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Report No.: 0041/17/ED/0670

## Monthly EM&A Report April 2022

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/0670

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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

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**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. H<sub>2</sub>S concentration monitoring, odour patrol monitoring and olfactometry analysis of H<sub>2</sub>S), 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 Fifty-seventh Monthly EM&A Report for the Project which summarizes findings of the EM&A works during the reporting period from 1 April 2022 to 30 April 2022 (the “reporting period”).

**Breaches of Action and Limit Levels**

Odour patrol monitoring was resumed from January 2020 and carried out on 4, 14, 20 and 26 April 2022. 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 27 April 2022. 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

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 H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). 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.

## 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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### 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 H<sub>2</sub>S Concentration Monitoring

2.1.1 15-min H<sub>2</sub>S concentration was measured using a Jerome 631-X analyzer. This analyzer is capable of measuring H<sub>2</sub>S 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 H<sub>2</sub>S 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 H<sub>2</sub>S monitoring.

**Table 2.1 Equipment used for H<sub>2</sub>S 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 H<sub>2</sub>S 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

- 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 H<sub>2</sub>S 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 <sub>2</sub> S concentration monitoring	15 minutes	<sup>1</sup> Weekly basis for 6 months during the initial operation stage
Odour patrol		<sup>4,5</sup> Weekly basis
Odour sampling for olfactometry analysis	<sup>3</sup> 15 minutes	<sup>2</sup> 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 H<sub>2</sub>S 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 H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>) 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.
- 4) As instruction from the company of Discovery Bay Tunnel, odour patrol monitoring at OD5 (Spur Road near Discovery Bay Tunnel Outlet) was conducted on monthly basis.

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 10, 16, 22 and 28 December 2021. As instruction from the company of Discovery Bay Tunnel, odour patrol monitoring at OD5 (Spur Road near Discovery Bay Tunnel Outlet) was conducted on monthly basis.

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)
4 April 2022	OD1	24.0	32	SW	1.3
	OD2			-	0.0
	OD3			SW	1.4
	OD4			SW	0.9
	OD6			-	0.0
	OD7			NE	1.1
	OD8			NE	0.7
	OD9			NE	0.3
	14 April 2022			OD1	24.7
OD2		NW	0.4		
OD3		NW	0.3		
OD4		NW	0.6		
OD6		N	0.5		
OD7		NW	0.3		
OD8		NW	1.2		
OD9		NW	0.6		
20 April 2022		OD1	22.2	72	
	OD2	N			0.4
	OD3	NE			0.4
	OD4	NE			0.6
	OD6	NE			0.3
	OD7	NE			0.4
	OD8	NE			0.4





	OD9			NE	0.7
26 April 2022	OD1	29.0	69	S	1.7
	OD2			S	0.5
	OD3			S	0.4
	OD4			S	1.4
	OD5			NE	0.7
	OD6			S	2.1
	OD7			SW	0.9
	OD8			N	1.2
	OD9			SW	0.8

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 <sup>^</sup> (Odour Level)
	Range
OD1	0 - 0
OD2	0 - 1
OD3	0 - 0
OD4	0 - 0
OD5	0
OD6	0 - 0
OD7	0 - 0
OD8	0 - 0
OD9	0 - 0

Remark:

<sup>^</sup>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 H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). 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.

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  $4^{\circ}\text{C}$  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*, BOD<sub>5</sub>, Suspended Solids, NH<sub>3</sub>-N, NO<sub>3</sub>-N, NO<sub>2</sub>-N, Total inorganic nitrogen, Total phosphorus (soluble and particulate).

**3.4 Laboratory Measurement and Analysis**

3.4.1 With reference to EPD’s letter (Ref: Ax(7) to EP 2/No/F/50 Pt.7) dated 8 February 2022, Change of Laboratory on Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey (0041\_17\_ED\_0632A) is approved. Fugro Technical Services Limited (HOKLAS Reg. No. 015), 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 23rd edition 5210B	1 mg/L
Total Suspended Solid	APHA 23rd edition 2540D	0.5 mg/L
Ammonia as N	APHA 23rd edition 4500 - NH <sub>3</sub> H	0.005 mg/L
Nitrate as N	APHA 23rd edition 4500 - NO <sub>3</sub> <sup>-</sup> I	0.005 mg/L
Nitrite as N	APHA 23rd edition 4500 - NO <sub>2</sub> <sup>-</sup> A & NO <sub>3</sub> <sup>-</sup> I	0.005 mg/L
Total Inorganic Nitrogen	By Calculation	0.01 mg/L



Analysis Description	Method	Reporting limits
Total phosphorus (soluble and particulate)	APHA 17th edition 4500-PB5 (digestion) and In-house method E-T-056 (determination)	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 27 April 2022. 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	6.49	25.02	8.24	26.14	4.1	0.09	74.1
		S 1	6.48	25.01	8.25	26.11	4.3	0.09	72.5
		M 8.5	6.21	24.74	8.28	26.32	5.9	0.14	100.3
		M 8.5	6.20	24.73	8.29	26.34	6.1	0.14	101.4
		B 16	6.14	24.52	8.31	26.71	7.2	0.12	89.2
		B 16	6.15	24.51	8.34	26.73	7.3	0.13	88.6
B	14	S 1	6.58	24.71	8.24	26.11	4.1	0.24	144.5
		S 1	6.57	24.72	8.24	26.14	4.3	0.22	141.7
		M 7	6.43	24.53	8.30	26.39	6.1	0.13	182.6
		M 7	6.42	24.54	8.31	26.34	6.3	0.18	173.5
		B 13	6.21	24.11	8.32	26.58	7.1	0.17	162.4
		B 13	6.23	24.14	8.32	26.59	7.3	0.19	166.1
C	12	S 1	6.42	24.74	8.29	26.10	9.1	0.06	31.6
		S 1	6.43	24.79	8.27	26.04	9.3	0.06	31.4
		M 6	6.27	23.92	8.26	26.41	12.7	0.04	52.4
		M 6	6.26	23.92	8.24	26.42	12.6	0.07	51.8
		B 11	6.15	23.81	8.24	26.81	13.4	0.10	49.2
		B 11	6.14	23.82	8.25	26.83	13.8	0.11	49.3
D	13	S 1	6.20	26.14	8.32	26.40	4.8	0.17	213.4
		S 1	6.18	26.19	8.31	26.41	4.9	0.13	206.1
		M 6.5	6.03	26.44	8.34	26.89	5.1	0.11	246.1
		M 6.5	6.05	26.48	8.34	26.88	5.3	0.12	241.3
		B 12	5.87	26.71	8.33	27.11	5.8	0.14	261.2
		B 12	5.86	26.72	8.33	27.13	5.9	0.17	253.1
E	16	S 1	6.02	24.16	8.26	28.17	4.9	0.06	312.4
		S 1	6.04	24.15	8.25	28.11	4.4	0.05	311.6
		M 8	5.74	24.01	8.24	28.31	5.9	0.09	271.4
		M 8	5.76	24.02	8.24	28.32	5.7	0.09	277.6
		B 15	5.64	23.86	8.29	28.59	7.1	0.13	301.2
		B 15	5.61	23.84	8.26	28.56	7.2	0.14	303.4
F	23	S 1	5.72	28.81	8.41	28.21	5.7	0.26	204.5
		S 1	5.73	23.82	8.42	28.34	5.6	0.24	201.1
		M 11.5	5.61	23.61	8.26	28.61	7.2	0.11	184.6
		M 11.5	5.62	23.62	8.27	28.67	7.3	0.13	183.1
		B 22	5.41	23.44	8.29	28.91	8.8	0.20	179.1
		B 22	5.42	23.41	8.29	28.92	8.9	0.21	177.2

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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)
G	22	S 1	6.01	24.61	8.24	27.31	4.1	0.10	71.4
		S 1	6.03	24.64	8.22	27.32	4.2	0.12	70.8
		M 11	6.02	24.51	8.26	27.11	4.2	0.15	92.1
		M 11	6.01	24.52	8.22	27.12	4.2	0.17	92.4
		B 21	6.03	24.44	8.24	27.14	3.4	0.13	101.4
		B 21	6.02	24.41	8.27	27.15	3.2	0.14	102.6
H	19	S 1	5.84	24.59	8.22	27.03	3.1	0.21	144.1
		S 1	5.81	24.58	8.23	27.04	3.4	0.23	142.5
		M 9.5	5.77	24.51	8.26	27.24	4.2	0.12	164.1
		M 9.5	5.74	24.52	8.24	27.22	4.3	0.14	166.2
		B 18	5.63	24.23	8.17	27.34	5.2	0.20	121.4
		B 18	5.64	24.22	8.17	27.38	5.1	0.21	122.4

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	6.12	25.77	8.26	25.11	4.1	0.21	324.5
		S 1	6.13	25.64	8.24	25.13	4.2	0.28	322.7
		M 7.5	6.07	25.91	8.31	25.38	8.7	0.13	341.9
		M 7.5	6.05	25.93	8.32	25.39	8.6	0.19	338.2
		B 14	5.89	26.14	8.36	25.82	9.4	0.18	350.6
		B 14	5.90	26.12	8.39	25.80	9.5	0.17	352.1
B	14	S 1	6.45	25.31	8.24	25.74	5.1	0.13	52.8
		S 1	6.41	25.34	8.23	25.79	5.3	0.15	51.4
		M 7	6.31	25.14	8.26	25.91	6.2	0.09	26.9
		M 7	6.33	25.11	8.26	25.93	6.4	0.08	26.4
		B 13	6.24	25.02	8.21	26.14	7.3	0.13	37.2
		B 13	6.22	25.04	8.23	26.12	7.4	0.16	37.8
C	12	S 1	5.86	27.14	8.26	27.41	1.3	0.24	61.4
		S 1	5.87	27.16	8.24	27.42	1.4	0.21	60.3
		M 6	5.52	27.82	8.22	27.81	5.6	0.26	81.2
		M 6	5.53	27.88	8.26	27.88	5.2	0.24	81.9
		B 11	5.41	28.26	8.29	28.02	7.7	0.20	64.7
		B 11	5.44	28.22	8.27	28.03	7.8	0.24	64.6
D	14	S 1	6.03	24.30	8.11	27.19	4.2	0.14	204.2
		S 1	6.01	24.31	8.12	27.18	4.4	0.11	206.1
		M 7	5.87	24.01	8.14	27.34	6.2	0.09	184.5
		M 7	5.86	24.02	8.15	27.33	6.3	0.09	182.7
		B 13	5.64	23.79	8.16	27.59	8.9	0.08	171.2
		B 13	5.63	23.78	8.16	27.58	9.1	0.07	173.4
E	14	S 1	6.44	24.59	8.31	28.12	2.5	0.14	91.2
		S 1	6.48	24.58	8.34	28.14	2.7	0.13	90.4
		M 7	6.37	24.13	8.31	28.36	4.1	0.19	131.4
		M 7	6.39	24.11	8.32	28.39	4.2	0.21	133.7
		B 13	6.12	23.17	8.32	28.61	5.3	0.15	104.1
		B 13	6.10	23.16	8.31	28.67	5.8	0.15	104.2
F	18	S 1	6.41	24.81	8.29	27.40	6.4	0.13	34.5



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	6.43	24.83	8.24	27.41	7.0	0.11	31.2
		M 9	6.18	24.51	8.26	27.58	7.1	0.15	52.6
		M 9	6.19	24.55	8.26	27.59	7.3	0.13	52.7
		B 17	6.11	24.11	8.31	27.81	8.0	0.09	41.8
		B 17	6.09	24.12	8.32	27.85	8.1	0.09	40.6
G	13	S 1	6.41	24.91	8.28	28.11	2.4	0.19	291.4
		S 1	6.39	24.92	8.29	28.14	2.5	0.21	283.7
		M 6.5	6.23	24.61	8.29	28.28	2.3	0.07	266.5
		M 6.5	6.24	24.62	8.31	28.34	2.4	0.07	266.1
		B 12	6.08	24.27	8.24	28.57	2.8	0.12	304.2
		B 12	6.09	24.22	8.26	28.56	2.9	0.14	303.8
H	19	S 1	6.24	24.40	8.28	27.72	3.4	0.08	161.5
		S 1	6.22	24.51	8.29	27.70	3.9	0.08	162.3
		M 9.5	6.03	24.11	8.26	27.56	5.8	0.06	164.8
		M 9.5	6.04	24.12	8.27	27.55	5.9	0.05	166.1
		B 18	5.92	24.01	8.26	27.84	7.1	0.13	183.1
		B 18	5.91	24.02	8.27	27.81	7.2	0.14	181.4

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 <sub>3</sub> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
A	17	S 1	5	0.040	0.020	0.55	0.61	ND	0.01	1.4
		S 1	5	0.040	0.020	0.52	0.59	2	0.01	1.2
		M 8.5	7	0.050	0.020	0.52	0.58	1	0.02	<1
		M 8.5	6	0.04	0.02	0.53	0.59	3	0.02	1.4
		B 16	3	0.03	0.02	0.62	0.67	1	0.01	1.6
		B 16	3	0.04	0.02	0.70	0.75	2	0.01	1.8
B	14	S 1	6	0.05	0.02	0.51	0.58	2	0.01	1.3
		S 1	6	0.05	0.02	0.56	0.63	ND	0.02	1.0
		M 7	6	0.05	0.02	0.49	0.56	2	0.02	1.8
		M 7	6	0.04	0.02	0.46	0.52	4	0.02	1.2
		B 13	7	0.04	0.02	0.55	0.61	2	0.01	1.2
		B 13	7	0.04	0.02	0.44	0.50	4	0.02	1.2
C	12	S 1	4	0.04	0.02	0.56	0.62	1	0.02	1.3
		S 1	4	0.04	0.02	0.57	0.63	2	0.02	2.9
		M 6	5	0.04	0.02	0.54	0.59	2	0.01	2.5
		M 6	5	0.04	0.02	0.52	0.58	4	0.01	<1
		B 11	5	0.03	0.02	0.55	0.60	3	0.01	1.5
		B 11	5	0.03	0.02	0.58	0.64	1	<0.01	2.7
D	13	S 1	5	0.07	0.02	0.48	0.57	1	<0.01	1.4
		S 1	5	0.07	0.02	0.52	0.60	1	0.01	1.5
		M 6.5	3	0.04	0.02	0.48	0.54	1	0.01	1.2
		M 6.5	3	0.04	0.02	0.46	0.53	2	0.01	1.1
		B 12	3	0.05	0.02	0.49	0.56	2	0.02	1.4



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Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH <sub>3</sub> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
E	16	B 12	4	0.05	0.02	0.53	0.60	4	0.02	1.1
		S 1	4	0.07	0.02	0.52	0.61	26	0.02	1.2
		S 1	4	0.07	0.02	0.49	0.58	32	0.01	2.7
		M 8	4	0.07	0.02	0.50	0.59	25	<0.01	1.4
		M 8	4	0.07	0.02	0.43	0.52	12	<0.01	1.8
		B 15	4	0.07	0.02	0.43	0.52	30	0.02	2.0
		B 15	4	0.06	0.02	0.45	0.54	35	0.01	1.3
F	23	S 1	3	0.06	0.02	0.46	0.55	22	0.01	1.3
		S 1	3	0.05	0.02	0.44	0.51	2	0.01	<1
		M 11.5	3	0.10	0.02	0.55	0.67	20	0.01	<1
		M 11.5	3	0.10	0.02	0.57	0.37	26	0.01	1.5
		B 22	3	0.07	0.02	0.50	0.59	20	0.01	1.3
		B 22	3	0.07	0.02	0.56	0.65	16	0.01	1.3
G	22	S 1	5	0.07	0.01	0.33	0.41	30	0.02	1.5
		S 1	5	0.07	0.02	0.32	0.41	41	0.01	1.4
		M 11	5	0.08	0.01	0.33	0.43	21	0.01	1.5
		M 11	5	0.08	0.01	0.35	0.45	14	0.01	1.3
		B 21	4	0.08	0.01	0.32	0.41	12	<0.01	1.8
		B 21	4	0.08	0.01	0.27	0.37	13	0.01	1.8
H	19	S 1	4	0.08	0.01	0.31	0.40	150	0.02	2.0
		S 1	4	0.08	0.01	0.31	0.41	140	0.02	2.3
		M 9.5	4	0.08	0.02	0.39	0.49	410	0.01	2.0
		M 9.5	4	0.09	0.01	0.43	0.53	210	0.01	2.3
		B 18	4	0.06	0.01	0.32	0.39	26	0.03	1.9
		B 18	4	0.06	0.01	0.34	0.42	15	0.04	1.8

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

Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH <sub>3</sub> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
A	15	S 1	3	0.04	0.02	0.48	0.54	3	0.02	1.0
		S 1	3	0.04	0.02	0.51	0.57	ND	0.02	1.1
		M 7.5	3	0.07	0.02	0.43	0.52	1	0.01	1.1
		M 7.5	3	0.07	0.02	0.44	0.53	ND	0.01	1.3
		B 14	3	0.04	0.02	0.45	0.51	ND	0.02	1.0
		B 14	3	0.04	0.02	0.51	0.56	1	0.02	1.1
B	14	S 1	4	0.05	0.02	0.50	0.57	ND	0.03	1.2
		S 1	4	0.05	0.02	0.47	0.54	1	0.03	<1
		M 7	4	0.09	0.02	0.59	0.70	1	0.03	<1
		M 7	4	0.09	0.02	0.55	0.66	1	0.02	1.1
		B 13	3	0.04	0.02	0.46	0.52	ND	0.03	1.0
		B 13	3	0.04	0.02	0.48	0.54	1	0.02	1.1
C	12	S 1	3	0.04	0.02	0.63	0.69	1	<0.01	1.3
		S 1	3	0.04	0.02	0.37	0.73	ND	<0.01	1.0
		M 6	3	0.05	0.02	0.45	0.51	ND	0.01	1.3
		M 6	3	0.04	0.02	0.48	0.55	1	0.01	1.1
		B 11	3	0.04	0.02	0.54	0.60	ND	0.01	1.1
		B 11	3	0.04	0.02	0.52	0.58	1	0.01	1.1
D	14	S 1	4	0.05	0.02	0.66	0.74	1	<0.01	<1
		S 1	4	0.05	0.02	0.62	0.69	ND	<0.01	<1



Monitoring Station	Water Depth (m)	Sampling Depth (m)	TSS (mg/L)	NH <sub>3</sub> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
		M 7	3	0.05	0.02	0.75	0.82	3	<0.01	1.2
		M 7	3	0.05	0.02	0.71	0.78	1	<0.01	1.2
		B 13	4	0.05	0.02	0.72	0.79	2	<0.01	1.2
		B 13	4	0.05	0.02	0.66	0.73	1	<0.01	1.2
E	14	S 1	5	0.02	0.02	0.39	0.43	13	0.01	2.1
		S 1	5	0.03	0.02	0.46	0.50	20	0.01	1.8
		M 7	5	0.04	0.02	0.60	0.66	22	<0.01	1.6
		M 7	5	0.04	0.02	0.67	0.73	30	<0.01	1.5
		B 13	5	0.04	0.02	0.61	0.67	15	0.01	1.4
		B 13	5	0.04	0.02	0.65	0.71	16	0.01	1.1
F	18	S 1	4	0.04	0.02	0.62	0.68	22	0.02	1.2
		S 1	4	0.04	0.02	0.64	0.69	14	0.02	1.3
		M 9	5	0.06	0.02	0.52	0.59	35	<0.01	1.1
		M 9	5	0.05	0.02	0.57	0.64	21	<0.01	1.0
		B 17	6	0.02	0.02	0.44	0.48	16	<0.01	1.3
		B 17	6	0.02	0.02	0.43	0.47	21	<0.01	1.5
G	13	S 1	6	0.04	0.02	0.38	0.44	390	0.01	1.5
		S 1	6	0.03	0.01	0.36	0.41	120	0.01	1.7
		M 6.5	6	0.05	0.01	0.42	0.48	160	0.02	1.5
		M 6.5	6	0.06	0.01	0.60	0.53	230	0.02	1.6
		B 12	6	0.03	0.02	0.55	0.59	10	<0.01	1.3
		B 12	6	0.03	0.02	0.53	0.57	7	0.01	1.4
H	19	S 1	6	0.03	0.01	0.38	0.42	24	0.01	1.9
		S 1	6	0.05	0.01	0.39	0.45	10	0.01	2.1
		M 9.5	6	0.04	0.01	0.38	0.43	8	0.02	1.8
		M 9.5	6	0.03	0.01	0.41	0.46	35	0.02	2.4
		B 18	6	0.04	0.02	0.37	0.42	200	0.01	2.2
		B 18	6	0.03	0.02	0.40	0.44	200	0.01	2.2

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)		
27 April 2022	31.6	28.4	26.1	78	0.0

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 With reference to EPD’s letter (Ref: Ax(7) to EP 2/No/F/50 Pt.7) dated 8 February 2022, Change of Laboratory on Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey (0041\_17\_ED\_0632A) is approved. Fugro Technical Services Limited (HOKLAS Reg. No. 015), 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 8.1, 8.5 and 8.7	1%
Total Organic Carbon	APHA 23rd edition 5310B	0.05%
pH value	APHA 23rd edition 4500-H+B	0.1 pH unit
Ammonia as N	APHA 23rd edition 4500 NH3: B & C / In house method E-T-039	0.5 mg/kg
Total Nitrogen	APHA 23rd edition 4500 N <sub>org</sub> : D (digestion), In-house method E-T-036, E-T-037 & APHA 23rd edition 4500 - NO <sub>3</sub> <sup>-</sup> I	10 mg/kg
Total Phosphorus	APHA 17th edition 4500 – PB.5 (digestion) & In house method E-T-056 (determination)	10 mg/kg
Cadmium	USEPA method 3050B (digestion) and 6020A (determination)	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 27 April 2022. 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 <sub>3</sub> 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	8.2	7.3	1200	490	<0.1	23	21	31	0.10	13	73	12	0.2
B	8.1	9.3	1100	450	<0.1	27	29	36	0.11	16	90	10	0.5
C	8.0	12	1100	480	<0.1	28	29	36	0.10	17	87	10	0.3
D	8.0	12	950	440	<0.1	28	29	36	0.14	16	89	10	0.3
E	8.0	15	930	460	<0.1	28	30	36	0.10	17	91	9.2	0.3
F	8.0	20	940	470	<0.1	22	37	33	0.21	13	87	9.4	0.3
G	8.8	6.0	920	740	<0.1	17	19	23	0.07	10	56	6.1	0.2
H	8.2	8.0	910	380	<0.1	26	36	32	0.07	15	79	10	0.3

**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	0.33	8	33	26	33	Moist, brownish grey, slightly gravelly, slightly sandy SILT/CLAY
B	0.68	0	13	43	44	Moist, grey, slightly sandy SILT/CLAY
C	0.79	0	3	47	50	Moist, grey, slightly sandy SILT/CLAY
D	0.70	0	7	47	46	Moist, grey, slightly sandy SILT/CLAY
E	0.75	0	3	48	49	Moist, grey, slightly sandy SILT/CLAY
F	0.86	0	2	51	47	Moist, grey, slightly sandy SILT/CLAY
G	0.57	43	25	17	15	Moist, brown, very clayey, very silty, very sandy GRAVEL with shell fragments
H	0.49	1	9	44	46	Moist, grey, slightly gravelly, slightly sandy SILT/CLAY

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)		
27 April 2022	31.6	28.4	26.1	78	0.0

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 27 April 2022

Monitoring Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	32	3.70	14	2.46	0.93
B	46	2.78	13	2.25	0.88
C	41	0.73	12	2.03	0.82
D	37	1.75	8	1.71	0.82
E	85	11.26	14	2.17	0.82
F	55	2.48	8	1.77	0.85
G	28	0.49	9	1.74	0.79
H	49	2.87	12	1.93	0.78

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

i) Abundance

A total of 373 benthic organisms was recorded from the eight monitoring stations during April 2022 monitoring period. Current monitoring results showed lower total monthly abundance compared to both dry (March 2004) and wet (August 2004) seasons baseline data results. Similar with previous monitoring periods, total monthly abundance of benthic organisms exhibits significant seasonal variation (F-value = 4.54; F-crit = 1.55; p-value = 3.72E-10;  $\alpha$  = 0.05).

In terms of spatial distribution, the lowest abundance of 28 ind. was recorded in the reference station, Station G, while the highest (85 ind.) was also noted in other reference station, Station E. Total macrobenthic abundances, similar with the previous monitoring periods, showed statistically significant spatial distribution (F-value = 3.43; F-crit = 2.05; P-value = 0.002;  $\alpha$  = 0.05).

ii) Biomass

The total wet biomass recorded in the eight monitoring stations was 26.05 g with the highest biomass recorded in the reference station, Station E (11.26 g) while the lowest biomass was observed in another reference station, Station G (0.49 g). Relative to the February 2022 period, a general decrease in biomass was observed during the current monitoring period. Most of the current decrease was attributed to the absence of *Trypauchen* (*T. vagina*) in the benthic community.

iii) Taxonomic Composition

A total of six phyla comprising of 24 families and about 28 genera were identified. During the current monitoring period, the molluscs (37.27%) dominated the macrobenthic assemblage, followed by the annelids (33.78%), and arthropods (26.54%). Relative to February 2022 community assemblage, current results showed a shift to molluscs-dominated community.

Currently, a shift in the community assemblage was noted as shift in season starts (from dry season to wet season).





iv) Diversity

Benthic diversity index ( $H'$ ) in the impact stations ranged from 1.71 to 2.03. In the reference stations,  $H'$  values ranged from 1.74 to 2.46. Currently, reference station, Station A had the highest diversity value among the different monitoring stations, while the lowest was the impact station, Station D. In terms of evenness index ( $J$ ) values, impact Stations C and D were noted with relatively high values as compared to reference stations G, and H. Moreover, current monitoring results indicated an overall increase in both diversity and evenness values from the baseline survey condition.

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



## **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 27 August 2021, "*Monitoring of Marine Mammals in Hong Kong Waters (2020-21)*", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in August 2021. 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 (2021-22) is uploaded to AFCD's webpage.

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### 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**.

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### **8. SUMMARY OF EXCEEDANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS**

- 8.1.1 Odour patrol monitoring was resumed and carried out on 4, 14, 20 and 26 April 2022. 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 27 April 2022. 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 H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). 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.

## 11. CONCLUSION

- 11.1.1 Odour patrol monitoring was resumed from January 2020 and carried out on 4, 14, 20 and 26 April 2022. 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 H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). 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.
- 11.1.3 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 27 April 2022 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 27 August 2021, "*Monitoring of Marine Mammals in Hong Kong Waters (2020-21)*" in terms of the distribution and abundance of CWDs was reviewed in the Monthly EM&A report in August 2021. 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 (2021-22) 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.



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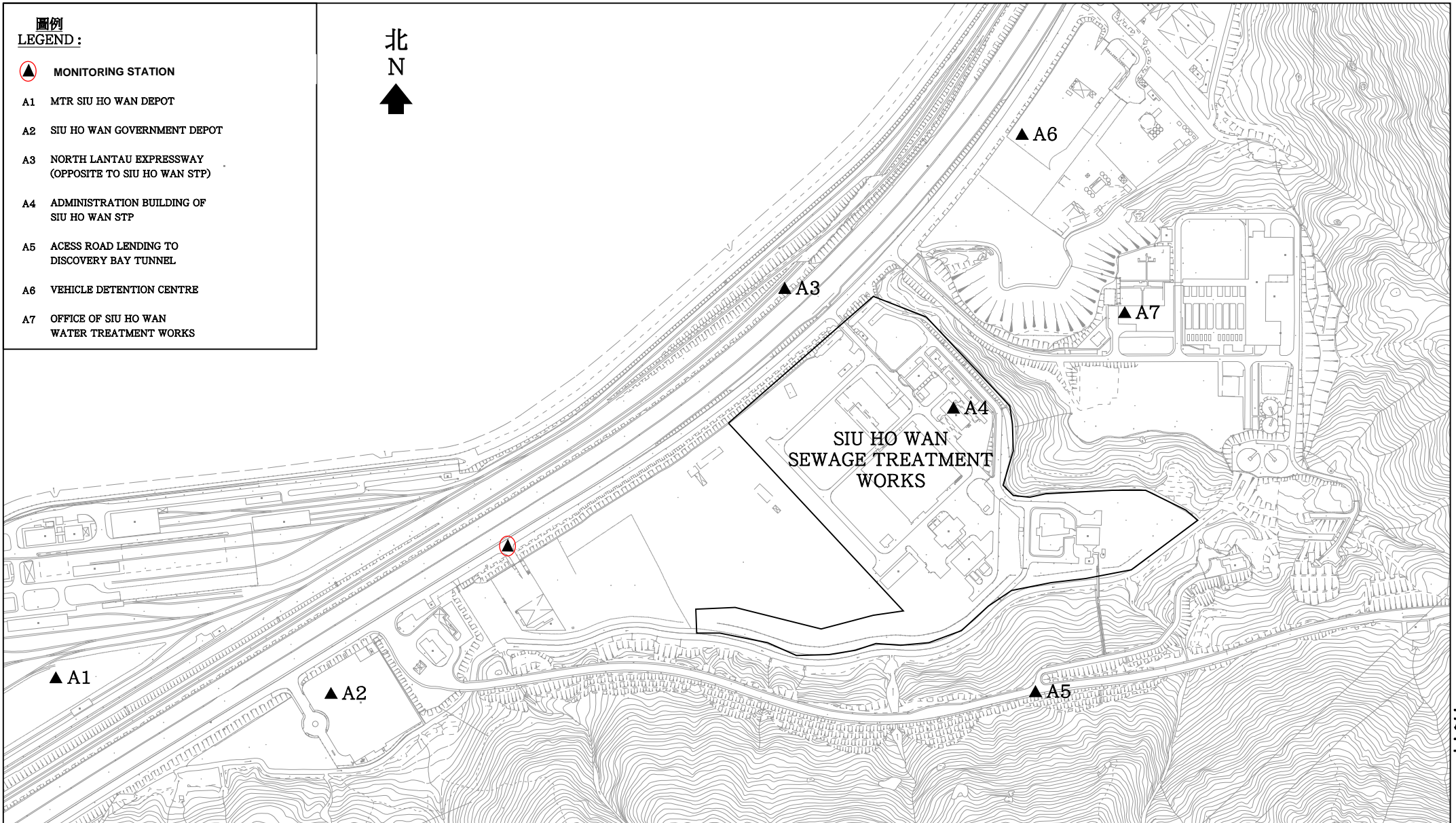
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Figure 1

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><b>圖則名稱 drawing title</b></p> <p><b>UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT OPTIONAL ENVIRONMENTAL MONITORING AND AUDIT PLAN ODOUR PATROL MONITORING STATIONS</b></p>	繪畫 drawn	C.W. CHAN	日期 date 16-08-2006	圖則編號 drawing no. <b>DCM/2006/063</b>	比例 scale N.T.S.
	核對 checked	C.K. LAM	日期 date 16-08-2006	保留版權 COPYRIGHT RESERVED	
	批核 approved	S.K. WONG	日期 date 16-08-2006		
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Website : www.fugro.com



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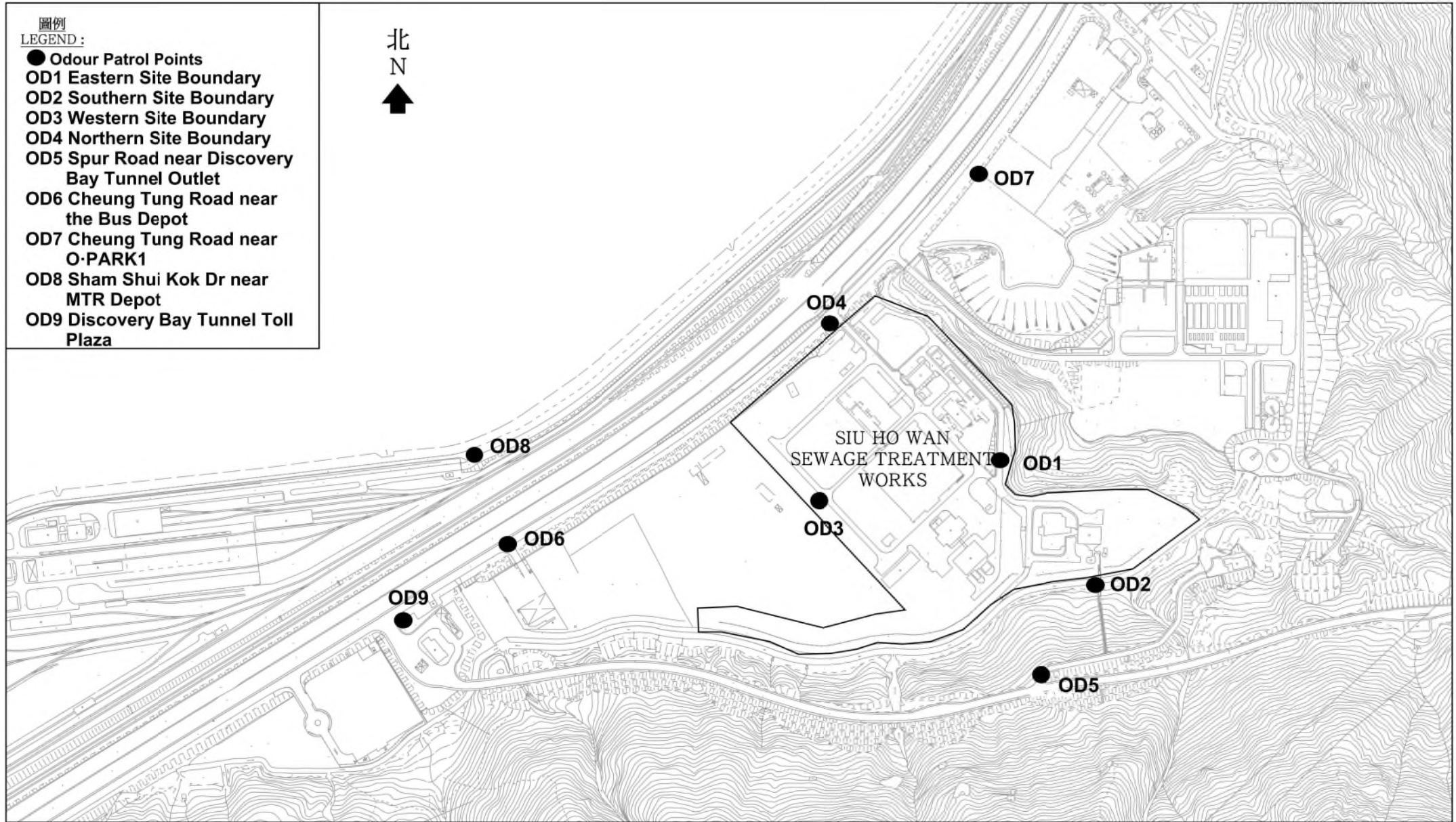
Report No.: 0041/17/ED/0670

## 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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Website : www.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

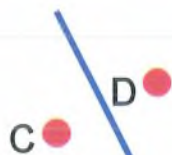
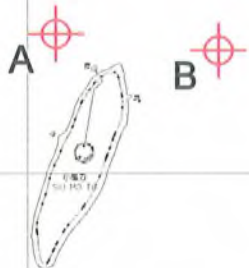
820000N




## 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

圖則名稱 drawing title

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

繪畫 drawn

H.K. LAI

日期 date

06-02-2004

核對 checked

C.K. LAM

日期 date

04-03-2004

批核 approved

S.K. WONG

日期 date

04-03-2004

部門 office

顧問工程管理部

CONSULTANTS MANAGEMENT DIVISION

圖則編號 drawing no.

DCM/2004/002

比例 scale

N.T.S.

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DRAINAGE SERVICES DEPARTMENT  
GOVERNMENT OF THE  
HONG KONG  
SPECIAL ADMINISTRATIVE REGION

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Report No.: 0041/17/ED/0670

Figure 4

Location of the Tide Gauge

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Location of the Tide Gauge

Source: Google Maps

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Report No.: 0041/17/ED/0670

## Appendix A Project Organization Chart

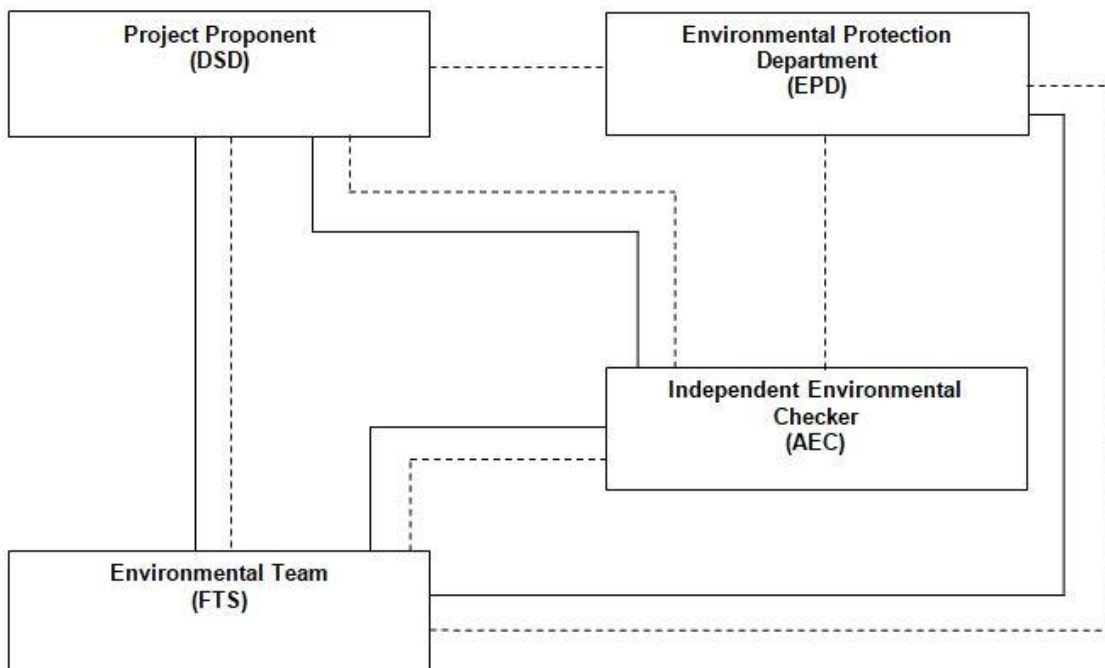
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Legend:  
— Line of Reporting  
- - - Line of Communication

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## Appendix B

### Monitoring Schedule for Present and Next Reporting Period

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Report No.: 0041/17/ED/0670

## Monitoring Schedule for the Present Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
					1 April	2
3	4 Odour Patrol	5	6	7	8	9
10	11	12	13	14 Odour Patrol	15	16
17	18	19	20 Odour Patrol	21	22	23
24	25	26 Odour Patrol	27 Water Quality Monitoring and Sediment Quality Monitoring and Benthic Survey Mid-Ebb (10:52) Mid-Flood (16:17)	28	29	30

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Website : www.fugro.com



Report No.: 0041/17/ED/0670

## 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 Odour Patrol	31				

### Remarks

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

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Report No.: 0041/17/ED/0670

## Appendix C

### Event and Action Plan for Air Quality Monitoring

# FUGRO TECHNICAL SERVICES LIMITED

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Report No.: 0041/17/ED/0670

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

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Report No.: 0041/17/ED/0670

	<p>Operator on the required remedial actions;</p> <ol style="list-style-type: none"><li>10. Submit proposals for remedial actions within 3 working days of notification;</li><li>11. Assess effectiveness of Operator's remedial actions and keep EPD informed of the results;</li><li>12. Amend proposal if appropriate; and</li><li>13. Resubmit proposal if problem still not under control.</li></ol>		
--	---	--	--

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



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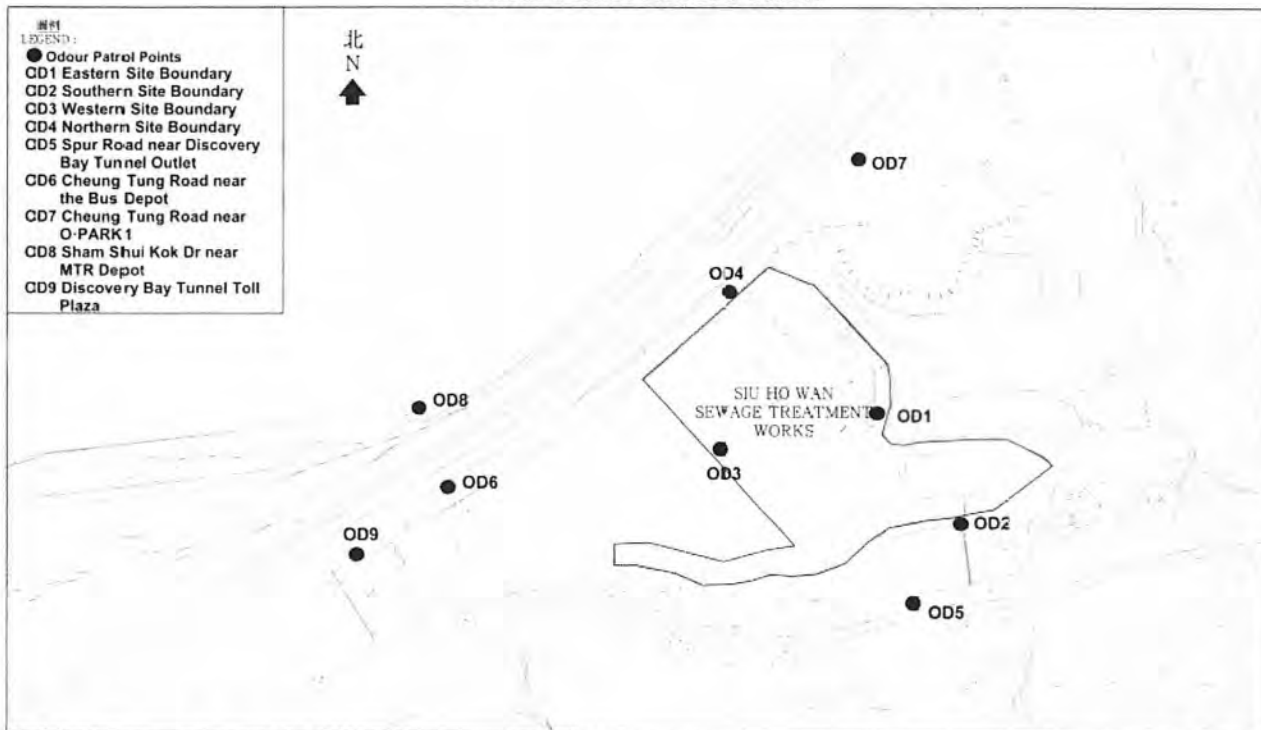
Report No.: 0041/17/ED/0670

### Appendix D

#### Results and Graphical Presentation of Air Quality Monitoring



**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	4-4-2022	Weather	Fine	Temperature	24°C	Humidity	32%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	12:43	SW	1.3	0	/	
OD2	Southern Site Boundary	12:50	/	0	0	/	
OD3	Western Site Boundary	12:46	SW	1.4	0	/	
OD4	Northern Site Boundary	12:44	SW	0.9	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	12:36	/	0	0	/	
OD7	Cheung Tung Road near O-PARK1	12:34	NE	1.1	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	12:19	NE	0.7	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	12:29	NE	0.3	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: A  
Name: Wong Shun-Hung Addison  
Date: 4-4-2022

Checked by: Mr  
Name: CHOI KAM HO  
Date: 4 April 2022

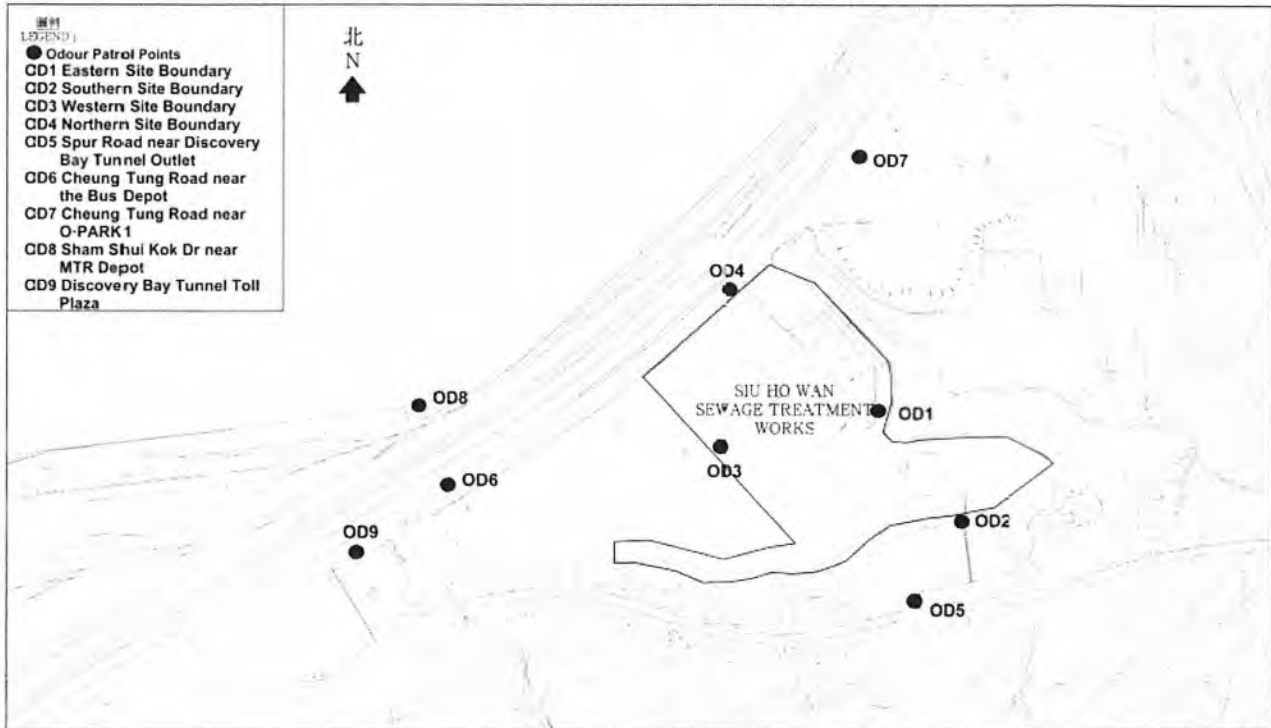
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1-15 Kwai Fung Crescent, Kwai Fong,  
Hong Kong.

