0	/	
OD2	Southern Site Boundary	10:58	/	0	0	/	
OD3	Western Site Boundary	10:50	/	0	0	/	
OD4	Northern Site Boundary	10:45	/	0	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	10:31	NW	0.9	0	/	
OD7	Cheung Tung Road near O-PARK1	10:33	/	0	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	10:24	NW	0.9	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	10:29	NW	0.4	0	/	

***Classification Criteria:**

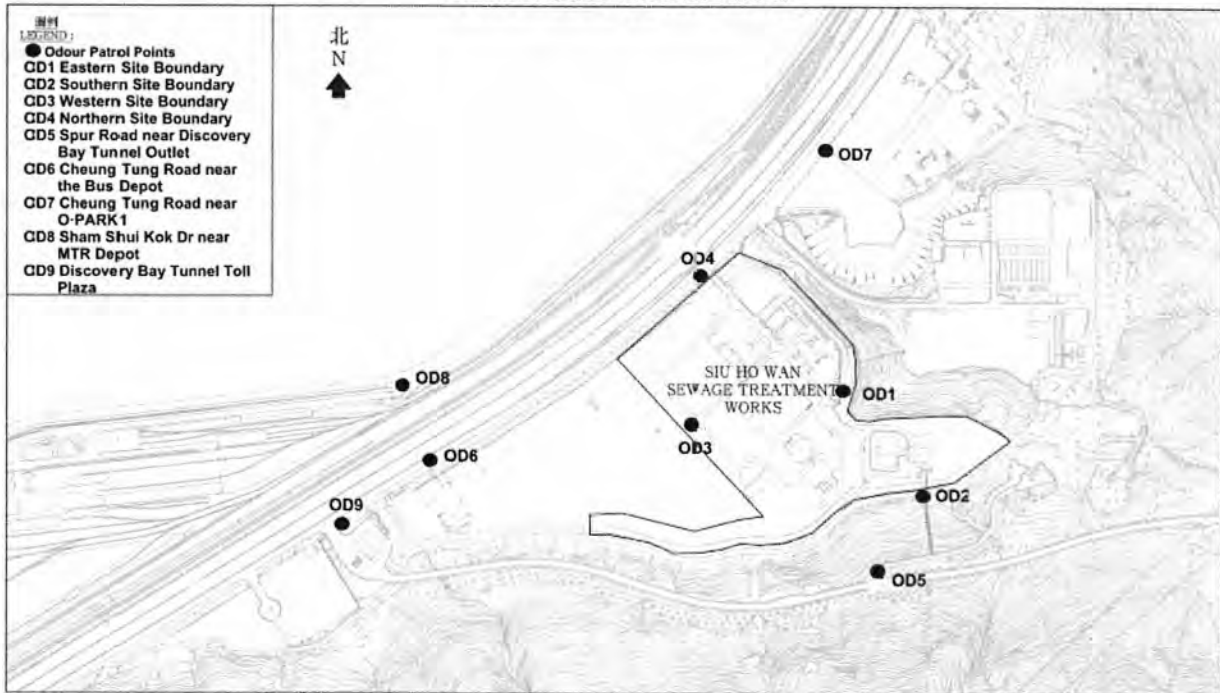
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: Sam
Name: Chan Ho Cheung
Date: 30-4-2021

Checked by: [Signature]
Name: CHUI KAM HO
Date: 30 April 2021



Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for
Siu Ho Wan Sewage Treatment Works
Odour Patrol Record Sheet



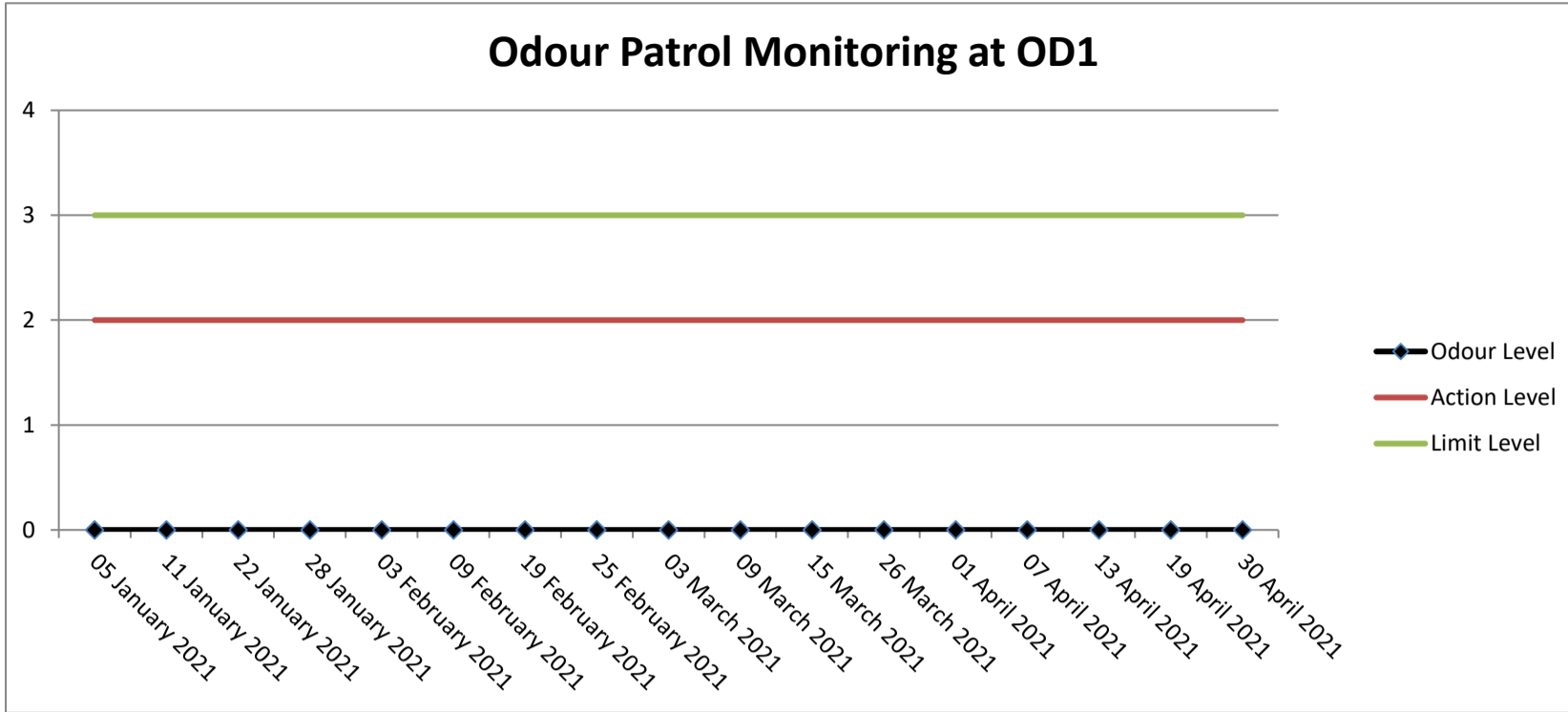
Date	30-4-2021	Weather	Fine	Temperature	26.2°C	Humidity	62%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	10:54	/	0	0	/	
OD2	Southern Site Boundary	10:58	/	0	0	/	
OD3	Western Site Boundary	10:50	/	0	0	/	
OD4	Northern Site Boundary	10:45	/	0	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	10:31	NW	0.9	0	/	
OD7	Cheung Tung Road near O-PARK1	10:33	/	0	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	10:24	NW	0.8	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	10:29	NW	0.4	0	/	

***Classification Criteria:**

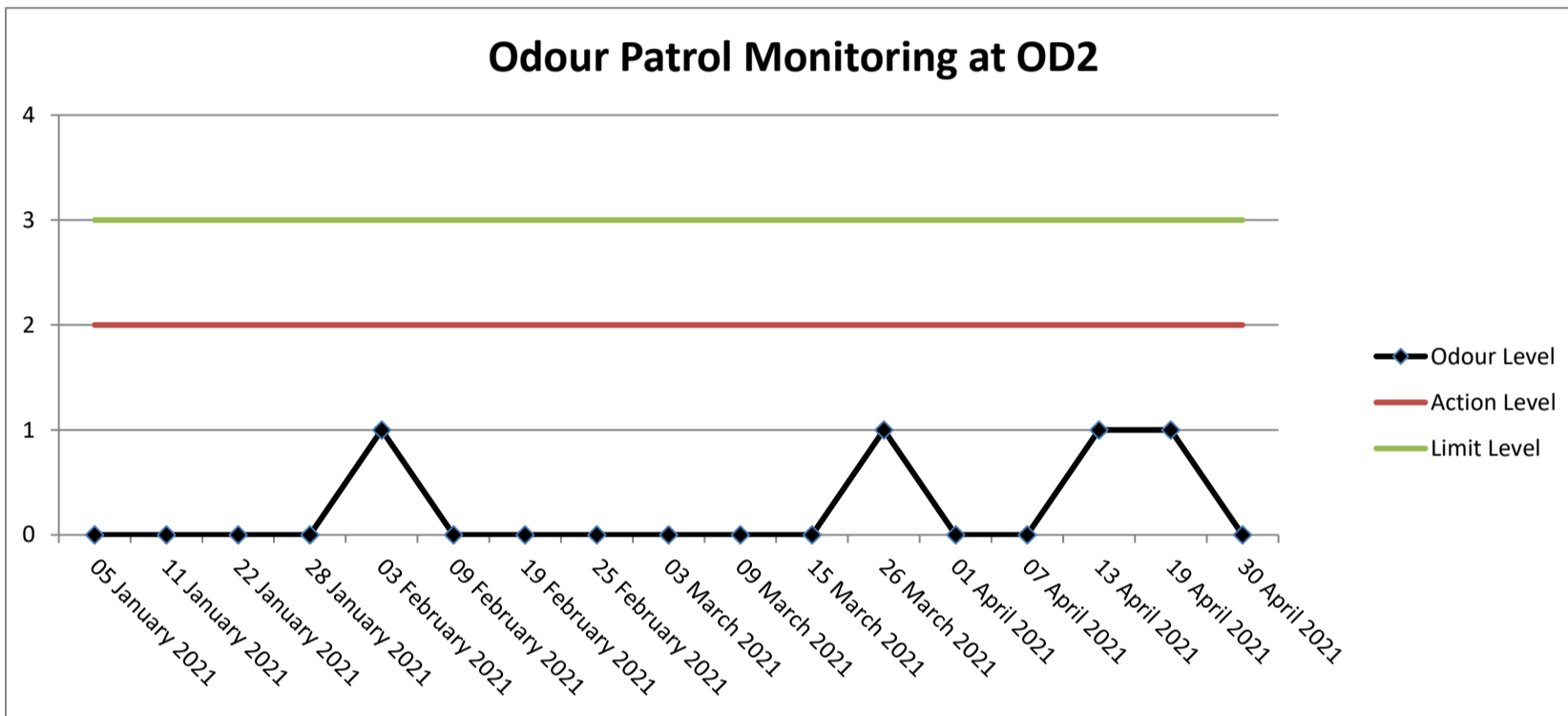
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance
- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: [Signature]
Name: LAW YEE CHUNG
Date: 30.4.2021

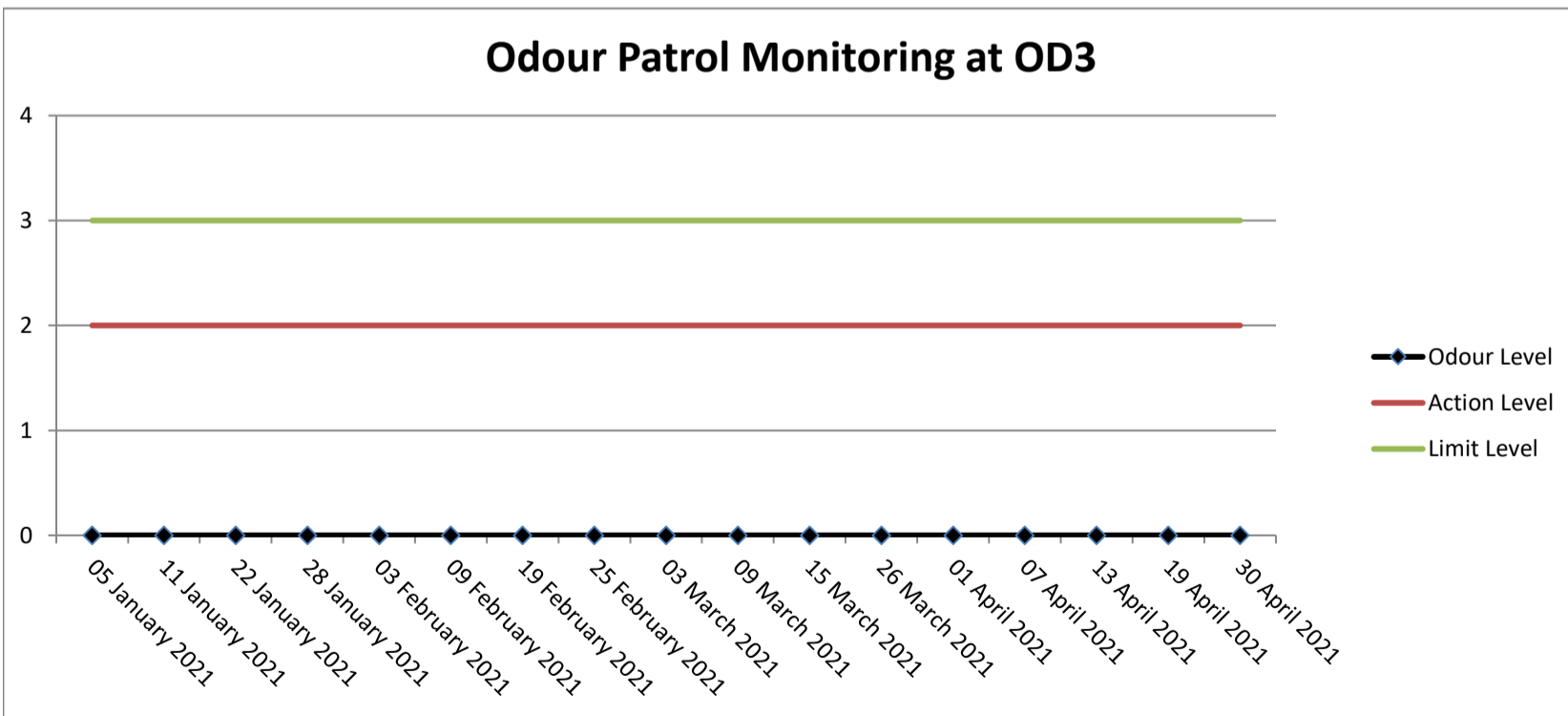
Checked by: [Signature]
Name: CHOI KAM HO
Date: 30 April 2021



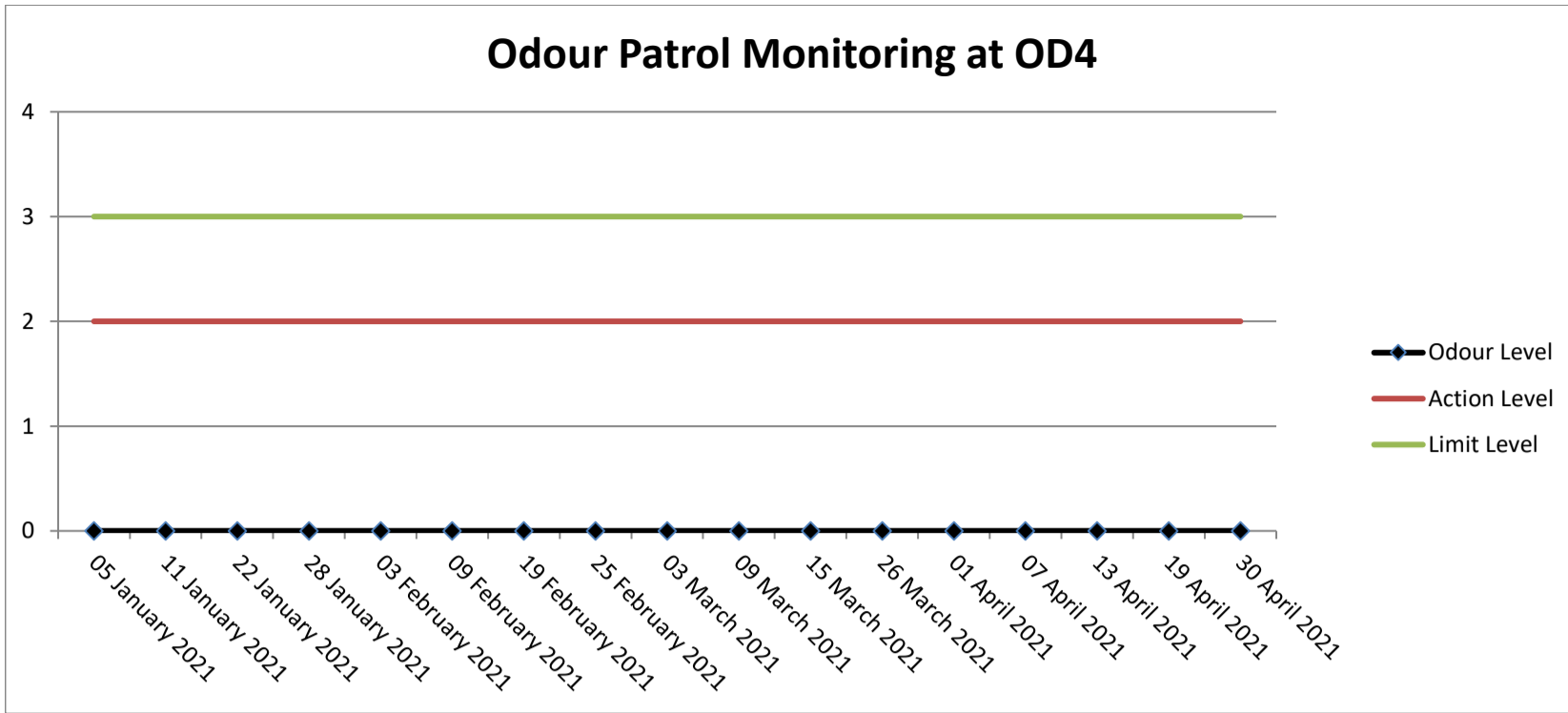
Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



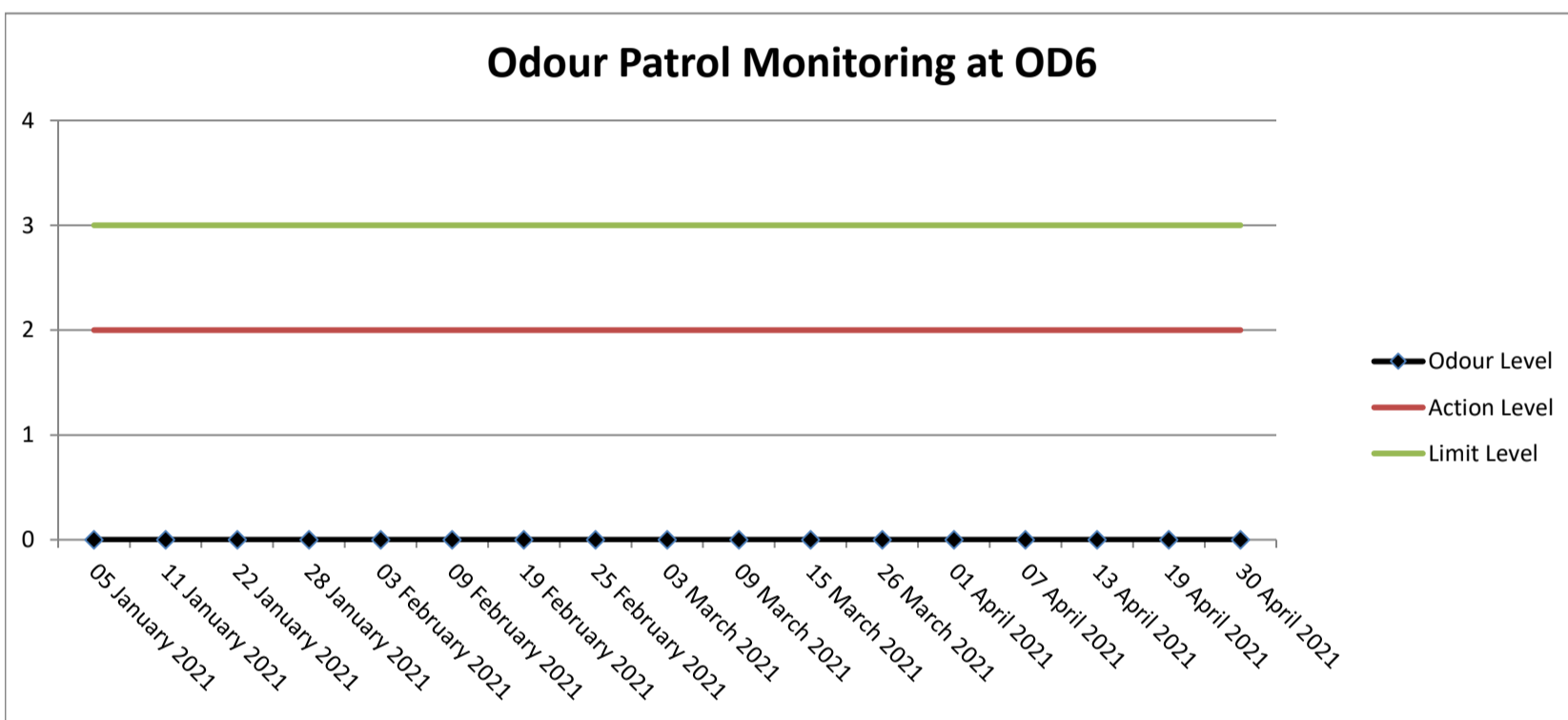
Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



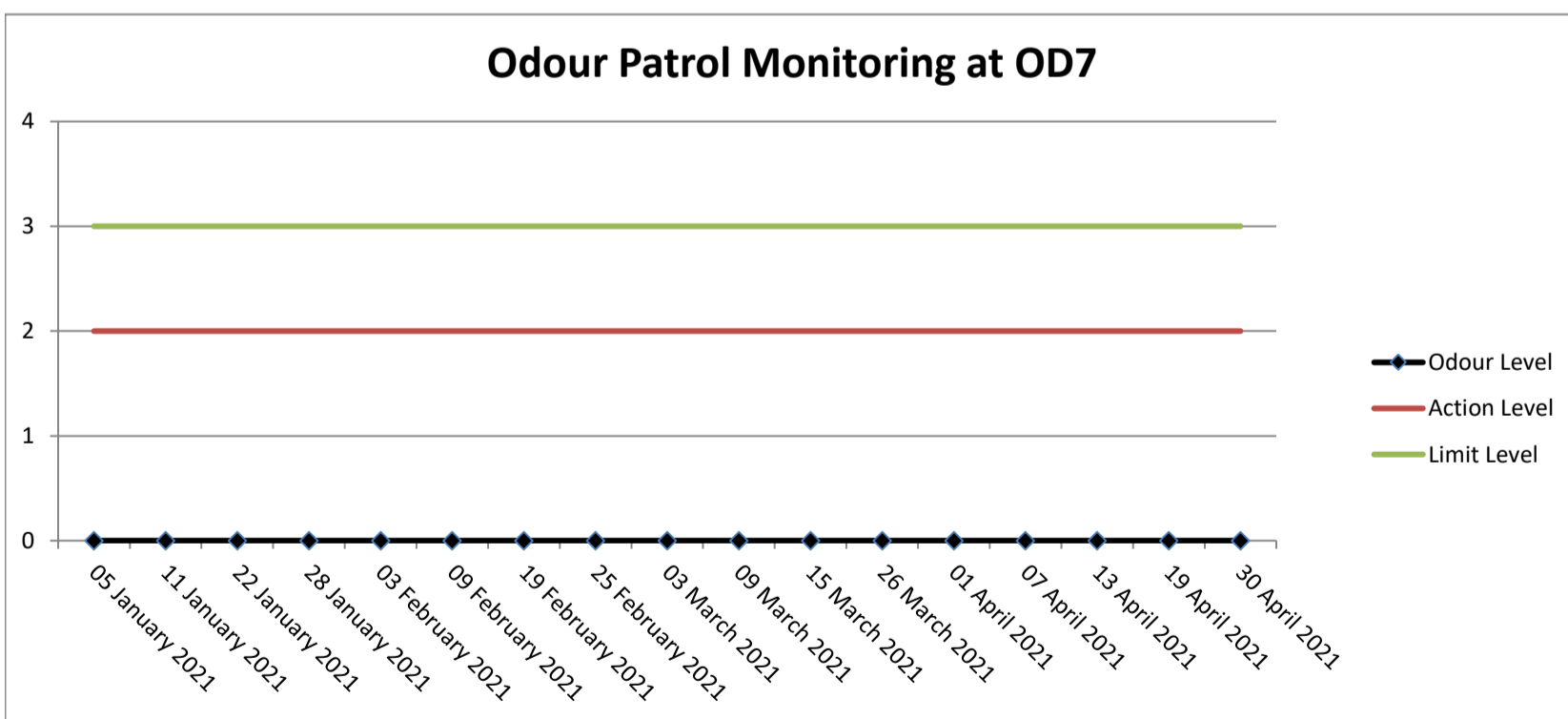
Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



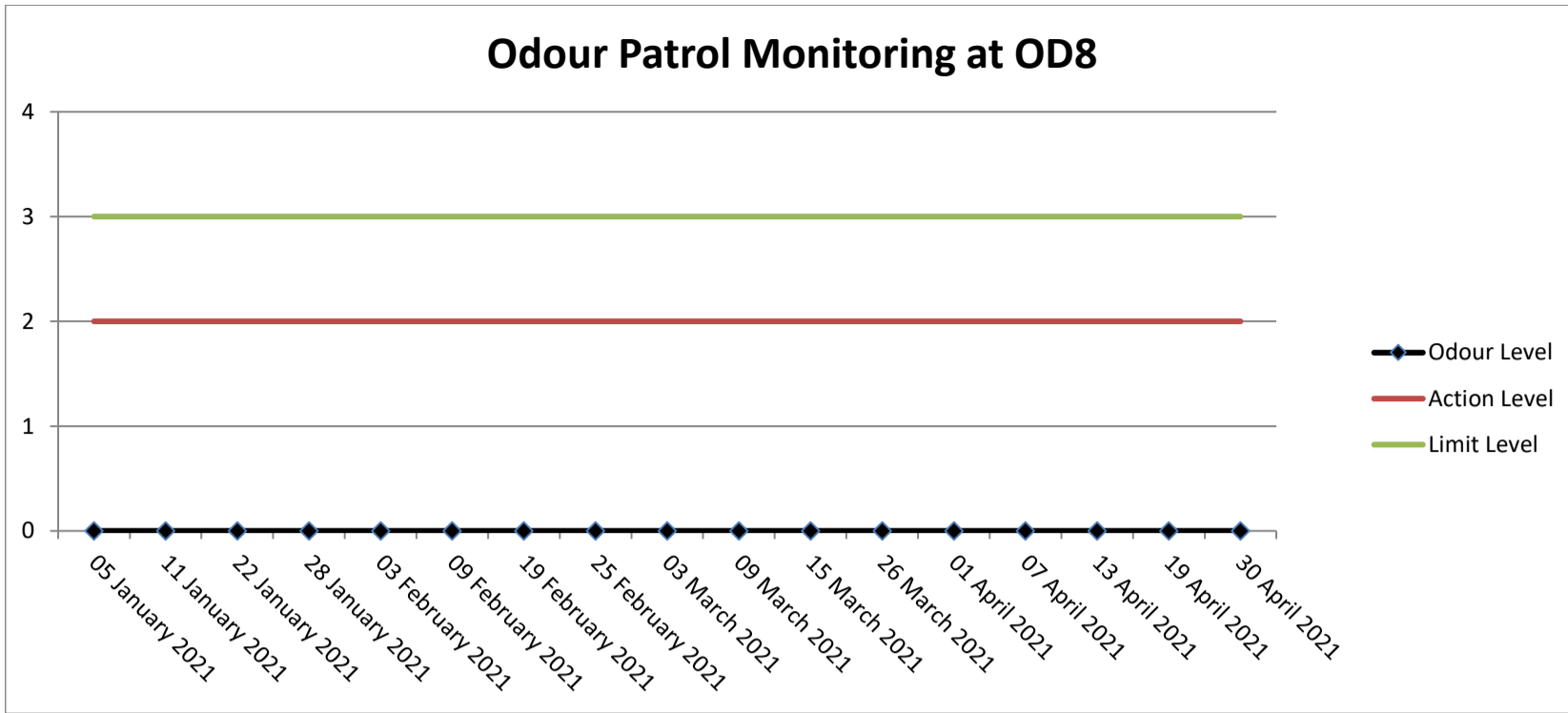
Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



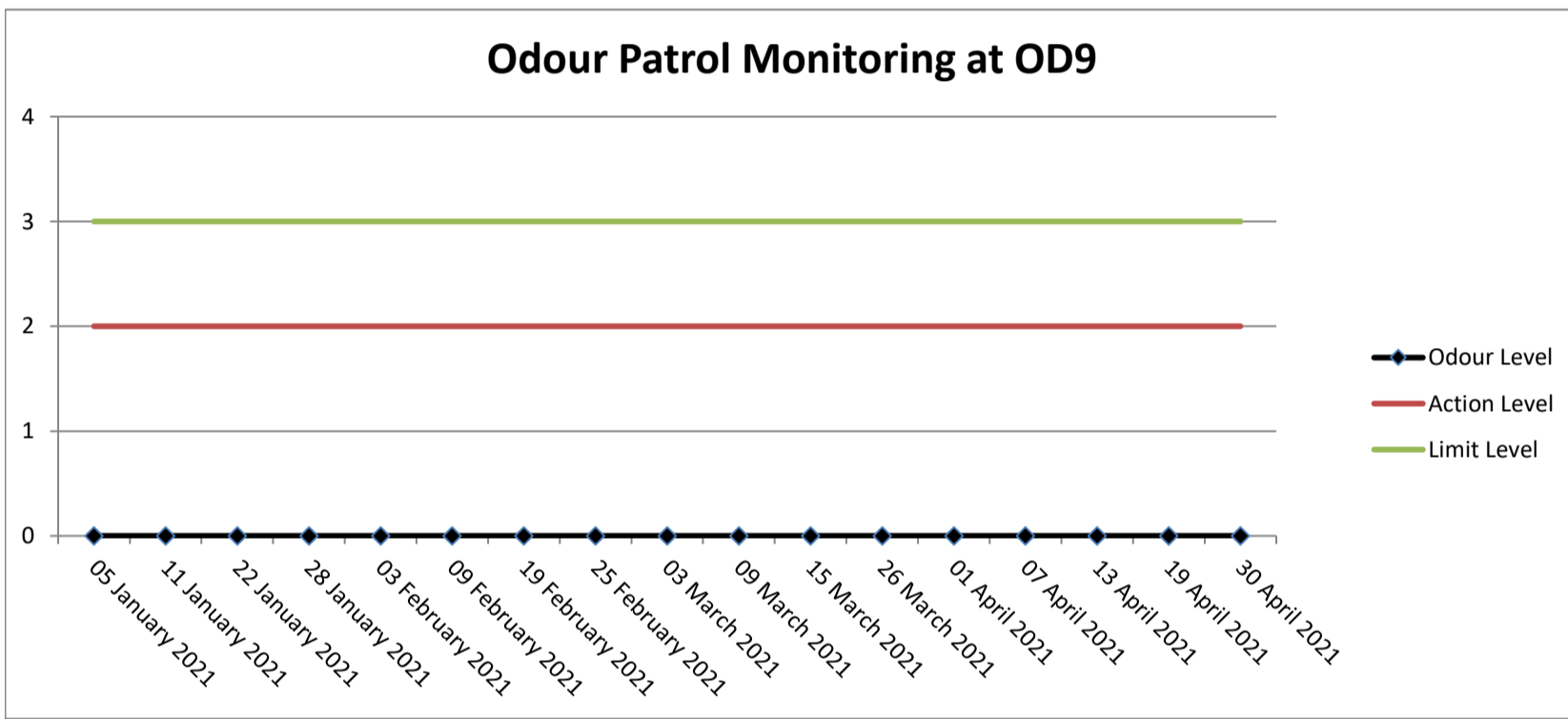
Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme

Remark:
As access permission from the company of Discovery Bay Tunnel is under requisition progress, the odour patrol monitoring will not cover OD5 (Spur Road near Discovery Bay Tunnel Outlet) temporarily.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix E

Copy of the Calibration Certificates for Water Quality Monitoring Equipment

Report No. : 142626WA210839



Page 1 of 3

Report on Calibration of Aqua Troll 600 Multi-parameter Water Quality Meter**Information Supplied by Client**

Client : Fugro Technical Services Limited (MCL)
Client's address : Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15,
Kwai Fung Crescent, Kwai Chung, N.T.
Sample description : One Aqua Troll 600 Multi-parameter Water Quality Meter
Client sample ID : Serial No. 525120
Test required : Calibration of the Aqua Troll 600 Multi-parameter Water Quality
Meter

Laboratory Information

Lab. sample ID : WA210839/1
Date of calibration : 11/03/2021
Next calibration date : 10/06/2021
Test method used : In-house comparison method

Note : This report refers only to the sample(s) tested.

Report No. : 142626WA210839

Page 2 of 3

Results :
A. pH calibration

pH reading at 25°C for Q.C. solution(6.86) and at 25°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.17	-0.01
6.86	6.86	0.00

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.04	+0.04	± 0.5
20	20.07	+0.07	± 1.0
30	29.83	-0.17	± 1.5
40	39.72	-0.28	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By calibrated D.O. meter	By D.O. meter
1	7.41	7.40
2	7.44	7.39
3	7.42	7.41
Average	7.42	7.40

Differences of D.O. Content between calibrated D.O. meter and D.O. meter should be less than 0.4mg/L

Certified by : 
 Approved Signatory : HO Kin Man, John
 Assistant General Manager – Laboratories

Date : 10/5/2021

Note : This report refers only to the sample(s) tested.

Report No. : 142626WA210839

Page 3 of 3

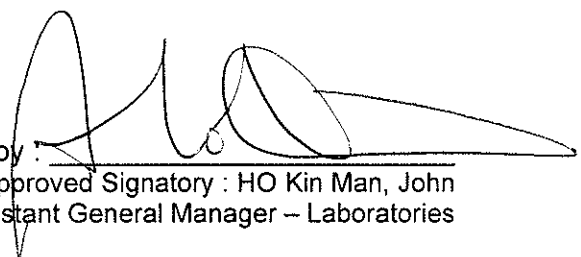
Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
24.02	23.97

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	-	-	± 0.5
4	4.072	+0.072	± 0.6
8	8.083	+0.083	± 0.8
40	39.715	-0.285	± 3.0
80	79.570	-0.43	± 4.0

Certified by : 
 Approved Signatory : HO Kin Man, John
 Assistant General Manager – Laboratories
 Date : 10/5/2021

**** End of Report ****

Note : This report refers only to the sample(s) tested.



a xylem brand

9940 Summers Ridge Road
San Diego, CA 92121
Tel: (858) 546-8327
support@sontek.com

Certificate of Calibration

TEST REPORT

Serial Number	5906
System Type	M9
System Orientation	Down
Compass Type	Sontek
Compass Offset (degrees)	N/A
Communications Output	RS232
Recorder Size (GB)	14.9
Firmware Version	4.02
Date Tested	05/23/2017

POWER TEST

Command Mode (W):	0.17	Range : 0.00 – 0.30
Sleep Mode (W):	N/A	Range : N/A
Ping Mode - 18V (W):	2.67	Range : 1.50 – 3.50
Power Check		PASS

NOISE TEST

Beam 1 – 3.0 MHz (counts)	95
Beam 2 – 1.0 MHz (counts)	96
Beam 3 – 3.0 MHz (counts)	95
Beam 4 – 1.0 MHz (counts)	101
Beam 5 – 3.0 MHz (counts)	93
Beam 6 – 1.0 MHz (counts)	95
Beam 7 – 3.0 MHz (counts)	91
Beam 8 – 1.0 MHz (counts)	100
Beam Vertical – 500KHz (counts)	88
Noise Test	PASS

VERIFICATION

Velocity Check	PASS
Transmit Output	PASS
Sensitivity	PASS
Temperature Sensor	PASS
Compass Heading Check	PASS
Compass Level Check	PASS
Burn-in (24 hrs)	PASS
Load Default Parameters	DONE

OPTIONS

Bottom Track	Installed
SmartPulse HD TM	Enabled
Stationary	Disabled
GPS Compass Integration	Disabled
RiverSurveyor	Enabled
HydroSurveyor	Disabled

Verified by: **ainthasane**

This report was generated on 5/24/2017.

ATTENTION: New Warranty Terms as of March 4, 2013:

This system is covered under a two year limited warranty that extends to all parts and labor for any malfunction due to workmanship or errors in the manufacturing process. The warranty is valid only if you properly maintain and operate this system under normal use as outlined in the User's Manual. The warranty does not cover shortcomings that are due to the design, or any incidental damages as a result of errors in the measurements.

SonTek will repair and/or replace, at its sole option, any product established to be defective with a product of like type. CLAIMS FOR LABOR COSTS AND/OR OTHER CHARGES RESULTING FROM THE USE OF SonTek GOODS AND/OR PRODUCTS ARE NOT COVERED BY THIS LIMITED WARRANTY.

SonTek DISCLAIMS ALL EXPRESS WARRANTIES OTHER THAN THOSE CONTAINED ABOVE AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. SonTek DISCLAIMS AND WILL NOT BE LIABLE, UNDER ANY CIRCUMSTANCE, IN CONTRACT, TORT OR WARRANTY, FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO LOST PROFITS, BUSINESS INTERRUPTION LOSSES, LOSS OF GOODWILL, OR LOSS OF BUSINESS OR CUSTOMER RELATIONSHIPS.

If your system is not functioning properly, first try to identify the source of the problem. If additional support is required, we encourage you to contact us immediately. We will work to resolve the problem as quickly as possible.

If the system needs to be returned to the factory, please contact SonTek to obtain a Service Request (SR) number. We reserve the right to refuse receipt of shipments without SRs. We require the system to be shipped back in the original shipping container using the original packing material with all delivery costs covered by the customer (including all taxes and duties). If the system is returned without appropriate packing, the customer will be required to cover the cost of a new packaging crate and material.

The warranty for repairs performed at an authorized SonTek Service Center is one year.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix F

Results and Graphical Presentation of Water Quality Monitoring

Water Quality Monitoring Data

Monitoring Location	Date	Tide Mode	Weather	Sea Condition	Time	Water Depth (m)	Monitoring Level	Monitoring Level (m)	Replicate	In-situ Measurement								Laboratory Analysis							
										pH	Salinity (ppt)	Temperature (degree C)	DO Saturation (%)	DO (mg/L)	Turbidity (NTU)	Current Speed (m/s)	Current Direction (degree magnetic)	Total Suspended Solids (mg/L)	Ammonia Nitrogen (mg/L-N)	Nitrite Nitrogen (mg/L-N)	Nitrate Nitrogen (mg/L-N)	Total Inorganic Nitrogen (mg/L-N)	E.coli (cfu/100mL)	Total phosphorus (soluble and particulate) (mg/L)	BOD ₅ (mg/L)
										Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	S	1	1	8.54	32.02	24.95	100.9	7.03	6.9	0.30	17.4	3.4	0.055	0.027	0.274	0.355	1	0.01	1.4
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	S	1	2	8.56	32.01	24.95	100.6	7.01	6.4	0.31	17.6	3.5	0.047	0.017	0.270	0.334	ND	0.01	<1.0
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	M	8.5	1	8.57	32.09	24.64	100.2	6.99	6.5	0.31	18.1	3.5	0.050	0.018	0.269	0.338	1	0.01	2.1
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	M	8.5	2	8.54	32.10	24.67	100.4	6.97	6.7	0.32	18.2	3.6	0.045	0.020	0.268	0.333	ND	0.01	2.2
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	B	16	1	8.53	32.74	24.45	95.6	6.69	3.8	0.31	21.4	5.2	0.052	0.025	0.266	0.342	ND	0.01	1.4
A	16/4/2021	Mid-Ebb	Fine	Moderate	13:30	17	B	16	2	8.54	32.77	24.43	95.9	6.67	3.7	0.39	21.3	4.4	0.056	0.035	0.255	0.347	ND	0.02	1.3
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	S	1	1	8.48	32.22	24.77	98.8	6.93	8.8	0.18	321.4	11.7	0.051	0.025	0.246	0.323	ND	0.02	1.2
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	S	1	2	8.48	32.25	24.75	98.4	6.90	8.4	0.16	314.5	10.6	0.049	0.022	0.251	0.321	1	0.02	1.2
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	M	7	1	8.54	32.71	24.58	96.5	6.75	10.7	0.19	336.7	10.5	0.052	0.024	0.250	0.326	1	0.02	1.1
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	M	7	2	8.55	32.74	24.59	96.4	6.74	10.8	0.17	330.5	11	0.053	0.011	0.264	0.328	ND	0.02	1.2
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	B	13	1	8.54	32.76	24.39	92.1	6.41	12.3	0.16	5.9	10.6	0.054	0.016	0.260	0.330	ND	0.02	1.5
B	16/4/2021	Mid-Ebb	Fine	Moderate	13:49	14	B	13	2	8.58	32.74	24.37	92.4	6.43	12.4	0.14	6.7	10.2	0.058	0.016	0.261	0.335	ND	0.02	1.2
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	S	1	1	7.92	29.04	25.09	98.4	6.85	10.7	0.11	53.2	9.3	0.050	0.022	0.281	0.354	2	0.01	1.2
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	S	1	2	7.96	29.01	25.08	98.7	6.83	10.3	0.15	53.1	8.5	0.049	0.022	0.285	0.356	3	0.02	1.0
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	M	6	1	7.94	29.49	24.62	97.8	6.78	11.2	0.18	48.1	8.1	0.051	0.023	0.281	0.354	ND	0.02	1.8
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	M	6	2	7.91	29.48	24.68	97.4	6.76	11.4	0.14	47.9	9.0	0.048	0.019	0.283	0.350	ND	0.02	2.0
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	B	11	1	7.99	29.51	24.69	96.4	6.74	11.6	0.10	43.6	7.2	0.049	0.024	0.281	0.354	ND	0.03	2.0
C	16/4/2021	Mid-Ebb	Fine	Moderate	14:10	12	B	11	2	7.98	29.54	24.67	96.8	6.75	11.9	0.18	43.4	8.3	0.051	0.019	0.285	0.355	ND	0.02	1.4
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	S	1	1	8.55	29.45	24.84	103.2	7.14	13.8	0.14	97.2	11.2	0.039	0.028	0.285	0.352	68	0.02	2.2
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	S	1	2	8.59	29.41	24.81	103.4	7.18	13.9	0.15	98.4	10.1	0.043	0.032	0.285	0.360	64	0.02	1.9
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	M	6.5	1	8.54	29.58	24.69	104.4	7.06	15.7	0.26	103.2	6.1	0.041	0.028	0.281	0.350	72	0.02	1.8
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	M	6.5	2	8.59	29.57	24.70	101.3	7.07	15.6	0.27	101.4	5.2	0.042	0.031	0.279	0.352	76	0.02	1.4
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	B	12	1	8.56	29.61	24.72	99.0	6.89	14.3	0.24	133.5	5.1	0.042	0.025	0.285	0.353	56	0.02	1.2
D	16/4/2021	Mid-Ebb	Fine	Moderate	14:23	13	B	12	2	8.57	29.62	24.78	99.2	6.88	14.8	0.22	132.6	5.1	0.040	0.014	0.297	0.351	58	0.02	1.4
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	S	1	1	8.59	29.45	24.94	104.1	7.23	5.7	0.05	337.4	6.2	0.048	0.013	0.301	0.362	50	0.02	1.3
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	S	1	2	8.57	29.54	24.92	104.2	7.24	5.8	0.08	336.1	6.2	0.042	0.028	0.287	0.357	36	0.02	1.0
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	M	8	1	8.56	30.40	24.56	102.1	7.05	4.3	0.12	314.1	5.5	0.046	0.013	0.297	0.356	34	0.02	1.2
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	M	8	2	8.59	30.41	24.55	102.3	7.12	4.6	0.14	312.3	6.0	0.040	0.016	0.297	0.353	46	0.01	1.8
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	B	15	1	8.42	30.67	24.51	94.8	6.54	4.9	0.09	357.2	5.2	0.052	0.027	0.285	0.364	24	0.02	1.2
E	16/4/2021	Mid-Ebb	Fine	Moderate	14:40	16	B	15	2	8.41	30.66	24.52	94.6	6.52	4.4	0.10	346.3	5.8	0.046	0.028	0.283	0.357	28	0.02	1.1
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	S	1	1	8.58	30.13	24.88	101.9	6.98	7.3	0.12	9.8	5.6	0.064	0.016	0.284	0.365	24	0.02	<1.0
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	S	1	2	8.57	30.16	24.89	101.8	7.01	7.5	0.13	9.9	4.5	0.052	0.025	0.288	0.365	38	0.01	1.4
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	M	11.5	1	8.56	30.55	24.59	99.6	6.72	9.3	0.05	64.1	4.9	0.047	0.030	0.277	0.354	49	0.01	1.2
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	M	11.5	2	8.57	30.52	24.58	99.1	6.73	9.5	0.04	65.3	5.6	0.051	0.027	0.269	0.347	46	0.01	<1.0
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	B	22	1	8.56	30.66	24.57	93.3	6.49	10.1	0.15	44.2	5.3	0.053	0.024	0.272	0.350	30	0.01	1.6
F	16/4/2021	Mid-Ebb	Fine	Moderate	14:53	23	B	22	2	8.59	30.67	24.55	93.4	6.51	10.4	0.14	43.6	6.7	0.052	0.016	0.299	0.367	37	0.02	1.5
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	S	1	1	8.59	32.76	24.57	101.3	7.14	3.4	0.28	315.2	5.8	0.047	0.019	0.289	0.355	47	<0.01	1.1
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	S	1	2	8.58	32.71	24.58	101.4	7.15	3.6	0.26	314.7	4.5	0.068	0.012	0.243	0.322	18	0.01	<1.0
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	M	11	1	8.57	32.90	24.47	95.2	6.64	3.2	0.14	317.2	5.8	0.073	0.017	0.226	0.315	29	0.01	1.2
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	M	11	2	8.56	32.95	24.48	95.4	6.67	3.1	0.18	318.4	6.8	0.077	0.021	0.226	0.324	28	0.02	1.0
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	B	21	1	8.57	32.72	24.58	95.3	6.54	3.5	0.13	294.7	7.2	0.069	0.025	0.248	0.342	19	0.02	1.0
G	16/4/2021	Mid-Ebb	Fine	Moderate	15:10	22	B	21	2	8.59	32.74	24.77	95.6	6.58	3.9	0.14	296.1	8.6	0.064	0.025	0.282	0.370	19	0.02	<1.0
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	S	1	1	8.58	32.54	24.69	98.2	6.79	4.3	0.14	311.8	4.7	0.077	0.024	0.221	0.322	11	0.01	1.4
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	S	1	2	8.59	32.58	24.68	98.4	6.81	4.9	0.17	319.2	4.4	0.080	0.013	0.230	0.323	14	0.01	1.2
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	M	9.5	1	8.59	32.74	24.59	96.6	6.74	4.6	0.05	292.8	4.8	0.073	0.014	0.228	0.315	10	0.01	<1.0
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	M	9.5	2	8.58	32.79	24.51	96.7	6.75	4.8	0.06	294.7	4.2	0.074	0.022	0.222	0.318	10	0.01	<1.0
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	B	18	1	8.59	33.57	24.46	95.8	6.61	5.0	0.03	341.8	3.4	0.077	0.014	0.229	0.320	5	0.01	<1.0
H	16/4/2021	Mid-Ebb	Fine	Moderate	15:31	19	B	18	2	8.57	33.18	24.47	95.4	6.59	5.1	0.04	342.5	6.5	0.071	0.014	0.240	0.324	6	0.02	1.1

Note: 1. ND: Not Detected

Water Quality Monitoring Data

Monitoring Location	Date	Tide Mode	Weather	Sea Condition	Time	Water Depth (m)	Monitoring Level	Monitoring Level (m)	Replicate	In-situ Measurement								Laboratory Analysis							
										pH	Salinity (ppt)	Temperature (degree C)	DO Saturation (%)	DO (mg/L)	Turbidity (NTU)	Current Speed (m/s)	Current Direction (degree magnetic)	Total Suspended Solids (mg/L)	Ammonia Nitrogen (mg/L-N)	Nitrite Nitrogen (mg/L-N)	Nitrate Nitrogen (mg/L-N)	Total Inorganic Nitrogen (mg/L-N)	E.coli (cfu/100mL)	Total phosphorus (soluble and particulate) (mg/L)	BOD ₅ (mg/L)
										Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	S	1	1	8.59	28.57	24.57	97.2	6.84	2.2	0.16	193.4	3.3	0.057	0.016	0.285	0.358	8	0.02	1.6
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	S	1	2	8.51	28.54	24.58	97.4	6.83	2.1	0.14	187.1	3.8	0.068	0.021	0.281	0.370	10	0.04	1.7
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	M	7.5	1	8.58	29.79	24.49	92.0	6.48	5.4	0.19	205.1	2.8	0.057	0.029	0.269	0.356	7	<0.01	1.4
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	M	7.5	2	8.53	29.88	24.44	92.1	6.49	5.3	0.13	212.4	3.1	0.062	0.030	0.270	0.362	5	0.02	1.5
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	B	14	1	8.58	29.99	24.47	91.5	6.42	6.2	0.14	177.5	3.5	0.061	0.023	0.275	0.358	4	0.04	1.0
A	16/4/2021	Mid-Flood	Fine	Moderate	09:12	15	B	14	2	8.54	29.86	24.43	91.4	6.41	6.0	0.18	176.4	3.2	0.068	0.024	0.277	0.368	10	<0.01	1.6
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	S	1	1	8.59	28.47	24.56	97.9	6.85	1.8	0.14	144.7	4.2	0.066	0.018	0.283	0.368	5	0.02	1.7
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	S	1	2	8.58	28.41	24.54	97.8	6.84	1.9	0.15	143.2	4.2	0.059	0.012	0.290	0.360	7	0.04	1.8
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	M	7	1	8.60	29.18	24.53	94.4	6.50	5.4	0.19	218.5	3.8	0.071	0.016	0.286	0.374	8	0.04	2.0
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	M	7	2	8.61	29.14	24.58	94.3	6.40	5.1	0.15	226.4	2.7	0.064	0.02	0.282	0.367	5	0.02	1.7
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	B	13	1	8.53	29.87	24.46	91.5	6.47	5.9	0.21	204.5	3.1	0.063	0.024	0.275	0.362	4	0.02	1.8
B	16/4/2021	Mid-Flood	Fine	Moderate	09:01	14	B	13	2	8.52	29.88	24.48	91.4	6.45	5.5	0.23	207.1	2.9	0.057	0.024	0.277	0.359	3	0.01	1.5
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	S	1	1	8.05	29.36	24.57	97.6	6.86	2.4	0.21	174.9	3.2	0.062	0.014	0.281	0.357	5	0.02	1.3
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	S	1	2	8.09	29.28	24.54	97.7	6.84	2.3	0.20	189.8	2.2	0.067	0.016	0.286	0.369	7	0.02	1.2
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	M	6	1	8.06	29.71	24.62	94.5	6.61	3.1	0.23	198.4	2.1	0.060	0.017	0.282	0.359	6	0.02	1.2
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	M	6	2	8.05	29.73	24.61	94.3	6.60	3.4	0.13	230.9	4.0	0.060	0.016	0.281	0.357	3	0.01	<1.0
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	B	11	1	8.05	29.73	24.67	93.9	6.56	7.2	0.15	210.8	4.4	0.064	0.021	0.276	0.361	7	0.02	1.1
C	16/4/2021	Mid-Flood	Fine	Moderate	08:53	12	B	11	2	8.01	29.75	26.68	93.4	6.55	7.3	0.15	220.1	3.5	0.060	0.023	0.278	0.360	5	0.02	1.2
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	S	1	1	8.58	29.36	24.56	98.2	6.81	2.5	0.15	205.8	3.2	0.060	0.023	0.276	0.360	4	0.02	1.8
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	S	1	2	8.58	29.34	24.58	98.3	6.85	2.7	0.15	188.4	3.0	0.061	0.025	0.278	0.364	3	0.02	2.1
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	M	7	1	8.57	29.72	24.63	94.3	6.58	2.7	0.18	226.3	3.5	0.064	0.019	0.283	0.365	9	0.02	2.1
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	M	7	2	8.54	29.71	24.66	94.5	6.59	2.6	0.15	268.7	3.0	0.072	0.018	0.284	0.374	5	0.02	2.1
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	B	13	1	8.56	29.75	24.67	93.9	6.56	6.7	0.19	258.6	4.8	0.067	0.018	0.283	0.368	4	0.03	2.1
D	16/4/2021	Mid-Flood	Fine	Moderate	08:41	14	B	13	2	8.54	29.74	24.68	93.9	6.55	6.8	0.18	256.0	4.1	0.066	0.018	0.286	0.370	5	0.02	1.8
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	S	1	1	8.53	31.65	24.56	97.7	6.83	1.8	0.12	124.5	2.1	0.074	0.018	0.275	0.366	6	0.02	1.0
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	S	1	2	8.54	31.66	24.70	97.8	6.82	1.9	0.13	122.9	2.6	0.072	0.023	0.268	0.364	8	0.01	<1.0
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	M	7	1	8.56	31.67	24.51	97.5	6.82	2.4	0.16	148.1	2.8	0.067	0.016	0.281	0.364	8	0.02	1.0
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	M	7	2	8.54	31.69	24.52	97.8	6.86	2.6	0.15	147.4	3.1	0.068	0.017	0.279	0.365	6	0.02	1.8
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	B	13	1	8.57	30.54	24.61	93.6	6.56	4.1	0.09	142.8	3.9	0.065	0.019	0.274	0.358	9	0.01	<1.0
E	16/4/2021	Mid-Flood	Fine	Moderate	07:48	14	B	13	2	8.54	30.51	24.66	93.5	6.58	4.2	0.10	142.3	3.0	0.068	0.018	0.275	0.360	6	0.01	<1.0
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	S	1	1	8.33	31.86	24.53	97.3	6.78	6.5	0.21	166.3	5.1	0.079	0.020	0.282	0.380	7	0.03	1.6
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	S	1	2	8.27	31.84	24.57	96.4	6.71	6.4	0.23	164.9	4.6	0.070	0.021	0.285	0.376	9	0.01	1.1
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	M	9	1	8.14	31.90	24.54	96.5	6.78	8.6	0.27	153.1	4.6	0.072	0.015	0.284	0.371	14	0.04	1.5
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	M	9	2	8.16	31.93	24.53	97.1	6.77	8.3	0.25	156.3	5.7	0.063	0.020	0.271	0.354	15	0.01	1.1
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	B	17	1	8.28	31.97	24.61	97.3	6.78	8.1	0.25	192.4	6.3	0.070	0.015	0.286	0.371	7	0.02	2.0
F	16/4/2021	Mid-Flood	Fine	Moderate	07:21	18	B	17	2	8.27	31.93	24.62	97.4	6.79	8.4	0.26	191.7	6.5	0.071	0.012	0.288	0.372	9	0.02	1.5
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	S	1	1	7.92	32.12	24.54	95.6	6.70	9.7	0.13	249.3	4.1	0.071	0.016	0.275	0.361	11	0.02	1.3
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	S	1	2	7.91	32.14	24.55	95.5	6.68	9.4	0.16	244.1	4.9	0.082	0.024	0.275	0.381	16	0.02	1.9
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	M	6.5	1	7.94	32.35	24.52	94.8	6.62	10.6	0.11	263.7	5.8	0.082	0.022	0.289	0.394	22	<0.01	1.6
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	M	6.5	2	7.94	32.36	24.51	94.8	6.61	10.9	0.15	266.9	5.0	0.080	0.019	0.282	0.381	16	<0.01	1.2
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	B	12	1	7.99	32.57	24.47	93.2	6.51	13.7	0.14	233.5	6.0	0.074	0.020	0.269	0.363	7	0.01	1.1
G	16/4/2021	Mid-Flood	Fine	Moderate	06:57	13	B	12	2	7.99	32.56	24.46	93.4	6.54	13.8	0.17	234.1	5.3	0.070	0.025	0.263	0.358	9	0.02	1.4
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	S	1	1	7.79	31.46	24.41	106.8	7.12	8.1	0.14	310.9	4.3	0.065	0.026	0.264	0.355	8	<0.01	1.3
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	S	1	2	7.78	31.44	24.51	97.2	6.80	8.2	0.16	312.7	4.9	0.070	0.023	0.265	0.359	11	0.01	1.3
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	M	9.5	1	7.74	32.23	24.53	94.6	6.61	9.5	0.13	304.8	5.0	0.062	0.026	0.264	0.351	14	0.02	<1.0
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	M	9.5	2	7.75	32.24	24.53	94.6	6.62	9.1	0.17	305.5	4.3	0.070	0.025	0.261	0.355	22	0.01	1.2
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	B	18	1	7.82	32.38	24.50	91.9	6.43	10.3	0.13	319.2	5.2	0.069	0.017	0.274	0.360	9	0.01	1.1
H	16/4/2021	Mid-Flood	Fine	Moderate	06:40	19	B	18	2	7.81	32.37	24.51	91.8	6.41	10.1	0.14	314.1	4.6	0.063	0.015	0.267	0.365	14	0.01	1.8

Note: 1. ND: Not Detected





CERTIFICATE OF ANALYSIS

Client	: FUGRO TECHNICAL SERVICES LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 28
Contact	: CYRUS LAI	Contact	: Richard Fung	Work Order	: HK2114310
Address	: ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: C.Lai@fugro.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3565 4374	Telephone	: +852 2610 1044		
Facsimile	: ---	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT	Date Samples Received	: 16-Apr-2021		
Order number	: 0041/17	Quote number	: HKE/1654/2017_R1	Issue Date	: 30-Apr-2021
C-O-C number	: ---			No. of samples received	: 96
Site	: ---			No. of samples analysed	: 96

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This document has been signed by those names that appear on this report and are the authorised signatories.