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	4 APR 2022	Weather	Fine	Temperature	24°C	Humidity	32%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	12:48	SW	1.3	0	/	
OD2	Southern Site Boundary	12:50	/	0	0	/	
OD3	Western Site Boundary	12:46	SW	1.4	0	/	
OD4	Northern Site Boundary	12:44	SW	0.9	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	12:36	/	0	0	/	
OD7	Cheung Tung Road near O-PARK1	12:34	NE	1.1	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	12:29	NE	0.7	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	12:29	NE	0.3	0	/	

**\*Classification Criteria:**

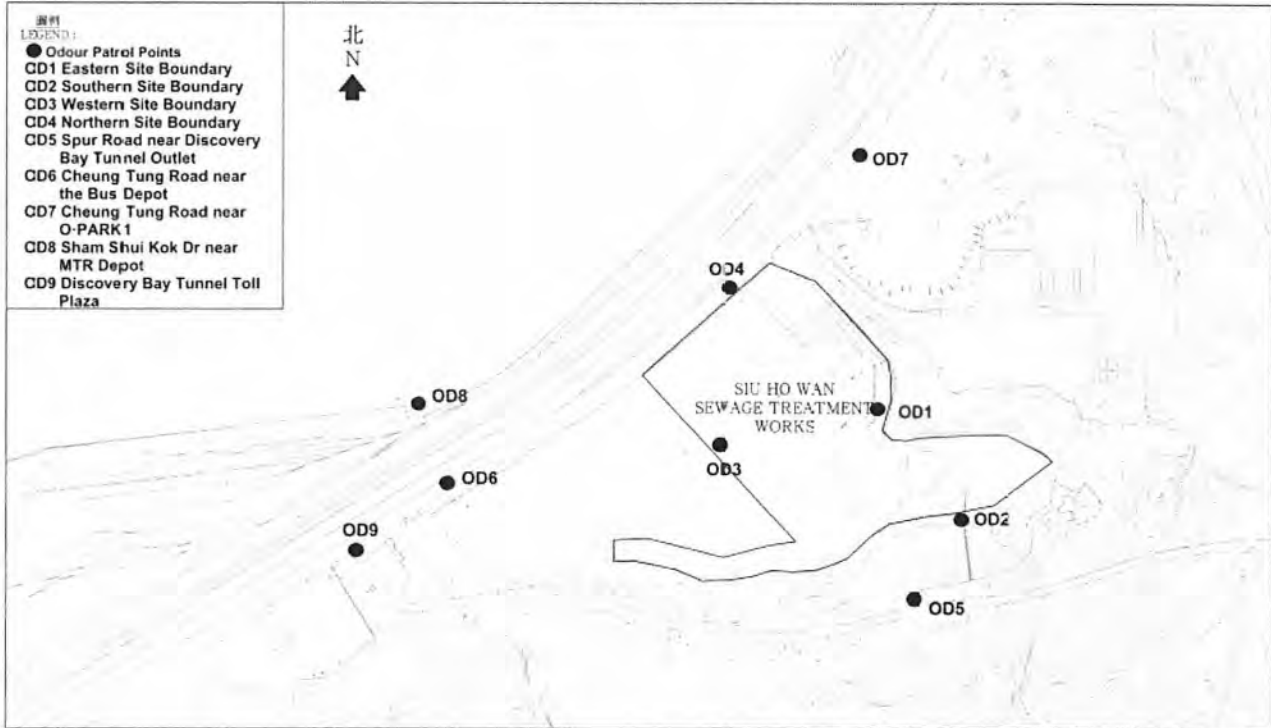
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
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- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable, likely to have odour nuisance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

Recorded by: Wang Wai Yiu  
Name: Wang Wai Yiu  
Date: 4 APR 2022

Checked by: CHOI KAM HO  
Name: CHOI KAM HO  
Date: 4 April 2022



**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	14-4-22	Weather	Fine	Temperature	24.7 °C	Humidity	64%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	10:19	NW	1.4	0	/	
OD2	Southern Site Boundary	10:22	NW	0.4	1	Effluent	
OD3	Western Site Boundary	10:17	NW	0.3	0	/	
OD4	Northern Site Boundary	10:14	NW	0.6	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	10:02	N	0.5	0	/	
OD7	Cheung Tung Road near O-PARK1	10:06	NW	0.3	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	9:50	NW	1.2	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	9:59	NW	0.6	0	/	

**\*Classification Criteria:**

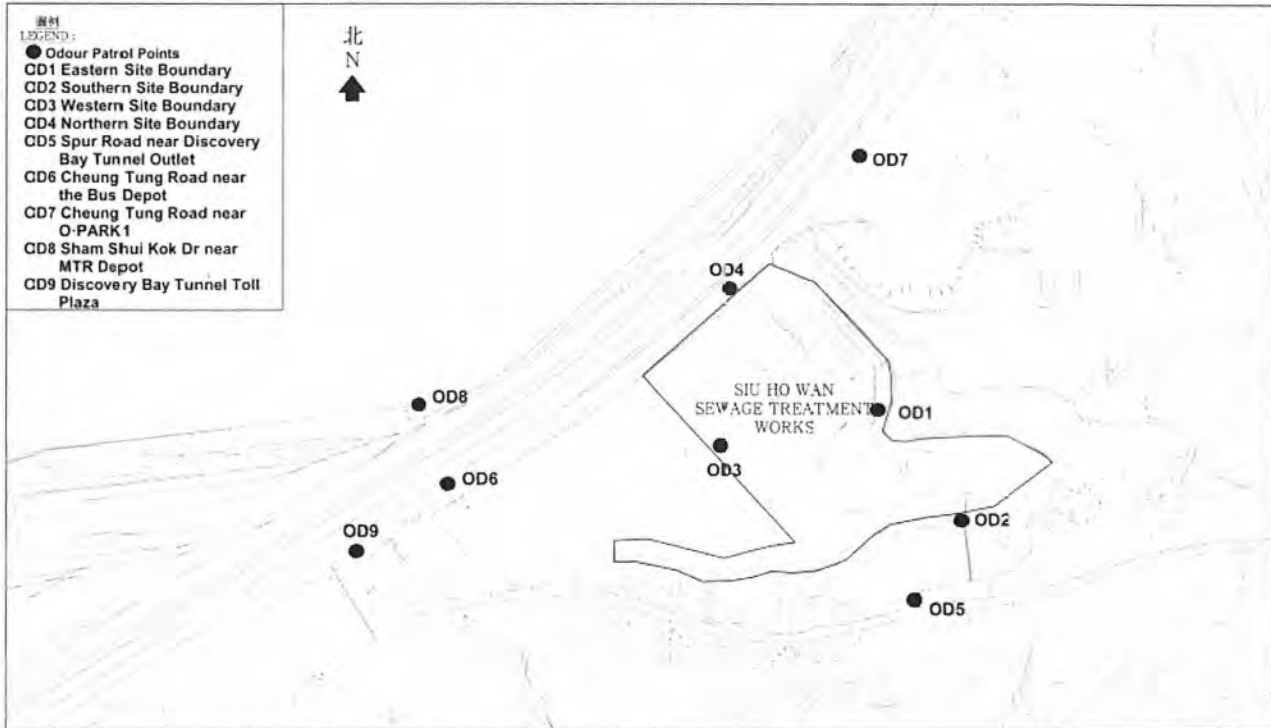
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable,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

Recorded by:           
Name: Cheung Wing Ching  
Date: 14-4-22

Checked by:           
Name: CHOI KAM HO  
Date: 14 April 2022



**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	14/4/2022	Weather	Fine	Temperature	24.7°C	Humidity	64%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	1019	NW	1.4	0	/	
OD2	Southern Site Boundary	1022	NW	0.4	0	/	
OD3	Western Site Boundary	1017	NW	0.3	0	/	
OD4	Northern Site Boundary	1014	NW	0.6	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	1002	N	0.5	0	/	
OD7	Cheung Tung Road near O-PARK1	1006	NW	0.3	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	0950	NW	1.2	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	0959	NW	0.6	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:                       
Name: Wong Ka Ho  
Date: 14/4/2022

Checked by:                       
Name: Choi Kam Ho  
Date: 14 April 2022

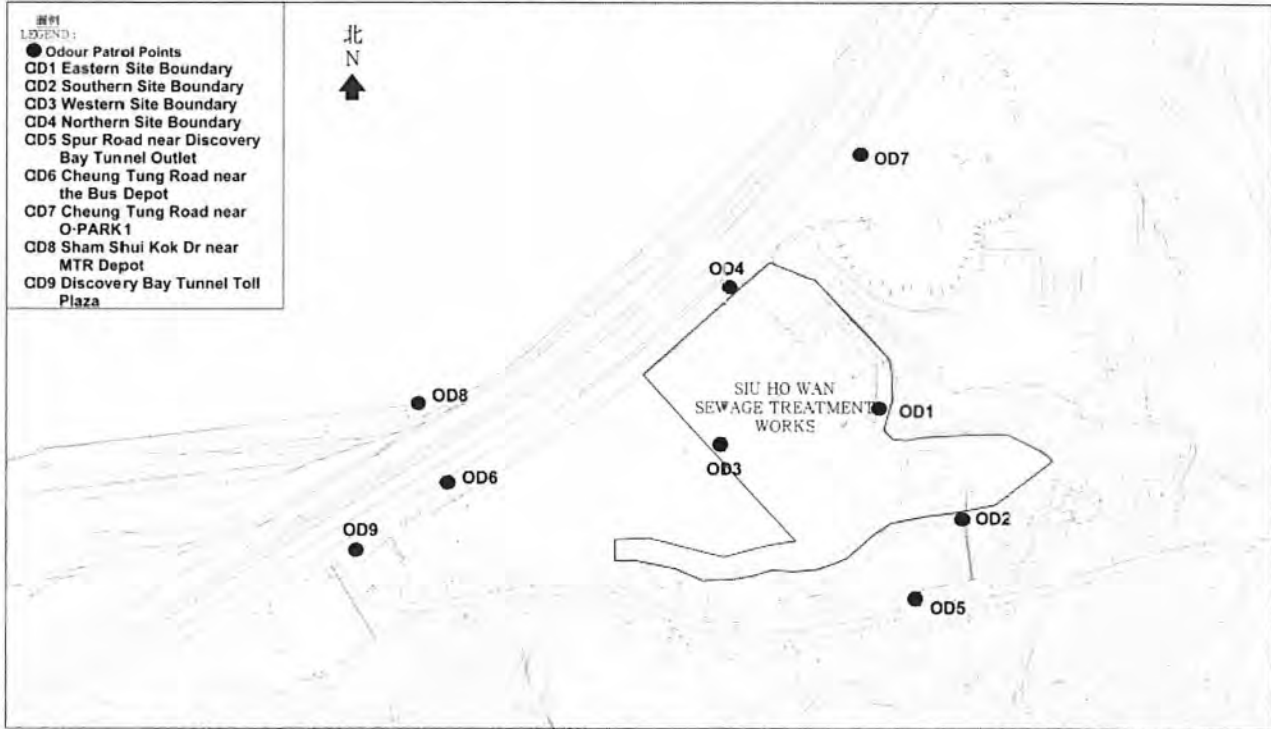
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## Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works Odour Patrol Record Sheet



Date	20/4/2022	Weather	cloudy	Temperature	22.2 °C	Humidity	72 %
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	1112	N	0.5	0	/	
OD2	Southern Site Boundary	1116	N	0.4	0	/	
OD3	Western Site Boundary	1109	NE	0.4	0	/	
OD4	Northern Site Boundary	1105	NE	0.6	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/	
OD6	Cheung Tung Road near the Bus Depot	1055	NE	0.3	0	/	
OD7	Cheung Tung Road near O-PARK1	1059	NE	0.4	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	1044	NE	0.4	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	1051	NE	0.7	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: Uuo  
Name: Uuo Ka Ho  
Date: 20/4/2022

Checked by: [Signature]  
Name: CHOL KAM HO  
Date: 20 April 2022



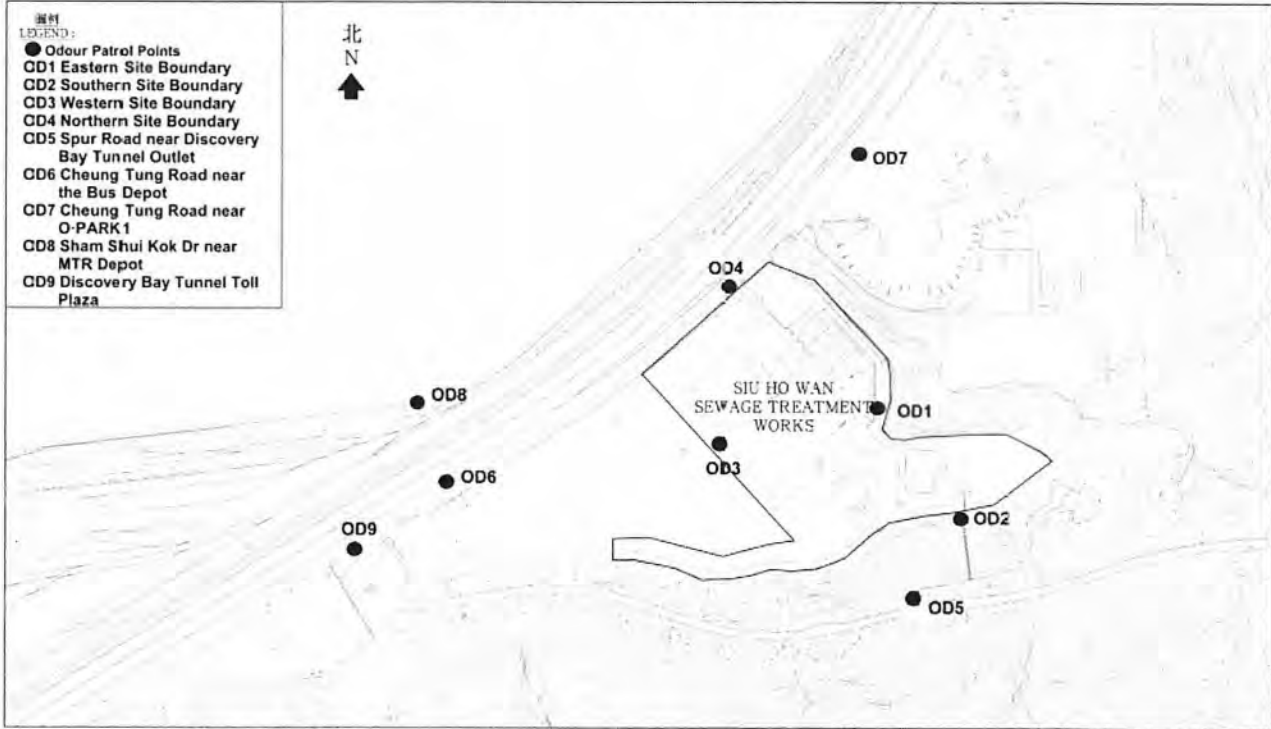
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## Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works Odour Patrol Record Sheet



Date		20 Apr 2022	Weather		cloudy	Temperature		22.2°C	Humidity		72%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics					
OD1	Eastern Site Boundary	11:12	N	0.5	0	/					
OD2	Southern Site Boundary	11:16	N	0.4	0	/					
OD3	Western Site Boundary	11:09	NE	0.4	0	/					
OD4	Northern Site Boundary	11:05	NE	0.6	0	/					
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/					
OD6	Cheung Tung Road near the Bus Depot	10:55	NE	0.3	0	/					
OD7	Cheung Tung Road near O-PARK1	10:59	NE	0.4	0	/					
OD8	Sham Shui Kok Dr near MTR Depot	10:44	NE	0.4	0	/					
OD9	Discovery Bay Tunnel Toll Plaza	10:51	NE	0.7	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
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- Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: 方  
Name: FONG KA CHUN  
Date: 20 Apr 2022

Checked by: 何  
Name: HOI KAM HO  
Date: 20 April 2022

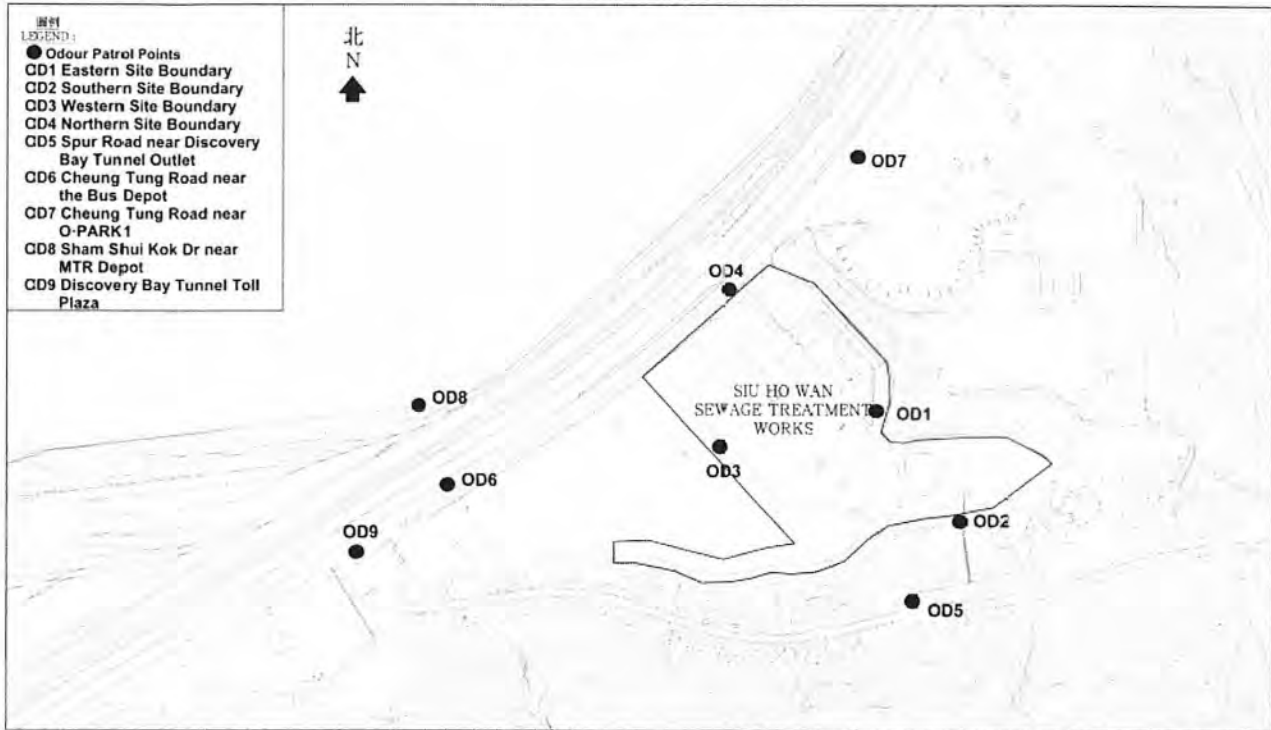
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## Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works Odour Patrol Record Sheet



Date		Weather	Fine	Temperature	Humidity	
26/4/2022				29°C	69%	
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics
OD1	Eastern Site Boundary	14:44	S	1.7	0	/
OD2	Southern Site Boundary	14:46	S	0.5	0	/
OD3	Western Site Boundary	14:42	S	0.4	0	/
OD4	Northern Site Boundary	14:39	S	1.4	0	/
OD5	Spur Road near Discovery Bay Tunnel Outlet	15:06	NE	0.7	0	/
OD6	Cheung Tung Road near the Bus Depot	14:25	S	2.1	0	/
OD7	Cheung Tung Road near O-PARK1	14:30	SW	0.9	0	/
OD8	Sham Shui Kok Dr near MTR Depot	14:12	W	1.2	0	/
OD9	Discovery Bay Tunnel Toll Plaza	14:22	SW	0.6	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

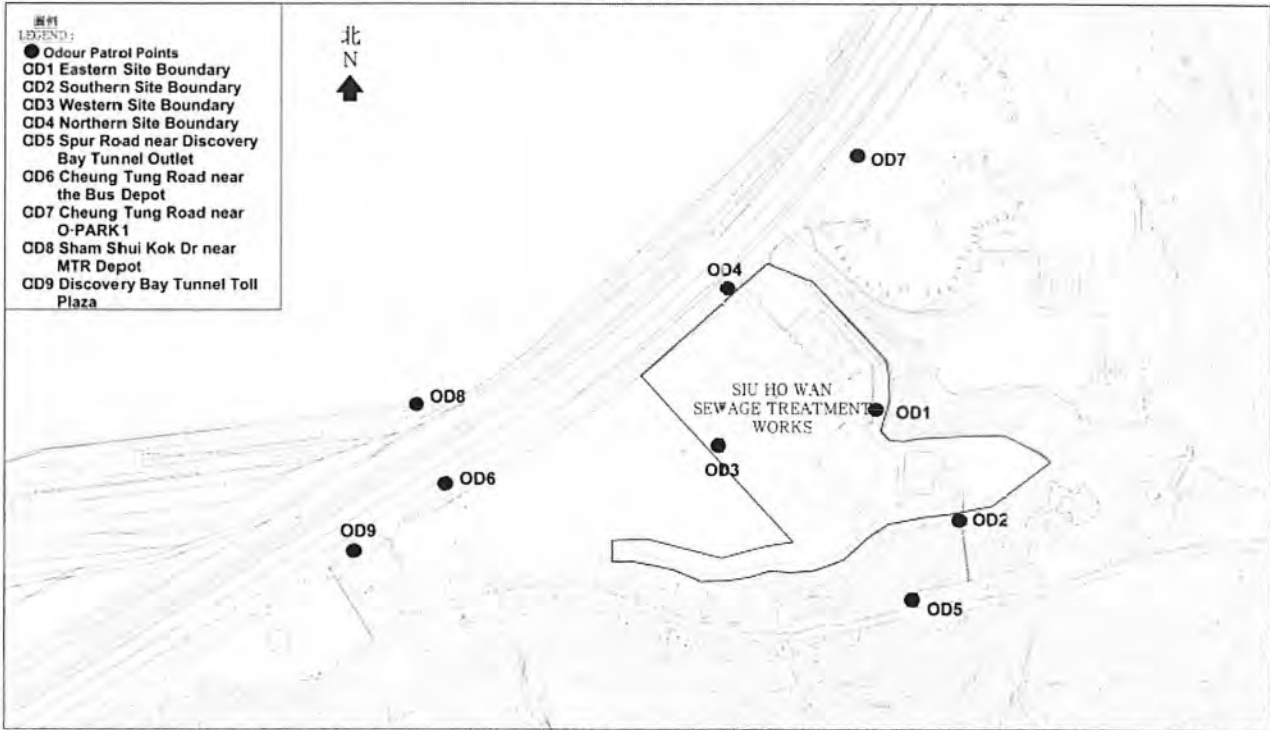
Recorded by:                       
Name: FONG KACHUN  
Date: 26 April 2022

Checked by:                       
Name: CHOI KAM HO  
Date: 26 April 2022





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



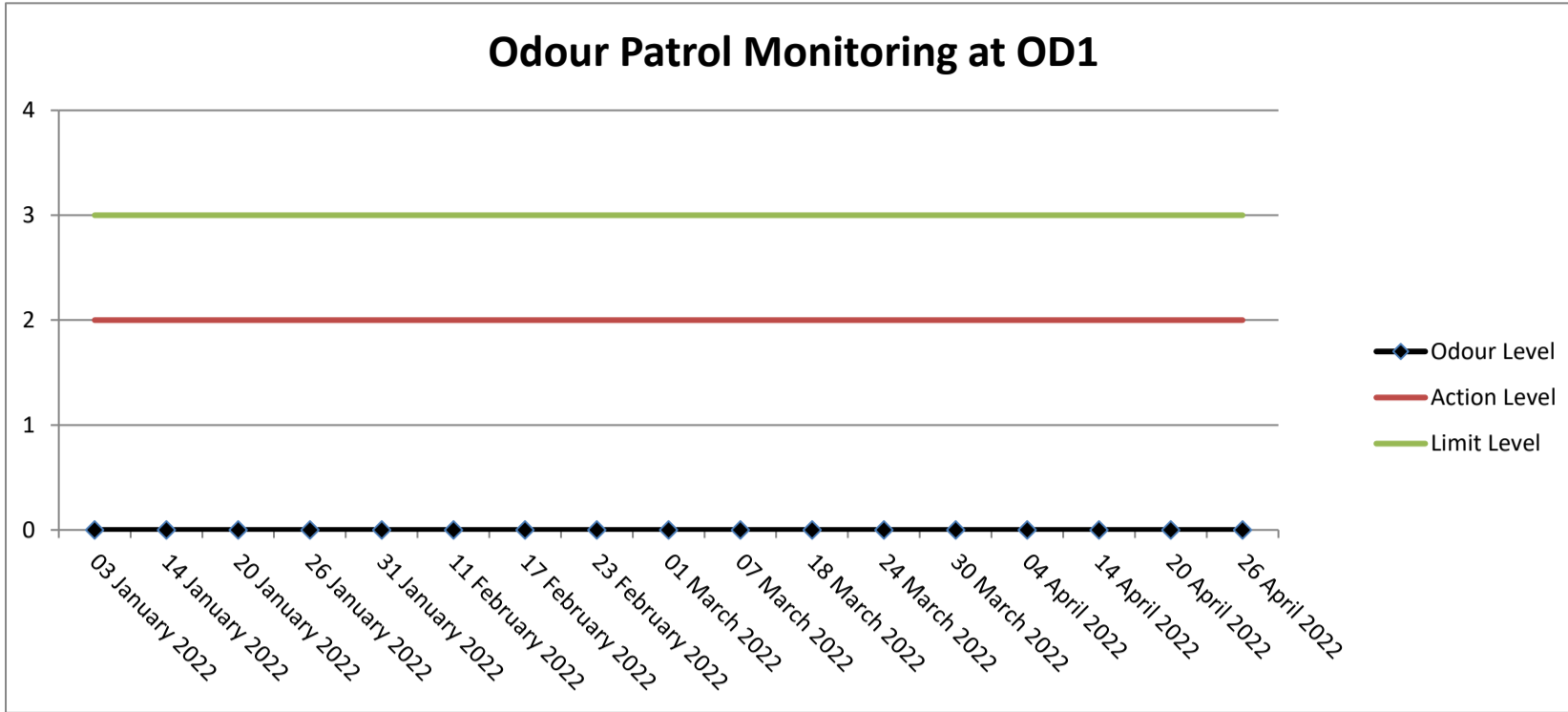
Date	26 APR 2022	Weather	Fine	Temperature	29°C	Humidity	69%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics	
OD1	Eastern Site Boundary	14:44	S	1.7	0	/	
OD2	Southern Site Boundary	1446	S	0.5	0	/	
OD3	Western Site Boundary	1442	S	0.4	0	/	
OD4	Northern Site Boundary	1439	S	1.4	0	/	
OD5	Spur Road near Discovery Bay Tunnel Outlet	1506	NE	0.7	0	/	
OD6	Cheung Tung Road near the Bus Depot	1425	S	2.1	0	/	
OD7	Cheung Tung Road near O-PARK1	1430	SW	0.9	0	/	
OD8	Sham Shui Kok Dr near MTR Depot	1412	N	1.2	0	/	
OD9	Discovery Bay Tunnel Toll Plaza	1422	SW	0.8	0	/	

**\*Classification Criteria:**

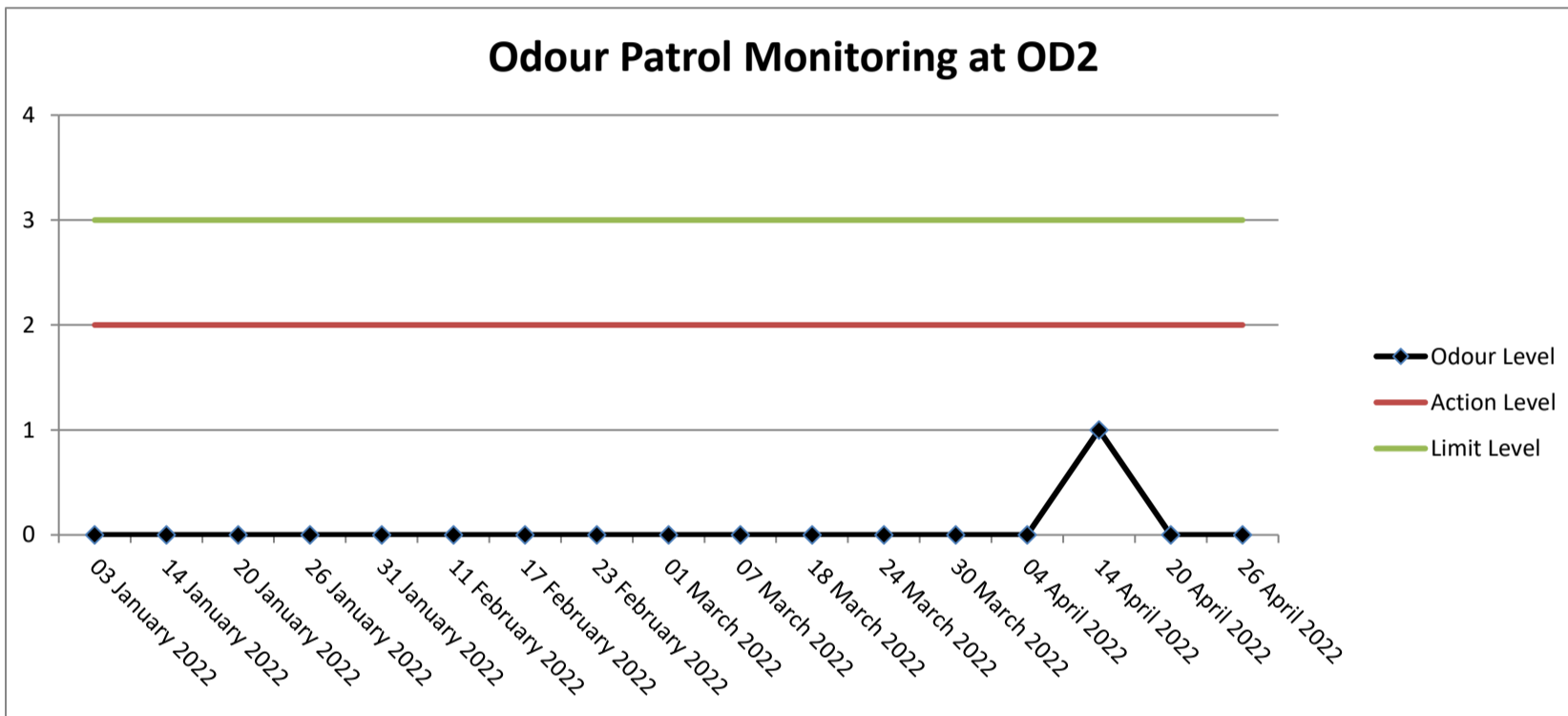
- Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described
- Slight : Slight identifiable odour, and slight chance to have odour nuisance
- Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance
- Strong : Strong identifiable,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

Recorded by: A. Yim  
Name: Wang Wan Yim  
Date: 26 APR 2022

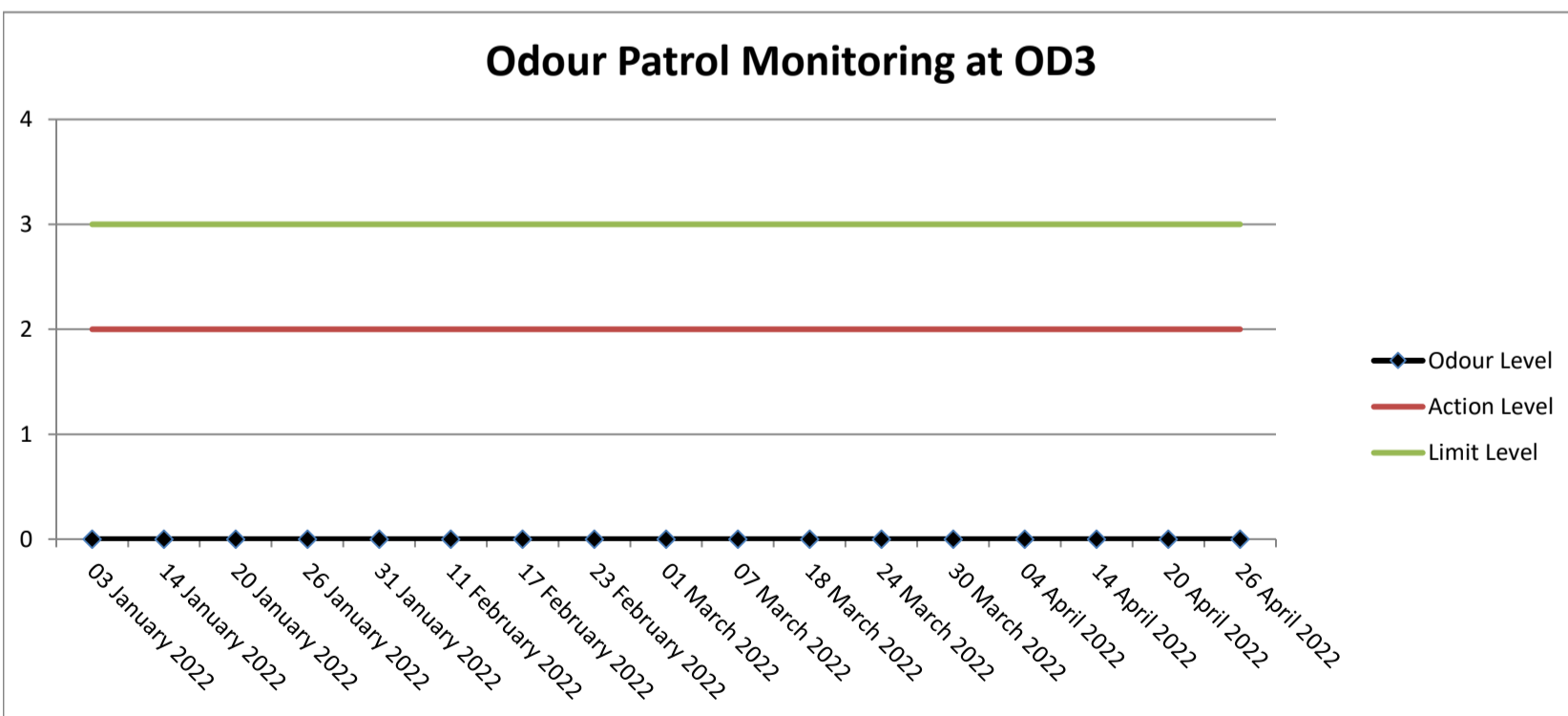
Checked by: [Signature]  
Name: CHOI KAM HO  
Date: 26 April 2022



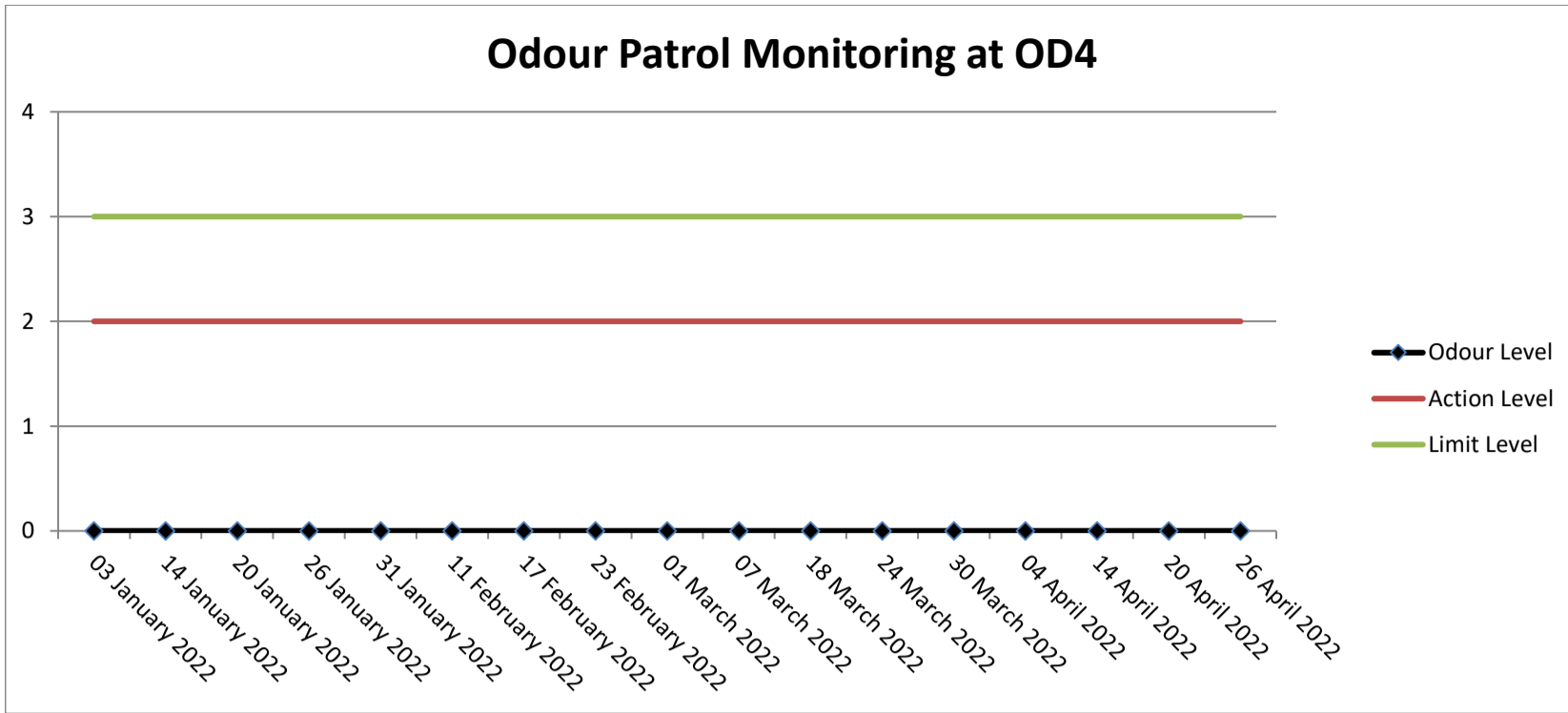
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



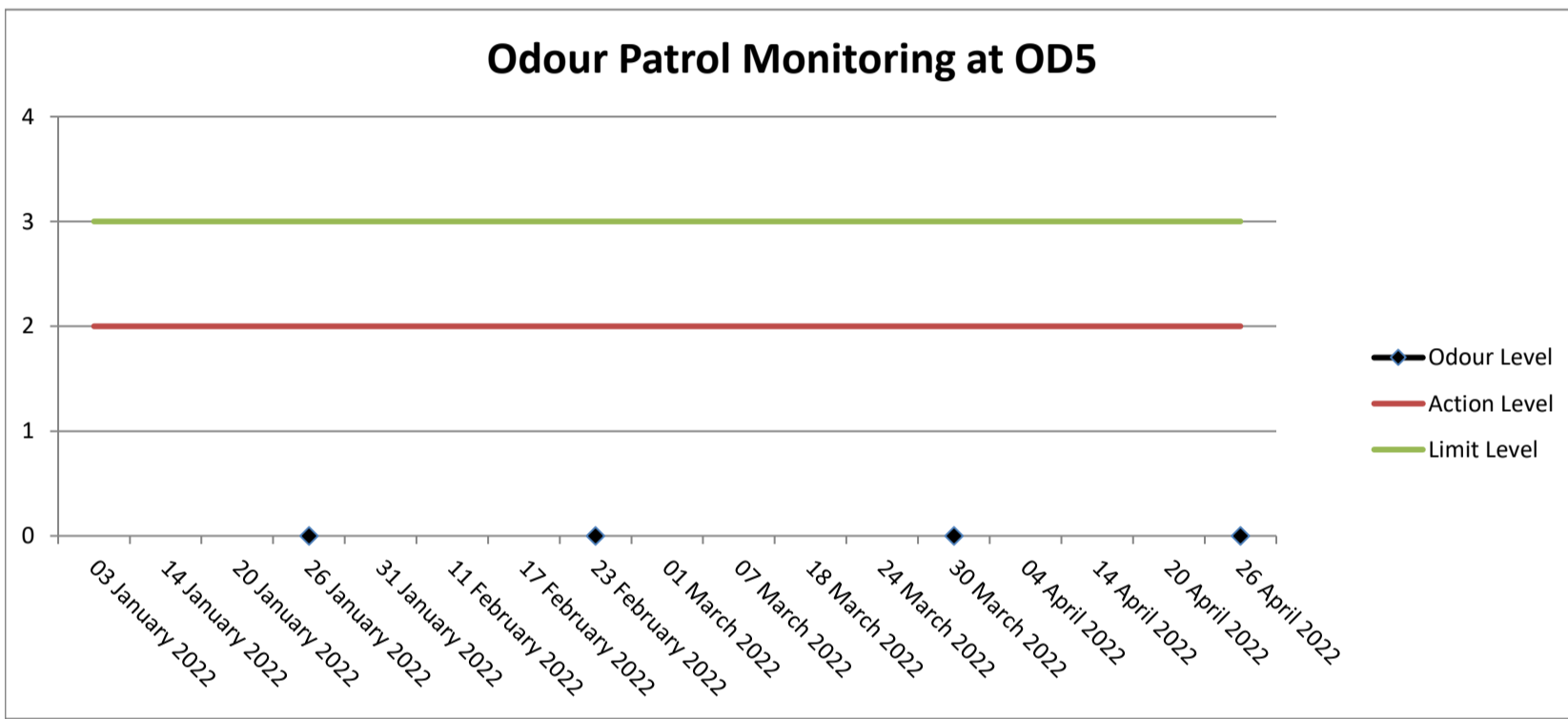
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



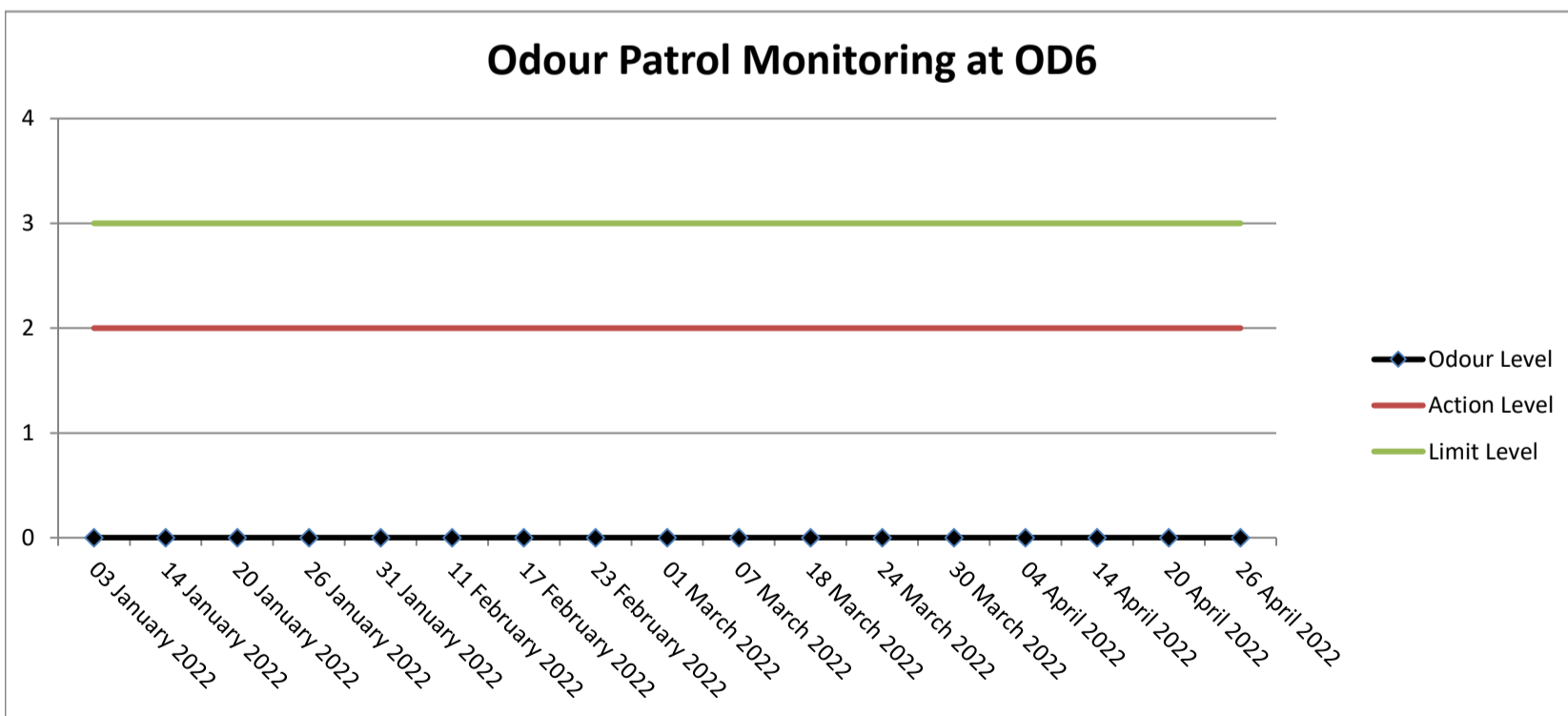
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



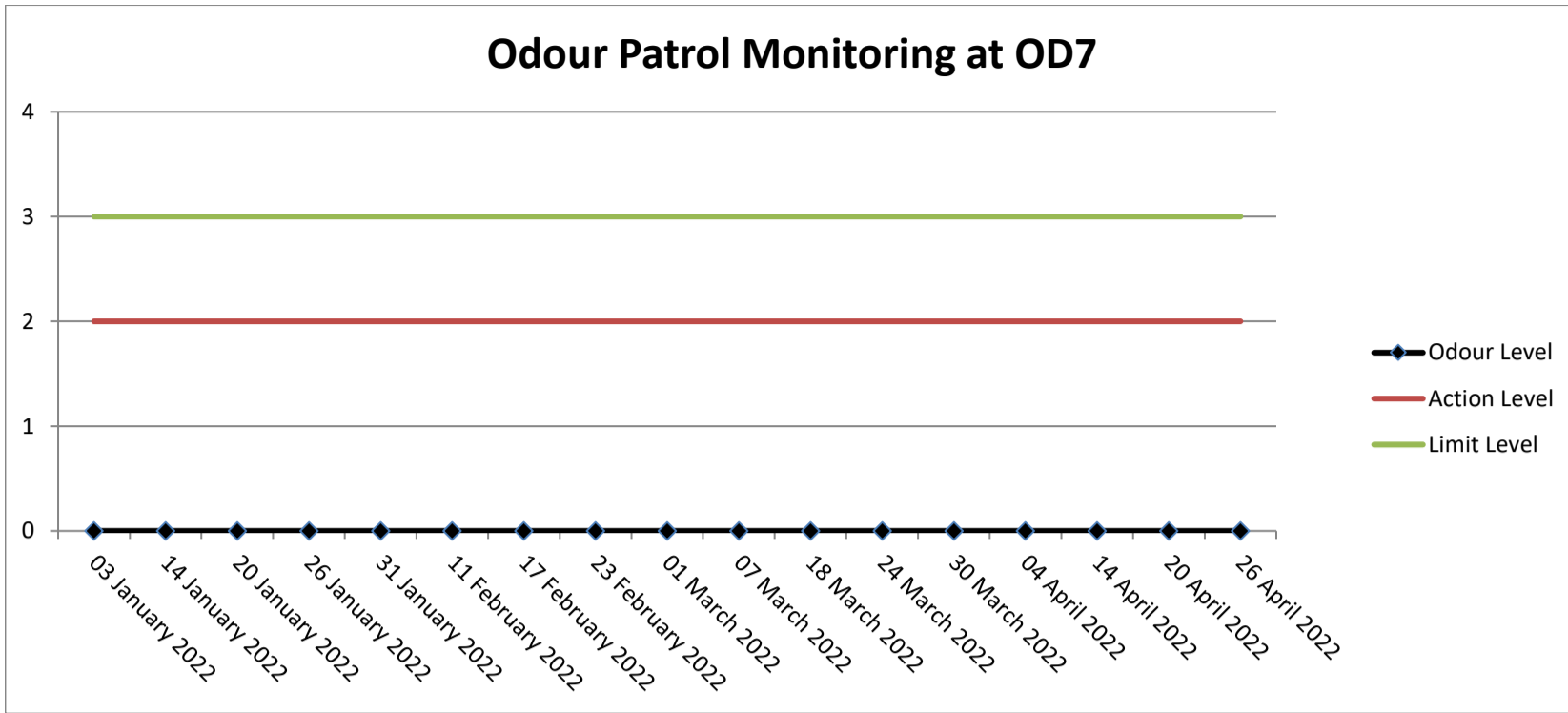
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



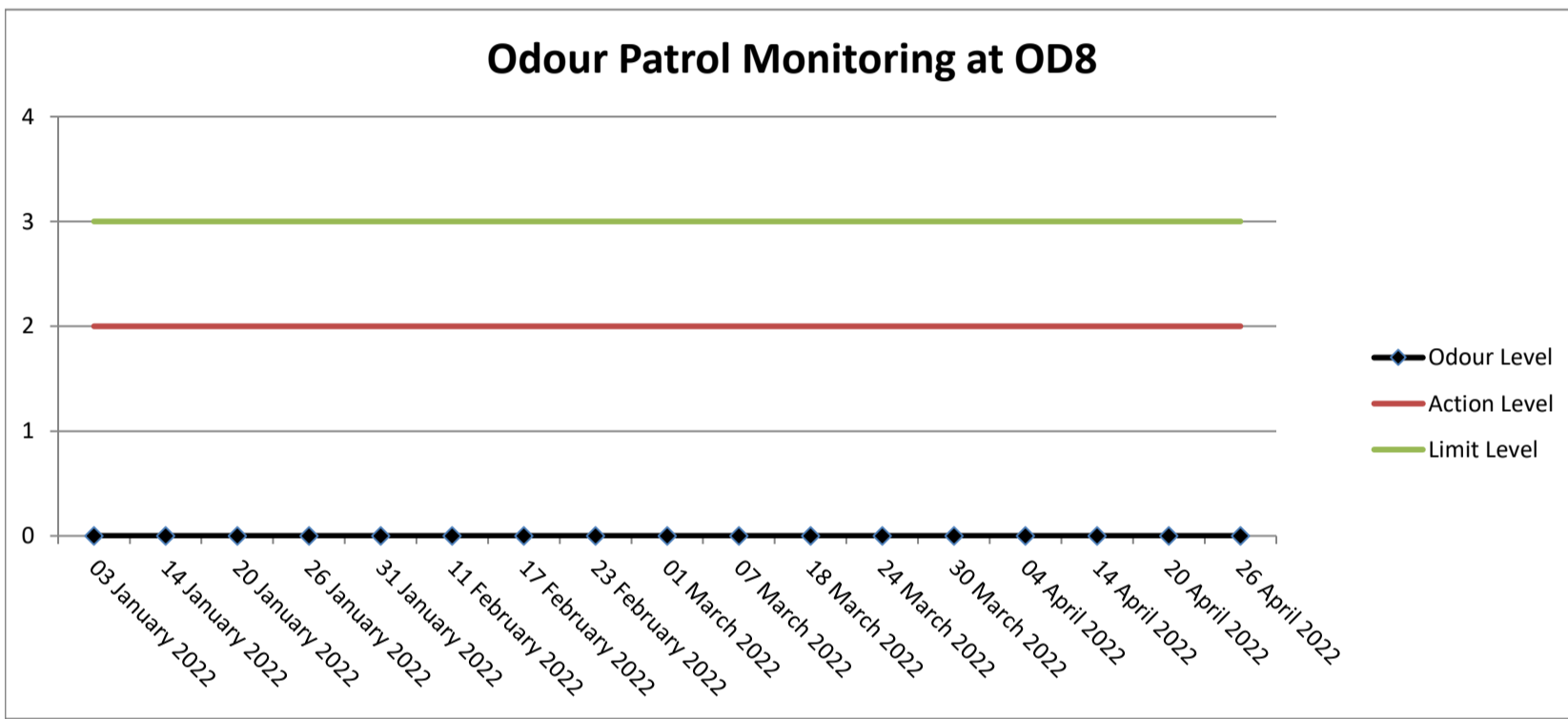
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



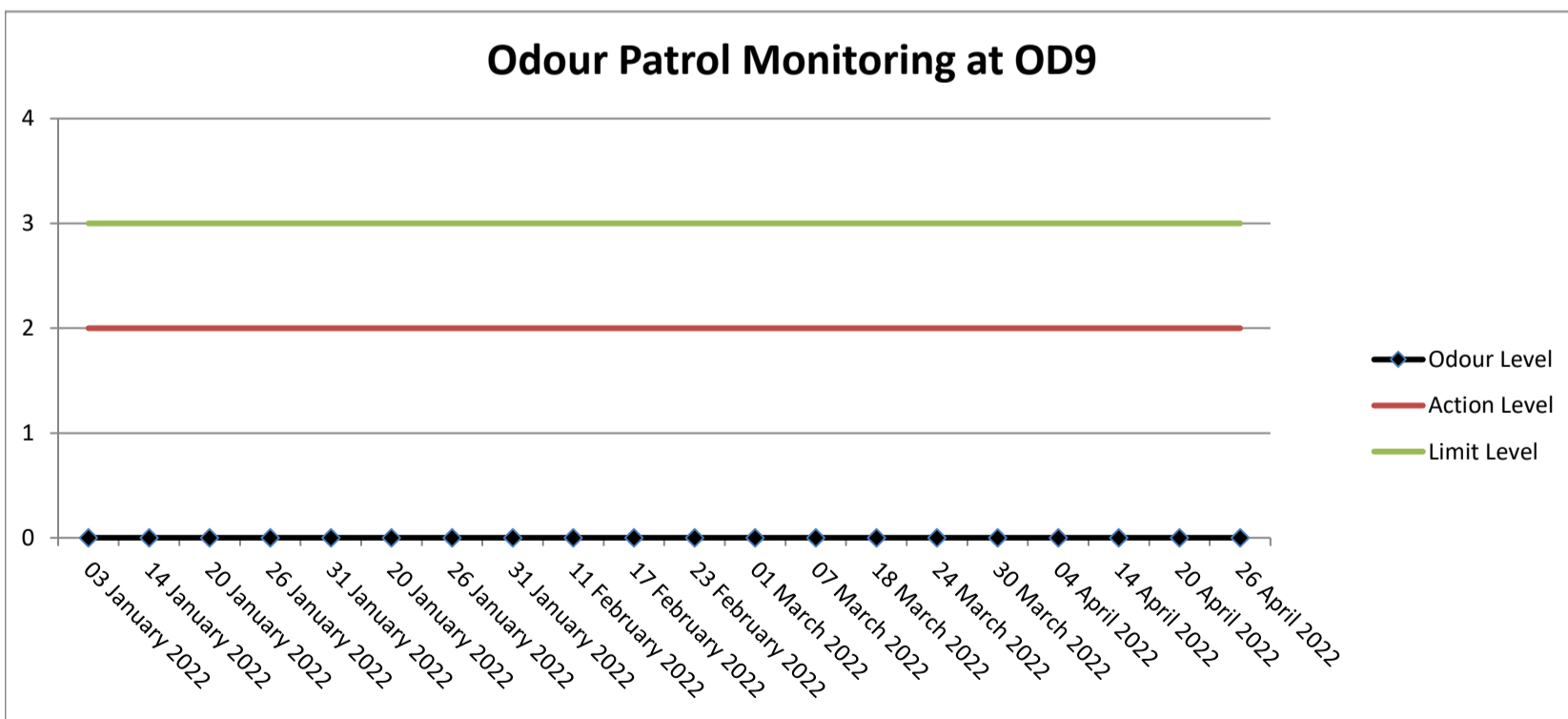
Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



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



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

# FUGRO TECHNICAL SERVICES LIMITED

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Report No.: 0041/17/ED/0670

## Appendix E

### Copy of the Calibration Certificates for Water Quality Monitoring Equipment

Report No. : 142626WA220802



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 : 13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung, N.T., H.K.

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 : WA220802/1

Date of calibration : 05/04/2022

Next calibration date : 04/07/2022

Test method used : In-house comparison method

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 142626WA220802

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**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	9.19	+0.01
6.86	6.87	+0.01

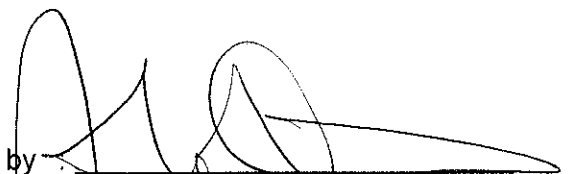
**B. Salinity calibration**

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.05	+0.05	± 0.5
20	20.08	+0.08	± 1.0
30	29.86	-0.14	± 1.5
40	40.13	+0.13	± 2.0

**C. Dissolved Oxygen calibration**

Trial No.	Dissolved oxygen content, mg/L	
	By calibrated D.O. meter	By D.O. meter
1	7.42	7.43
2	7.40	7.41
3	7.40	7.40
Average	7.41	7.41

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 : 27/4/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 142626WA220802

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**Results :**

**D. Temperature calibration**

Thermometer reading, °C	Meter reading, °C
25.03	24.98

**E. Turbidity calibration**

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
4	4.08	+0.08	± 0.6
8	8.07	+0.07	± 0.8
40	39.83	-0.17	± 3.0
80	79.63	-0.37	± 4.0

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 27/4/2022

\*\* End of Report \*\*

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*





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 <sup>TM</sup>	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

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



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Report No.: 0041/17/ED/0670

## 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 <sub>5</sub> (mg/L)
										Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	S	1	1	8.24	26.14	25.02	90.4	6.49	4.1	0.09	74.1	5	0.040	0.020	0.55	0.61	ND	0.01	1.4
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	S	1	2	8.25	26.11	25.01	90.2	6.48	4.3	0.09	72.5	5	0.040	0.020	0.52	0.59	2	0.01	1.2
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	M	8.5	1	8.28	26.32	24.74	8.5	6.21	5.9	0.14	100.3	7	0.050	0.020	0.52	0.58	1	0.02	<1
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	M	8.5	2	8.29	26.34	24.73	87.4	6.20	6.1	0.14	101.4	6	0.04	0.02	0.53	0.59	3	0.02	1.4
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	B	16	1	8.31	26.71	24.52	86.8	6.14	7.2	0.12	89.2	3	0.03	0.02	0.62	0.67	1	0.01	1.6
A	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	B	16	2	8.34	26.73	24.51	86.7	6.15	7.3	0.13	88.6	3	0.04	0.02	0.70	0.75	2	0.01	1.8
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	S	1	1	8.24	26.11	24.71	91.4	6.58	4.1	0.24	144.5	6	0.05	0.02	0.51	0.58	2	0.01	1.3
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	S	1	2	8.24	26.14	24.72	91.3	6.57	4.3	0.22	141.7	6	0.05	0.02	0.56	0.63	ND	0.02	1.0
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	M	7	1	8.30	26.39	24.53	89.1	6.43	6.1	0.13	182.6	6	0.05	0.02	0.49	0.56	2	0.02	1.8
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	M	7	2	8.31	26.34	24.54	89.2	6.42	6.3	0.18	173.5	6	0.04	0.02	0.46	0.52	4	0.02	1.2
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	B	13	1	8.32	26.58	24.11	86.5	6.21	7.1	0.17	162.4	7	0.04	0.02	0.55	0.61	2	0.01	1.2
B	27/4/2022	Mid-Ebb	Fine	Moderate	09:41	14	B	13	2	8.32	26.59	24.14	86.6	6.23	7.3	0.19	166.1	7	0.04	0.02	0.44	0.50	4	0.02	1.2
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	S	1	1	8.29	26.10	24.74	89.9	6.42	9.1	0.06	31.6	4	0.04	0.02	0.56	0.62	1	0.02	1.3
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	S	1	2	8.27	26.04	24.79	90.1	6.43	9.3	0.06	31.4	4	0.04	0.02	0.57	0.63	2	0.02	2.9
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	M	6	1	8.26	26.41	23.92	88.1	6.27	12.7	0.04	52.4	5	0.04	0.02	0.54	0.59	2	0.01	2.5
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	M	6	2	8.24	26.42	23.92	88.2	6.26	12.6	0.07	51.8	5	0.04	0.02	0.52	0.58	4	0.01	<1
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	B	11	1	8.24	26.81	23.81	86.4	6.15	13.4	0.10	49.2	5	0.03	0.02	0.55	0.60	3	0.01	1.5
C	27/4/2022	Mid-Ebb	Fine	Moderate	10:01	12	B	11	2	8.25	26.83	23.82	86.3	6.14	13.8	0.11	49.3	5	0.03	0.02	0.58	0.64	1	<0.01	2.7
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	S	1	1	8.32	26.40	26.14	86.4	6.20	4.8	0.17	213.4	5	0.07	0.02	0.48	0.57	1	<0.01	1.4
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	S	1	2	8.31	26.41	26.19	86.2	6.18	4.9	0.13	206.1	5	0.07	0.02	0.52	0.60	1	0.01	1.5
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	M	6.5	1	8.34	26.89	26.44	85.1	6.03	5.1	0.11	246.1	3	0.04	0.02	0.48	0.54	1	0.01	1.2
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	M	6.5	2	8.34	26.88	26.48	85.3	6.05	5.3	0.12	241.3	3	0.04	0.02	0.46	0.53	2	0.01	1.1
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	B	12	1	8.33	27.11	26.71	83.7	5.87	5.8	0.14	261.2	3	0.05	0.02	0.49	0.56	2	0.02	1.4
D	27/4/2022	Mid-Ebb	Fine	Moderate	10:17	13	B	12	2	8.33	27.13	26.72	83.6	5.86	5.9	0.17	253.1	4	0.05	0.02	0.53	0.60	4	0.02	1.1
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	S	1	1	8.26	28.17	24.16	84.2	6.02	4.9	0.06	312.4	4	0.07	0.02	0.52	0.61	26	0.02	1.2
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	S	1	2	8.25	28.11	24.15	84.8	6.04	4.4	0.05	311.6	4	0.07	0.02	0.49	0.58	32	0.01	2.7
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	M	8	1	8.24	28.31	24.01	83.1	5.74	5.9	0.09	271.4	4	0.07	0.02	0.50	0.59	25	<0.01	1.4
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	M	8	2	8.24	28.32	24.02	83.2	5.76	5.7	0.09	277.6	4	0.07	0.02	0.43	0.52	12	<0.01	1.8
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	B	15	1	8.29	28.59	23.86	82.6	5.64	7.1	0.13	301.2	4	0.07	0.02	0.43	0.52	30	0.02	2.0
E	27/4/2022	Mid-Ebb	Fine	Moderate	10:36	16	B	15	2	8.26	28.56	23.84	82.4	5.61	7.2	0.14	303.4	4	0.06	0.02	0.45	0.54	35	0.01	1.3
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	S	1	1	8.41	28.21	28.81	83.1	5.72	5.7	0.26	204.5	3	0.06	0.02	0.46	0.55	22	0.01	1.3
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	S	1	2	8.42	28.34	23.82	83.2	5.73	5.6	0.24	201.1	3	0.05	0.02	0.44	0.51	2	0.01	<1
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	M	11.5	1	8.26	28.61	23.61	81.6	5.61	7.2	0.11	184.6	3	0.10	0.02	0.55	0.67	20	0.01	<1
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	M	11.5	2	8.27	28.67	23.62	81.7	5.62	7.3	0.13	183.1	3	0.10	0.02	0.57	0.37	26	0.01	1.5
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	B	22	1	8.29	28.91	23.44	80.2	5.41	8.8	0.20	179.1	3	0.07	0.02	0.50	0.59	20	0.01	1.3
F	27/4/2022	Mid-Ebb	Fine	Moderate	10:51	23	B	22	2	8.29	28.92	23.41	80.3	5.42	8.9	0.21	177.2	3	0.07	0.02	0.56	0.65	16	0.01	1.3
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	S	1	1	8.24	27.31	24.61	85.2	6.01	4.1	0.10	71.4	5	0.07	0.01	0.33	0.41	30	0.02	1.5
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	S	1	2	8.22	27.32	24.64	85.3	6.03	4.2	0.12	70.8	5	0.07	0.02	0.32	0.41	41	0.01	1.4
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	M	11	1	8.26	27.11	24.51	84.1	6.02	4.2	0.15	92.1	5	0.08	0.01	0.33	0.43	21	0.01	1.5
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	M	11	2	8.22	27.12	24.52	84.4	6.01	4.2	0.17	92.4	5	0.08	0.01	0.35	0.45	14	0.01	1.3
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	B	21	1	8.24	27.14	24.44	84.1	6.03	3.4	0.13	101.4	4	0.08	0.01	0.32	0.41	12	<0.01	1.8
G	27/4/2022	Mid-Ebb	Fine	Moderate	11:12	22	B	21	2	8.27	27.15	24.41	84.1	6.02	3.2	0.14	102.6	4	0.08	0.01	0.27	0.37	13	0.01	1.8
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	S	1	1	8.22	27.03	24.59	84.9	5.84	3.1	0.21	144.1	4	0.08	0.01	0.31	0.40	150	0.02	2.0
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	S	1	2	8.23	27.04	24.58	84.8	5.81	3.4	0.23	142.5	4	0.08	0.01	0.31	0.41	140	0.02	2.3
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	M	9.5	1	8.26	27.24	24.51	84.7	5.77	4.2	0.12	164.1	4	0.08	0.02	0.39	0.49	410	0.01	2.0
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	M	9.5	2	8.24	27.22	24.52	84.6	5.74	4.3	0.14	166.2	4	0.09	0.01	0.43	0.53	210	0.01	2.3
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	B	18	1	8.17	27.34	24.23	84.5	5.63	5.2	0.20	121.4	4	0.06	0.01	0.32	0.39	26	0.03	1.9
H	27/4/2022	Mid-Ebb	Fine	Moderate	11:28	19	B	18	2	8.17	27.38	24.22	84.4	5.64	5.1	0.21	122.4	4	0.06	0.01	0.34	0.42	15	0.04	1.8

Note: 1. ND: Not Detected



Report No. : 181172WA220748



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**Test Report on Analysis of Water**

**Information Supplied by Client**

- Client : Fugro Technical Services Limited
- Client's address : 13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung, N.T., H.K
- Project : Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works
- Sample description : Ninety-six samples of water taken by the staff of FTS on 27/04/2022
- Client sample ID : Refer to pages 3 to 18
- Tests required :
  1. Biochemical oxygen demand
  2. Total suspended solids dried at 103°C – 105°C
  3. Ammoniacal Nitrogen content
  4. Nitrate-Nitrogen content
  5. Nitrite-Nitrogen content
  6. Total Inorganic Nitrogen content
  7. Total phosphorus content
  8. Total phosphorus content (Filtered)
  9. E. coli count

**Laboratory Information**

Lab. sample ID :	Chemical tests	Microbiological tests
	WA220748/1-96	WA220748/1B-96B

	Chemical tests	Microbiological tests
Container	Ninety-six 250 mL and 3 L plastic bottles	Ninety-six sterilized 250 mL plastic bottles with thiosulphate added
Appearance	Colorless	
Temperature	Cooled	

Date of receipt of sample : 27/04/2022

Date test commenced : 27/04/2022

Date test completed : 12/05/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748

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Test methods used : Biochemical oxygen demand  
*APHA 23ed. 5210B*

Total suspended solids dried at 103°C – 105°C  
*APHA 23ed. 2540D*

Ammoniacal Nitrogen content  
*APHA 23ed. 4500-NH<sub>3</sub> H*

Nitrate-Nitrogen content  
*APHA 23ed. 4500-NO<sub>3</sub><sup>-</sup> I*

Nitrite-Nitrogen content  
*APHA 23ed. 4500-NO<sub>2</sub><sup>-</sup> A & NO<sub>3</sub><sup>-</sup> I*

Total Inorganic Nitrogen content  
*In-house method E-T-112 (By Calculation)*

Total phosphorus content  
*APHA 17ed. 4500-PB.5 (Digestion) &  
In-house method E-T-056 (Determination)*

Total phosphorus content (Filtered)  
*APHA 17ed. 4500-PB.5 (Digestion) &  
In-house method E-T-056 (Determination)*

E. coli count  
*The Bacteriological Examination of Drinking Water Supplies  
1982, DoE (1983) Membrane Filtration Procedure: Sections 7.8,  
7.9.4.2 Bacterial Confirmation: Section 7.9.4.4 & in-situ urease  
test*

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748

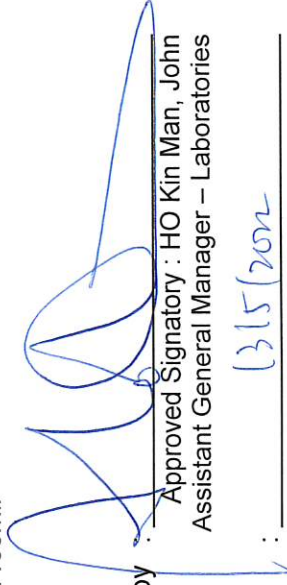
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**Results :**

Test parameters	Sample identification						
	A/S/E	A/S/E/Dup	A/M/E	A/M/E/Dup	A/B/E	A/B/E/Dup	
1. Biochemical oxygen demand, mg/L	1.4	1.2	<1	1.4	1.6	1.8	
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	7	6	3	3	
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.05	0.04	0.03	0.04	
4. Nitrate-Nitrogen content, mg/L	0.55	0.52	0.52	0.53	0.62	0.70	
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02	
6. Total Inorganic Nitrogen content, mg/L	0.61	0.59	0.58	0.59	0.67	0.75	
7. Total phosphorus content, mg/L	0.03	0.02	0.02	0.03	0.02	0.02	
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.02	0.02	0.01	0.01	
9. E. coli count, cfu/100ml	0	2*	1*	3*	1*	2*	

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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

Date : 13/5/2021

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



Report No. : 181172WA220748


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**Results :**

Test parameters	Sample identification							
	B/S/E	B/S/E/Dup	B/M/E	B/M/E/Dup	B/B/E	B/B/E/Dup	B/B/E/Dup	B/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.3	1.0	1.8	1.2	1.2	1.2	1.2	1.2
2. Total suspended solids dried at 103°C - 105°C, mg/L	6	6	6	6	7	7	7	7
3. Ammoniacal nitrogen content, mg/L	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04
4. Nitrate-Nitrogen content, mg/L	0.51	0.56	0.49	0.46	0.55	0.55	0.44	0.44
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.58	0.63	0.56	0.52	0.61	0.61	0.50	0.50
7. Total phosphorus content, mg/L	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02
9. E. coli count, cfu/100ml	2*	0	2*	4*	2*	2*	4*	4*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

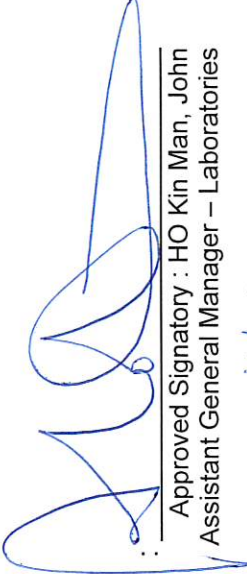
Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification							
	C/S/E	C/S/E/Dup	C/M/E	C/M/E/Dup	C/B/E	C/B/E/Dup	C/B/E/Dup	C/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.3	2.9	2.5	<1	1.5	2.7	2.7	2.7
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	5	5	5	5	5	5
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03
4. Nitrate-Nitrogen content, mg/L	0.56	0.57	0.54	0.52	0.55	0.58	0.58	0.58
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.62	0.63	0.59	0.58	0.60	0.64	0.64	0.64
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.01	<0.01	<0.01	<0.01
9. E. coli count, cfu/100ml	1*	2*	2*	4*	3*	1*	1*	1*

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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

Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

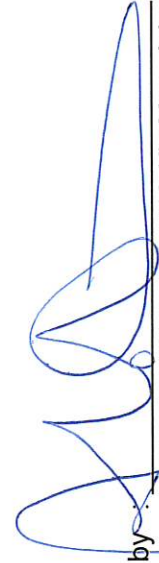
Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification					
	D/S/E	D/S/E/Dup	D/M/E	D/M/E/Dup	D/B/E	D/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.4	1.5	1.2	1.1	1.4	1.1
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	3	3	3	4
3. Ammoniacal nitrogen content, mg/L	0.07	0.07	0.04	0.04	0.05	0.05
4. Nitrate-Nitrogen content, mg/L	0.48	0.52	0.48	0.46	0.49	0.53
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.57	0.60	0.54	0.53	0.56	0.60
7. Total phosphorus content, mg/L	0.02	0.03	0.02	0.02	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	<0.01	0.01	0.01	0.01	0.02	0.02
9. E. coli count, cfu/100ml	1*	1*	1*	2*	2*	4*

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by:   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/15/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

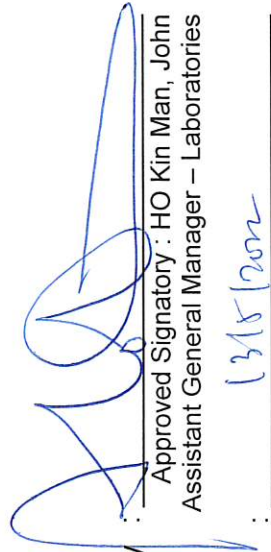


Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification							
	E/S/E	E/S/E/Dup	E/M/E	E/M/E/Dup	E/B/E	E/B/E/Dup	E/S/E	E/S/E/Dup
1. Biochemical oxygen demand, mg/L	1.2	2.7	1.4	1.8	2.0	1.3		
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	4	4	4	4		
3. Ammoniacal nitrogen content, mg/L	0.07	0.07	0.07	0.07	0.07	0.06		
4. Nitrate-Nitrogen content, mg/L	0.52	0.49	0.50	0.43	0.43	0.45		
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02		
6. Total Inorganic Nitrogen content, mg/L	0.61	0.58	0.59	0.52	0.52	0.54		
7. Total phosphorus content, mg/L	0.04	0.03	0.02	0.02	0.04	0.03		
8. Total phosphorus content (Filtered), mg/L	0.02	0.01	<0.01	<0.01	0.02	0.01		
9. E. coli count, cfu/100ml	2.6 x 10	3.2 x 10	2.5 x 10	1.2 x 10	3.0 x 10	3.5 x 10		

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification								
	F/S/E	F/S/E/Dup	F/M/E	F/M/E/Dup	F/B/E	F/B/E/Dup			
1. Biochemical oxygen demand, mg/L	1.3	<1	<1	1.5	1.3	1.3			
2. Total suspended solids dried at 103°C - 105°C, mg/L	3	3	3	3	3	3			
3. Ammoniacal nitrogen content, mg/L	0.06	0.05	0.10	0.10	0.07	0.07			
4. Nitrate-Nitrogen content, mg/L	0.46	0.44	0.55	0.57	0.50	0.56			
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02			
6. Total Inorganic Nitrogen content, mg/L	0.55	0.51	0.67	0.69	0.59	0.65			
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.02	0.03			
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.01	0.01	0.01	0.01			
9. E. coli count, cfu/100ml	2.2 x 10	1.9 x 10	2.0 x 10	2.6 x 10	2.0 x 10	1.6 x 10			

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2020


*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification							
	G/S/E	G/S/E/Dup	G/M/E	G/M/E/Dup	G/B/E	G/B/E/Dup	G/B/E	G/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.5	1.4	1.5	1.3	1.8	1.8	1.8	1.8
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	5	5	4	4	4	4
3. Ammoniacal nitrogen content, mg/L	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08
4. Nitrate-Nitrogen content, mg/L	0.33	0.32	0.33	0.35	0.32	0.32	0.32	0.27
5. Nitrite-Nitrogen content, mg/L	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
6. Total Inorganic Nitrogen content, mg/L	0.41	0.41	0.43	0.45	0.41	0.41	0.41	0.37
7. Total phosphorus content, mg/L	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.02	0.01	0.01	0.01	<0.01	<0.01	<0.01	0.01
9. E. coli count, cfu/100ml	3.0 x 10	4.1 x 10	2.1 x 10	1.4 x 10	1.2 x 10	1.2 x 10	1.2 x 10	1.3 x 10

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date 13/5/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

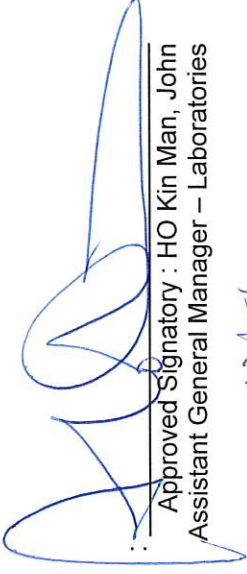


Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification							
	H/S/E	H/S/E/Dup	H/M/E	H/M/E/Dup	H/B/E	H/B/E/Dup	H/S/E	H/S/E/Dup
1. Biochemical oxygen demand, mg/L	2.0	2.3	2.0	2.3	1.9	1.8		
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	4	4	4	4		
3. Ammoniacal nitrogen content, mg/L	0.08	0.08	0.08	0.09	0.06	0.06		
4. Nitrate-Nitrogen content, mg/L	0.31	0.31	0.39	0.43	0.32	0.34		
5. Nitrite-Nitrogen content, mg/L	0.01	0.01	0.02	0.01	0.01	0.01		
6. Total Inorganic Nitrogen content, mg/L	0.40	0.41	0.49	0.53	0.39	0.42		
7. Total phosphorus content, mg/L	0.03	0.04	0.02	0.02	0.12	0.12		
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.03	0.04		
9. E. coli count, cfu/100ml	1.5 x 10 <sup>2</sup>	1.4 x 10 <sup>2</sup>	4.1 x 10 <sup>2</sup>	2.1 x 10 <sup>2</sup>	2.6 x 10	1.5 x 10		

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

Date : 13/5/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748

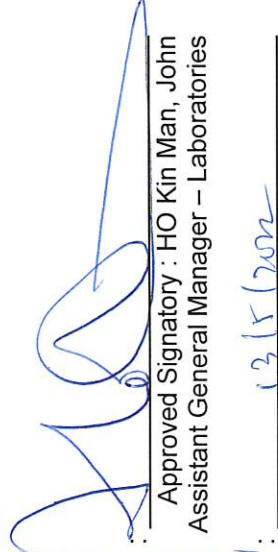
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**Results :**

Test parameters	Sample identification						
	A/S/F	A/S/F/Dup	A/M/F	A/M/F/Dup	A/B/F	A/B/F/Dup	
1. Biochemical oxygen demand, mg/L	1.0	1.1	1.1	1.3	1.0	1.1	
2. Total suspended solids dried at 103°C - 105°C, mg/L	3	3	3	3	3	3	
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.07	0.07	0.04	0.04	
4. Nitrate-Nitrogen content, mg/L	0.48	0.51	0.43	0.44	0.45	0.51	
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02	
6. Total Inorganic Nitrogen content, mg/L	0.54	0.57	0.52	0.53	0.51	0.56	
7. Total phosphorus content, mg/L	0.04	0.03	0.13	0.13	0.03	0.03	
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.02	0.02	
9. E. coli count, cfu/100ml	3*	0	1*	0	0	1*	

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



Report No. : 181172WA220748

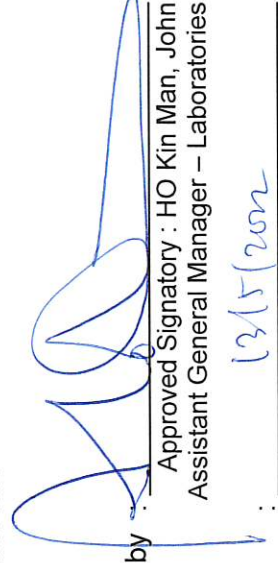
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**Results :**

Test parameters	Sample identification									
	B/S/F	B/S/F/Dup	B/M/F	B/M/F/Dup	B/B/F	B/B/F/Dup	B/S/F	B/S/F/Dup	B/M/F	B/M/F/Dup
1. Biochemical oxygen demand, mg/L	1.2	<1	<1	1.1	1.0	1.1				
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	4	4	3	3				3
3. Ammoniacal nitrogen content, mg/L	0.05	0.05	0.09	0.09	0.04	0.04				0.04
4. Nitrate-Nitrogen content, mg/L	0.50	0.47	0.59	0.55	0.46	0.48				0.48
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02				0.02
6. Total Inorganic Nitrogen content, mg/L	0.57	0.54	0.70	0.66	0.52	0.54				0.54
7. Total phosphorus content, mg/L	0.03	0.03	0.03	0.02	0.03	0.02				0.02
8. Total phosphorus content (Filtered), mg/L	0.02	0.01	0.01	0.02	0.01	0.01				0.01
9. E. coli count, cfu/100ml	0	1*	1*	1*	0	1*				1*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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

Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

Report No. : 181172WA220748

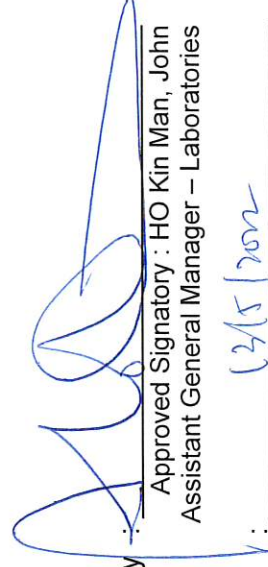
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**Results :**

Test parameters	Sample identification								
	C/S/F	C/S/F/Dup	C/M/F	C/M/F/Dup	C/B/F	C/B/F/Dup			
1. Biochemical oxygen demand, mg/L	1.3	1.0	1.3	1.1	1.1	1.1			
2. Total suspended solids dried at 103°C - 105°C, mg/L	3	3	3	3	3	3			
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.05	0.04	0.04	0.04			
4. Nitrate-Nitrogen content, mg/L	0.63	0.67	0.45	0.48	0.54	0.52			
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02			
6. Total Inorganic Nitrogen content, mg/L	0.69	0.73	0.51	0.55	0.60	0.58			
7. Total phosphorus content, mg/L	0.02	0.03	0.04	0.03	0.03	0.02			
8. Total phosphorus content (Filtered), mg/L	<0.01	<0.01	0.01	0.01	0.01	0.01			
9. E. coli count, cfu/100ml	1*	0	0	1*	0	1*			

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

Report No. : 181172WA220748

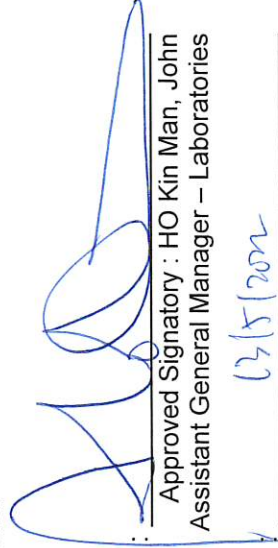
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**Results :**

Test parameters	Sample identification							
	D/S/F	D/S/F/Dup	D/M/F	D/M/F/Dup	D/B/F	D/B/F/Dup		
1. Biochemical oxygen demand, mg/L	<1	<1	1.2	1.2	1.2	1.2	1.2	1.2
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	3	3	4	4	4	4
3. Ammoniacal nitrogen content, mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
4. Nitrate-Nitrogen content, mg/L	0.66	0.62	0.75	0.71	0.72	0.66	0.66	0.66
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.74	0.69	0.82	0.78	0.79	0.73	0.73	0.73
7. Total phosphorus content, mg/L	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
9. E. coli count, cfu/100ml	1*	0	3*	1*	2*	1*	2*	1*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date 13/5/2022

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Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification								
	E/S/F	E/S/F/Dup	E/M/F	E/M/F/Dup	E/B/F	E/B/F/Dup			
1. Biochemical oxygen demand, mg/L	2.1	1.8	1.6	1.5	1.4	1.1			
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	5	5	5	5			
3. Ammoniacal nitrogen content, mg/L	0.02	0.03	0.04	0.04	0.04	0.04			
4. Nitrate-Nitrogen content, mg/L	0.39	0.46	0.60	0.67	0.61	0.65			
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02			
6. Total Inorganic Nitrogen content, mg/L	0.43	0.50	0.66	0.73	0.67	0.71			
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.03	0.03			
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	<0.01	<0.01	0.01	0.01			
9. E. coli count, cfu/100ml	1.3 x 10	2.0 x 10	2.2 x 10	3.0 x 10	1.5 x 10	1.6 x 10			

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 Assistant General Manager – Laboratories

Date : 13/5/2022

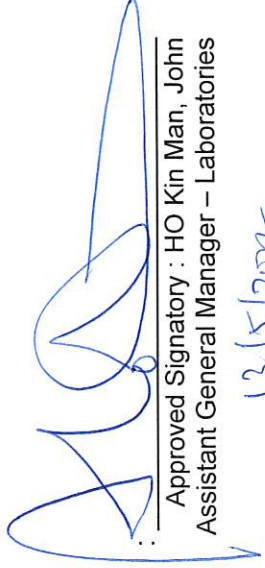
*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

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**Results :**

Test parameters	Sample identification							
	F/S/F	F/S/F/Dup	F/M/F	F/M/F/Dup	F/B/F	F/B/F/Dup		
1. Biochemical oxygen demand, mg/L	1.2	1.3	1.1	1.0	1.3	1.5		
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	5	5	6	6		
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.06	0.05	0.02	0.02		
4. Nitrate-Nitrogen content, mg/L	0.62	0.64	0.52	0.57	0.44	0.43		
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02		
6. Total Inorganic Nitrogen content, mg/L	0.68	0.69	0.59	0.64	0.48	0.47		
7. Total phosphorus content, mg/L	0.05	0.04	0.02	0.02	0.02	0.02		
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	<0.01	<0.01	<0.01	<0.01		
9. E. coli count, cfu/100ml	2.2 x 10	1.4 x 10	3.5 x 10	2.1 x 10	1.6 x 10	2.1 x 10		

Certified by :   
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Date : 13/5/2022

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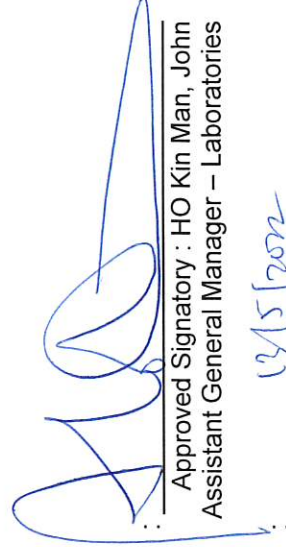
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**Results :**

Test parameters	Sample identification					
	G/S/IF	G/S/IF/Dup	G/M/IF	G/M/IF/Dup	G/B/IF	G/B/IF/Dup
1. Biochemical oxygen demand, mg/L	1.5	1.7	1.5	1.6	1.3	1.4
2. Total suspended solids dried at 103°C - 105°C, mg/L	6	6	6	6	6	6
3. Ammoniacal nitrogen content, mg/L	0.04	0.03	0.05	0.06	0.03	0.03
4. Nitrate-Nitrogen content, mg/L	0.38	0.36	0.42	0.46	0.55	0.53
5. Nitrite-Nitrogen content, mg/L	0.02	0.01	0.01	0.01	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.44	0.41	0.48	0.53	0.59	0.57
7. Total phosphorus content, mg/L	0.04	0.04	0.03	0.03	0.03	0.04
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.02	0.02	<0.01	0.01
9. E. coli count, cfu/100ml	3.9 x 10 <sup>2</sup>	1.2 x 10 <sup>2</sup>	1.6 x 10 <sup>2</sup>	2.3 x 10 <sup>2</sup>	1.0 x 10	7*

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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

Date : 13/5/2022

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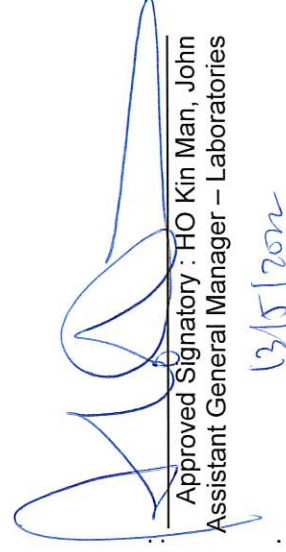
Report No. : 181172WA220748

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**Results :**

Test parameters	Sample identification							
	H/S/F	H/S/F/Dup	H/M/F	H/M/F/Dup	H/B/F	H/B/F/Dup	H/S/F	H/S/F/Dup
1. Biochemical oxygen demand, mg/L	1.9	2.1	1.8	2.4	2.2	2.2	2.2	2.2
2. Total suspended solids dried at 103°C - 105°C, mg/L	6	6	6	6	6	6	6	6
3. Ammoniacal nitrogen content, mg/L	0.03	0.05	0.04	0.03	0.04	0.03	0.04	0.03
4. Nitrate-Nitrogen content, mg/L	0.38	0.39	0.38	0.41	0.37	0.40	0.37	0.40
5. Nitrite-Nitrogen content, mg/L	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.42	0.45	0.43	0.46	0.42	0.44	0.42	0.44
7. Total phosphorus content, mg/L	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
9. E. coli count, cfu/100ml	2.4 x 10	1.0 x 10	8*	3.5 x 10	2.0 x 10 <sup>2</sup>	2.0 x 10 <sup>2</sup>	2.0 x 10 <sup>2</sup>	2.0 x 10 <sup>2</sup>

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by :   
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 Assistant General Manager – Laboratories

Date : 13/5/2022

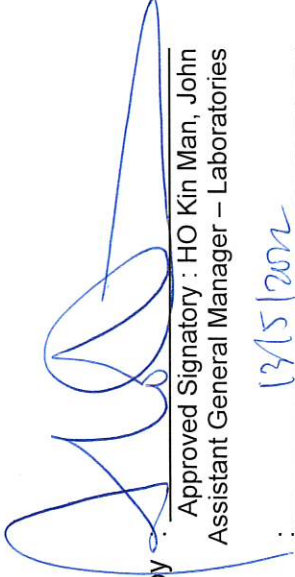
\*\* End of Report \*\*

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

**Note**

**Laboratory Duplicate, Quality Assurance/Quality Control Report**

Biochemical oxygen demand, mg/L						Nitrate-Nitrogen content, mg/L					
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		RPD%	Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		RPD%
			Original result	Duplicate result					Original result	Duplicate result	
1	<1	-	1.52	1.44	5.41	0.005	-	-			
			1.28	1.23	3.98						
			1.04	1.12	7.41						
			1.25	1.30	3.92						
			2.24	2.06	8.37						
Total suspended solids dried at 103°C – 105°C, mg/L											
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		RPD%	Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		RPD%
			Original result	Duplicate result					Original result	Duplicate result	
1	<1	99.98	5.10	5.43	6.27	0.005	<0.005	103.25	0.021	0.020	4.88
			5.47	5.48	0.18				0.014	0.014	0.00
			2.92	3.02	3.37				0.019	0.019	0.00
			4.10	3.80	7.59				0.018	0.018	0.00
			5.90	5.74	2.75				0.016	0.016	0.00

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

Date : 13/5/2022

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**Note**

**Laboratory Duplicate, Quality Assurance/Quality Control Report**

Ammoniacal Nitrogen content, mg/L				Total Inorganic Nitrogen content, mg/L				
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	
			Original result    Duplicate result    RPD%				Original result    Duplicate result    RPD%	
0.005	<0.005	94.90	0.068    0.068    0.15	0.005	-	-	-	
	<0.005	103.22	0.080    0.077    3.94					
	<0.005	98.43	0.036    0.037    1.10					
	<0.005	102.30	0.040    0.039    1.27					
	<0.005	104.22	0.029    0.028    6.00					
Total phosphorus content, mg/L				Total phosphorus content (Filtered) , mg/L				
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	
			Original result    Duplicate result    RPD%				Original result    Duplicate result    RPD%	
0.01	<0.01	99.40	0.031    0.029    6.67	0.01	<0.01	99.90	0.013    0.014    7.41	
	<0.01	100.90	0.027    0.028    3.64			<0.01	99.90	0.011    0.010    9.52
	<0.01	100.30	0.024    0.025    4.08			<0.01	100.00	0.015    0.013    14.29
	<0.01	100.10	0.042    0.045    6.90			<0.01	100.00	0.020    0.022    9.52
	<0.01	99.60	0.030    0.032    6.45			<0.01	100.40	0.014    0.014    0.00
E. coli count, cfu/100ml								
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	
			Original result    Duplicate result    Precision				Original result    Duplicate result    Precision	
1	0	-	1    1    0	1	0	-	1    1    0	
			1.1 x 10    1.6 x 10    0.16					1.6 x 10    1.2 x 10    0.12
			1    1    0					1.7 x 10 <sup>2</sup> 2.3 x 10 <sup>2</sup> 0.13
			1.6 x 10    1.2 x 10    0.12					
			1.7 x 10 <sup>2</sup> 2.3 x 10 <sup>2</sup> 0.13					

Certified by :

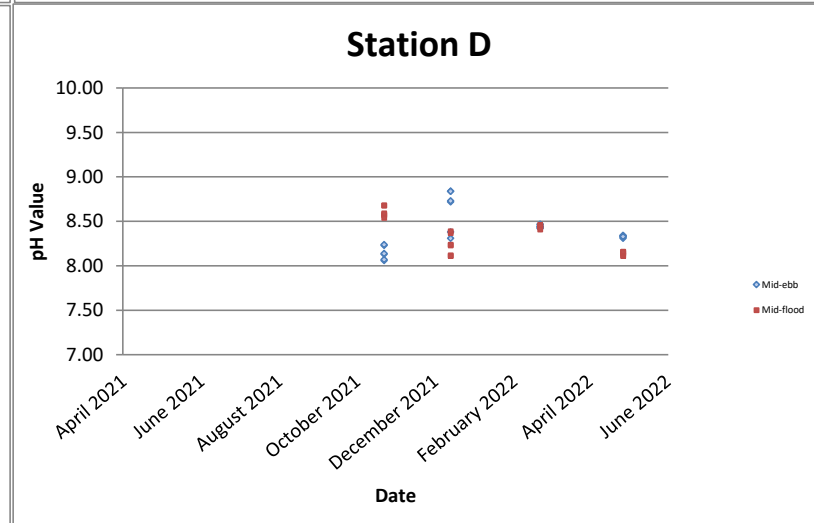
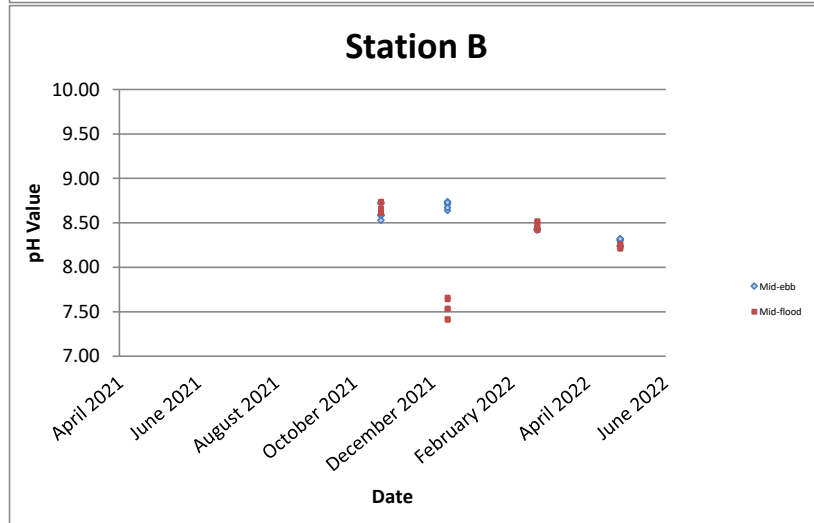
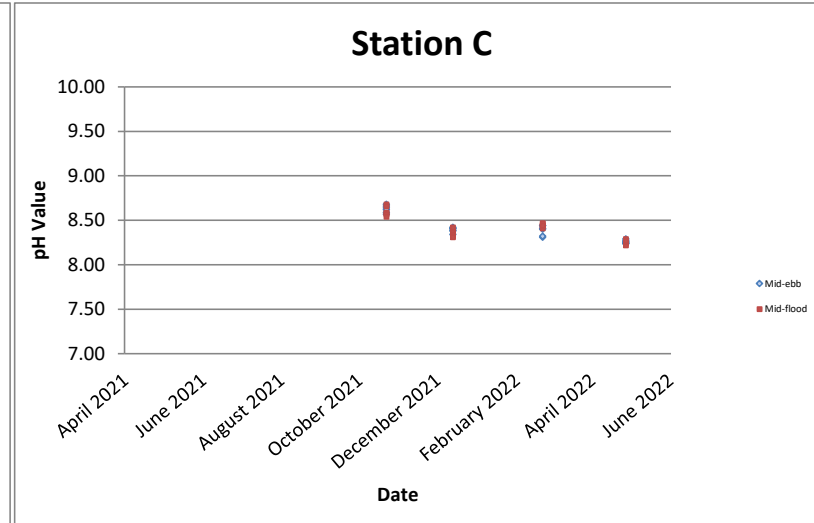
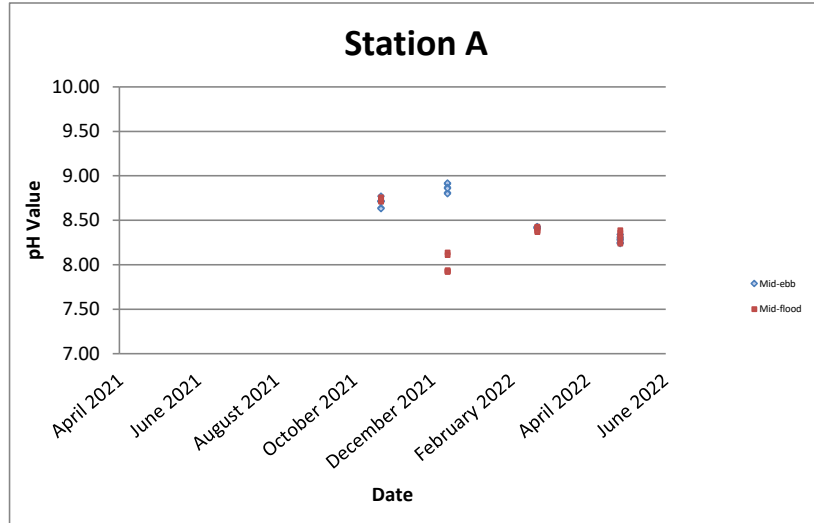
Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories

Date :