<u>Signatories</u>	<u>Position</u>	<u>Authorised results for</u>
		
Fung Lim Chee, Richard	Managing Director	Inorganics
		
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV



General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 16-Apr-2021 to 30-Apr-2021.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2114310

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Microbiological sample(s) was/ were collected in 125mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 16:50.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EK063A - Total Inorganic Nitrogen is the sum of the Total Oxidizable Nitrogen and Ammonical Nitrogen.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below 2mg/L and the decimal value of the results were for reference only.

EK067P - Total Phosphorus - Filtered is not HOKLAS accredited.



Analytical Results

Sub-Matrix: WATER

				Sample ID	A/S/E	A/S/E/Dup	A/M/E	A/M/E/Dup	A/B/E
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-001	HK2114310-002	HK2114310-003	HK2114310-004	HK2114310-005	HK2114310-005
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	3.4	3.5	3.5	3.6	5.2	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.055	0.047	0.050	0.045	0.052	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.027	0.017	0.018	0.020	0.025	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.274	0.270	0.269	0.268	0.266	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.355	0.334	0.338	0.333	0.342	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	<0.01	<0.01	0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.4	<1.0	2.1	2.2	1.4	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	1	NOT DETECTED	1	NOT DETECTED	NOT DETECTED	



Sub-Matrix: WATER				Sample ID	A/B/E/Dup	B/S/E	B/S/E/Dup	B/M/E	B/M/E/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-006	HK2114310-007	HK2114310-008	HK2114310-009	HK2114310-010	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.4	11.7	10.6	10.5	11.0	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.056	0.051	0.049	0.052	0.053	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.035	0.025	0.022	0.024	0.011	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.255	0.246	0.251	0.250	0.264	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.347	0.323	0.321	0.326	0.328	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.3	1.2	1.2	1.1	1.2	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	NOT DETECTED	NOT DETECTED	1	1	NOT DETECTED	



Sub-Matrix: WATER				Sample ID	B/B/E	B/B/E/Dup	C/S/E	C/S/E/Dup	C/M/E
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-011	HK2114310-012	HK2114310-013	HK2114310-014	HK2114310-015	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	10.6	10.2	9.3	8.5	8.1	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.054	0.058	0.050	0.049	0.051	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.016	0.016	0.022	0.022	0.023	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.260	0.261	0.281	0.285	0.281	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.330	0.335	0.354	0.356	0.354	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.01	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.5	1.2	1.2	1.0	1.8	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	NOT DETECTED	NOT DETECTED	2	3	NOT DETECTED	



Sub-Matrix: WATER				Sample ID	C/M/E/Dup	C/B/E	C/B/E/Dup	D/S/E	D/S/E/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-016	HK2114310-017	HK2114310-018	HK2114310-019	HK2114310-020	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	9.0	7.2	8.3	11.2	10.1	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.048	0.049	0.051	0.039	0.043	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.019	0.024	0.019	0.028	0.032	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.283	0.281	0.285	0.285	0.285	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.350	0.354	0.355	0.352	0.360	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.02	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	0.01	0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.0	2.0	1.4	2.2	1.9	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	NOT DETECTED	NOT DETECTED	NOT DETECTED	68	64	



Sub-Matrix: WATER				Sample ID	D/M/E	D/M/E/Dup	D/B/E	D/B/E/Dup	E/S/E
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-021	HK2114310-022	HK2114310-023	HK2114310-024	HK2114310-025	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	6.1	5.2	5.1	5.1	6.2	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.041	0.042	0.042	0.040	0.048	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.028	0.031	0.025	0.014	0.013	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.281	0.279	0.285	0.297	0.301	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.350	0.352	0.353	0.351	0.362	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.01	0.01	0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.8	1.4	1.2	1.4	1.3	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	72	76	56	58	50	



Sub-Matrix: WATER				Sample ID	E/S/E/Dup	E/M/E	E/M/E/Dup	E/B/E	E/B/E/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-026	HK2114310-027	HK2114310-028	HK2114310-029	HK2114310-030	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	6.2	5.5	6.0	5.2	5.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.042	0.046	0.040	0.052	0.046	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.028	0.013	0.016	0.027	0.028	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.287	0.297	0.297	0.285	0.283	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.357	0.356	0.353	0.364	0.357	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.01	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.0	1.2	1.8	1.2	1.1	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	36	34	46	24	28	



Sub-Matrix: WATER				Sample ID	F/S/E	F/S/E/Dup	F/M/E	F/M/E/Dup	F/B/E
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-031	HK2114310-032	HK2114310-033	HK2114310-034	HK2114310-035	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.5	4.9	5.6	5.3	6.7	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.052	0.047	0.051	0.053	0.052	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.025	0.030	0.027	0.024	0.016	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.288	0.277	0.269	0.272	0.299	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.365	0.354	0.347	0.350	0.367	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.4	1.2	<1.0	1.6	1.5	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	38	49	46	30	37	



Sub-Matrix: WATER				Sample ID	F/B/E/Dup	G/S/E	G/S/E/Dup	G/M/E	G/M/E/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-036	HK2114310-037	HK2114310-038	HK2114310-039	HK2114310-040	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	5.8	4.5	5.6	5.8	6.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.047	0.068	0.064	0.073	0.077	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.019	0.012	0.016	0.017	0.021	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.289	0.243	0.284	0.226	0.226	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.355	0.322	0.365	0.315	0.324	
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.01	0.02	0.01	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.1	<1.0	<1.0	1.2	1.0	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	47	18	24	29	28	



Sub-Matrix: WATER				Sample ID	G/B/E	G/B/E/Dup	H/S/E	H/S/E/Dup	H/M/E
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-041	HK2114310-042	HK2114310-043	HK2114310-044	HK2114310-045	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	7.2	8.6	4.7	4.4	4.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.069	0.064	0.077	0.080	0.073	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.025	0.025	0.024	0.013	0.014	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.248	0.282	0.221	0.230	0.228	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.342	0.370	0.322	0.323	0.315	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.01	0.01	0.01	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.0	<1.0	1.4	1.2	<1.0	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	19	19	11	14	10	



Sub-Matrix: WATER				Sample ID	H/M/E/Dup	H/B/E	H/B/E/Dup	A/S/F	A/S/F/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-046	HK2114310-047	HK2114310-048	HK2114310-049	HK2114310-050	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.2	5.4	6.5	3.3	3.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.074	0.077	0.071	0.057	0.068	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.022	0.014	0.014	0.016	0.021	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.222	0.229	0.240	0.285	0.281	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.318	0.320	0.324	0.358	0.370	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.02	0.02	0.04	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	<1.0	1.1	1.6	1.7	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	10	5	6	8	10	



Sub-Matrix: WATER				Sample ID	A/M/F	A/M/F/Dup	A/B/F	A/B/F/Dup	B/S/F
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-051	HK2114310-052	HK2114310-053	HK2114310-054	HK2114310-055	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	3.1	3.5	3.2	2.8	4.2	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.062	0.061	0.068	0.057	0.066	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.030	0.023	0.024	0.029	0.018	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.270	0.275	0.277	0.269	0.283	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.362	0.358	0.368	0.356	0.368	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.04	<0.01	<0.01	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.5	1.0	1.6	1.4	1.7	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	5	4	10	7	5	



Sub-Matrix: WATER				Sample ID	B/S/F/Dup	B/M/F	B/M/F/Dup	B/B/F	B/B/F/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-056	HK2114310-057	HK2114310-058	HK2114310-059	HK2114310-060	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.2	3.8	2.7	3.1	2.9	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.059	0.071	0.064	0.063	0.057	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.012	0.016	0.020	0.024	0.024	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.290	0.286	0.282	0.275	0.277	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.360	0.374	0.367	0.362	0.359	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.04	0.04	0.02	0.02	0.01	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.8	2.0	1.7	1.8	1.5	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	7	8	5	4	3	



Sub-Matrix: WATER				Sample ID	C/S/F	C/S/F/Dup	C/M/F	C/M/F/Dup	C/B/F
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-061	HK2114310-062	HK2114310-063	HK2114310-064	HK2114310-065	HK2114310-065
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	2.2	2.1	4.0	3.2	4.4	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.067	0.060	0.060	0.062	0.064	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.016	0.017	0.016	0.014	0.021	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.286	0.282	0.281	0.281	0.276	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.369	0.359	0.357	0.357	0.361	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.01	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.2	1.2	<1.0	1.3	1.1	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	7	6	3	5	7	



Sub-Matrix: WATER				Sample ID	C/B/F/Dup	D/S/F	D/S/F/Dup	D/M/F	D/M/F/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-066	HK2114310-067	HK2114310-068	HK2114310-069	HK2114310-070	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	3.5	3.2	3.0	3.5	3.0	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.060	0.060	0.061	0.064	0.072	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.023	0.023	0.025	0.019	0.018	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.278	0.276	0.278	0.283	0.284	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.360	0.360	0.364	0.365	0.374	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.2	1.8	2.1	2.1	2.1	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	5	4	3	9	5	



Sub-Matrix: WATER				Sample ID	D/B/F	D/B/F/Dup	E/S/F	E/S/F/Dup	E/M/F
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-071	HK2114310-072	HK2114310-073	HK2114310-074	HK2114310-075	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.8	4.1	2.1	2.6	2.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.067	0.066	0.074	0.072	0.067	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.018	0.018	0.018	0.023	0.016	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.283	0.286	0.275	0.268	0.281	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.368	0.370	0.366	0.364	0.364	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	0.02	0.01	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.1	1.8	1.0	<1.0	1.0	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	4	5	6	8	8	



Sub-Matrix: WATER				Sample ID	E/M/F/Dup	E/B/F	E/B/F/Dup	F/S/F	F/S/F/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-076	HK2114310-077	HK2114310-078	HK2114310-079	HK2114310-080	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	3.1	3.9	3.0	5.1	4.6	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.068	0.065	0.068	0.079	0.070	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.017	0.019	0.018	0.020	0.021	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.279	0.274	0.275	0.282	0.285	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.365	0.358	0.360	0.380	0.376	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.01	0.01	0.03	0.01	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.8	<1.0	<1.0	1.6	1.1	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	6	9	6	7	9	



Sub-Matrix: WATER				Sample ID	F/M/F	F/M/F/Dup	F/B/F	F/B/F/Dup	G/S/F
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-081	HK2114310-082	HK2114310-083	HK2114310-084	HK2114310-085	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.6	5.7	6.3	6.5	4.1	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.072	0.063	0.070	0.071	0.071	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.015	0.020	0.015	0.012	0.016	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.284	0.271	0.286	0.288	0.275	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.371	0.354	0.371	0.372	0.361	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.04	0.01	0.02	0.02	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.02	<0.01	0.01	0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.5	1.1	2.0	1.5	1.3	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	14	15	7	9	11	



Sub-Matrix: WATER				Sample ID	G/S/F/Dup	G/M/F	G/M/F/Dup	G/B/F	G/B/F/Dup
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-086	HK2114310-087	HK2114310-088	HK2114310-089	HK2114310-090	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.9	5.8	5.0	6.0	5.3	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.082	0.082	0.080	0.074	0.070	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.024	0.022	0.019	0.020	0.025	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.275	0.289	0.282	0.269	0.263	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.381	0.394	0.381	0.363	0.358	
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	<0.01	<0.01	0.01	0.02	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.9	1.6	1.2	1.1	1.4	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	16	22	16	7	9	



Sub-Matrix: WATER				Sample ID	H/S/F	H/S/F/Dup	H/M/F	H/M/F/Dup	H/B/F
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114310-091	HK2114310-092	HK2114310-093	HK2114310-094	HK2114310-095	
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.3	4.9	5.0	4.3	5.2	
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.065	0.070	0.062	0.070	0.069	
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.026	0.023	0.026	0.025	0.017	
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.264	0.265	0.264	0.261	0.274	
EK063A: Total Inorganic Nitrogen as N	----	0.010	mg/L	0.355	0.359	0.351	0.355	0.360	
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.01	0.02	0.01	0.01	
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.3	1.3	<1.0	1.2	1.1	
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL	8	11	14	22	9	



Sub-Matrix: WATER				Sample ID	H/B/F/Dup	---	---	---	---
				Sampling date / time	16-Apr-2021	---	---	---	---
Compound	CAS Number	LOR	Unit	HK2114310-096	---	---	---	---	---
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	---	0.5	mg/L	4.6	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.063	---	---	---	---	---
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.015	---	---	---	---	---
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.287	---	---	---	---	---
EK063A: Total Inorganic Nitrogen as N	---	0.010	mg/L	0.365	---	---	---	---	---
EK067P: Total Phosphorus as P	---	0.01	mg/L	0.01	---	---	---	---	---
EK067P: Total Phosphorus - Filtered	---	0.01	mg/L	<0.01	---	---	---	---	---
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	---	1.0	mg/L	1.8	---	---	---	---	---
EM: Microbiological Testing									
EM002: E. coli	---	1	CFU/100mL	14	---	---	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3629115)								
HK2114310-001	A/S/E	EA025: Suspended Solids (SS)	----	0.5	mg/L	3.4	3.8	9.00
HK2114310-011	B/B/E	EA025: Suspended Solids (SS)	----	0.5	mg/L	10.6	10.3	2.40
EA/ED: Physical and Aggregate Properties (QC Lot: 3629116)								
HK2114310-021	D/M/E	EA025: Suspended Solids (SS)	----	0.5	mg/L	6.1	6.4	5.21
HK2114310-031	F/S/E	EA025: Suspended Solids (SS)	----	0.5	mg/L	4.5	4.0	13.6
EA/ED: Physical and Aggregate Properties (QC Lot: 3629117)								
HK2114310-041	G/B/E	EA025: Suspended Solids (SS)	----	0.5	mg/L	7.2	7.8	7.95
HK2114310-051	A/M/F	EA025: Suspended Solids (SS)	----	0.5	mg/L	3.1	3.0	0.00
EA/ED: Physical and Aggregate Properties (QC Lot: 3629118)								
HK2114310-061	C/S/F	EA025: Suspended Solids (SS)	----	0.5	mg/L	2.2	2.5	13.9
HK2114310-071	D/B/F	EA025: Suspended Solids (SS)	----	0.5	mg/L	4.8	5.2	8.04
EA/ED: Physical and Aggregate Properties (QC Lot: 3629119)								
HK2114310-081	F/M/F	EA025: Suspended Solids (SS)	----	0.5	mg/L	4.6	5.0	8.29
HK2114310-091	H/S/F	EA025: Suspended Solids (SS)	----	0.5	mg/L	4.3	4.8	10.5
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627187)								
HK2114310-020	D/S/E/Dup	EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.032	0.028	11.6
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627189)								
HK2114310-040	G/M/E/Dup	EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.021	0.016	25.1
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627191)								
HK2114310-060	B/B/F/Dup	EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.024	0.022	8.99
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627193)								
HK2114310-080	F/S/F/Dup	EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.021	0.022	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627195)								
HK2114310-096	H/B/F/Dup	EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.015	0.019	24.2
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628587)								
HK2114310-020	D/S/E/Dup	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.043	0.039	8.48
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628588)								
HK2114310-040	G/M/E/Dup	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.077	0.073	4.30
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628589)								
HK2114310-060	B/B/F/Dup	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.057	0.058	0.00



Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628590)								
HK2114310-080	F/S/F/Dup	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.070	0.071	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628591)								
HK2114310-096	H/B/F/Dup	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.063	0.064	1.84
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629169)								
HK2114310-020	D/S/E/Dup	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629170)								
HK2114310-020	D/S/E/Dup	EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629171)								
HK2114310-040	G/M/E/Dup	EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629172)								
HK2114310-040	G/M/E/Dup	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629173)								
HK2114310-060	B/B/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629174)								
HK2114310-060	B/B/F/Dup	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629175)								
HK2114310-080	F/S/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629176)								
HK2114310-080	F/S/F/Dup	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629177)								
HK2114310-096	H/B/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629178)								
HK2114310-096	H/B/F/Dup	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
EA/ED: Physical and Aggregate Properties (QC Lot: 3629115)												
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	105	----	85.9	117	----	----	
EA/ED: Physical and Aggregate Properties (QC Lot: 3629116)												



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 3629116) - Continued											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	102	----	85.9	117	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 3629117)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	99.0	----	85.9	117	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 3629118)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	97.0	----	85.9	117	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 3629119)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	98.0	----	85.9	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627187)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	96.6	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627189)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	106	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627191)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	107	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627193)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	109	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627195)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	112	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628587)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	97.0	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628588)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	89.8	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628589)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.5 mg/L	101	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628590)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.5 mg/L	99.8	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628591)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.5 mg/L	95.5	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629169)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	94.7	----	93.6	102	----	----



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629170)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	95.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629171)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	95.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629172)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	95.7	----	93.6	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629173)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	95.0	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629174)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	96.2	----	93.6	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629175)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	94.6	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629176)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.1	----	93.6	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629177)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	95.0	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629178)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.3	----	93.6	102	----	----
EP: Aggregate Organics (QC Lot: 3626522)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	113	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 3626670)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	114	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 3626671)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	94.8	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 3626672)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	104	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 3626673)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	106	----	81.0	115	----	----



Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627187)										
HK2114310-020	D/S/E/Dup	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	95.8	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627189)										
HK2114310-040	G/M/E/Dup	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627191)										
HK2114310-060	B/B/F/Dup	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	98.8	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627193)										
HK2114310-080	F/S/F/Dup	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	102	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3627195)										
HK2114310-096	H/B/F/Dup	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	105	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628587)										
HK2114310-020	D/S/E/Dup	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	90.8	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628588)										
HK2114310-040	G/M/E/Dup	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	97.1	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628589)										
HK2114310-060	B/B/F/Dup	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	89.6	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628590)										
HK2114310-080	F/S/F/Dup	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	88.0	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3628591)										
HK2114310-096	H/B/F/Dup	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	95.1	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629169)										
HK2114310-020	D/S/E/Dup	EK067P: Total Phosphorus as P	----	0.5 mg/L	83.3	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629170)										

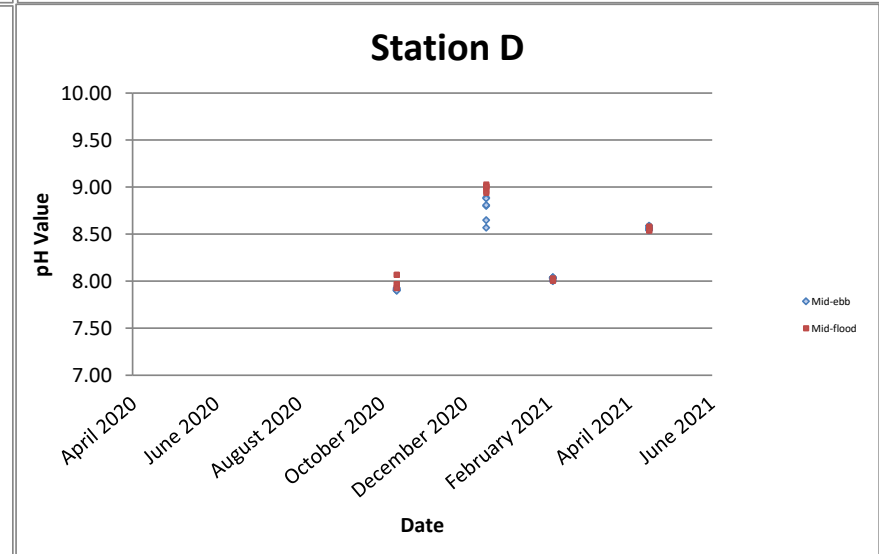
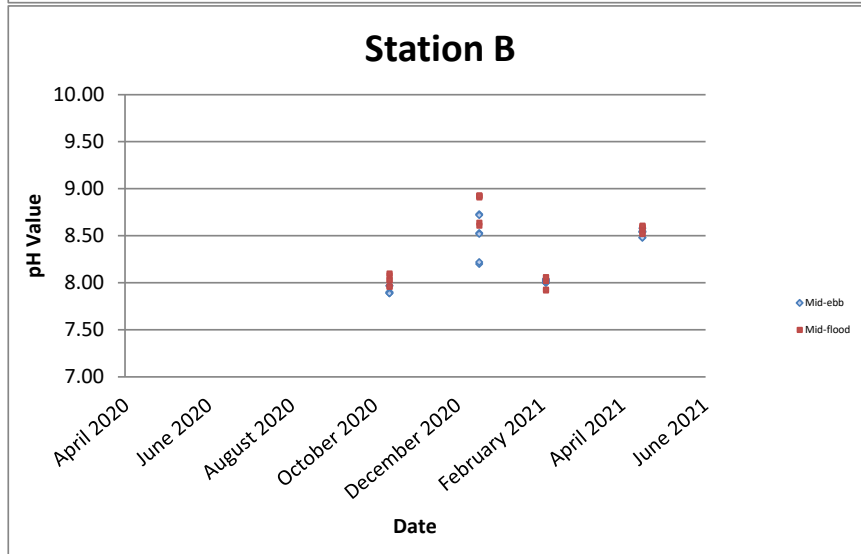
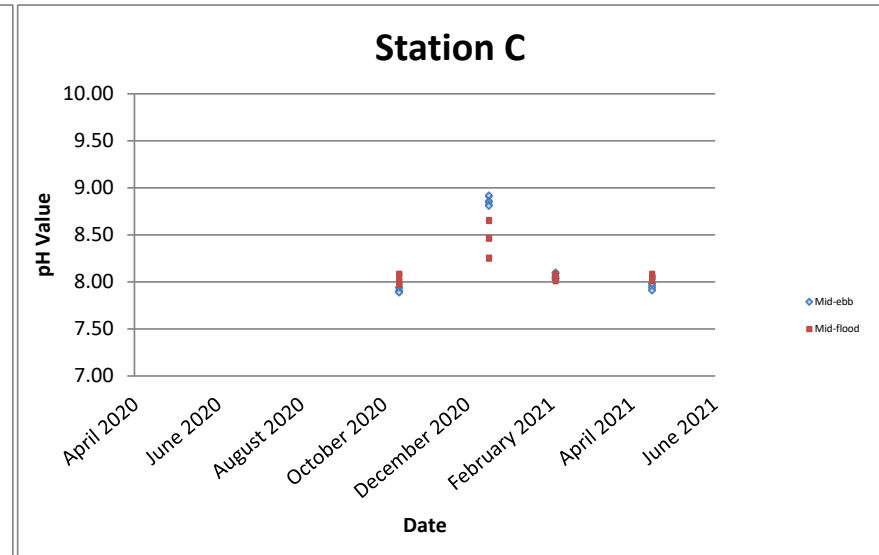
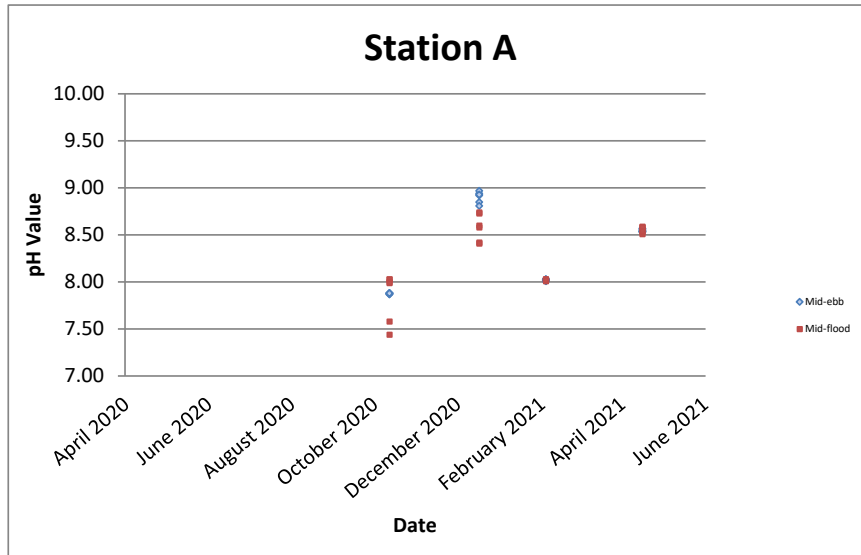


Matrix: WATER

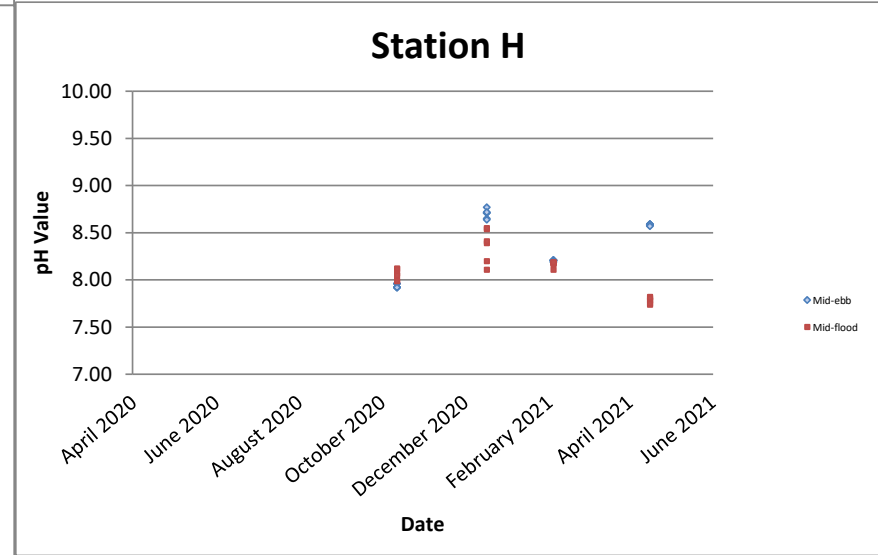
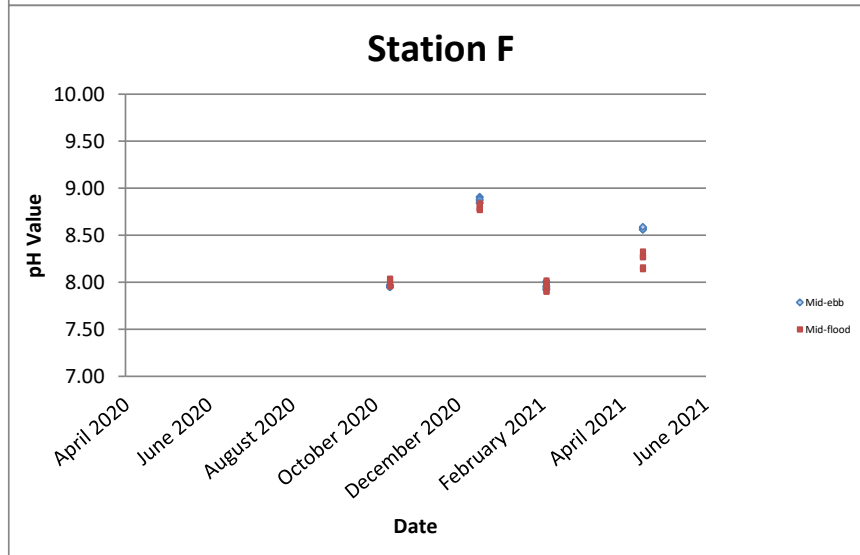
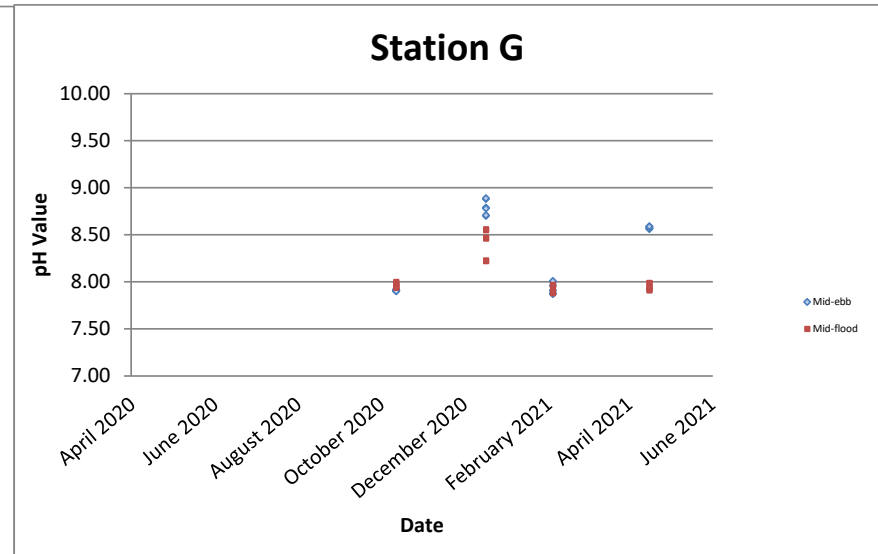
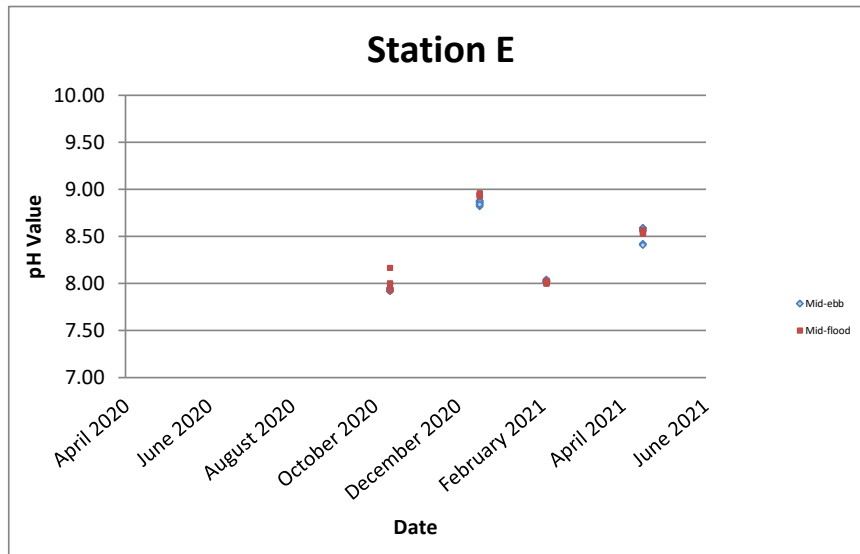
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629170) - Continued										
HK2114310-020	D/S/E/Dup	EK067P: Total Phosphorus - Filtered	----	0.5 mg/L	90.7	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629171)										
HK2114310-040	G/M/E/Dup	EK067P: Total Phosphorus - Filtered	----	0.5 mg/L	108	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629172)										
HK2114310-040	G/M/E/Dup	EK067P: Total Phosphorus as P	----	0.5 mg/L	102	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629173)										
HK2114310-060	B/B/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.5 mg/L	95.9	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629174)										
HK2114310-060	B/B/F/Dup	EK067P: Total Phosphorus as P	----	0.5 mg/L	94.3	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629175)										
HK2114310-080	F/S/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.5 mg/L	94.5	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629176)										
HK2114310-080	F/S/F/Dup	EK067P: Total Phosphorus as P	----	0.5 mg/L	90.2	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629177)										
HK2114310-096	H/B/F/Dup	EK067P: Total Phosphorus - Filtered	----	0.5 mg/L	89.0	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629178)										
HK2114310-096	H/B/F/Dup	EK067P: Total Phosphorus as P	----	0.5 mg/L	90.8	----	75.0	125	----	----

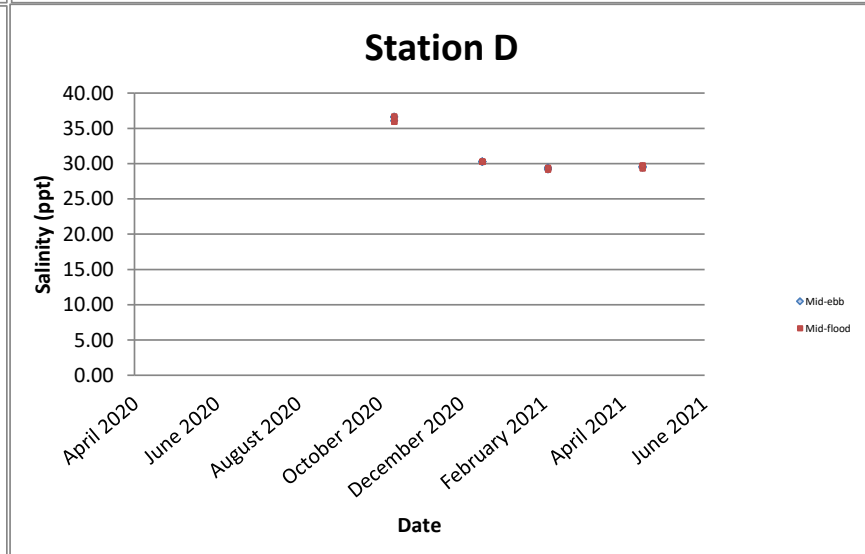
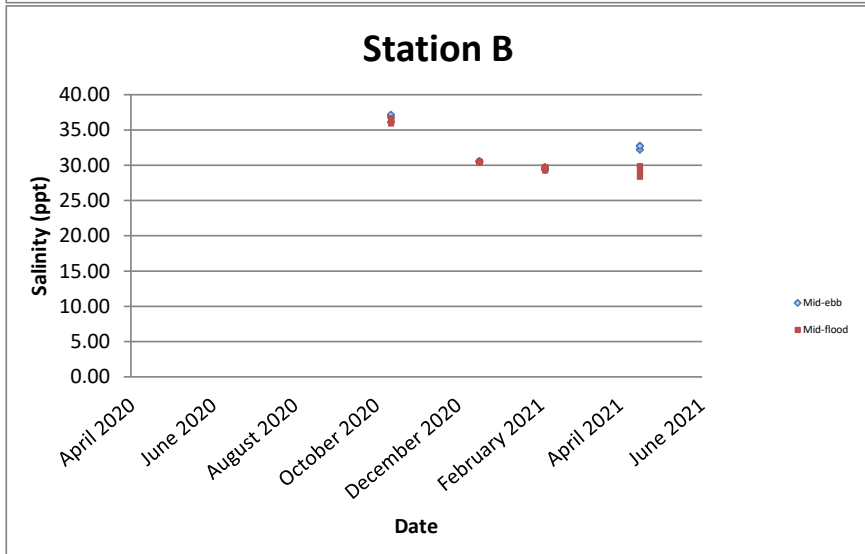
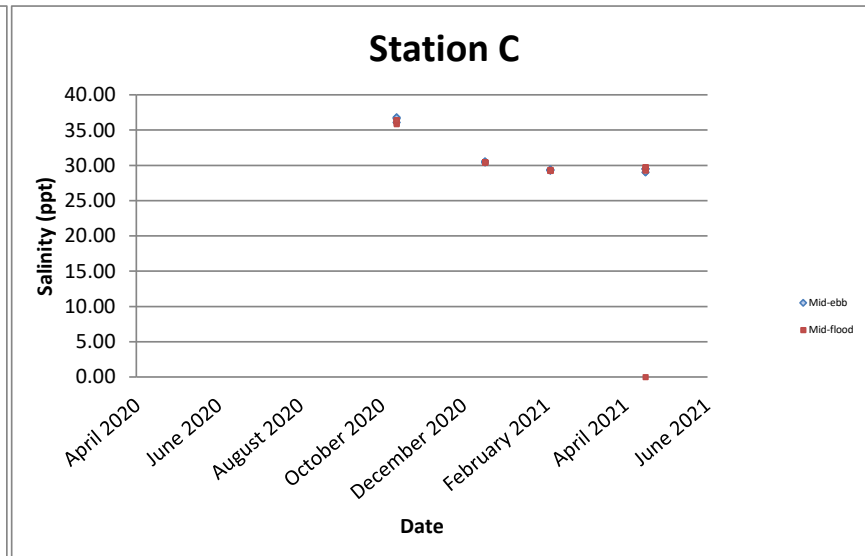
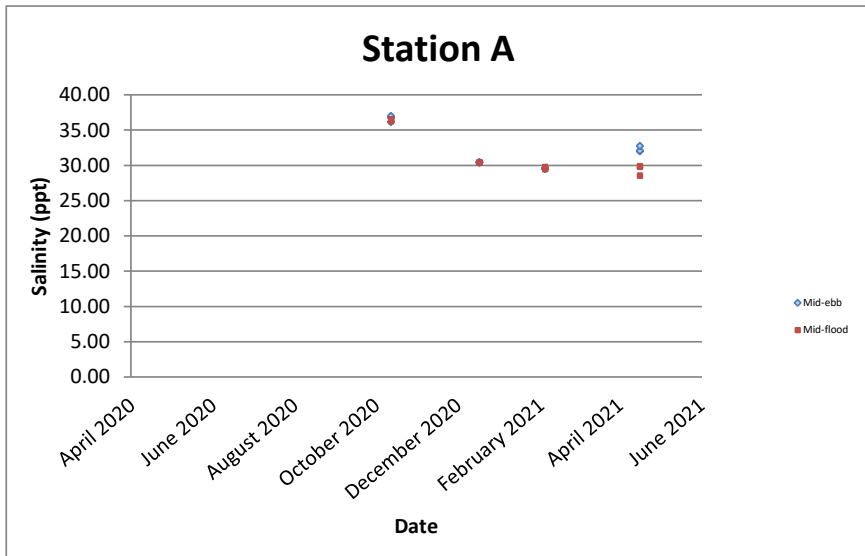
pH value



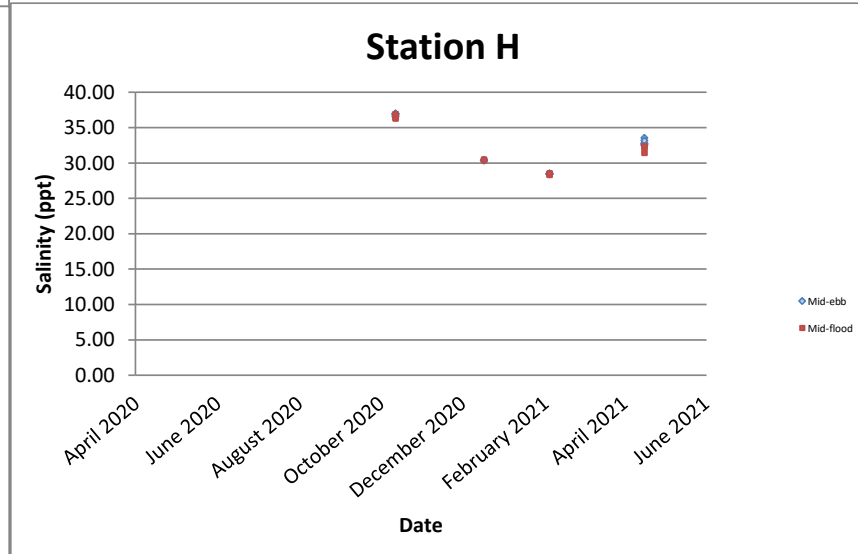
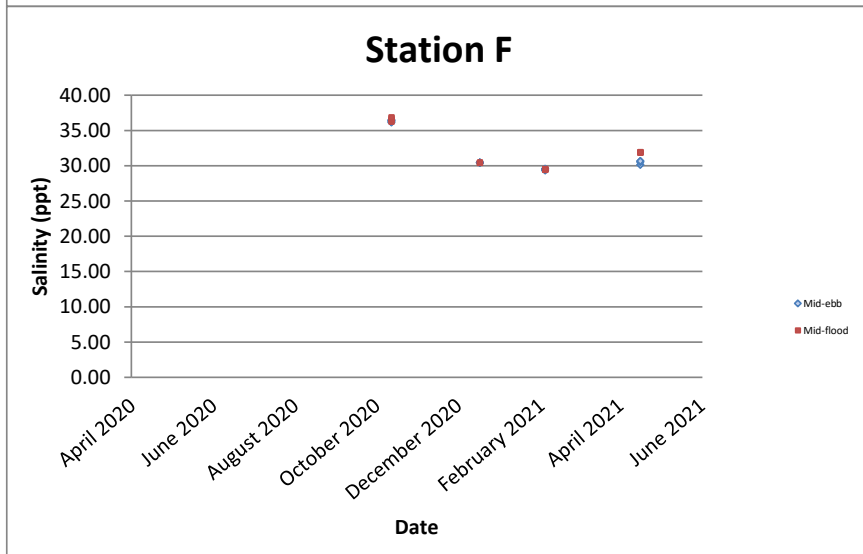
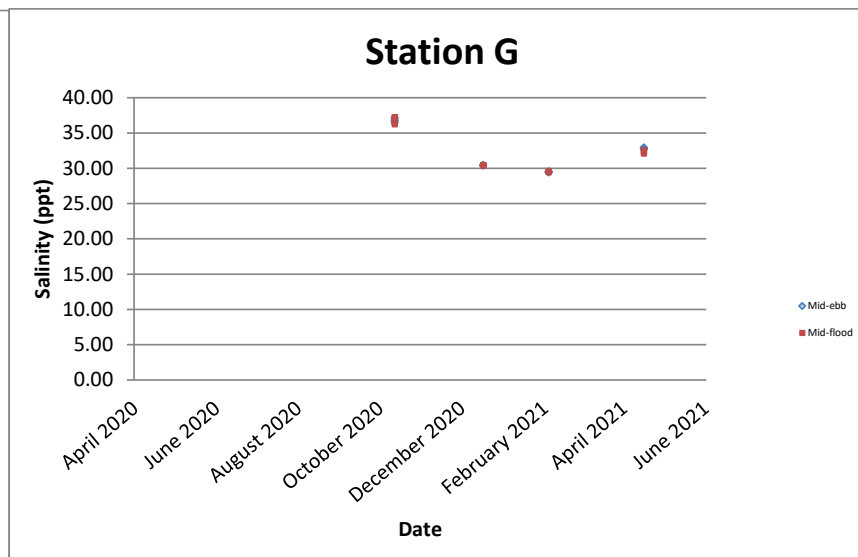
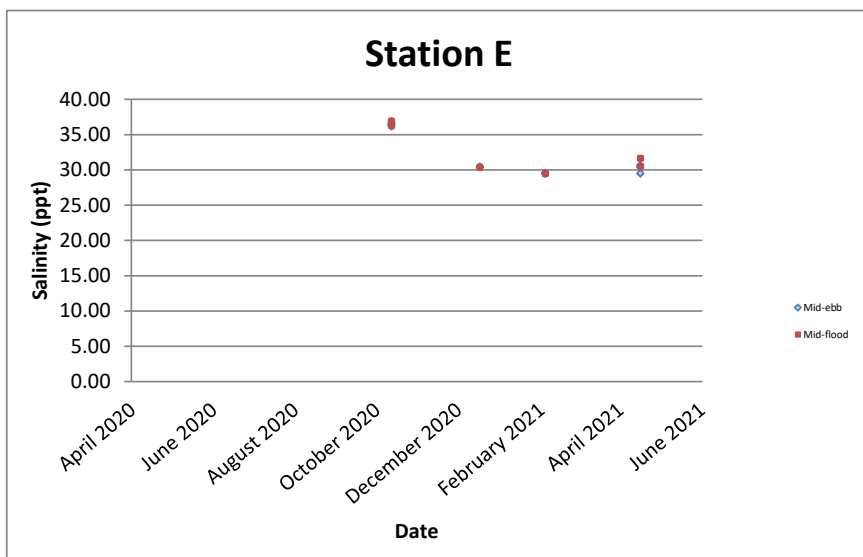
pH value



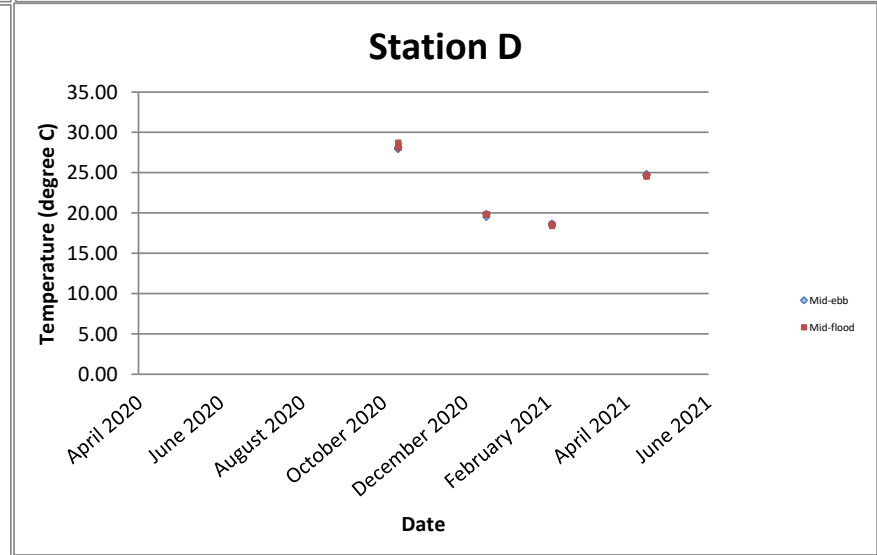
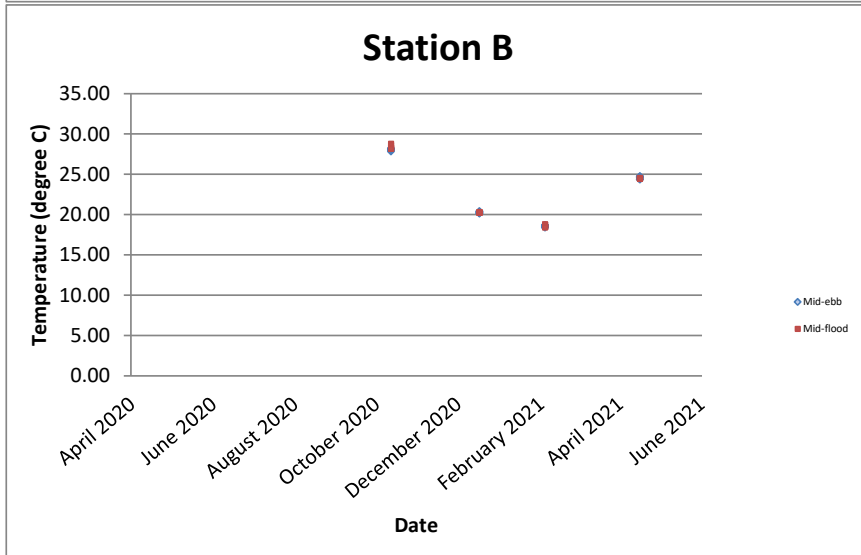
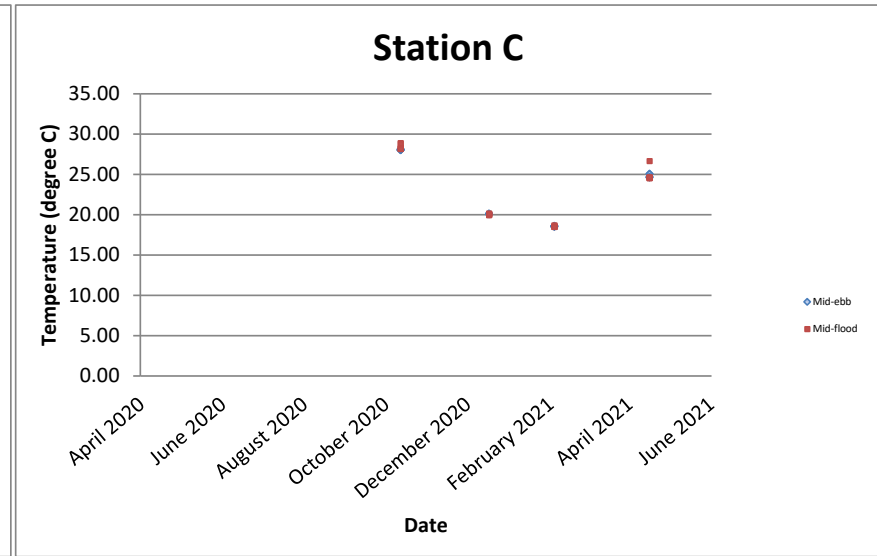
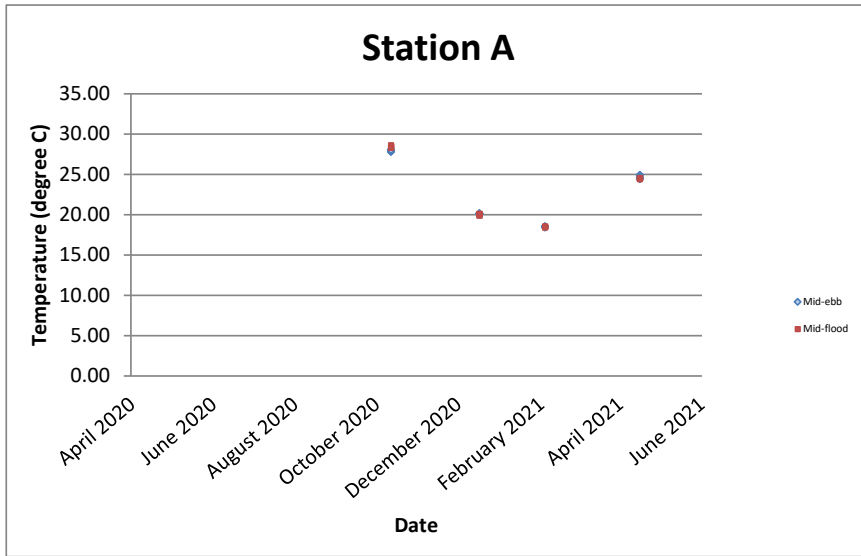
Salinity (ppt)



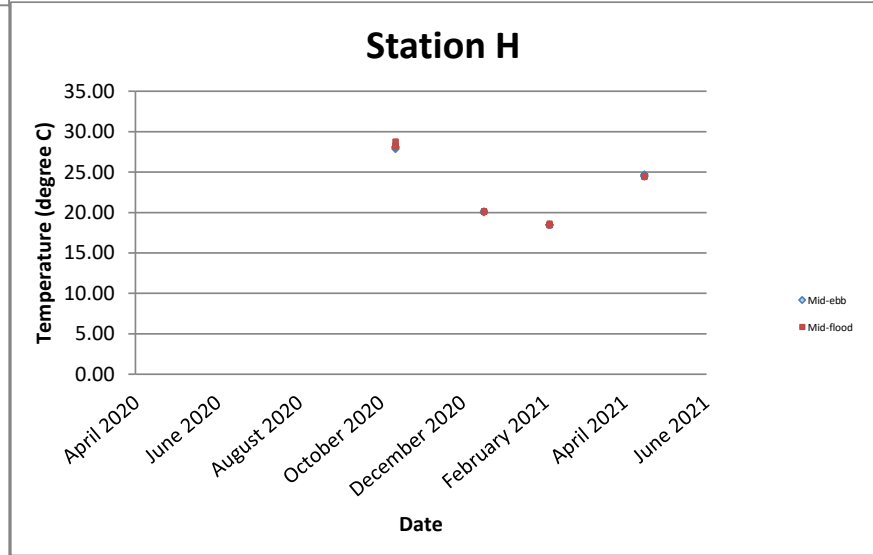
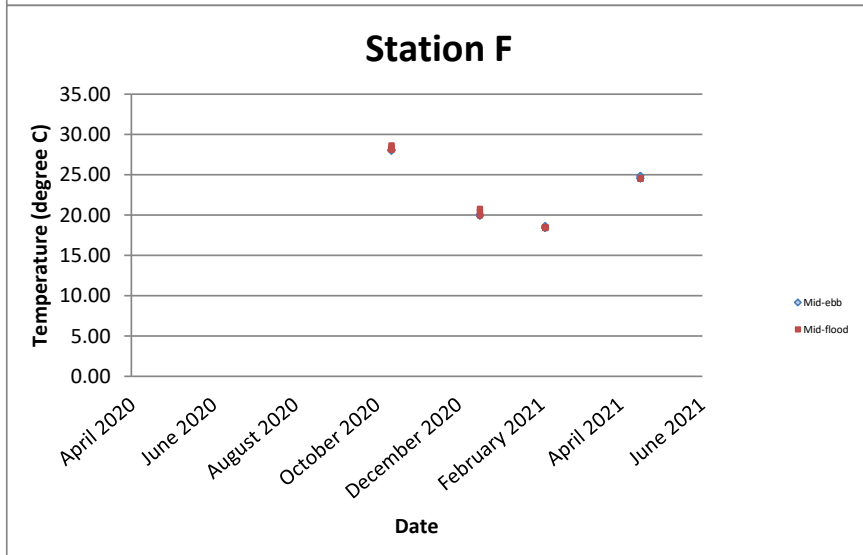
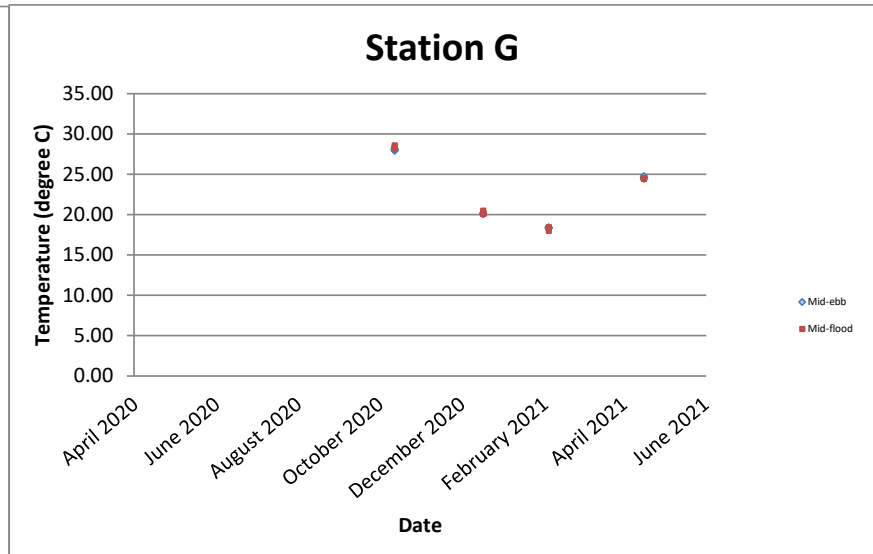
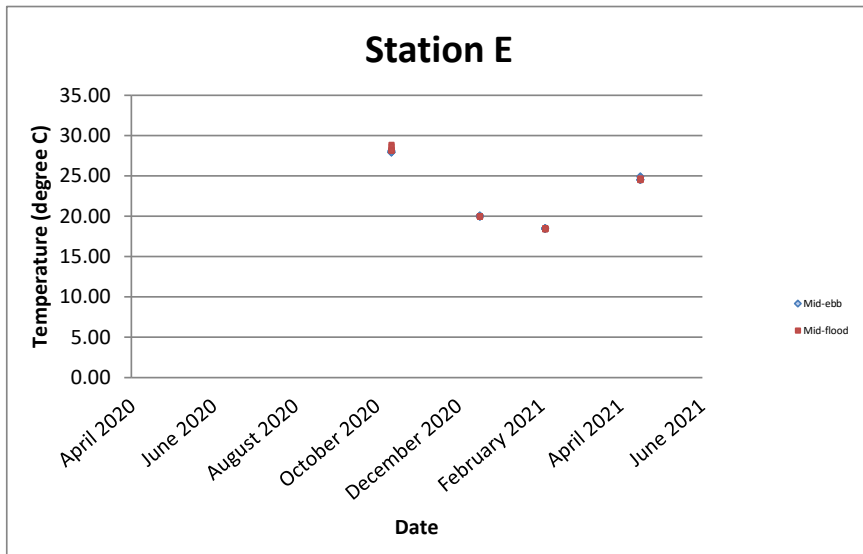
Salinity (ppt)