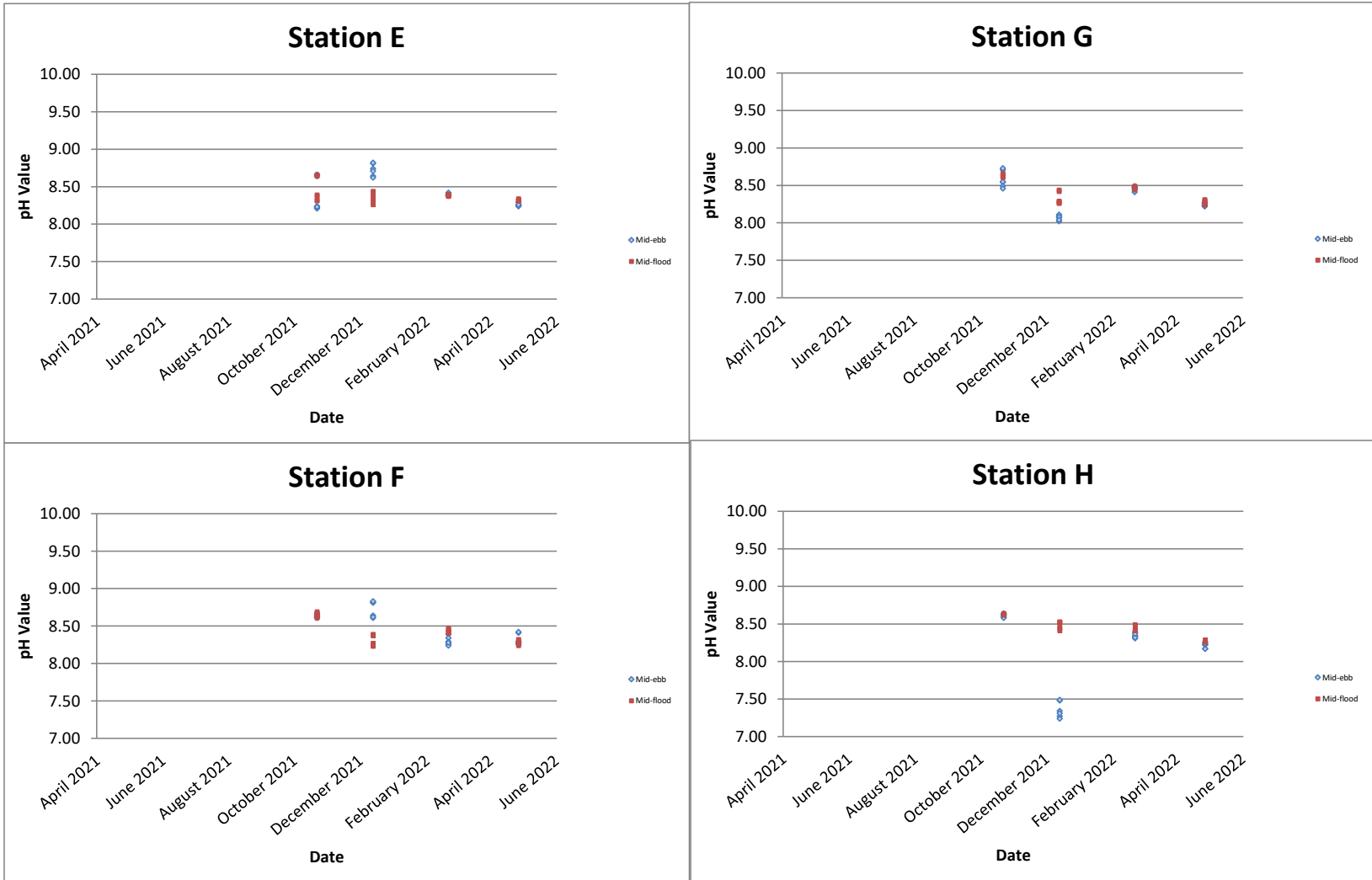
13/5/2022

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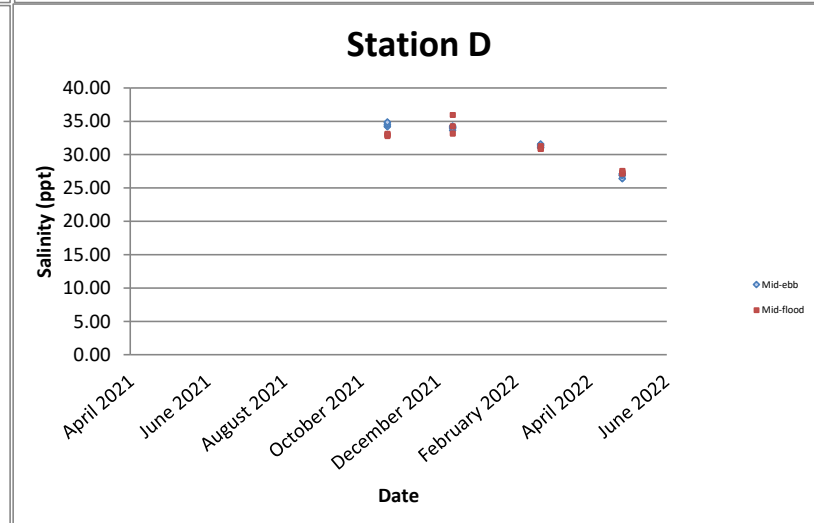
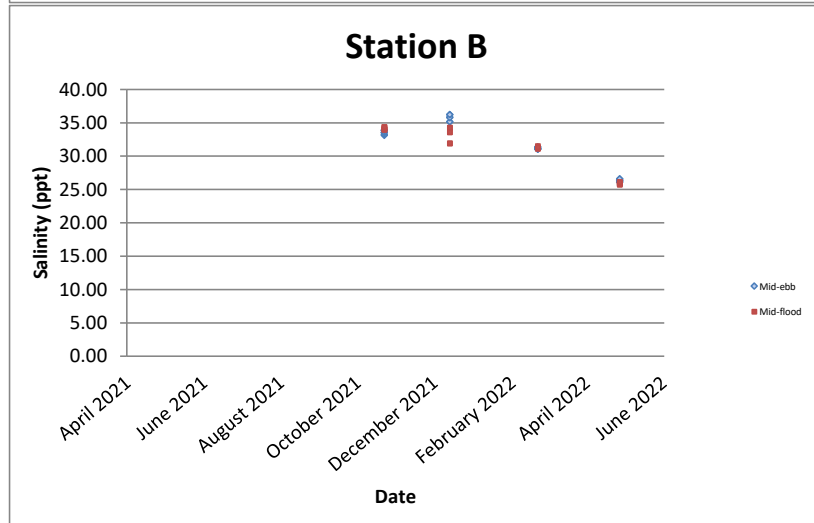
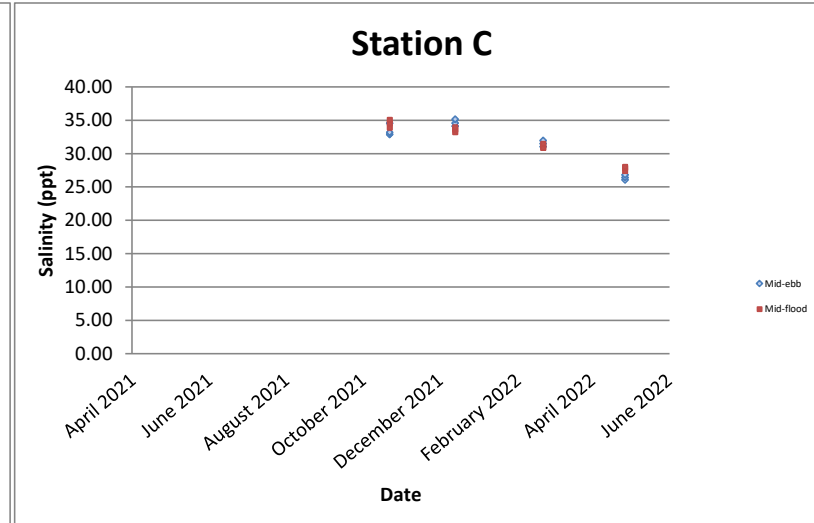
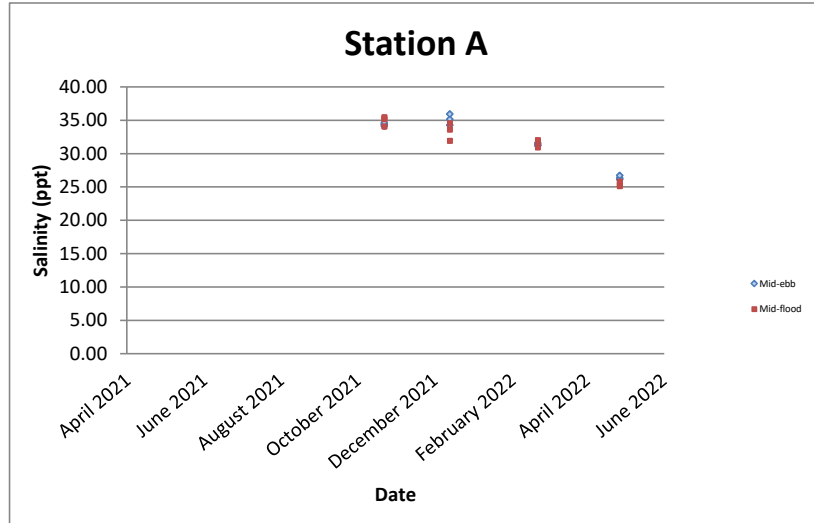
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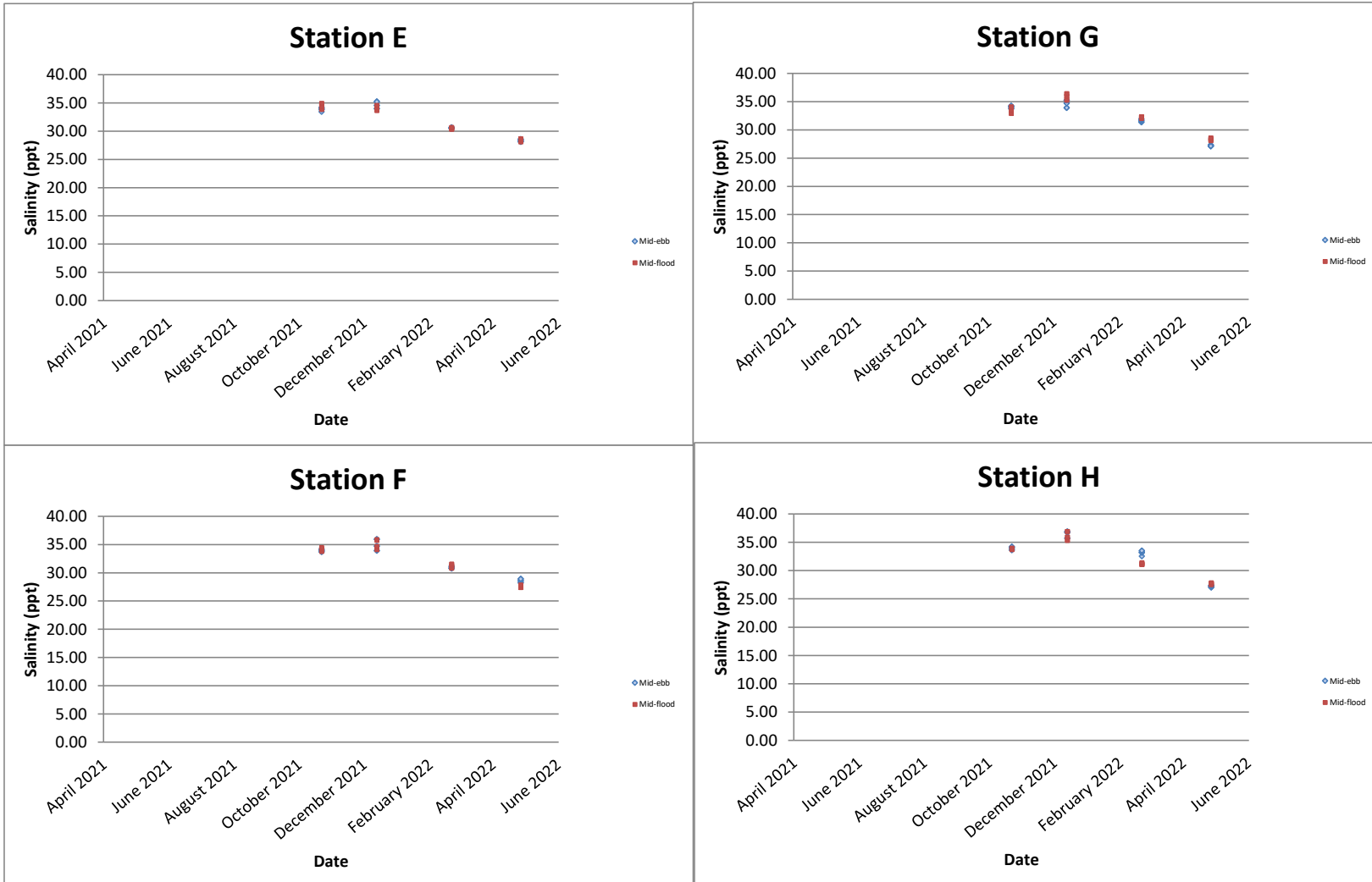
pH value



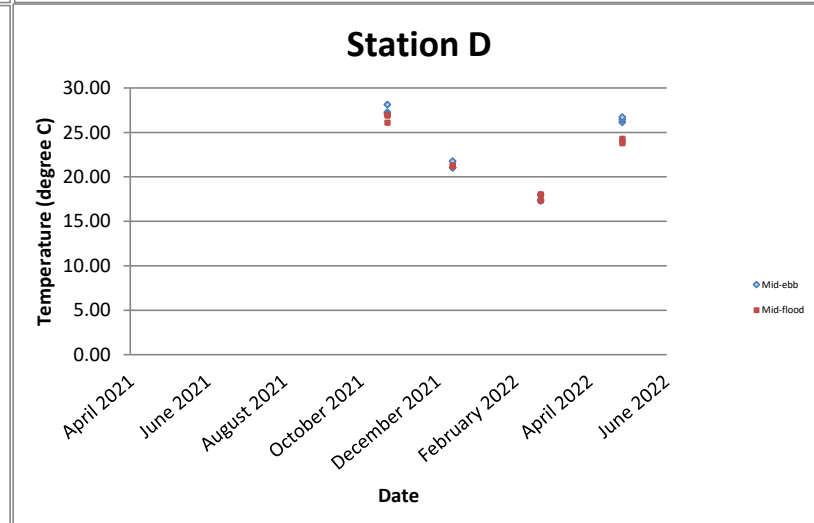
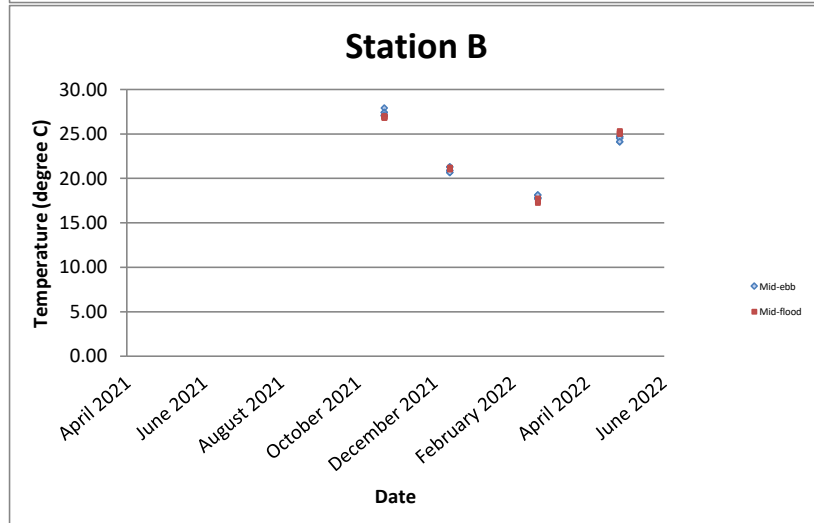
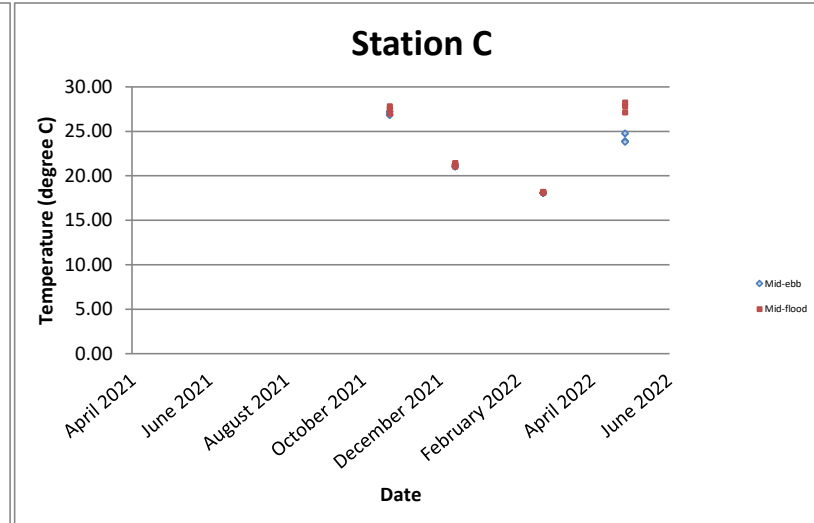
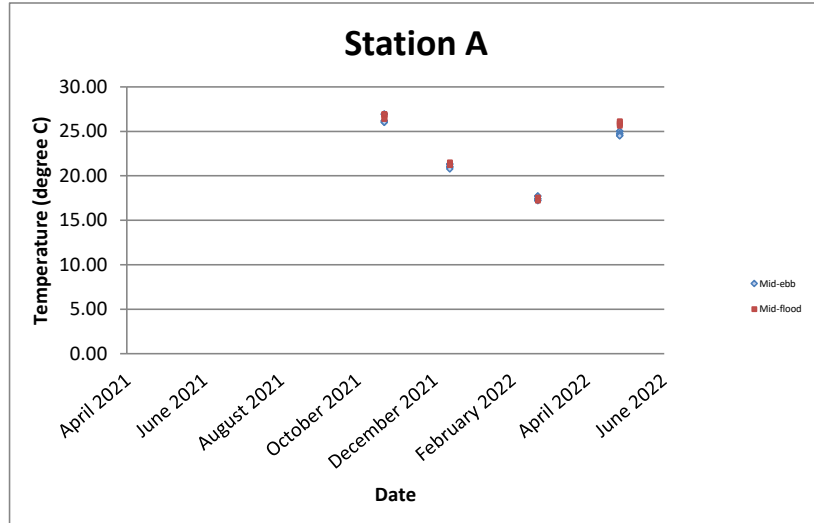
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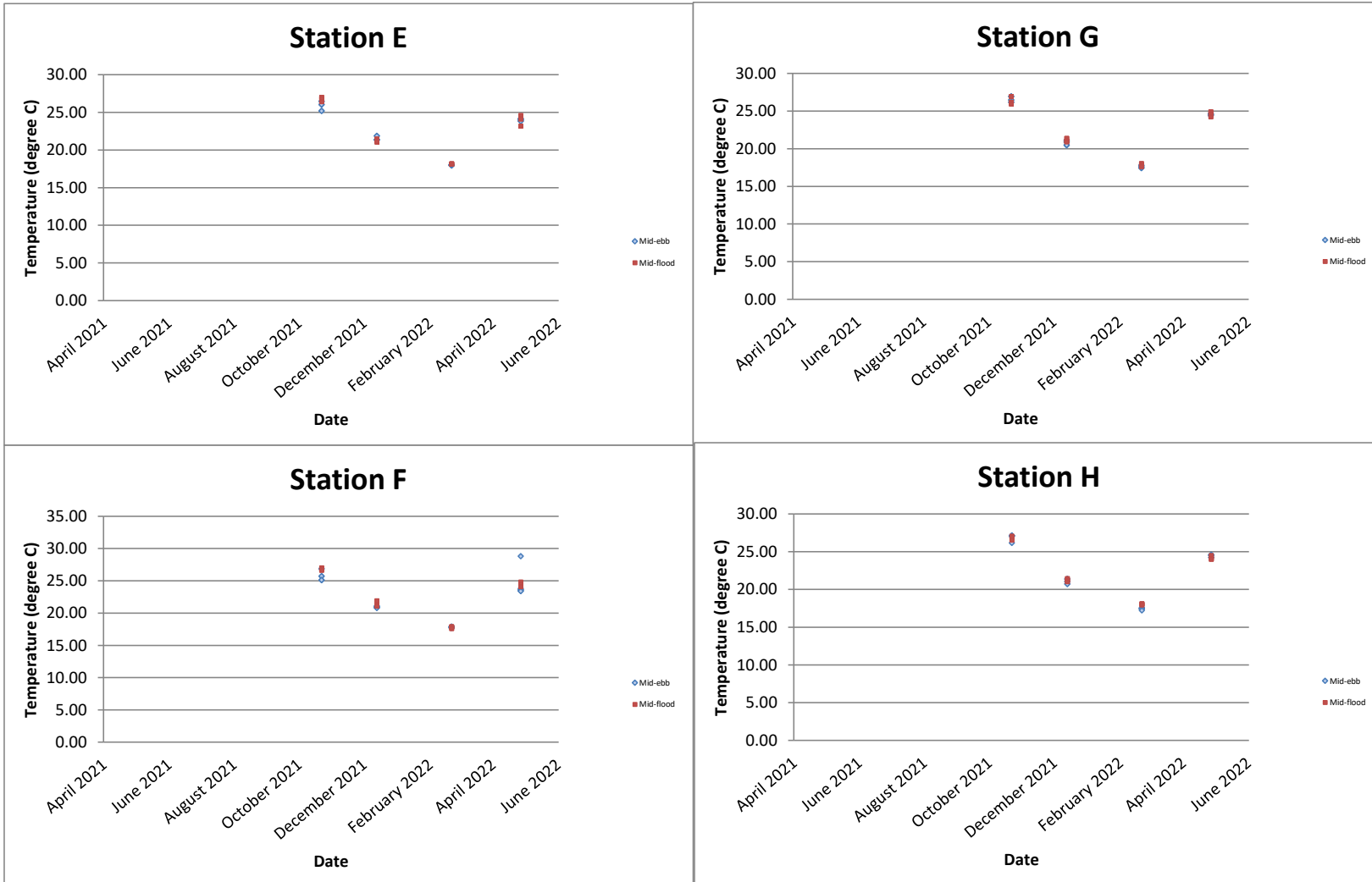
Salinity (ppt)



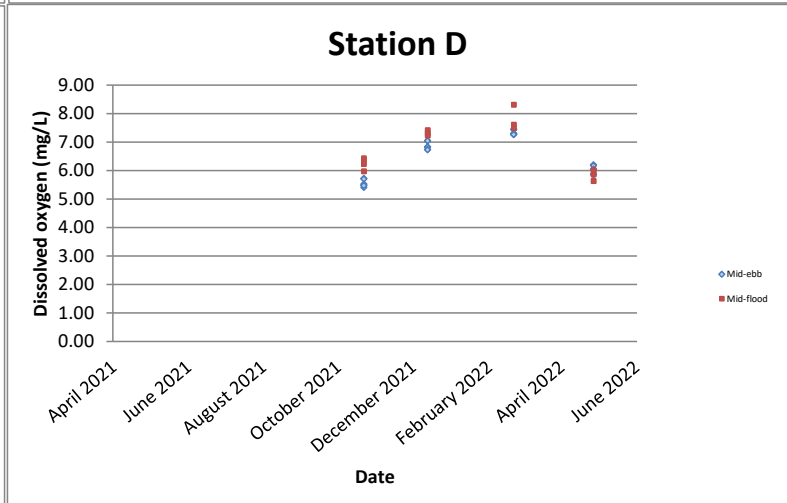
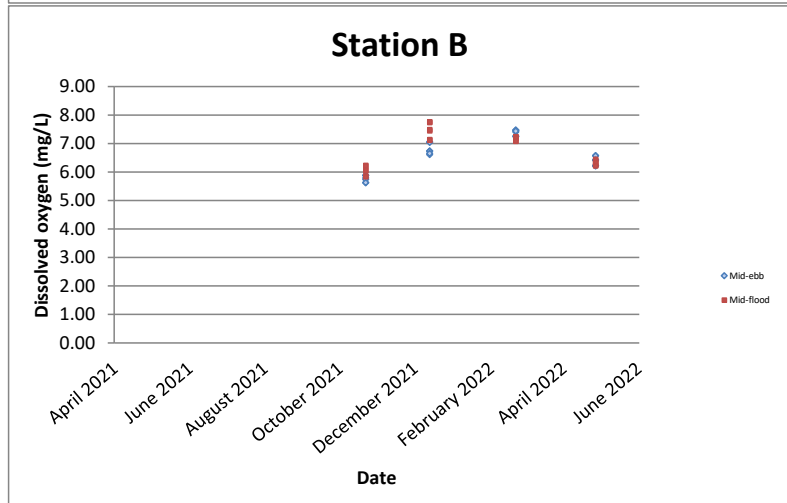
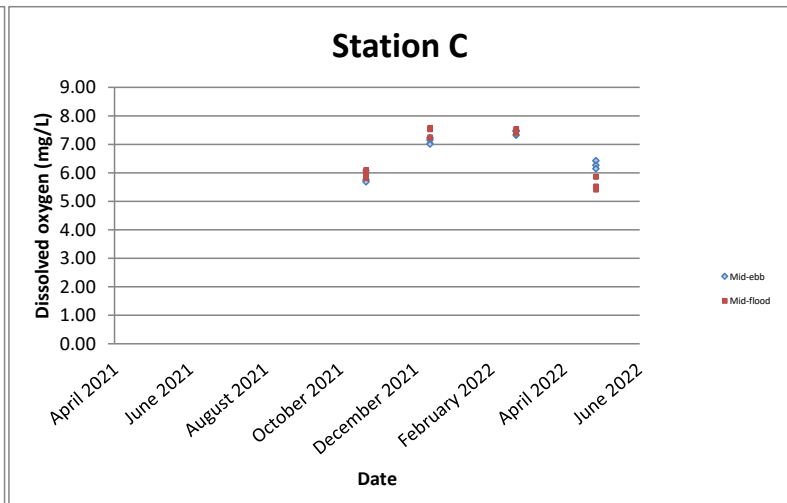
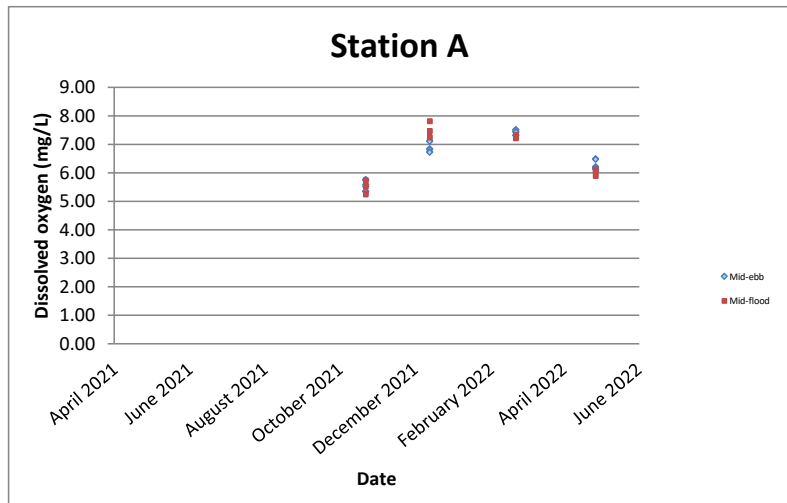
Temperature (degree C)



Temperature (degree C)

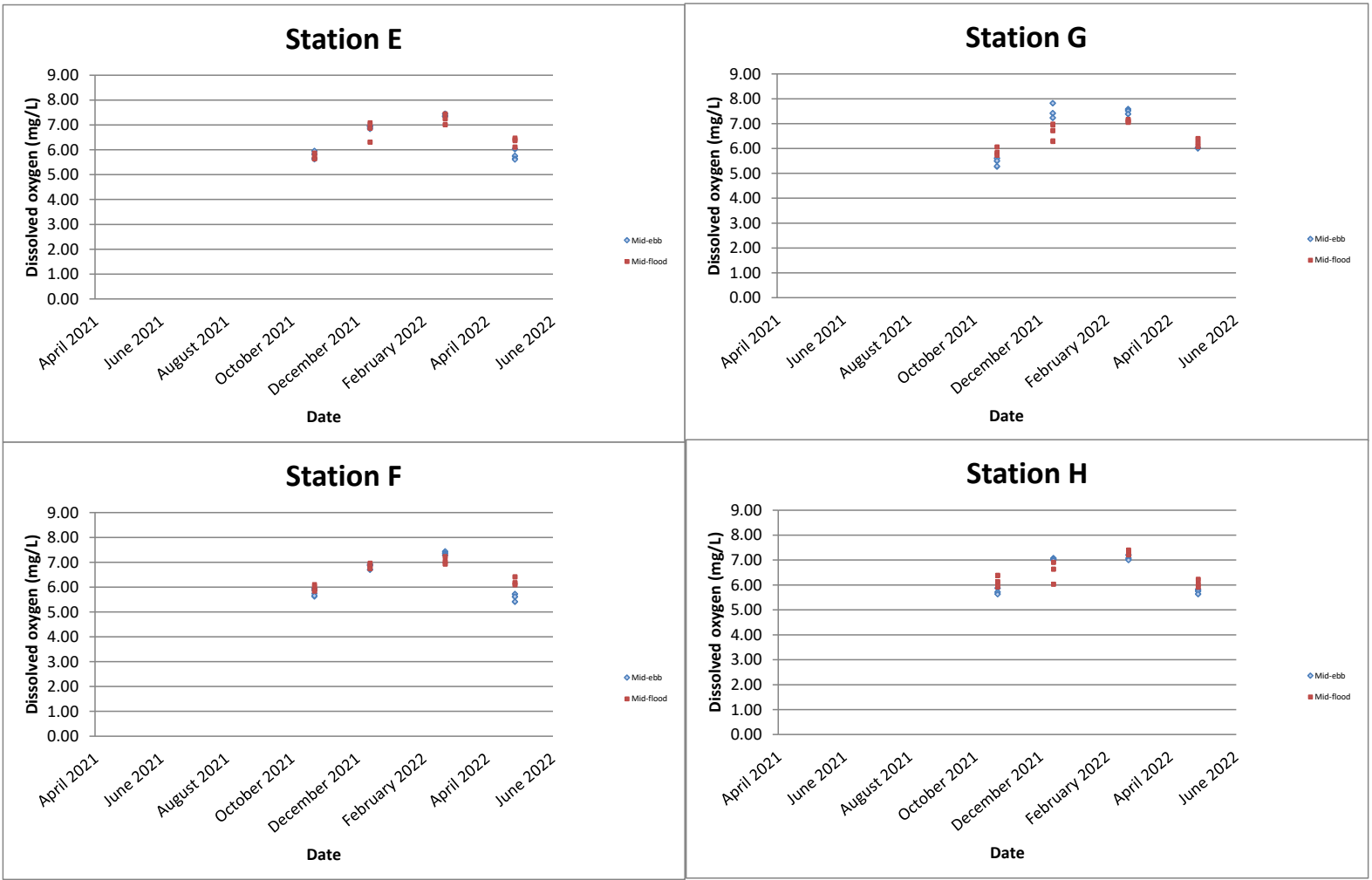


Dissolved oxygen (mg/L)

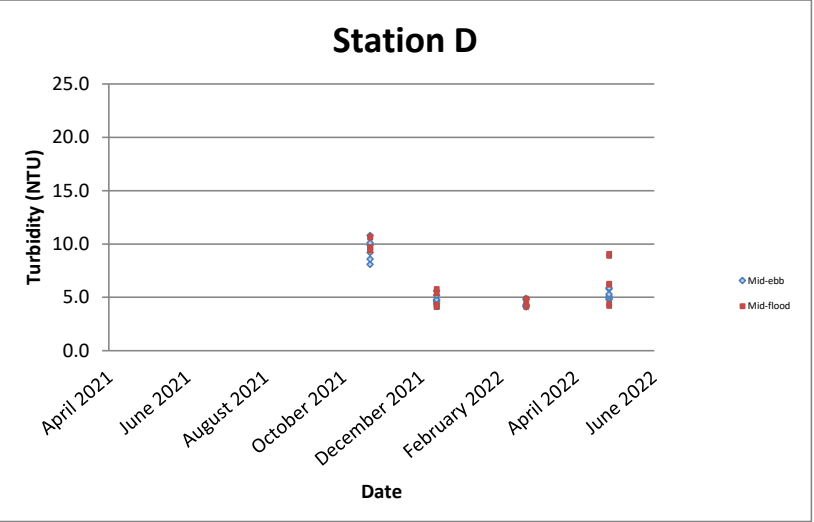
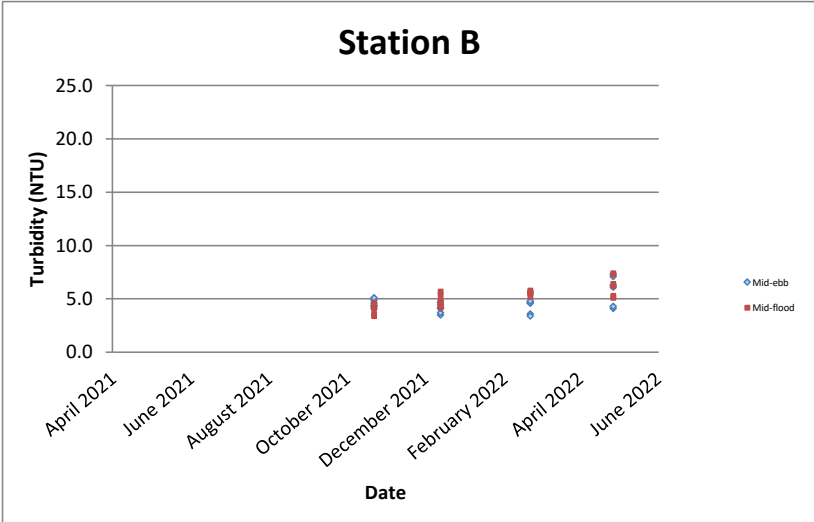
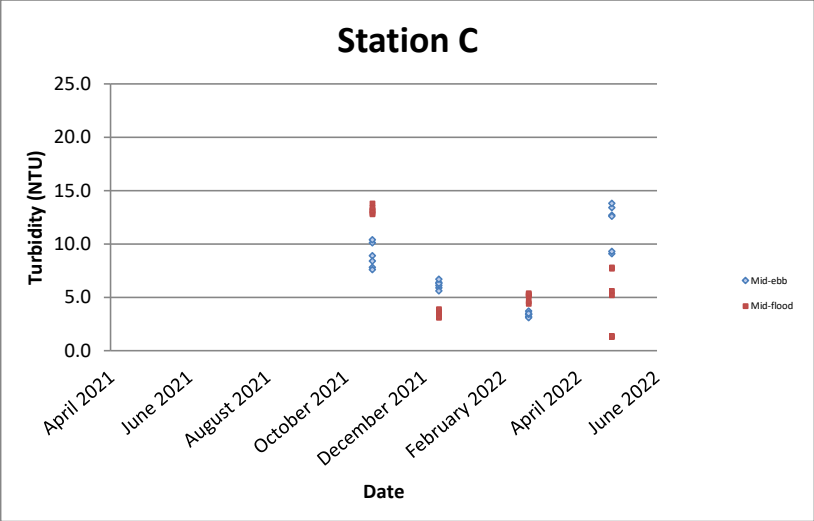
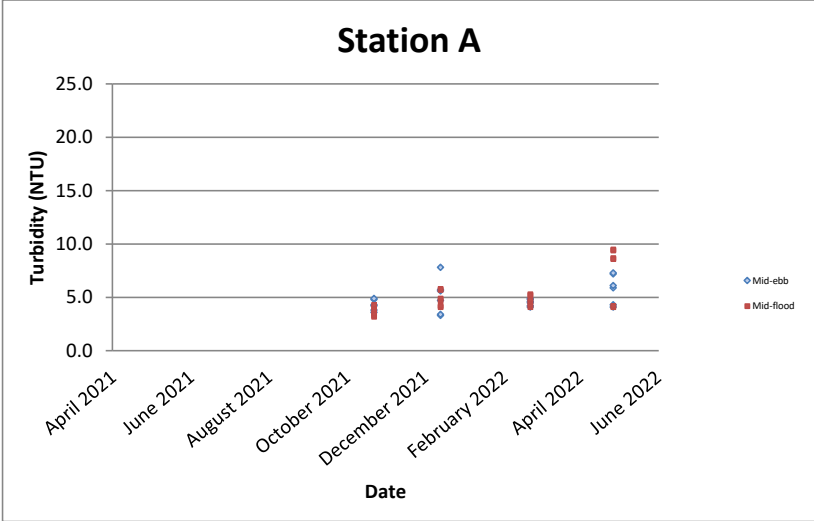




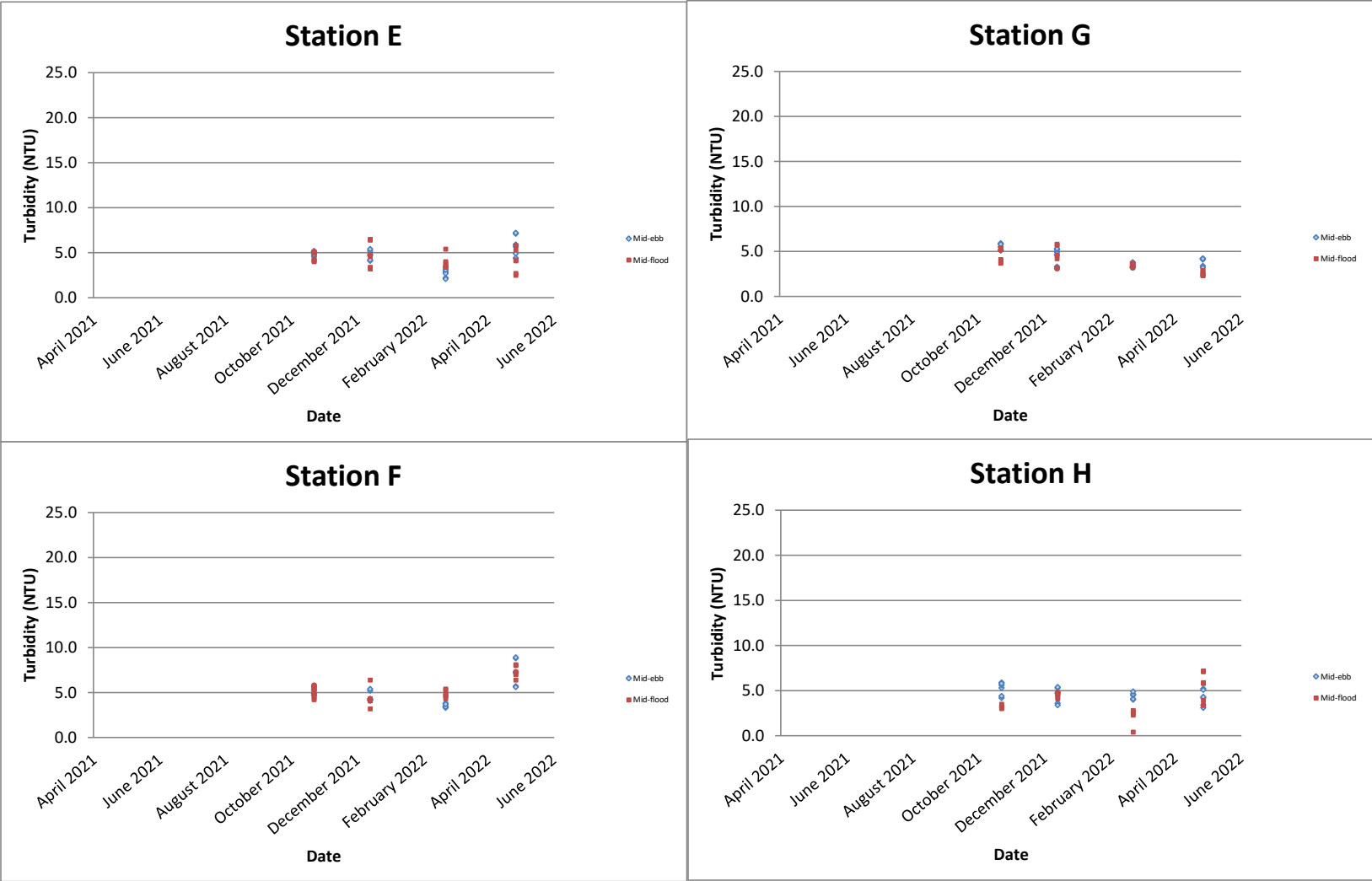
Dissolved oxygen (mg/L)



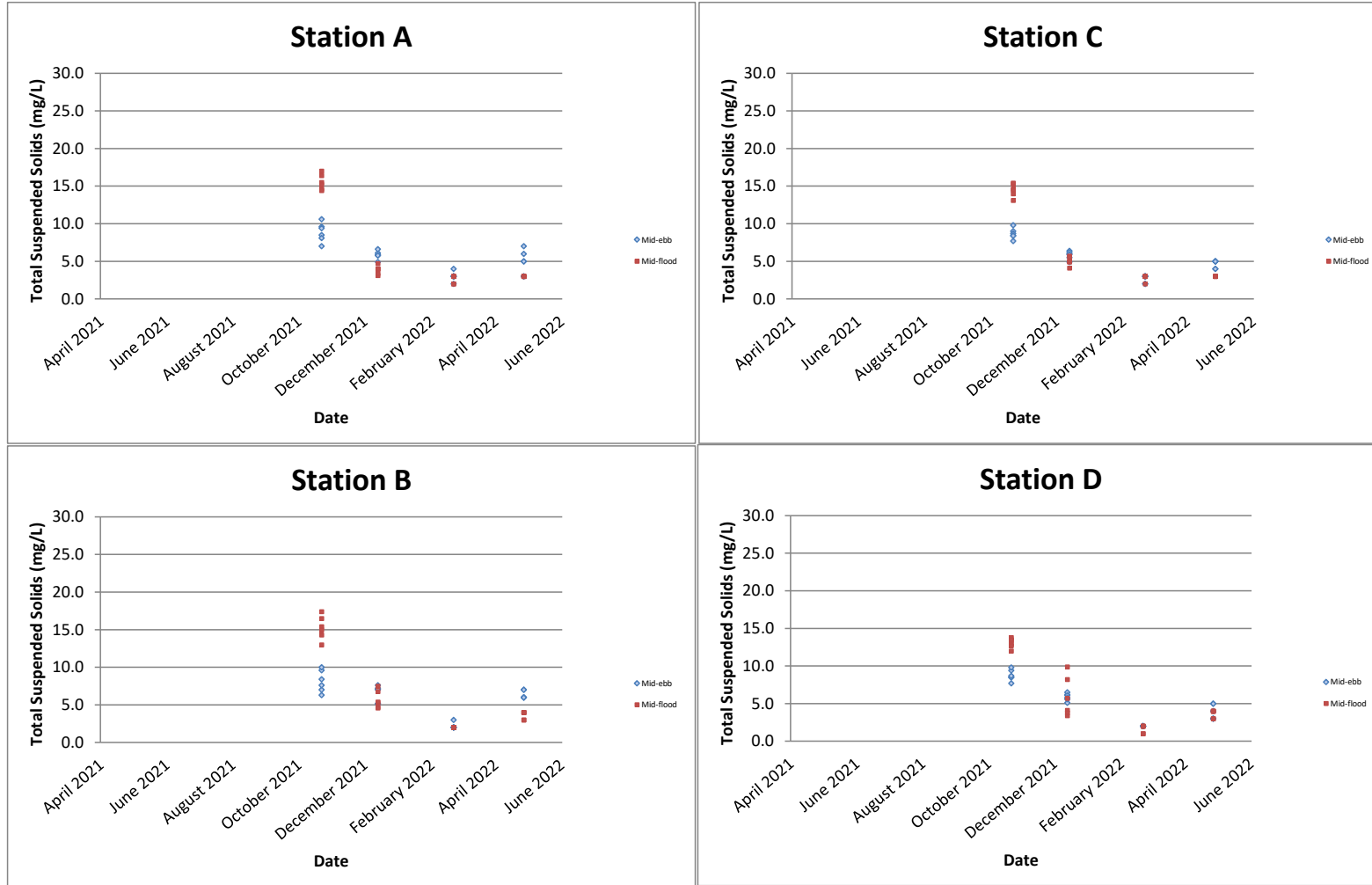
Turbidity (NTU)



Turbidity (NTU)

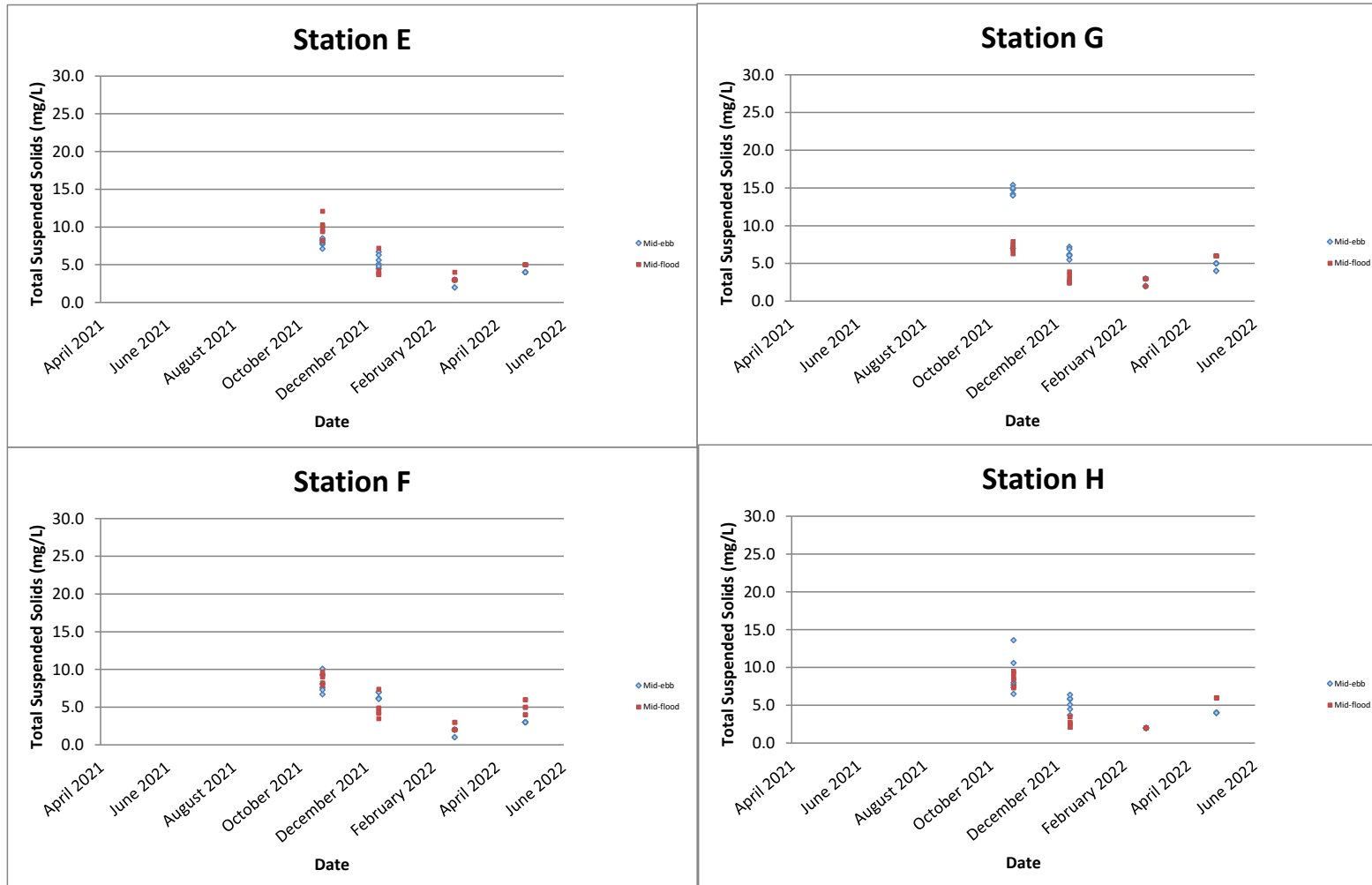


Total Suspended Solids (mg/L)



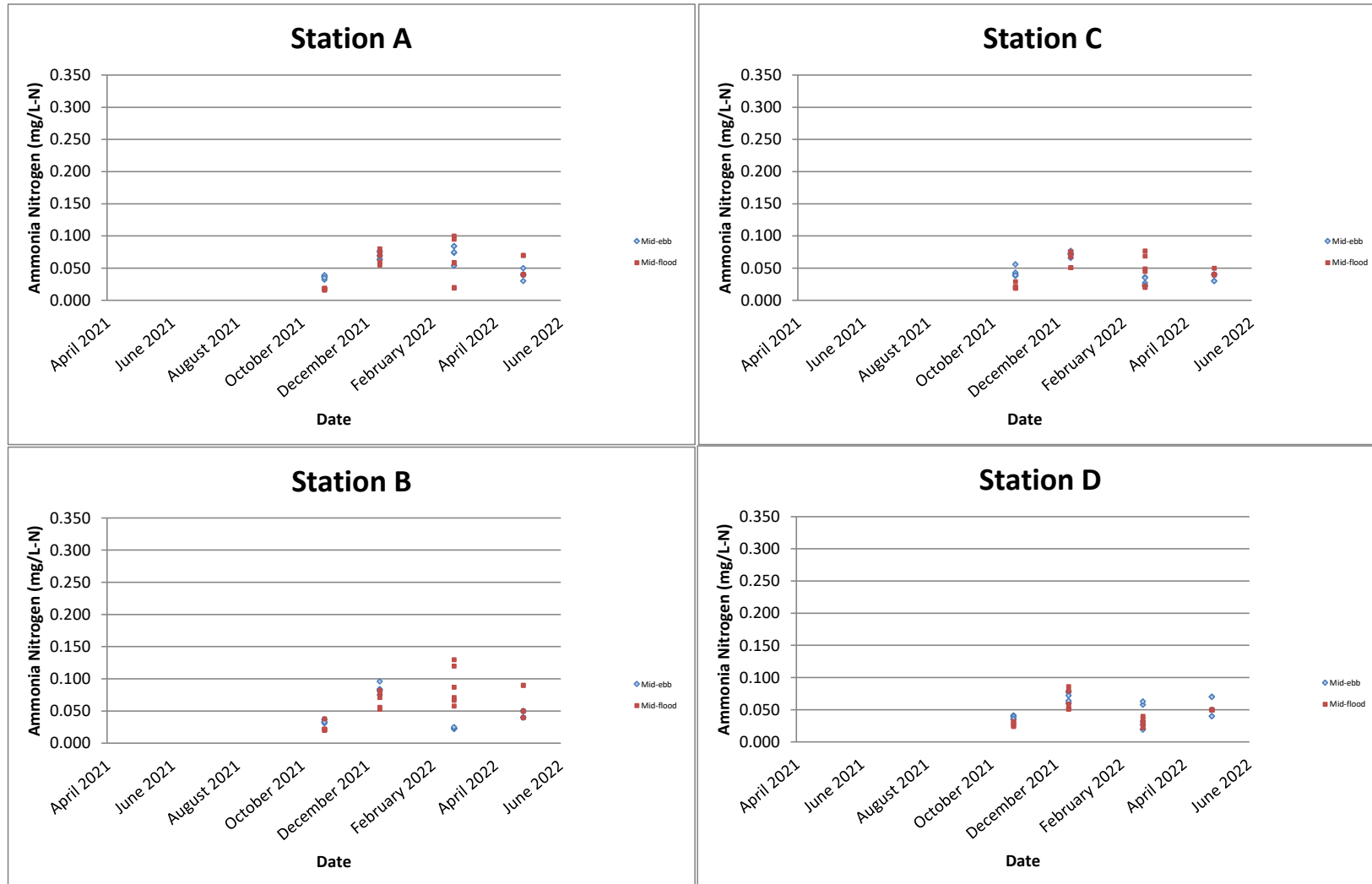
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

Total Suspended Solids (mg/L)



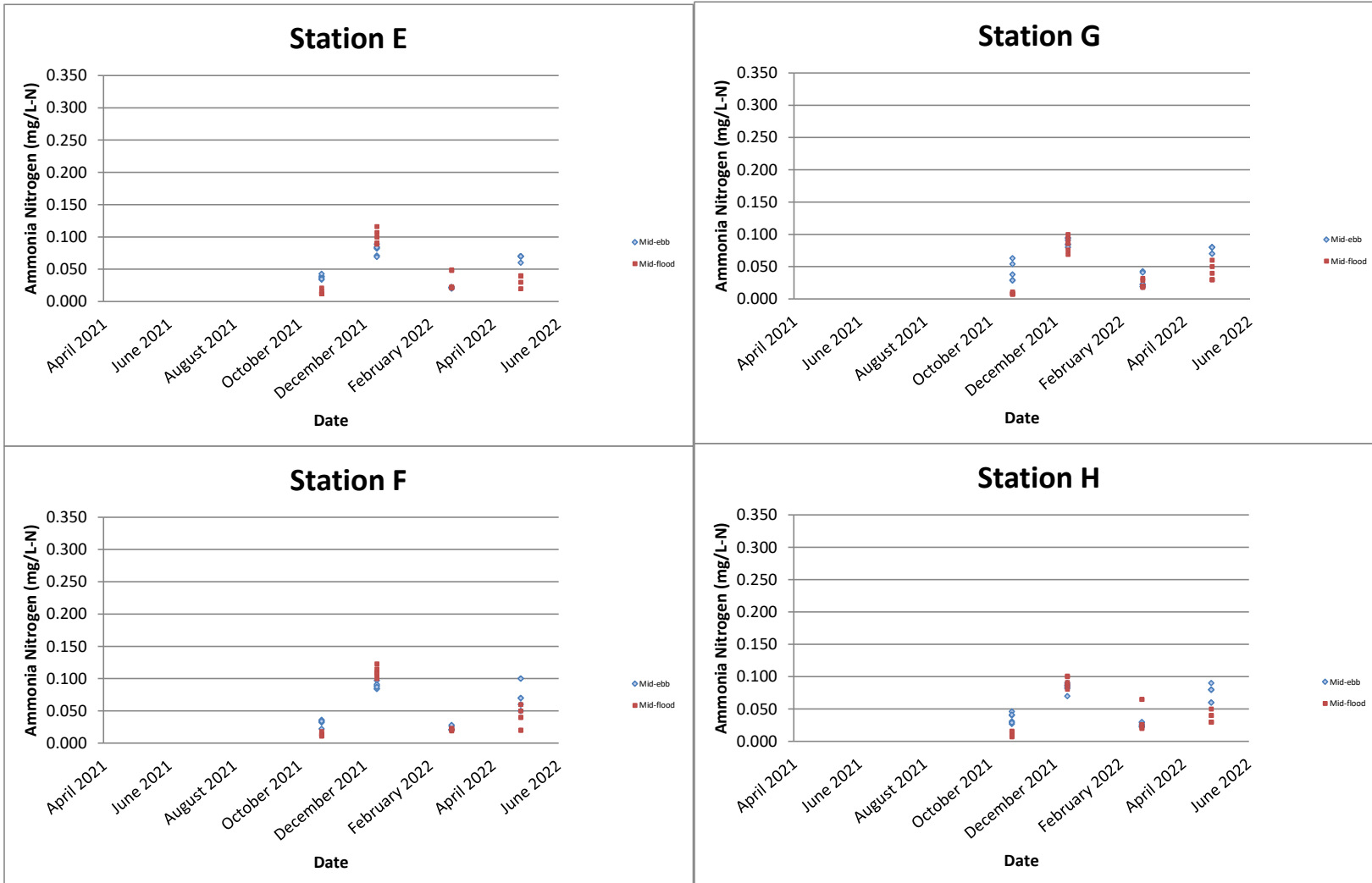
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

Ammonia Nitrogen (mg/L-N)



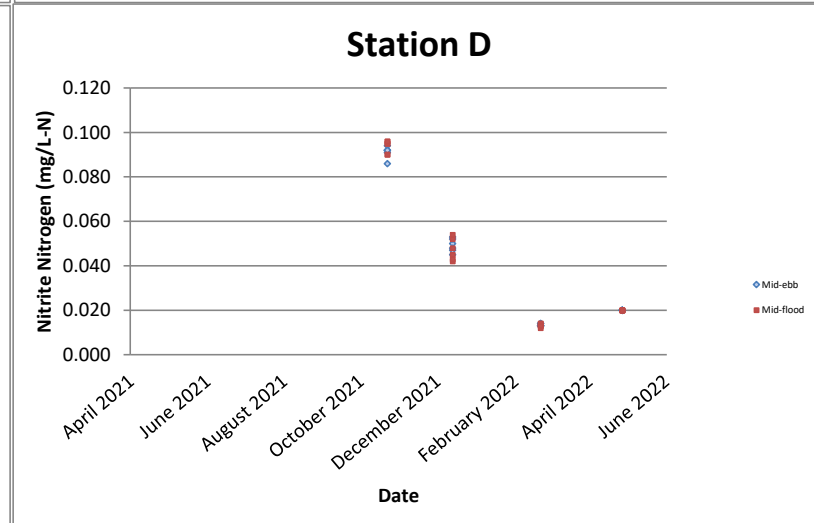
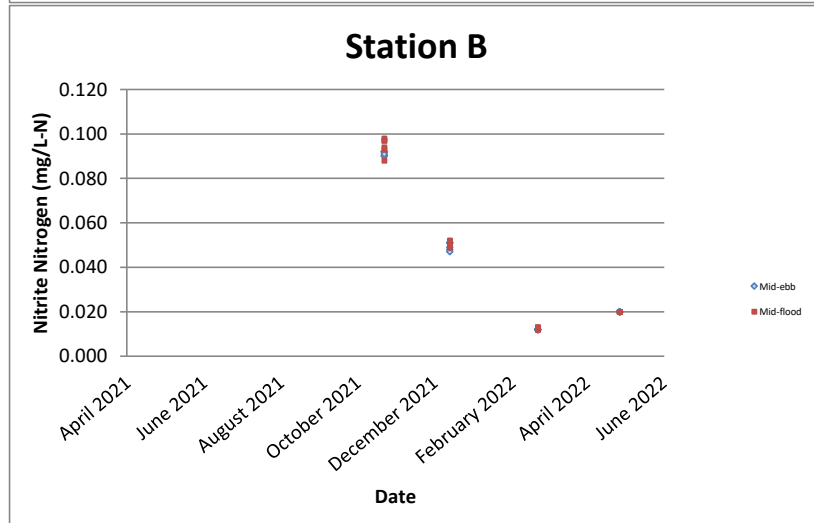
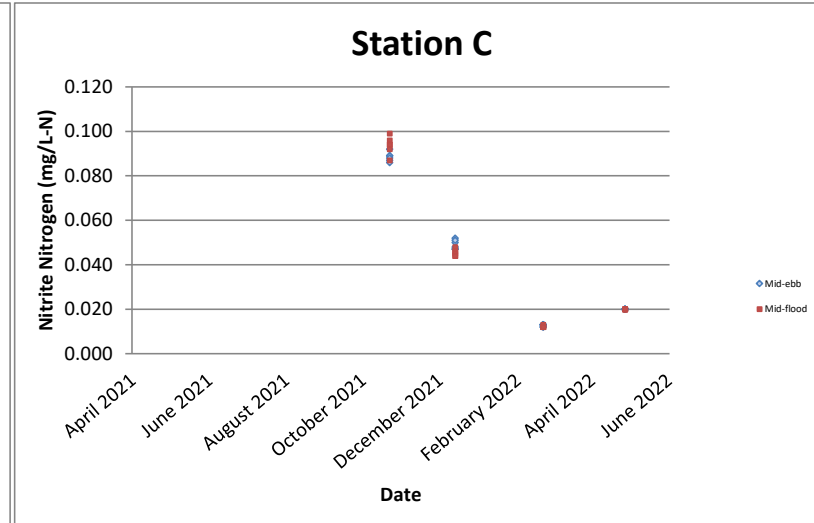
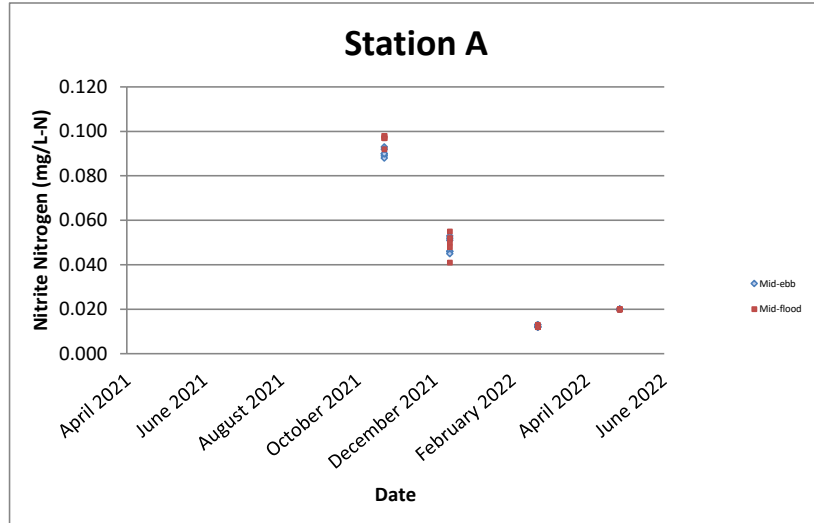
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.

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.

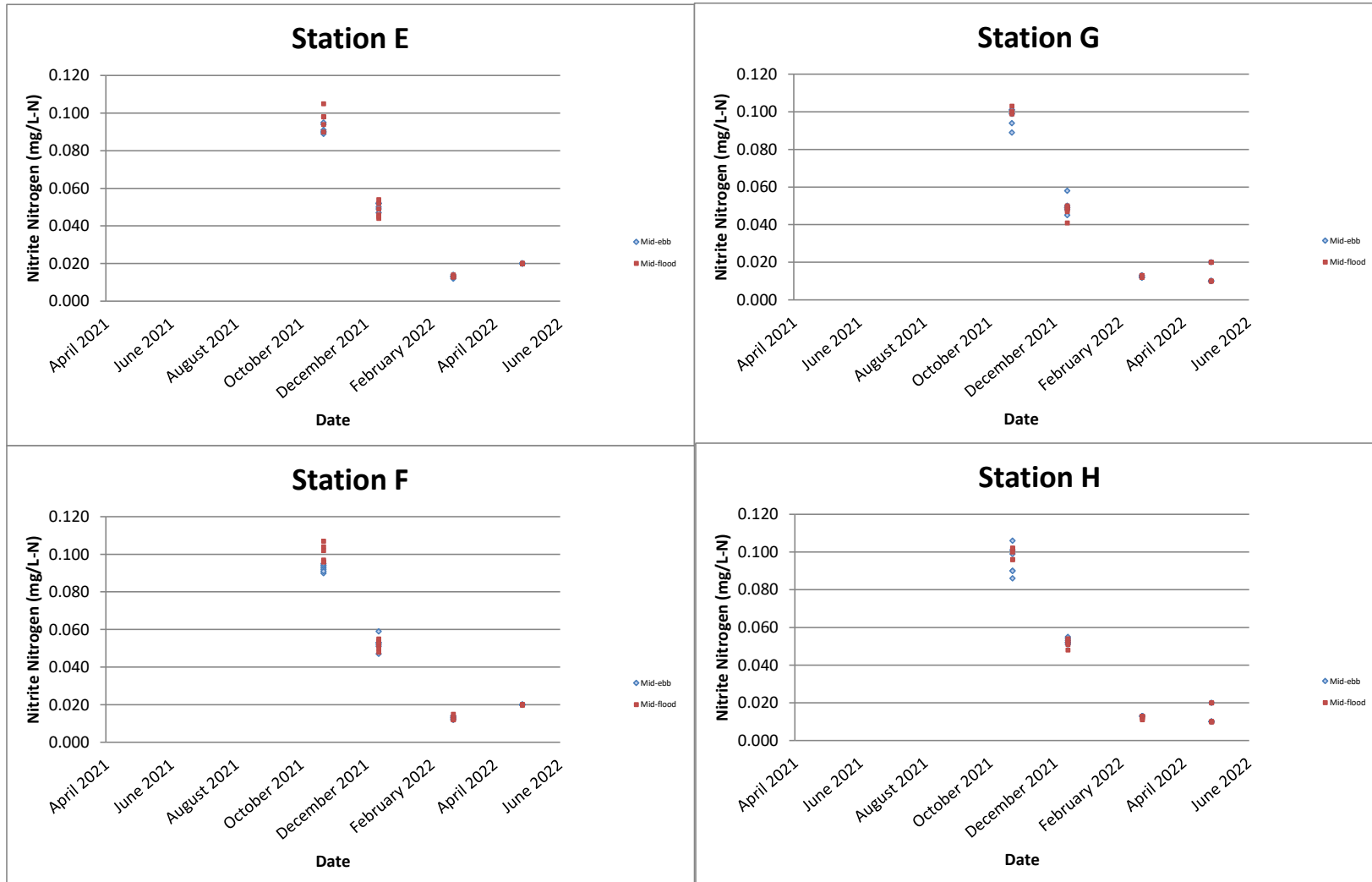
Nitrite Nitrogen (mg/L-N)



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.

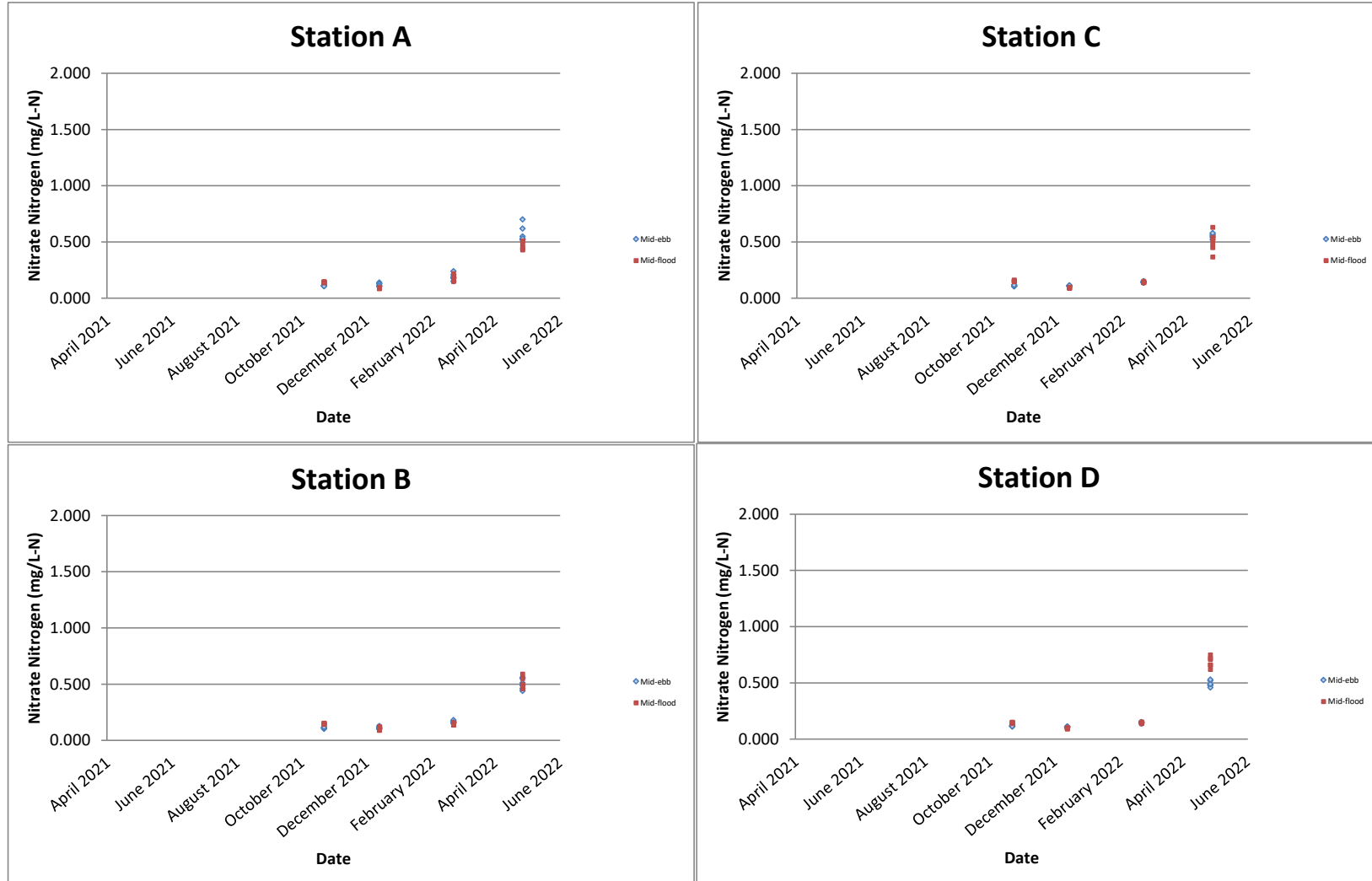


Nitrite Nitrogen (mg/L-N)



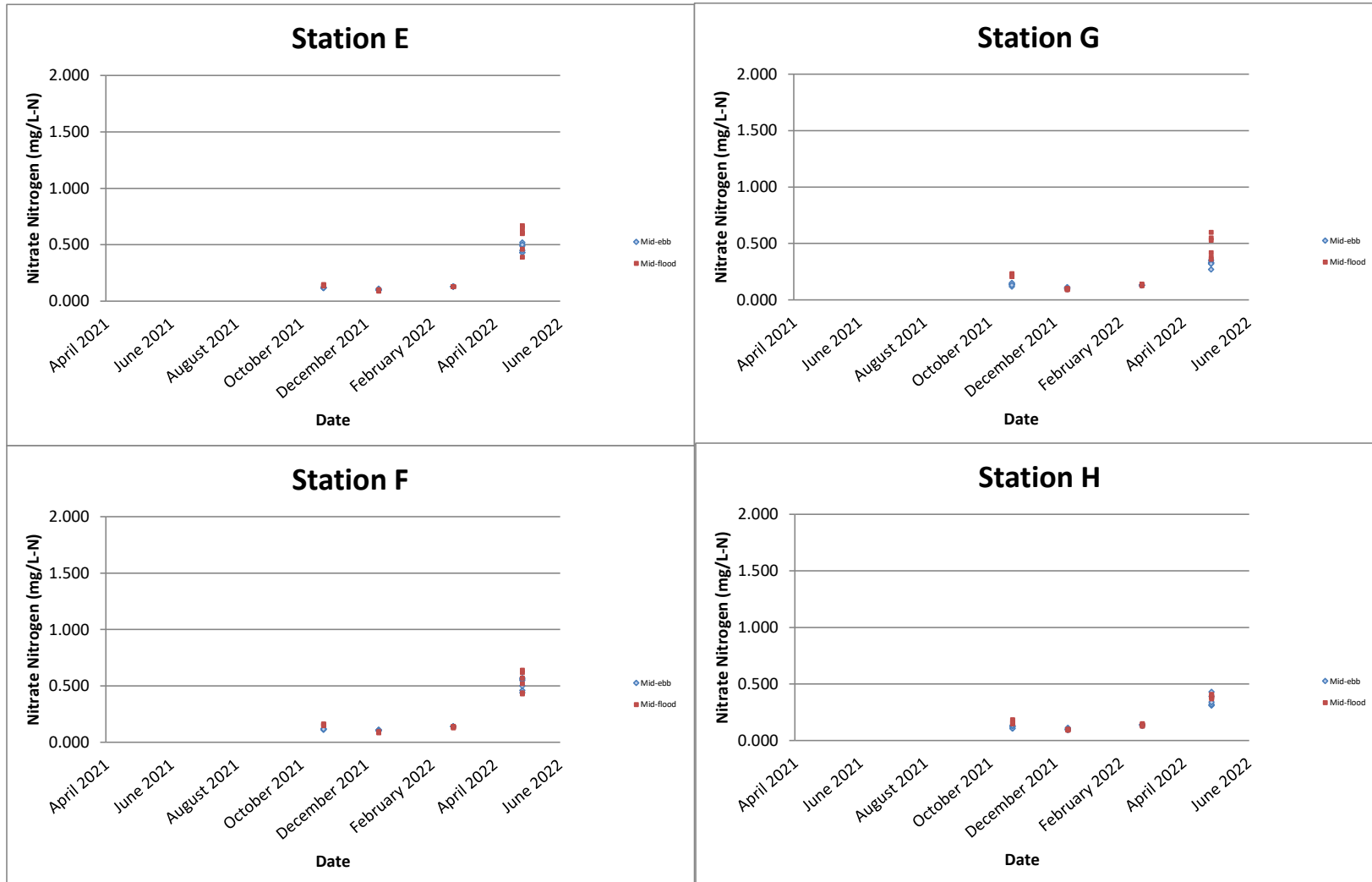
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrate Nitrogen (mg/L-N)



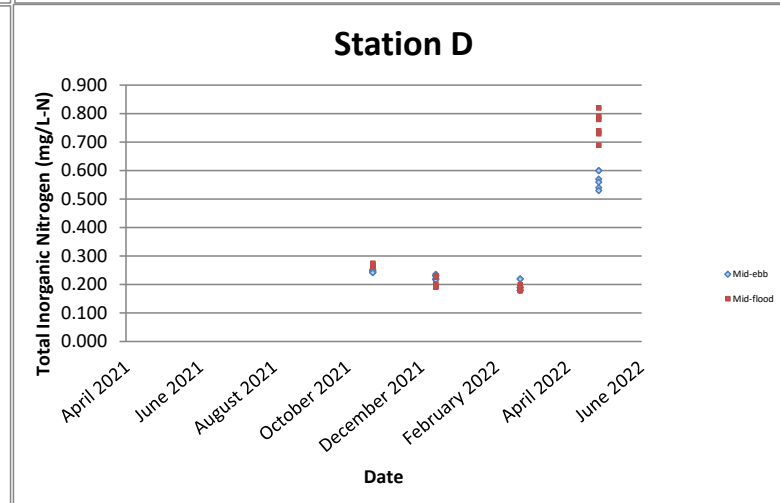
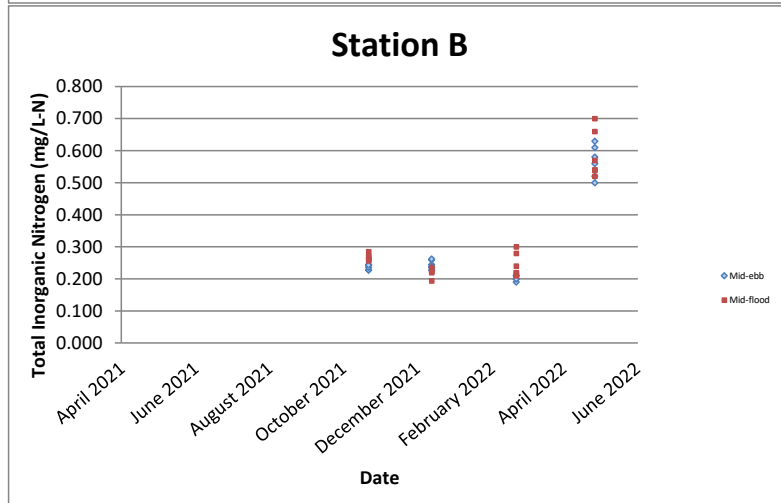
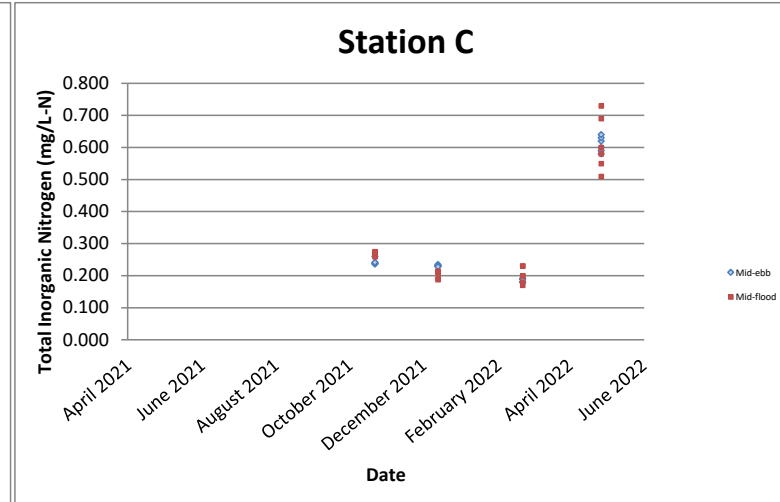
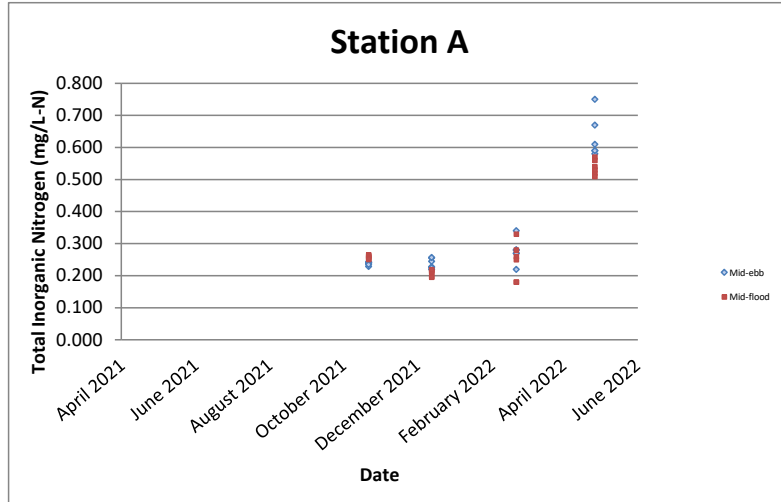
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrate Nitrogen (mg/L-N)



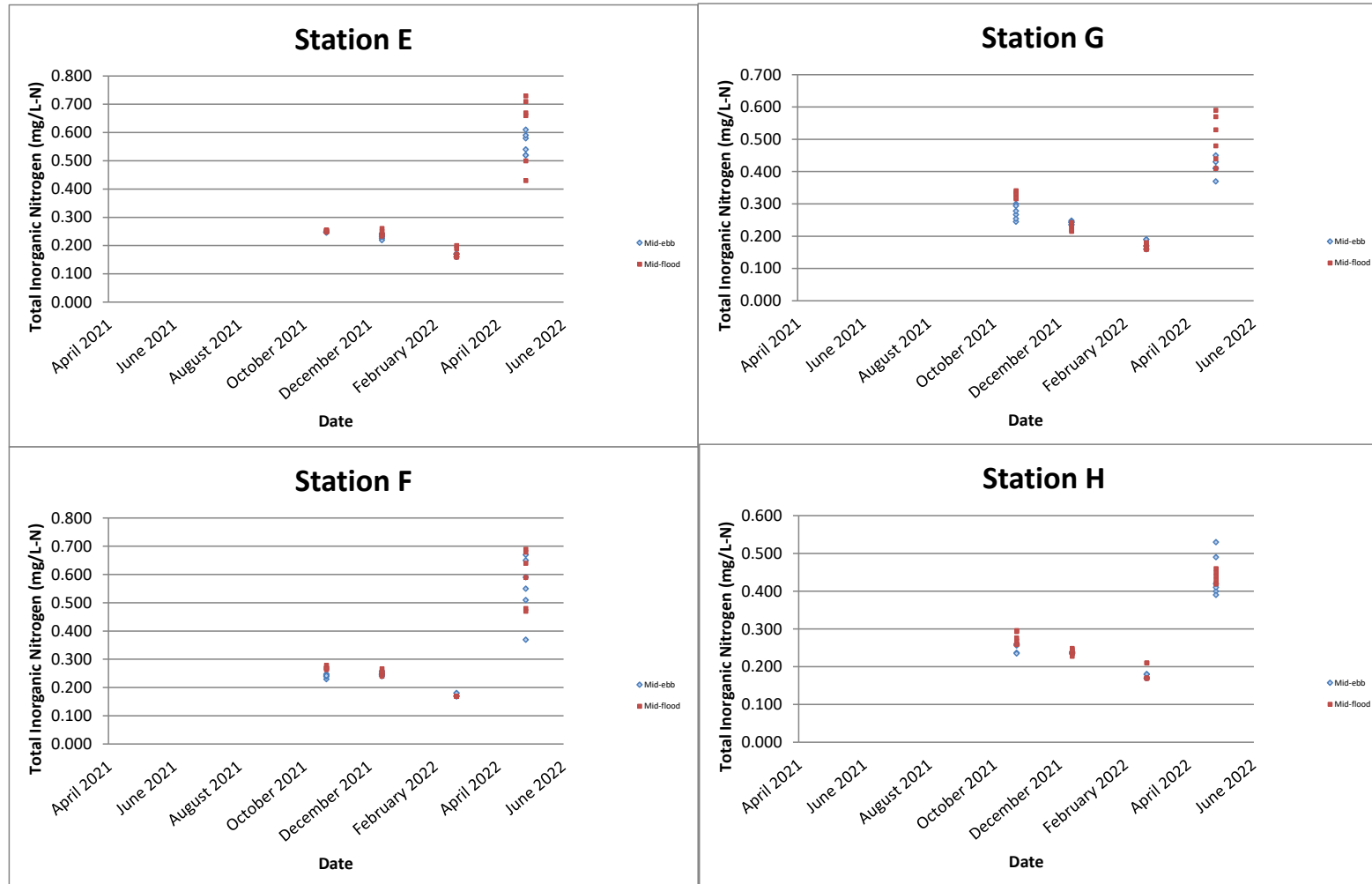
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Total Inorganic Nitrogen (mg/L-N)



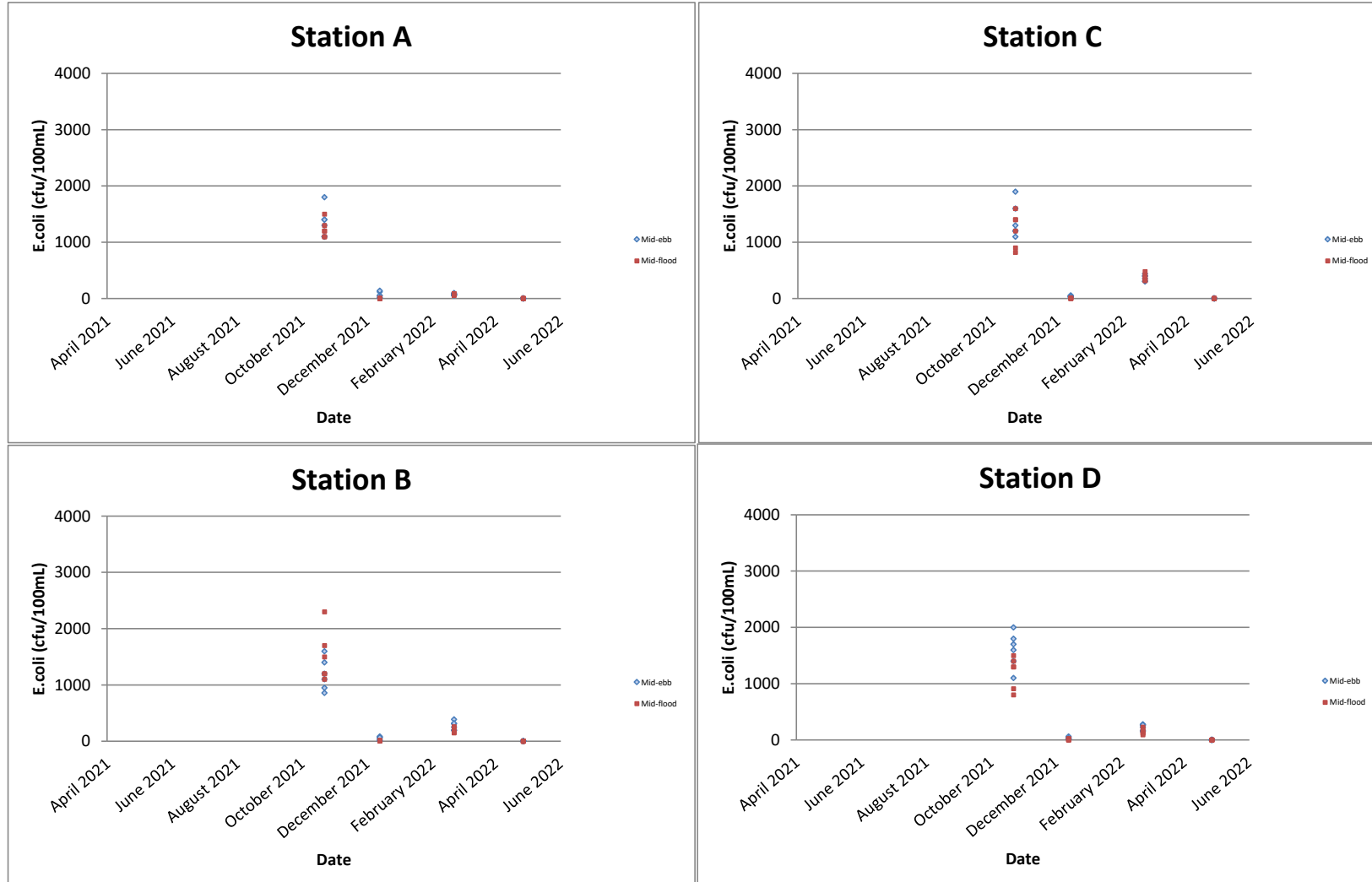
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

Total Inorganic Nitrogen (mg/L-N)



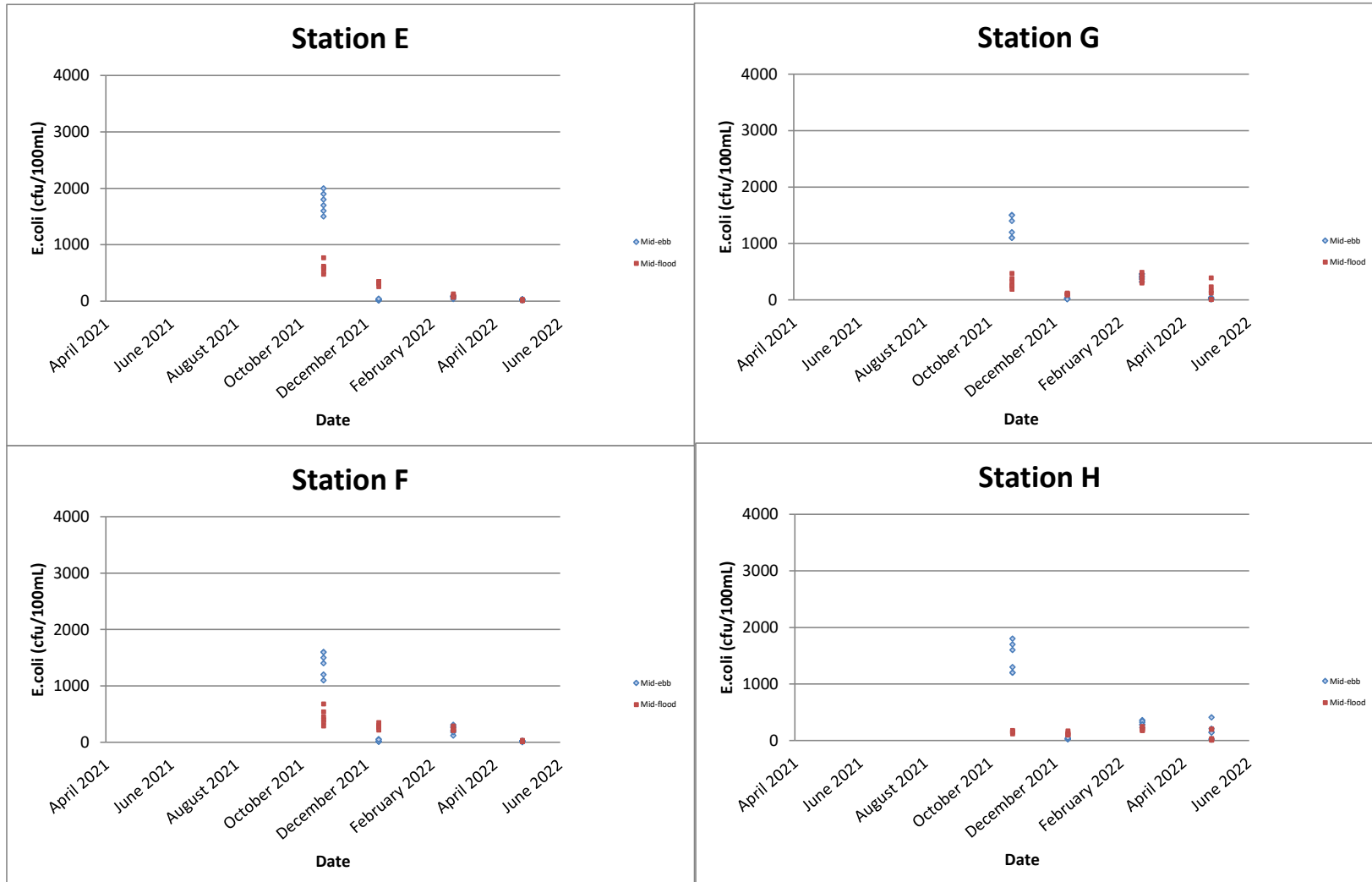
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

E.coli (cfu/100mL)



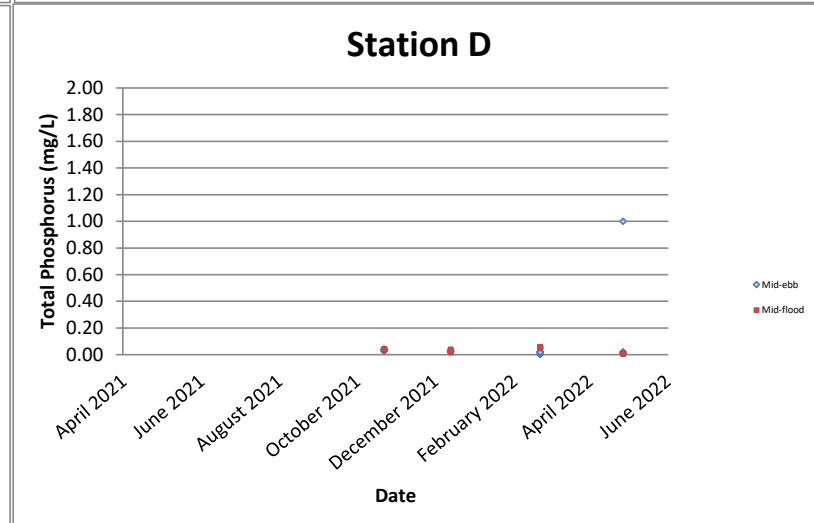
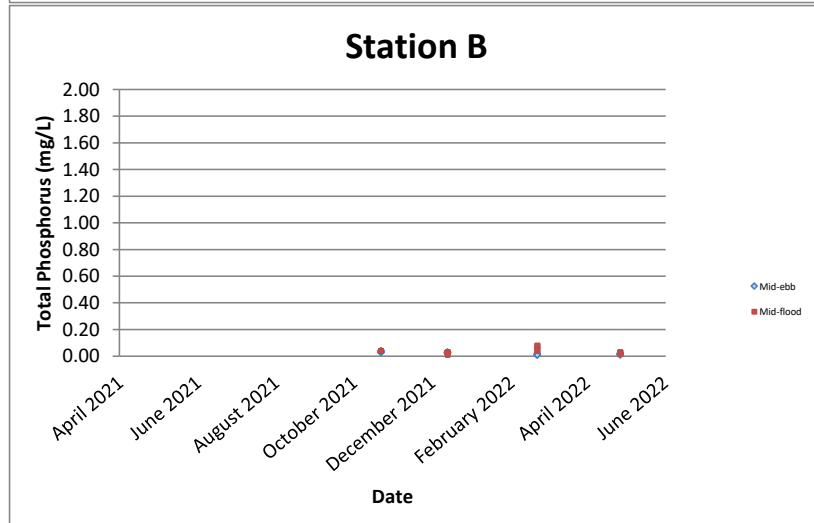
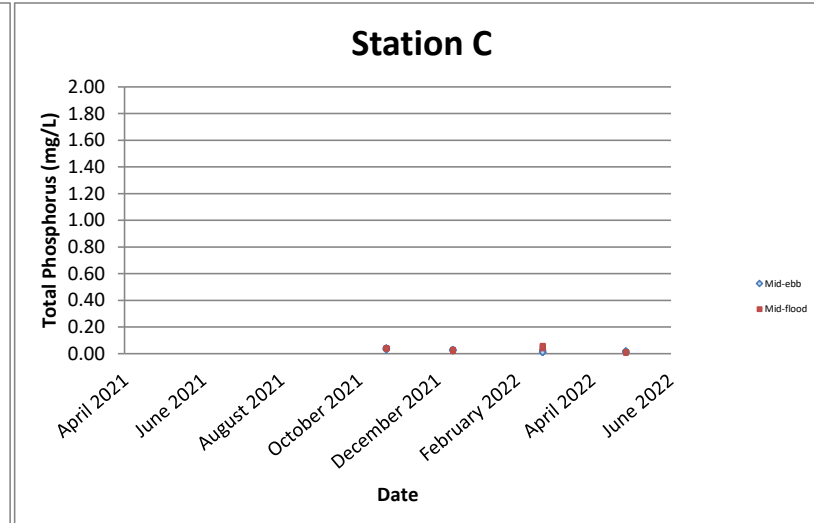
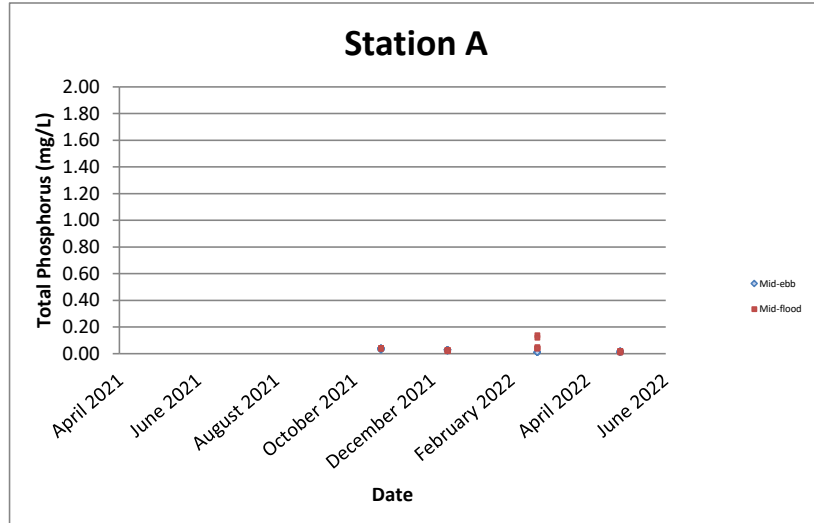
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.

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.

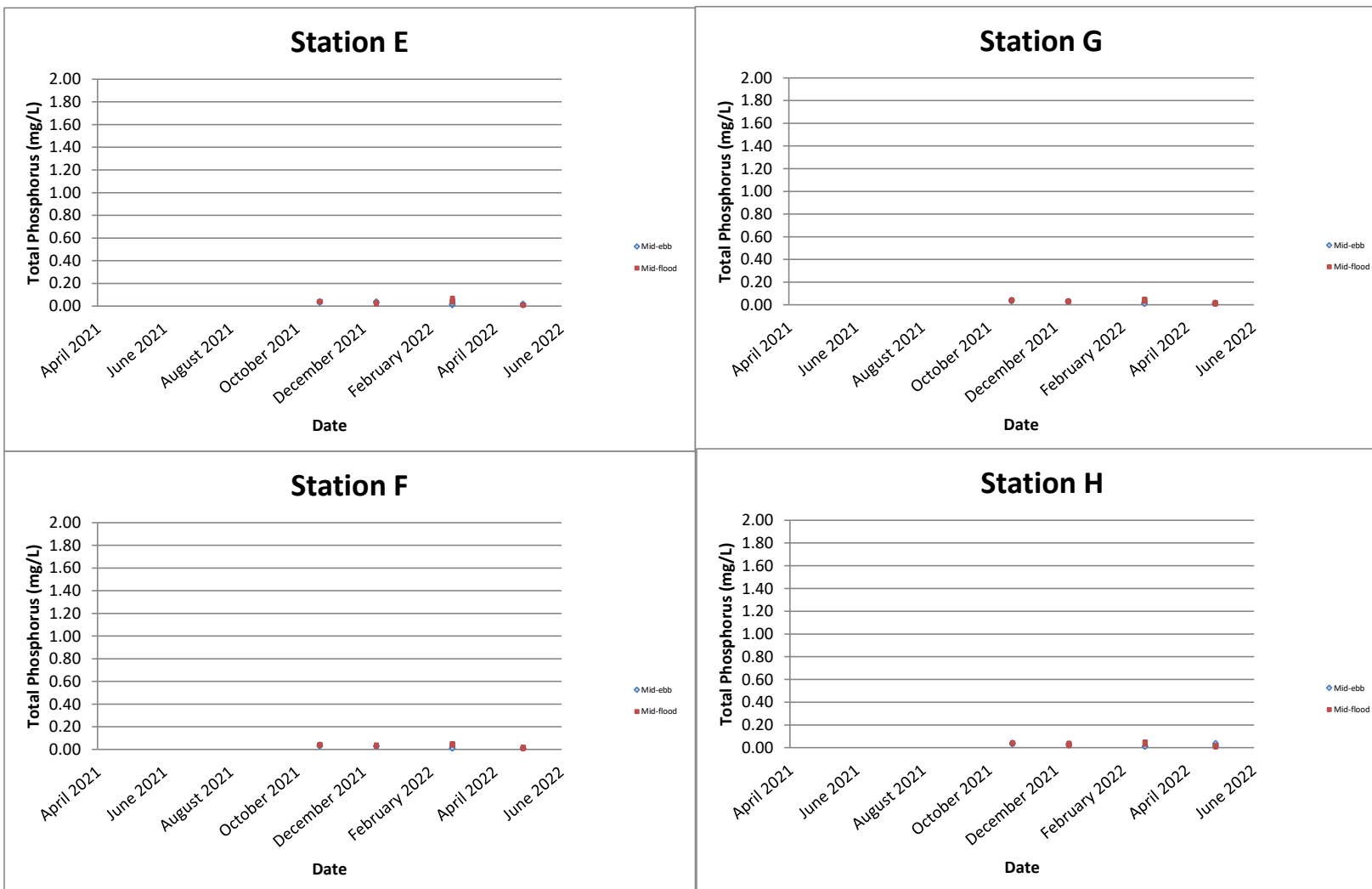
Total Phosphorus (soluble and particulate) (mg/L)



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.

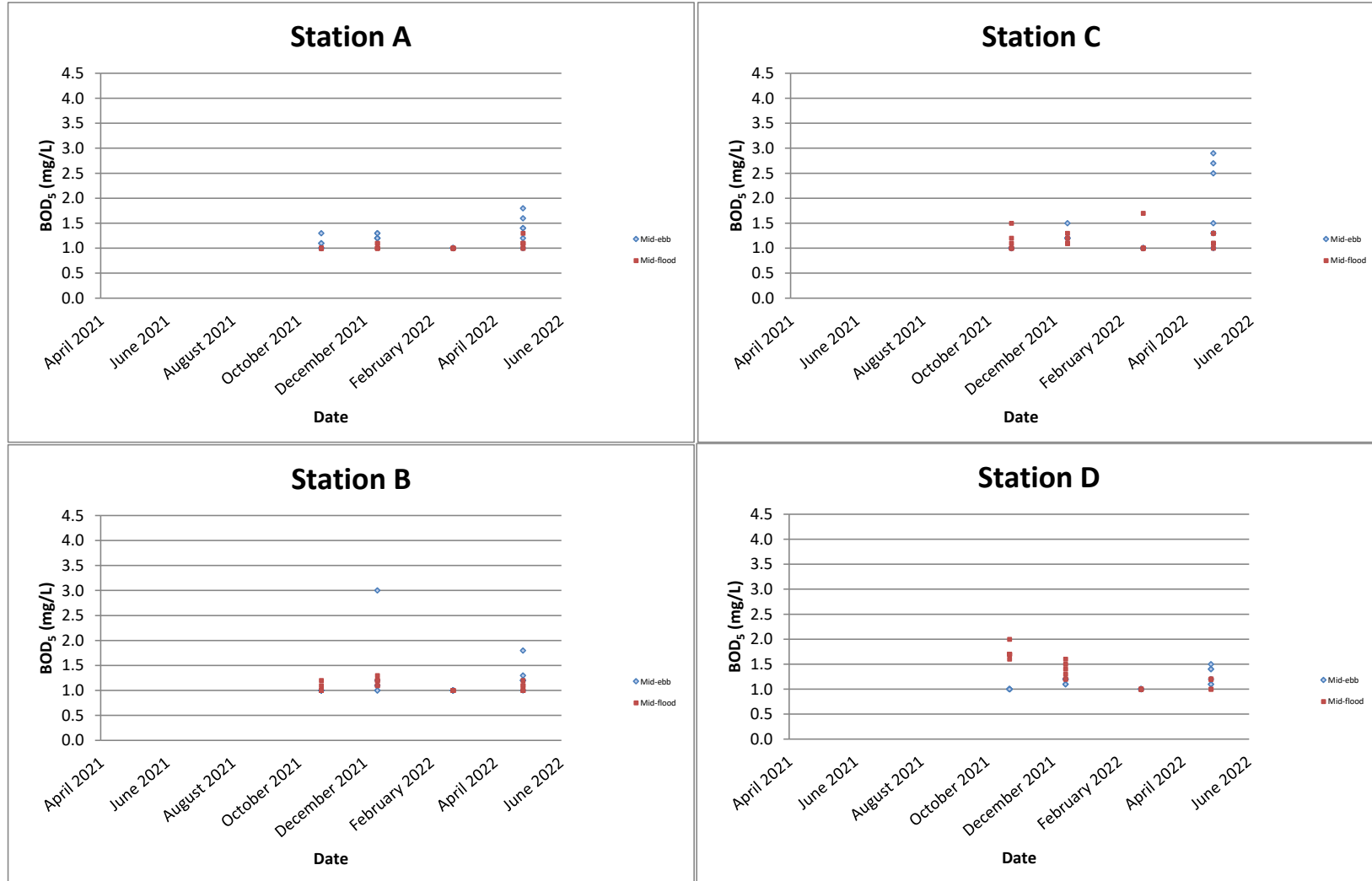


Total Phosphorus (soluble and particulate) (mg/L)



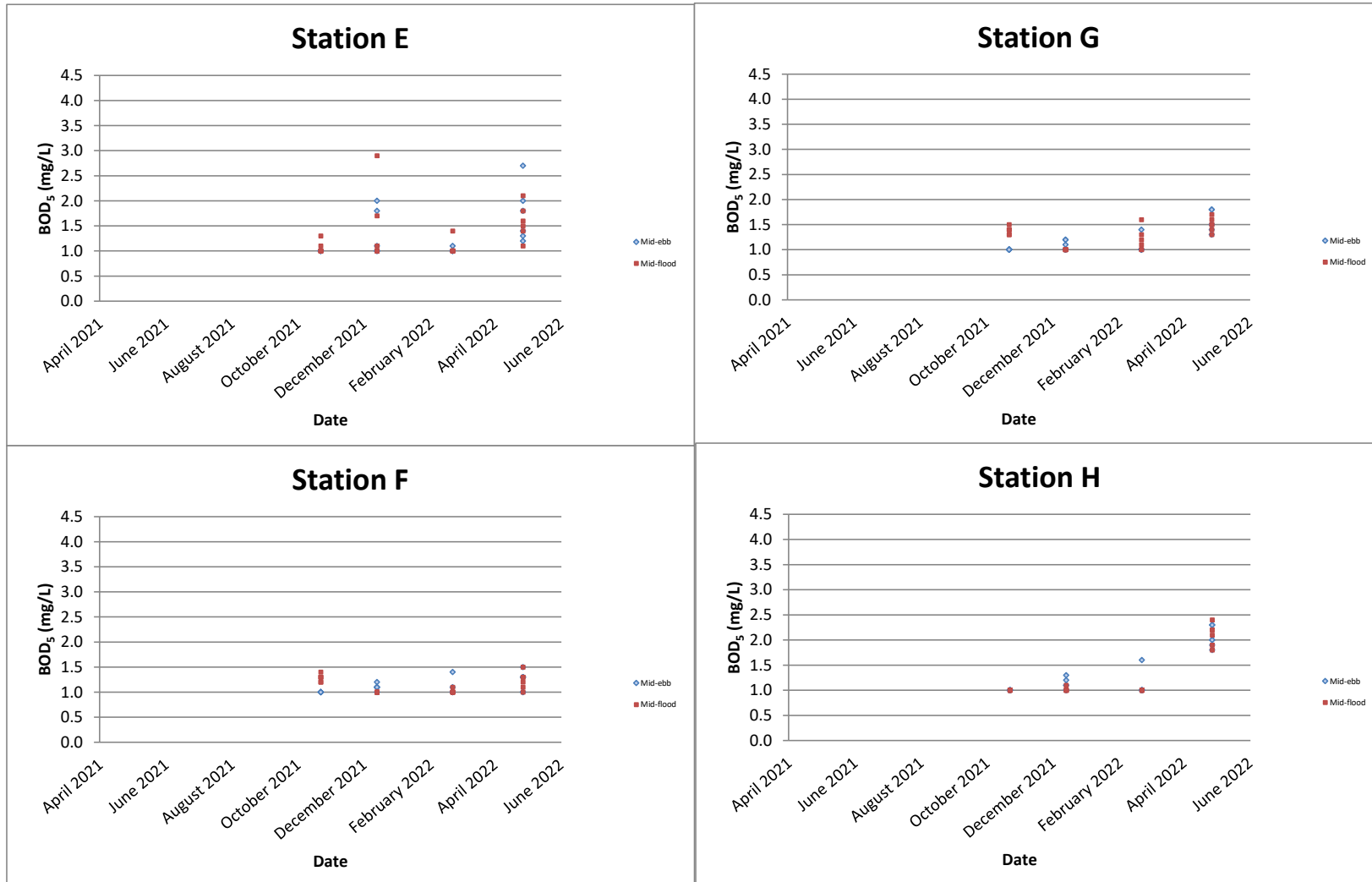
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.