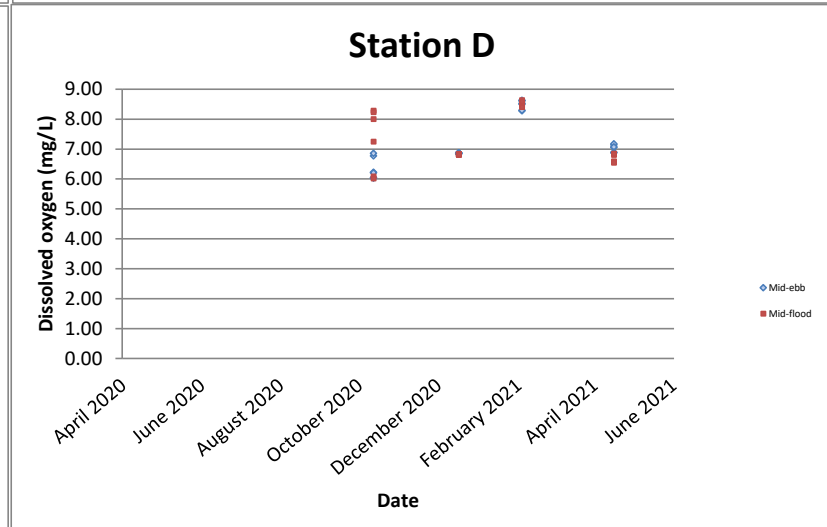
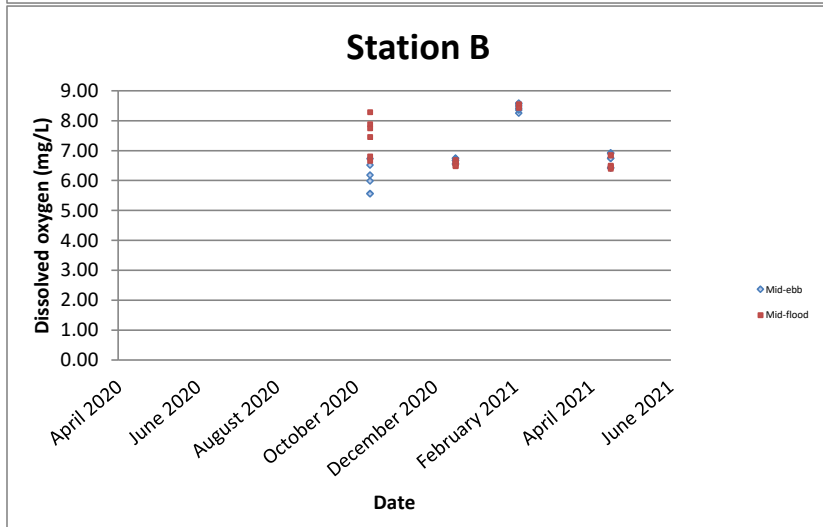
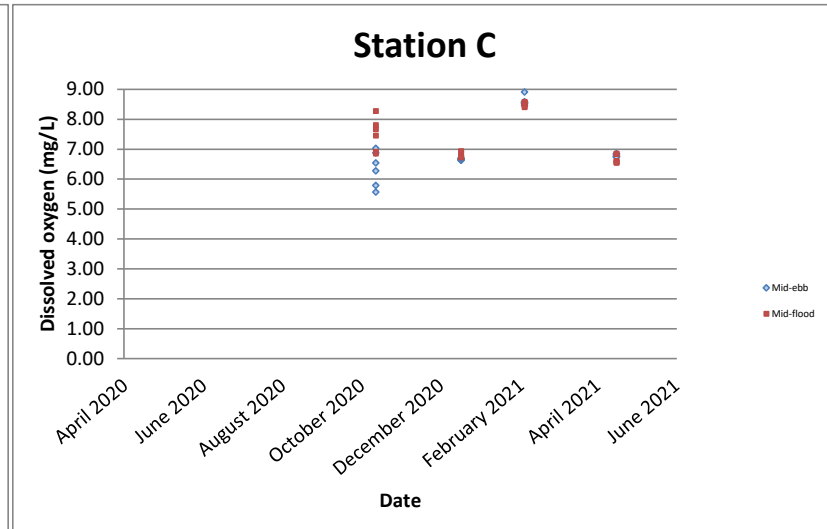
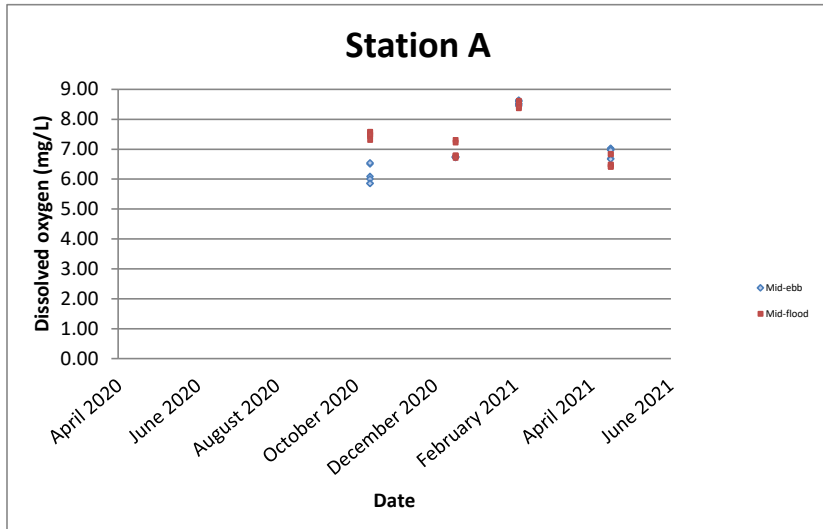
Temperature (degree C)



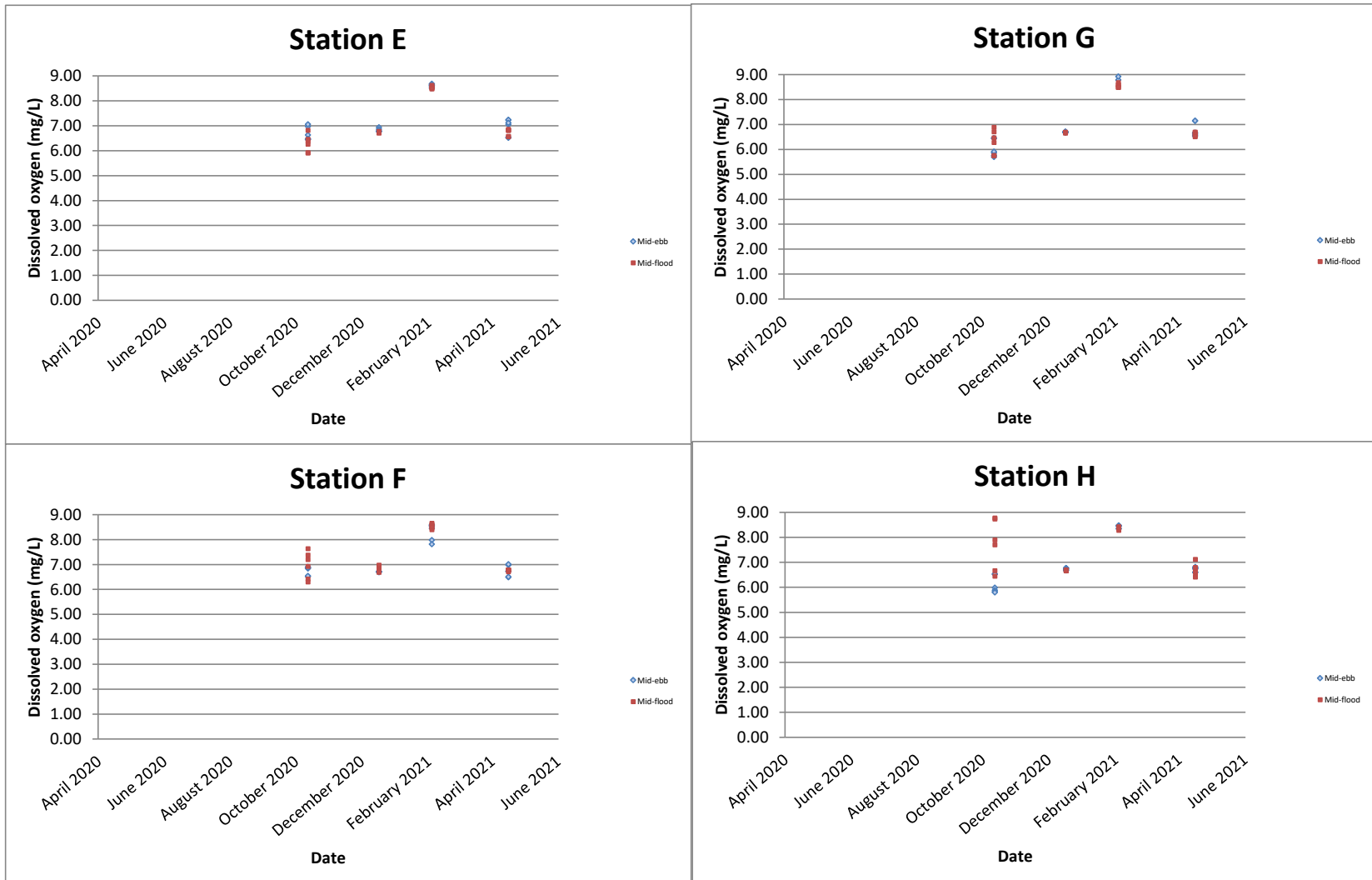
Temperature (degree C)



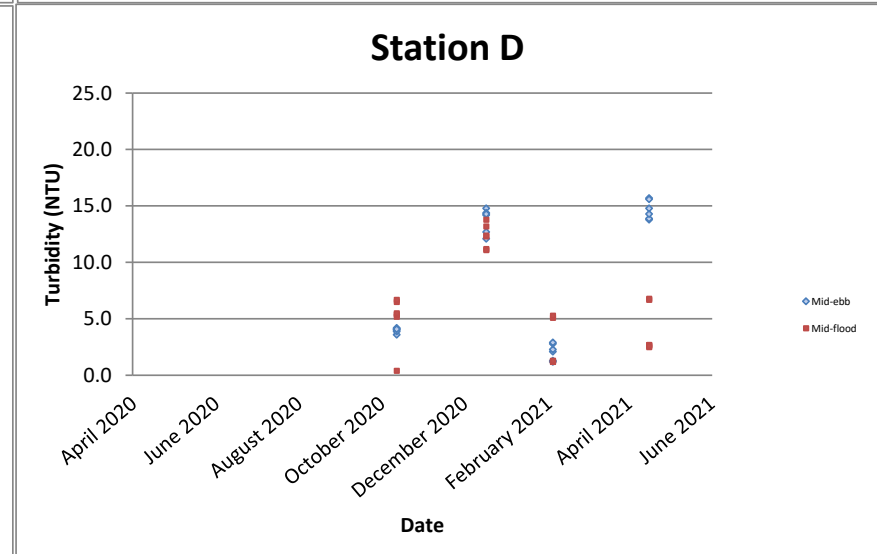
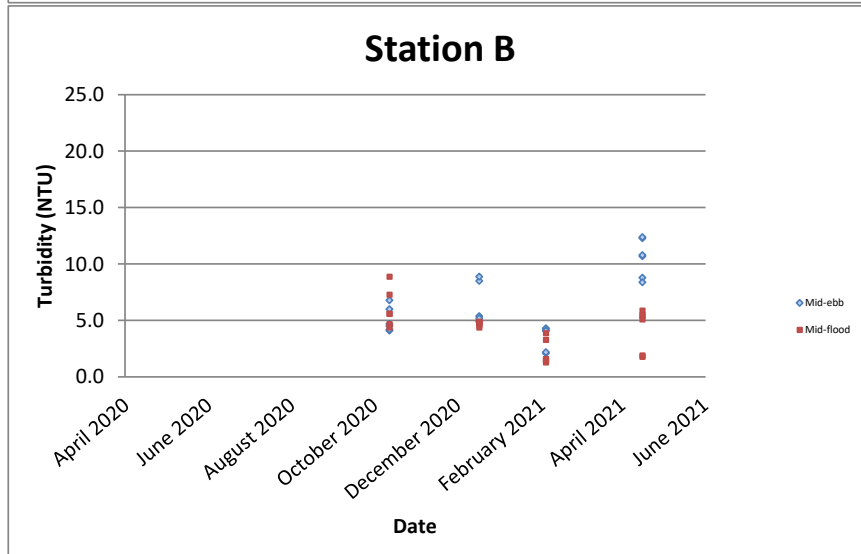
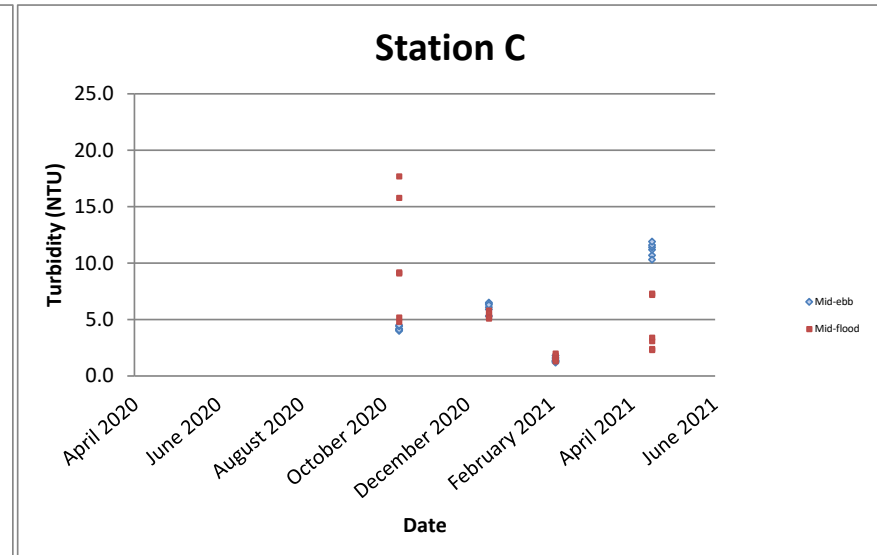
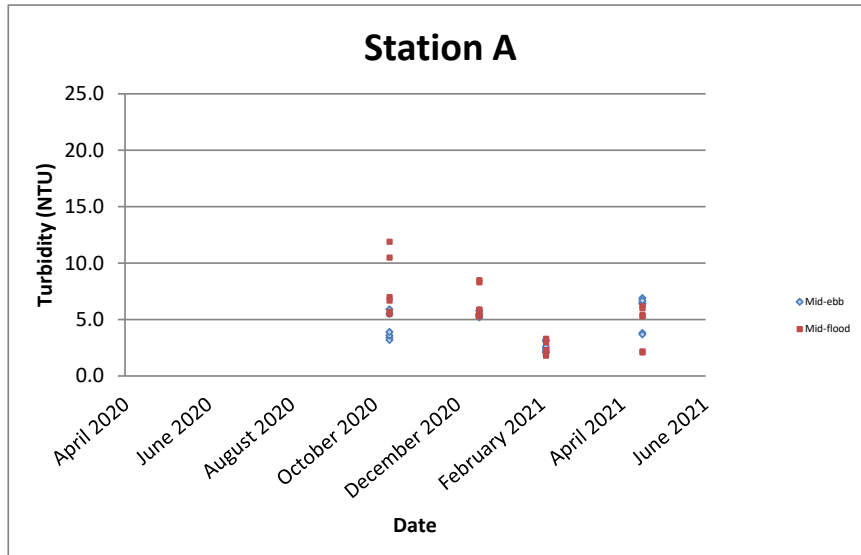
Dissolved oxygen (mg/L)



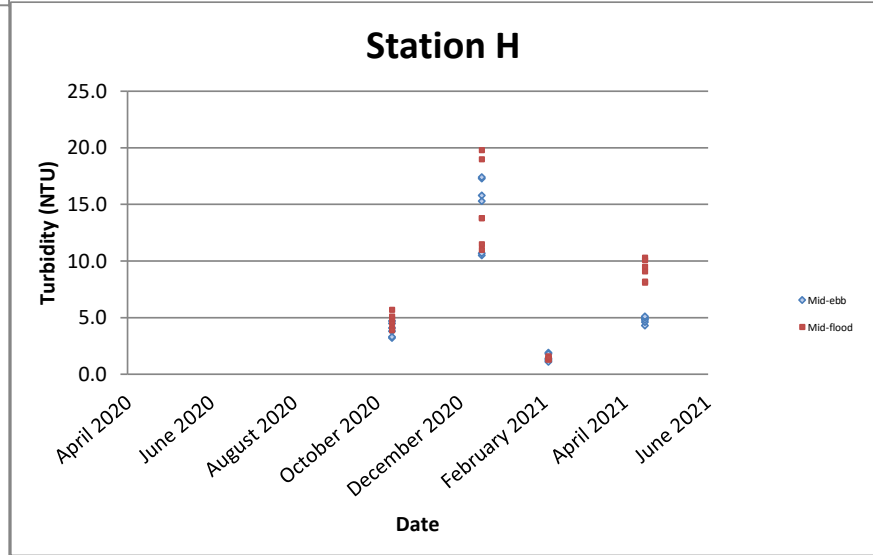
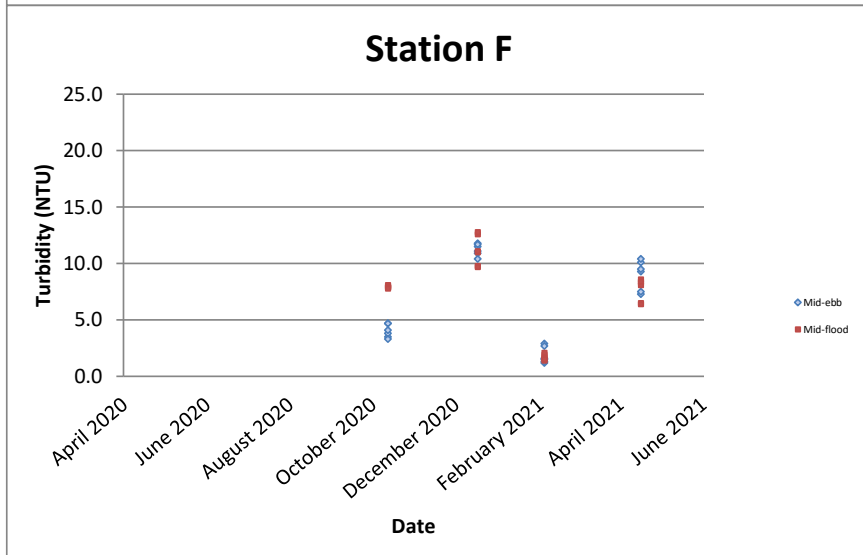
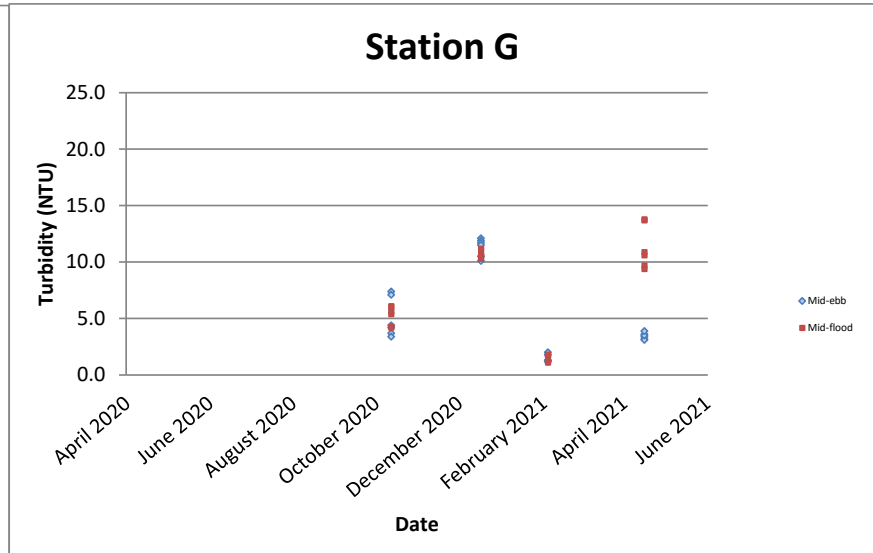
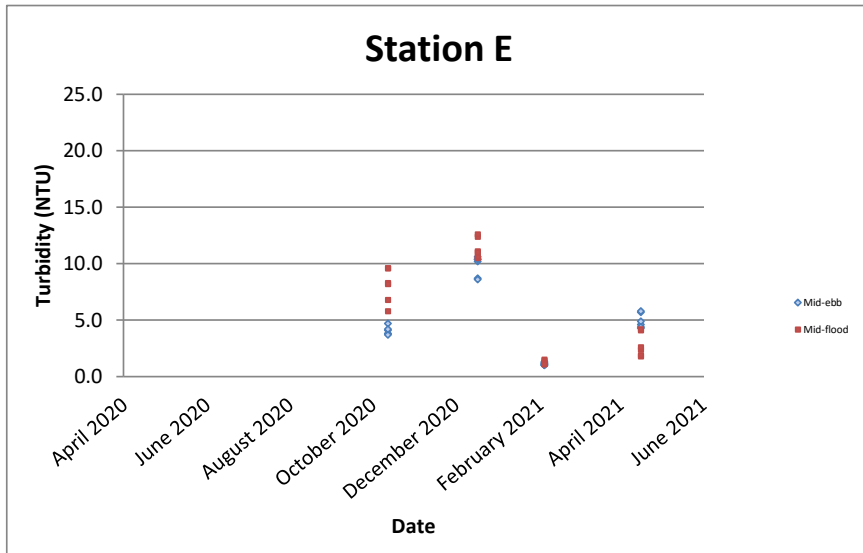
Dissolved oxygen (mg/L)



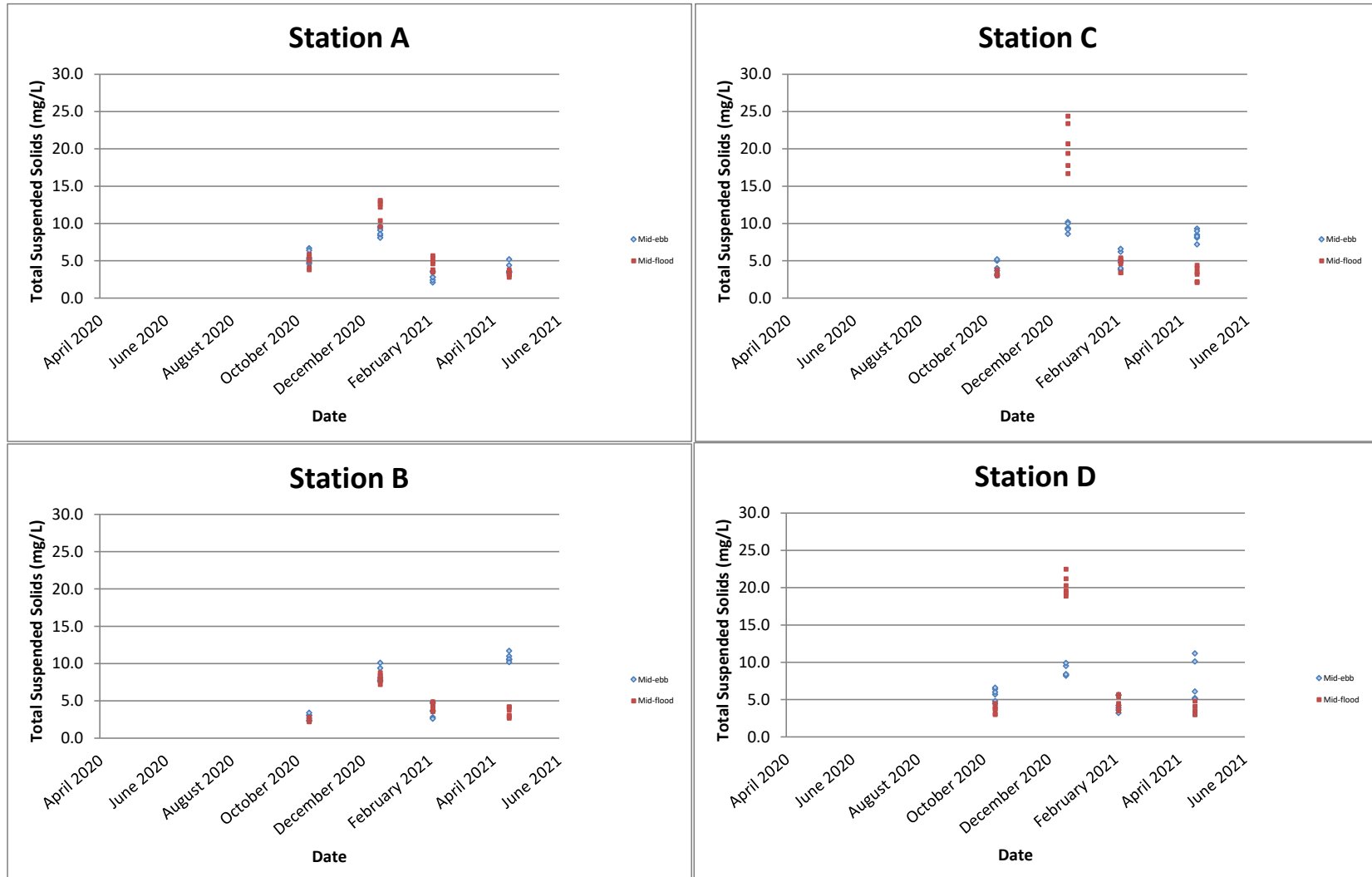
Turbidity (NTU)



Turbidity (NTU)

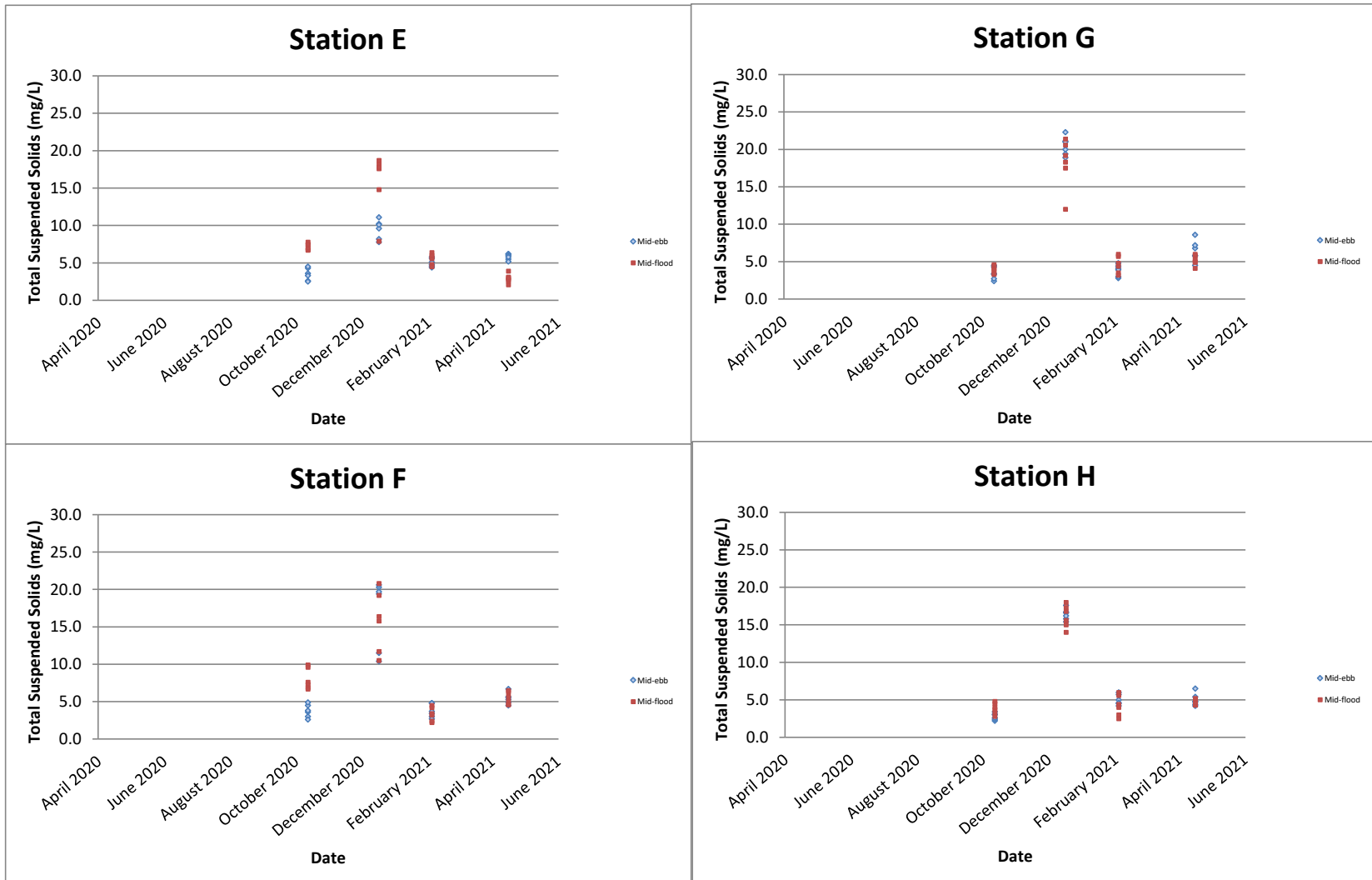


Total Suspended Solids (mg/L)



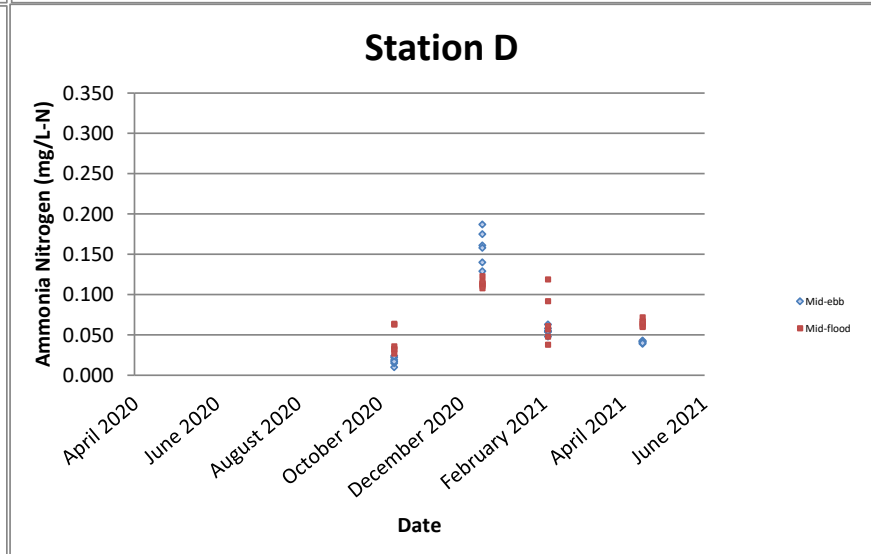
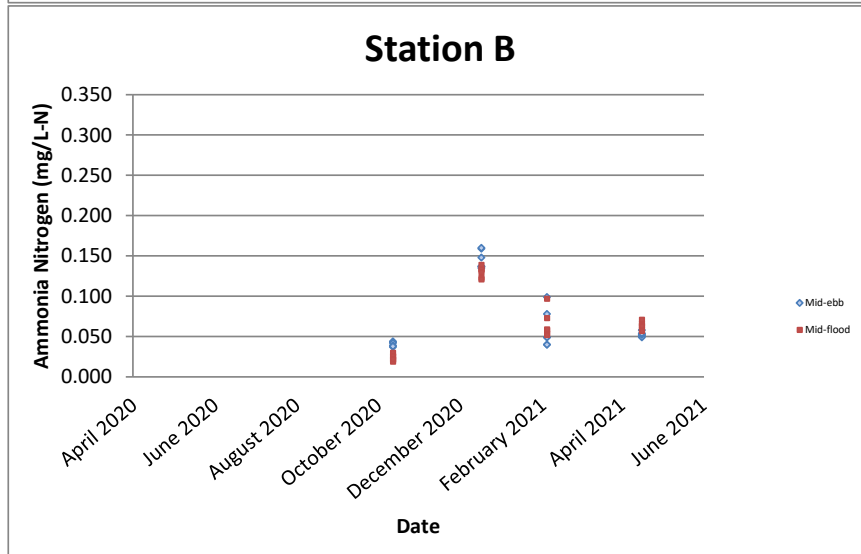
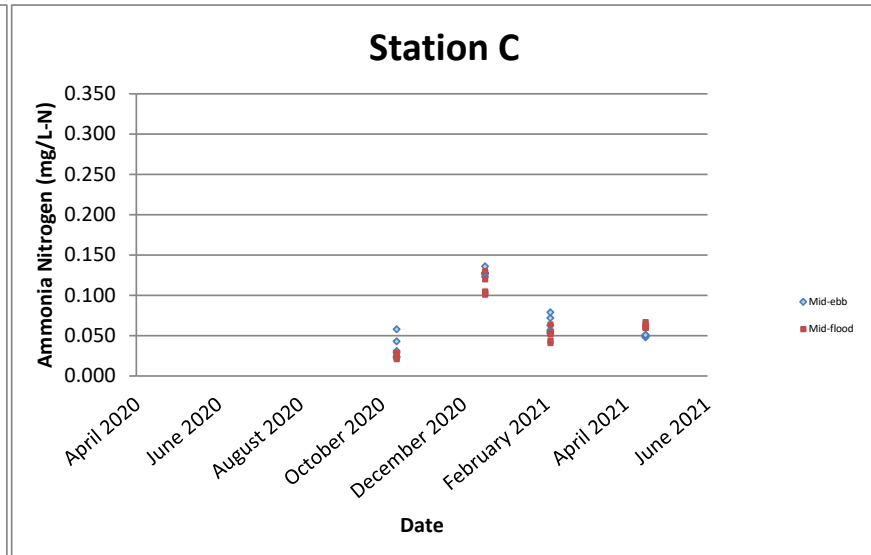
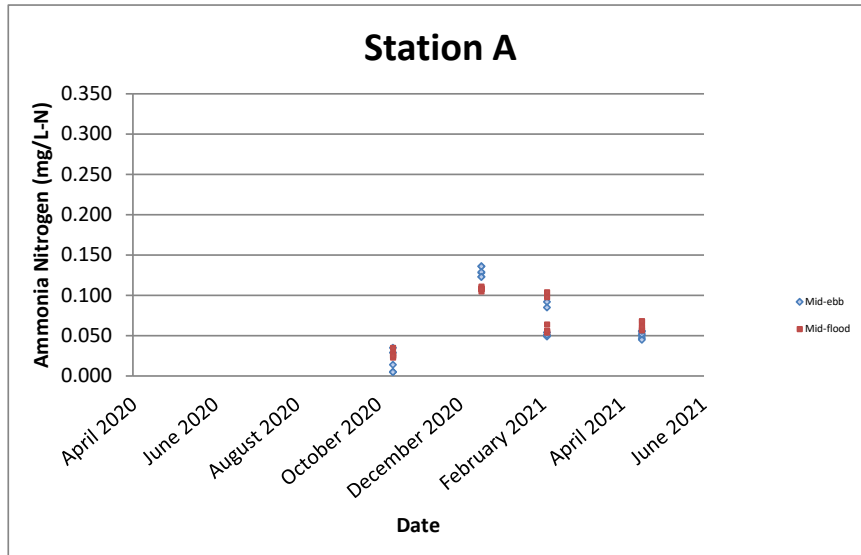
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

Total Suspended Solids (mg/L)



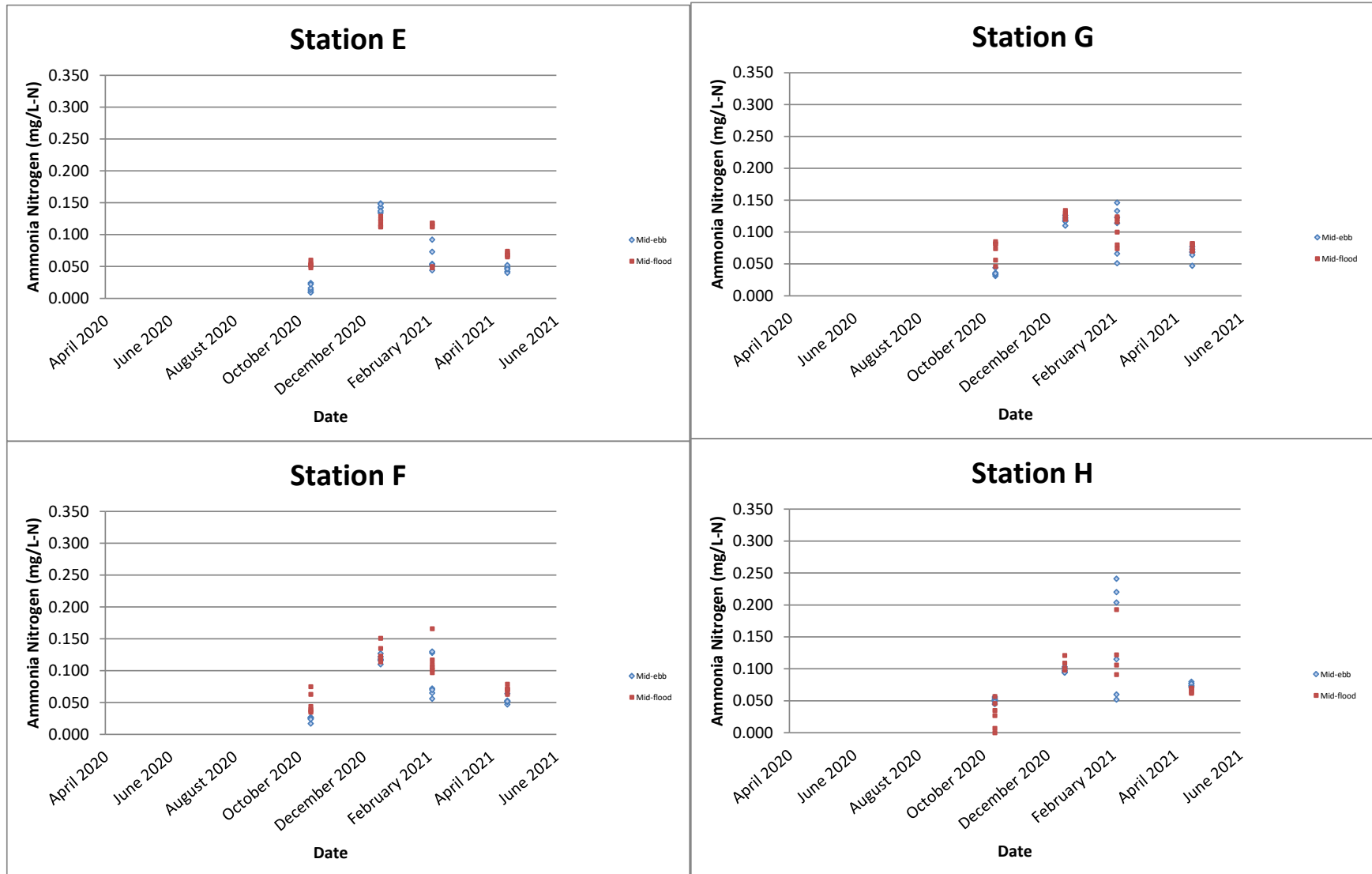
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

Ammonia Nitrogen (mg/L-N)



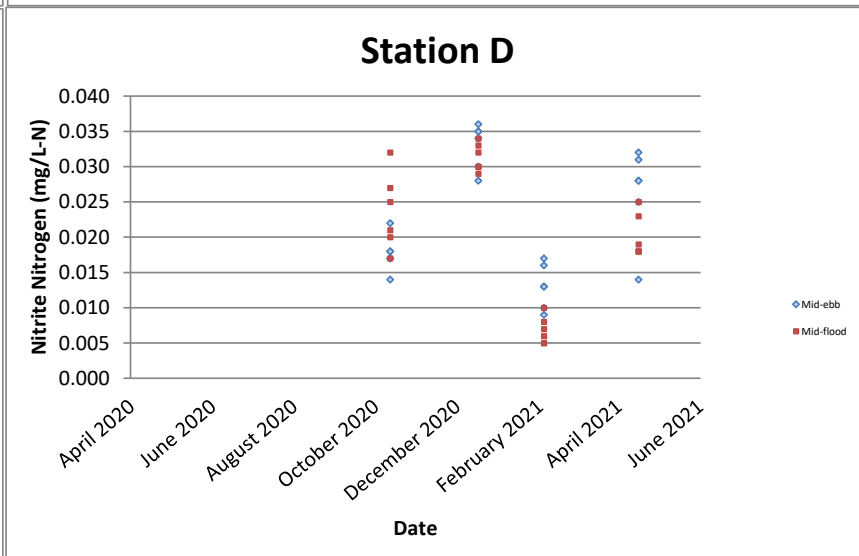
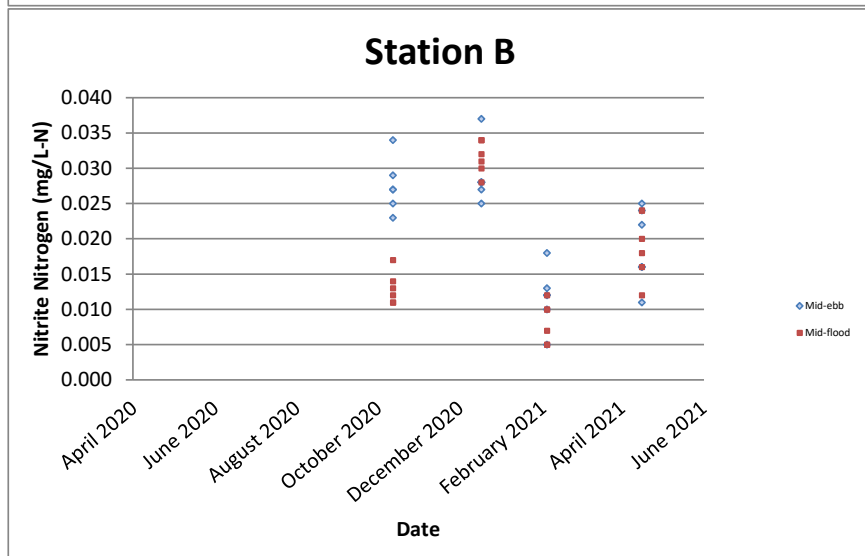
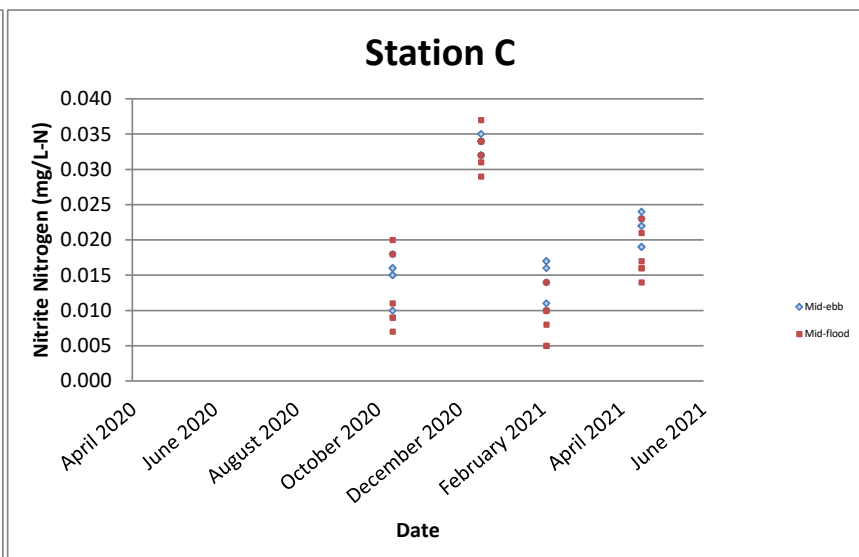
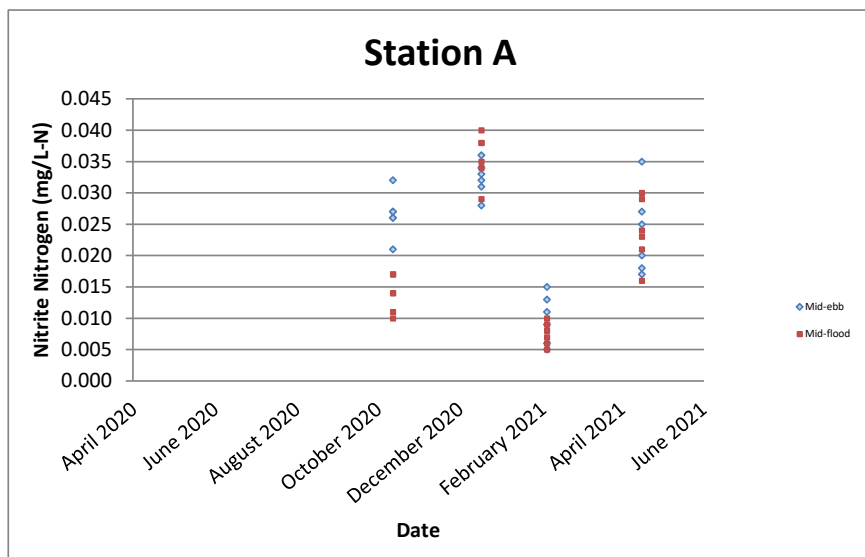
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Ammonia Nitrogen (mg/L-N)



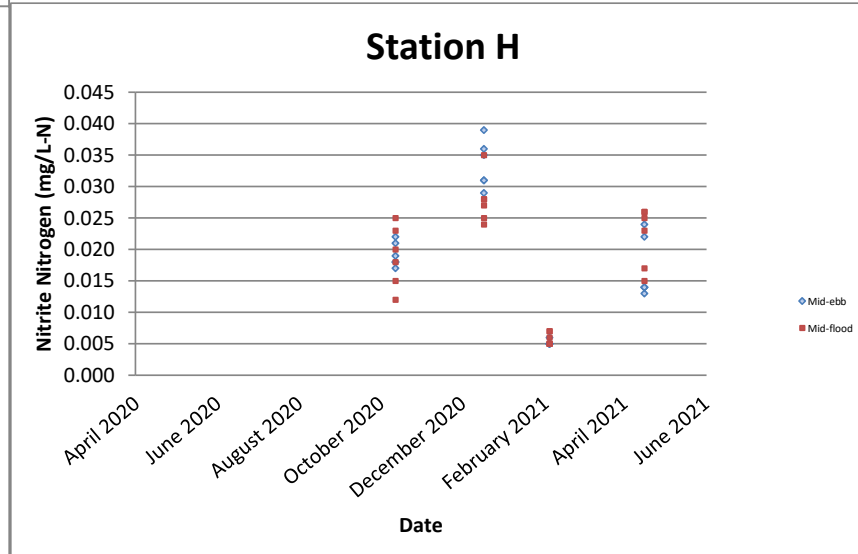
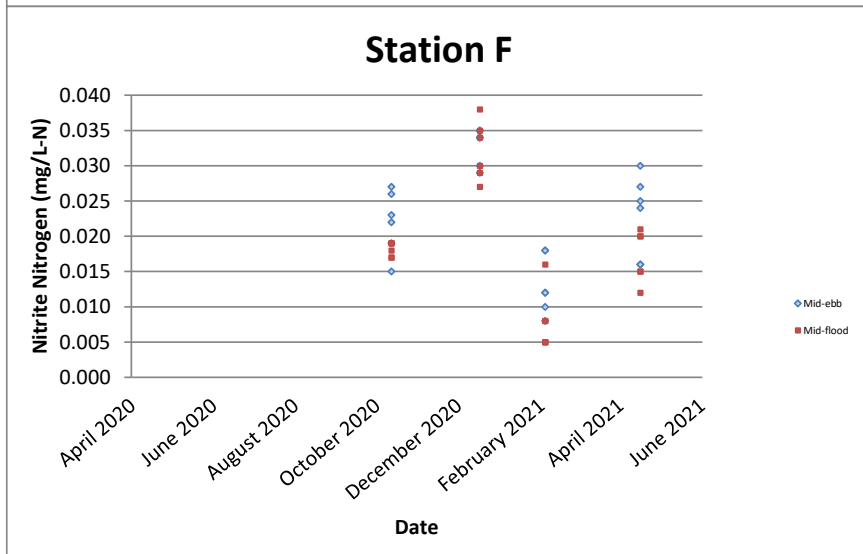
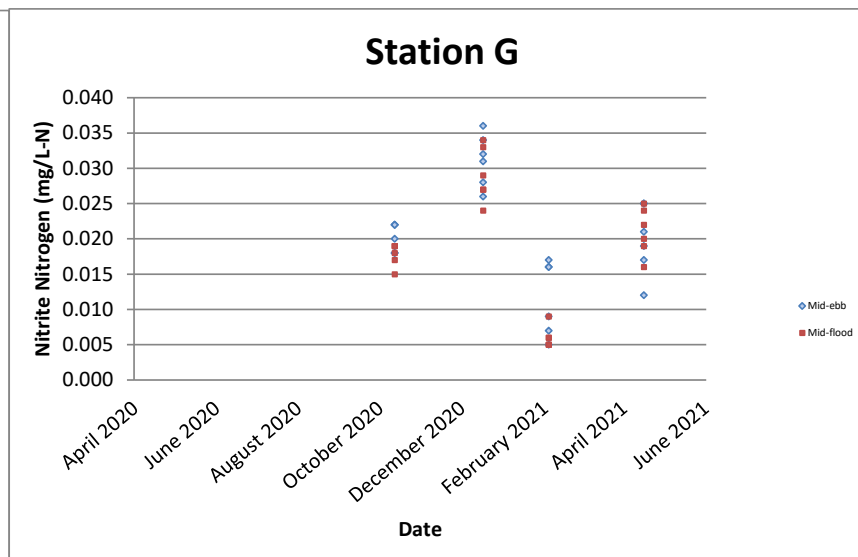
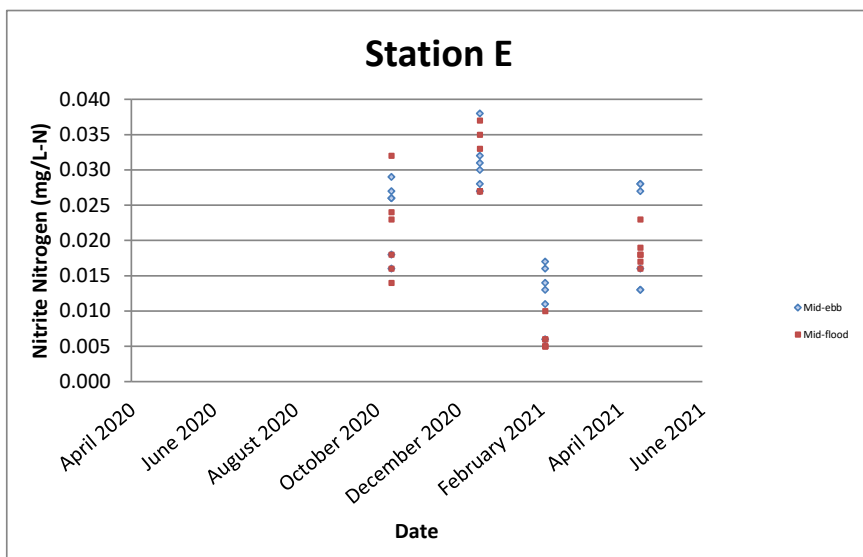
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrite Nitrogen (mg/L-N)



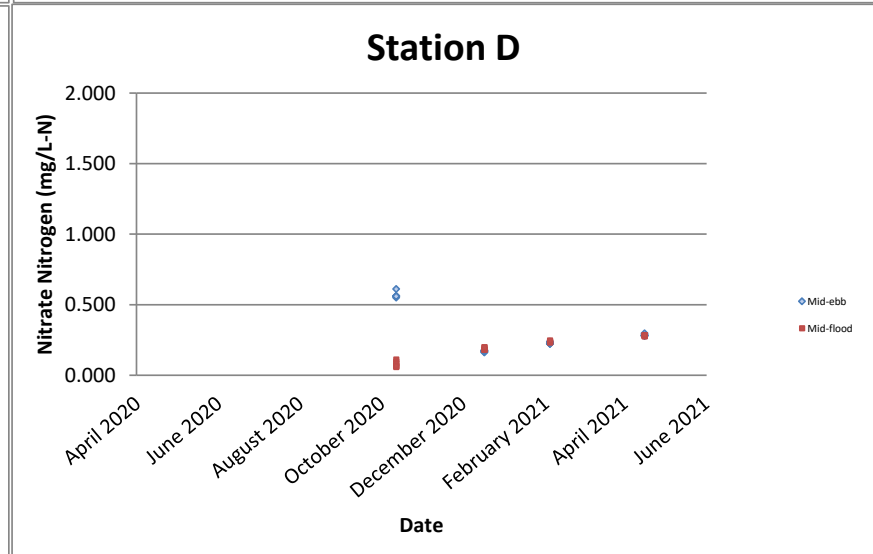
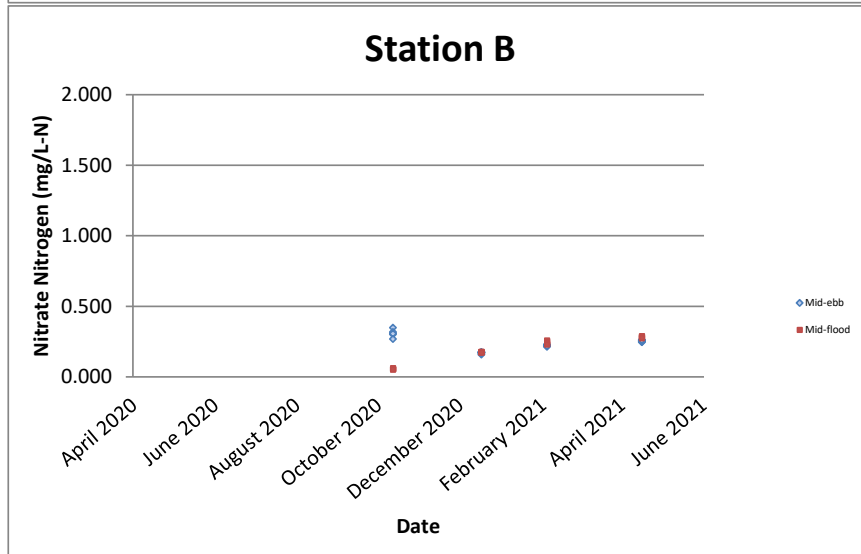
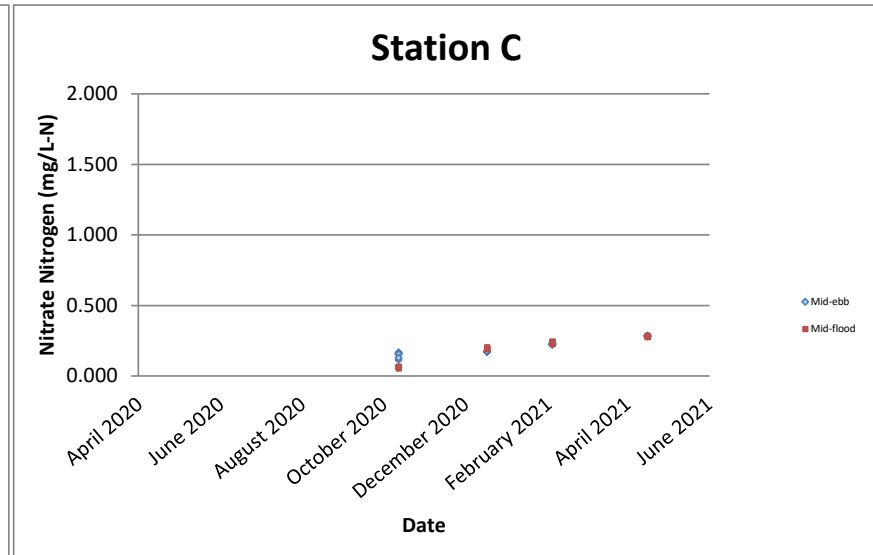
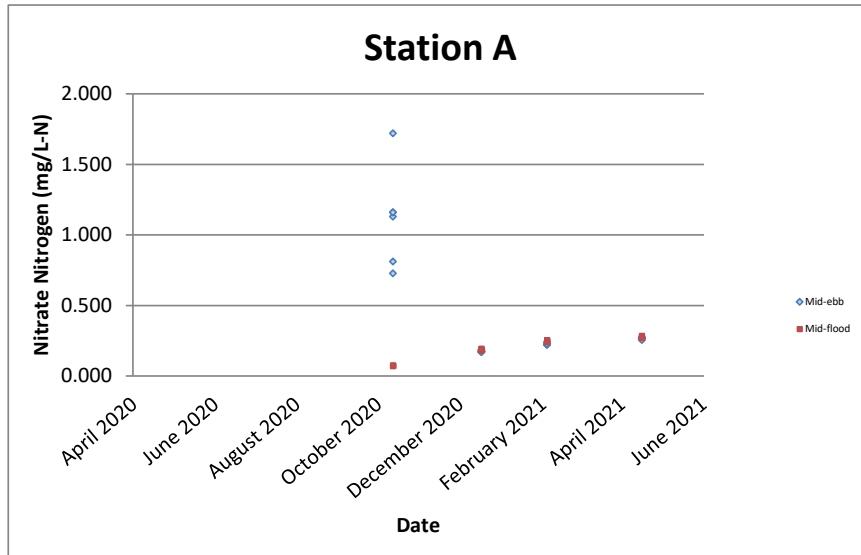
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrite Nitrogen (mg/L-N)



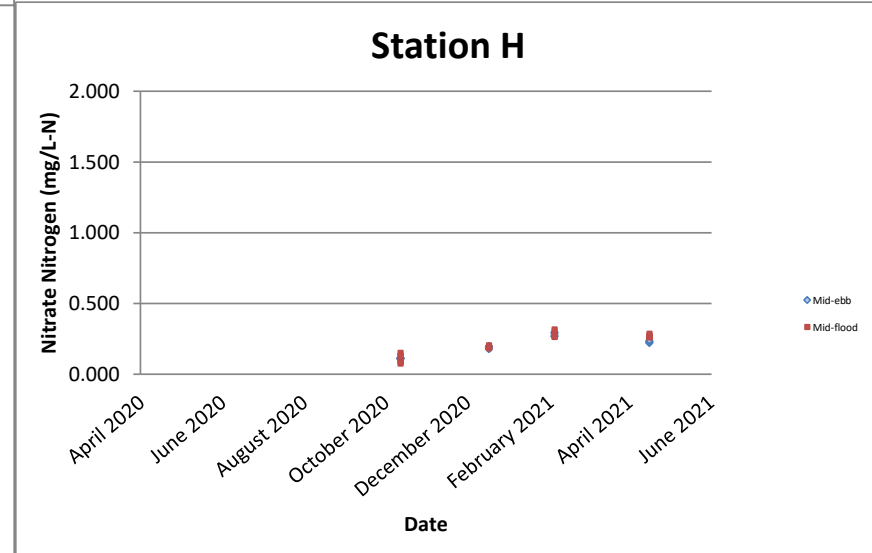
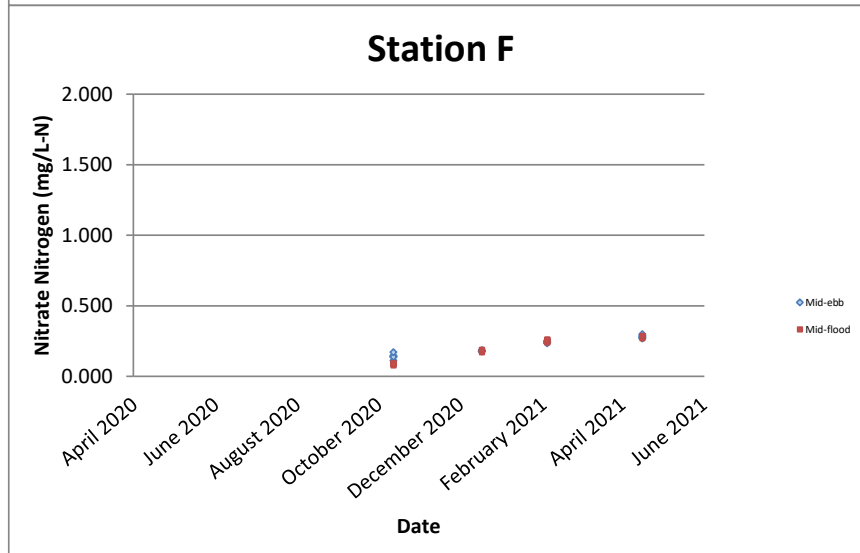
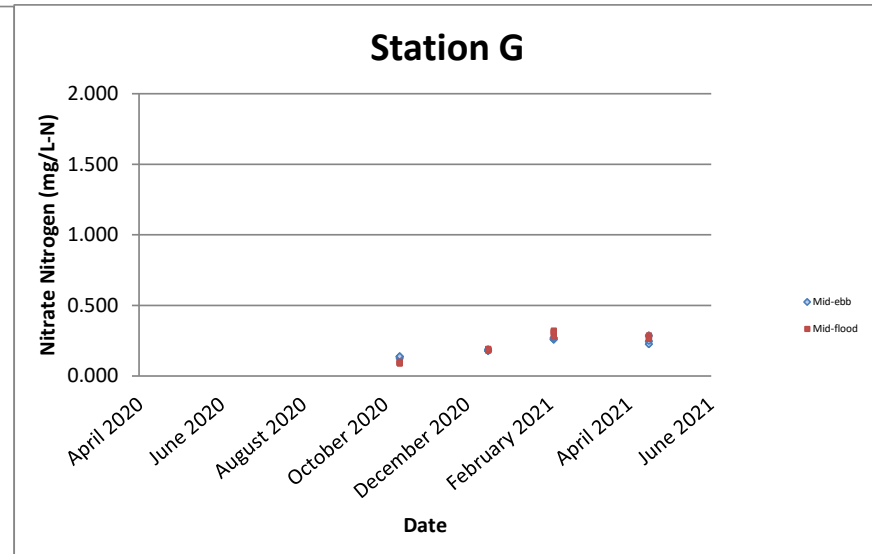
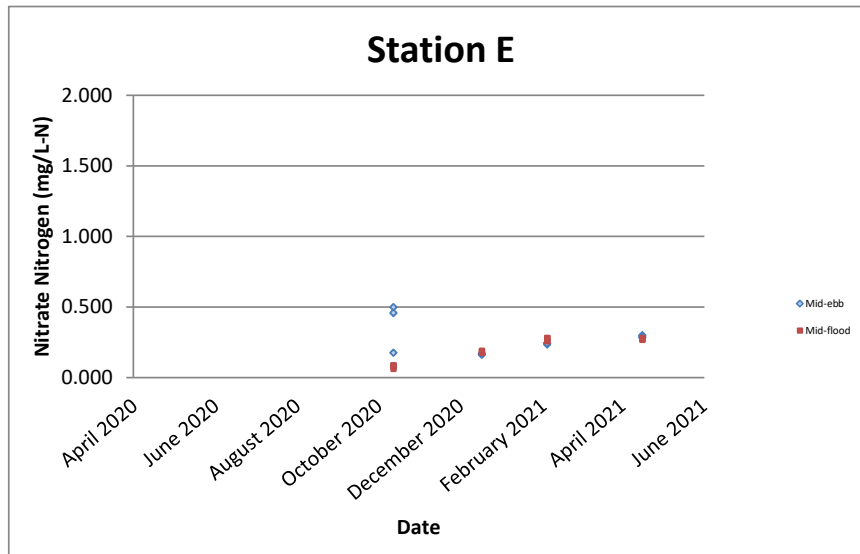
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrate Nitrogen (mg/L-N)



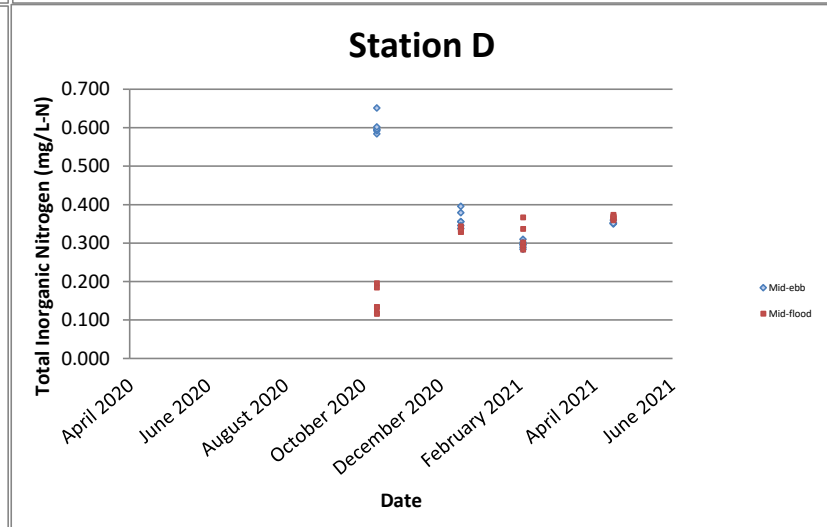
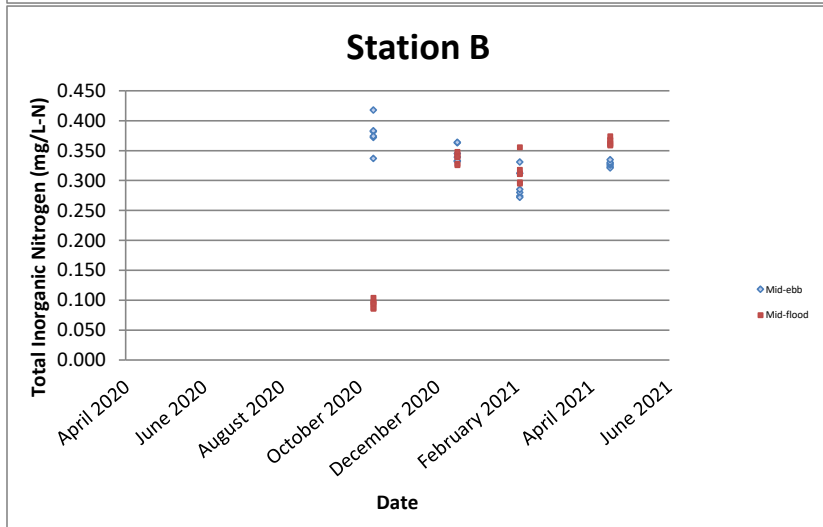
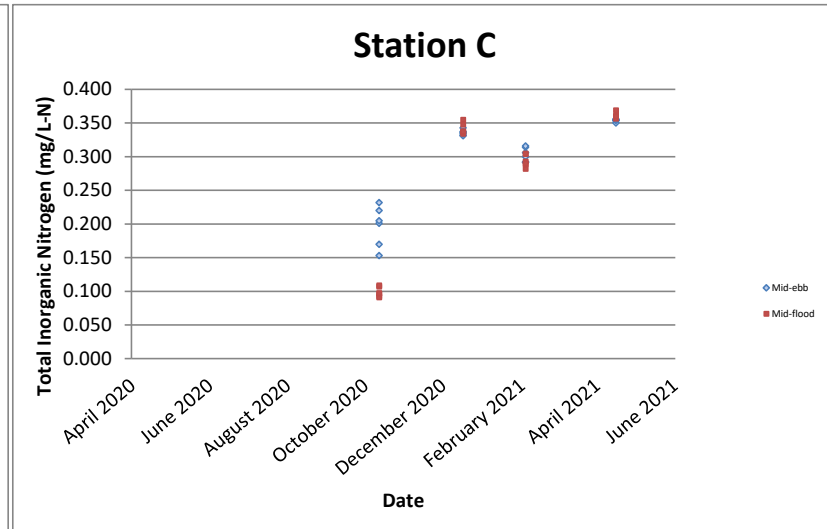
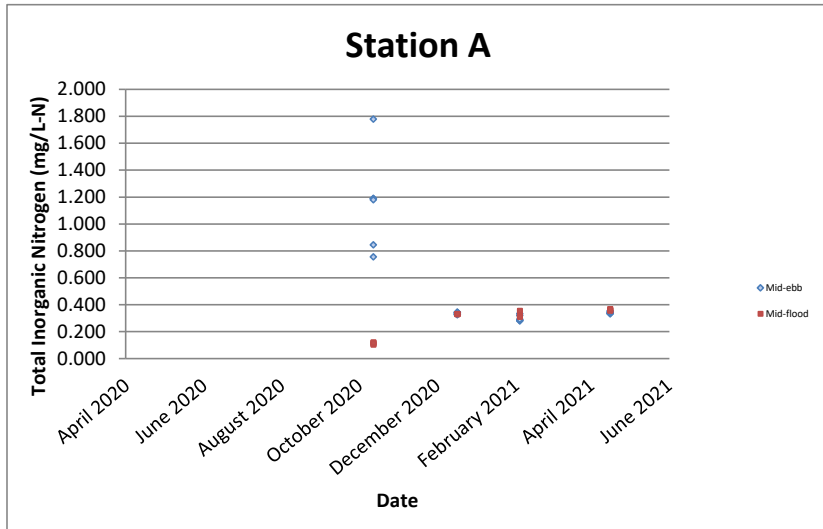
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrate Nitrogen (mg/L-N)



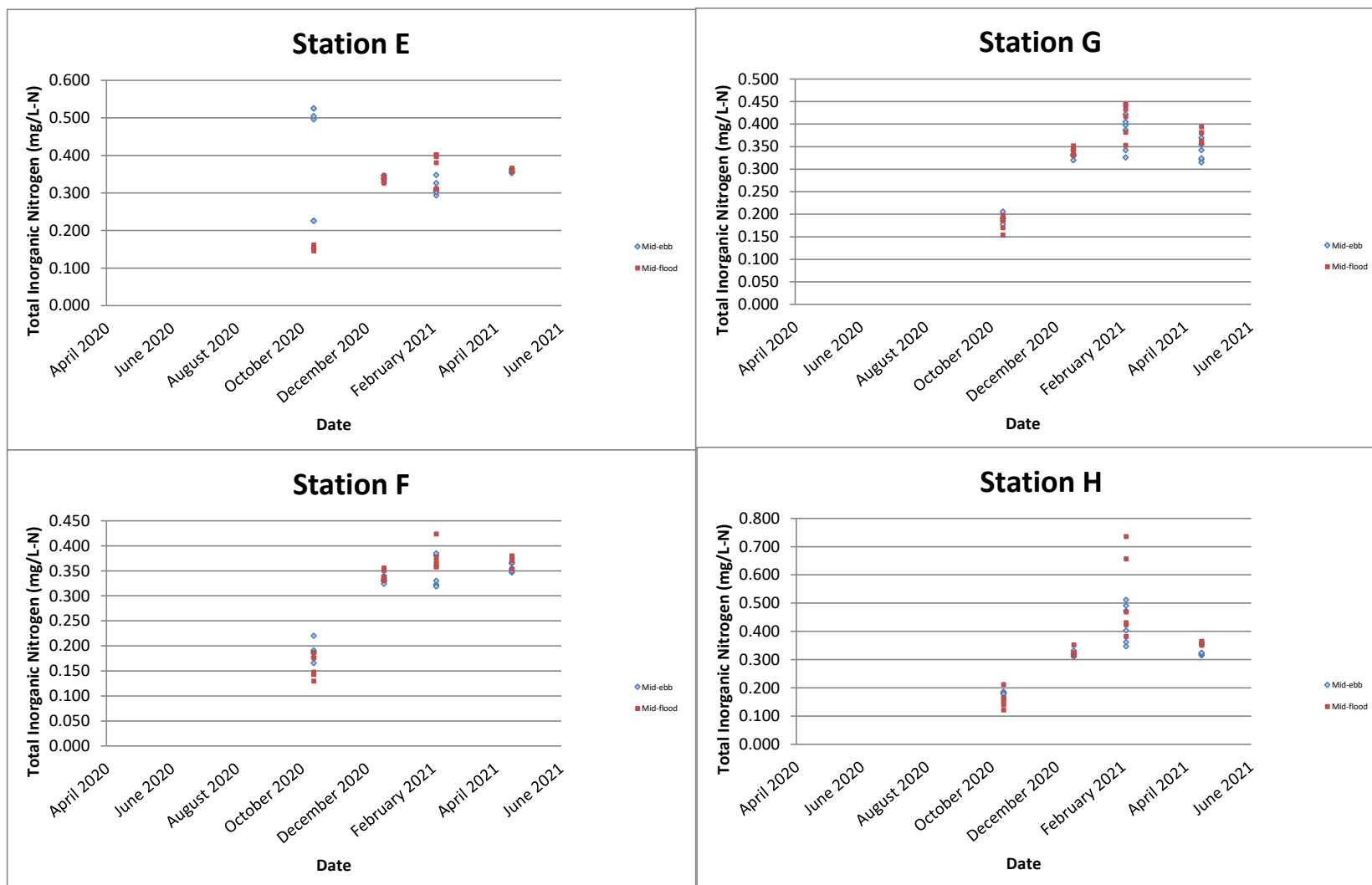
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Total Inorganic Nitrogen (mg/L-N)



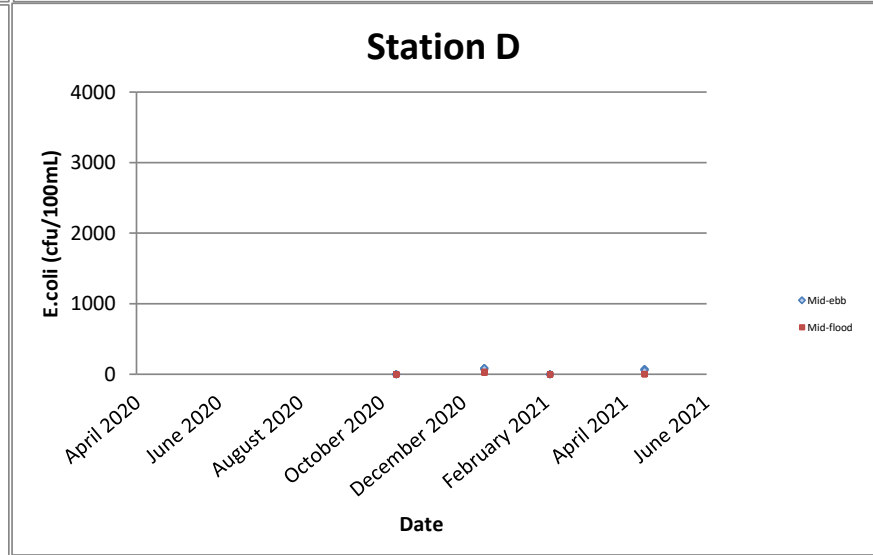
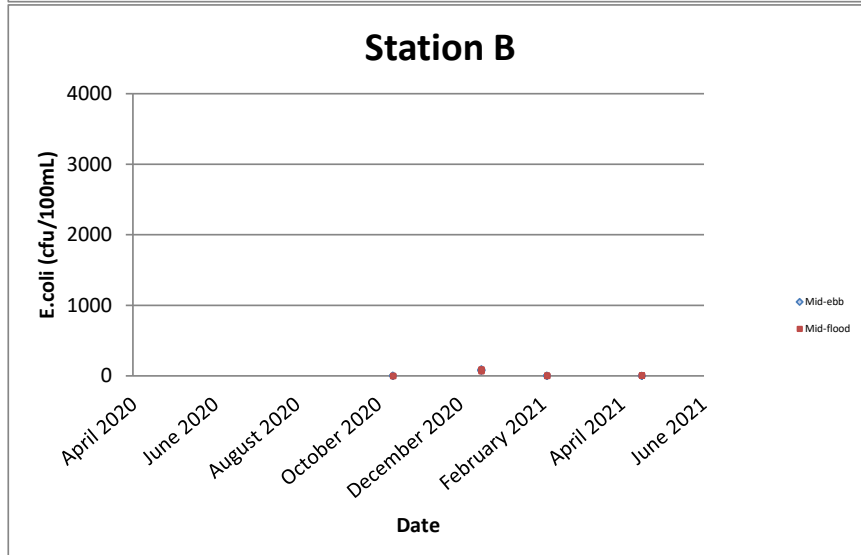
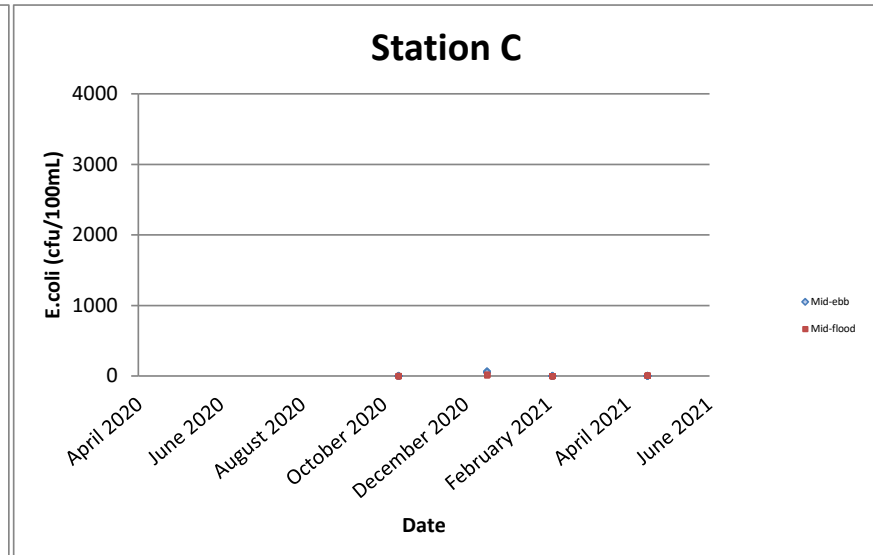
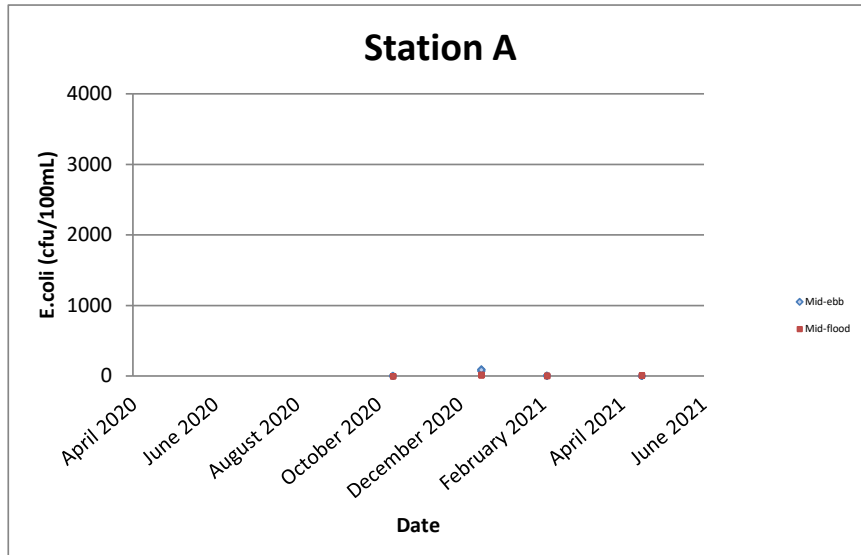
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

Total Inorganic Nitrogen (mg/L-N)



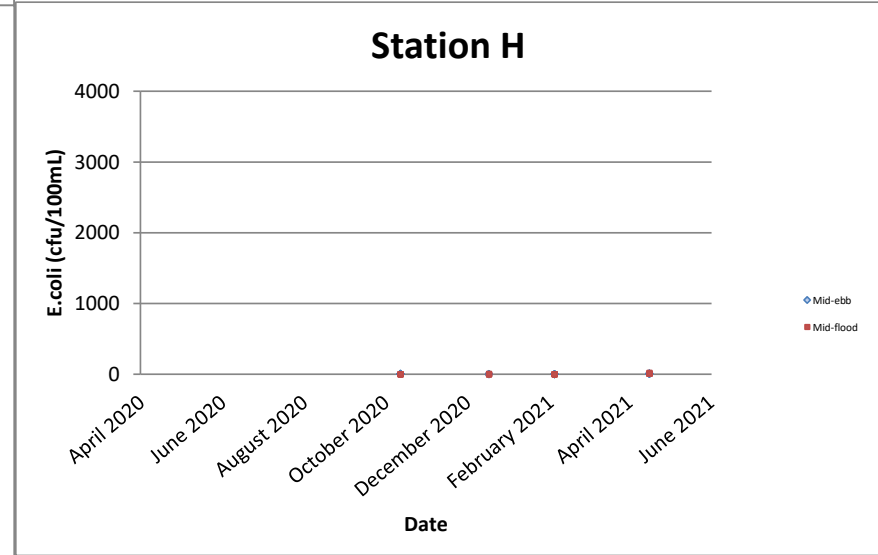
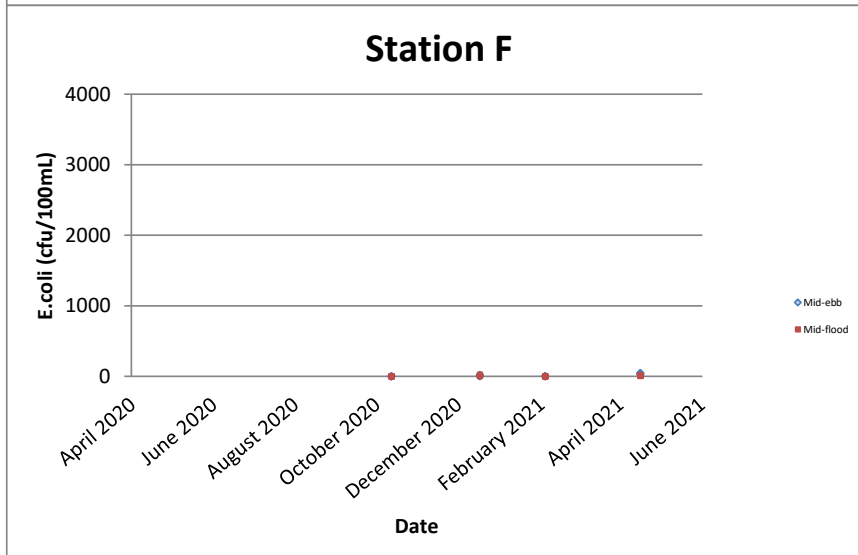
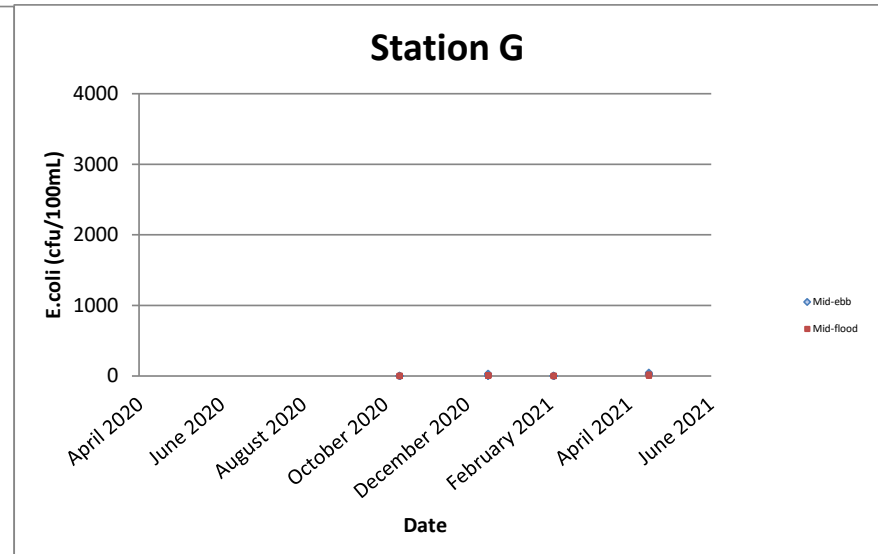
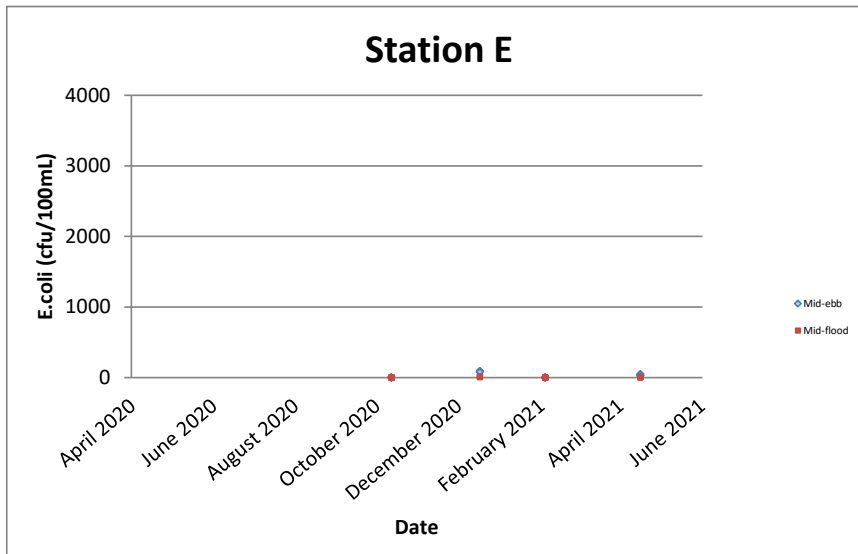
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

E.coli (cfu/100mL)



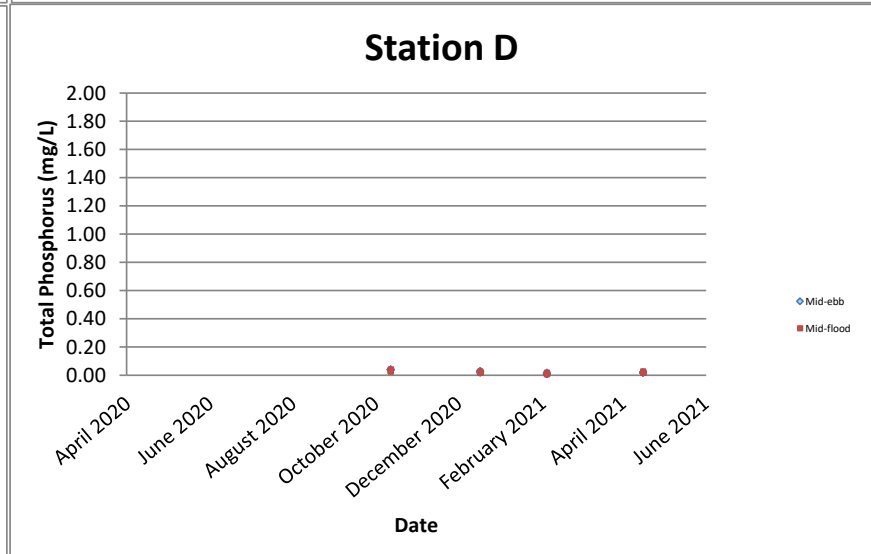
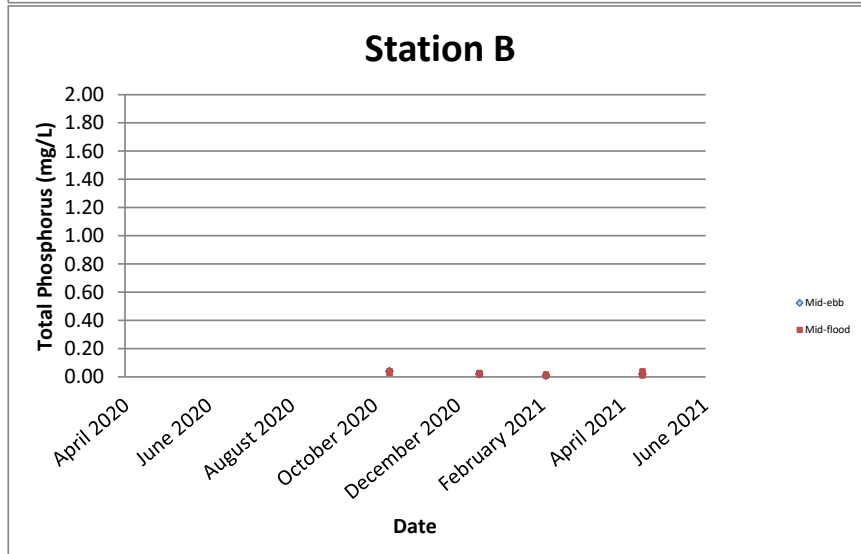
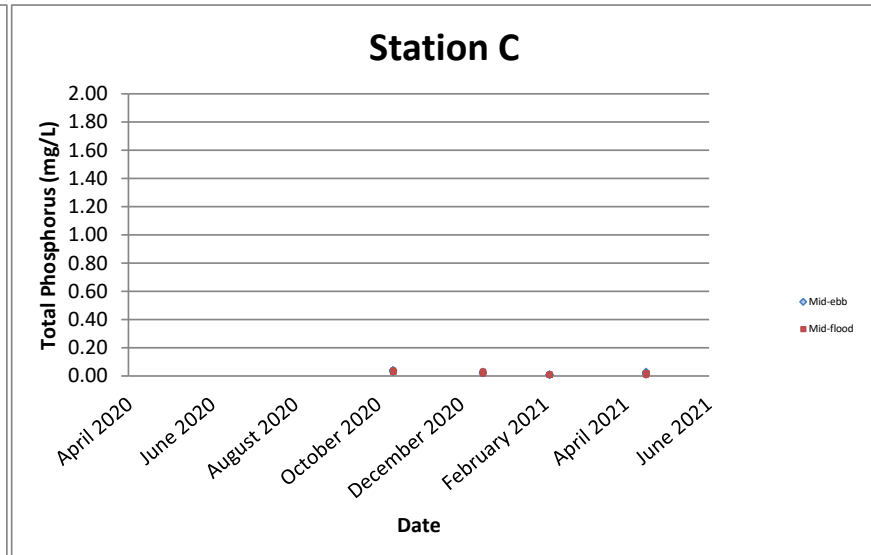
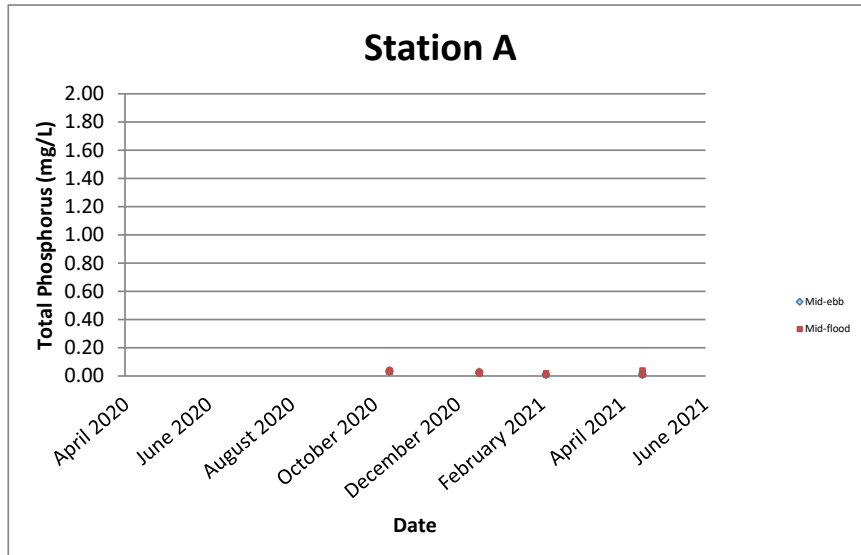
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.

E.coli (cfu/100mL)



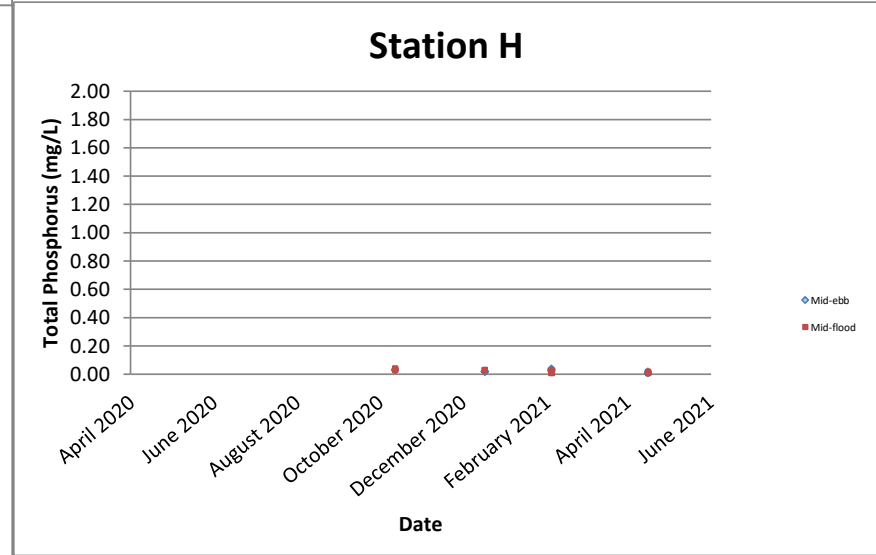
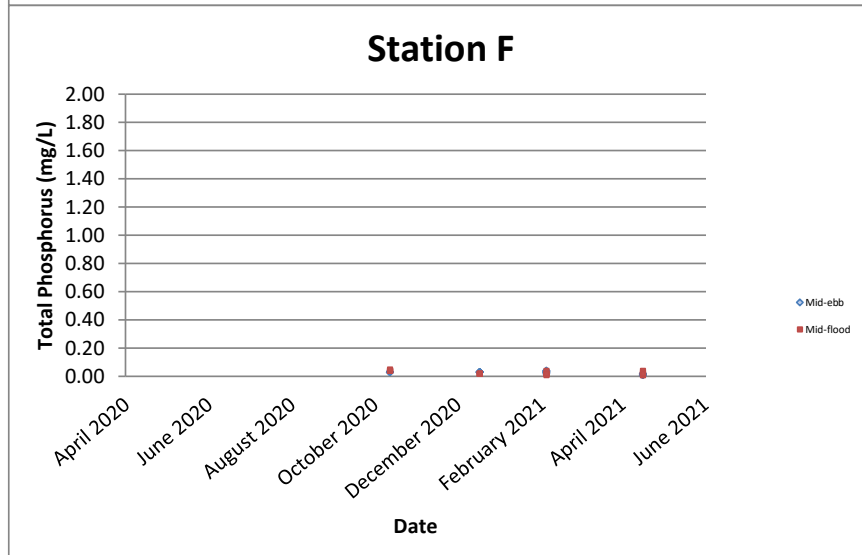
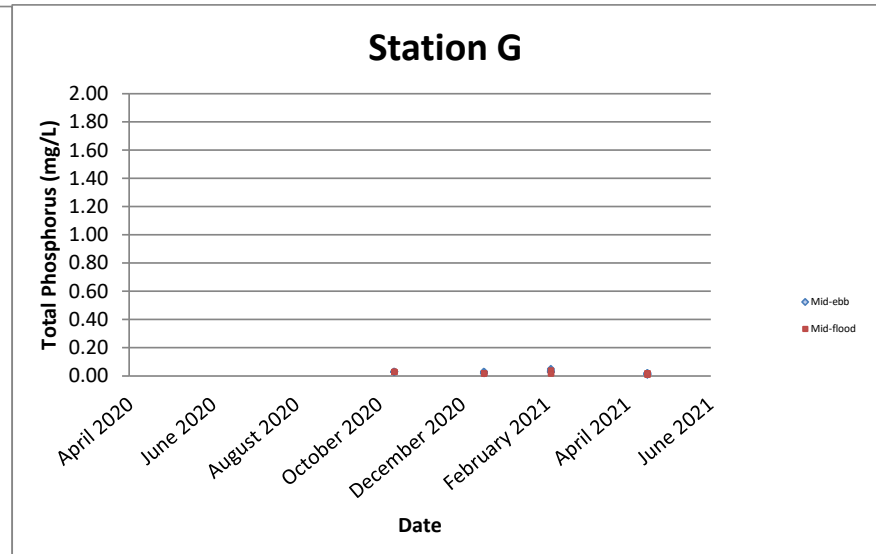
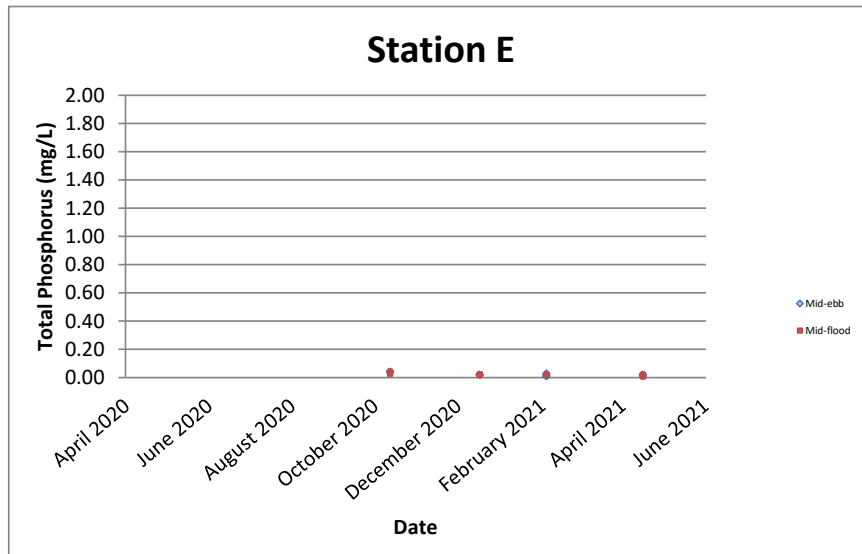
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.

Total Phosphorus (soluble and particulate) (mg/L)



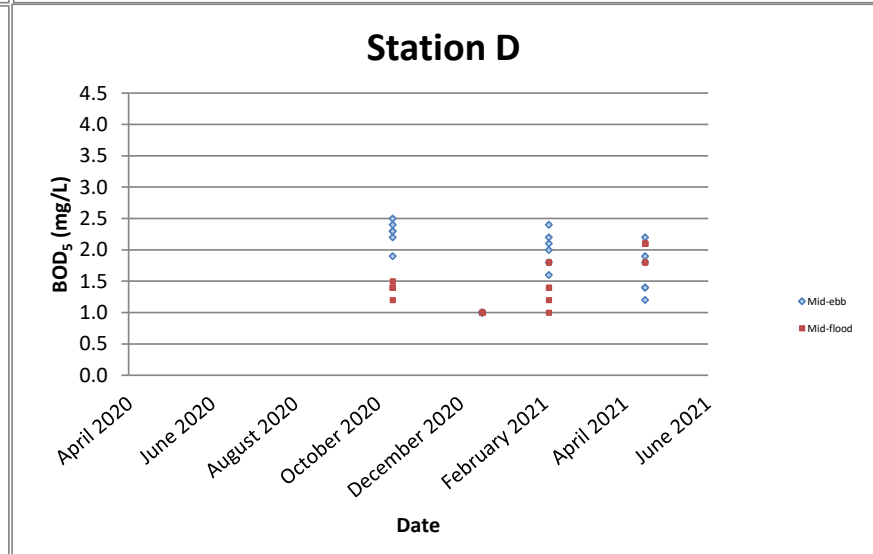
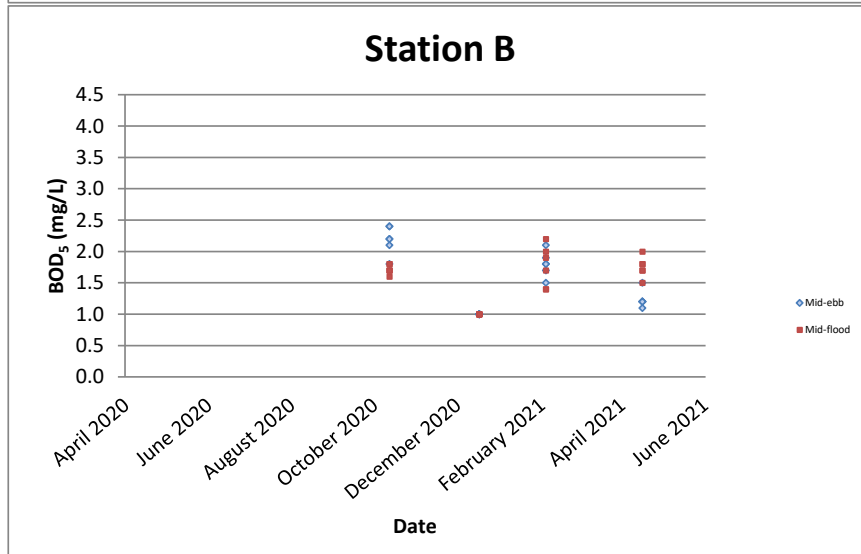
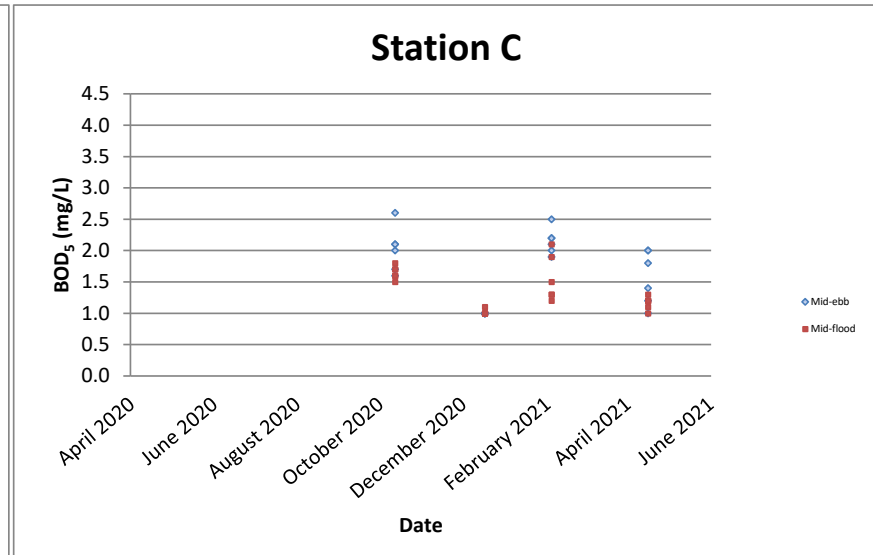
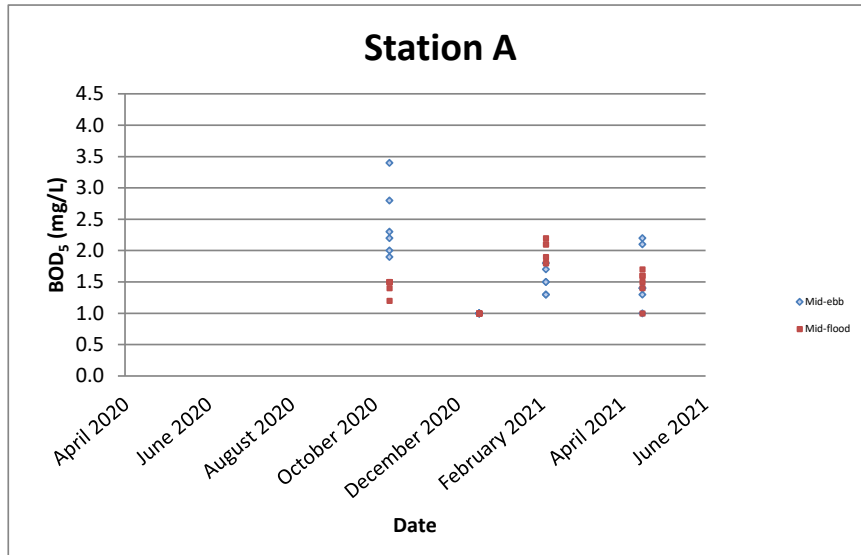
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.

Total Phosphorus (soluble and particulate) (mg/L)



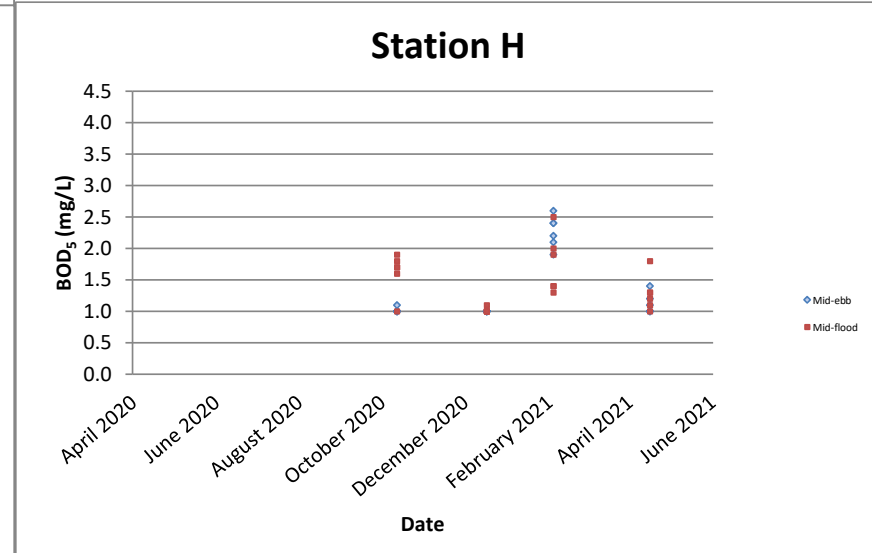
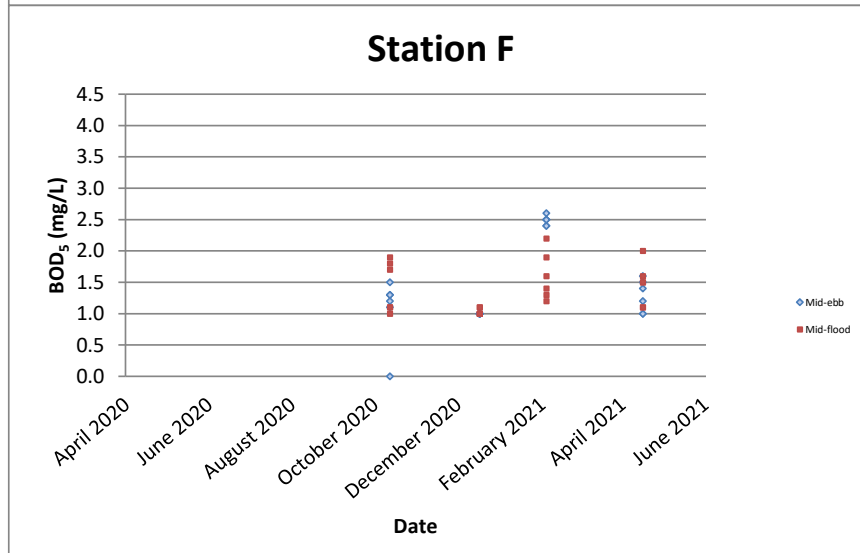
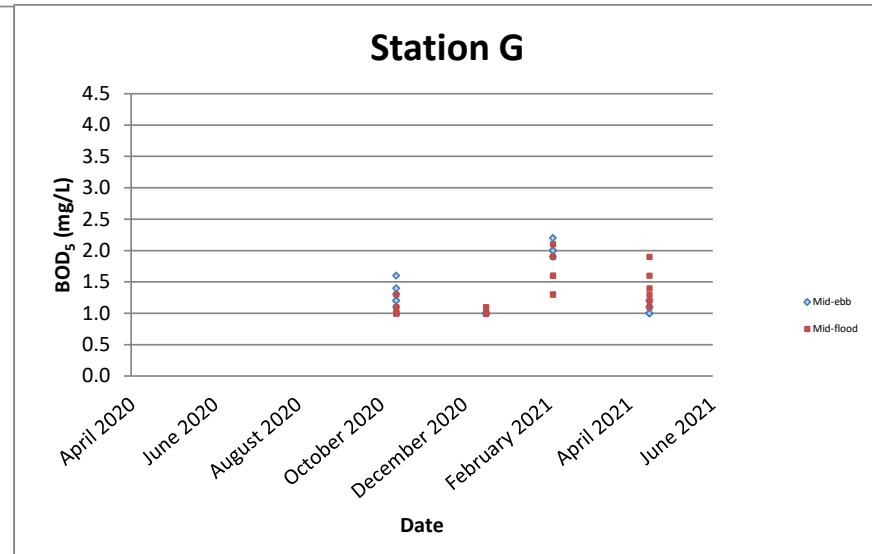
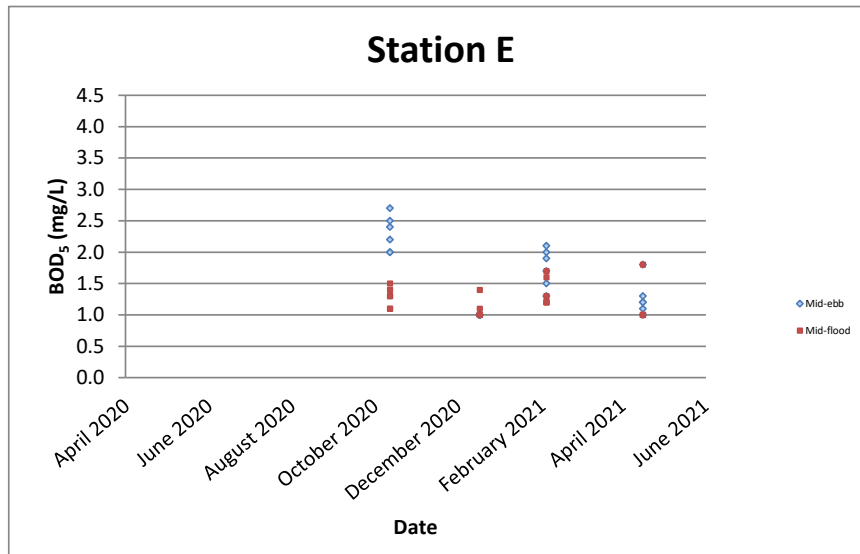
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.

BOD₅ (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD₅ is regarded as 1.0 mg/L in graphical presentation.

BOD₅ (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD₅ is regarded as 1.0 mg/L in graphical presentation.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix G

Tidal Data obtained from Ma Wan Marine Traffic Station

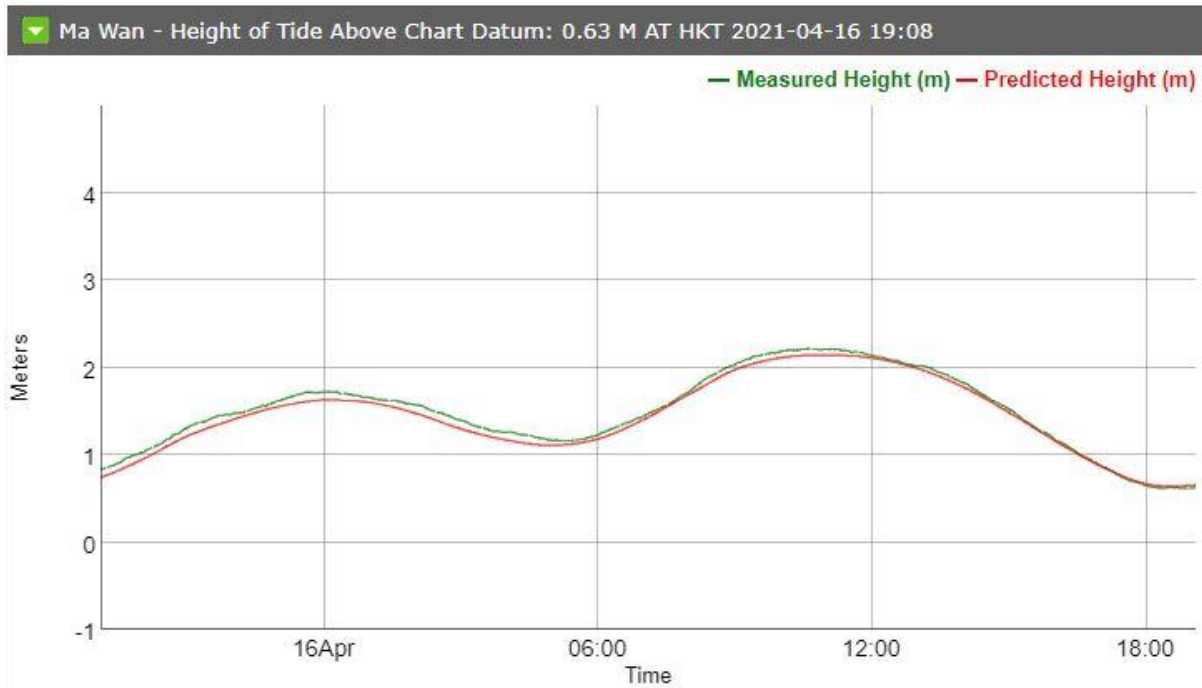
FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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Appendix H

Results and Graphical Presentation of Laboratory Analysis for Sediment Quality Monitoring and Benthic Survey

Monitoring Location	Date	Weather	Sea Condition	Time	Sediment Monitoring												
					pH	Ammonia as N (mg-N/kg)	Total Nitrogen (mg-N/kg)	Total Phosphorus (mg-P/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)	Arsenic (mg/kg)	Silver (mg/kg)
A	16/4/2021	Fine	Moderate	11:41	8.6	3.4	1270	459	<0.10	34.6	28.0	37.1	0.12	20.0	97.2	15.2	0.21
B	16/4/2021	Fine	Moderate	11:29	8.5	5.8	1970	526	0.11	39.5	37.8	39.5	0.12	23.4	106	12.7	0.34
C	16/4/2021	Fine	Moderate	11:11	8.6	2.3	1180	433	<0.10	35.8	29.6	37.6	0.11	21.9	97.7	10.6	0.25
D	16/4/2021	Fine	Moderate	11:00	8.5	3.2	1320	491	0.12	40.4	35.0	41.7	0.12	24.7	114	11.5	0.30
E	16/4/2021	Fine	Moderate	10:43	8.4	9.3	2050	615	<0.10	40.2	35.9	42.2	0.13	24.9	114	10.5	0.33
F	16/4/2021	Fine	Moderate	10:29	8.2	6.8	1880	654	0.10	46.3	41.2	47.6	0.16	28.9	130	11.9	0.38
G	16/4/2021	Fine	Moderate	10:10	8.4	6.6	1540	570	0.11	42.3	50.3	45.0	0.14	25.7	124	11.7	0.48
H	16/4/2021	Fine	Moderate	09:59	8.5	8.2	1500	548	0.13	47.1	48.3	49.4	0.14	29.0	149	13.6	0.55

Monitoring Location	Date	Weather	Sea Condition	Time	Benthic Survey				
					Total Organic Carbon (%)	Particle Size Distribution			
						Gravel (%)	Sand (%)	Silt (%)	Clay (%)
A	16/4/2021	Fine	Moderate	11:41	0.76	1	44	29	26
B	16/4/2021	Fine	Moderate	11:29	1.01	0	17	46	37
C	16/4/2021	Fine	Moderate	11:11	0.83	5	34	32	29
D	16/4/2021	Fine	Moderate	11:00	0.90	1	15	47	37
E	16/4/2021	Fine	Moderate	10:43	1.07	0	8	46	46
F	16/4/2021	Fine	Moderate	10:29	1.09	0	3	53	44
G	16/4/2021	Fine	Moderate	10:10	1.11	0	8	46	46
H	16/4/2021	Fine	Moderate	09:59	0.96	1	5	45	49





CERTIFICATE OF ANALYSIS

Client	: FUGRO TECHNICAL SERVICES LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: CYRUS LAI	Contact	: Richard Fung	Work Order	: HK2114410
Address	: ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: C.Lai@fugro.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3565 4374	Telephone	: +852 2610 1044		
Facsimile	: ---	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT	Date Samples Received	: 16-Apr-2021		
Order number	: 0041/17	Quote number	: HKE/1654/2017_R1	Issue Date	: 30-Apr-2021
C-O-C number	: ---			No. of samples received	: 24
Site	: ---			No. of samples analysed	: 24

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This document has been signed by those names that appear on this report and are the authorised signatories.

<u>Signatories</u>	<u>Position</u>	<u>Authorised results for</u>
		
Fung Lim Chee, Richard	Managing Director	Inorganics
		
Fung Lim Chee, Richard	Managing Director	Metals_ENV



General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 16-Apr-2021 to 30-Apr-2021.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2114410

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

Particle Size Distribution was subcontracted to and analysed by Gammon Construction Limited.

Due to matrix interference, sample(s) required dilution prior to metals analysis, LOR has been adjusted accordingly.

Sample digested by In-house method E-3005 prior to the determination of total metals. The In-house method is developed based on USEPA method 3005.

EA002SOIL - pH value is reported as at 25°C.

EK055S - Ammoniacal Nitrogen was determined on a 1:5 soil / 1M KCl solution extract.

EK059A - Nitrate and Nitrite were determined on a 1:5 soil / 1M KCl solution extract.

Sample(s) as received, digested by In-house method E-3051A prior to the determination of metals. The In-house method is developed based on USEPA method 3051A.

EA002SOIL - Soil sample(s) analysed on as air-dry weight basis. pH value determined and reported on a 1:5 soil / water extract.

EA002SOIL - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.

EK062A - Total Nitrogen is the sum of Total Oxidizable (NOx) and Total Kjeldahl Nitrogen.