BOD<sub>5</sub> (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD<sub>5</sub> is regarded as 1.0 mg/L in graphical presentation.

BOD<sub>5</sub> (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD<sub>5</sub> is regarded as 1.0 mg/L in graphical presentation.

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Report No.: 0041/17/ED/0670

## Appendix G

Tidal Data obtained from Ma Wan Marine Traffic Station

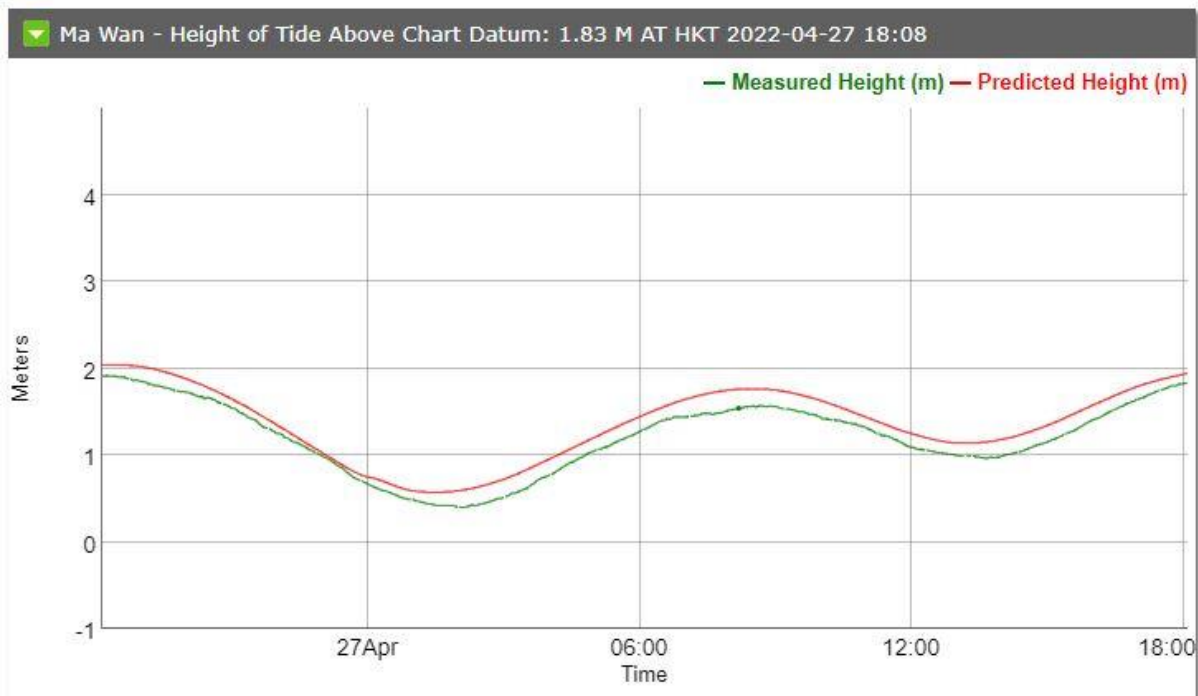
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Report No.: 0041/17/ED/0670



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Report No.: 0041/17/ED/0670

## 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	27/4/2022	Fine	Moderate	12:28	8.2	7.3	1200	490	<0.1	23	21	31	0.10	13	73	12	0.2
B	27/4/2022	Fine	Moderate	12:59	8.1	9.3	1100	450	<0.1	27	29	36	0.11	16	90	10	0.5
C	27/4/2022	Fine	Moderate	13:20	8.0	12	1100	480	<0.1	28	29	36	0.10	17	87	10	0.3
D	27/4/2022	Fine	Moderate	13:33	8.0	12	950	440	<0.1	28	29	36	0.14	16	89	10	0.3
E	27/4/2022	Fine	Moderate	13:52	8.0	15	930	460	<0.1	28	30	36	0.10	17	91	9.2	0.3
F	27/4/2022	Fine	Moderate	14:09	8.0	20	940	470	<0.1	22	37	33	0.21	13	87	9.4	0.3
G	27/4/2022	Fine	Moderate	14:27	8.8	6.0	920	740	<0.1	17	19	23	0.07	10	56	6.1	0.2
H	27/4/2022	Fine	Moderate	14:44	8.2	8.0	910	380	<0.1	26	36	32	0.07	15	79	10	0.3

Monitoring Location	Date	Weather	Sea Condition	Time	Benthic Survey				
					Total Organic Carbon (%)	Particle Size Distribution			
						Gravel (%)	Sand (%)	Silt (%)	Clay (%)
A	27/4/2022	Fine	Moderate	12:28	0.33	8	33	26	33
B	27/4/2022	Fine	Moderate	12:59	0.68	0	13	43	44
C	27/4/2022	Fine	Moderate	13:20	0.79	0	3	47	50
D	27/4/2022	Fine	Moderate	13:33	0.70	0	7	47	46
E	27/4/2022	Fine	Moderate	13:52	0.75	0	3	48	49
F	27/4/2022	Fine	Moderate	14:09	0.86	0	2	51	47
G	27/4/2022	Fine	Moderate	14:27	0.57	43	25	17	15
H	27/4/2022	Fine	Moderate	14:44	0.49	1	9	44	46

Report No. : 181172WA220748(1)



Page 1 of 3

**Test Report on Analysis of Sediment****Information Supplied by Client**

Client : Fugro Technical Services Limited

Client's address : 13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung, N.T., H.K

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

Sample description : Eight samples of sediment taken by the staff of FTS on 27/04/2022

Client sample ID : Refer to page 3

Tests required : 

1. pH value
2. Moisture content
3. Ammoniacal nitrogen content
4. Total nitrogen content
5. Total phosphorus content
6. Cadmium content
7. Chromium content
8. Copper content
9. Lead content
10. Mercury content
11. Nickel content
12. Zinc content
13. Arsenic content
14. Silver content

**Laboratory Information**

Lab. sample ID : WA220748(1)/1-8

Date of receipt of sample : 27/04/2022

Date test commenced : 03/05/2022

Date test completed : 12/05/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*



Report No. : 181172WA220748(1)

Page 2 of 3

Test methods used : pH value  
*APHA 23ed. 4500-H<sup>+</sup>B*

Moisture content  
*In house method E-T-186*

Ammoniacal Nitrogen content  
*In house method E-T-095*

Total nitrogen  
*In house method E-T-114 (By Calculation),  
In house method E-T-036 & APHA 23ed.4500-NO<sub>3</sub><sup>-</sup>-I*

Total phosphorus content  
*APHA 17ed. 4500-PB.5 (Digestion) &  
In house method E-T-056 (Determination)*

Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc,  
Arsenic, Silver content  
*USEPA method 3050B (Digestion) & 6020A (Determination)*


*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748(1)

Page 3 of 3

**Results :**

Test parameters	Sample identification													
	A/Sediment	B/Sediment	C/Sediment	D/Sediment	E/Sediment	F/Sediment	G/Sediment	H/Sediment						
1. pH value at 25°C	8.2	8.1	8.0	8.0	8.0	8.0	8.0	8.8	8.2					
2. Moisture content, %	52.9	59.1	62.3	58.5	61.9	65.9	41.6	55.6						
3. Ammoniacal nitrogen content, mg/kg	7.3	9.3	12	12	15	20	6.0	8.0						
4. Total nitrogen, mg/kg	1200	1100	1100	950	930	940	920	910						
5. Total phosphorus content, mg/kg	490	450	480	440	460	470	740	380						
6. Cadmium content, mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
7. Chromium content, mg/kg	23	27	28	28	28	22	17	26						
8. Copper content, mg/kg	21	29	29	29	30	37	19	36						
9. Lead content, mg/kg	31	36	36	36	36	33	23	32						
10. Mercury content, mg/kg	0.10	0.11	0.10	0.14	0.10	0.21	0.07	0.07						
11. Nickel content, mg/kg	13	16	17	16	17	13	10	15						
12. Zinc content, mg/kg	73	90	87	89	91	87	56	79						
13. Arsenic content, mg/kg	12	10	10	10	9.2	9.4	6.1	10						
14. Silver content, mg/kg	0.2	0.5	0.3	0.3	0.3	0.3	0.2	0.3						

Certified by :   
 Approved Signatory : HO Kin Man, John  
 Assistant General Manager – Laboratories  
 Date : 13/5/2012


\*\* End of Report \*\*

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

**Note**

**Laboratory Duplicate, Quality Assurance/Quality Control Report**

pH value		Moisture content, %							
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		Blank	Spike recovery (%)	Laboratory Duplicate		
0.1	-	-	Original result	Duplicate result	Reporting Limit	-	Original result	Duplicate result	
			8.82	8.82	0.1	-	29.15	29.59	
								1.50	
Ammoniacal nitrogen content, mg/kg		Total nitrogen, mg/kg							
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	
0.5	<0.5	-	Original result	Duplicate result	Reporting Limit	-	Original result	Duplicate result	
			-	-	50	-	-	-	
Total phosphorus content, mg/kg									
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate	
10	<10	-	Original result	Duplicate result	Reporting Limit	-	Original result	Duplicate result	
			382.24	384.33					

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

Date : 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

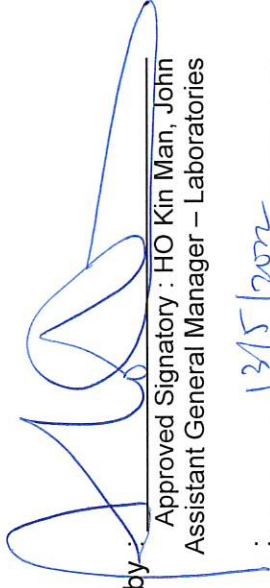
**Note**

**Method Blank (MB), Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report**

Heavy metals content, mg/kg

Item	Method Blank (MB) Report		Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
	LOR	Result	Spike Concentration	Spike recovery (%)		Recovery limits (%)		RPD%	
				MS	MSD	Low	High	Value	Control Limited
Arsenic	0.5	< 0.5	10	88.5	-	75	125	-	-
Cadmium	0.1	< 0.1	2	98.7	-	75	125	-	-
Chromium	0.5	< 0.5	50	96.7	-	75	125	-	-
Copper	0.2	< 0.2	50	89.3	-	75	125	-	-
Lead	0.2	< 0.2	50	103.8	-	75	125	-	-
Mercury	0.05	< 0.05	1	85.9	-	75	125	-	-
Nickel	0.2	< 0.2	20	90.1	-	75	125	-	-
Silver	0.1	< 0.1	2	102.4	-	75	125	-	-
Zinc	0.5	< 0.5	200	96.1	-	75	125	-	-

Remark: 1. µg/L - microgram per litre

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

Date: 13/5/2022

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



Report No. : 181172WA220748(2)



Page 1 of 2

**Test Report on Analysis of Sediment****Information Supplied by Client**

Client : Fugro Technical Services Limited

Client's address : 13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung, N.T., H.K

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

Sample description : Eight samples of benthic survey sediment taken by the staff of FTS on 27/04/2022

Client sample ID : Refer to page 2

Tests required : 1. Moisture content  
2. Total organic carbon content

**Laboratory Information**

Lab. sample ID : WA220748(1)/9-16

Date of receipt of sample : 27/04/2022

Date test commenced : 27/04/2022

Date test completed : 05/05/2022

Test methods used : 1. In-house method E-T-186  
2. APHA 23ed. 5310B


*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172WA220748(2)

Page 2 of 2

**Results :**

Test parameters	Sample identification							
	A/Benthic Survey	B/Benthic Survey	C/Benthic Survey	D/Benthic Survey	E/Benthic Survey	F/Benthic Survey	G/Benthic Survey	H/Benthic Survey
1. Moisture content, %	52.7	56.1	62.3	60.1	58.3	41.1	65.2	60.0
2. Total organic carbon content, %	0.33	0.68	0.79	0.70	0.75	0.86	0.57	0.49

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

Date : 13/5/2022

\*\* End of Report \*\*

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

**Note**

**Laboratory Duplicate, Quality Assurance/Quality Control Report**

Moisture content, %				Total organic carbon content, %					
Reporting Limit	Blank	Spike recovery (%)	Laboratory Duplicate		Reporting Limit	Blank	Laboratory Duplicate		
			Original result	Duplicate result			Original result	Duplicate result	RPD%
0.1	-	-	29.15	29.59	0.05	-	0.48	0.50	2.90

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

Date : 13/5/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172EN220918



Page 1 of 2

**Test Report on Analysis of Water and Wastewater****Information Supplied by Client**

Client : Fugro Technical Services Limited

Client's address : Rm 723-726, 7/F, Profit Industrial Building, No.1-15, Kwai Fung Crescent, Kwai Chung, N.T.

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

Sampling date : 27/04/2022

Sampling location : -

Sample description : Eight sample(s) of Rinsate Blank

Sample identification : 1. A/Rinsate Blank  
2. B/Rinsate Blank  
3. C/Rinsate Blank  
4. D/Rinsate Blank  
5. E/Rinsate Blank  
6. F/Rinsate Blank  
7. G/Rinsate Blank  
8. H/Rinsate Blank

Test required : Total recoverable metals:  
1. Arsenic content  
2. Cadmium content  
3. Chromium content  
4. Copper content  
5. Lead content  
6. Mercury content  
7. Nickel content  
8. Silver content  
9. Zinc content

**Laboratory Information**

Lab sample ID : EN220918/1-8

Date of receipt of sample : 27/04/2022

Date test completed : 04/05/2022

Test method used : In-house method E-T-189 & E-T-190 (ICP-MS)

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*



Report No. : 181172EN220918


Page 2 of 2

**Results :**

Item	LOR	Client sample ID	A/Rinsate Blank	B/Rinsate Blank	C/Rinsate Blank	D/Rinsate Blank
In-house method E-T-189 & E-T-190 (ICP-MS)						
Arsenic	1	µg/L	< 1	< 1	< 1	< 1
Cadmium	0.2	µg/L	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	µg/L	1	1	1	< 1
Copper	1	µg/L	5	2	2	2
Lead	1	µg/L	< 1	< 1	< 1	< 1
Mercury	0.5	µg/L	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	1	µg/L	2	2	2	2
Silver	1	µg/L	< 1	< 1	< 1	< 1
Zinc	10	µg/L	20	20	10	10

Item	LOR	Client sample ID	E/Rinsate Blank	F/Rinsate Blank	G/Rinsate Blank	H/Rinsate Blank
In-house method E-T-189 & E-T-190 (ICP-MS)						
Arsenic	1	µg/L	< 1	< 1	< 1	< 1
Cadmium	0.2	µg/L	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	µg/L	< 1	2	1	2
Copper	1	µg/L	1	2	2	2
Lead	1	µg/L	< 1	< 1	< 1	< 1
Mercury	0.5	µg/L	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	1	µg/L	2	2	2	2
Silver	1	µg/L	< 1	< 1	< 1	< 1
Zinc	10	µg/L	10	10	20	10

- Remark: 1. The sampling procedure for the sample received in this report is outside the scope of accreditation.  
 2. µg/L - microgram per litre

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

Date : 13/5/2022

**\*\* End of Report \*\***


*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Report No. : 181172EN220918

**Note**
**Method Blank (MB), Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report**

Heavy metals content, µg/L									
Item	Method Blank (MB) Report		Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
	LOR	Result	Spike Concentration	Spike recovery (%)		Recovery limits (%)		RPD%	
				MS	MSD	Low	High	Value	Control Limited
Arsenic	1	< 0.5	10	102.2%	-	75.0%	125.0%	-	-
Cadmium	0.2	< 0.1	10	99.3%	-	75.0%	125.0%	-	-
Chromium	1	< 0.5	10	100.8%	-	75.0%	125.0%	-	-
Copper	1	< 0.5	10	100.4%	-	75.0%	125.0%	-	-
Lead	1	< 0.5	10	101.2%	-	75.0%	125.0%	-	-
Mercury	0.5	< 0.25	0.5	86.5%	-	75.0%	125.0%	-	-
Nickel	1	< 0.5	10	100.5%	-	75.0%	125.0%	-	-
Silver	1	< 0.5	10	101.4%	-	75.0%	125.0%	-	-
Zinc	10	< 5	100	100.0%	-	75.0%	125.0%	-	-

Certified by :


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

Date :

13/5/2022

*Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.*

Test Report No. : M160554SL220155

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**
**Information supplied by Client**

 Client : Fugro Technical Services Limited  
 Client's Address : -

Client sample No. : A

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

 Borehole No. : -  
 Depth (m) : From - To -  
 Sample origin : -  
 Description : Benthic Survey

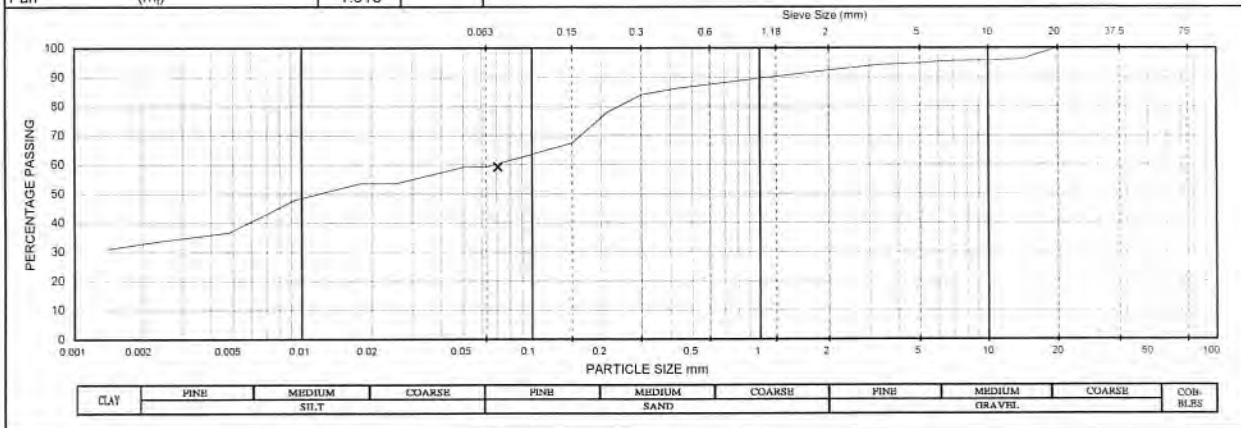
Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, brownish grey, slightly gravelly, slightly sandy SILT/CLAY.

 Laboratory sample I.D. : SL220155/1  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation : within original sample (m)  
 From : FULL MIX  
 To : -


Test Result (Sieve Analysis)				Test Result (Sedimentation Analysis)																																																																																																			
Initial dry mass (m <sub>1</sub> ) g	160.827	Mass retained (g)	Percent passing (%)	Hydrometer Serial No.						8295797																																																																																													
Sieve size mm				Particle density (Assumed)						2.65																																																																																													
100	0.000	100		Initial dry mass*						27.173 g																																																																																													
75	0.000	100		Mass retained on 63µm						9.121 g																																																																																													
63	0.000	100		<table border="1"> <thead> <tr> <th>Date</th> <th>Time Started</th> <th>Period min</th> <th>Temp. °C</th> <th>Hydro. Rdg</th> <th>Hydro. Rdg #</th> <th>Particle dia. mm</th> <th>K %</th> <th>K* %</th> </tr> </thead> <tbody> <tr> <td>05-05-2022</td> <td>10:35</td> <td>0.5</td> <td>25.00</td> <td>11.0</td> <td>0.5</td> <td>0.071</td> <td>62</td> <td>59</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>25.00</td> <td>11.0</td> <td>0.5</td> <td>0.050</td> <td>62</td> <td>59</td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>25.00</td> <td>10.5</td> <td>0.5</td> <td>0.036</td> <td>59</td> <td>56</td> </tr> <tr> <td></td> <td></td> <td>4</td> <td>25.00</td> <td>10.0</td> <td>0.5</td> <td>0.025</td> <td>56</td> <td>53</td> </tr> <tr> <td></td> <td></td> <td>8</td> <td>25.00</td> <td>10.0</td> <td>0.5</td> <td>0.018</td> <td>56</td> <td>53</td> </tr> <tr> <td></td> <td></td> <td>30</td> <td>25.00</td> <td>9.0</td> <td>0.5</td> <td>0.0094</td> <td>50</td> <td>48</td> </tr> <tr> <td></td> <td></td> <td>120</td> <td>25.00</td> <td>7.0</td> <td>0.5</td> <td>0.0048</td> <td>38</td> <td>37</td> </tr> <tr> <td></td> <td></td> <td>480</td> <td>25.00</td> <td>6.5</td> <td>0.5</td> <td>0.0024</td> <td>35</td> <td>34</td> </tr> <tr> <td></td> <td></td> <td>1440</td> <td>25.00</td> <td>6.0</td> <td>0.5</td> <td>0.0014</td> <td>33</td> <td>31</td> </tr> </tbody> </table>										Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %	05-05-2022	10:35	0.5	25.00	11.0	0.5	0.071	62	59			1	25.00	11.0	0.5	0.050	62	59			2	25.00	10.5	0.5	0.036	59	56			4	25.00	10.0	0.5	0.025	56	53			8	25.00	10.0	0.5	0.018	56	53			30	25.00	9.0	0.5	0.0094	50	48			120	25.00	7.0	0.5	0.0048	38	37			480	25.00	6.5	0.5	0.0024	35	34			1440	25.00	6.0	0.5	0.0014	33	31
Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %																																																																																															
05-05-2022	10:35	0.5	25.00	11.0	0.5	0.071	62	59																																																																																															
		1	25.00	11.0	0.5	0.050	62	59																																																																																															
		2	25.00	10.5	0.5	0.036	59	56																																																																																															
		4	25.00	10.0	0.5	0.025	56	53																																																																																															
		8	25.00	10.0	0.5	0.018	56	53																																																																																															
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		120	25.00	7.0	0.5	0.0048	38	37																																																																																															
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		1440	25.00	6.0	0.5	0.0014	33	31																																																																																															
50	0.000	100		# Hydrometer reading in solution only (R <sub>0</sub> )																																																																																																			
37.5	0.000	100		K* modified according to Geospec 3 (November 2001) Test Method 8.7																																																																																																			
28	0.000	100		<p style="text-align: center;"><b>SUMMATION :</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>GRAVEL</td> <td>% :</td> <td>8</td> </tr> <tr> <td>SAND</td> <td>% :</td> <td>33</td> </tr> <tr> <td>SILT</td> <td>% :</td> <td>26</td> </tr> <tr> <td>CLAY</td> <td>% :</td> <td>33</td> </tr> </table>										GRAVEL	% :	8	SAND	% :	33	SILT	% :	26	CLAY	% :	33																																																																														
GRAVEL	% :	8																																																																																																					
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CLAY	% :	33																																																																																																					
20	0.000	100																																																																																																					
Passing (m <sub>2</sub> )	20	160.827																																																																																																					
Riffled passing (m <sub>3</sub> )	20	160.827																																																																																																					
Wash passing (m <sub>4</sub> )	20	67.291																																																																																																					
	14	6.220	96																																																																																																				
	10	0.430	96																																																																																																				
	6.3	0.700	95																																																																																																				
Passing (m <sub>5</sub> )	6.3	59.941																																																																																																					
Riffled passing (m <sub>6</sub> )	6.3	59.941																																																																																																					
	5.0	0.932	95																																																																																																				
	3.35	0.950	94																																																																																																				
	2.00	3.031	92																																																																																																				
	1.18	3.292	90																																																																																																				
	0.600	4.400	88																																																																																																				
	0.425	2.300	86																																																																																																				
	0.300	3.452	84																																																																																																				
	0.212	10.020	78																																																																																																				
	0.150	16.700	67																																																																																																				
	0.063	13.354	59																																																																																																				
Pan (m <sub>7</sub> )		1.510																																																																																																					



Abbreviations used : Sample type - U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory : Au Yeung Wai Kit - Laboratory Manager Date : **13 MAY 2022**

\*\*End of Report\*\*

Test Report No. : M160554SL220155(1)

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**
**Information supplied by Client**

 Client : Fugro Technical Services Limited  
 Client's Address : -


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

 Client sample No. : B  
 Borehole No. : -  
 Depth (m) : From : -  
 To : -  
 Sample origin : -  
 Description : Benthic Survey

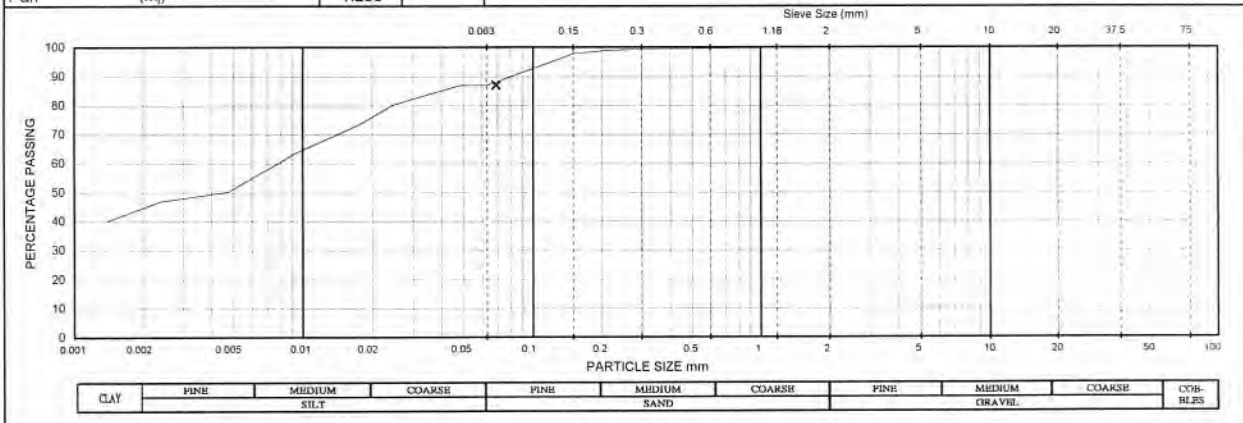
Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly sandy SILT/CLAY.

 Laboratory sample I.D. : SL220155/2  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) :  
 From : FULL MIX  
 To : -

Test Result (Sieve Analysis)				Test Result (Sedimentation Analysis)																																																																																																		
Initial dry mass (m <sub>1</sub> ) g	: 142.569	Mass retained (g)	Percent passing (%)	Hydrometer Serial No.					: 8295797																																																																																													
Sieve size mm				Particle density (Assumed)					: 2.65																																																																																													
100	0.000	100		Initial dry mass*					g : 24.418																																																																																													
75	0.000	100		Mass retained on 63µm					g : 3.250																																																																																													
63	0.000	100		<table border="1"> <thead> <tr> <th>Date</th> <th>Time Started</th> <th>Period min</th> <th>Temp. °C</th> <th>Hydro. Rdg</th> <th>Hydro. Rdg #</th> <th>Particle dia. mm</th> <th>K %</th> <th>K* %</th> </tr> </thead> <tbody> <tr> <td>05-05-2022</td> <td>10:30</td> <td>0.5</td> <td>25.00</td> <td>13.5</td> <td>0.5</td> <td>0.069</td> <td>86</td> <td>87</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>25.00</td> <td>13.5</td> <td>0.5</td> <td>0.049</td> <td>86</td> <td>87</td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>25.00</td> <td>13.0</td> <td>0.5</td> <td>0.035</td> <td>82</td> <td>84</td> </tr> <tr> <td></td> <td></td> <td>4</td> <td>25.00</td> <td>12.5</td> <td>0.5</td> <td>0.025</td> <td>79</td> <td>80</td> </tr> <tr> <td></td> <td></td> <td>8</td> <td>25.00</td> <td>11.5</td> <td>0.5</td> <td>0.018</td> <td>72</td> <td>74</td> </tr> <tr> <td></td> <td></td> <td>30</td> <td>25.00</td> <td>10.0</td> <td>0.5</td> <td>0.0093</td> <td>62</td> <td>64</td> </tr> <tr> <td></td> <td></td> <td>120</td> <td>25.00</td> <td>8.0</td> <td>0.5</td> <td>0.0047</td> <td>49</td> <td>50</td> </tr> <tr> <td></td> <td></td> <td>480</td> <td>25.00</td> <td>7.5</td> <td>0.5</td> <td>0.0024</td> <td>46</td> <td>47</td> </tr> <tr> <td></td> <td></td> <td>1440</td> <td>25.00</td> <td>6.5</td> <td>0.5</td> <td>0.0014</td> <td>39</td> <td>40</td> </tr> </tbody> </table>									Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %	05-05-2022	10:30	0.5	25.00	13.5	0.5	0.069	86	87			1	25.00	13.5	0.5	0.049	86	87			2	25.00	13.0	0.5	0.035	82	84			4	25.00	12.5	0.5	0.025	79	80			8	25.00	11.5	0.5	0.018	72	74			30	25.00	10.0	0.5	0.0093	62	64			120	25.00	8.0	0.5	0.0047	49	50			480	25.00	7.5	0.5	0.0024	46	47			1440	25.00	6.5	0.5	0.0014	39	40
Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %																																																																																														
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37.5	0.000	100		K* modified according to Geospec 3 (November 2001) Test Method 8.7																																																																																																		
28	0.000	100		<p style="text-align: center;"><b>SUMMATION :</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>GRAVEL</td> <td>% :</td> <td>0</td> </tr> <tr> <td>SAND</td> <td>% :</td> <td>13</td> </tr> <tr> <td>SILT</td> <td>% :</td> <td>43</td> </tr> <tr> <td>CLAY</td> <td>% :</td> <td>44</td> </tr> </table>									GRAVEL	% :	0	SAND	% :	13	SILT	% :	43	CLAY	% :	44																																																																														
GRAVEL	% :	0																																																																																																				
SAND	% :	13																																																																																																				
SILT	% :	43																																																																																																				
CLAY	% :	44																																																																																																				
20	0.000	100																																																																																																				
Passing (m <sub>2</sub> )	20	142.569																																																																																																				
Riffled passing (m <sub>3</sub> )	20	142.569																																																																																																				
Wash passing (m <sub>4</sub> )	20	19.820																																																																																																				
	14	0.000	100																																																																																																			
	10	0.000	100																																																																																																			
	6.3	0.000	100																																																																																																			
Passing (m <sub>5</sub> )	6.3	19.820																																																																																																				
Riffled passing (m <sub>6</sub> )	6.3	19.820																																																																																																				
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	0.212	0.540	99																																																																																																			
	0.150	1.630	98																																																																																																			
	0.063	15.399	87																																																																																																			
Pan (m <sub>7</sub> )		1.250																																																																																																				



Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory : Au Yeung Wai Kit - Laboratory Manager

Date : 13 MAY 2022

\*\*End of Report\*\*

Test Report No. : M160554SL220155(2)

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**
**Information supplied by Client**

 Client : Fugro Technical Services Limited  
 Client's Address : -


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

 Client sample No. : C  
 Borehole No. : -  
 Depth (m) : From - To -  
 Sample origin : -  
 Description : Benthic Survey

Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly sandy SILT/CLAY.

 Laboratory sample I.D. : SL220155/3  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) : From - To -  
 FULL MIX

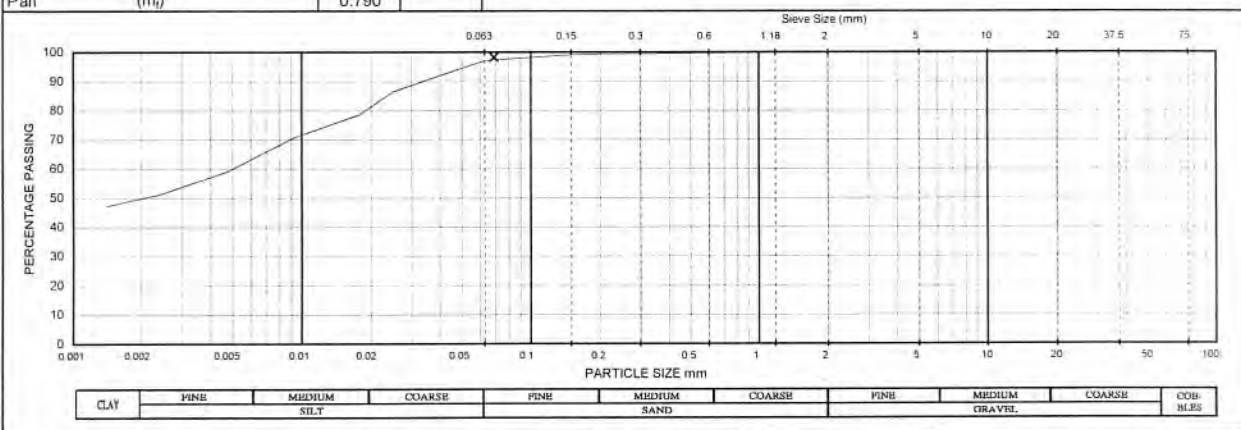
Test Result (Sieve Analysis)		
Initial dry mass (m <sub>1</sub> ) g	Sieve size mm	Mass retained (g) / Percent passing (%)
118.484	100	0.000 / 100
	75	0.000 / 100
	63	0.000 / 100
	50	0.000 / 100
	37.5	0.000 / 100
	28	0.000 / 100
	20	0.000 / 100
Passing (m <sub>2</sub> )	20	118.484
Riffled passing (m <sub>3</sub> )	20	118.484
Wash passing (m <sub>4</sub> )	20	4.239
	14	0.000 / 100
	10	0.000 / 100
	6.3	0.000 / 100
Passing (m <sub>5</sub> )	6.3	4.239
Riffled passing (m <sub>6</sub> )	6.3	4.239
	5.0	0.000 / 100
	3.35	0.000 / 100
	2.00	0.050 / 100
	1.18	0.072 / 100
	0.600	0.210 / 100
	0.425	0.152 / 100
	0.300	0.163 / 99
	0.212	0.160 / 99
	0.150	0.180 / 99
	0.063	2.462 / 97
Pan (m <sub>7</sub> )		0.790

**Test Result (Sedimentation Analysis)**

 Hydrometer Serial No. : B295797  
 Particle density (Assumed) : 2.65  
 Initial dry mass\* g : 20.159  
 Mass retained on 63µm g : 0.810

Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %
05-05-2022	10:25	0.5	25.00	13.0	0.5	0.069	100	98
		1	25.00	12.5	0.5	0.049	96	94
		2	25.00	12.0	0.5	0.035	92	90
		4	25.00	11.5	0.5	0.025	88	86
		8	25.00	10.5	0.5	0.018	80	79
		30	25.00	9.5	0.5	0.0093	72	71
		120	25.00	8.0	0.5	0.0047	60	59
		480	25.00	7.0	0.5	0.0024	52	51
		1440	25.00	6.5	0.5	0.0014	48	47

 # Hydrometer reading in solution only (R<sub>0</sub>)  
 K\* modified according to Geospec 3 (November 2001) Test Method 8.7

**SUMMATION :** GRAVEL % : 0  
 SAND % : 3  
 SILT % : 47  
 CLAY % : 50

 Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :

Au Yeung Wai Kit - Laboratory Manager

Date :

13 MAY 2022

\*\*End of Report\*\*



Test Report No. : M160554SL220155(3)

Page 1 of 1

## TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

### Information supplied by Client

Client : Fugro Technical Services Limited  
 Client's Address : -



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

Client sample No. : D  
 Borehole No. : -  
 Depth (m) : From - To -  
 Sample origin : -  
 Description : Benthic Survey

Service/Works Order No. : -

### Laboratory Information

Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly sandy SILT/CLAY.

Laboratory sample I.D. : SL220155/4  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) : From FULL MIX To -

Test Result (Sieve Analysis)			
Initial dry mass (m <sub>1</sub> ) g	Sieve size mm	Mass retained (g)	Percent passing (%)
130.134	100	0.000	100
	75	0.000	100
	63	0.000	100
	50	0.000	100
	37.5	0.000	100
	28	0.000	100
	20	0.000	100
Passing (m <sub>2</sub> )	20	130.134	
Riffled passing (m <sub>3</sub> )	20	130.134	
Wash passing (m <sub>4</sub> )	20	9.722	
	14	0.000	100
	10	0.000	100
	6.3	0.000	100
Passing (m <sub>5</sub> )	6.3	9.722	
Riffled passing (m <sub>6</sub> )	6.3	9.722	
	5.0	0.000	100
	3.35	0.000	100
	2.00	0.070	100
	1.18	0.090	100
	0.600	0.173	100
	0.425	0.152	100
	0.300	0.200	99
	0.212	0.284	99
	0.150	0.710	99
	0.063	7.693	93
Pan (m <sub>7</sub> )		0.350	

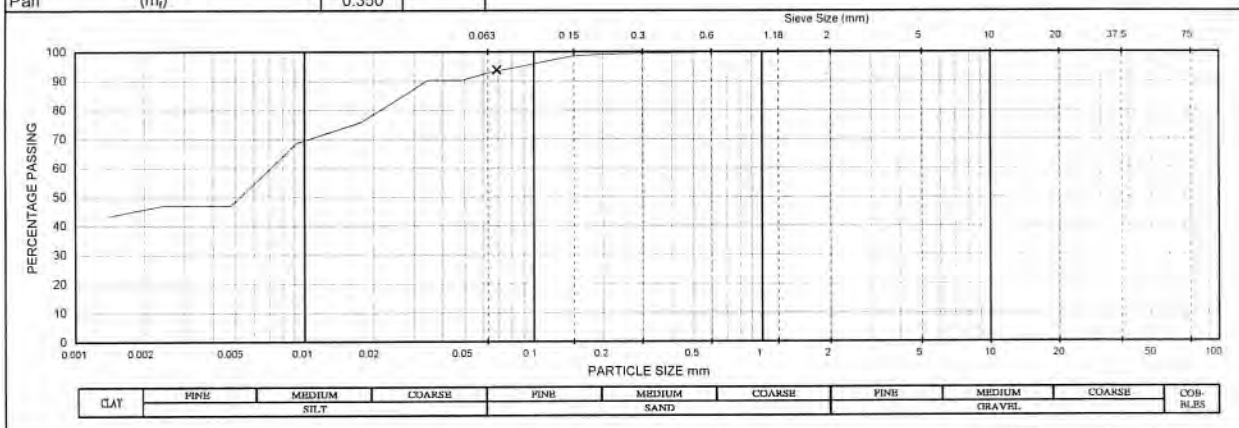
### Test Result (Sedimentation Analysis)

Hydrometer Serial No. : 8295797  
 Particle density (Assumed) : 2.65  
 Initial dry mass\* g : 21.845  
 Mass retained on 63µm g : 1.785

Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %
05-05-2022	10:20	0.5	25.00	13.5	0.5	0.069	96	94
		1	25.00	13.0	0.5	0.049	92	90
		2	25.00	13.0	0.5	0.035	92	90
		4	25.00	12.0	0.5	0.025	85	83
		8	25.00	11.0	0.5	0.018	77	76
		30	25.00	10.0	0.5	0.0093	70	69
		120	25.00	7.0	0.5	0.0048	48	47
		480	25.00	7.0	0.5	0.0024	48	47
		1440	25.00	6.5	0.5	0.0014	44	43

# Hydrometer reading in solution only (R<sub>0</sub>)  
 K\* modified according to Geospec 3 (November 2001) Test Method 8.7

**SUMMATION :** GRAVEL % : 0  
 SAND % : 7  
 SILT % : 47  
 CLAY % : 46



Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazer, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :

Au Yeung Wai Kit - Laboratory Manager

Date : 13 MAY 2022

\*\*End of Report\*\*

Test Report No. : M160554SL220155(4)

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**
**Information supplied by Client**

 Client : Fugro Technical Services Limited  
 Client's Address : -


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

 Client sample No. : E  
 Borehole No. : -  
 Depth (m) : From : -  
 To : -  
 Sample origin : -  
 Description : Benthic Survey

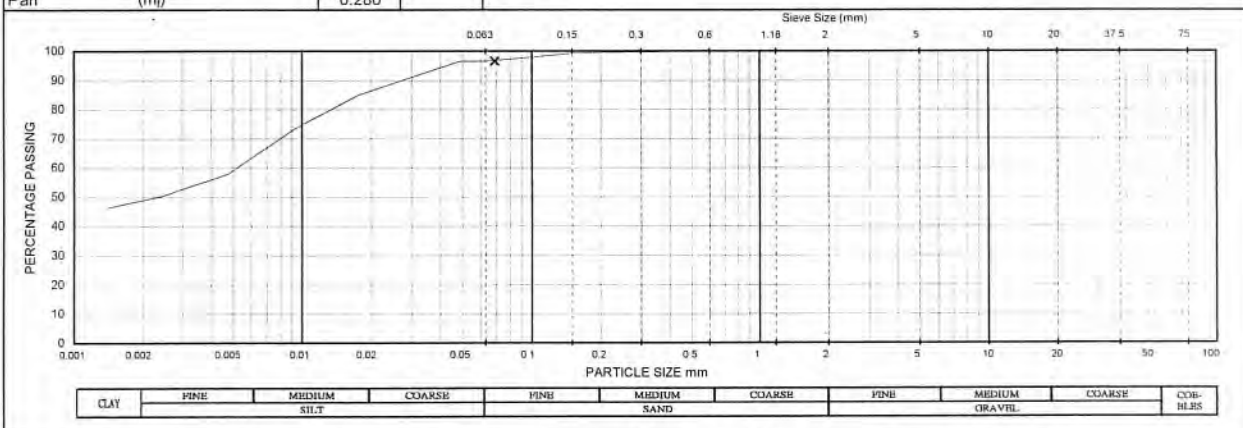
Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly sandy SILT/CLAY.

 Laboratory sample I.D. : SL220155/5  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) :  
 From : FULL MIX  
 To : -

Test Result (Sieve Analysis)				Test Result (Sedimentation Analysis)																																																																																		
Initial dry mass (m <sub>1</sub> ) g	123.213	Mass retained (g)	Percent passing (%)	Hydrometer Serial No.					: 8295797																																																																													
Sieve size mm				Particle density (Assumed)					: 2.65																																																																													
100	0.000	100		Initial dry mass*					g : 21.650																																																																													
75	0.000	100		Mass retained on 63µm					g : 0.821																																																																													
63	0.000	100		<table border="1"> <thead> <tr> <th>Date</th> <th>Time Started</th> <th>Period min</th> <th>Temp. °C</th> <th>Hydro. Rdg</th> <th>Hydro. Rdg #</th> <th>Particle dia. mm</th> <th>K %</th> <th>K* %</th> </tr> </thead> <tbody> <tr> <td rowspan="10">05-05-2022</td> <td rowspan="10">10:15</td> <td>0.5</td> <td>25.00</td> <td>13.0</td> <td>0.5</td> <td>0.069</td> <td>93</td> <td>97</td> </tr> <tr> <td>1</td> <td>25.00</td> <td>13.0</td> <td>0.5</td> <td>0.049</td> <td>93</td> <td>97</td> </tr> <tr> <td>2</td> <td>25.00</td> <td>12.5</td> <td>0.5</td> <td>0.035</td> <td>89</td> <td>93</td> </tr> <tr> <td>4</td> <td>25.00</td> <td>12.0</td> <td>0.5</td> <td>0.025</td> <td>85</td> <td>89</td> </tr> <tr> <td>8</td> <td>25.00</td> <td>11.5</td> <td>0.5</td> <td>0.018</td> <td>82</td> <td>85</td> </tr> <tr> <td>30</td> <td>25.00</td> <td>10.0</td> <td>0.5</td> <td>0.0093</td> <td>70</td> <td>73</td> </tr> <tr> <td>120</td> <td>25.00</td> <td>8.0</td> <td>0.5</td> <td>0.0047</td> <td>56</td> <td>58</td> </tr> <tr> <td>480</td> <td>25.00</td> <td>7.0</td> <td>0.5</td> <td>0.0024</td> <td>48</td> <td>50</td> </tr> <tr> <td>1440</td> <td>25.00</td> <td>6.5</td> <td>0.5</td> <td>0.0014</td> <td>45</td> <td>46</td> </tr> </tbody> </table>									Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %	05-05-2022	10:15	0.5	25.00	13.0	0.5	0.069	93	97	1	25.00	13.0	0.5	0.049	93	97	2	25.00	12.5	0.5	0.035	89	93	4	25.00	12.0	0.5	0.025	85	89	8	25.00	11.5	0.5	0.018	82	85	30	25.00	10.0	0.5	0.0093	70	73	120	25.00	8.0	0.5	0.0047	56	58	480	25.00	7.0	0.5	0.0024	48	50	1440	25.00	6.5	0.5	0.0014	45	46
Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %																																																																														
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28	0.000	100		<p style="text-align: center;"><b>SUMMATION :</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>GRAVEL</td> <td>% :</td> <td>0</td> </tr> <tr> <td>SAND</td> <td>% :</td> <td>3</td> </tr> <tr> <td>SILT</td> <td>% :</td> <td>48</td> </tr> <tr> <td>CLAY</td> <td>% :</td> <td>49</td> </tr> </table>									GRAVEL	% :	0	SAND	% :	3	SILT	% :	48	CLAY	% :	49																																																														
GRAVEL	% :	0																																																																																				
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Passing (m <sub>2</sub> )	20	123.213																																																																																				
Riffled passing (m <sub>3</sub> )	20	123.213																																																																																				
Wash passing (m <sub>4</sub> )	20	4.530																																																																																				
	14	0.000	100																																																																																			
	10	0.000	100																																																																																			
	6.3	0.000	100																																																																																			
Passing (m <sub>5</sub> )	6.3	4.530																																																																																				
Riffled passing (m <sub>6</sub> )	6.3	4.530																																																																																				
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	0.300	0.122	100																																																																																			
	0.212	0.240	100																																																																																			
	0.150	0.370	99																																																																																			
	0.063	3.298	97																																																																																			
Pan (m <sub>7</sub> )		0.280																																																																																				



Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory : Au Yeung Wai Kit - Laboratory Manager Date : 13 MAY 2022

\*\*End of Report\*\*

Test Report No. : M160554SL220155(5)

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**

Information supplied by Client

 Client : Fugro Technical Services Limited  
 Client's Address : -

 Client sample No. : F  
 Borehole No. : -  
 Depth (m) : From - To -  
 Sample origin : -  
 Description : Benthic Survey

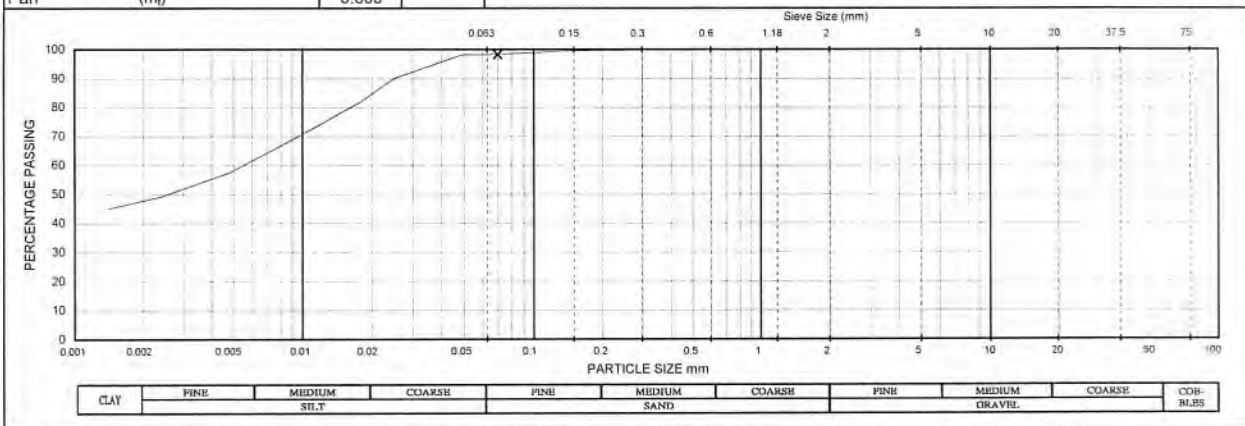

Project : Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works

Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly sandy SILT/CLAY.  
 Laboratory sample I.D. : SL220155/6  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) : From - To - FULL MIX

Test Result (Sieve Analysis)				Test Result (Sedimentation Analysis)																																																																																			
Initial dry mass (m <sub>1</sub> ) g	: 122.185	Mass retained (g)	Percent passing (%)	Hydrometer Serial No. : 8295797																																																																																			
	Sieve size mm			Particle density (Assumed) : 2.65																																																																																			
	100	0.000	100	Initial dry mass* g : 19.725																																																																																			
	75	0.000	100	Mass retained on 63µm g : 0.479																																																																																			
	63	0.000	100	<table border="1"> <thead> <tr> <th>Date</th> <th>Time Started</th> <th>Period min</th> <th>Temp. °C</th> <th>Hydro. Rdg</th> <th>Hydro. Rdg #</th> <th>Particle dia. mm</th> <th>K %</th> <th>K* %</th> </tr> </thead> <tbody> <tr> <td rowspan="10">05-05-2022</td> <td rowspan="10">10:10</td> <td>0.5</td> <td>25.00</td> <td>12.5</td> <td>0.5</td> <td>0.070</td> <td>98</td> <td>98</td> </tr> <tr> <td>1</td> <td>25.00</td> <td>12.5</td> <td>0.5</td> <td>0.049</td> <td>98</td> <td>98</td> </tr> <tr> <td>2</td> <td>25.00</td> <td>12.0</td> <td>0.5</td> <td>0.035</td> <td>94</td> <td>94</td> </tr> <tr> <td>4</td> <td>25.00</td> <td>11.5</td> <td>0.5</td> <td>0.025</td> <td>90</td> <td>90</td> </tr> <tr> <td>8</td> <td>25.00</td> <td>10.5</td> <td>0.5</td> <td>0.018</td> <td>81</td> <td>82</td> </tr> <tr> <td>30</td> <td>25.00</td> <td>9.0</td> <td>0.5</td> <td>0.0094</td> <td>69</td> <td>70</td> </tr> <tr> <td>120</td> <td>25.00</td> <td>7.5</td> <td>0.5</td> <td>0.0048</td> <td>57</td> <td>57</td> </tr> <tr> <td>480</td> <td>25.00</td> <td>6.5</td> <td>0.5</td> <td>0.0024</td> <td>49</td> <td>49</td> </tr> <tr> <td>1440</td> <td>25.00</td> <td>6.0</td> <td>0.5</td> <td>0.0014</td> <td>45</td> <td>45</td> </tr> </tbody> </table>										Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %	05-05-2022	10:10	0.5	25.00	12.5	0.5	0.070	98	98	1	25.00	12.5	0.5	0.049	98	98	2	25.00	12.0	0.5	0.035	94	94	4	25.00	11.5	0.5	0.025	90	90	8	25.00	10.5	0.5	0.018	81	82	30	25.00	9.0	0.5	0.0094	69	70	120	25.00	7.5	0.5	0.0048	57	57	480	25.00	6.5	0.5	0.0024	49	49	1440	25.00	6.0	0.5	0.0014	45	45
Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %																																																																															
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		Passing (m <sub>2</sub> )	20	122.185		# Hydrometer reading in solution only (R <sub>0</sub> )																																																																																	
Riffled passing (m <sub>3</sub> )	20	122.185		K* modified according to Geospec 3 (November 2001) Test Method 8.7																																																																																			
Wash passing (m <sub>4</sub> )	20	2.720		<p style="text-align: center;"><b>SUMMATION :</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>GRAVEL</td> <td>% :</td> <td>0</td> </tr> <tr> <td>SAND</td> <td>% :</td> <td>2</td> </tr> <tr> <td>SILT</td> <td>% :</td> <td>51</td> </tr> <tr> <td>CLAY</td> <td>% :</td> <td>47</td> </tr> </table>										GRAVEL	% :	0	SAND	% :	2	SILT	% :	51	CLAY	% :	47																																																														
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 Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :

Au Yeung Wai Kit - Laboratory Manager

Date :

**13 MAY 2022**
**\*\*End of Report\*\***



Test Report No. : M160554SL220155(6)

Page 1 of 1

**TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL**
**Information supplied by Client**

 Client : Fugro Technical Services Limited  
 Client's Address : -


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

 Client sample No. : G  
 Borehole No. : -  
 Depth (m) : From : -  
 To : -  
 Sample origin : -  
 Description : Benthic Survey

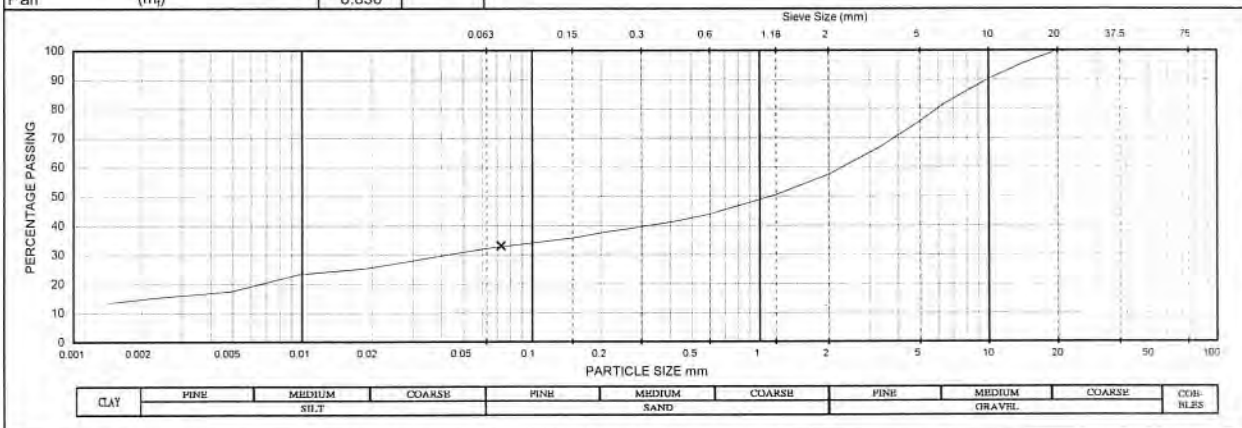
Service/Works Order No. : -

**Laboratory Information**

 Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, brown, very clayey, very silty, very sandy GRAVEL with shell fragments.