Analytical Results

Sub-Matrix: SEDIMENT

				Sample ID	A/Sediment	B/Sediment	C/Sediment	D/Sediment	E/Sediment
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114410-001	HK2114410-002	HK2114410-003	HK2114410-004	HK2114410-005	
EA/ED: Physical and Aggregate Properties									
EA002SOIL: pH Value	----	0.1	pH Unit	8.6	8.5	8.6	8.5	8.4	
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	51.7	51.1	51.9	56.8	
ED/EK: Inorganic Nonmetallic Parameters									
EK055S: Ammonia as N	7664-41-7	0.5	mg/kg	3.4	5.8	2.3	3.2	9.3	
EK062A: Total Nitrogen as N	----	10	mg/kg	1270	1970	1180	1320	2050	
EK067A: Total Phosphorus as P	----	10	mg/kg	459	526	433	491	615	
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	0.5	mg/kg	15.2	12.7	10.6	11.5	10.5	
EG020: Cadmium	7440-43-9	0.10	mg/kg	<0.10	0.11	<0.10	0.12	<0.10	
EG020: Chromium	7440-47-3	0.5	mg/kg	34.6	39.5	35.8	40.4	40.2	
EG020: Copper	7440-50-8	0.20	mg/kg	28.0	37.8	29.6	35.0	35.9	
EG020: Lead	7439-92-1	0.20	mg/kg	37.1	39.5	37.6	41.7	42.2	
EG020: Mercury	7439-97-6	0.05	mg/kg	0.12	0.12	0.11	0.12	0.13	
EG020: Nickel	7440-02-0	0.20	mg/kg	20.0	23.4	21.9	24.7	24.9	
EG020: Silver	7440-22-4	0.10	mg/kg	0.21	0.34	0.25	0.30	0.33	
EG020: Zinc	7440-66-6	0.5	mg/kg	97.2	106	97.7	114	114	



Sub-Matrix: SEDIMENT				Sample ID	F/Sediment	G/Sediment	H/Sediment	A/Benthic Survey	B/Benthic Survey
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit	HK2114410-006	HK2114410-007	HK2114410-008	HK2114410-009	HK2114410-010	
EA/ED: Physical and Aggregate Properties									
EA002SOIL: pH Value	----	0.1	pH Unit	8.2	8.4	8.5	---	---	
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	61.5	57.4	57.1	42.9	57.3	
ED/EK: Inorganic Nonmetallic Parameters									
EK055S: Ammonia as N	7664-41-7	0.5	mg/kg	6.8	6.6	8.2	---	---	
EK062A: Total Nitrogen as N	----	10	mg/kg	1880	1540	1500	---	---	
EK067A: Total Phosphorus as P	----	10	mg/kg	654	570	548	---	---	
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	0.5	mg/kg	11.9	11.7	13.6	---	---	
EG020: Cadmium	7440-43-9	0.10	mg/kg	0.10	0.11	0.13	---	---	
EG020: Chromium	7440-47-3	0.5	mg/kg	46.3	42.3	47.1	---	---	
EG020: Copper	7440-50-8	0.20	mg/kg	41.2	50.3	48.3	---	---	
EG020: Lead	7439-92-1	0.20	mg/kg	47.6	45.0	49.4	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	0.16	0.14	0.14	---	---	
EG020: Nickel	7440-02-0	0.20	mg/kg	28.9	25.7	29.0	---	---	
EG020: Silver	7440-22-4	0.10	mg/kg	0.38	0.48	0.55	---	---	
EG020: Zinc	7440-66-6	0.5	mg/kg	130	124	149	---	---	
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	0.05	%	---	---	---	0.76	1.01	



Sub-Matrix: SEDIMENT				Sample ID	C/Benthic Survey	D/Benthic Survey	E/Benthic Survey	F/Benthic Survey	G/Benthic Survey
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021	16-Apr-2021
Compound	CAS Number	LOR	Unit		HK2114410-011	HK2114410-012	HK2114410-013	HK2114410-014	HK2114410-015
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		51.1	55.1	60.1	56.7	59.8
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	0.05	%		0.83	0.90	1.07	1.09	1.11



Sub-Matrix: SEDIMENT				Sample ID	H/Benthic Survey	---	---	---	---
				Sampling date / time	16-Apr-2021	---	---	---	---
Compound	CAS Number	LOR	Unit	HK2114410-016	---	---	---	---	---
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	56.9	---	---	---	---	---
EP: Aggregate Organics									
EP005: Total Organic Carbon	---	0.05	%	0.96	---	---	---	---	---



Sub-Matrix: WATER				Sample ID	F/Rinsate Blank	G/Rinsate Blank	H/Rinsate Blank	---	---
				Sampling date / time	16-Apr-2021	16-Apr-2021	16-Apr-2021	----	----
Compound	CAS Number	LOR	Unit	HK2114410-022	HK2114410-023	HK2114410-024	-----	-----	
EG: Metals and Major Cations - Total									
EG020: Arsenic	7440-38-2	10	µg/L	<100	<100	<100	---	---	
EG020: Cadmium	7440-43-9	0.2	µg/L	<2.0	<2.0	<2.0	---	---	
EG020: Chromium	7440-47-3	1	µg/L	<10	<10	<10	---	---	
EG020: Copper	7440-50-8	1	µg/L	<10	<10	<10	---	---	
EG020: Lead	7439-92-1	1	µg/L	<10	<10	<10	---	---	
EG020: Mercury	7439-97-6	0.5	µg/L	<5.0	<5.0	<5.0	---	---	
EG020: Nickel	7440-02-0	1	µg/L	<10	<10	<10	---	---	
EG020: Silver	7440-22-4	1	µg/L	<10	<10	<10	---	---	
EG020: Zinc	7440-66-6	10	µg/L	<100	<100	<100	---	---	



Laboratory Duplicate (DUP) Report

Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3628554)								
HK2114033-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	12.4	12.7	2.18
HK2114410-016	H/Benthic Survey	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	56.9	56.8	0.230
EA/ED: Physical and Aggregate Properties (QC Lot: 3628555)								
HK2115177-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	27.9	28.4	1.61
HK2114410-004	D/Sediment	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	51.9	51.3	1.24
EA/ED: Physical and Aggregate Properties (QC Lot: 3629236)								
HK2114410-001	A/Sediment	EA002SOIL: pH Value	----	0.1	pH Unit	8.6	8.6	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3644190)								
HK2114410-001	A/Sediment	EK067A: Total Phosphorus as P	----	10	mg/kg	459	427	7.28
EG: Metals and Major Cations (QC Lot: 3647715)								
HK2114410-002	B/Sediment	EG020: Cadmium	7440-43-9	0.01	mg/kg	0.11	<0.10	0.00
		EG020: Mercury	7439-97-6	0.02	mg/kg	0.12	0.13	0.00
		EG020: Copper	7440-50-8	0.05	mg/kg	37.8	38.0	0.375
		EG020: Lead	7439-92-1	0.05	mg/kg	39.5	39.2	0.891
		EG020: Nickel	7440-02-0	0.05	mg/kg	23.4	23.7	1.34
		EG020: Silver	7440-22-4	0.05	mg/kg	0.34	0.29	17.0
		EG020: Arsenic	7440-38-2	0.5	mg/kg	12.7	12.4	2.79
		EG020: Chromium	7440-47-3	0.5	mg/kg	39.5	39.6	0.00
EG020: Zinc	7440-66-6	0.5	mg/kg	106	107	0.646		
EP: Aggregate Organics (QC Lot: 3639994)								
HK2114410-009	A/Benthic Survey	EP005: Total Organic Carbon	----	0.05	%	0.76	0.75	1.77

Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Total (QC Lot: 3628652)								
HK2114410-018	B/Rinsate Blank	EG020: Cadmium	7440-43-9	0.2	µg/L	<2.0	<2.0	0.00
		EG020: Mercury	7439-97-6	0.5	µg/L	<5.0	<5.0	0.00
		EG020: Arsenic	7440-38-2	1	µg/L	<100	<100	0.00
		EG020: Chromium	7440-47-3	1	µg/L	<10	<10	0.00
		EG020: Copper	7440-50-8	1	µg/L	<10	<10	0.00



Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Total (QC Lot: 3628652) - Continued								
HK2114410-018	B/Rinsate Blank	EG020: Lead	7439-92-1	1	µg/L	<10	<10	0.00
		EG020: Nickel	7440-02-0	1	µg/L	<10	<10	0.00
		EG020: Silver	7440-22-4	1	µg/L	<10	<10	0.00
		EG020: Zinc	7440-66-6	10	µg/L	<100	<100	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3629235)												
EK055S: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	98.3	----	85.8	109	----	----	
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3644190)												
EK067A: Total Phosphorus as P	----	10	mg/kg	<10	512 mg/kg	109	----	85.0	115	----	----	
EG: Metals and Major Cations (QC Lot: 3647715)												
EG020: Arsenic	7440-38-2	0.5	mg/kg	<0.5	5 mg/kg	94.8	----	82.8	110	----	----	
EG020: Cadmium	7440-43-9	0.01	mg/kg	<0.01	0.5 mg/kg	98.0	----	78.7	110	----	----	
EG020: Chromium	7440-47-3	0.5	mg/kg	<0.5	5 mg/kg	103	----	84.3	111	----	----	
EG020: Copper	7440-50-8	0.05	mg/kg	<0.05	5 mg/kg	103	----	89.4	115	----	----	
EG020: Lead	7439-92-1	0.05	mg/kg	<0.05	5 mg/kg	101	----	87.8	112	----	----	
EG020: Mercury	7439-97-6	0.02	mg/kg	<0.02	0.1 mg/kg	107	----	76.8	115	----	----	
EG020: Nickel	7440-02-0	0.05	mg/kg	<0.05	5 mg/kg	102	----	86.8	111	----	----	
EG020: Silver	7440-22-4	0.05	mg/kg	<0.05	5 mg/kg	98.4	----	80.6	110	----	----	
EG020: Zinc	7440-66-6	0.5	mg/kg	<0.5	5 mg/kg	109	----	80.7	115	----	----	
EP: Aggregate Organics (QC Lot: 3639994)												
EP005: Total Organic Carbon	----	0.05	%	<0.05	40 %	102	----	89.8	107	----	----	

Matrix: WATER				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
EG: Metals and Major Cations - Total (QC Lot: 3628652)												



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 3628652) - Continued											
EG020: Arsenic	7440-38-2	1	µg/L	<1	50 µg/L	97.9	----	85.0	110	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	5 µg/L	106	----	85.0	109	----	----
EG020: Chromium	7440-47-3	1	µg/L	<1	50 µg/L	100	----	86.0	111	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	50 µg/L	105	----	90.0	111	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	50 µg/L	100	----	89.0	111	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	102	----	85.0	115	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	50 µg/L	102	----	87.0	110	----	----
EG020: Silver	7440-22-4	1	µg/L	<1	50 µg/L	87.4	----	85.0	114	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	50 µg/L	111	----	86.0	114	----	----



Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3644190)										
HK2114410-001	A/Sediment	EK067A: Total Phosphorus as P	----	129 mg/kg	81.9	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 3647715)										
HK2114410-001	A/Sediment	EG020: Arsenic	7440-38-2	5 mg/kg	124	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	102	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	124	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	99.8	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	97.0	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	122	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	111	----	75.0	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	100	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 3639994)										
HK2114410-009	A/Benthic Survey	EP005: Total Organic Carbon	----	0.51141 %	103	----	75.0	125	----	----
Matrix: WATER					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 3628652)										
HK2114410-017	A/Rinsate Blank	EG020: Arsenic	7440-38-2	50 µg/L	103	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	5 µg/L	104	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	50 µg/L	96.8	----	75.0	125	----	----
		EG020: Copper	7440-50-8	50 µg/L	92.3	----	75.0	125	----	----
		EG020: Lead	7439-92-1	50 µg/L	94.6	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	2 µg/L	121	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	50 µg/L	92.2	----	75.0	125	----	----
		EG020: Silver	7440-22-4	50 µg/L	99.0	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	50 µg/L	95.6	----	75.0	125	----	----





ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: CYRUS LAI	WORK ORDER	: HK2114410
CLIENT	: FUGRO TECHNICAL SERVICES LIMITED		
ADDRESS	: ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 16-APR-2021
		DATE OF ISSUE	: 27-APR-2021
PROJECT	: CONTRACT NO. CM 14/2016	NO. OF SAMPLES	: 24
	ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT	CLIENT ORDER	: 0041/17

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.
- Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.
- Particle Size Distribution was subcontracted to and analysed by Gammon Construction Limited.
- Sample digested by In-house method E-3005 prior to the determination of total metals. The In-house method is developed based on USEPA method 3005.
- EA002SOIL - pH value is reported as at 25°C.
- EK055S - Ammoniacal Nitrogen was determined on a 1:5 soil / 1M KCl solution extract.
- EK059A - Nitrate and Nitrite were determined on a 1:5 soil / 1M KCl solution extract.
- Sample(s) as received, digested by In-house method E-3051A prior to the determination of metals. The In-house method is developed based on USEPA method 3051A.
- EA002SOIL - Soil sample(s) analysed on as air-dry weight basis. pH value determined and reported on a 1:5 soil / water extract.
- EA002SOIL - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.
- EK062A - Total Nitrogen is the sum of Total Oxidizable (NOx) and Total Kjeldahl Nitrogen.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

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

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

11/F, Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK2114410
 SUB-BATCH : 1
 CLIENT : FUGRO TECHNICAL SERVICES LIMITED
 PROJECT : CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL
 ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE
 TREATMENT PLANT



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2114410-001	A/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-002	B/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-003	C/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-004	D/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-005	E/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-006	F/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-007	G/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-008	H/Sediment	SEDIMENT	16-Apr-2021	
HK2114410-009	A/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-010	B/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-011	C/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-012	D/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-013	E/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-014	F/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-015	G/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-016	H/Benthic Survey	SEDIMENT	16-Apr-2021	J2999-365.4
HK2114410-017	A/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-018	B/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-019	C/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-020	D/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-021	E/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-022	F/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-023	G/Rinsate Blank	WATER	16-Apr-2021	
HK2114410-024	H/Rinsate Blank	WATER	16-Apr-2021	

**TEST CERTIFICATE
SUMMARY OF SOIL CLASSIFICATION TEST RESULT
GEOSPEC 3 : 2001**

Report No : J2999-365.4

Works Order No. : 365

Job No. : J2999

Customer : ALS Technichem (HK) Pty Ltd

Date : 19/04/2021

Contract No. :

Project : -

Sample ID No.	Sample		Δ Moisture Content (%)	Test 6.1 Liquid Limit (%)	Test 6.1 Plastic Limit (%)	Test 6.1 Plastic Index (%)	Test 6.2 Liquidity Index	Passing 425µm Sieve (%)	Preparation Method	Particle Size Distribution				Sample Origin		
	No.	Type								Depth (m)	# Test Method	Gravel (%)	Sand (%)		Silt (%)	Clay (%)
HK2114410-009	A/Benthic Survey	D								1,5,7	1	44	29	26	Dark grey, sandy SILT/CLAY with shell fragments	- ‡
HK2114410-010	B/Benthic Survey	D								1,5,7	0	17	46	37	Dark grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2114410-011	C/Benthic Survey	D								1,5,7	5	34	32	29	Dark grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2114410-012	D/Benthic Survey	D								1,5,7	1	15	47	37	Dark grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2114410-013	E/Benthic Survey	D								1,5,7	0	8	46	46	Dark grey, slightly sandy SILT/CLAY	- ‡

Legend : Δ = Test Method in accordance with GEOSPEC 3 : 2001 Test 5.1 Moisture Content at 45°C ± 5°C (A), Test 5.2 Moisture Content at 105°C ± 5°C (B), Test 5.3 Comparative Moisture Content 45/105°C ± 5°C (C)
= Test Method in accordance with GEOSPEC3 : 2001 Test 8.1 (1), 8.2 (2), 8.3 (3), 8.4 (4), 8.5 (5), 8.6 (6), 8.7 (7).

Symbols : U - Undisturbed Sample; LB - Large Disturbed Sample; BLK - Block Sample; SPTL - SPT Split-Barrel Sample; P - Piston Sample; M - Mazier Sample; D - Small Disturbed Sample; PT - Portable triple tube Sample; N.P. - Non Plastic; A.R. - As Received; H.P. - Hand Picked; * - Moisture Content for A.L. Test; A.D. - Air Dried; O.D. - Oven Dried; W.S. - Wet Sieved; Sampling History - Refer the Individual Test Report; Estimated Uncertainty - Refer the Individual Test Report. ‡ - Information provided by customer.

Notes: IS - Insufficient Sample; TF - To Follow on supplementary Report.

Checked by: T K Lam Approved By: Date: 26/04/2021

Chung Hei Wing
Quality Manager

HOKLAS has accredited this laboratory (Reg. No. HOKLAS 055) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. This report shall not be reproduced unless with prior written approval from this laboratory.

Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel: 26991980, Fax: 26917547

**TEST CERTIFICATE
SUMMARY OF SOIL CLASSIFICATION TEST RESULT
GEOSPEC 3 : 2001**

Report No : J2999-365.4

Customer : ALS Technichem (HK) Pty Ltd

Job No. : J2999

Works Order No. : 365

Project : -

Contract No.:

Date : 19/04/2021

Sample ID No.	Sample		Δ Moisture Content (%)	Test 6.1 Liquid Limit (%)	Test 6.1 Plastic Limit (%)	Test 6.1 Plasticity Index (%)	Test 6.2 Liquidity Index	Passing 425µm Test Sieve (%)	Preparation Method	Particle Size Distribution			Description	Sample Origin		
	No.	Type								Depth (m)	# Test Method	Gravel (%)			Sand (%)	Silt Clay (%)
HK2114410-014	F/Benthic Survey	D								1,5,7	0	3	53	44	Dark grey, SILT/CLAY with shell fragments	- ‡
HK2114410-015	G/Benthic Survey	D								1,5,7	0	8	46	46	Dark grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2114410-016	H/Benthic Survey	D								1,5,7	1	5	45	49	Dark grey, slightly sandy SILT/CLAY with shell fragments	- ‡

Legend : Δ = Test Method in accordance with GEOSPEC 3 : 2001 Test 5.1 Moisture Content at 45°C ± 5°C (A), Test 5.2 Moisture Content at 105°C ± 5°C (B), Test 5.3 Comparative Moisture Content 45/105°C ± 5°C (C)
= Test Method in accordance with GEOSPEC 3 : 2001 Test 8.1 (1), 8.2 (2), 8.3 (3), 8.4 (4), 8.5 (5), 8.6 (6), 8.7 (7).

Symbols : U - Undisturbed Sample; LB - Large Disturbed Sample; BLK - Block Sample; SPTL - SPT Split-Barrel Sample; IS - Insufficient Sample; TF - To Follow on supplementary Report.

Notes : P - Piston Sample; M - Mazier Sample; D - Small Disturbed Sample; PT - Portable triple tube Sample; N.P. - Non Plastic; A.R. - As Received; H.P. - Hand Picked; - Moisture Content for A.L. Test. A.D. - Air Dried; O.D. - Oven Dried; W.S. - Wet Sieved; Sampling History - Refer the Individual Test Report; Estimated Uncertainty ‡ - Information provided by customer.

Checked by : T K Lam
Approved By :
Quality Manager
Date : 26/04/2021

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Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel.: 26991980, Fax: 26917547

TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

Job No. : J2999 Contract No. :
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

Works Order No. : 365
 Sample ID No. : HK2114410-009
 Sample No. : A/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, sandy SILT/CLAY with shell fragments

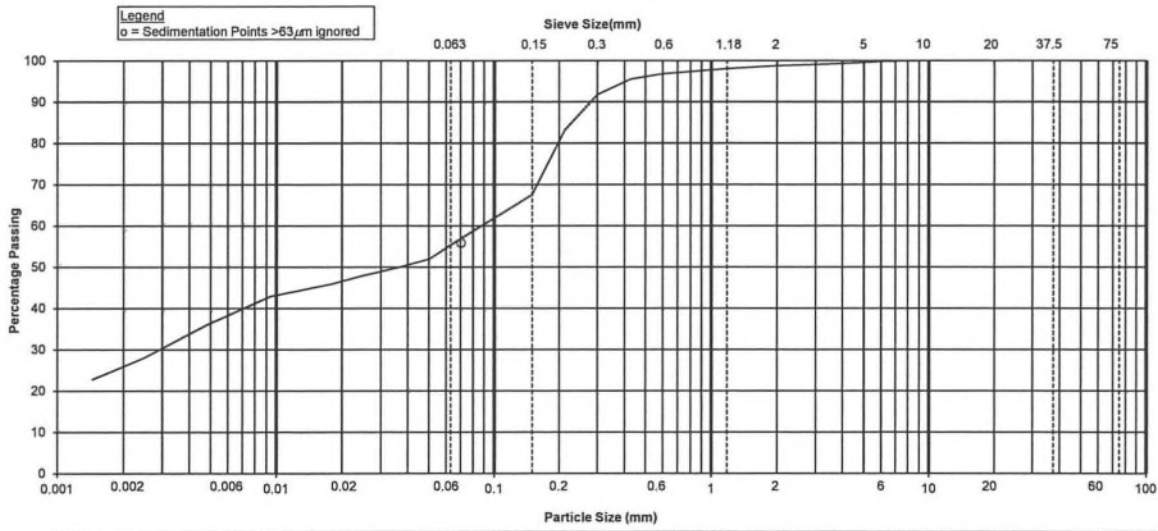
Sieve Method : Method A

[^] Upon request

^{*} Delete as appropriate

[‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) : 2.65 #	Dispersant Details : Sodium hexametaphosphate, Sodium carbonate		
100.0 mm	100	-	-	Sampling History : As received			
75.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
63.0 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
50.0 mm	100	-	-	0.0705	-	56	-
37.5 mm	100	-	-	0.0505	-	52	-
28.0 mm	100	-	-	0.0359	-	50	-
20.0 mm	100	-	-	0.0255	-	48	-
14.0 mm	100	-	-	0.0182	-	46	-
10.0 mm	100	-	-	0.0095	-	43	-
6.30 mm	100	-	-	0.0048	-	36	-
5.00 mm	100	-	-	0.0025	-	28	-
3.35 mm	99	-	-	0.0014	-	23	-
2.00 mm	99	-	-	SUMMARY :			
1.18 mm	98	-	-	Gravel (%)	:	1	
600 µm	97	-	-	Sand (%)	:	44	
425 µm	95	-	-	Silt (%)	:	29	
300 µm	92	-	-	Clay (%)	:	26	
212 µm	83	-	-				
150 µm	68	-	-				
63 µm	55	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Technician : C M Yip
 Date : 19/04/2021

Checked By : T K Lam
 Name : T K Lam
 Date : 24/04/2021

Approved By : Chung Hei Wing
 Signatory : Chung Hei Wing
 Date : 24/04/2021

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Form : GESR003.5 / Sept.14.18 / Issue 1 / Rev 3

TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Job No. : J2999
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

Contract No. :

Report No. : J2999-365.4

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Works Order No. : 365
 Sample ID No. : HK2114410-010
 Sample No. : B/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Description : Dark grey, slightly sandy SILT/CLAY with shell fragments

Sieve Method : Method A

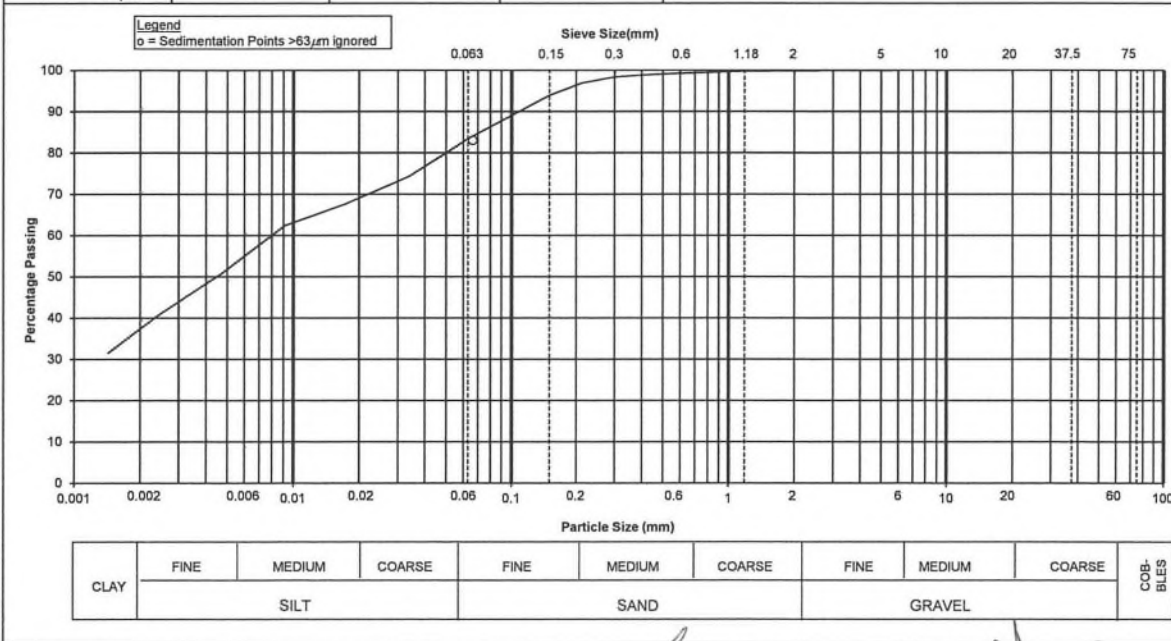
[^] Upon request

^{*} Delete as appropriate

[‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
100.0 mm	100	-	-				
75.0 mm	100	-	-				
63.0 mm	100	-	-				
50.0 mm	100	-	-				
37.5 mm	100	-	-				
28.0 mm	100	-	-				
20.0 mm	100	-	-	0.0664	-	83	-
14.0 mm	100	-	-	0.0475	-	79	-
10.0 mm	100	-	-	0.0341	-	74	-
6.30 mm	100	-	-	0.0243	-	71	-
5.00 mm	100	-	-	0.0174	-	68	-
3.35 mm	100	-	-	0.0091	-	62	-
2.00 mm	100	-	-	0.0047	-	51	-
1.18 mm	100	-	-	0.0024	-	41	-
600 µm	99	-	-	0.0014	-	31	-
425 µm	99	-	-				
300 µm	98	-	-				
212 µm	97	-	-				
150 µm	94	-	-				
63 µm	83	-	-				
0 µm	0	-	-				

SEDIMENTATION ANALYSIS			
Specific Gravity (# if assumed) :	2.65 #		
Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
Sampling History :	As received		
The presence of any visible organic matter in the soil : None			
SUMMARY :			
Gravel (%) :	0		
Sand (%) :	17		
Silt (%) :	46		
Clay (%) :	37		



Technician : C M Yip

Checked By : T K Lam

Approved By : Chung Hei Wing

Date : 19/04/2021

Date : 24/04/2021

Date : 24/04/2021

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**TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)**

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Report No. : J2999-365.4

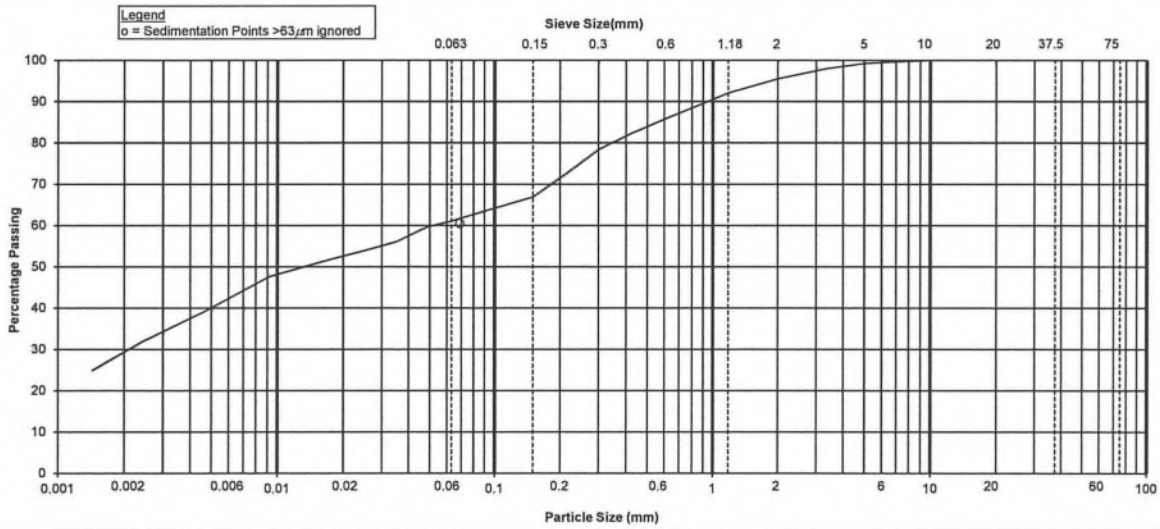
Date Received : 19/04/2021
Tested Date : 19/04/2021

Works Order No. : 365
Sample ID No. : HK2114410-011
Sample No. : C/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -[‡]

Description : Dark grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A [^] Upon request * Delete as appropriate

[‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0690	-	61	-
20.0 mm	100	-	-	0.0489	-	60	-
14.0 mm	100	-	-	0.0350	-	56	-
10.0 mm	100	-	-	0.0249	-	54	-
6.30 mm	100	-	-	0.0177	-	52	-
5.00 mm	99	-	-	0.0093	-	48	-
3.35 mm	98	-	-	0.0048	-	39	-
2.00 mm	95	-	-	0.0024	-	32	-
1.18 mm	92	-	-	0.0014	-	25	-
600 µm	86	-	-	SUMMARY :			
425 µm	82	-	-	Gravel (%) :	5		
300 µm	78	-	-	Sand (%) :	34		
212 µm	72	-	-	Silt (%) :	32		
150 µm	67	-	-	Clay (%) :	29		
63 µm	61	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Technician : C M Yip Checked By : T K Lam Approved By : Chung Hei Wing
Date : 19/04/2021 Date : 24/04/2021 Date : 24/04/2021

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Form : GESR003.5 / Sept.14.18 / Issue 1 / Rev 3

TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

 Job No. : J2999
 Contract No. :
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

 Works Order No. : 365
 Sample ID No. : HK2114410-012
 Sample No. : D/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

 Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, slightly sandy SILT/CLAY with shell fragments

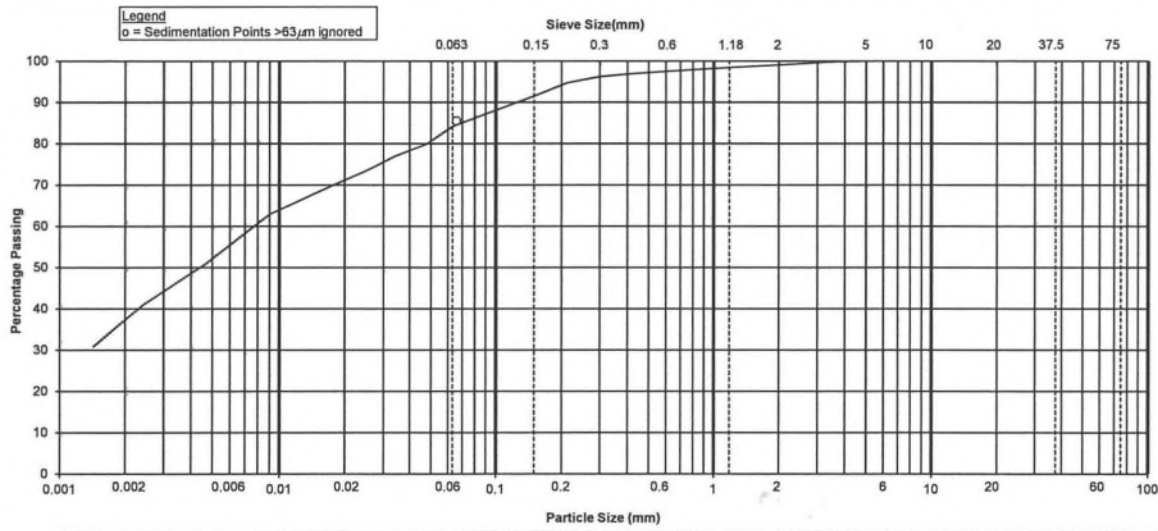
Sieve Method : Method A

[^] Upon request

* Delete as appropriate

[‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0658	-	86	-
20.0 mm	100	-	-	0.0474	-	80	-
14.0 mm	100	-	-	0.0338	-	77	-
10.0 mm	100	-	-	0.0242	-	73	-
6.30 mm	100	-	-	0.0173	-	70	-
5.00 mm	100	-	-	0.0091	-	63	-
3.35 mm	100	-	-	0.0047	-	51	-
2.00 mm	99	-	-	0.0024	-	41	-
1.18 mm	98	-	-	0.0014	-	31	-
600 µm	98	-	-	SUMMARY :			
425 µm	97	-	-	Gravel (%) :	1		
300 µm	96	-	-	Sand (%) :	15		
212 µm	95	-	-	Silt (%) :	47		
150 µm	92	-	-	Clay (%) :	37		
63 µm	84	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COB-BLES
	SILT			SAND			GRAVEL			

Technician : C M Yip

 Checked By : T K Lam
 Name : T K Lam
 Date : 24/04/2021

 Approved By : Chung Hei Wing
 Signatory : Chung Hei Wing
 Date : 24/04/2021

Date : 19/04/2021

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TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

Job No. : J2999 Contract No. :
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

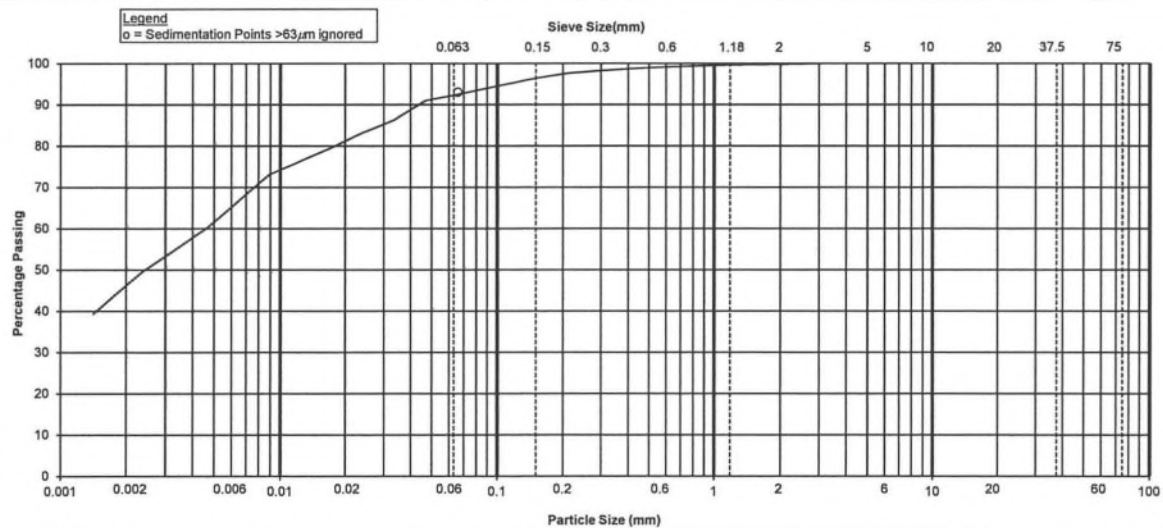
Works Order No. : 365
 Sample ID No. : HK2114410-013
 Sample No. : E/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, slightly sandy SILT/CLAY

Sieve Method : Method A [^] Upon request * Delete as appropriate [‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0658	-	93	-
20.0 mm	100	-	-	0.0468	-	91	-
14.0 mm	100	-	-	0.0336	-	86	-
10.0 mm	100	-	-	0.0239	-	83	-
6.30 mm	100	-	-	0.0171	-	79	-
5.00 mm	100	-	-	0.0090	-	73	-
3.35 mm	100	-	-	0.0046	-	60	-
2.00 mm	100	-	-	0.0024	-	50	-
1.18 mm	100	-	-	0.0014	-	39	-
600 µm	99	-	-	SUMMARY :			
425 µm	99	-	-	Gravel (%) :	0		
300 µm	98	-	-	Sand (%) :	8		
212 µm	98	-	-	Silt (%) :	46		
150 µm	96	-	-	Clay (%) :	46		
63 µm	92	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COB- BLES
	SILT			SAND			GRAVEL			

Technician : C M Yip

Checked By : T K Lam
 Name : T K Lam
 Date : 24/04/2021

Approved By : Chung Hei Wing
 Signatory : Chung Hei Wing
 Date : 24/04/2021

Date : 19/04/2021

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TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

Job No. : J2999
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

Contract No. :

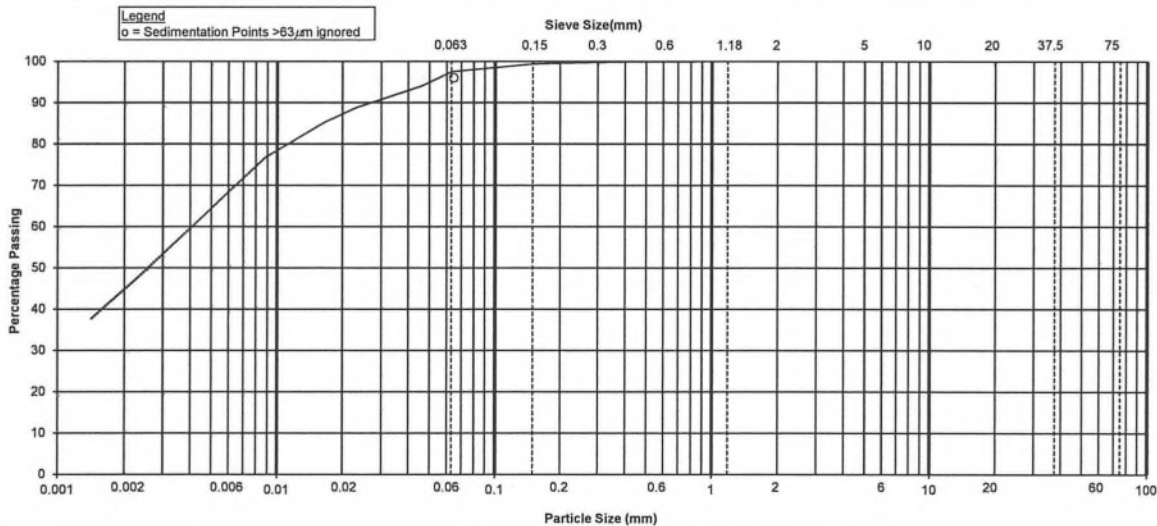
Works Order No. : 365
 Sample ID No. : HK2114410-014
 Sample No. : F/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, SILT/CLAY with shell fragments

Sieve Method : Method A [^] Upon request * Delete as appropriate [‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0647	-	96	-
20.0 mm	100	-	-	0.0460	-	94	-
14.0 mm	100	-	-	0.0328	-	91	-
10.0 mm	100	-	-	0.0234	-	89	-
6.30 mm	100	-	-	0.0167	-	85	-
5.00 mm	100	-	-	0.0088	-	77	-
3.35 mm	100	-	-	0.0046	-	63	-
2.00 mm	100	-	-	0.0024	-	48	-
1.18 mm	100	-	-	0.0014	-	38	-
600 µm	100	-	-	SUMMARY :			
425 µm	100	-	-	Gravel (%) :	0		
300 µm	100	-	-	Sand (%) :	3		
212 µm	100	-	-	Silt (%) :	53		
150 µm	99	-	-	Clay (%) :	44		
63 µm	97	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Technician : C M Yip

Checked By : T K Lam
 Name : T K Lam
 Date : 24/04/2021

Approved By : Chung Hei Wing
 Signatory : Chung Hei Wing
 Date : 24/04/2021

Date : 19/04/2021

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TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

Job No. : J2999
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

Contract No. :

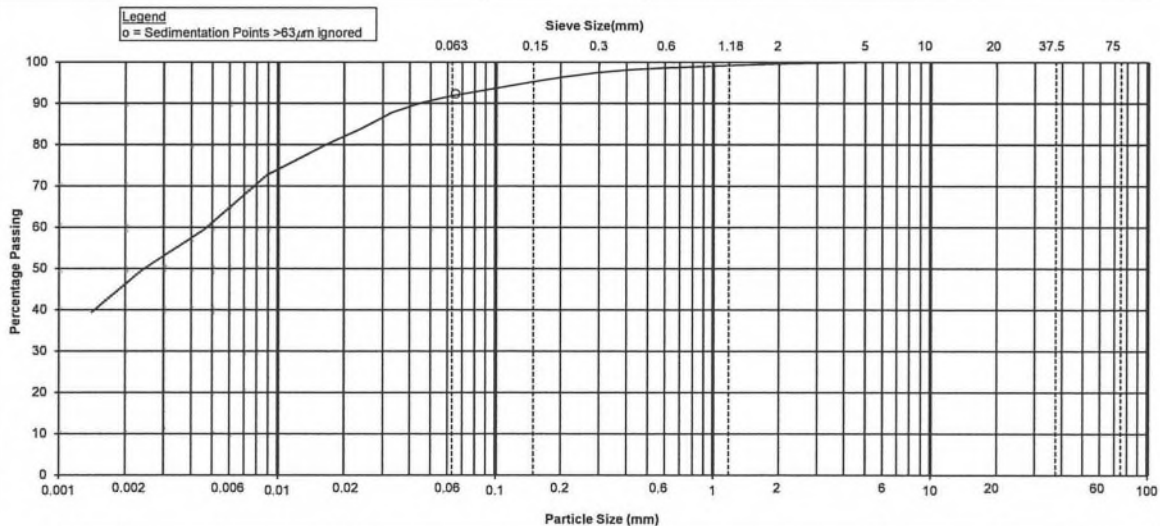
Works Order No. : 365
 Sample ID No. : HK2114410-015
 Sample No. : G/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, slightly sandy SILT/CLAY with shell fragments

Sieve Method : Method A ^ Upon request * Delete as appropriate ‡ Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	^Expanded Uncertainty of the Percent Passing (%)	^Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	^Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	^Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0653	-	92	-
20.0 mm	100	-	-	0.0465	-	90	-
14.0 mm	100	-	-	0.0331	-	88	-
10.0 mm	100	-	-	0.0237	-	84	-
6.30 mm	100	-	-	0.0169	-	80	-
5.00 mm	100	-	-	0.0089	-	73	-
3.35 mm	100	-	-	0.0046	-	60	-
2.00 mm	100	-	-	0.0024	-	49	-
1.18 mm	99	-	-	0.0014	-	39	-
600 µm	99	-	-	SUMMARY :			
425 µm	98	-	-	Gravel (%) :	0		
300 µm	97	-	-	Sand (%) :	8		
212 µm	97	-	-	Silt (%) :	46		
150 µm	95	-	-	Clay (%) :	46		
63 µm	92	-	-				
0 µm	0	-	-				



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COB- BLES
	SILT			SAND			GRAVEL			

Technician : C M Yip

Checked By : T K Lam
 Name : T K Lam
 Date : 24/04/2021

Approved By : Chung Hei Wing
 Signatory : Chung Hei Wing
 Date : 24/04/2021

Date : 19/04/2021

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TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / 8.2*, 8.5 / 8.6* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-365.4

Job No. : J2999 Contract No. :
 Customer : ALS Technichem (HK) Pty Ltd
 Project : -

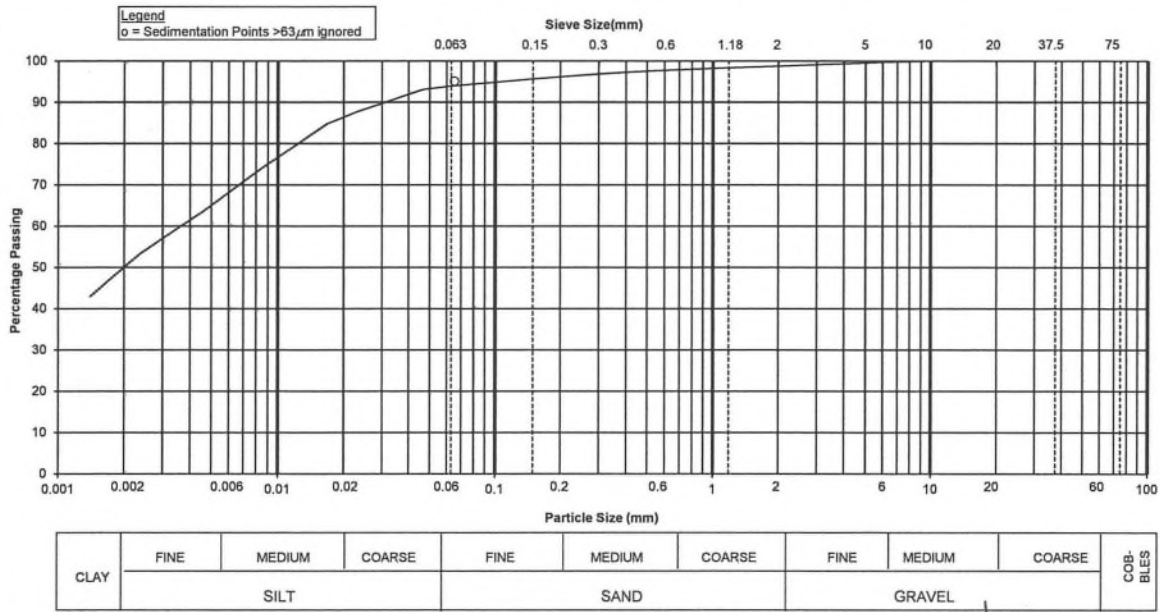
Works Order No. : 365
 Sample ID No. : HK2114410-016
 Sample No. : H/Benthic Survey
 Sample Depth (m) :
 Specimen Depth (m) :
 Sample Type : Small Disturbed
 Sample Origin : -[‡]

Date Received : 19/04/2021
 Tested Date : 19/04/2021

Description : Dark grey, slightly sandy SILT/CLAY with shell fragments

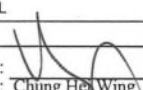
Sieve Method : Method A [^] Upon request * Delete as appropriate [‡] Information provided by customer

SIEVE ANALYSIS				SEDIMENTATION ANALYSIS			
Sieve Size	Percent Passing (%)	[^] Expanded Uncertainty of the Percent Passing (%)	[^] Cumulative Percent Passing with Expanded Uncertainty (%)	Specific Gravity (# if assumed) :			
100.0 mm	100	-	-	2.65 #			
75.0 mm	100	-	-	Dispersant Details :	Sodium hexametaphosphate, Sodium carbonate		
63.0 mm	100	-	-	Sampling History :	As received		
50.0 mm	100	-	-	The presence of any visible organic matter in the soil : None			
37.5 mm	100	-	-	Particle Diameter (mm)	[^] Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	[^] Expanded Uncertainty of % finer than D (%)
28.0 mm	100	-	-	0.0653	-	95	-
20.0 mm	100	-	-	0.0464	-	93	-
14.0 mm	100	-	-	0.0331	-	90	-
10.0 mm	100	-	-	0.0236	-	88	-
6.30 mm	100	-	-	0.0168	-	85	-
5.00 mm	100	-	-	0.0089	-	75	-
3.35 mm	99	-	-	0.0046	-	64	-
2.00 mm	99	-	-	0.0024	-	53	-
1.18 mm	98	-	-	0.0014	-	43	-
600 µm	98	-	-	SUMMARY : Gravel (%) : 1 Sand (%) : 5 Silt (%) : 45 Clay (%) : 49			
425 µm	97	-	-				
300 µm	97	-	-				
212 µm	96	-	-				
150 µm	96	-	-				
63 µm	94	-	-				
0 µm	0	-	-				



Technician : C M Yip

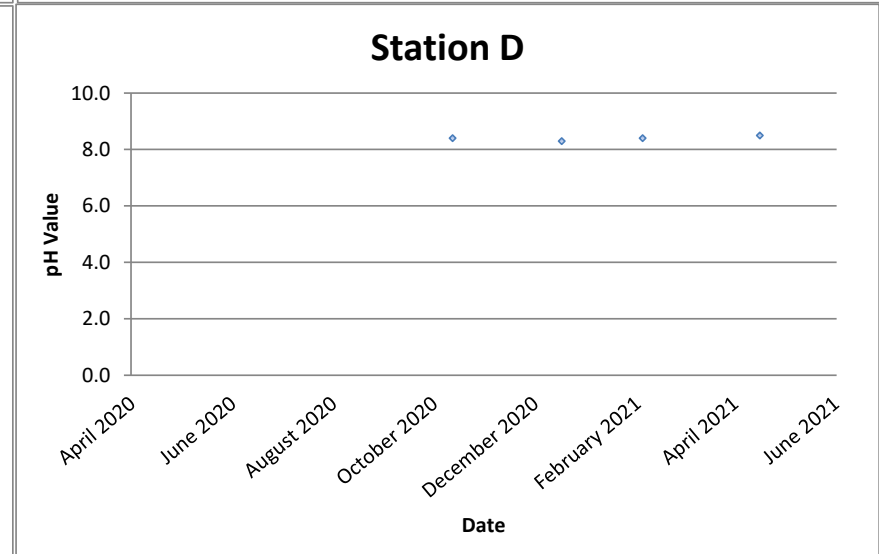
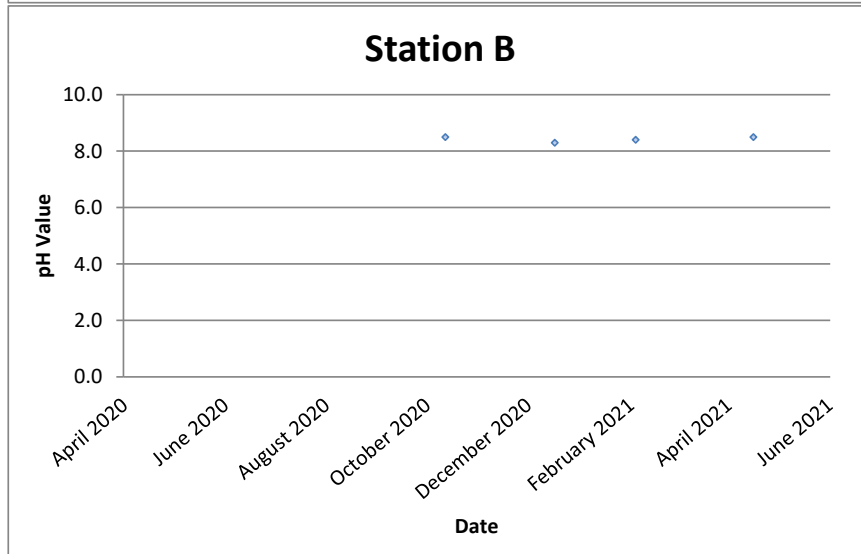
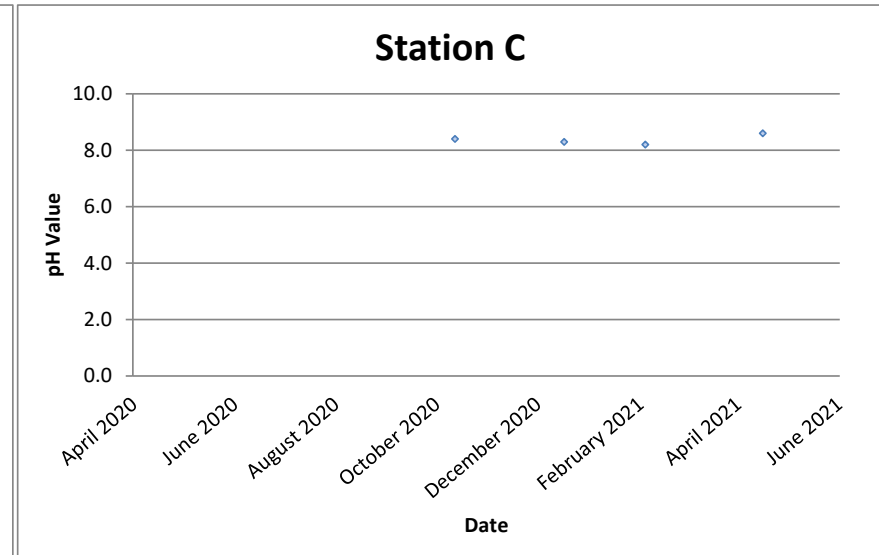
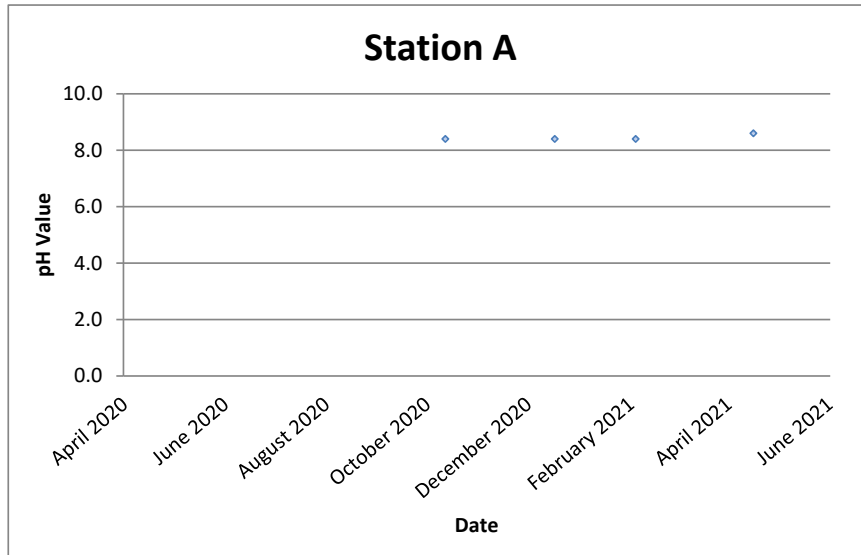
Checked By : 
 Name : T K Lam
 Date : 24/04/2021

Approved By : 
 Signatory : Chung Hei Wing
 Date : 24/04/2021

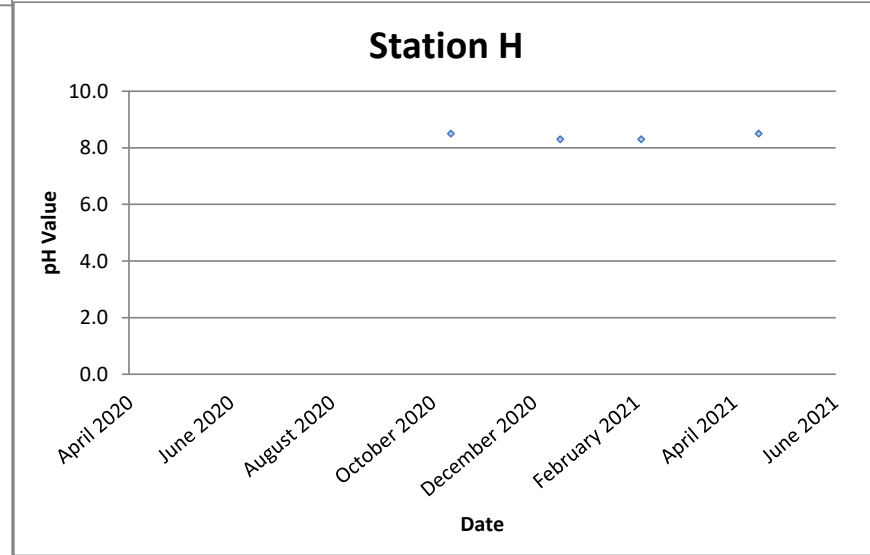
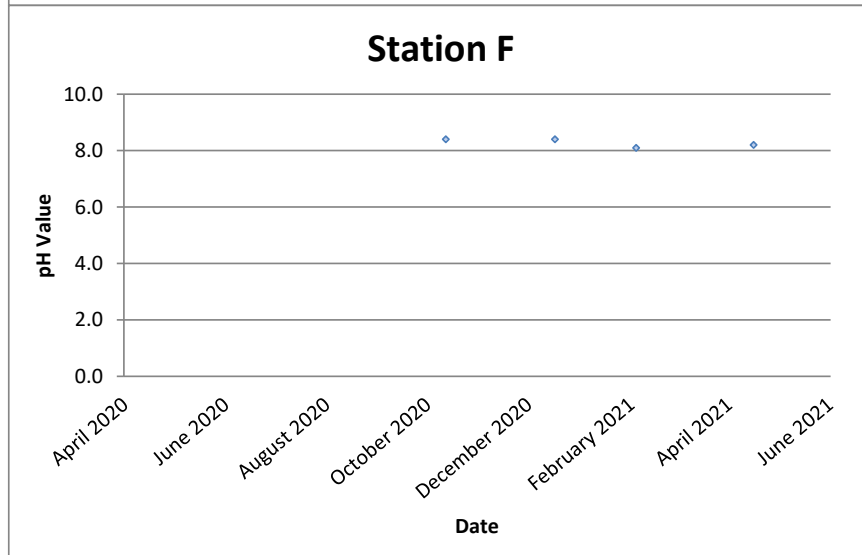
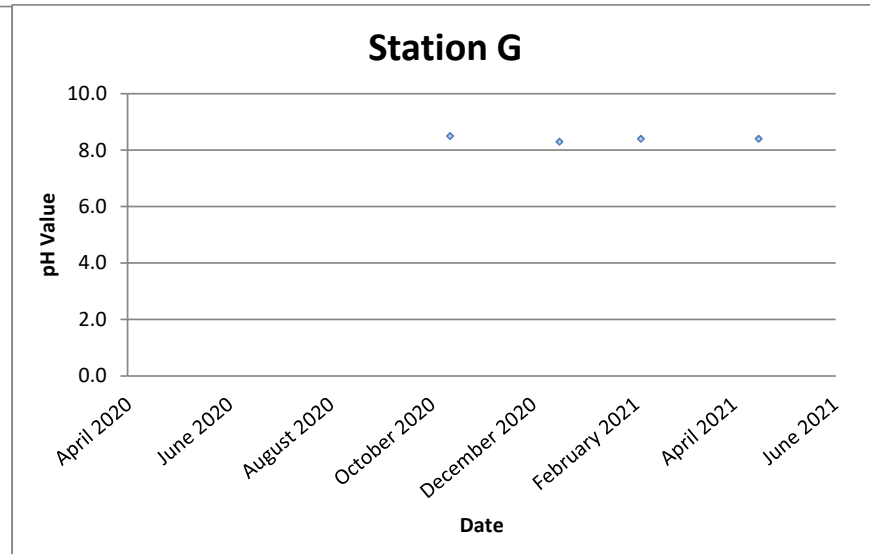
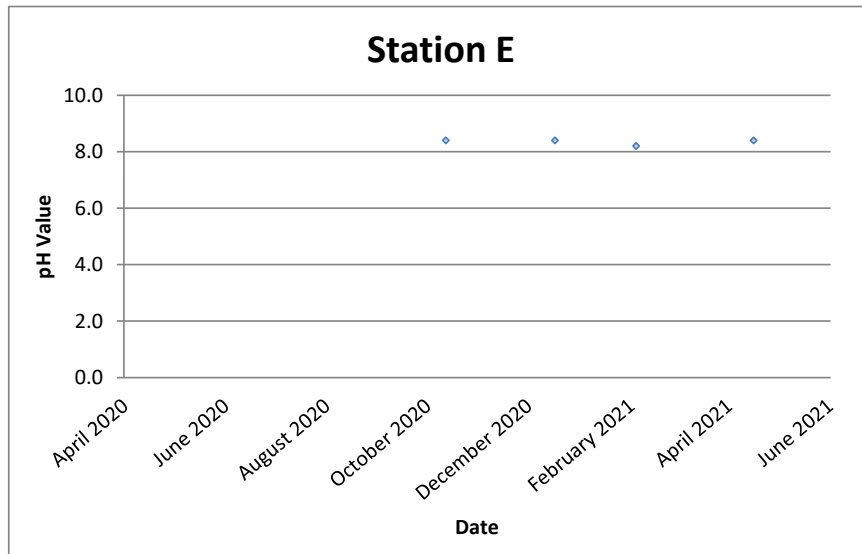
Date : 19/04/2021