 Laboratory sample I.D. : SL220155/7  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) : From : FULL MIX  
 To : -

Test Result (Sieve Analysis)				Test Result (Sedimentation Analysis)																																																																																		
Initial dry mass (m <sub>1</sub> ) g	: 188.047	Mass retained (g)	Percent passing (%)	Hydrometer Serial No.					: 8295797																																																																													
Sieve size mm				Particle density (Assumed)					: 2.65																																																																													
100	0.000	100		Initial dry mass*					g : 32.943																																																																													
75	0.000	100		Mass retained on 63µm					g : 17.717																																																																													
63	0.000	100		<table border="1"> <thead> <tr> <th>Date</th> <th>Time Started</th> <th>Period min</th> <th>Temp. °C</th> <th>Hydro. Rdg</th> <th>Hydro. Rdg #</th> <th>Particle dia. mm</th> <th>K %</th> <th>K* %</th> </tr> </thead> <tbody> <tr> <td rowspan="10">05-05-2022</td> <td rowspan="10">10:05</td> <td>0.5</td> <td>25.00</td> <td>9.0</td> <td>0.5</td> <td>0.073</td> <td>41</td> <td>33</td> </tr> <tr> <td>1</td> <td>25.00</td> <td>8.5</td> <td>0.5</td> <td>0.052</td> <td>39</td> <td>31</td> </tr> <tr> <td>2</td> <td>25.00</td> <td>8.0</td> <td>0.5</td> <td>0.037</td> <td>37</td> <td>29</td> </tr> <tr> <td>4</td> <td>25.00</td> <td>7.5</td> <td>0.5</td> <td>0.026</td> <td>34</td> <td>27</td> </tr> <tr> <td>8</td> <td>25.00</td> <td>7.0</td> <td>0.5</td> <td>0.019</td> <td>32</td> <td>25</td> </tr> <tr> <td>30</td> <td>25.00</td> <td>6.5</td> <td>0.5</td> <td>0.0097</td> <td>29</td> <td>23</td> </tr> <tr> <td>120</td> <td>25.00</td> <td>5.0</td> <td>0.5</td> <td>0.0049</td> <td>22</td> <td>17</td> </tr> <tr> <td>480</td> <td>25.00</td> <td>4.5</td> <td>0.5</td> <td>0.0025</td> <td>20</td> <td>16</td> </tr> <tr> <td>1440</td> <td>25.00</td> <td>4.0</td> <td>0.5</td> <td>0.0014</td> <td>17</td> <td>14</td> </tr> </tbody> </table>									Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %	05-05-2022	10:05	0.5	25.00	9.0	0.5	0.073	41	33	1	25.00	8.5	0.5	0.052	39	31	2	25.00	8.0	0.5	0.037	37	29	4	25.00	7.5	0.5	0.026	34	27	8	25.00	7.0	0.5	0.019	32	25	30	25.00	6.5	0.5	0.0097	29	23	120	25.00	5.0	0.5	0.0049	22	17	480	25.00	4.5	0.5	0.0025	20	16	1440	25.00	4.0	0.5	0.0014	17	14
Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %																																																																														
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28	0.000	100		<table border="0"> <tr> <td><b>SUMMATION :</b></td> <td><b>GRAVEL</b></td> <td><b>% :</b></td> <td><b>43</b></td> </tr> <tr> <td></td> <td><b>SAND</b></td> <td><b>% :</b></td> <td><b>25</b></td> </tr> <tr> <td></td> <td><b>SILT</b></td> <td><b>% :</b></td> <td><b>17</b></td> </tr> <tr> <td></td> <td><b>CLAY</b></td> <td><b>% :</b></td> <td><b>15</b></td> </tr> </table>									<b>SUMMATION :</b>	<b>GRAVEL</b>	<b>% :</b>	<b>43</b>		<b>SAND</b>	<b>% :</b>	<b>25</b>		<b>SILT</b>	<b>% :</b>	<b>17</b>		<b>CLAY</b>	<b>% :</b>	<b>15</b>																																																										
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Passing (m <sub>2</sub> )	20	188.047																																																																																				
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Wash passing (m <sub>4</sub> )	20	128.539																																																																																				
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	10	9.713	90																																																																																			
	6.3	16.740	81																																																																																			
Passing (m <sub>5</sub> )	6.3	93.626																																																																																				
Riffled passing (m <sub>6</sub> )	6.3	93.626																																																																																				
	5.0	10.850	76																																																																																			
	3.35	16.472	67																																																																																			
	2.00	17.780	57																																																																																			
	1.18	13.190	50																																																																																			
	0.600	12.510	44																																																																																			
	0.425	4.430	41																																																																																			
	0.300	3.502	40																																																																																			
	0.212	3.330	38																																																																																			
	0.150	4.000	36																																																																																			
	0.063	6.732	32																																																																																			
Pan (m <sub>7</sub> )		0.830																																																																																				


 Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :

Au Yeung Wai Kit - Laboratory Manager

Date :

**13 MAY 2022**
**\*\*End of Report\*\***

Test Report No. : M160554SL220155(7)

Page 1 of 1

## TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client

Client : Fugro Technical Services Limited  
 Client's Address : -

Client sample No. : H



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

Borehole No. : -  
 Depth (m) : From - To -  
 Sample origin : -  
 Description : Benthic Survey

Service/Works Order No. : -

### Laboratory Information

Date sample received : 28-04-2022  
 Date test commenced : 03-05-2022  
 Date test completed : 06-05-2022  
 Test method used : Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7  
 Method of preparation : Method B  
 Visual description : Moist, grey, slightly gravelly, slightly sandy SILT/CLAY.

Laboratory sample I.D. : SL220155/8  
 Specimen reference : A  
 Sample type : D  
 Location and Orientation within original sample (m) : From - To - FULL MIX

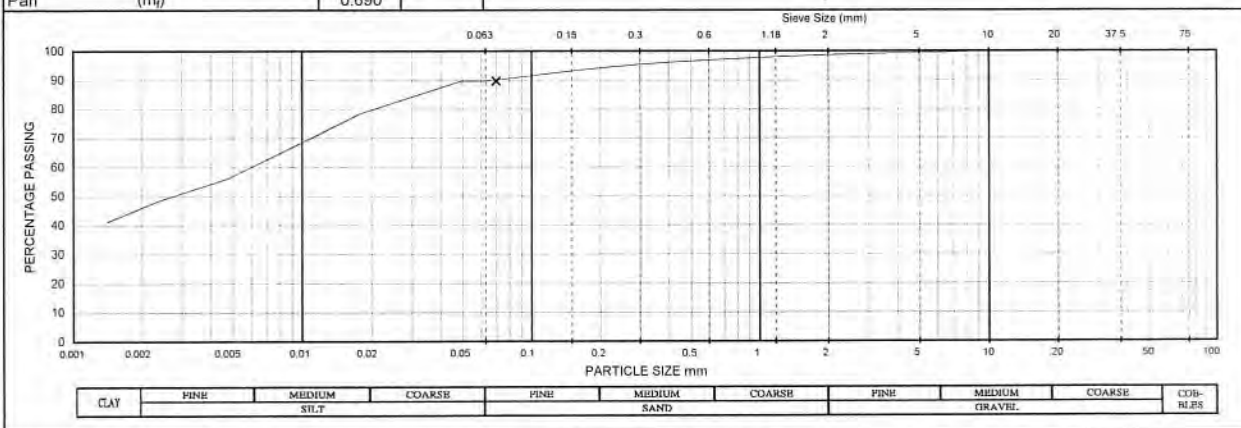
Test Result (Sieve Analysis)		
Initial dry mass (m <sub>1</sub> ) g	Sieve size mm	Mass retained (g) / Percent passing (%)
135.854	100	0.000 / 100
	75	0.000 / 100
	63	0.000 / 100
	50	0.000 / 100
	37.5	0.000 / 100
	28	0.000 / 100
	20	0.000 / 100
Passing (m <sub>2</sub> )	20	135.854
Riffled passing (m <sub>3</sub> )	20	135.854
Wash passing (m <sub>4</sub> )	20	14.789
	14	0.000 / 100
	10	0.000 / 100
	6.3	0.700 / 99
Passing (m <sub>5</sub> )	6.3	14.089
Riffled passing (m <sub>6</sub> )	6.3	14.089
	5.0	0.000 / 99
	3.35	0.440 / 99
	2.00	0.672 / 99
	1.18	0.863 / 98
	0.600	1.500 / 97
	0.425	0.930 / 96
	0.300	1.030 / 95
	0.212	1.443 / 94
	0.150	1.780 / 93
	0.063	4.741 / 90
Pan (m <sub>7</sub> )		0.690

Test Result (Sedimentation Analysis)			
Hydrometer Serial No.	:	:	8295797
Particle density (Assumed)	:	:	2.65
Initial dry mass*	g	:	23.252
Mass retained on 63µm	g	:	2.677

Date	Time Started	Period min	Temp. °C	Hydro. Rdg	Hydro. Rdg #	Particle dia. mm	K %	K* %
05-05-2022	10:00	0.5	25.00	12.5	0.5	0.070	83	90
		1	25.00	12.5	0.5	0.049	83	90
		2	25.00	12.0	0.5	0.035	79	86
		4	25.00	11.5	0.5	0.025	76	82
		8	25.00	11.0	0.5	0.018	73	78
		30	25.00	9.5	0.5	0.0093	62	67
		120	25.00	8.0	0.5	0.0047	52	56
		480	25.00	7.0	0.5	0.0024	45	49
		1440	25.00	6.0	0.5	0.0014	38	41

# Hydrometer reading in solution only (R<sub>0</sub>)  
 K\* modified according to Geospec 3 (November 2001) Test Method 8.7

<b>SUMMATION :</b>	<b>GRAVEL</b>	<b>% :</b>	<b>1</b>
	<b>SAND</b>	<b>% :</b>	<b>9</b>
	<b>SILT</b>	<b>% :</b>	<b>44</b>
	<b>CLAY</b>	<b>% :</b>	<b>46</b>



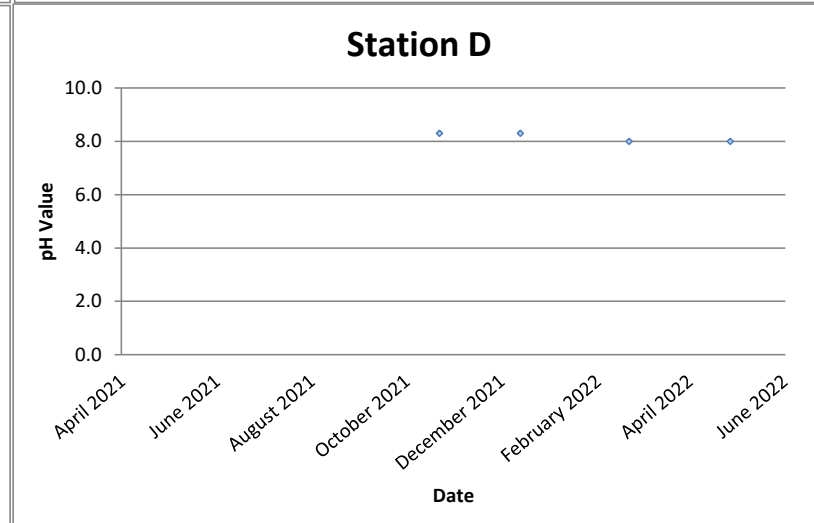
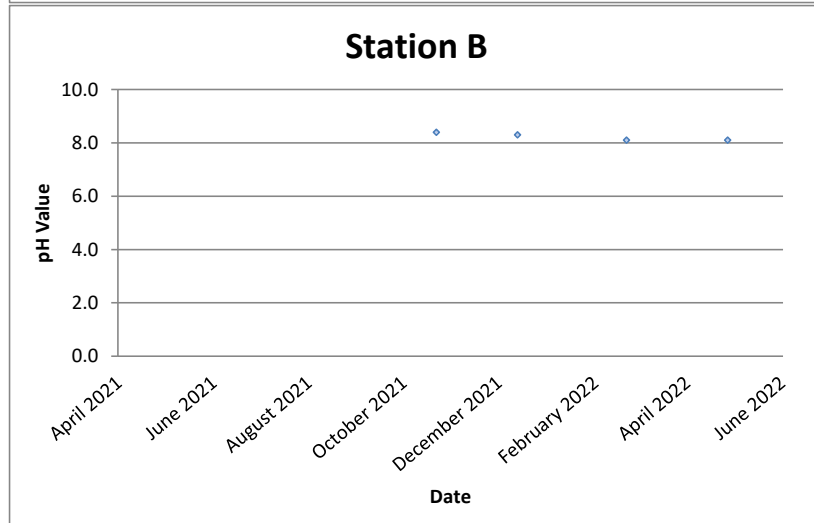
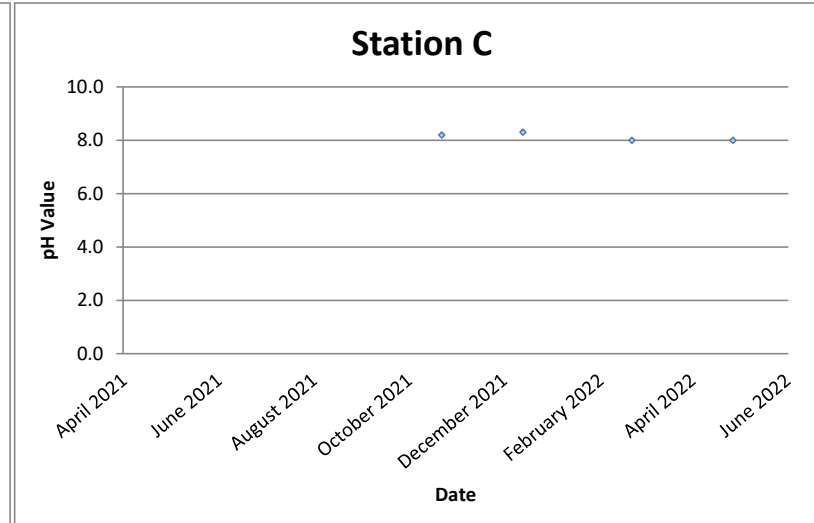
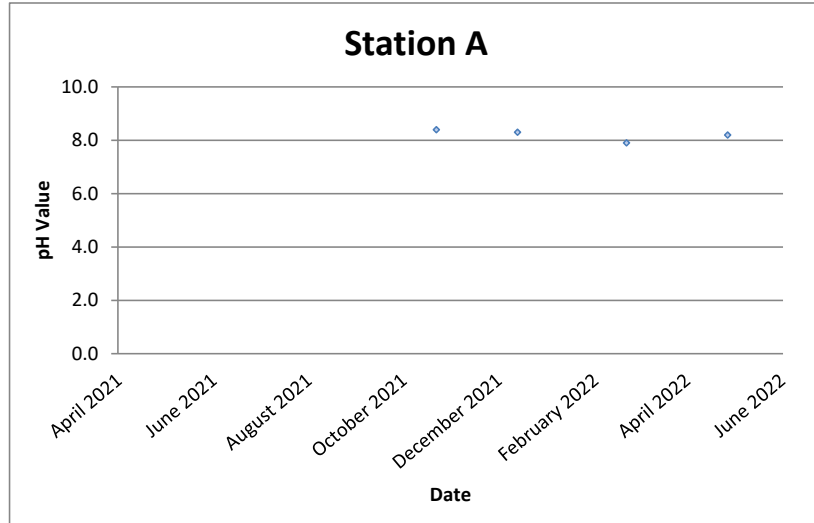
Abbreviations used : Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)  
 Remarks : Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.  
 Coefficient of Uniformity is undefined.  
 Initial dry mass\* : The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :  Au Yeung Wai Kit - Laboratory Manager

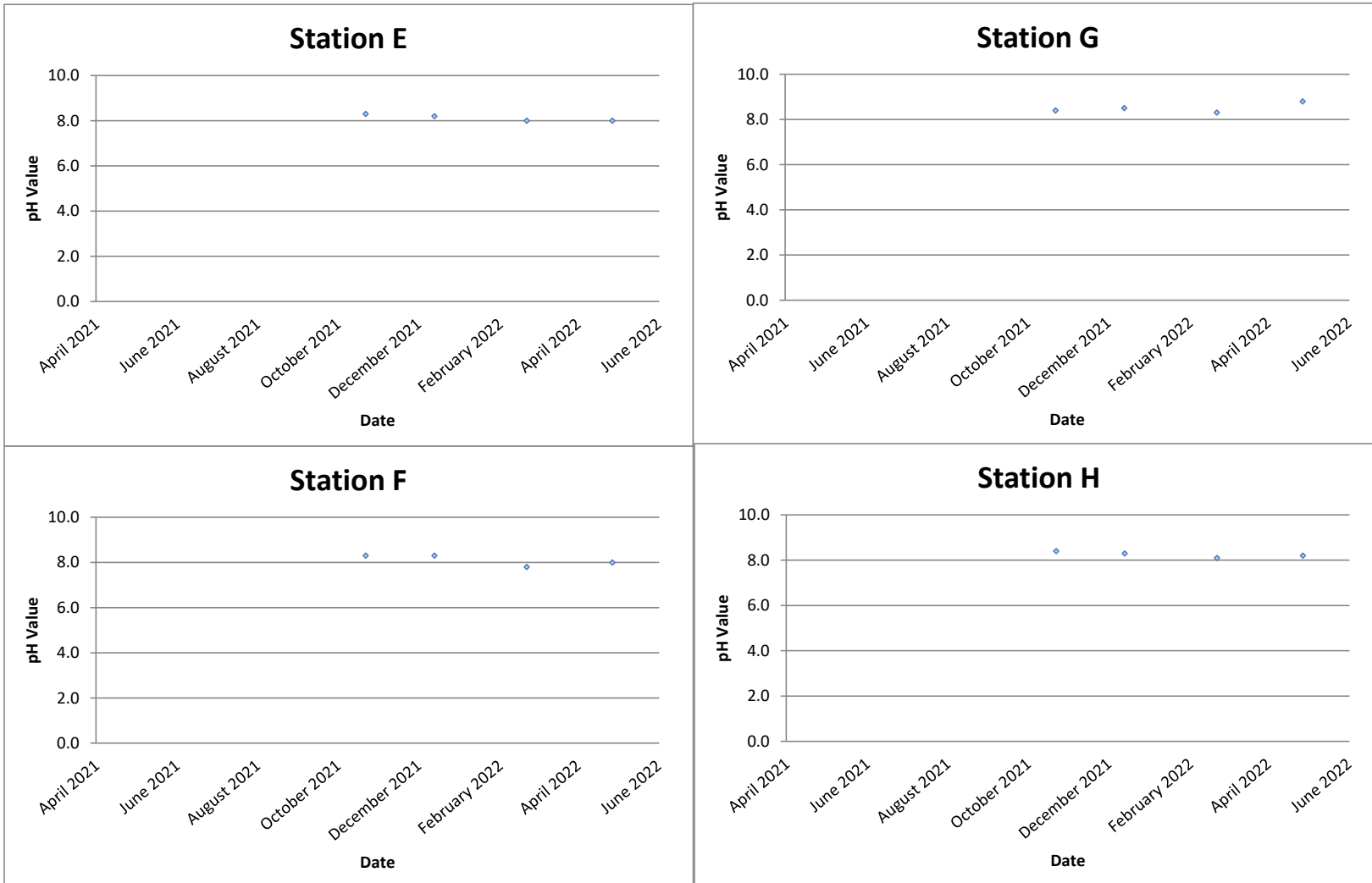
Date : 13 MAY 2022

\*\*End of Report\*\*

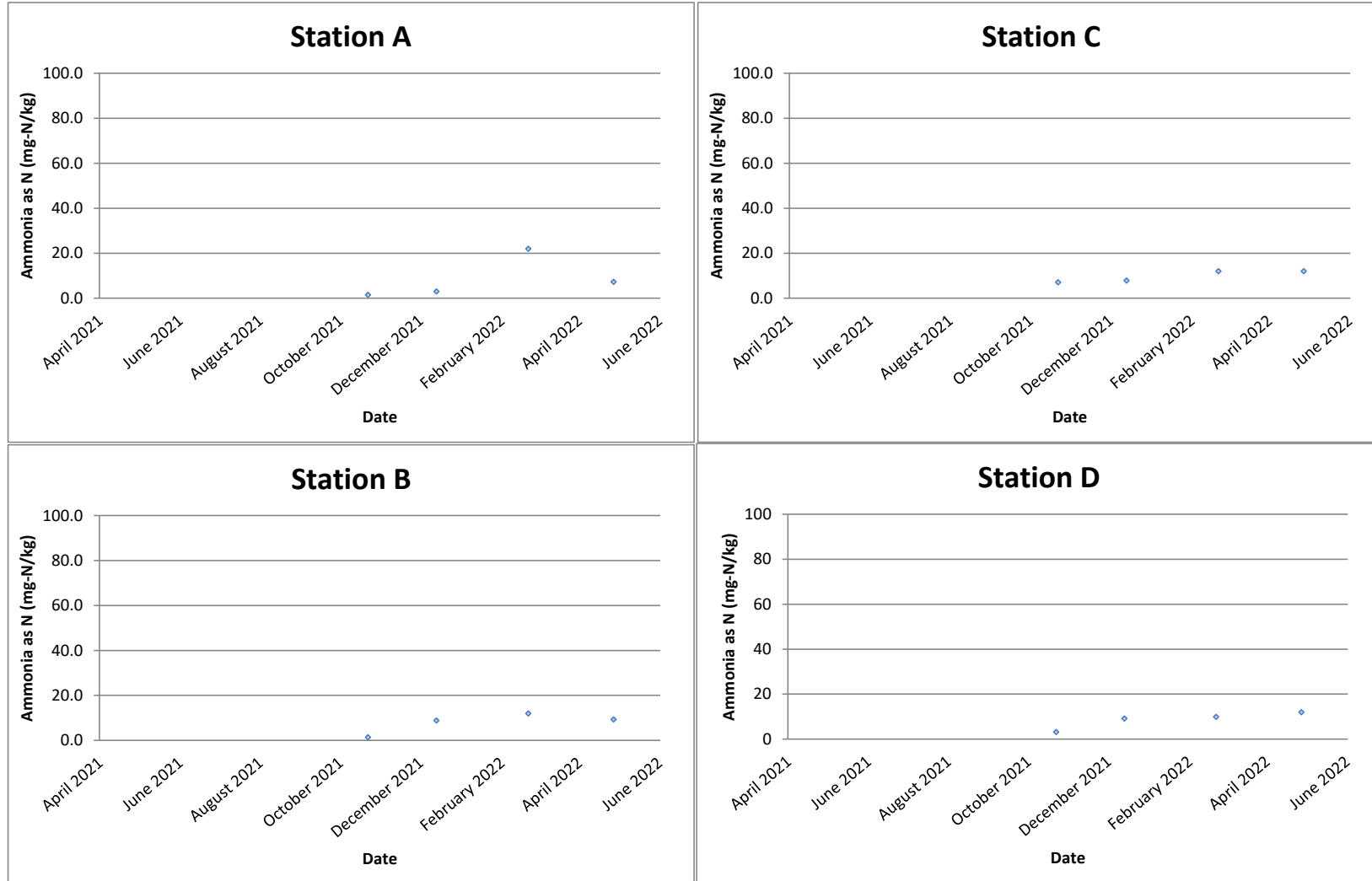
pH value



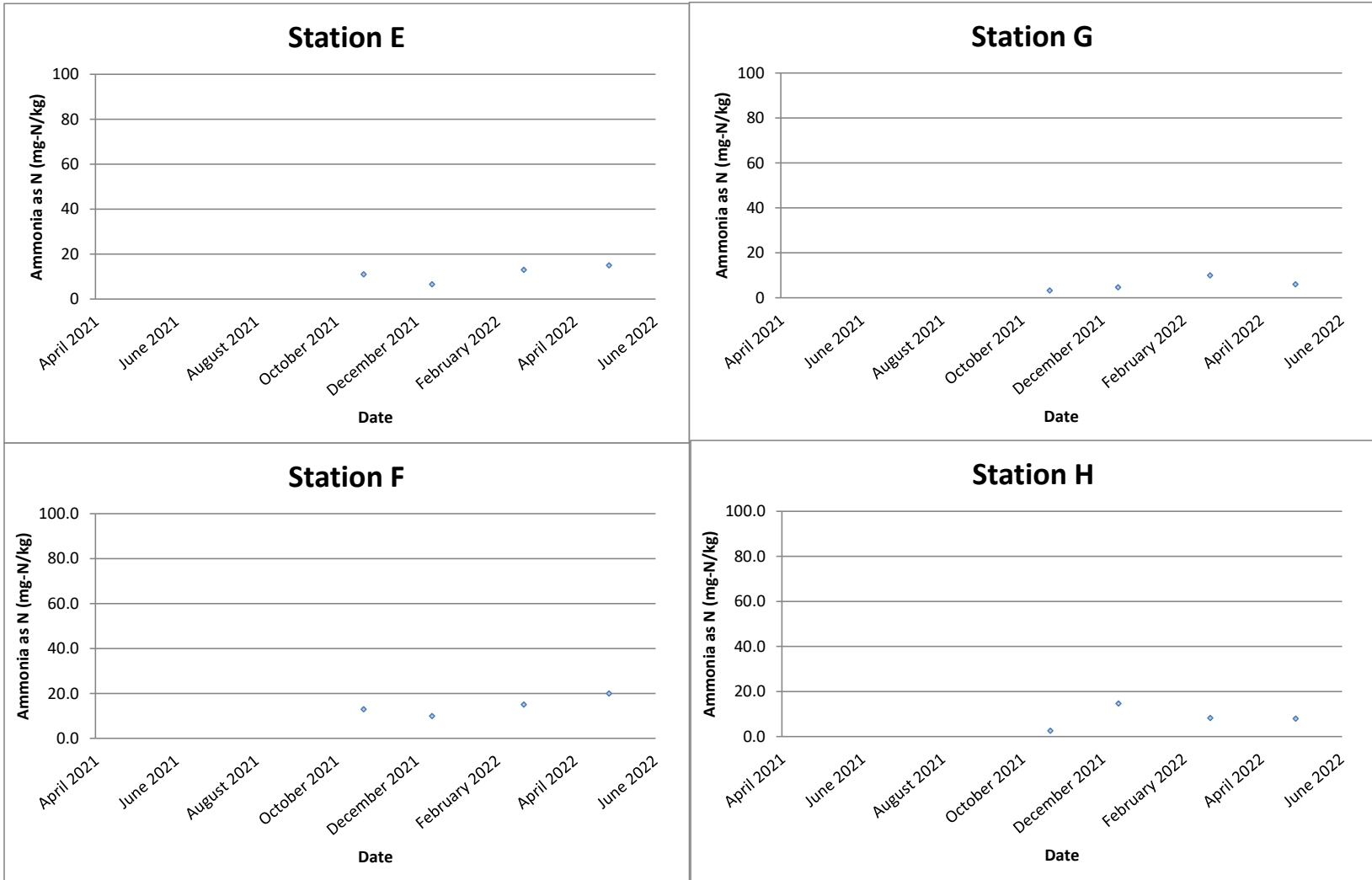
pH value



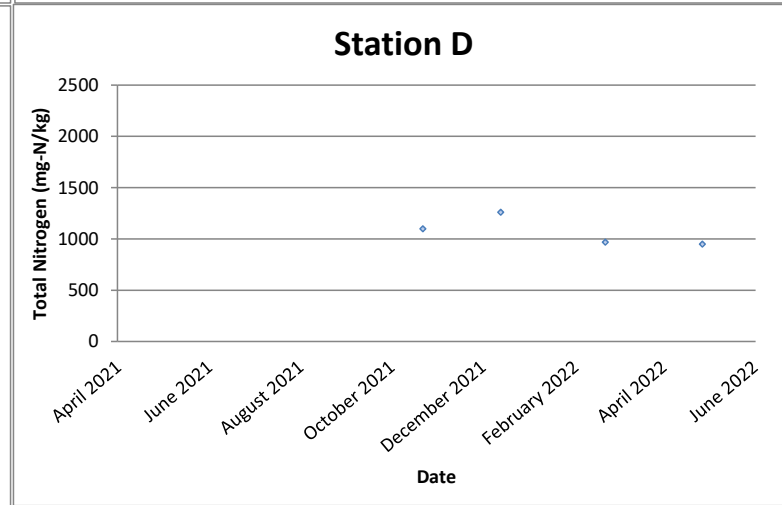
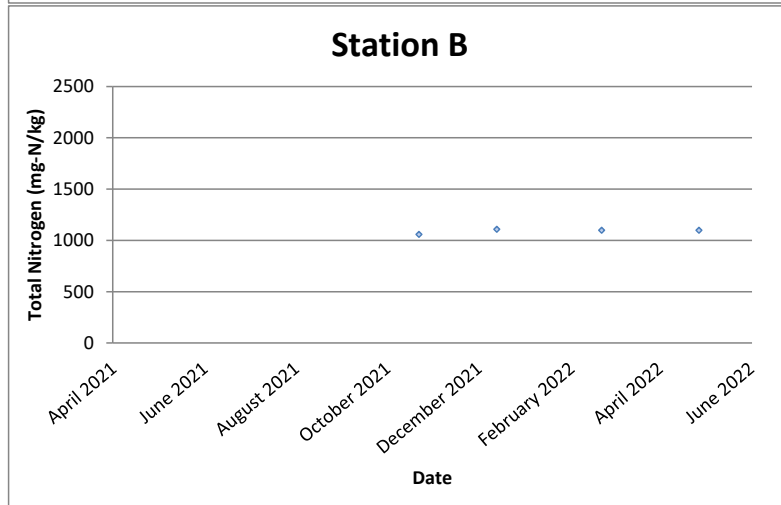
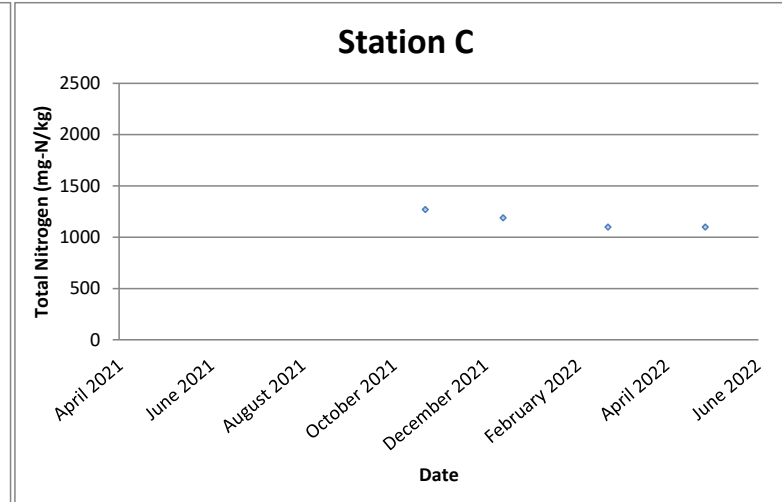
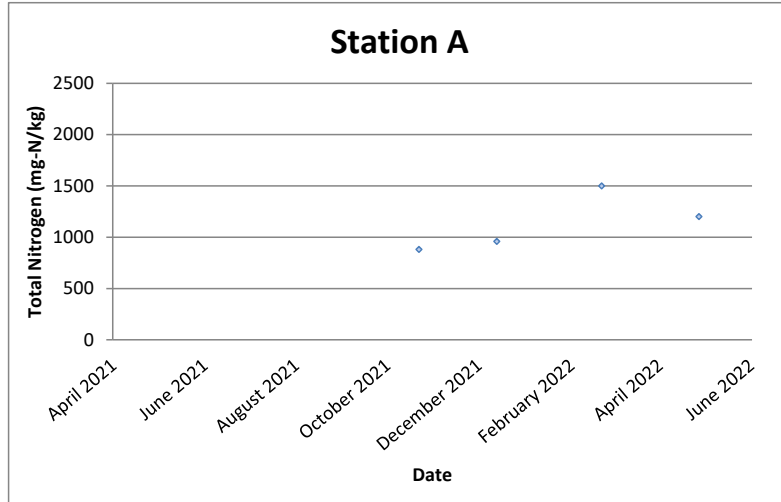
Ammonia Nitrogen (mg-N/kg)



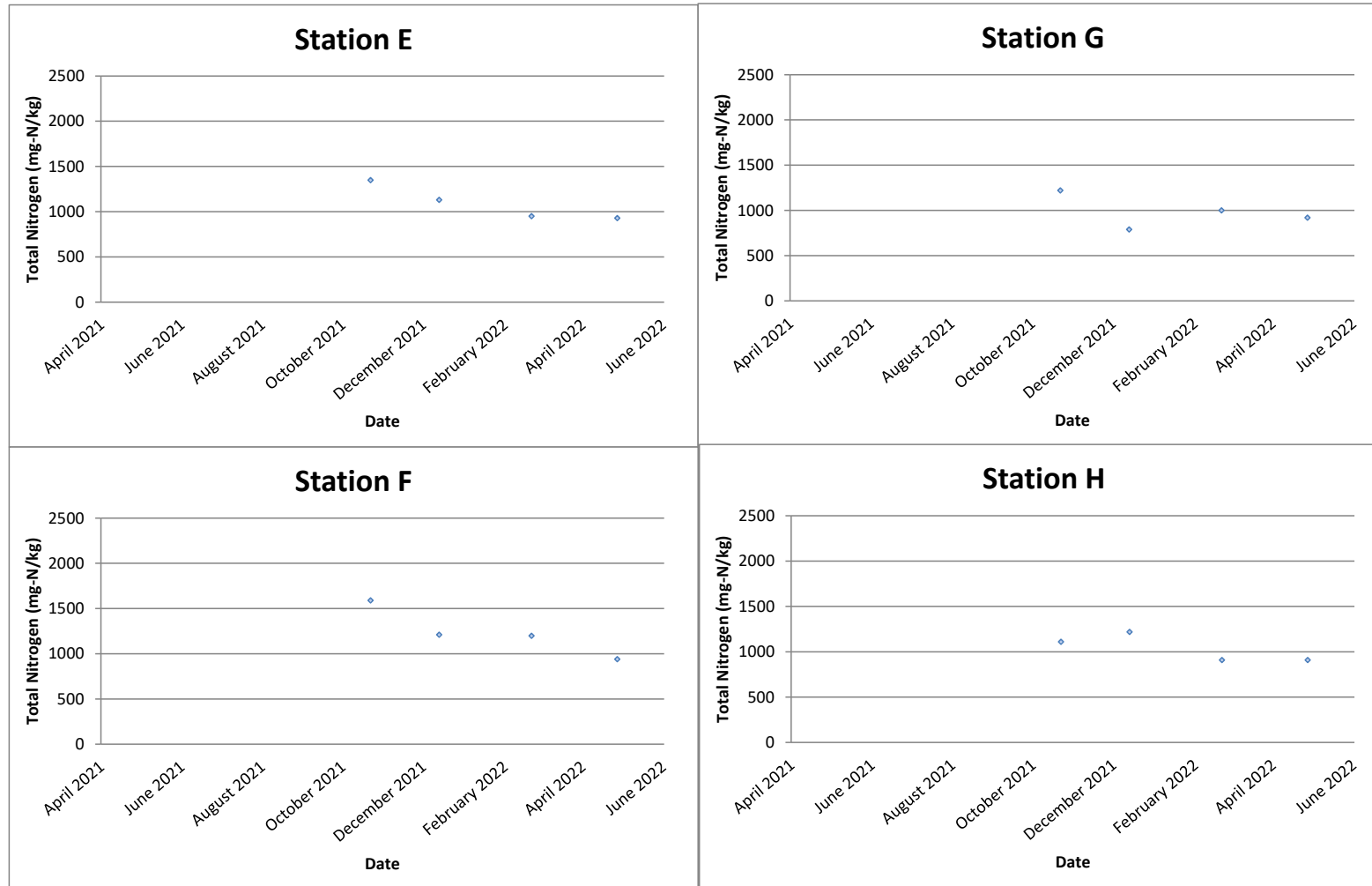
Ammonia Nitrogen (mg-N/kg)



Total Nitrogen (mg-N/kg)

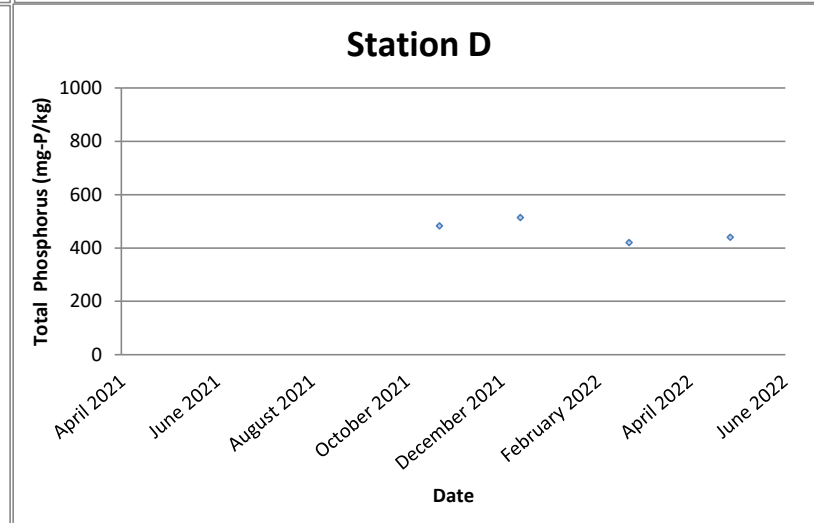
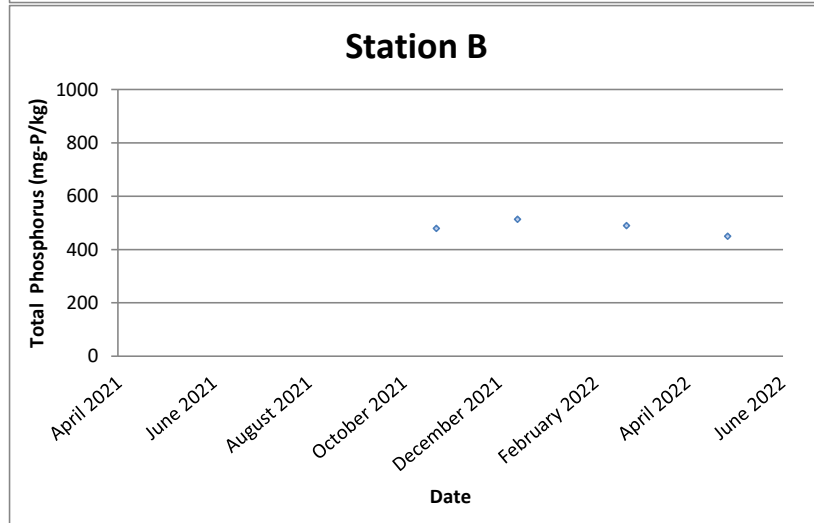
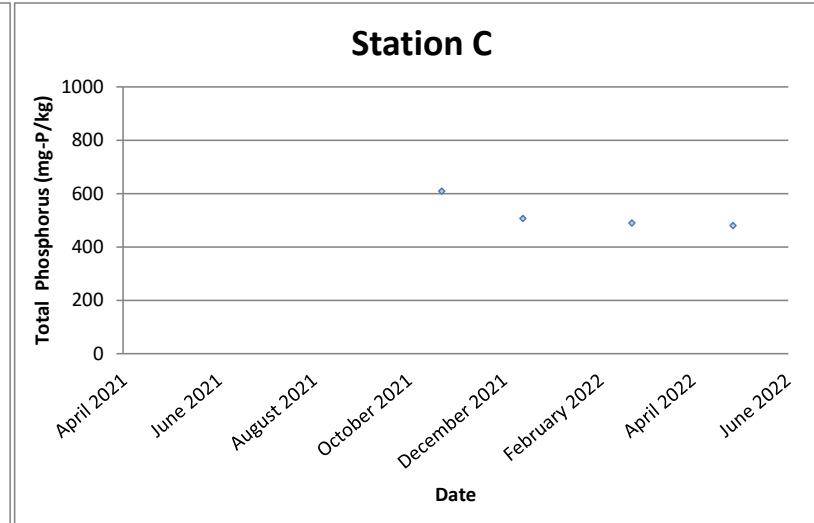
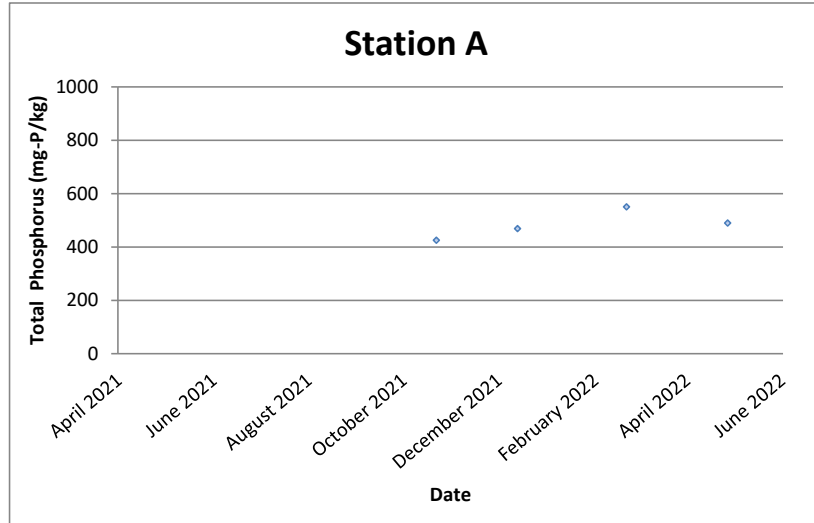


Total Nitrogen (mg-N/kg)