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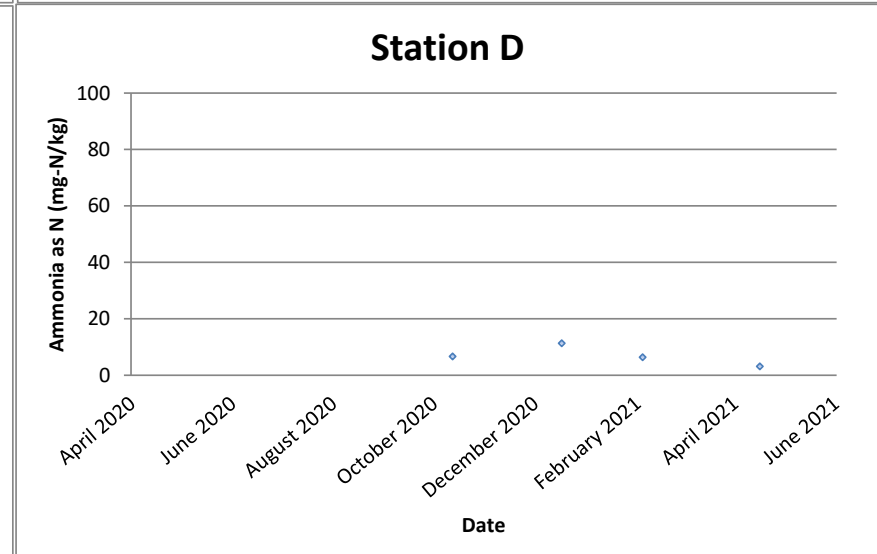
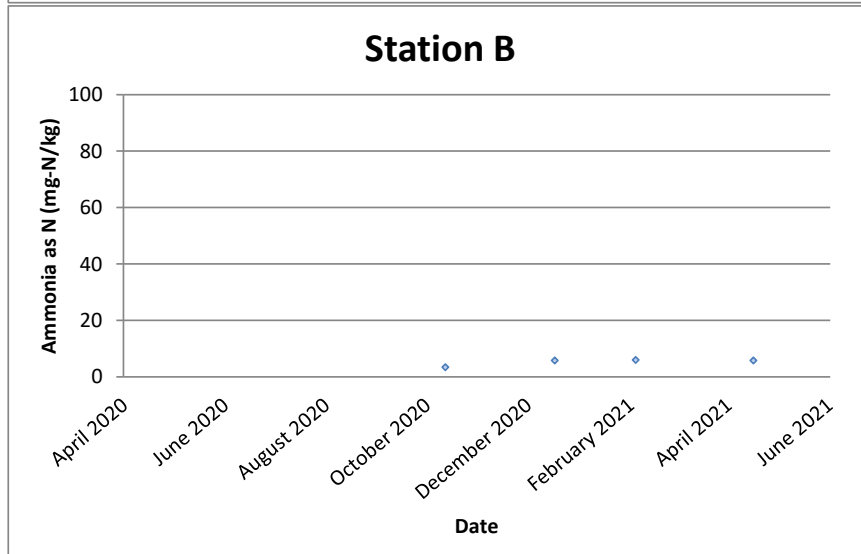
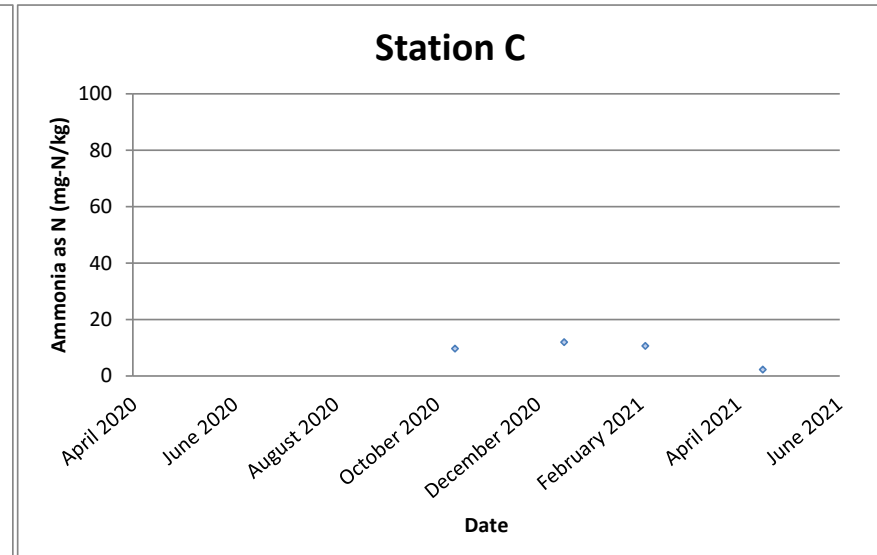
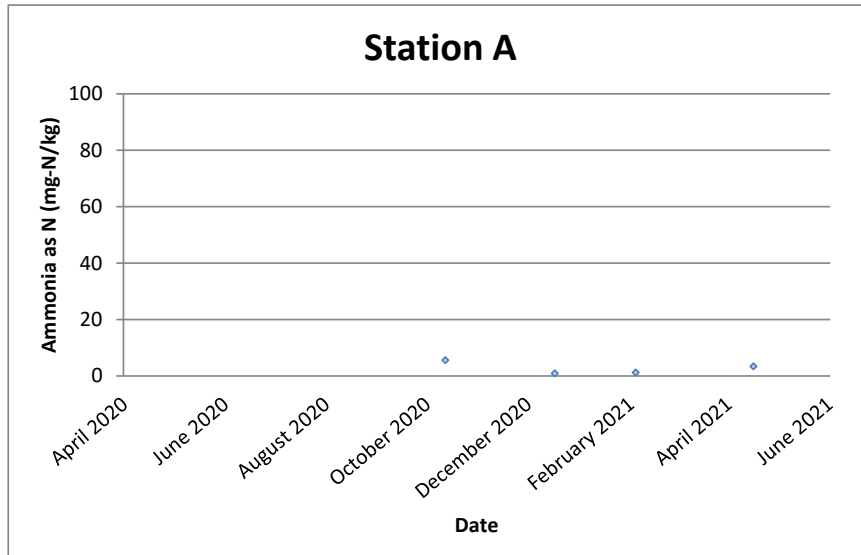
pH value



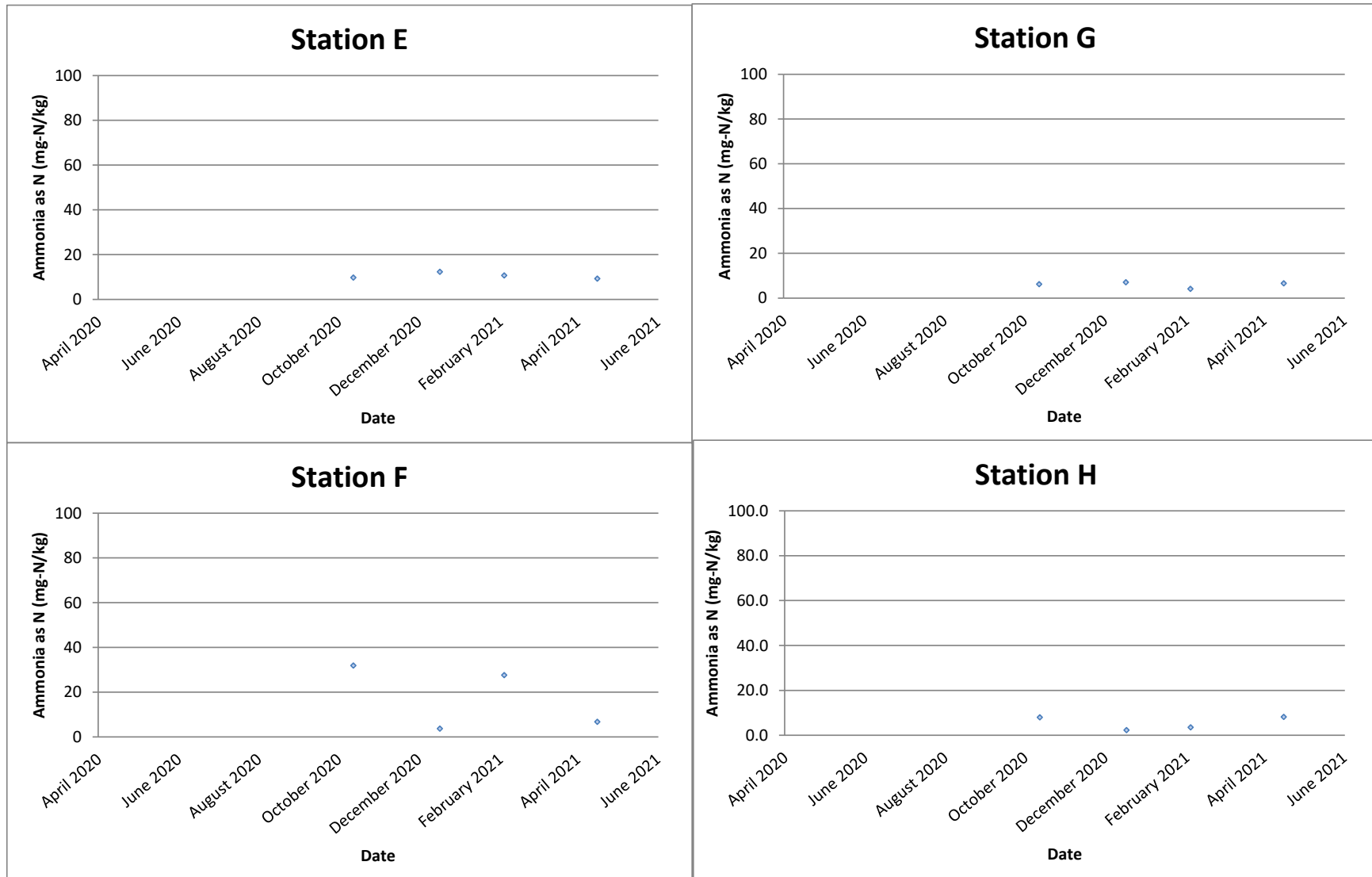
pH value



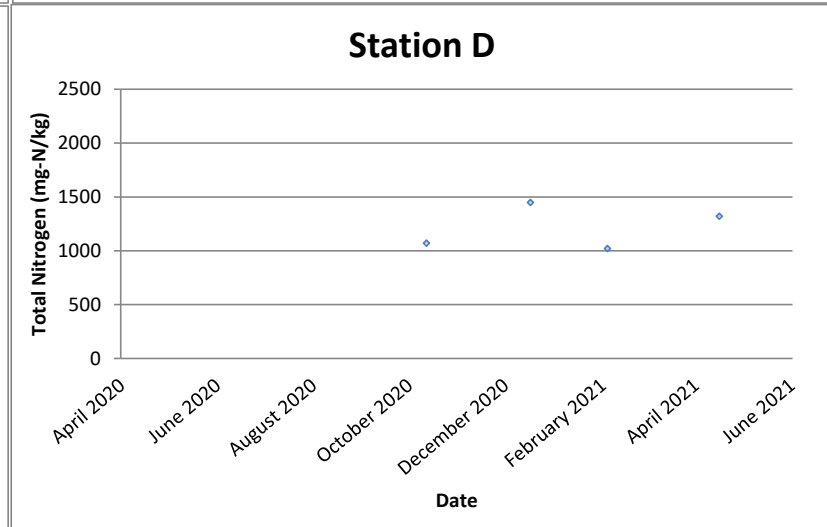
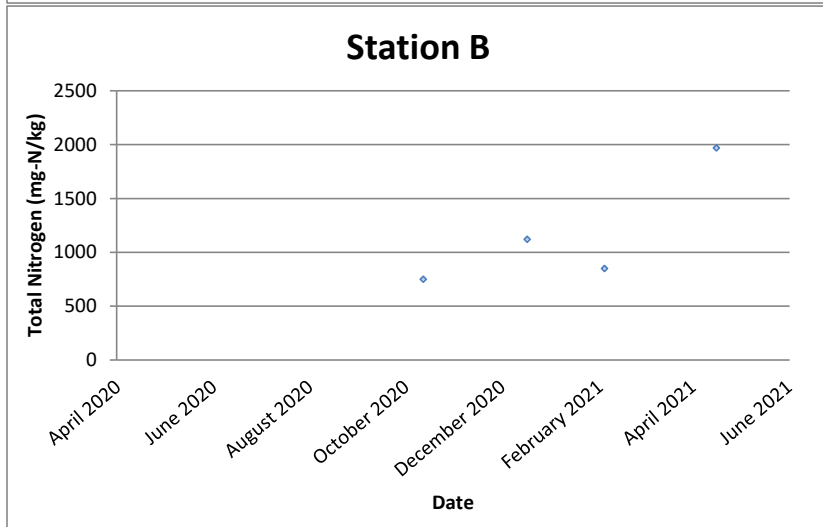
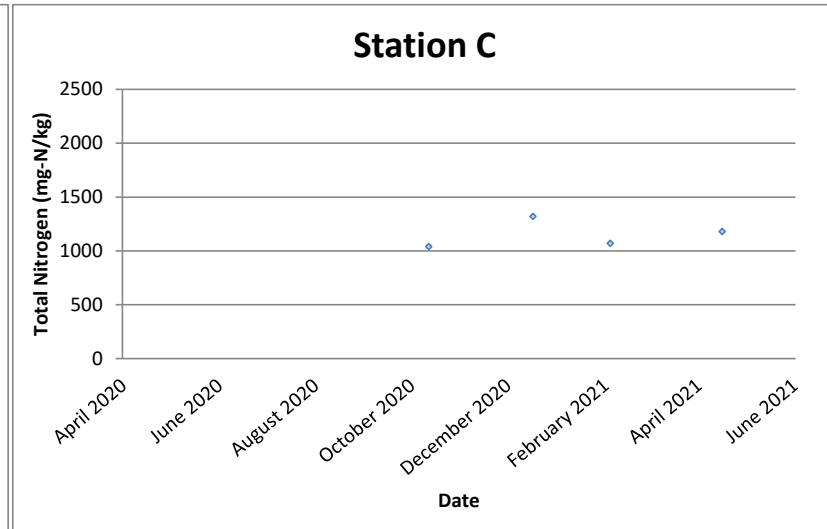
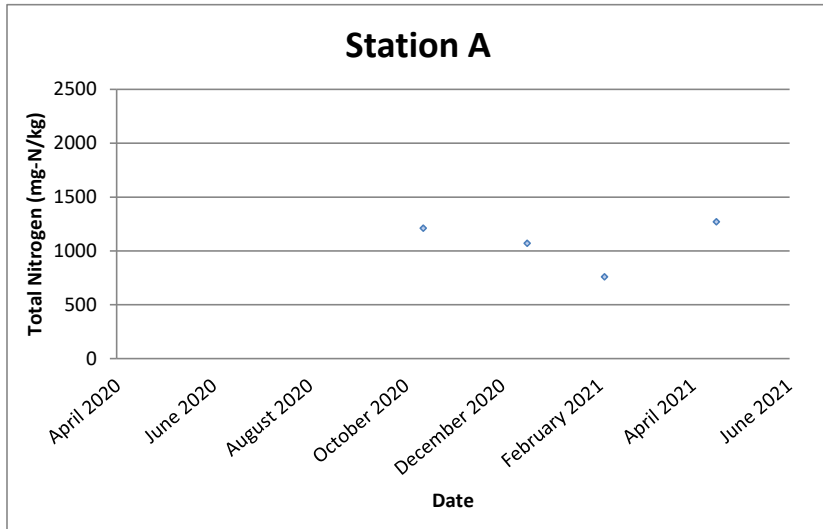
Ammonia Nitrogen (mg-N/kg)



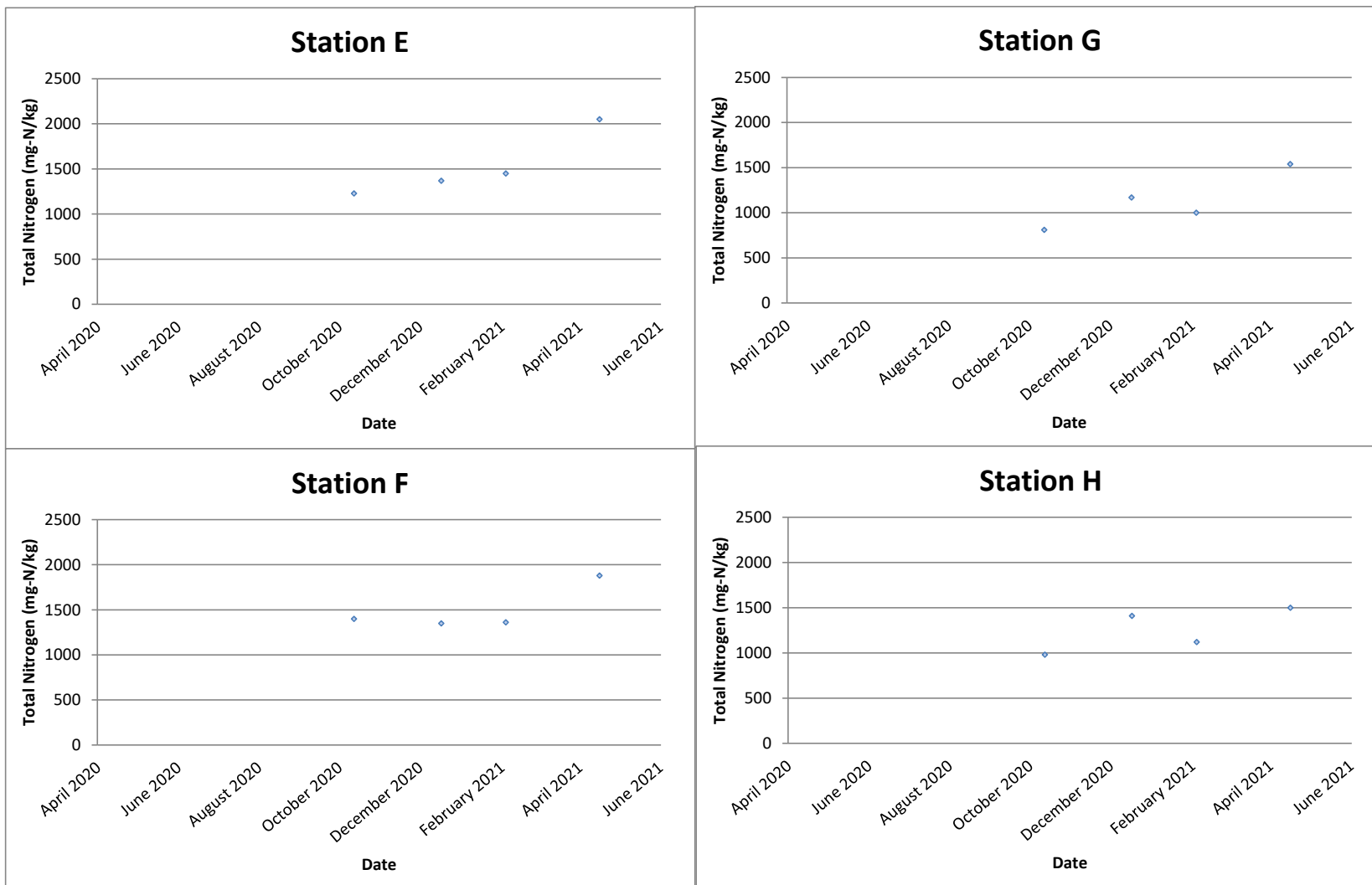
Ammonia Nitrogen (mg-N/kg)



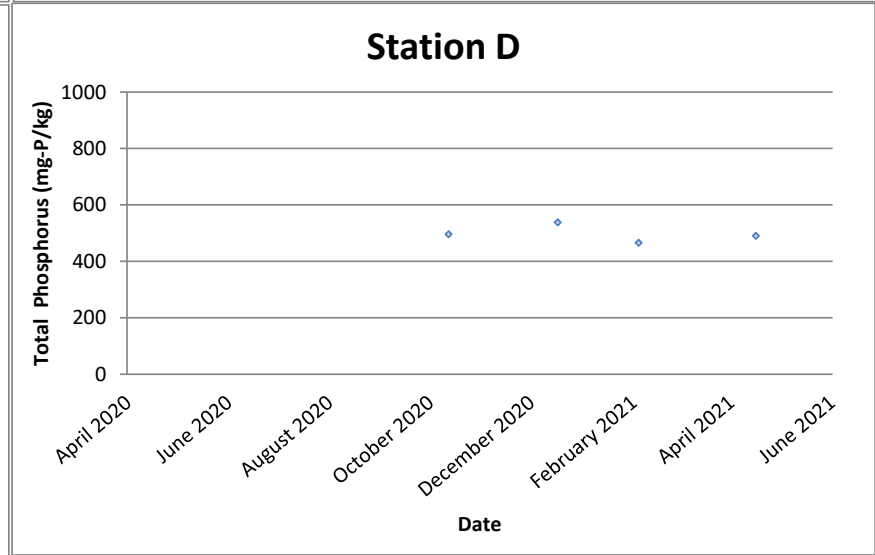
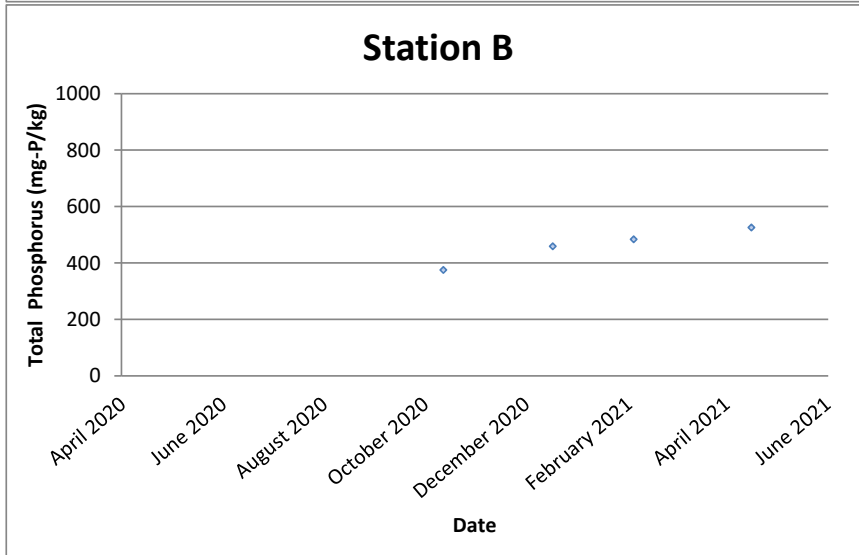
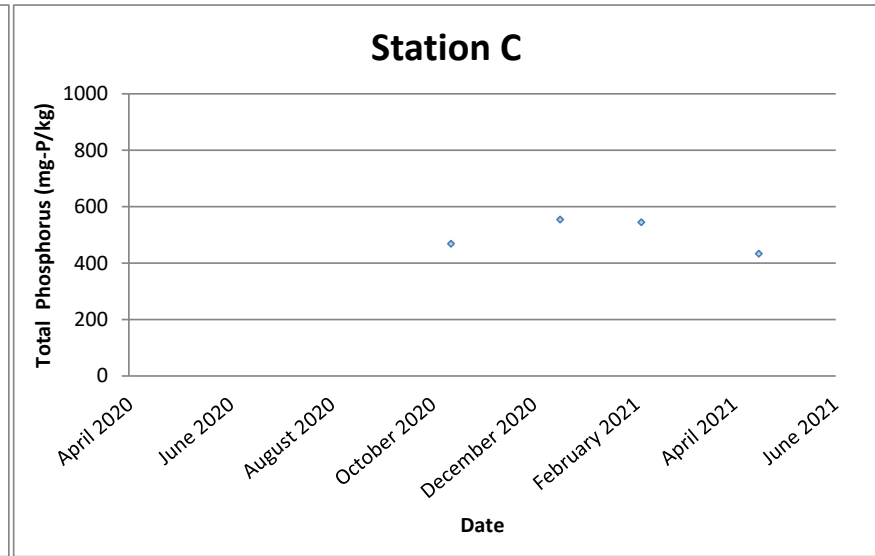
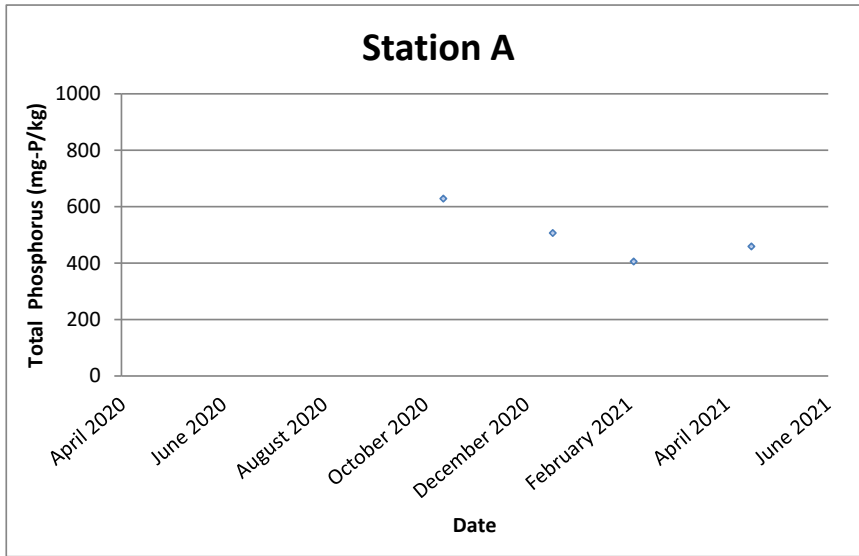
Total Nitrogen (mg-N/kg)



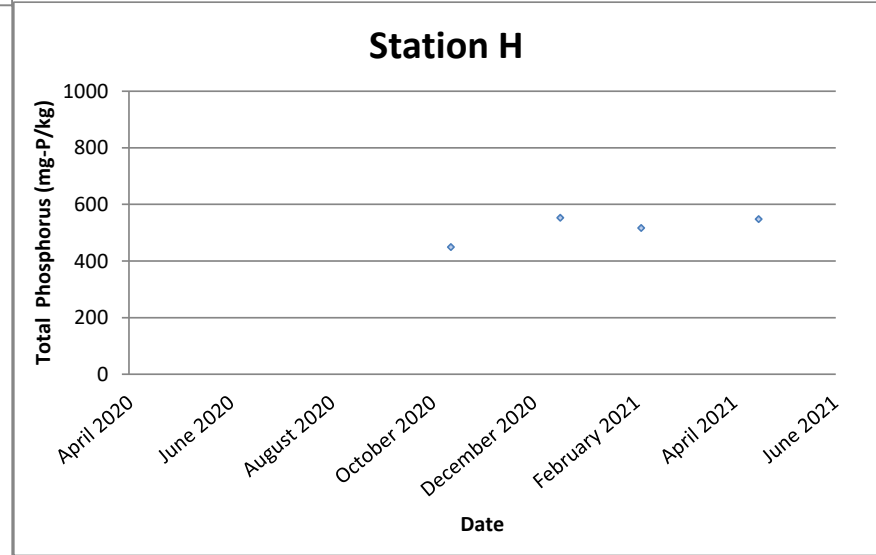
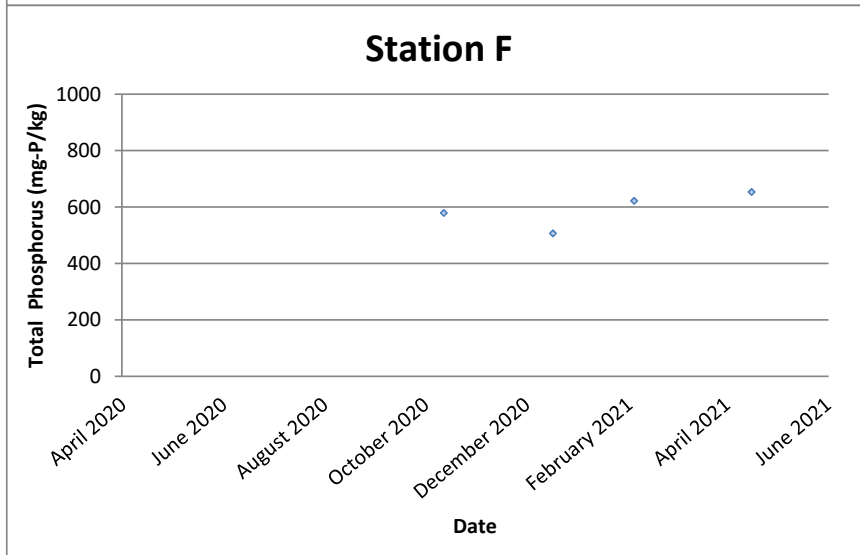
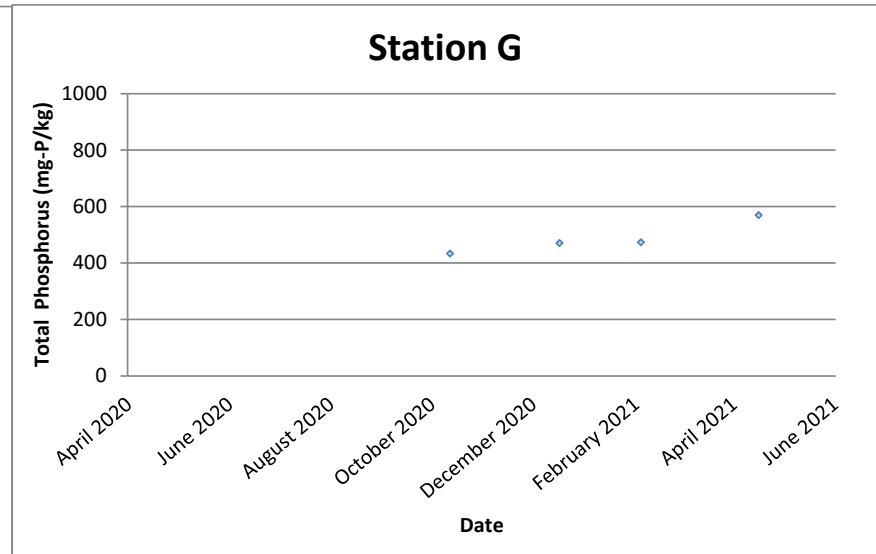
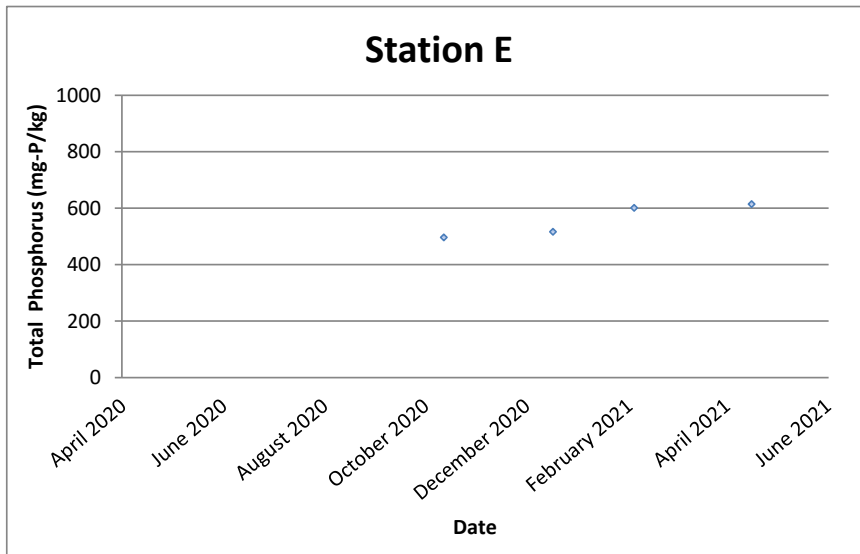
Total Nitrogen (mg-N/kg)



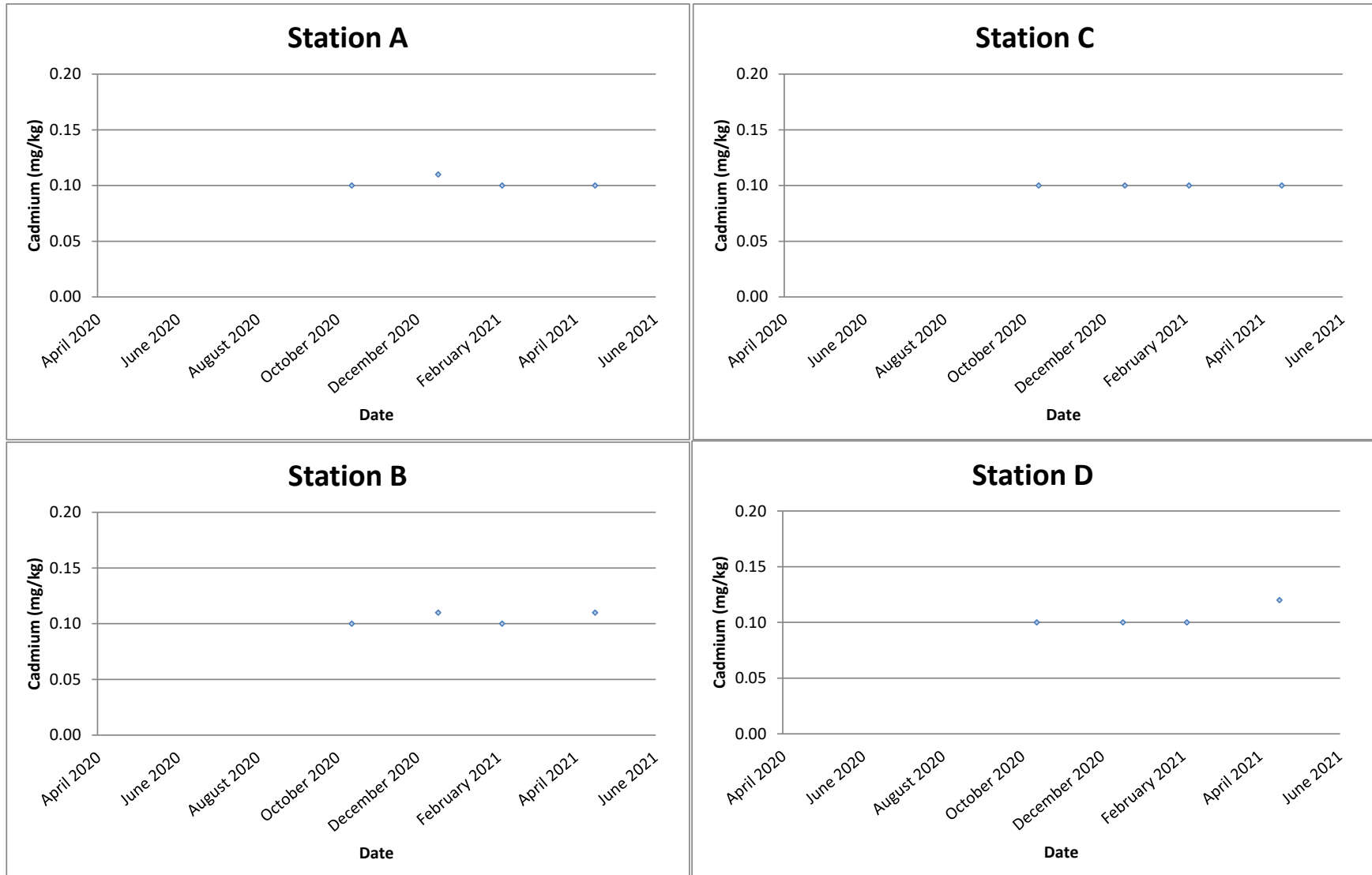
Total Phosphorus (mg-P/kg)



Total Phosphorus (mg-P/kg)

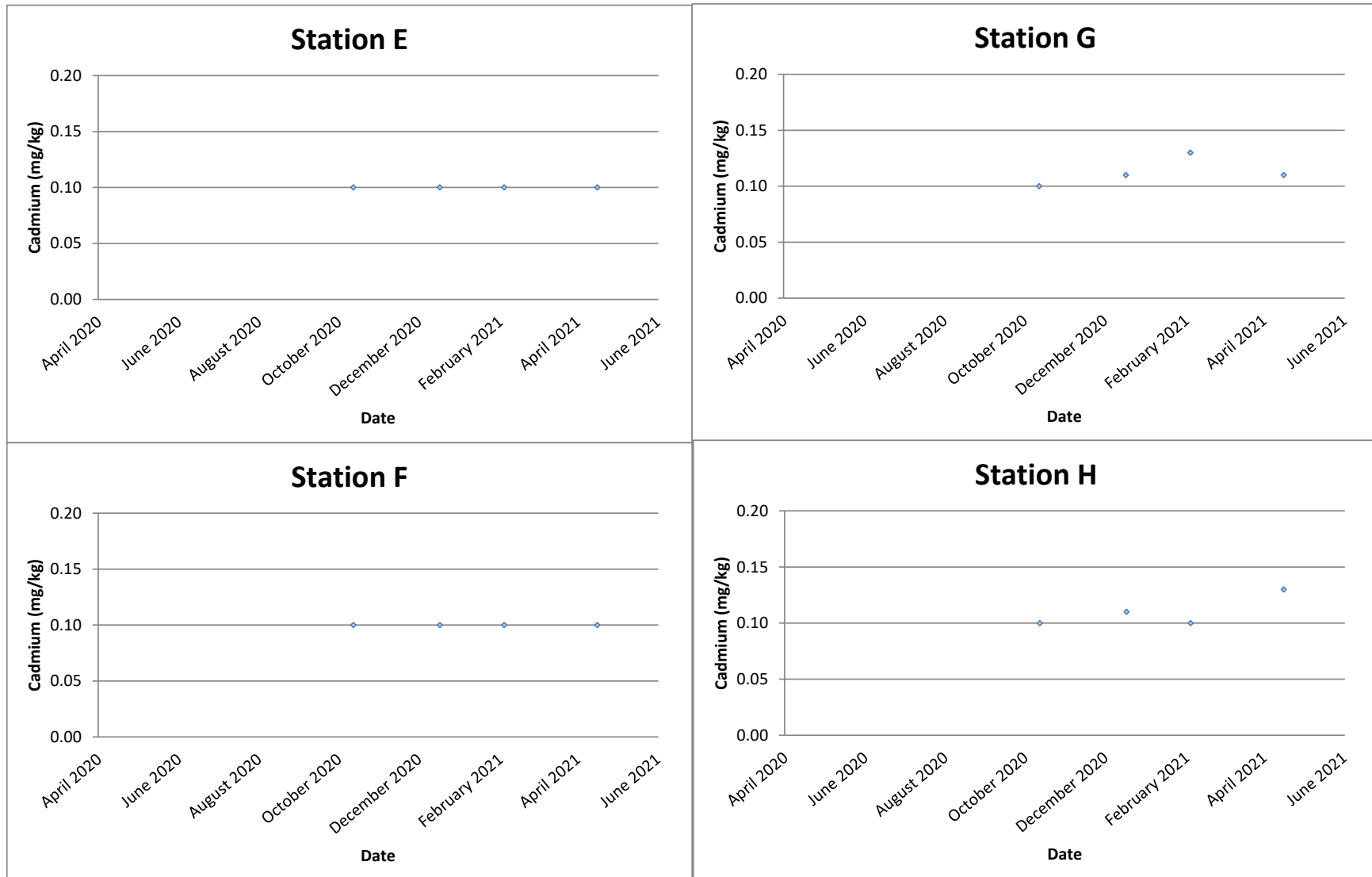


Cadmium (mg/kg)



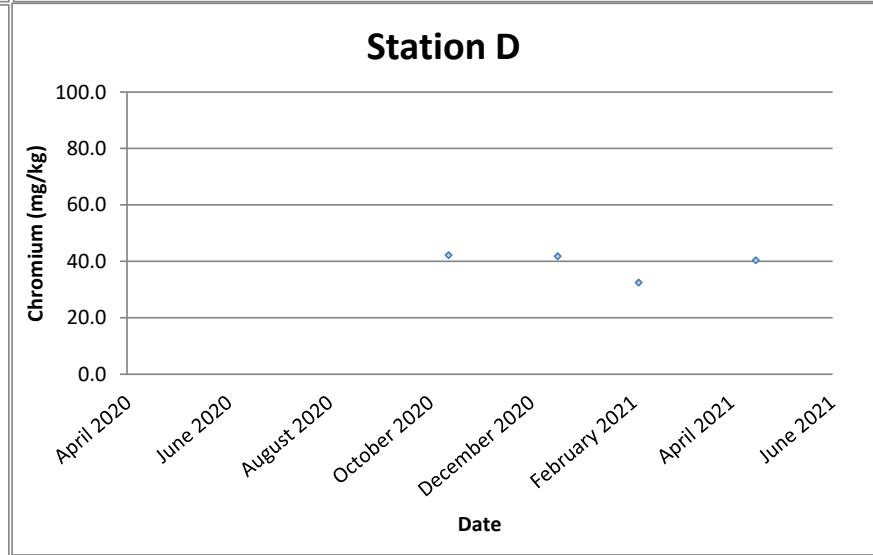
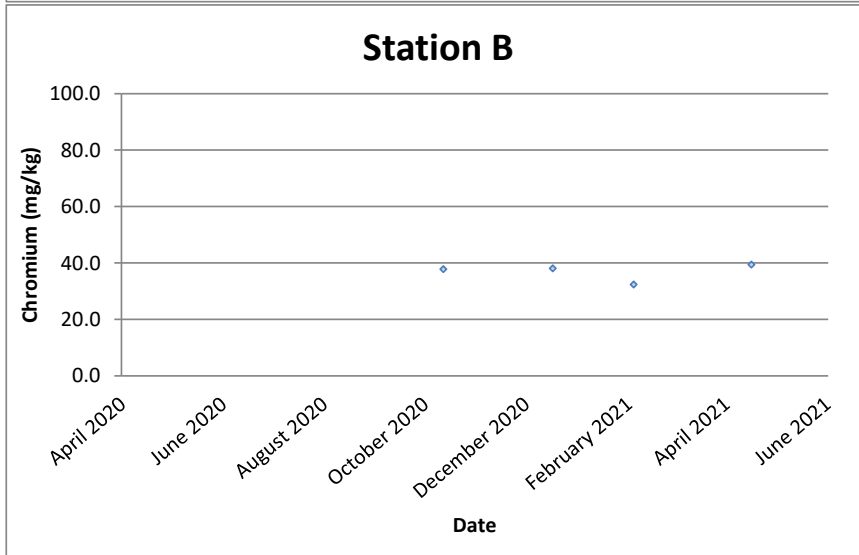
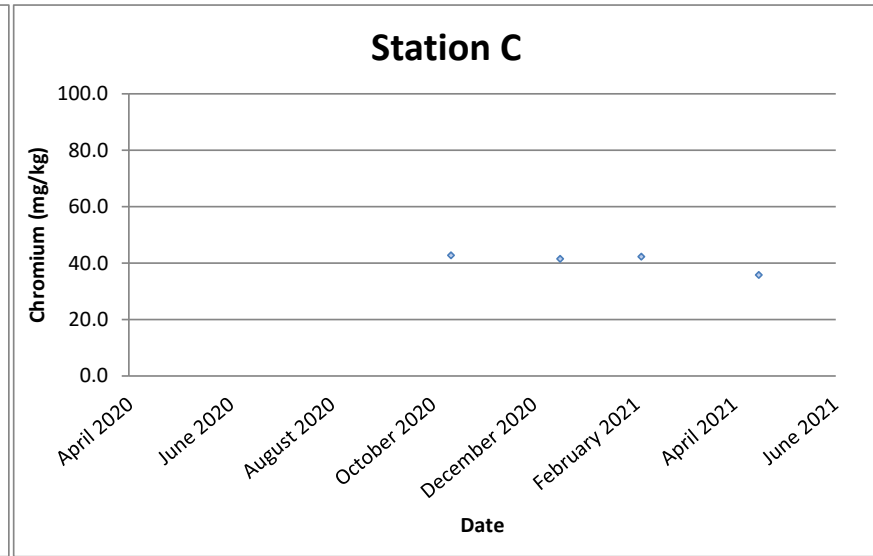
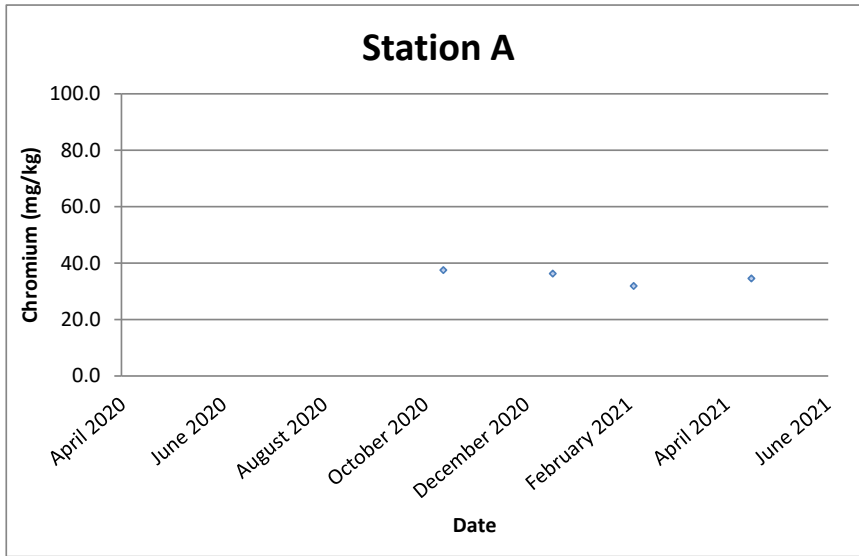
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

Cadmium (mg/kg)

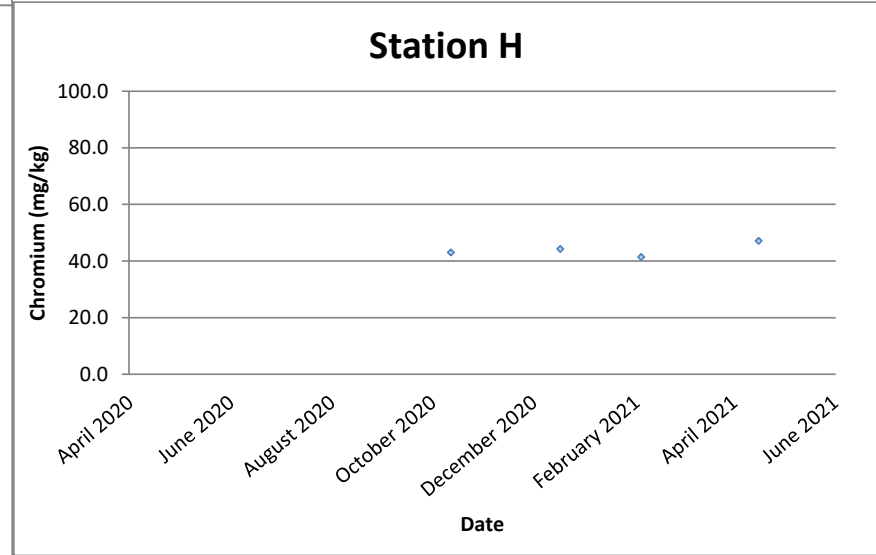
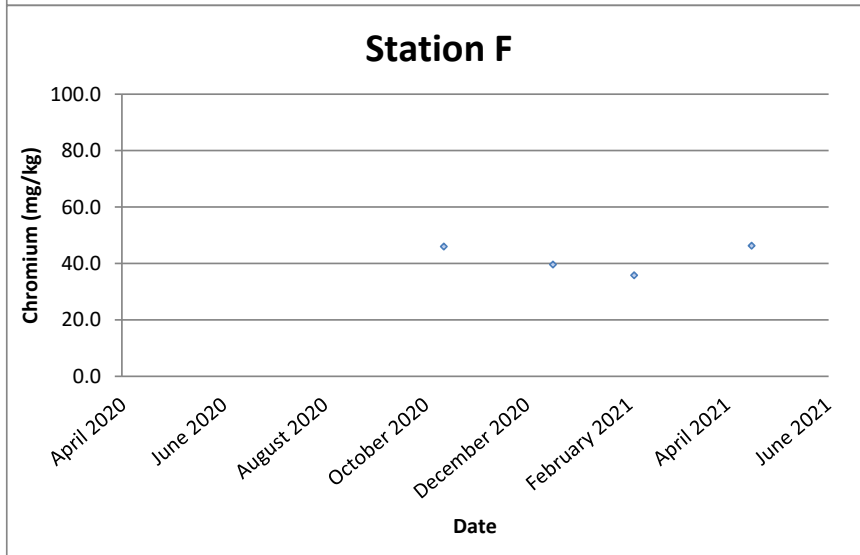
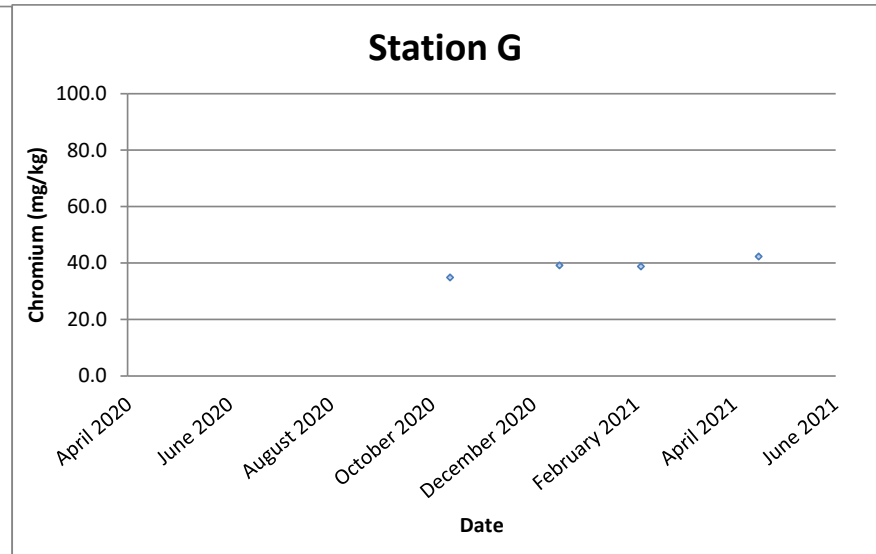
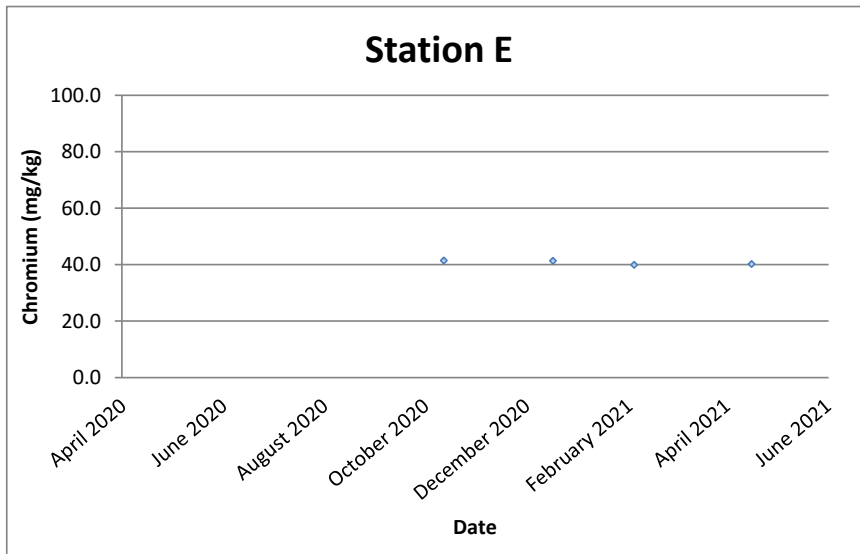


Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

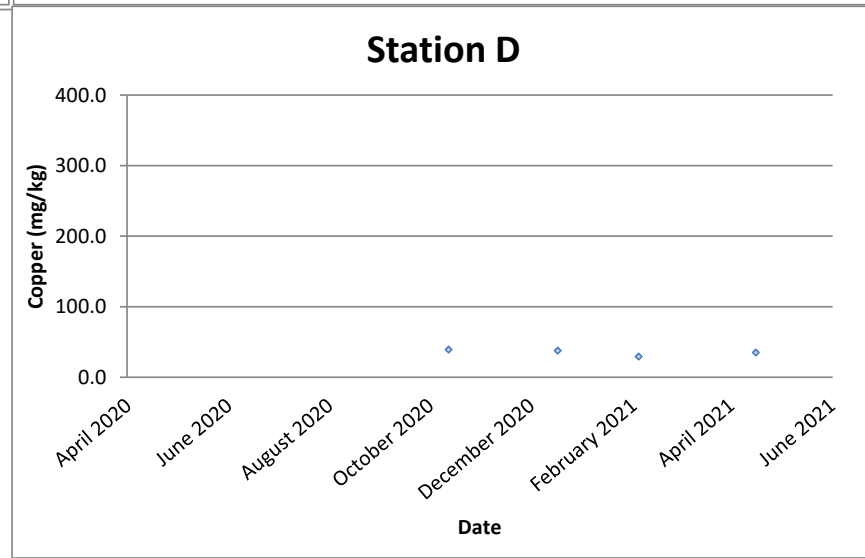
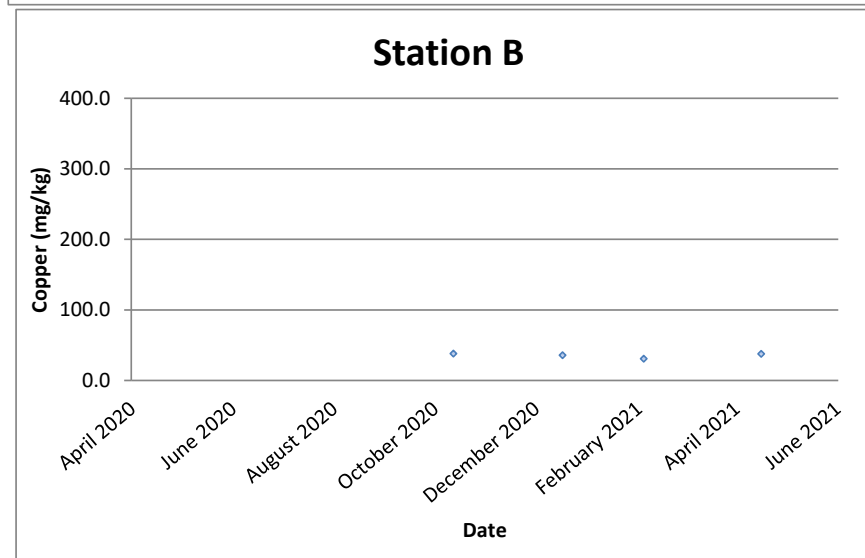
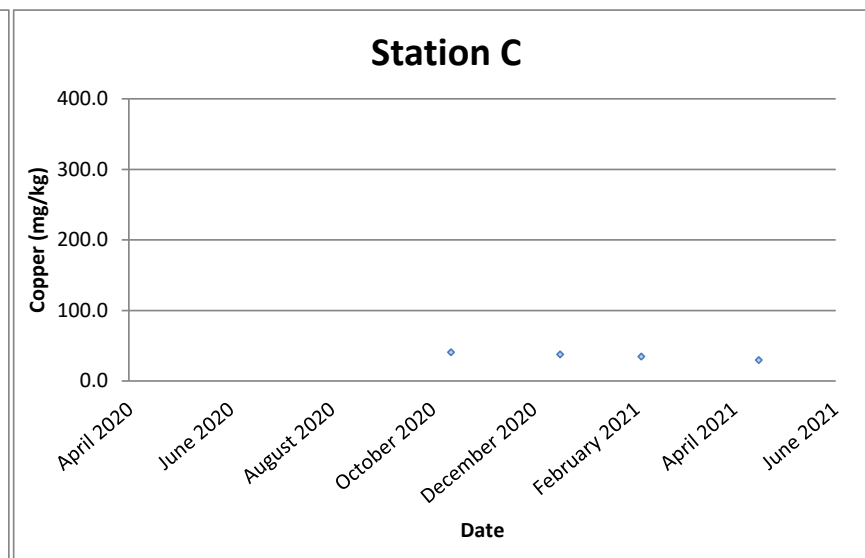
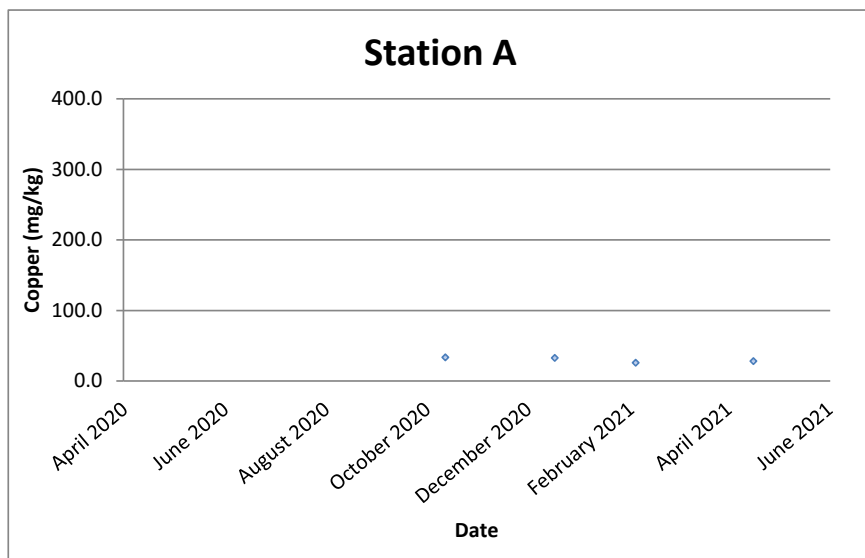
Chromium (mg/kg)



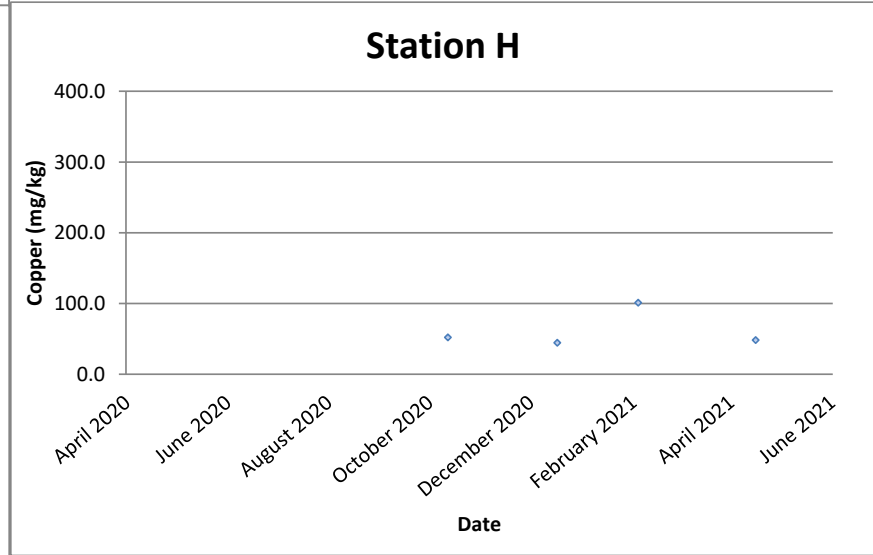
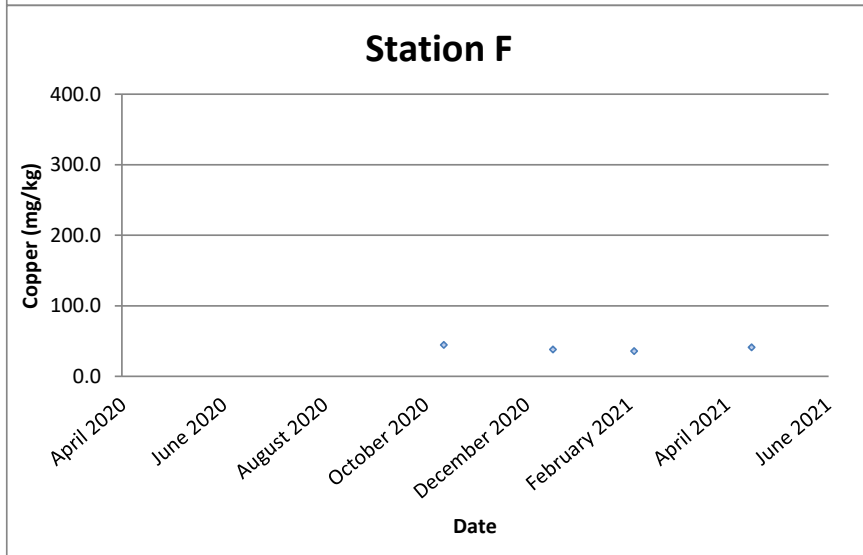
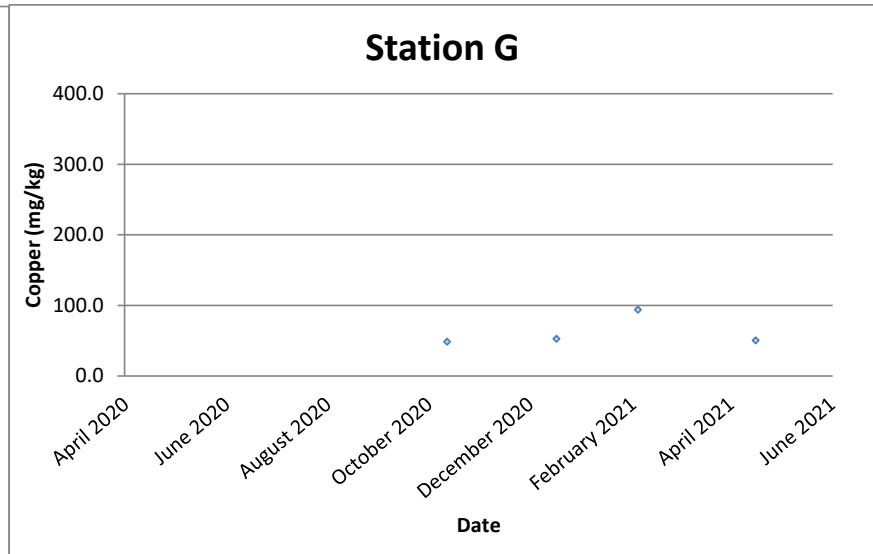
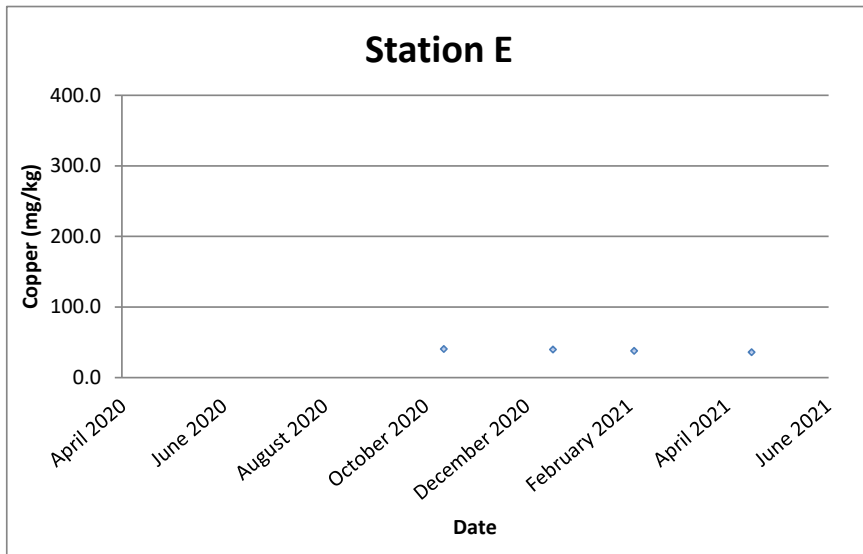
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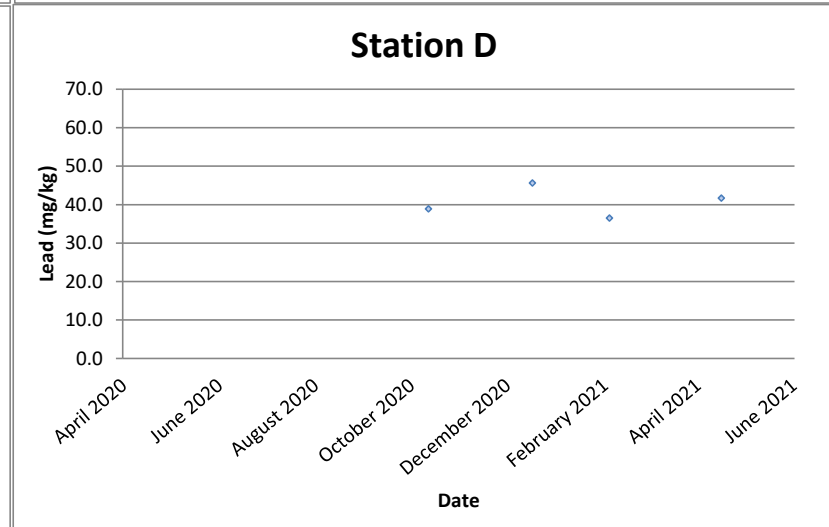
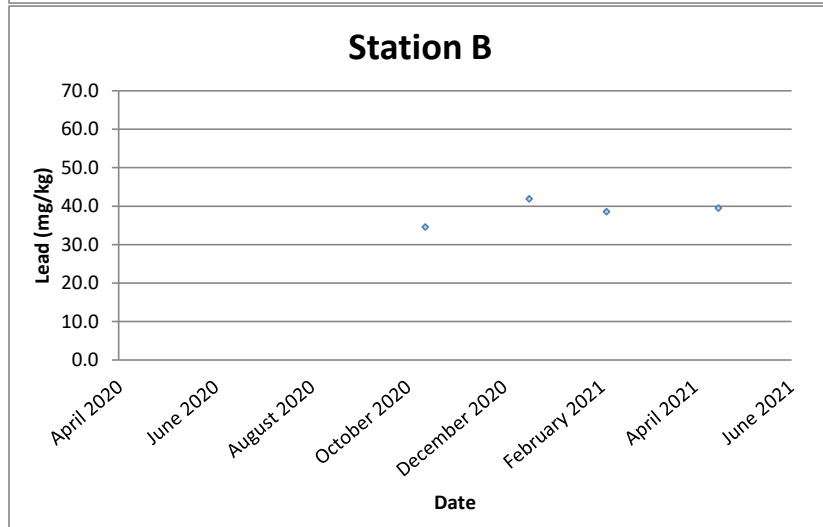
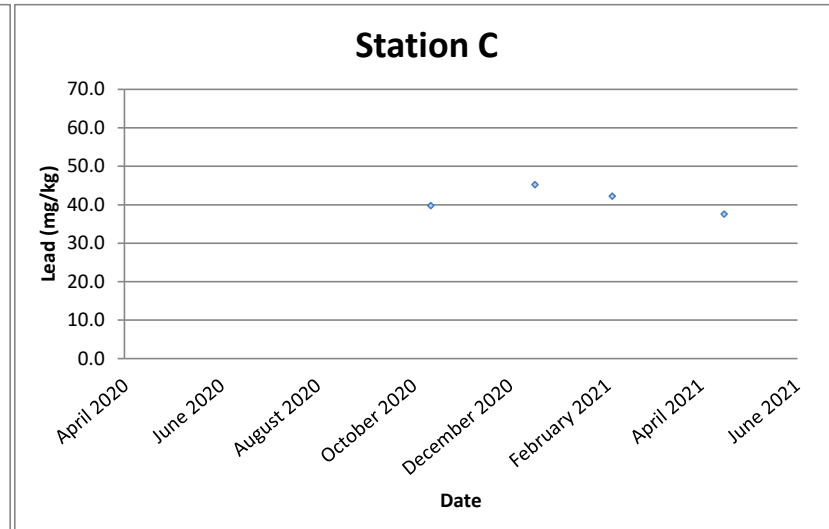
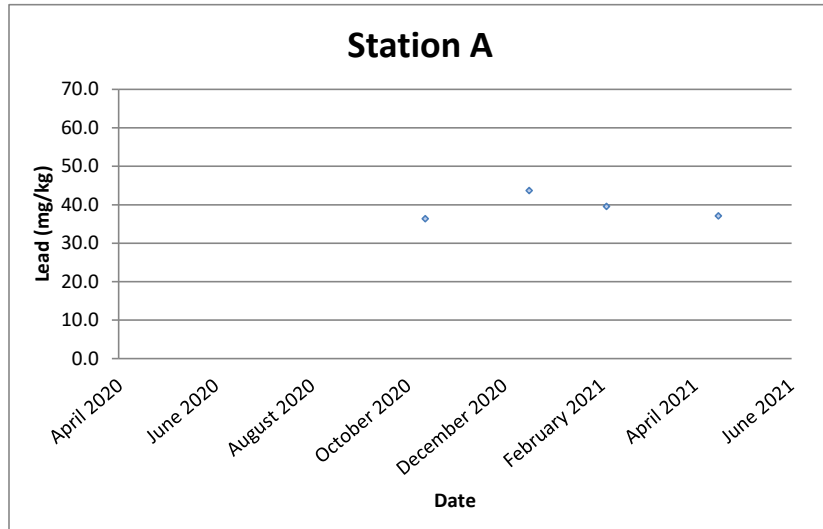
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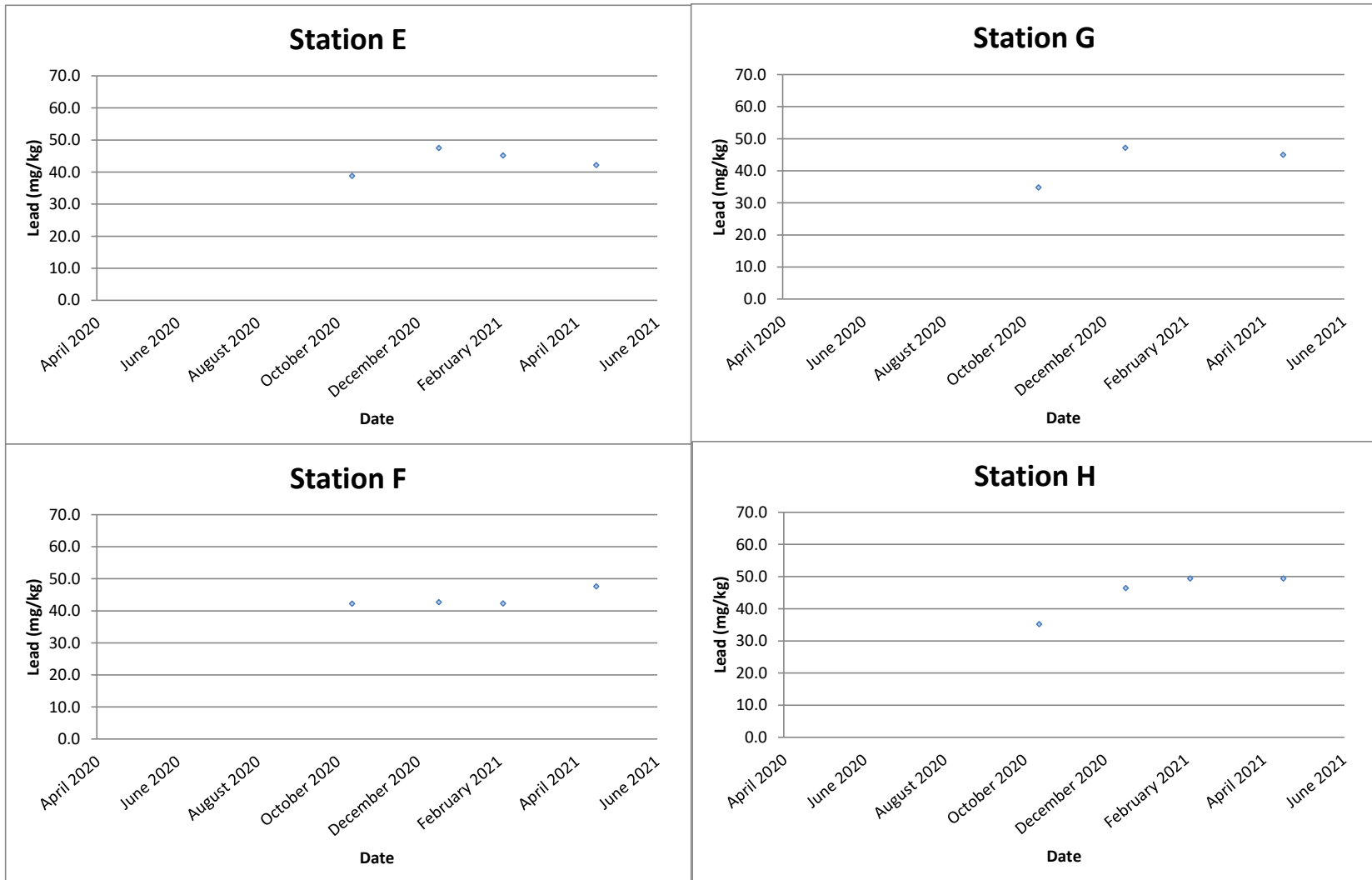
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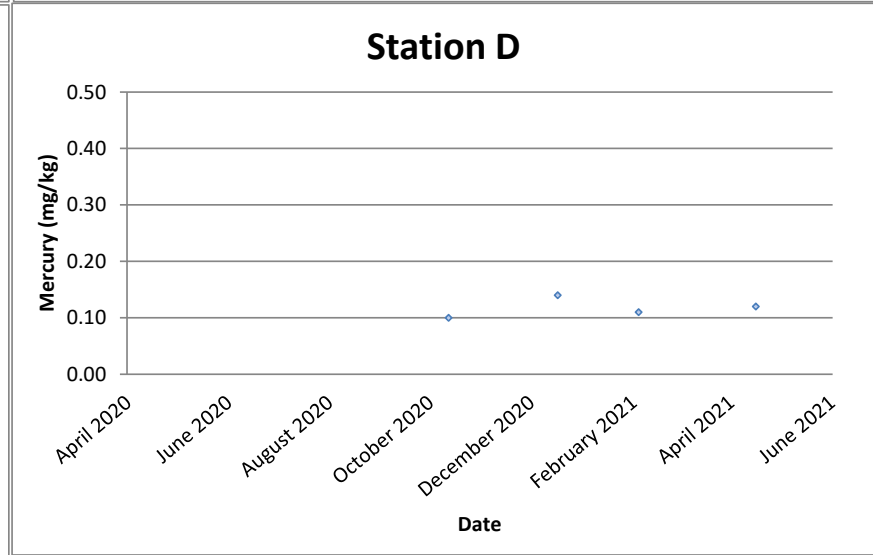
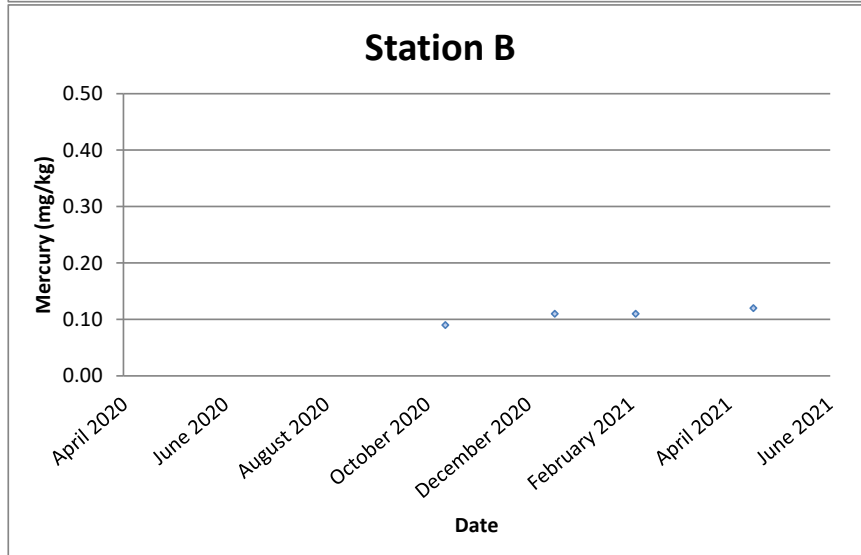
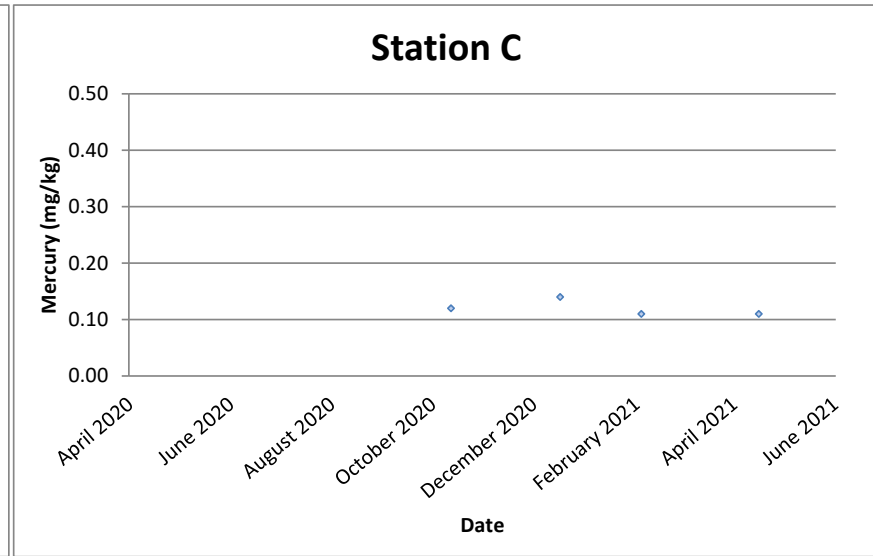
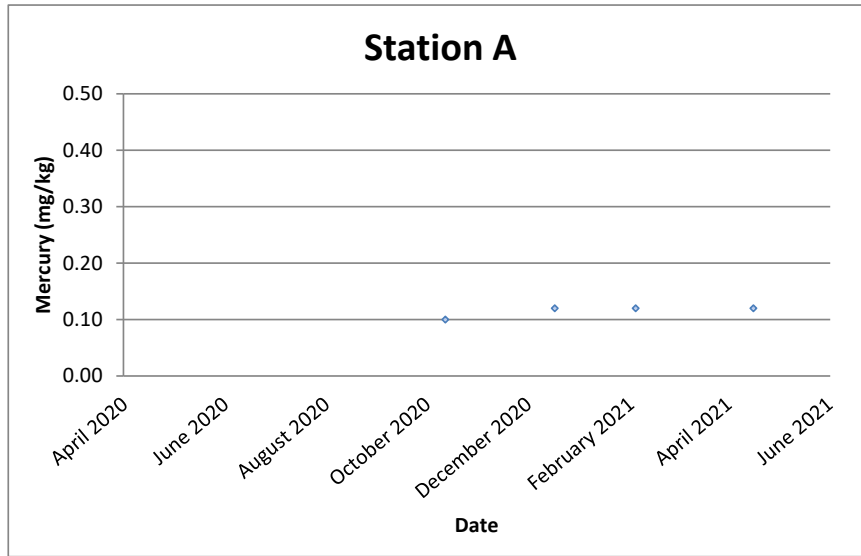
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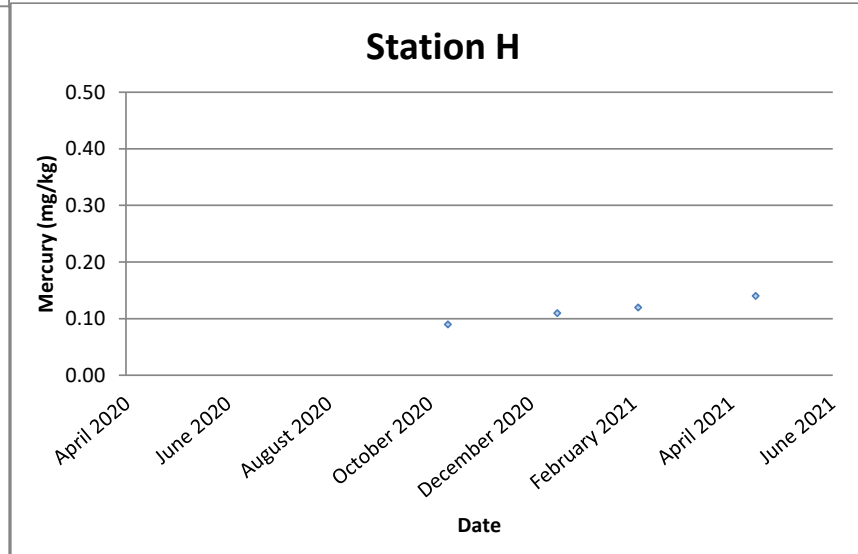
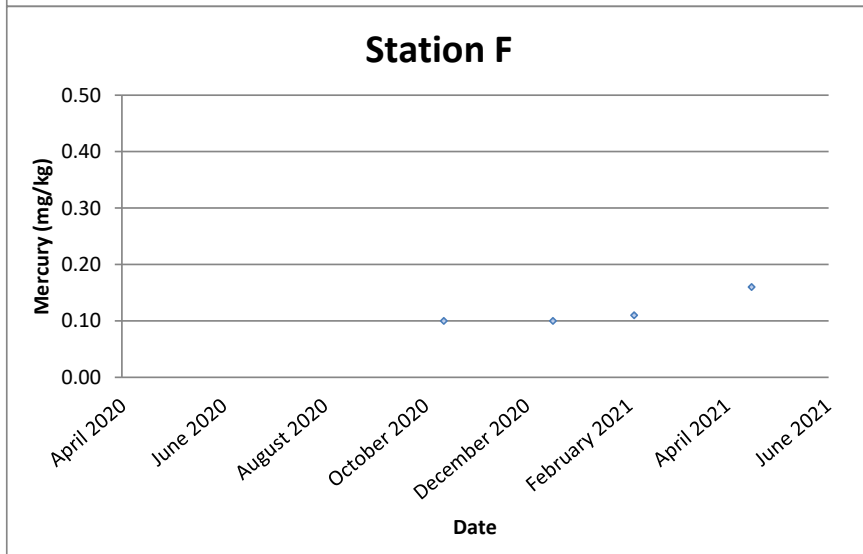
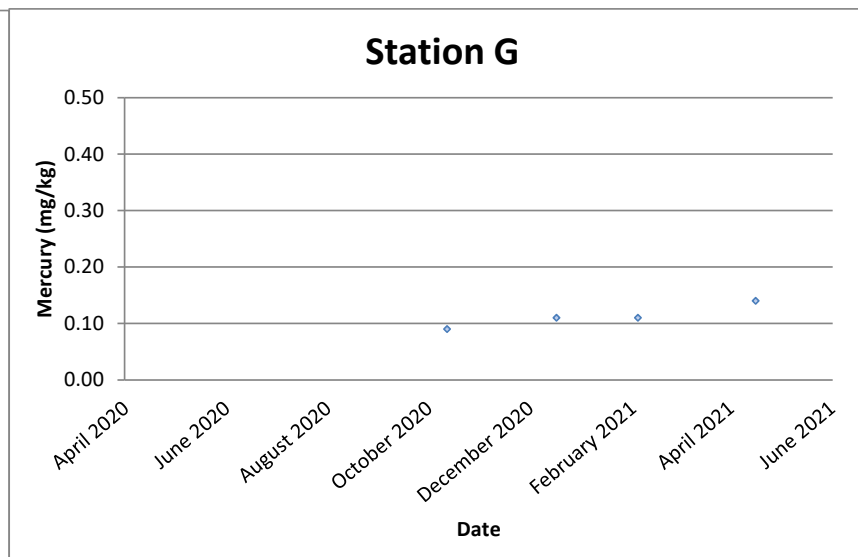
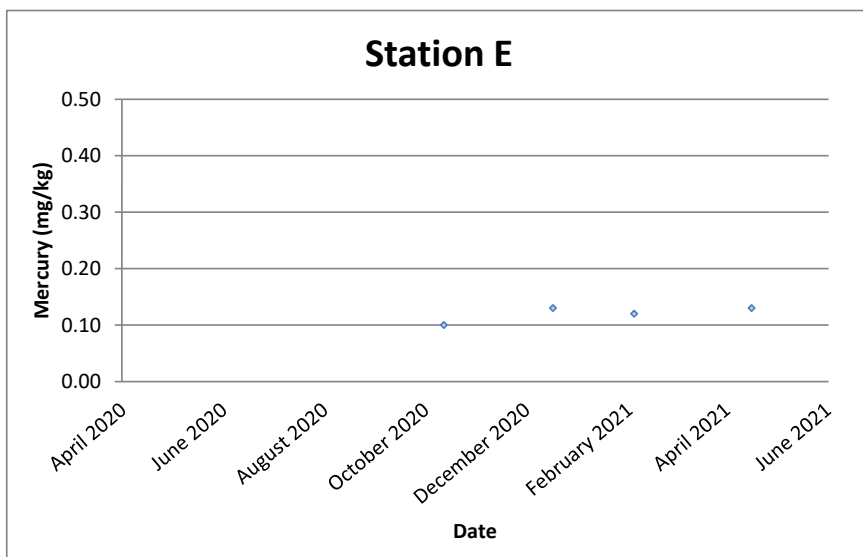
Lead (mg/kg)



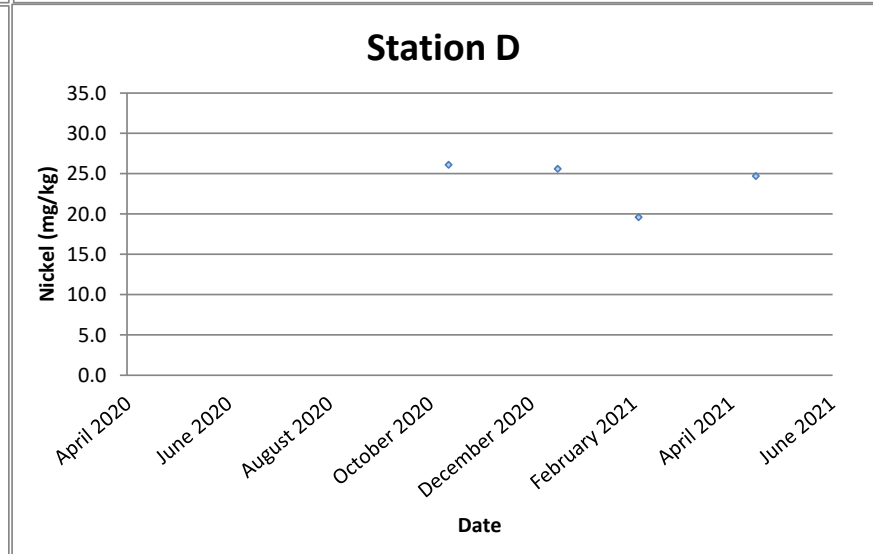
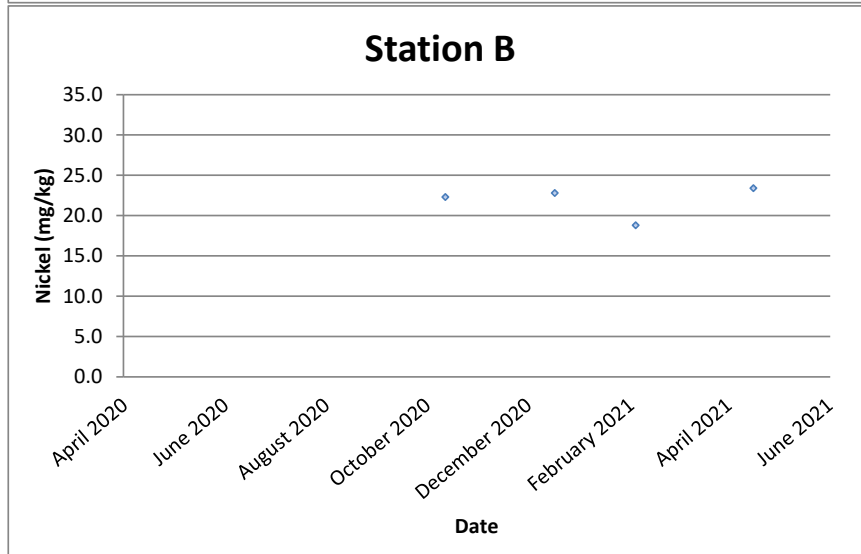
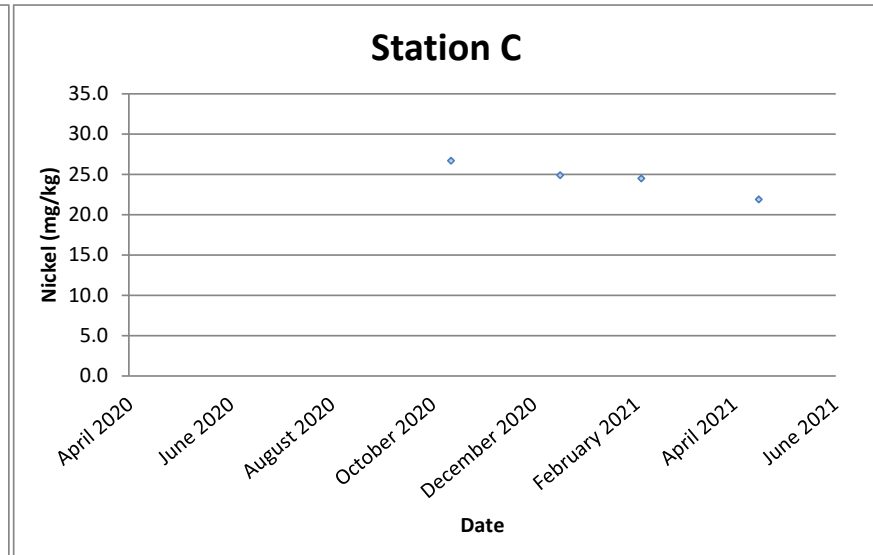
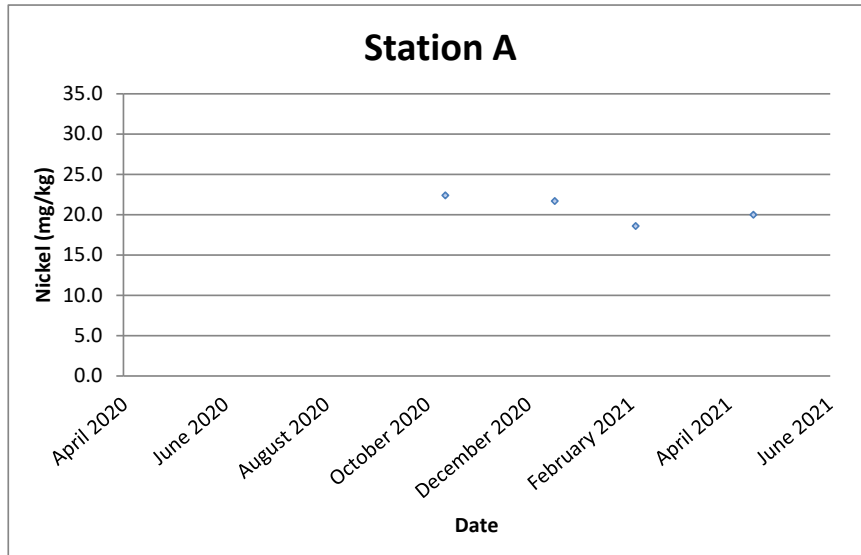
Mercury (mg/kg)



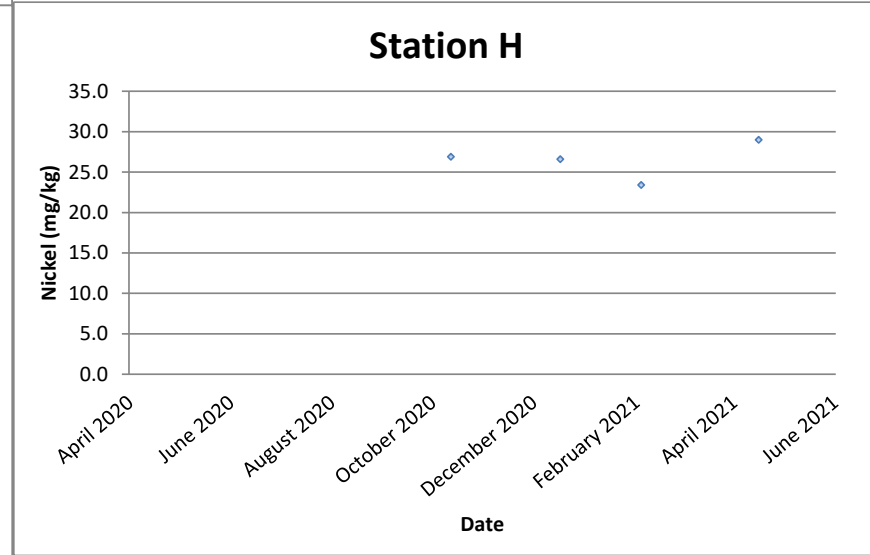
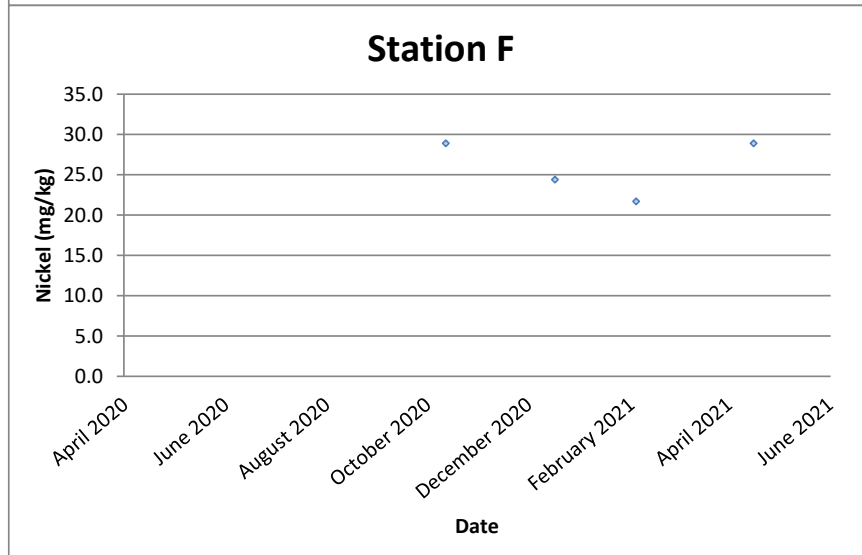
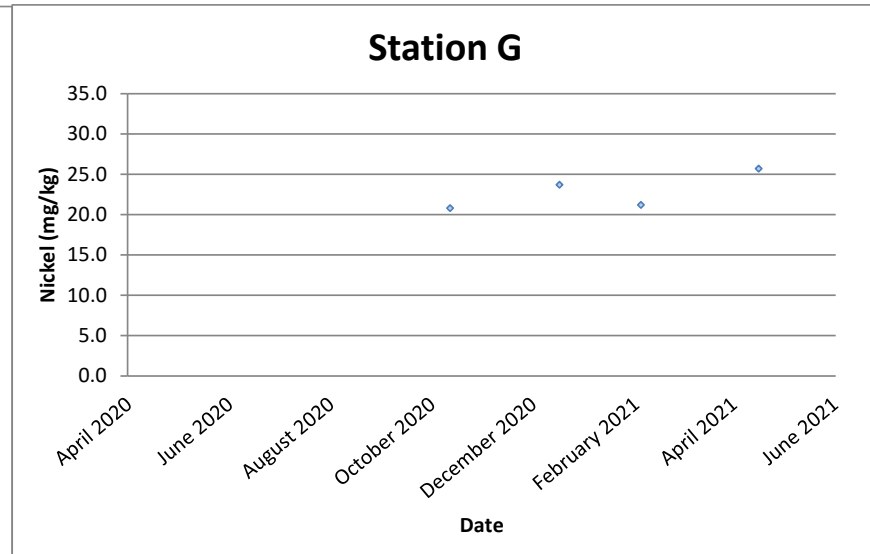
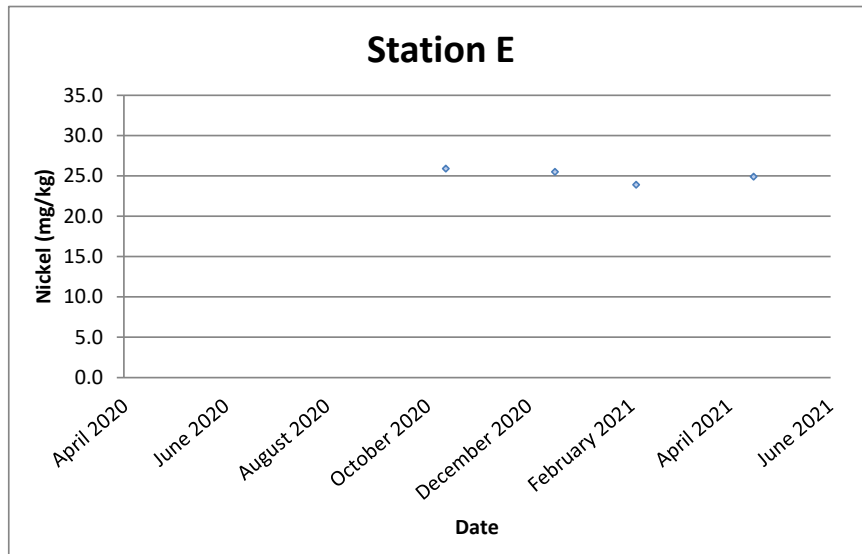
Mercury (mg/kg)



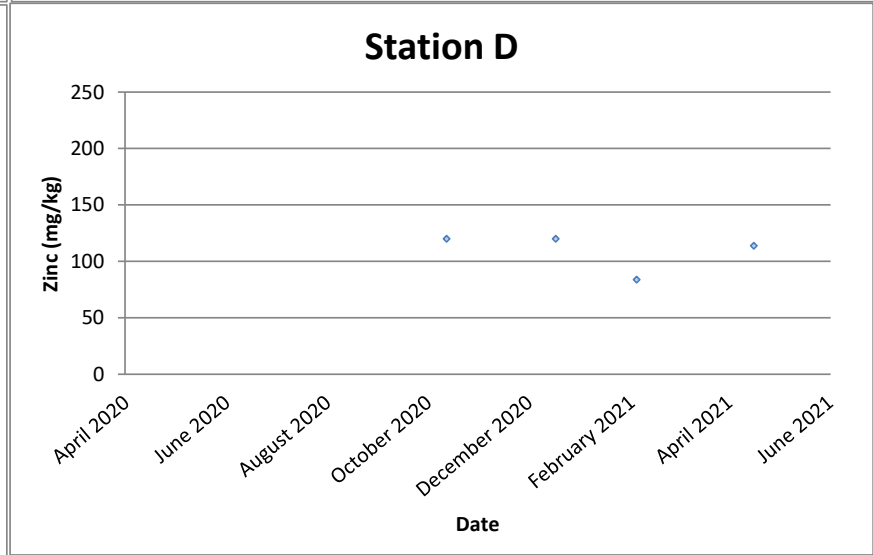
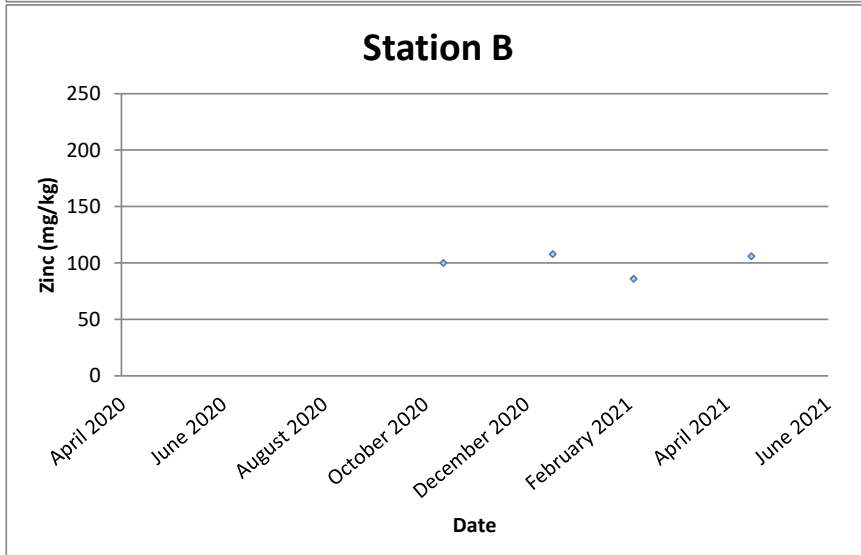
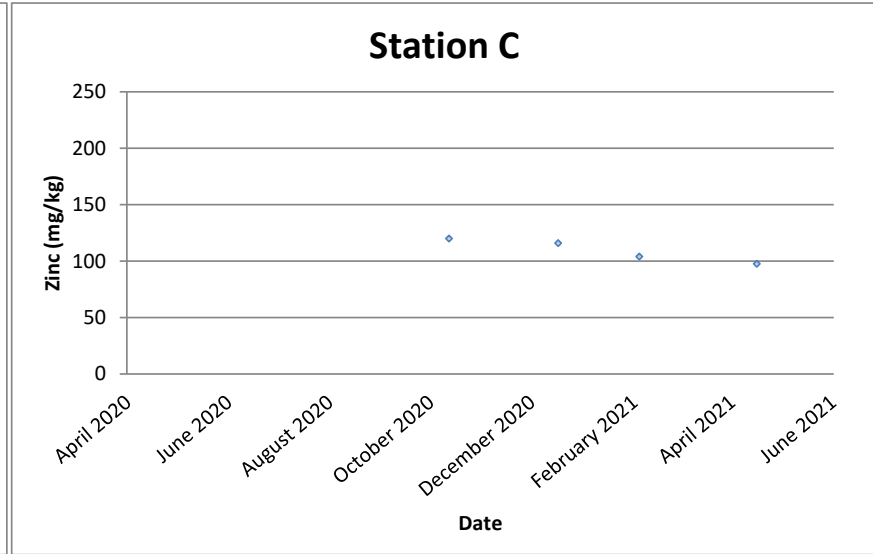
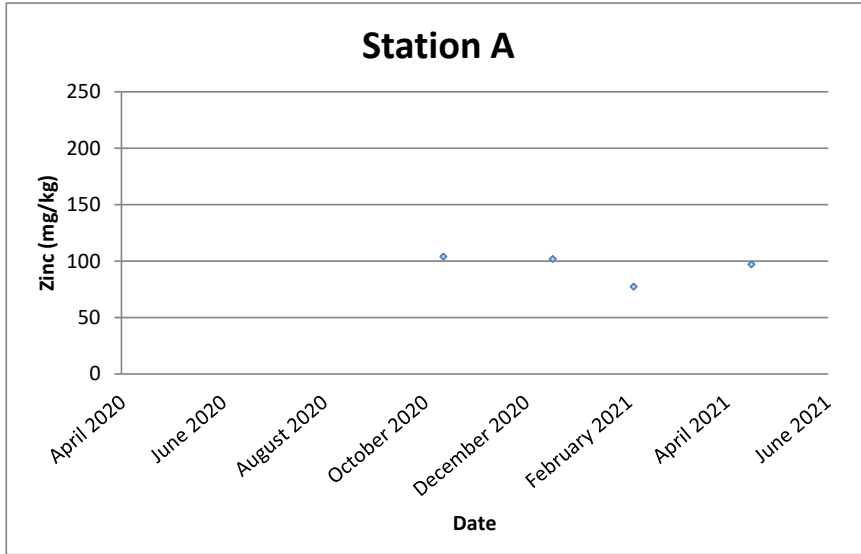
Nickel (mg/kg)



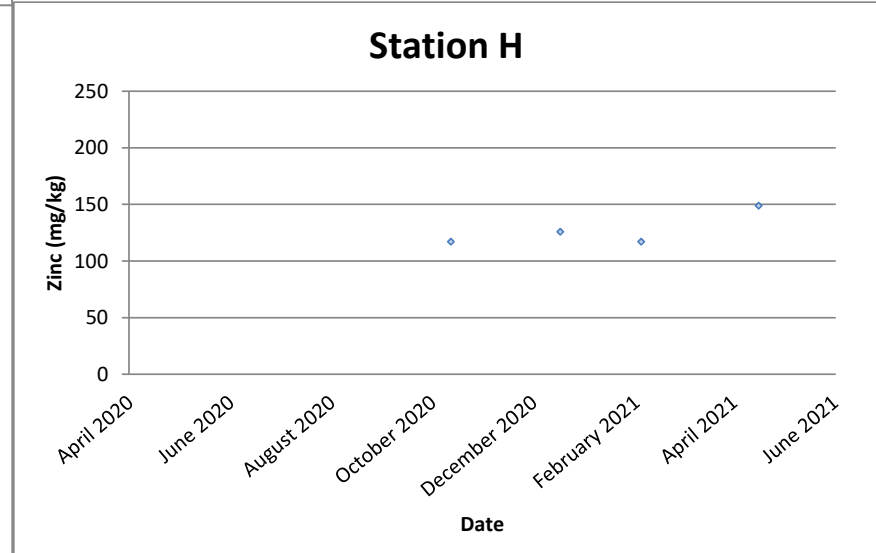
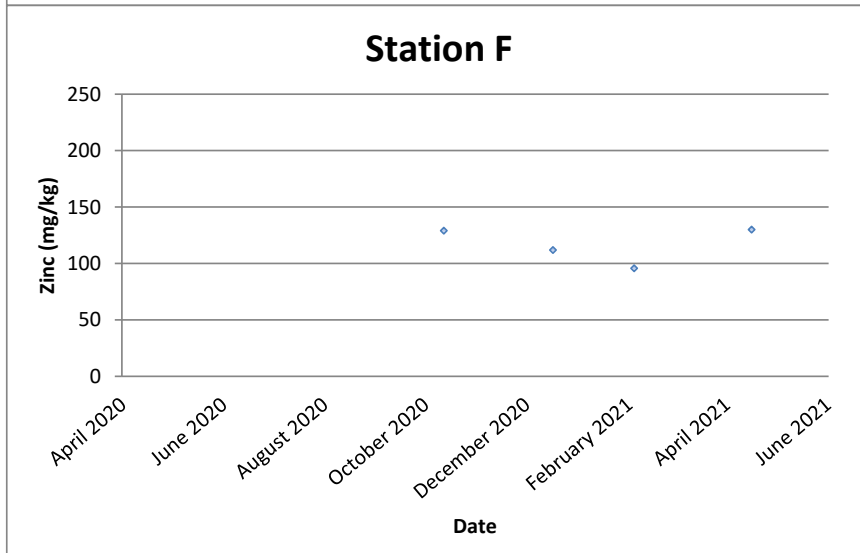
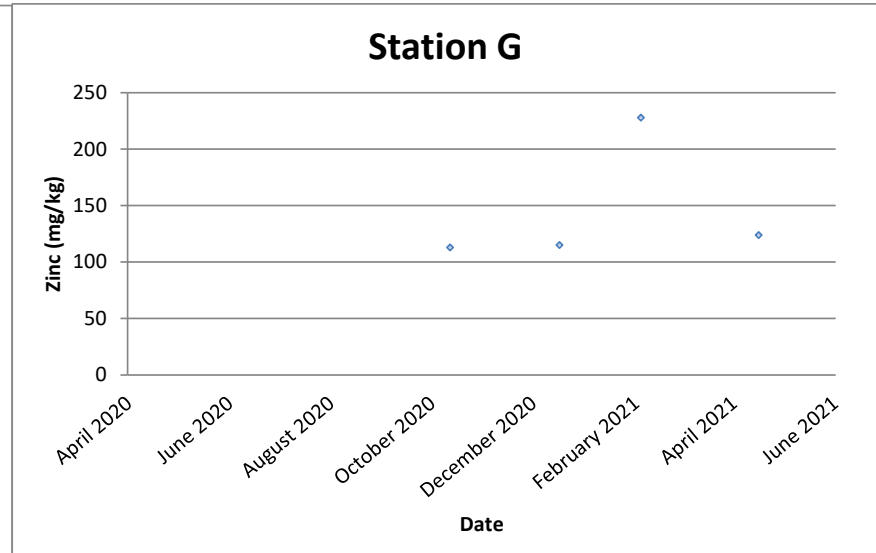
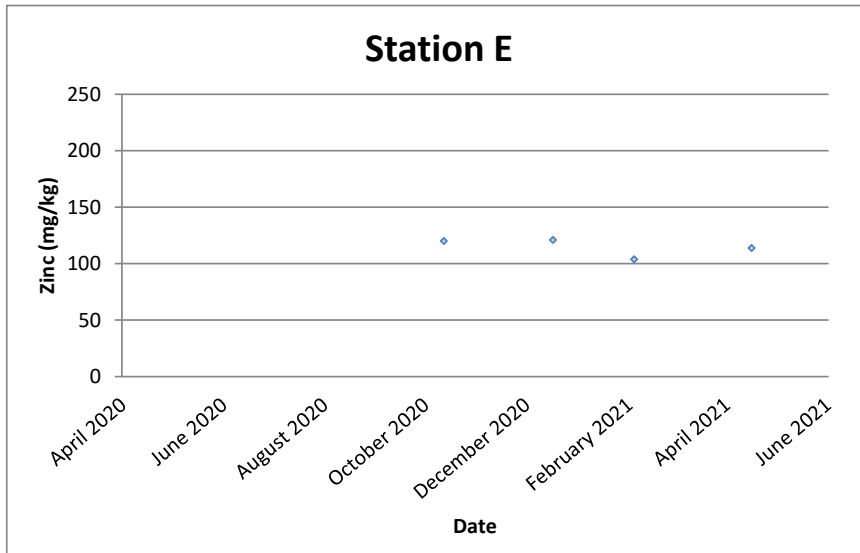
Nickel (mg/kg)



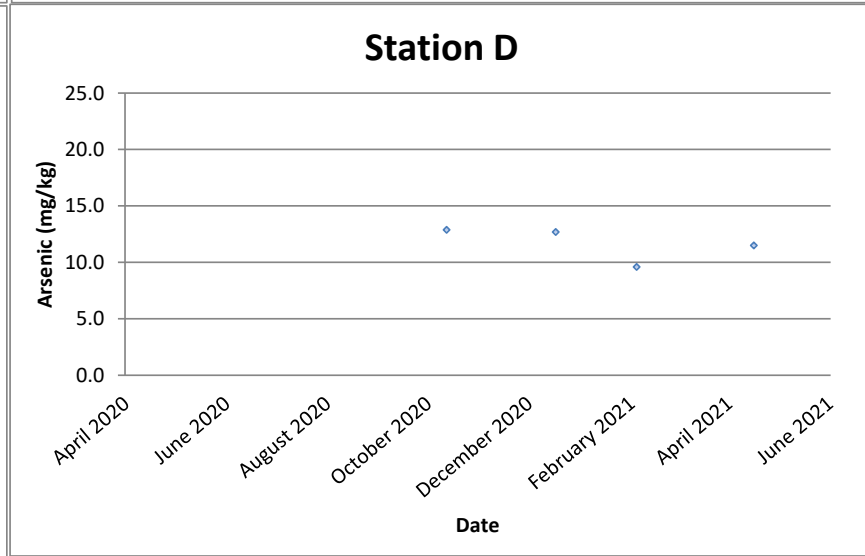
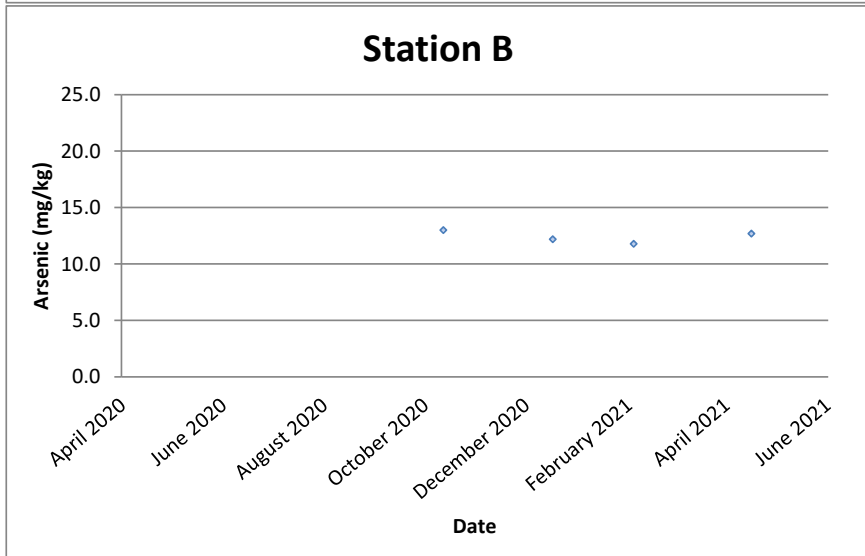
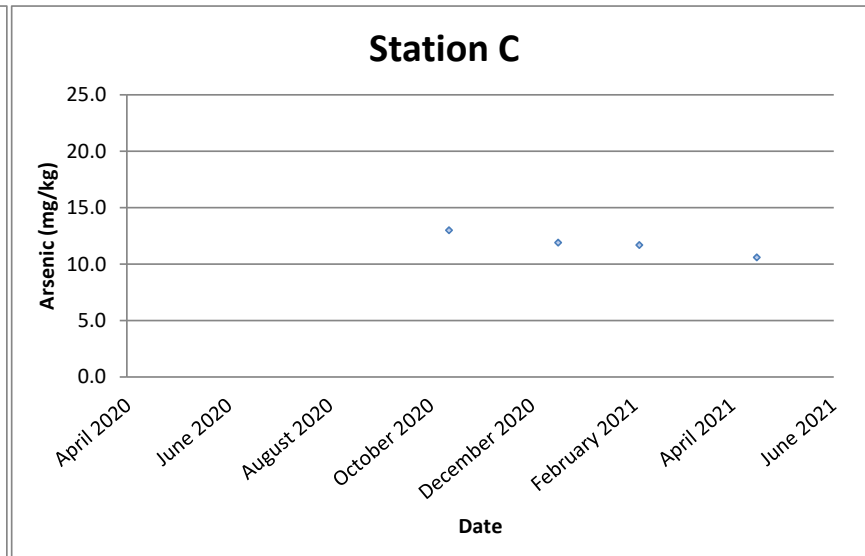
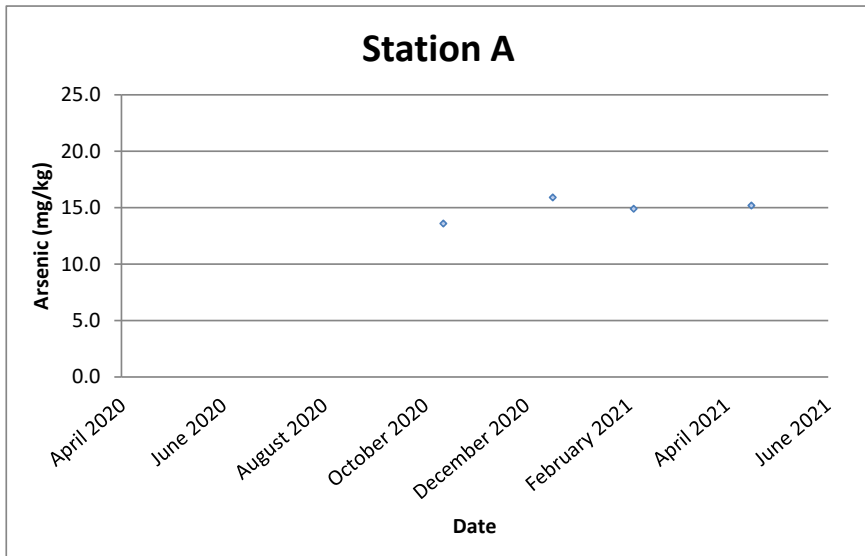
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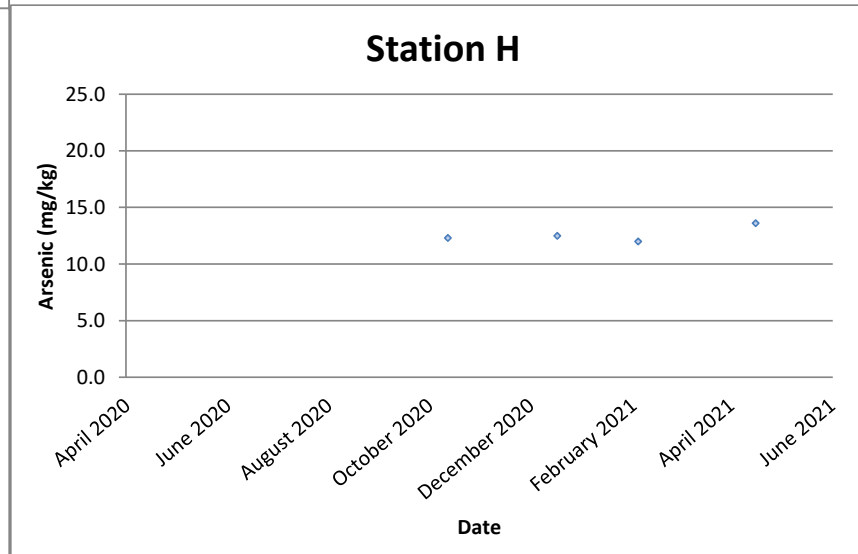
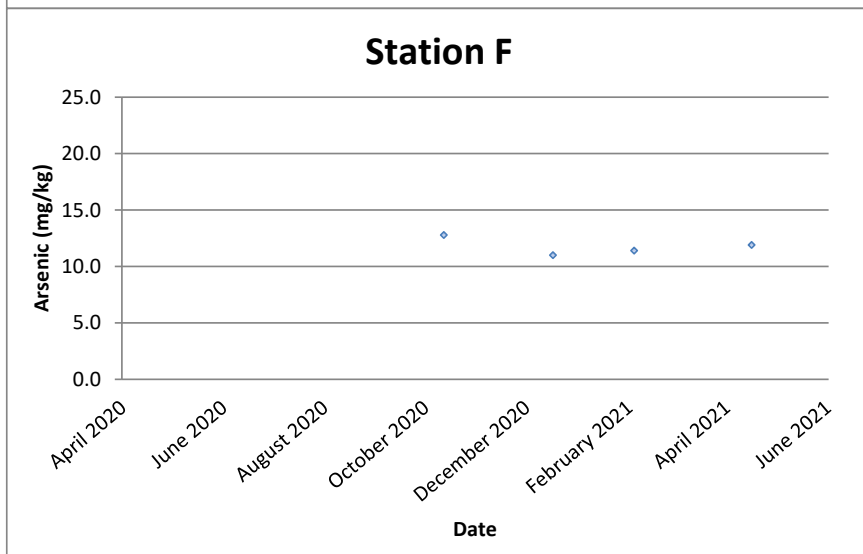
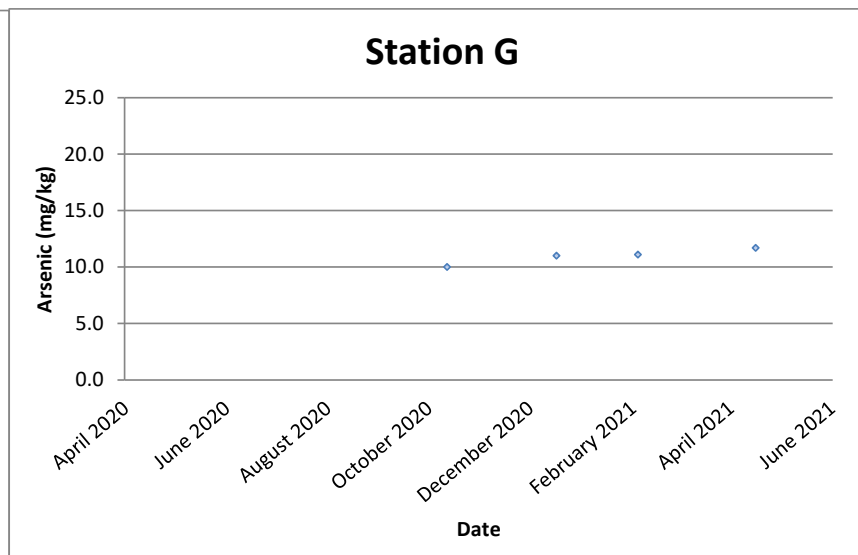
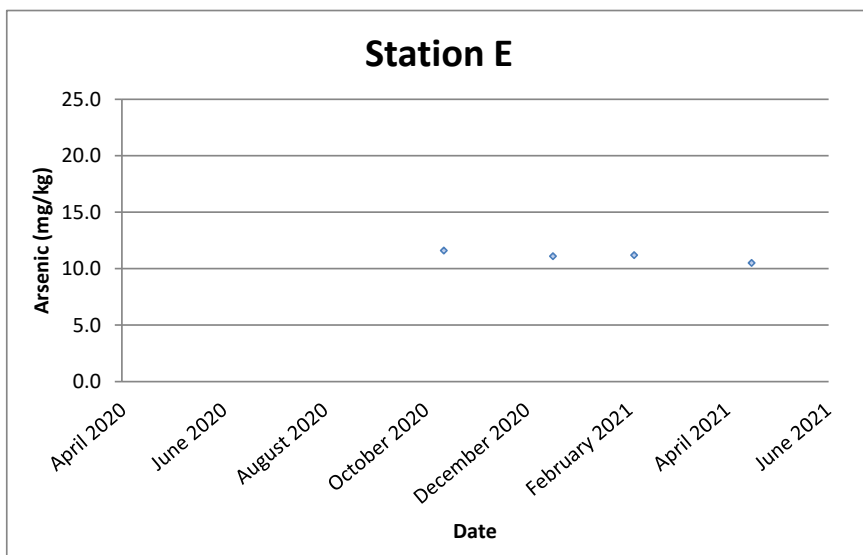
Zinc (mg/kg)



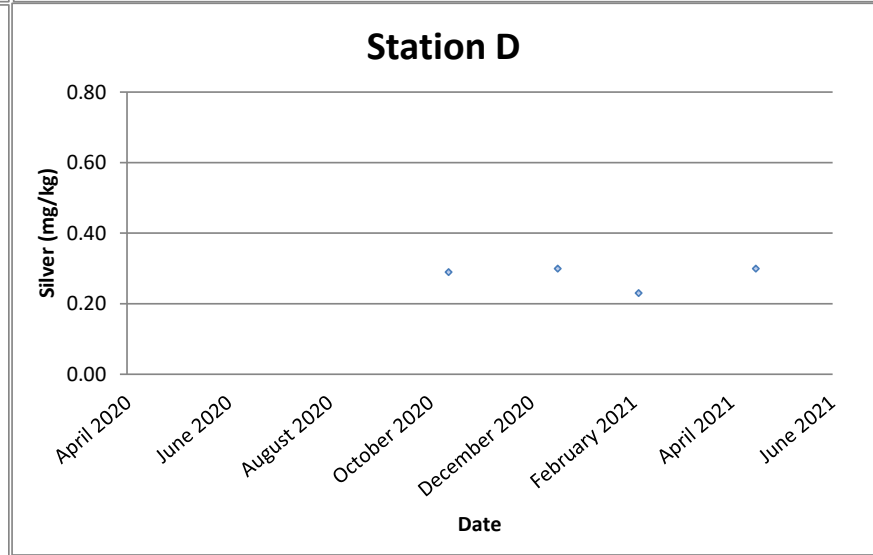
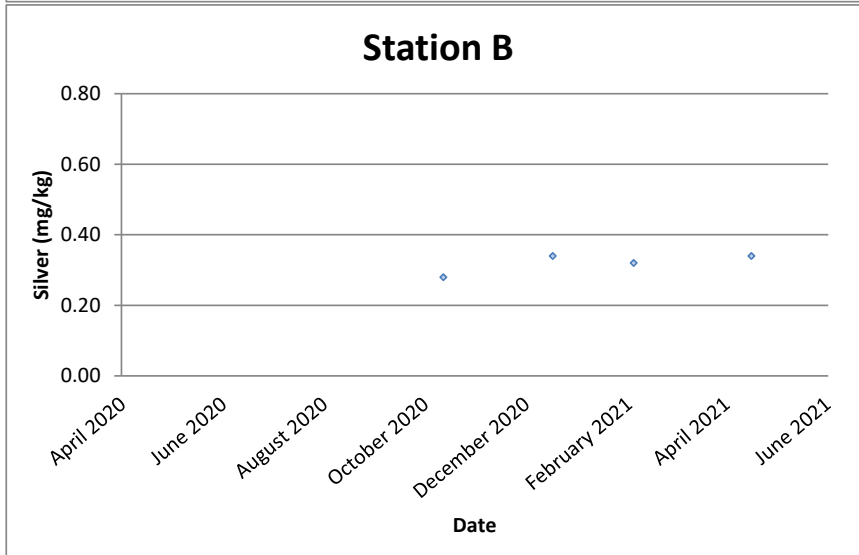
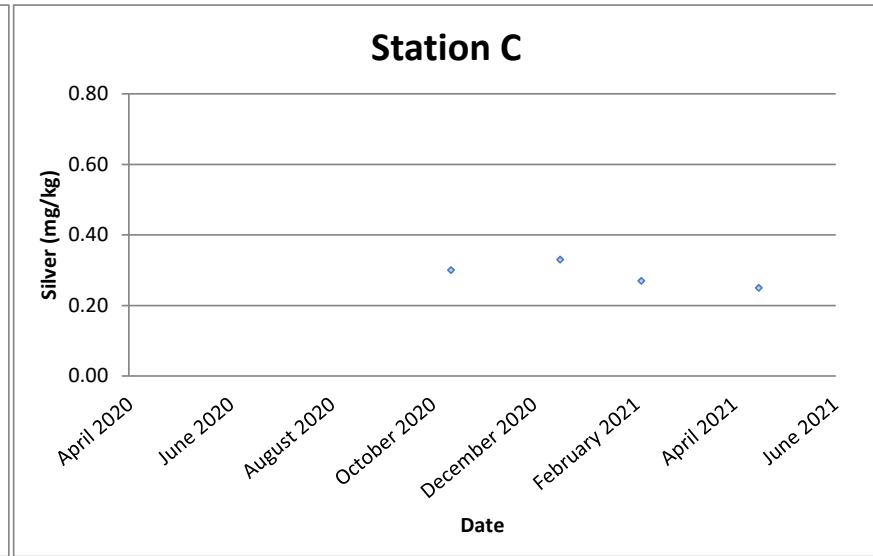
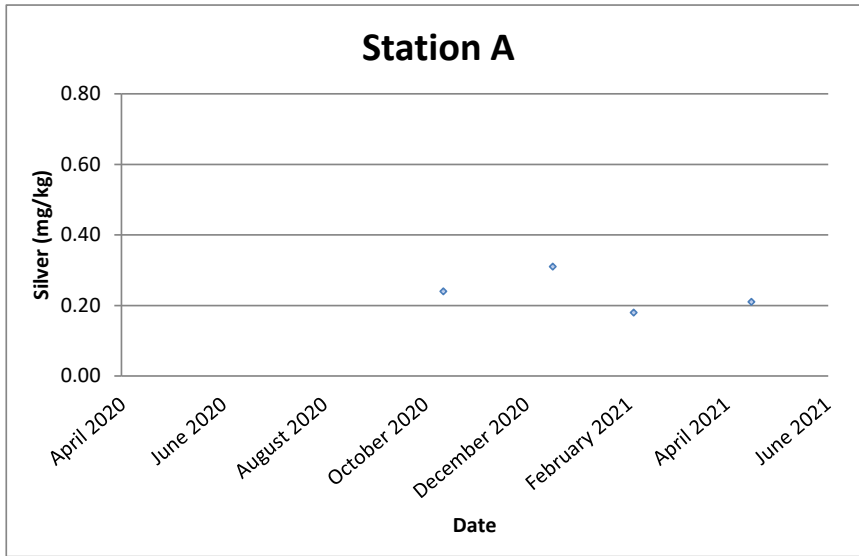
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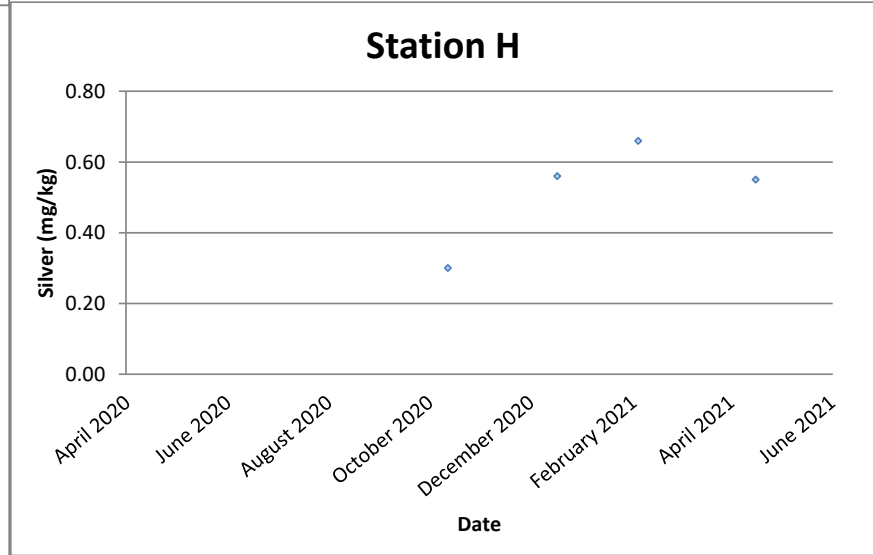
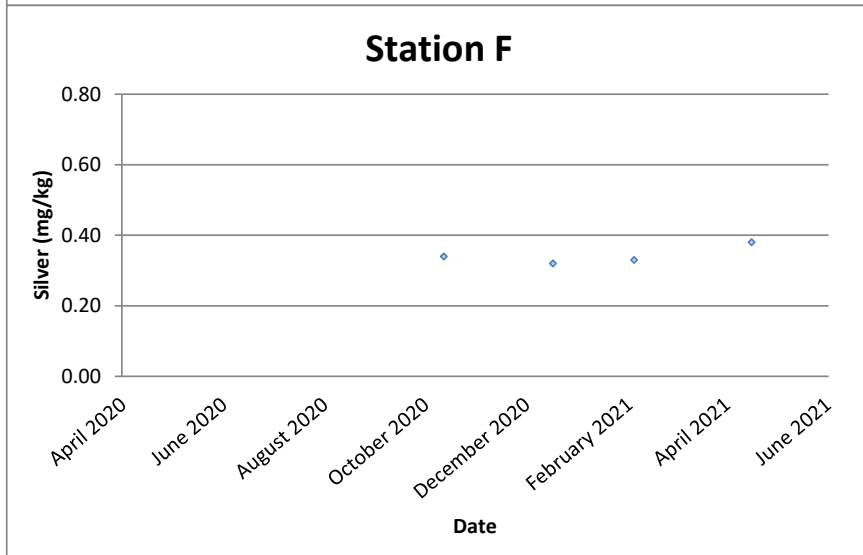
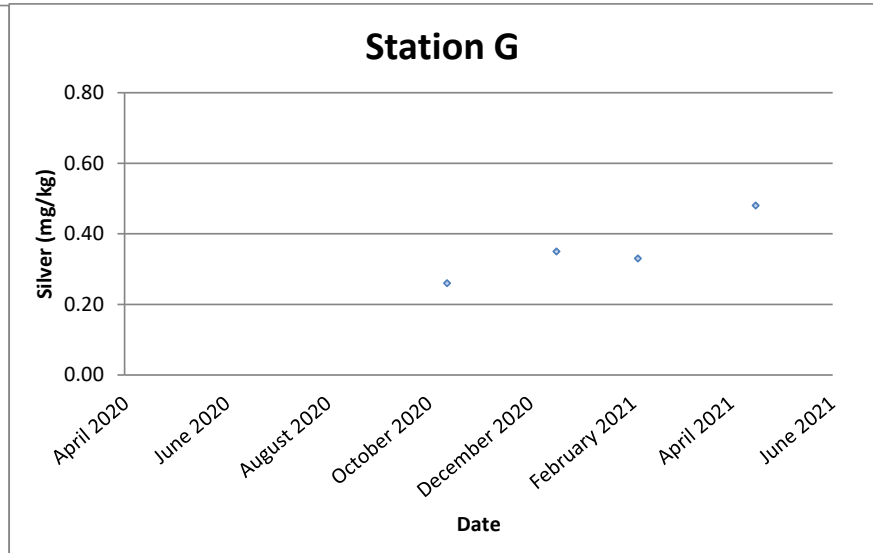
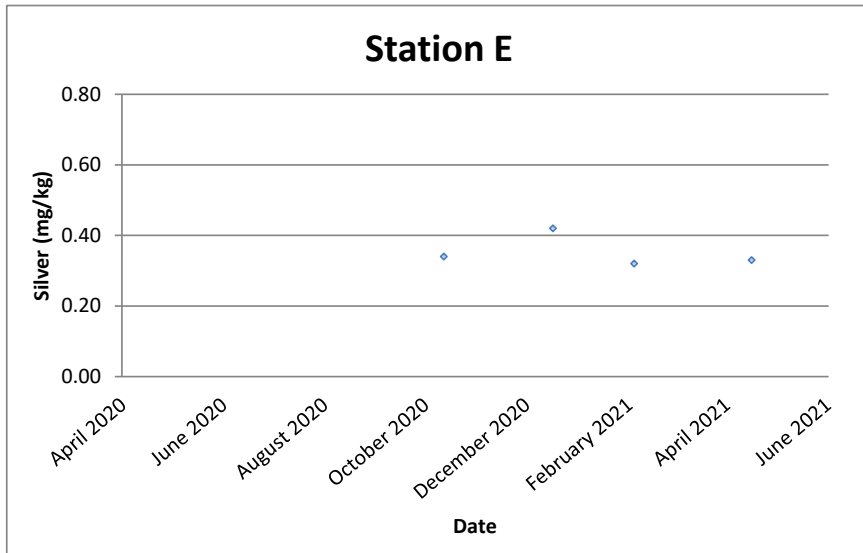
Arsenic (mg/kg)



Silver (mg/kg)



Silver (mg/kg)



FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix I Benthic Survey Report

Benthic Survey Report (April 2021)

Abundance

A total of 908 macrobenthic organisms was recorded from the eight monitoring stations during April 2021 monitoring period. Current result showed higher total abundance as compared to both dry (March 2004) and wet (August 2004) seasons baseline data (**Figure 1**) but was lower compared to the February 2021 results. The decrease in total abundance was due to the decrease in abundance particularly at reference stations A, B, E and F with respect to the previous monitoring period (February 2021). The arthropod *Gammarus* had lower abundance during the current monitoring period compared to February 2021 results. Members of this genus usually favour high concentration of dissolved oxygen (DO) and low water temperature for survival (Zadereev et. al, 2010). The current monitoring period was recorded with lower DO levels that ranged from 6.41 mg/L to 7.24 mg/L; and higher water temperatures that ranged from 24.50°C to 24.61°C relative to February 2021. The change in season with higher temperatures and lower levels of dissolved oxygen in the water column could have caused the lower abundance of *Gammarus* during the current monitoring period compared as to the February 2021 results.

A significant seasonal variation of the macrobenthic abundances was noted during the current monitoring period (F-value = 4.24; F-crit = 1.64; P-value = 0.0000001).

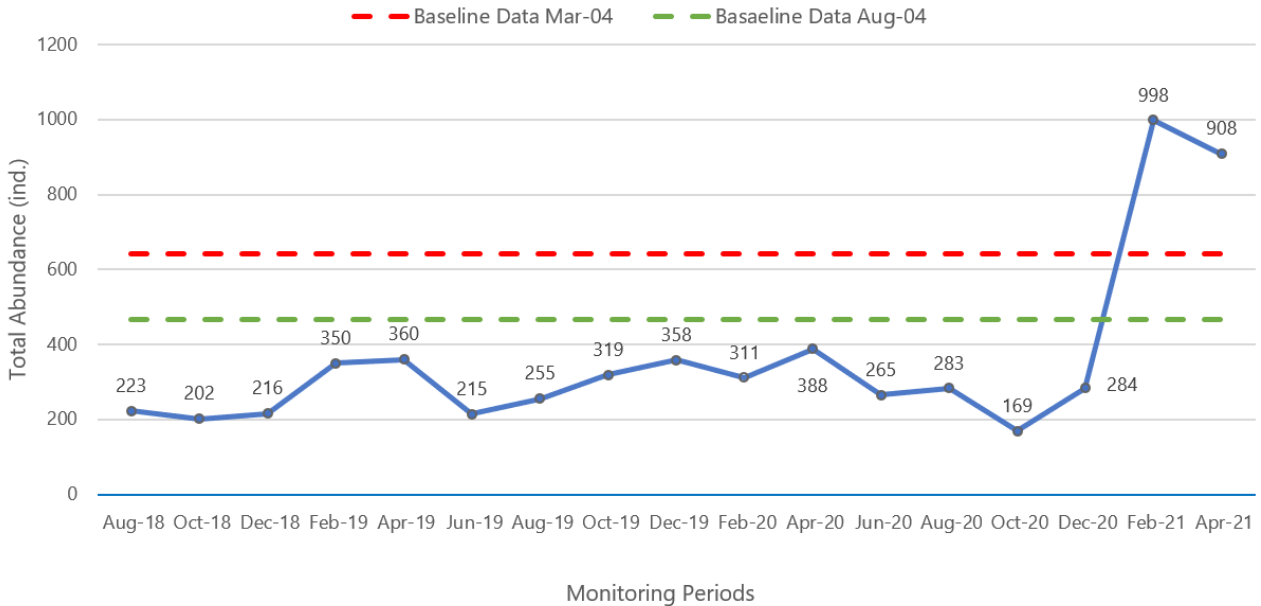


Figure 1. Total abundance (ind.) of benthic organisms across monitoring periods

The lowest abundance of 28 individuals (ind.) was recorded at Station F while the highest (253 ind.) was noted at Station G (**Figure 2**), both as reference stations. Current abundances in the impact stations C and D also increased relative to February 2021 monitoring results. Stations A, B, E and F were observed with decreased abundances as compared to February 2021 results while the rest of

the remaining stations were noted with increased abundances. Same with the previous monitoring periods, differences in the total abundance across the monitoring stations were still statistically significant (F-value = 2.92; F-crit = 2.07; P-value = 0.01).

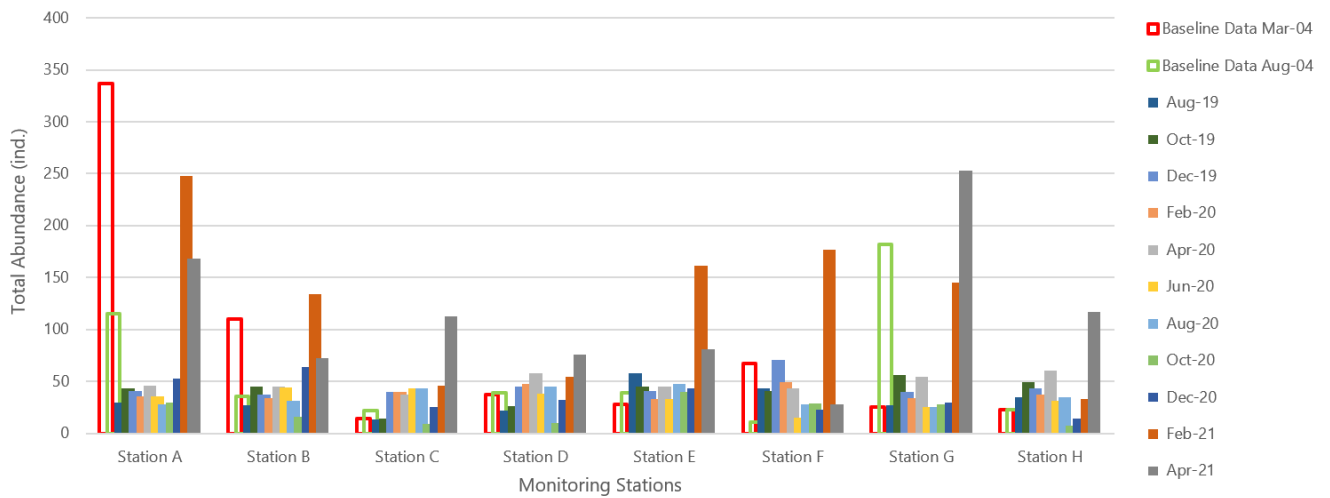


Figure 2. Total abundance (ind.) of benthic organisms across monitoring stations

Biomass

The total wet biomass recorded in the eight monitoring stations was 41.13 g with the highest biomass at the impact site Station D (10.47 g) and in reference Station E (10.1 g). Among the different genera observed in these two stations, the bivalve *Paphia* (9.47 g) at Station D and the bivalve *Meretrix* (4.79 g) at Station E, contributed to the current high recorded biomass. Meanwhile, it was in the reference Station F that the lowest (0.19 g) biomass was noted. Low biomass values were also observed in Stations B (1.23 g) and A (3.31 g). Furthermore, relative to the February 2021 period, a general decrease in biomass was observed during the current monitoring period. The data of all surveys are shown in Figure 3.

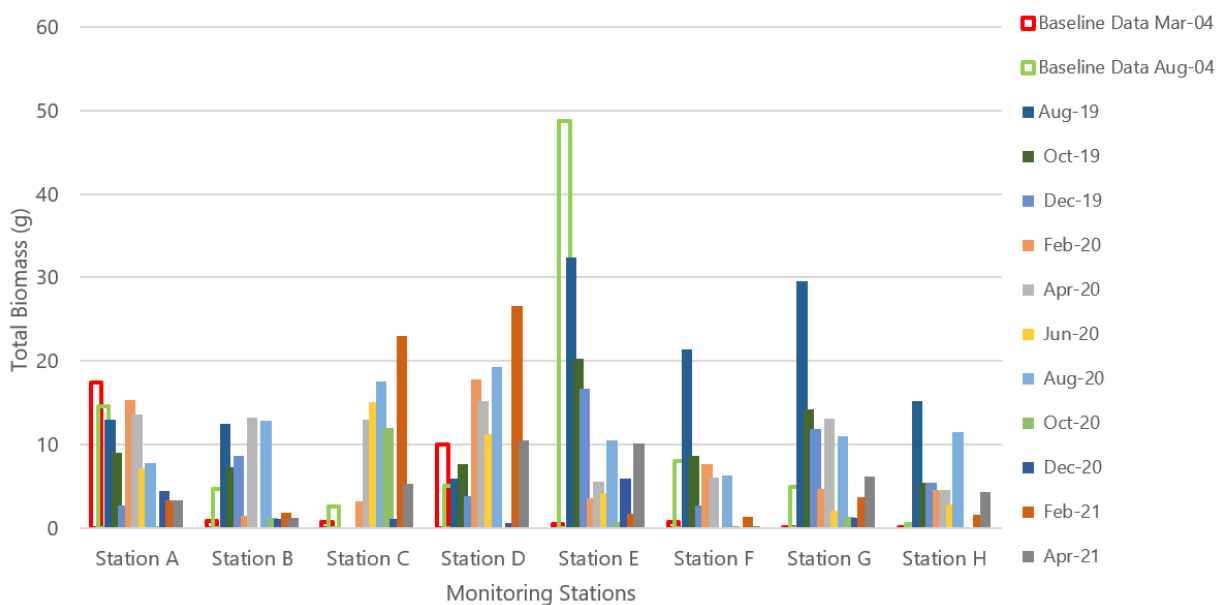


Figure 3. Total biomass (g) of benthic organisms

Taxonomic Composition

A total of four phyla comprising of 23 families and 30 genera were identified. During the current survey, the arthropods (56%) dominated the macrobenthic assemblage followed by the annelids (32%) and molluscs (11%) while the group with the lowest dominance was the echinoderms (1.43%). Even though arthropods were still the most abundant within this monitoring period, the percent composition was still lesser compared to February 2021 results. Meanwhile, the composition of annelids increased on this monitoring period relative to the February 2021 results.

There were no dominant genera (member species > 10) recorded during the current monitoring survey.

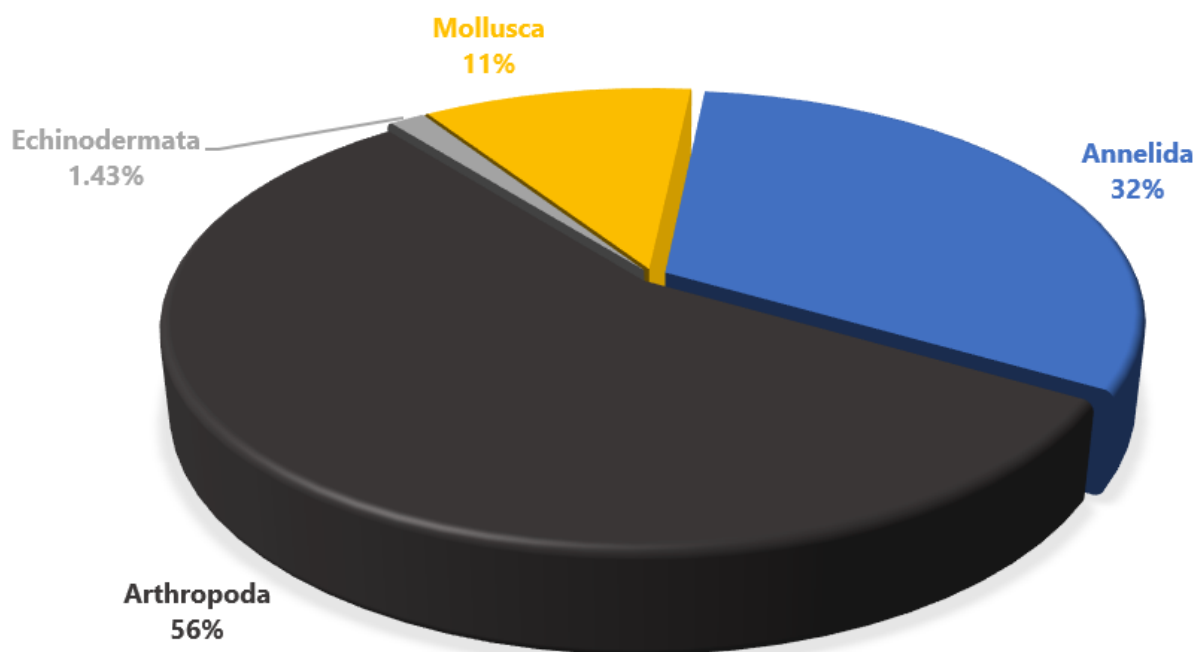


Figure 4. Percent composition of benthic organisms

Diversity

Benthic diversity index (H') ranged from 1.88 to 1.90 in the impact stations while its values ranged from 1.02 to 1.70 among the different reference stations. Impact stations had relatively higher diversity values as compared to reference stations.

Meanwhile, in terms of evenness index (J) values, reference Station G had the lowest value (0.38) and followed by another reference Station A (0.54). Current results showed that both the impact Stations C and D were able to maintain high evenness index relative to the December 2020 results but were

little lower compared to February 2021 monitoring results. Current results indicated an overall increase in diversity and evenness values from the baseline survey condition.

Abundance and biomass of macrobenthic organisms are shown in **Tables 1** and **2**, respectively. Data summary for different monitoring periods are presented in **Tables 3** to **7**. Representative photos of specimen and assemblages are shown in the last pages of this benthic survey report.

References:

Zadereev, E.S, A. P. Tolomeyev, A. V. Drobotov, A. Y. Emeljanova and M. V. Gubanov. 2010. The vertical distribution and abundance of *Gammarus lacustris* in the pelagic zone of the meromictic lakes Shira and Shunet (Khakassia, Russia). *Aquat Ecol.* 44:531–539

Data Summaries

Table 1. Abundance of macrobenthic communities in the eight monitoring stations, April 2021

Phylum	Class	Order	Family	Genus	SHW-Benthic Stations								
					A	B	C	D	E	F	G	H	
Annelida	Polychaeta	Terebellida	Terebellidae	<i>Amaena</i>	1								
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella</i>	31	30	10	7	3	6	17	22	
Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Chloeia parva</i>							1		
Annelida	Polychaeta	Phyllodocida	Polynoidae	<i>Lepidonotus (L. cirratus)</i>			1						
Annelida	Polychaeta		Maldanidae	<i>Maldanella</i>					1				
Annelida	Polychaeta	Scolecida	Orbiniidae	<i>Naineris</i>	1								
Annelida	Polychaeta	Phyllodocida	Nereidae	<i>Neanthes</i>	1								
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Nephtys</i>	4	8	19	9	12	8	3	13	
Annelida	Polychaeta	Aciculata	Nereidae	<i>Nereis</i>	2	9	3	2	3	6		8	
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Notomastus</i>		3							
Annelida	Polychaeta	Terebellida	Pectinariidae	<i>Pectinaria (Lagis)</i>			2						
Annelida	Polychaeta	Errantia	Phyllodocidae	<i>Phyllodoce</i>		4		1					
Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i>	5		14				11		
Annelida	Polychaeta	Terebellida	Terebellidae	<i>Terebella</i>			1				4	2	
Arthropoda	Crustacea	Decapoda	Alpheidae	<i>Alpheus</i>		2		2	1			4	
Arthropoda	Malacostraca	Amphipoda	Gammaridae	<i>Gammarus</i>	100	7	45	31	47	7	196	61	
Arthropoda	Crustacea	Decapoda	Dotillidae	<i>Ilyoplax</i>	1								
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile				1			1	2	
Echinodermata	Holothuroidea	Molpadiida	Caudinidae	<i>Acaudina</i>		1	2	1					

Phylum	Class	Order	Family	Genus	SHW-Benthic Stations							
					A	B	C	D	E	F	G	H
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus</i>	1			4	4			
Mollusca	Bivalvia	Veneroida	Tellinidae	<i>c.f. Angulus</i>	4	3	5	7	1		6	
Mollusca	Bivalvia	Veneroida	Veneridae	<i>c.f. Meretrix (M. lusoria)</i>	5	1			1		1	3
Mollusca	Bivalvia	Veneroida	Veneridae	<i>c.f. Phylloda foliacea</i>	5	1	8	1	2	1		
Mollusca	Bivalvia	Cardiida	Cardiidae	<i>Cardium</i>					1			
Mollusca	Bivalvia	Veneroida	Tellinidae	<i>Macoma</i>		1			1			
Mollusca	Bivalvia	Mytilida	Mytilidae	<i>Modiolus</i>	3						4	
Mollusca	Gastropoda	Buccinoidea	Nassariidae	<i>Nassarius</i>							1	
Mollusca	Bivalvia	Veneroida	Veneridae	<i>Paphia (P. undulata)</i>	3	2	3	10	1		4	2
Mollusca	Bivalvia	Venerida	Veneridae	<i>Placamen isabellina</i>					1			
Mollusca	Bivalvia	Adapedonta	Solenidae	<i>Solen</i>							1	
Mollusca	Bivalvia	Veneroida	Veneridae	<i>Timoclea scabra</i>	1				2		3	

Notes: Empty cells denote that the individual is not recorded in the station

Table 2. Biomass (g) of macrobenthic communities in the eight monitoring stations, April 2021

Phylum	Class	Order	Family	Genus	SHW-Benthic Stations							
					A	B	C	D	E	F	G	H
Annelida	Polychaeta	Terebellida	Terebellidae	<i>Amaena</i>	0.0108							
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella</i>	0.3624	0.0301	0.0403	0.0635	0.0038	0.0067	0.2127	0.0536
Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Chloeia parva</i>							2.3208	

Phylum	Class	Order	Family	Genus	SHW-Benthic Stations							
					A	B	C	D	E	F	G	H
Annelida	Polychaeta	Phyllodocida	Polynoidae	<i>Lepidonotus (L. cirratus)</i>			0.0004					
Annelida	Polychaeta		Maldanidae	<i>Maldanella</i>					0.0001			
Annelida	Polychaeta	Scolecida	Orbiniidae	<i>Naineris</i>	0.2162							
Annelida	Polychaeta	Phyllodocida	Nereidae	<i>Neanthes</i>	0.0175							
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Nephtys</i>	0.0215	0.0323	0.2154	0.1194	0.1820	0.1219	0.0252	0.1625
Annelida	Polychaeta	Aciculata	Nereidae	<i>Nereis</i>	1.7243	0.3093	0.0628	0.0397	0.0487	0.0286		0.0665
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Notomastus</i>		0.1188						
Annelida	Polychaeta	Terebellida	Pectinariidae	<i>Pectinaria (Lagis)</i>			0.0333					
Annelida	Polychaeta	Errantia	Phyllodocidae	<i>Phyllodoce</i>		0.0326		0.0185				
Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i>	0.0114		0.0288				0.0062	
Annelida	Polychaeta	Terebellida	Terebellidae	<i>Terebella</i>			0.0150				0.1065	0.0360
Arthropoda	Crustacea	Decapoda	Alpheidae	<i>Alpheus</i>		0.0001		0.0001	0.0001			0.0003
Arthropoda	Malacostraca	Amphipoda	Gammaridae	<i>Gammarus</i>	0.0428	0.0015	0.0128	0.0148	0.0317	0.0017	0.0454	0.0520
Arthropoda	Crustacea	Decapoda	Dotillidae	<i>Ilyoplax</i>	0.1008							
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile				0.0244			0.0015	0.0124
Echinodermata	Holothuroidea	Molpadiida	Caudinidae	<i>Acaudina</i>		0.2010	3.6608	0.0719				
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus</i>	0.0002			0.1146	0.1446			
Mollusca	Bivalvia	Veneroida	Tellinidae	<i>c.f. Angulus</i>	0.1629	0.0461	0.2115	0.3617	0.0251		0.2399	
Mollusca	Bivalvia	Veneroida	Veneridae	<i>c.f. Meretrix (M. lusoria)</i>	0.1283	0.1650			4.7912		0.6899	2.8668
Mollusca	Bivalvia	Veneroida	Veneridae	<i>c.f. Phylloda foliacea</i>	0.2284	0.0250	0.6507	0.1651	0.1279	0.0325		
Mollusca	Bivalvia	Cardiida	Cardiidae	<i>Cardium</i>					0.0047			
Mollusca	Bivalvia	Veneroida	Tellinidae	<i>Macoma</i>		0.0635			0.0136			
Mollusca	Bivalvia	Mytilida	Mytilidae	<i>Modiolus</i>	0.0788						0.1173	

Phylum	Class	Order	Family	Genus	SHW-Benthic Stations								
					A	B	C	D	E	F	G	H	
Mollusca	Gastropoda	Buccinoidea	Nassariidae	<i>Nassarius</i>								0.1301	
Mollusca	Bivalvia	Veneroidea	Veneridae	<i>Paphia (P. undulata)</i>	0.1956	0.2024	0.3588	9.4741	3.9603			1.8396	1.1265
Mollusca	Bivalvia	Venerida	Veneridae	<i>Placamen isabellina</i>					0.7175				
Mollusca	Bivalvia	Adapedonta	Solenidae	<i>Solen</i>								0.3609	
Mollusca	Bivalvia	Veneroidea	Veneridae	<i>Timoclea scabra</i>	0.0128				0.0523			0.0629	

Notes: Empty cells denote that the individual is not recorded in the station

Table 3. Summary of Benthic Survey Data, April 2021

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	168	3.31	16	1.49	0.54
B	72	1.23	13	1.70	0.66
C*	113	5.29	13	1.88	0.76
D*	76	10.47	12	1.90	0.76
E	81	10.1	15	1.61	0.59
F	28	0.19	5	1.48	0.92
G	253	6.16	14	1.02	0.38
H	117	4.38	9	1.50	0.68
TOTAL	908	41.13			

*impact sites

Table 4. Summary of Benthic Survey Baseline Data, August 2004

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	115	14.56	24	0.93	0.29
B	36	4.76	14	0.89	0.34
C*	22	2.66	13	0.80	0.31
D*	39	5.07	11	0.62	0.26
E	39	48.69	16	0.89	0.32
F	11	8.07	9	0.68	0.31
G	182	4.91	31	1.10	0.32
H	23	0.49	11	0.81	0.34

*impact sites

Table 5. Summary of Benthic Survey Baseline Data, March 2004

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	337	17.39	38	0.78	0.21
B	110	0.9	21	0.82	0.27
C*	14	0.7	10	0.69	0.30
D*	37	10.07	20	1.01	0.34
E	28	0.44	11	0.76	0.32
F	67	0.78	16	0.85	0.31
G	25	0.09	9	0.64	0.29
H	23	0.15	11	0.44	0.18

*impact site




Table 6. Taxonomic Composition (%) of Benthic Survey

Taxa	Mar-04	Aug-04	Feb-19	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20	Apr-20	Jun-20	Aug-20	Oct-20	Dec-20	Feb-21	Apr-21
Annelida	80.19	73.29	54.99	70.28	0.47	64.31	66.14	59.78	60.77	56.44	69.06	63.25	51.48	50.35	22.75	31.72
Sipuncula	0.78	0.21	0.00	0.00	0.00	1.57	1.25	0.00	1.29	0.52	1.13	0.35	1.78	1.06	0.70	0.00
Arthropoda	11.23	18.80	20.23	10.83	4.65	9.80	19.75	14.53	13.83	28.87	8.30	13.43	18.93	20.77	70.14	55.95
Echinodermata	0.62	3.63	3.42	4.72	0.47	5.10	3.13	1.68	1.61	0.77	2.26	3.53	2.96	2.82	0.30	1.43
Cnidaria	1.72	0.43	0.85	0.00	1.86	0.39	0.00	0.84	0.32	0.26	0.75	0.00	1.18	0.00	0.00	0.00
Mollusca	5.46	3.42	19.94	13.33	0.47	17.25	8.15	22.35	19.94	11.60	15.85	15.90	18.93	24.65	5.81	10.90
Chordata	0.00	0.21	0.28	0.56	0.47	1.18	0.94	0.00	0.32	0.52	1.13	1.41	0.00	0.35	0.10	0.00
Nemertea	0.00	0.00	0.28	0.28	98.60	0.39	0.63	0.84	1.93	1.03	1.51	2.12	4.73	0.00	0.20	0.00

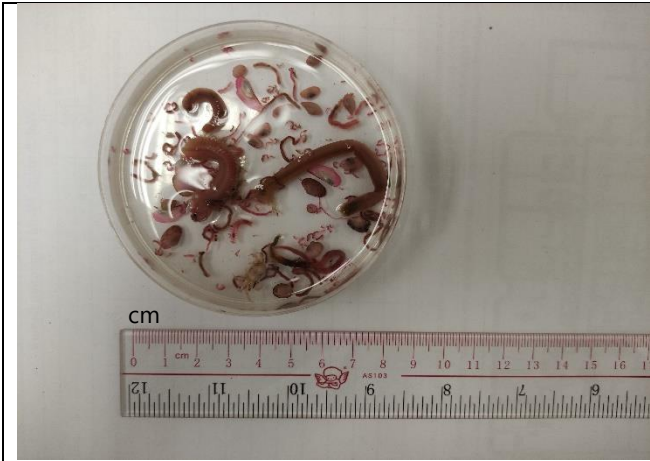
Table 7. Taxonomic Composition (abundance) of Benthic Survey

Taxa	Mar-04	Aug-04	Feb-19	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20	Apr-20	Jun-20	Aug-20	Oct-20	Dec-20	Feb-21	Apr-21
Annelida	514	343	193	253	124	164	211	214	189	219	183	179	87	143	227	288
Sipuncula	5	1	0	0	0	4	4	0	4	2	3	1	3	3	7	0
Arthropoda	72	88	71	39	17	25	63	52	43	112	22	38	32	59	700	508
Echinodermata	4	17	12	17	10	13	10	6	5	3	6	10	5	8	3	13
Cnidaria	11	2	3	0	2	1	0	3	1	1	2	0	2	0	0	0
Mollusca	35	16	70	48	59	44	26	80	62	45	42	45	32	70	58	99
Chordata	0	1	1	2	2	3	3	0	1	2	3	4	0	1	1	0
Nemertea	0	0	1	1	1	1	2	3	6	4	4	6	8	0	2	0

Photos of Representative Taxa Identified

		
A.) Annelida, <i>Chloeia parva</i>	B) Arthropoda, <i>Ilyoplax</i>	C.) Bivalvia, <i>Paphia undulata</i>

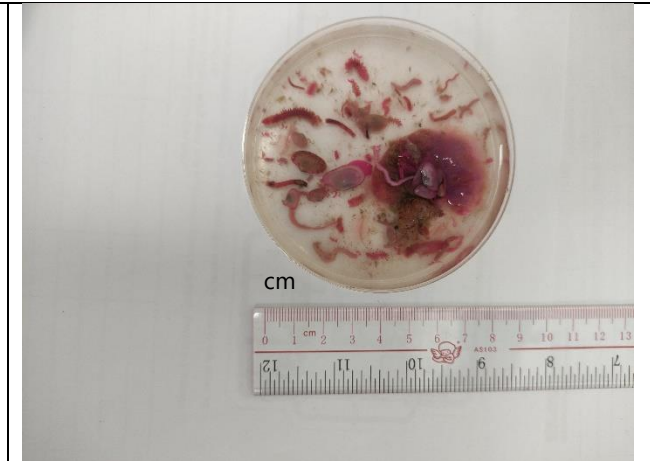
Photos of Macrobenthic Assemblages



A) Station A



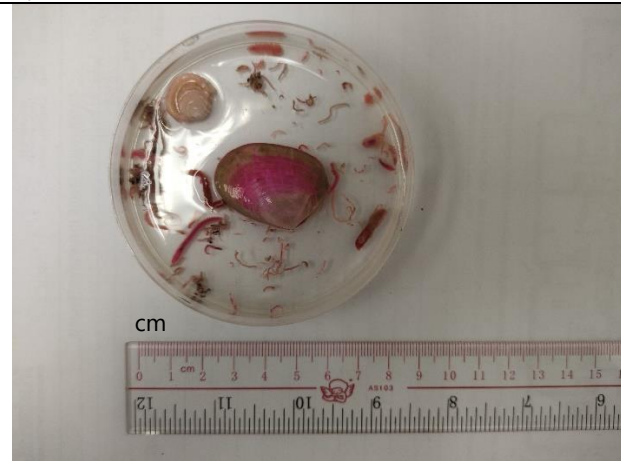
B) Station B



C) Station C



D) Station D



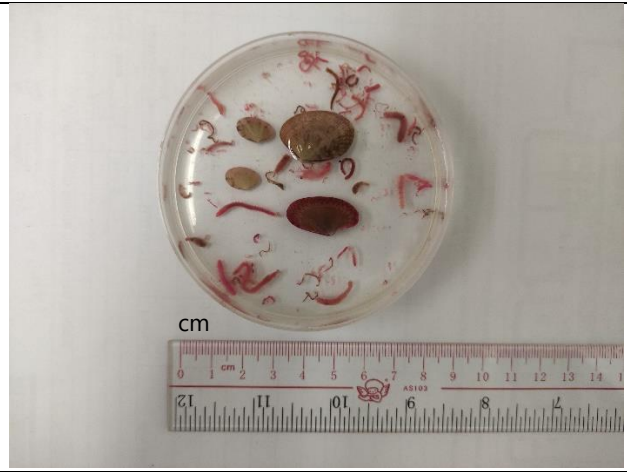
E) Station E



F) Station F



G) Station G



H) Station H

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix J

Photos of Grab Samplers

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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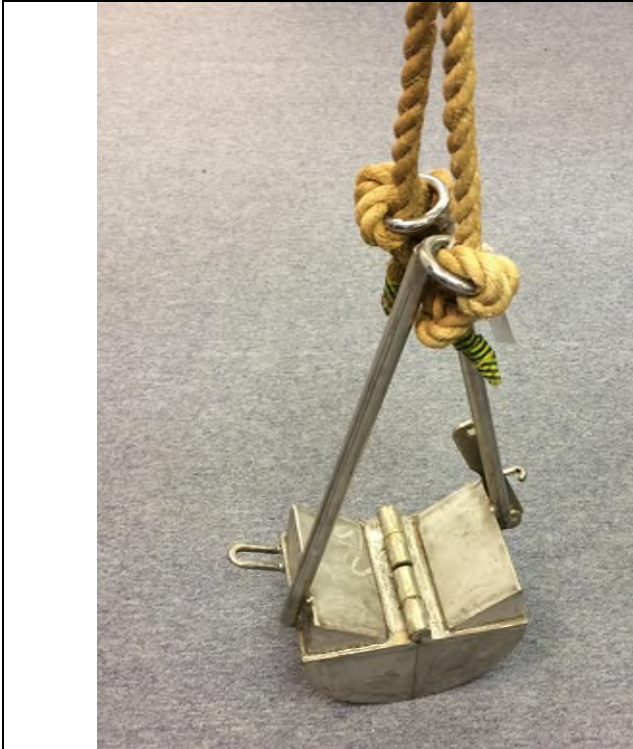


Photo 1. A ponar grab sampler

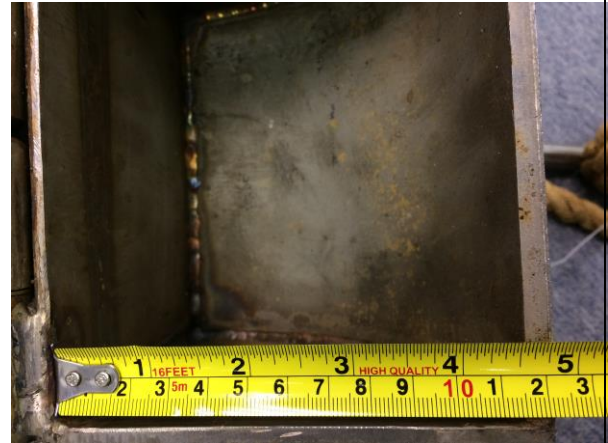


Photo 2. Grab dimension 1



Photo3. Grab dimension 2



Photo4. Grab dimension 3

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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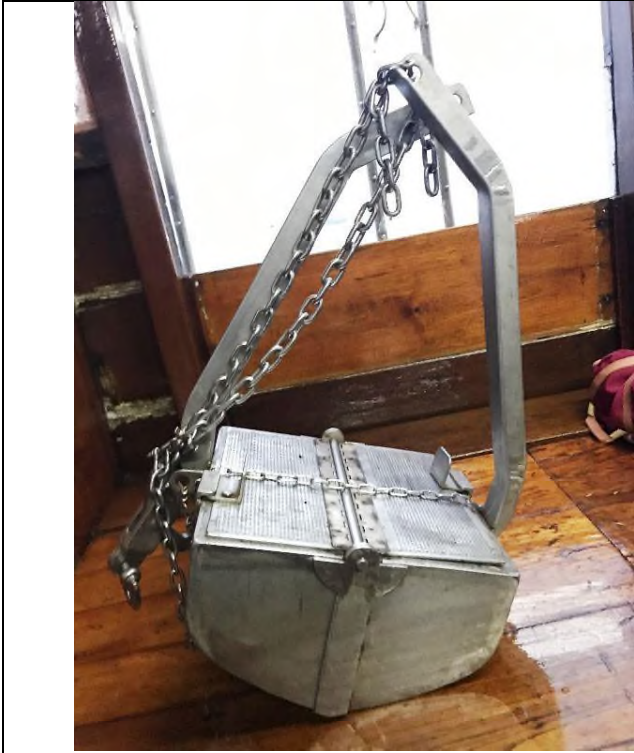


Photo 1. A modified Van Veen grab sampler



Photo 2. Grab dimension 1



Photo3. Grab dimension 2



Photo4. Grab dimension 3

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Appendix K Environmental Complaints Log

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From and Received By	Nature of Complaint	Investigation
1	28 November 2019	EPD	According to EPD, a member of public complained that SHWSTW cause a malodour and was smelled as far as the Discovery Bay tunnel portal.	As advised by DSD, the operation of Siu Ho Wan Sewage Treatment Works was properly functioned and there was no special activity on 28 th November 2019. Due to the possibility of having unpleasant gases or odours emitted from these non-DSD premises cannot be precluded, the complaint is considered as non-project related.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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Appendix L

Environmental Mitigation Implementation Schedule (EMIS)

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0627A

EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
Air Quality					
NA	4.5	NA	Odour reduction measures like aeration, chemical dosing system shall be implemented to reduce any odour impacts to an acceptable level.	SHWSTW	Implemented
3.4	4.5	NA	Sewage treatment works including sludge thickening tanks, the sludge pump house and sludge press house shall be completely enclosed.	SHWSTW	Implemented
3.4	4.5	NA	Exhaust air shall be ventilated to an odour scrubber prior to discharge. Ventilating air to a biological treatment unit with 95% odour removal efficiency prior to stack exhaust shall be implemented	SHWSTW	Implemented
Water Quality					
3.3	NA	4.01	To avoid impacts on the marine ecology due to effluent discharge, the disinfection facility as in Part B of the EP shall be equipped with an UV disinfection system capable of removing at least 99.9% of E.coli from the sewage	SHWSTW	Implemented
Waste Management					
3.6	NA	NA	Transportation of sludge shall be carried out in fully enclosed containers, or be placed in sludge skips with tarpaulin covers	SHWSTW	Implemented
NA	NA	5.02	Trip-ticket system mentioned shall be implemented. Trip-ticket is required for each truckload delivered to the landfills facilities according to WBTC No. 31/2004.	SHWSTW	Implemented
NA	NA	5.02	The acceptance criteria for Landfill disposal should be followed, i.e. solid content of sludge waste should be more than 30%.	SHWSTW	Implemented
NA	NA	5.02	The disposal of grit & debris (if any) generated during primary screening works should follow the requirement set in the WMP Section 4.05.	SHWSTW	Implemented
NA	NA	5.03	The wet sludge should be temporarily stored at the sludge buffer tank. It should then be transported to the centrifuge building for dewatering and discharged to the container for disposal. The whole process should be managed by the automatic electronic electronic system and monitored by the operators during operation.	SHWSTW	Implemented
NA	NA	5.04	The other solid waste material such as sediment and grit, refuse containers or collection bags should be temporarily stored in slips at designated area. Operators should ensure sufficient space is identified and provided for temporary storage of waste materials to facilitate collection. Storage of waste material on site will be kept to a minimum to avoid nuisance to local residents.	SHWSTW	Implemented
NA	NA	5.05	Chemical wastes which likely to be generated by activities arise from the maintenance, shall followed the Waste Disposal (Chemical Waste) (General) Regulation, includes Schedule 1 of the Regulation.	SHWSTW	Implemented
NA	NA	5.06	In case of unlikely occurred chemical spillage, procedures should be followed as according to the WMP Section 5.06.	SHWSTW	Implemented
NA	NA	5.07	Temporary storage areas should be identify and provided for the temporary storage of general	SHWSTW	Implemented

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Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
			refuse to facilitate collection		
NA	NA	5.07	Domestics wastes refuse generated on-site will be stored in enclosed bins or compaction units separately	SHWSTW	Implemented
NA	NA	5.07	Sufficient dustbins should be provided for domestic waste if required.	SHWSTW	Implemented
NA	NA	5.07	Domestics wastes should be cleared daily and will be disposed off to the nearest licensed landfill or refuse transfer station.	SHWSTW	Implemented
NA	NA	5.07	Separate labeled bins should be provided to segregate the waste generated by workforce. Waste recycle collector should be employed to collect the segregated waste	SHWSTW	Implemented
NA	NA	5.07	Cardboard and paper packaging (for plant, equipment and materials) should be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other materials.	SHWSTW	Implemented
NA	NA	5.07	Office waste should be minimized through using papers on both sides. Communication by electronic means should be used as far as possible.	SHWSTW	Implemented
NA	NA	5.07	The burning of refuse on-site is prohibited by law and shall not be undertaken	SHWSTW	Implemented
NA	NA	5.07	Toilet wastewater shall be transported to the STW for treatment	SHWSTW	Implemented
NA	NA	5.07	Arrangement for collection of recyclable materials by recycling contractors should be followed as according to the WMP Section 5.07.	SHWSTW	Implemented
NA	NA	5.08	All recycling materials removed by the recycling contractors should be properly recorded before the removal. The natures and quantities of the recycling materials, the date of removal and the name of the recycling contractor should be recorded.	SHWSTW	Implemented
NA	NA	5.09	To maintain the site in a clean and tidy condition during the operation, general measures specified in the WMP should be implemented on site at all times. Regular site inspections shall be undertaken by the management team to ensure the measures are implemented.	SHWSTW	Implemented
NA	NA	5.10	Daily cleaning should be performed daily after work within the plant and the public areas immediately next to the site.	SHWSTW	Implemented
NA	NA	5.11	The work officer in charge of the corresponding area should perform daily inspection on the items mentioned in the WMP Section 5.10. If observations were discovered, the work officer should record the result of the inspection on an inspection checklist with photos taken and submitted to the inspectors or Chief Technical Officer for review on the following day. Any deficiency should be rectified promptly.	SHWSTW	Implemented
NA	NA	5.12	Weekly tidying should be performed weekly within the site.	SHWSTW	Implemented
NA	NA	5.13	The inspector should perform Weekly Inspection on the items mentioned in the WMP Section 5.12. If observations were discovered, the work officer should record the result on an inspection checklist and submitted to the Chief Technical Officer for review on the following day. Any deficiency should be rectified promptly.	SHWSTW	Implemented

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Fugro Development Centre,
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Hong Kong.

Tel : +852 2450 8233
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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
NA	NA	5.14	All wastes generated through the operational phase will be managed in accordance with the protocols set out in the WMP Section 5.14.	SHWSTW	Implemented

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