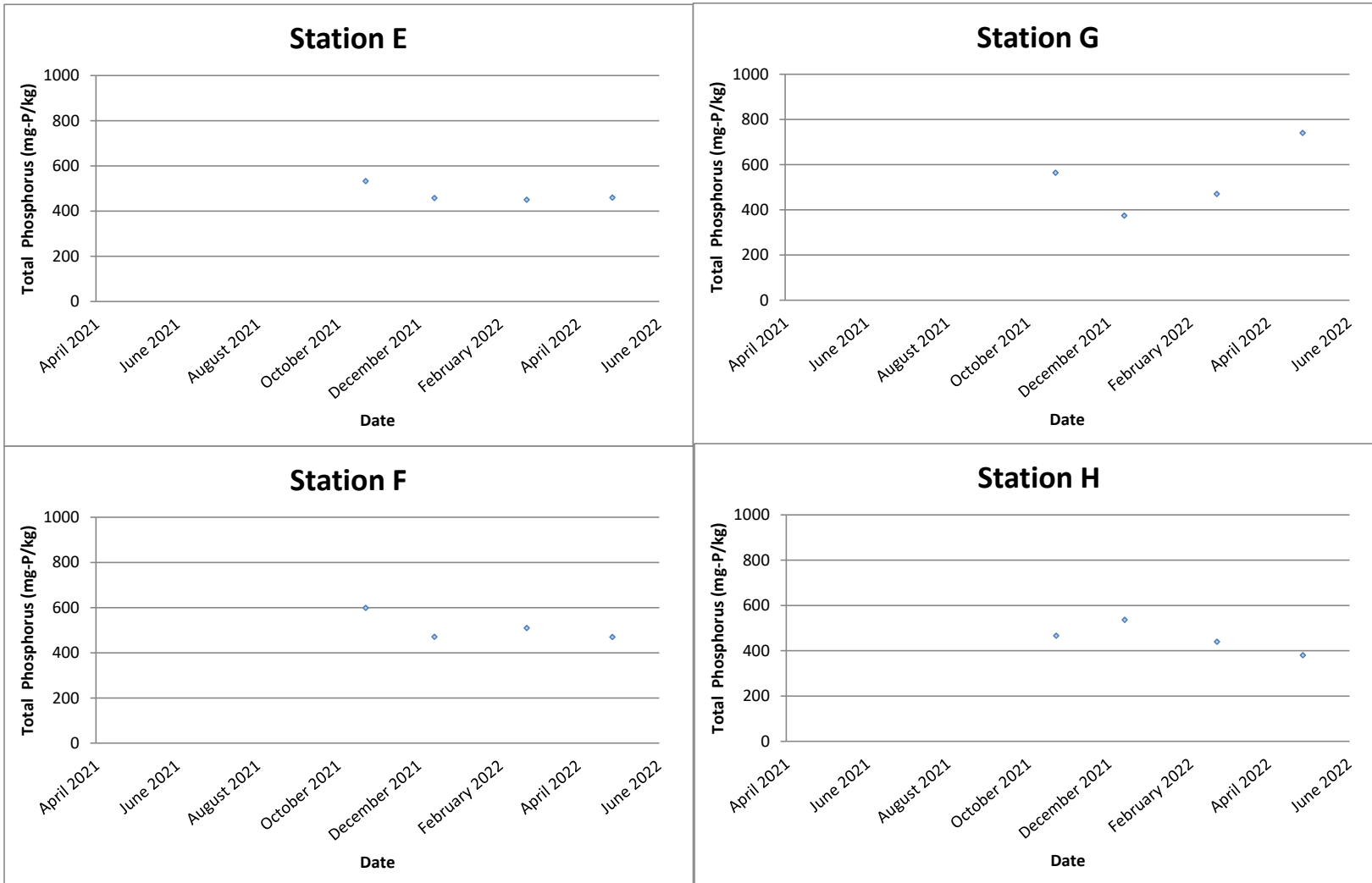




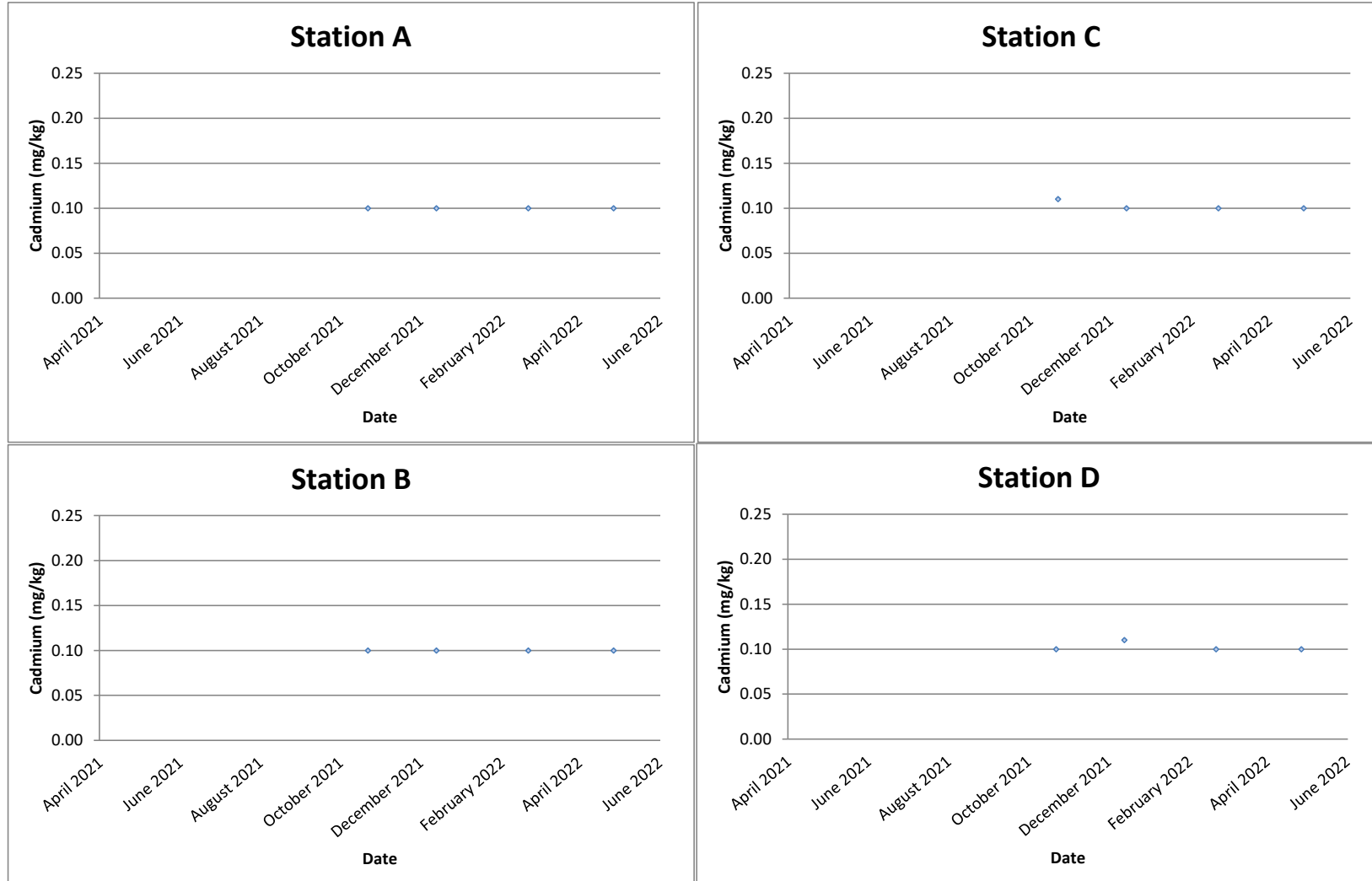
Total Phosphorus (mg-P/kg)



Total Phosphorus (mg-P/kg)

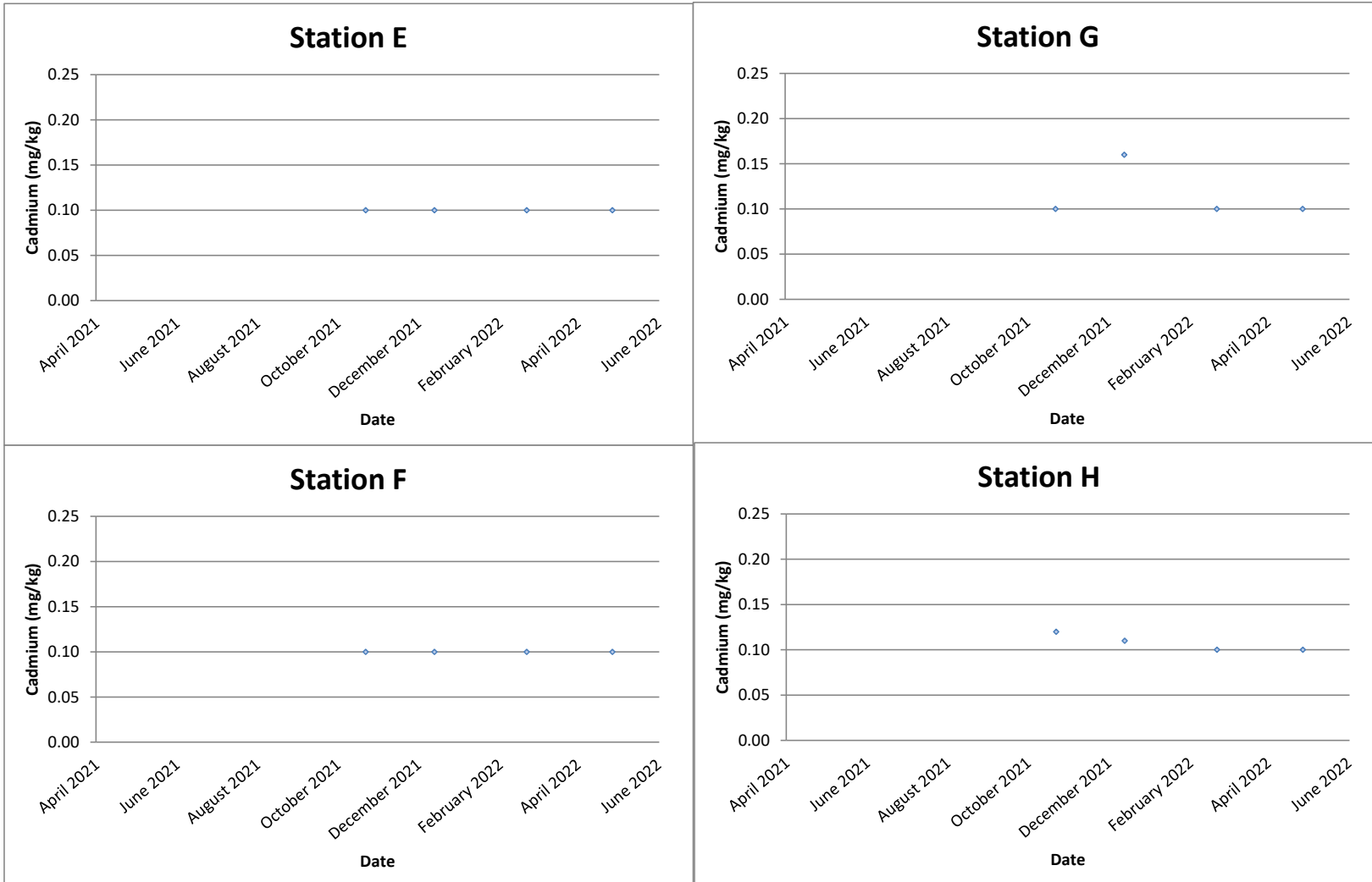


### Cadmium (mg/kg)



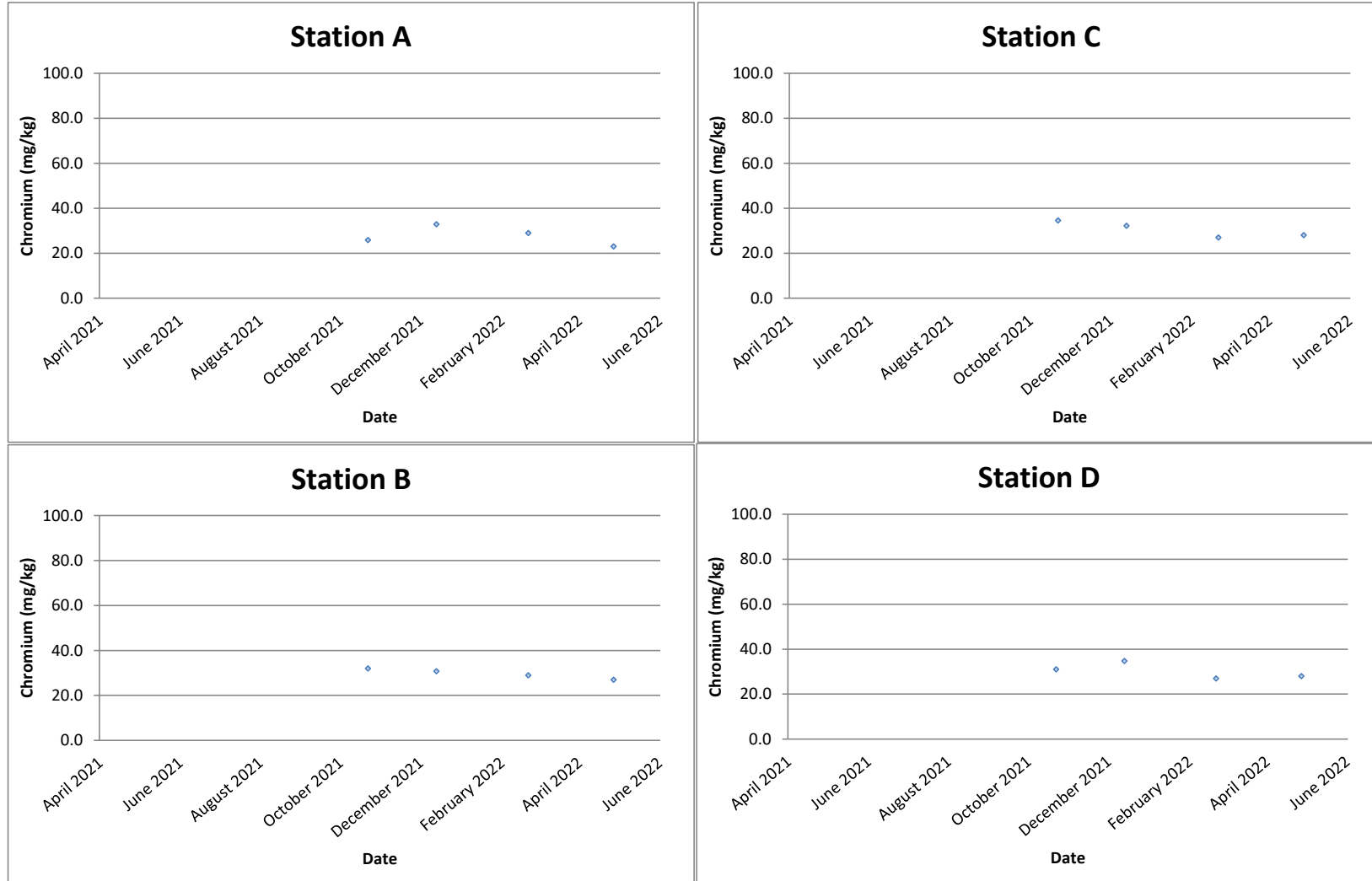
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

Cadmium (mg/kg)

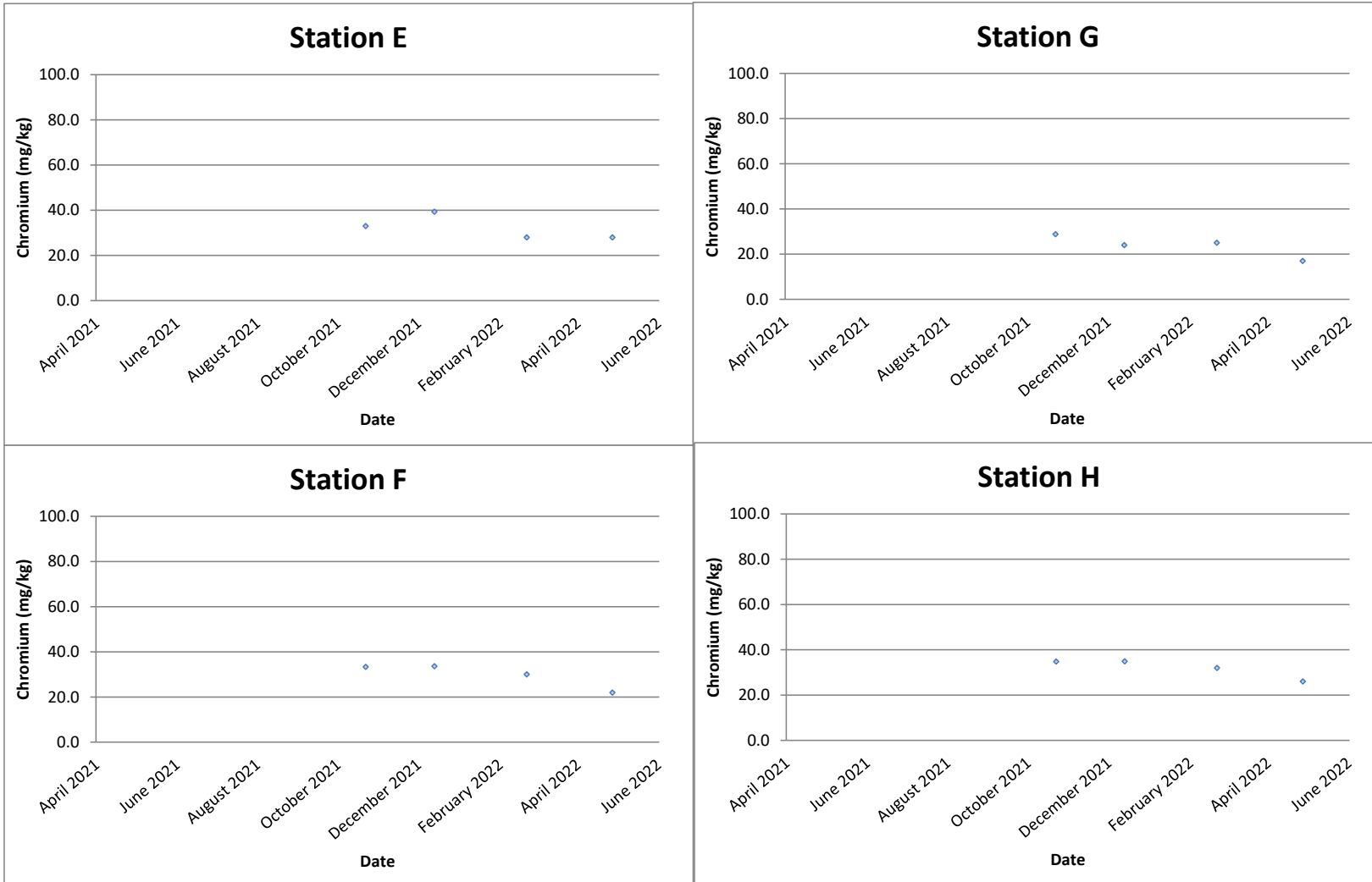


Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

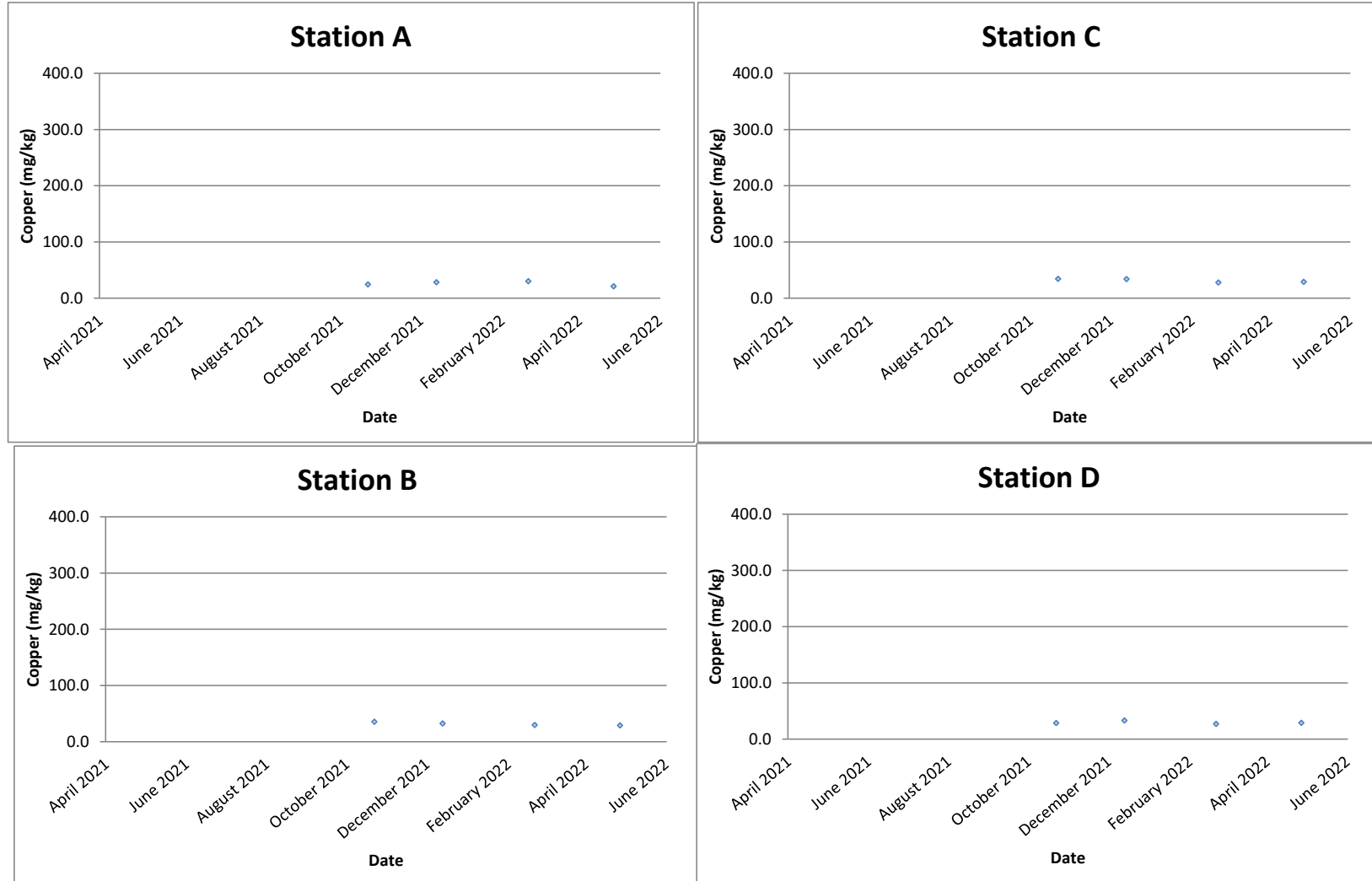
Chromium (mg/kg)



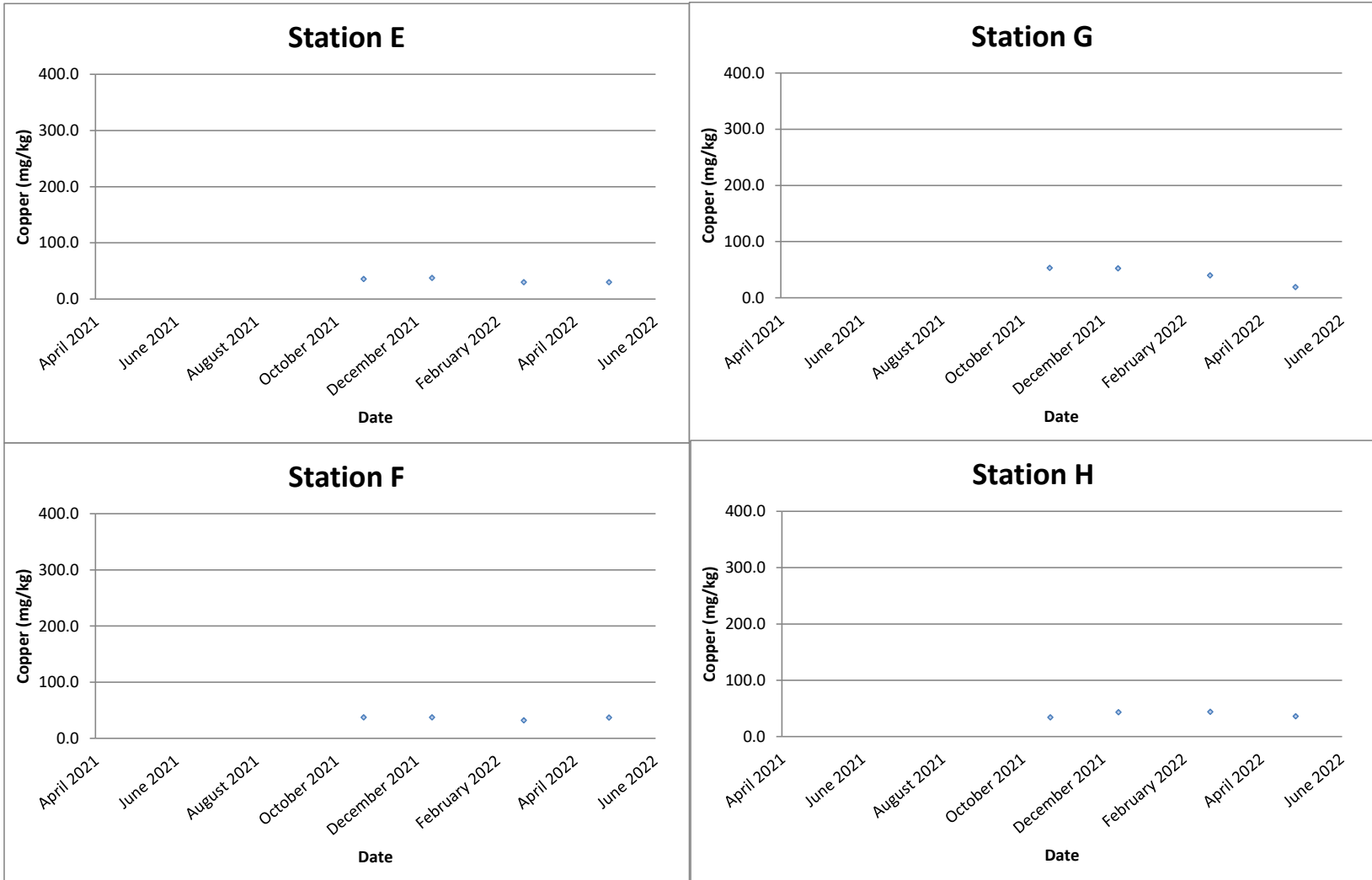
Chromium (mg/kg)



Copper (mg/kg)

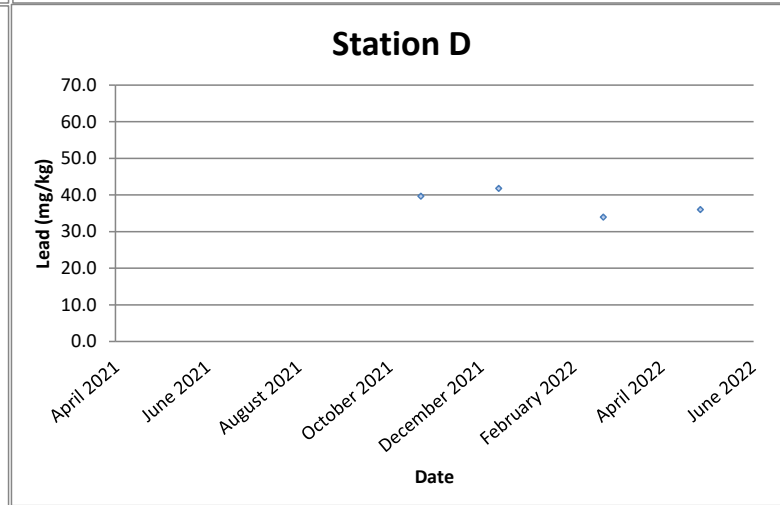
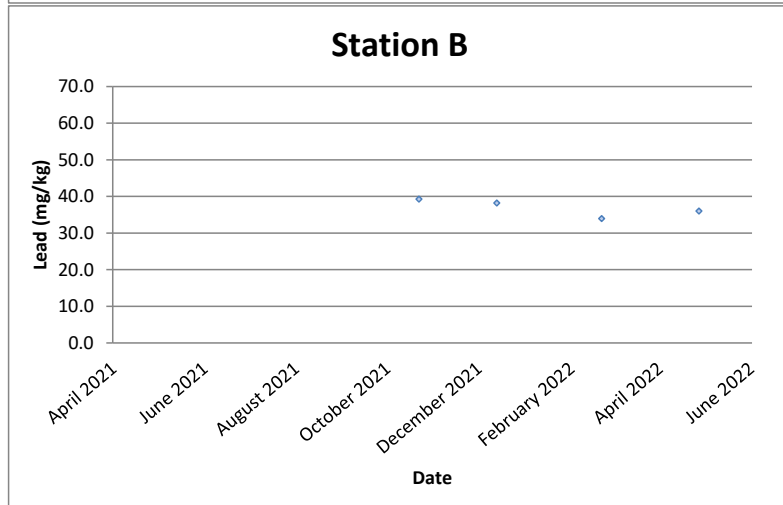
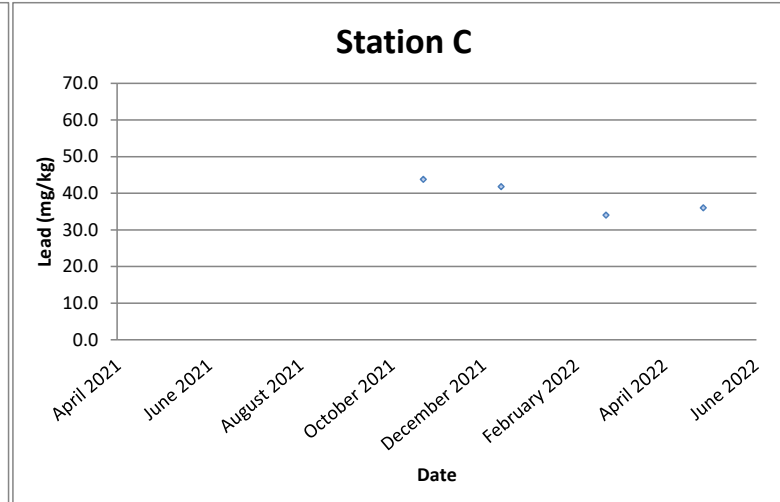
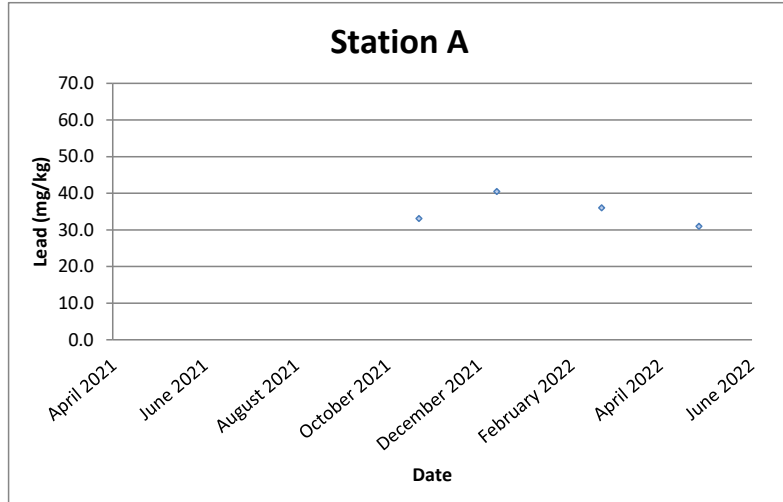


Copper (mg/kg)

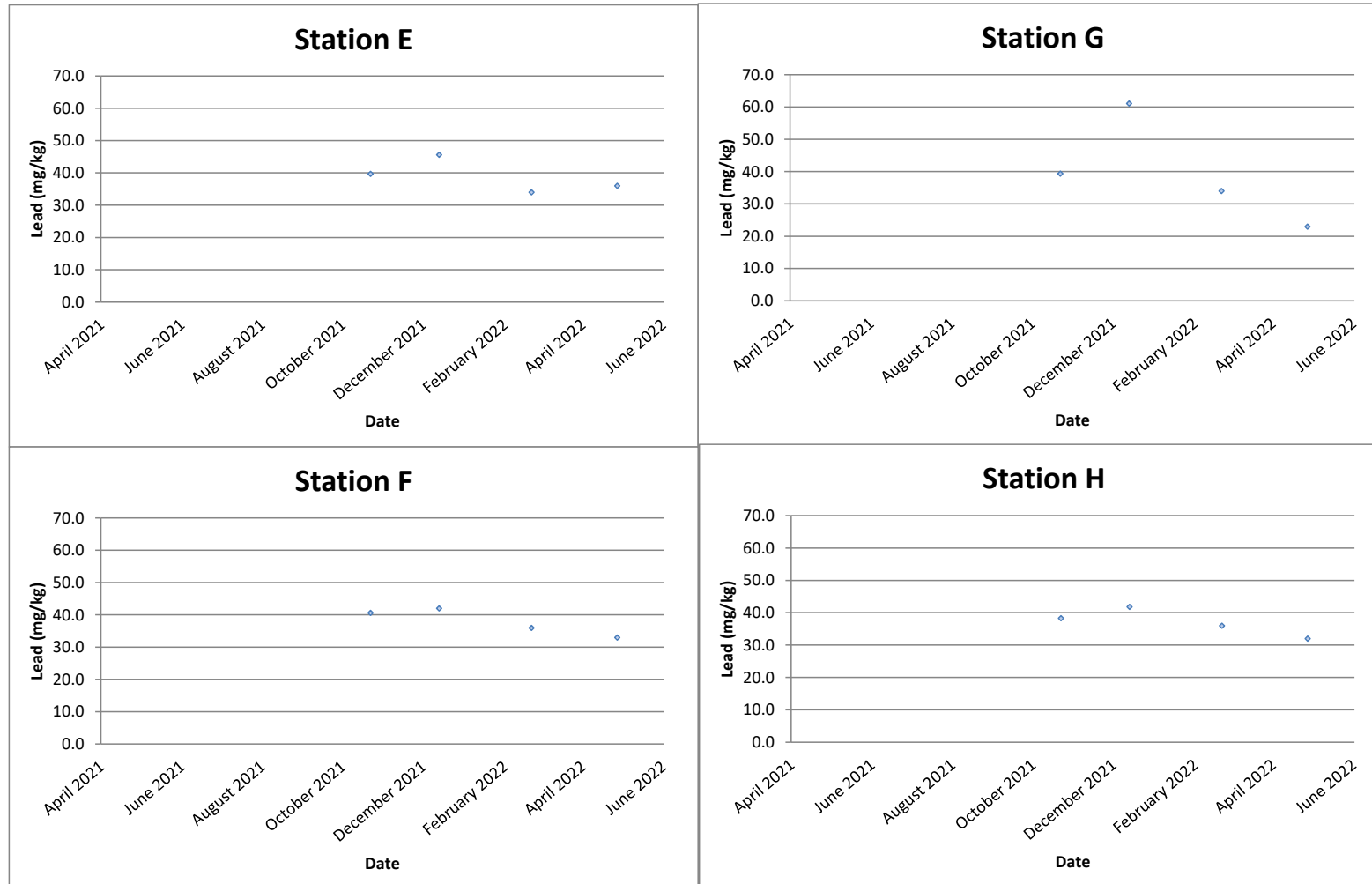




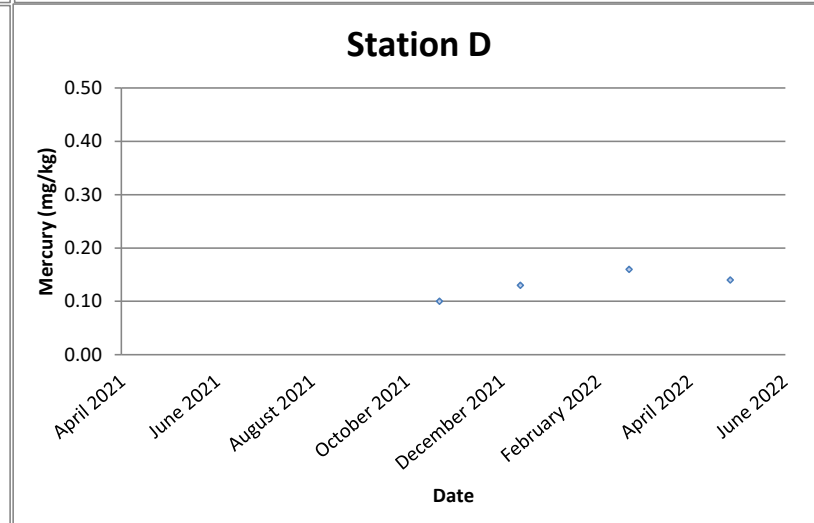
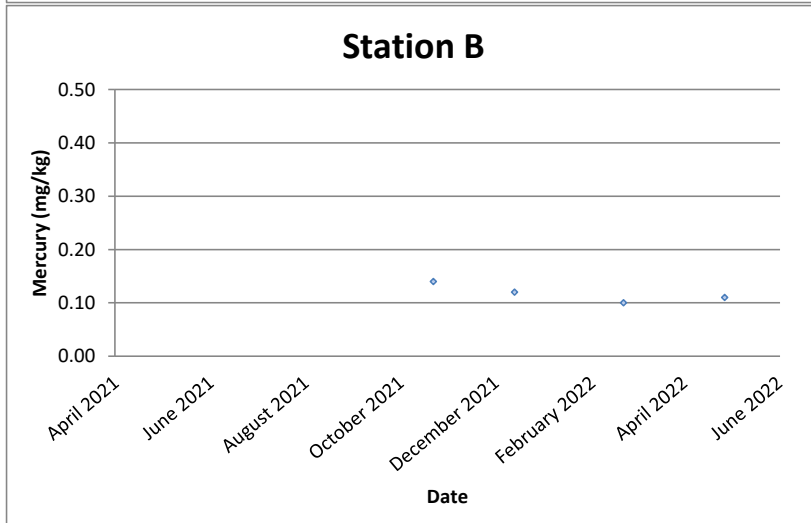
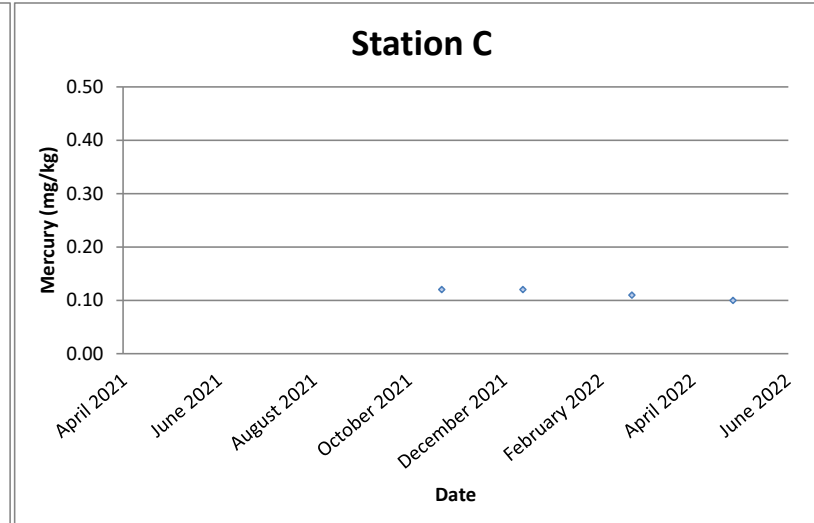
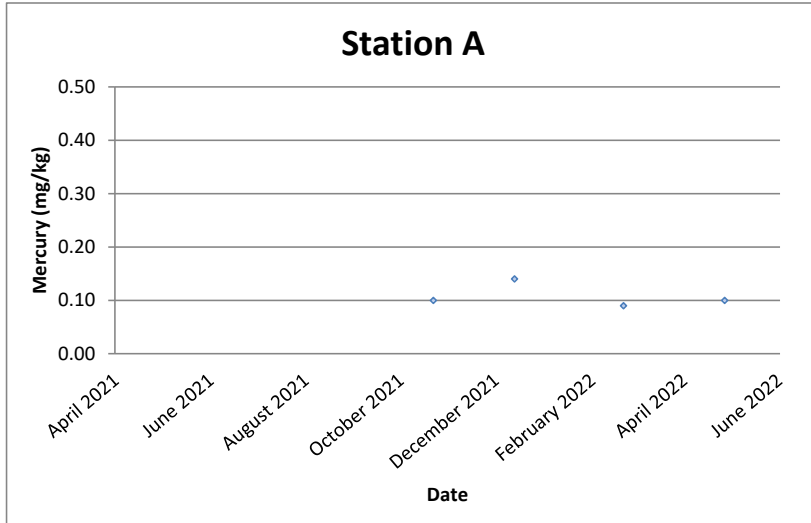
Lead (mg/kg)



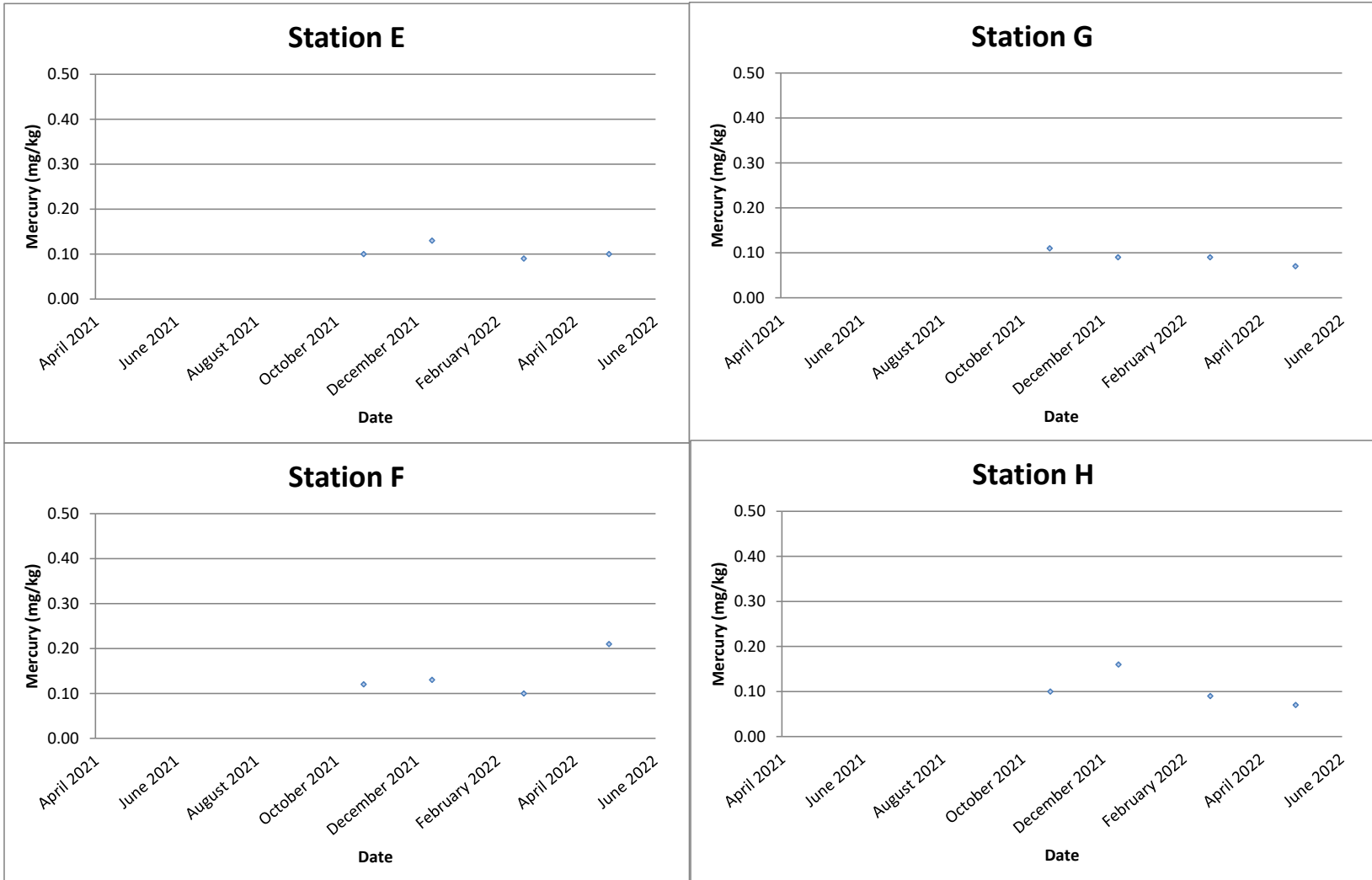
Lead (mg/kg)



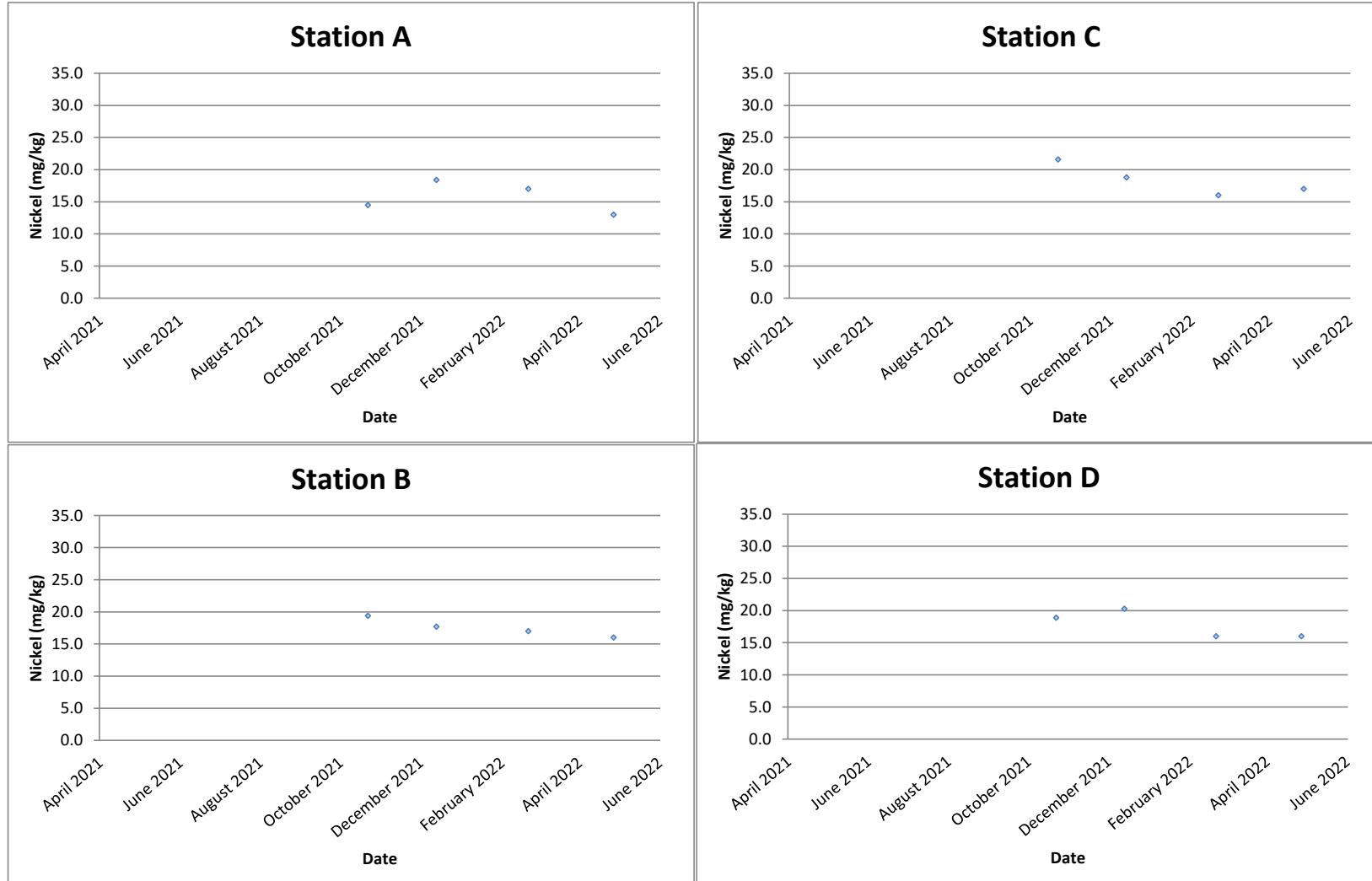
Mercury (mg/kg)



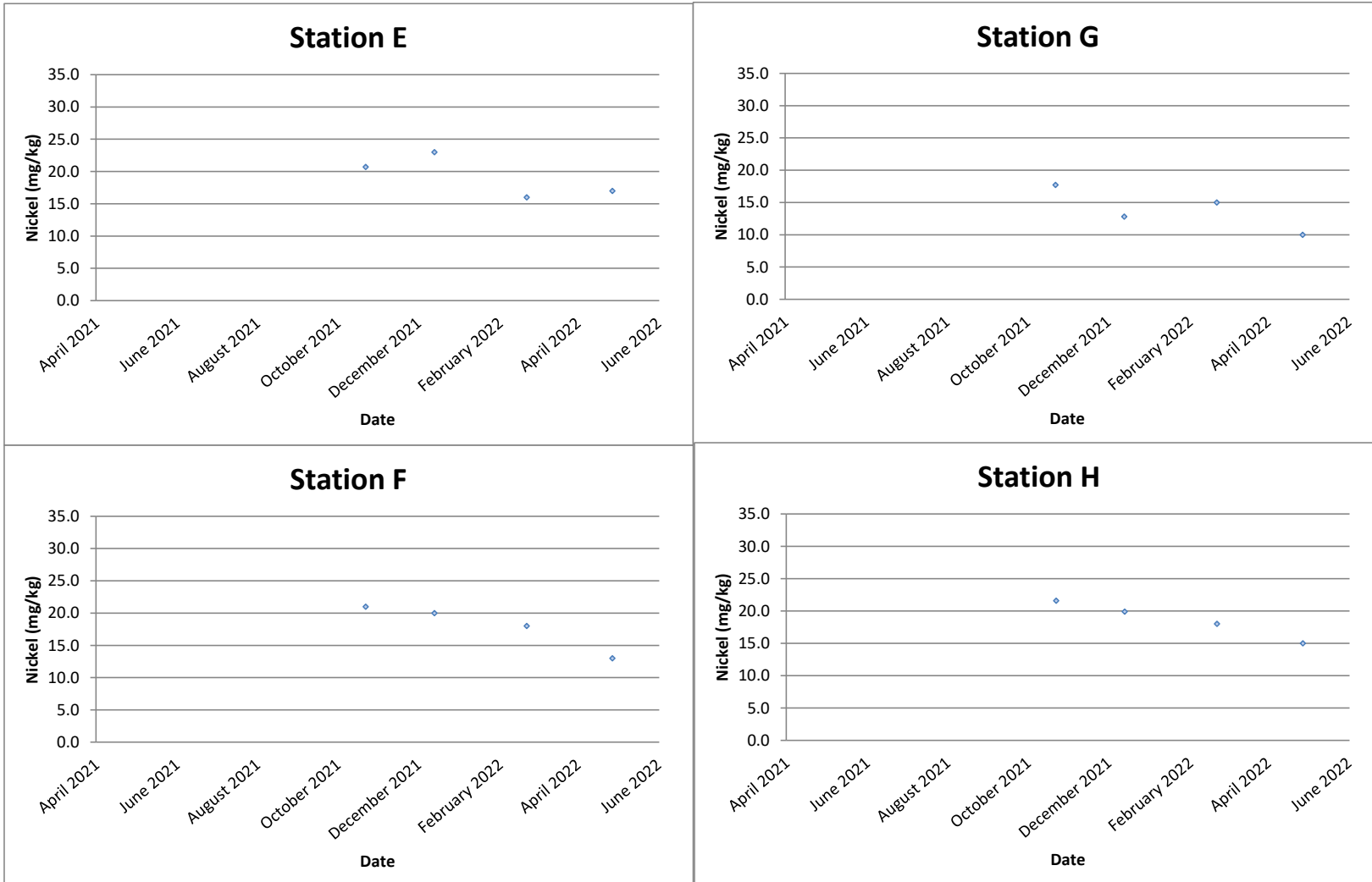
Mercury (mg/kg)



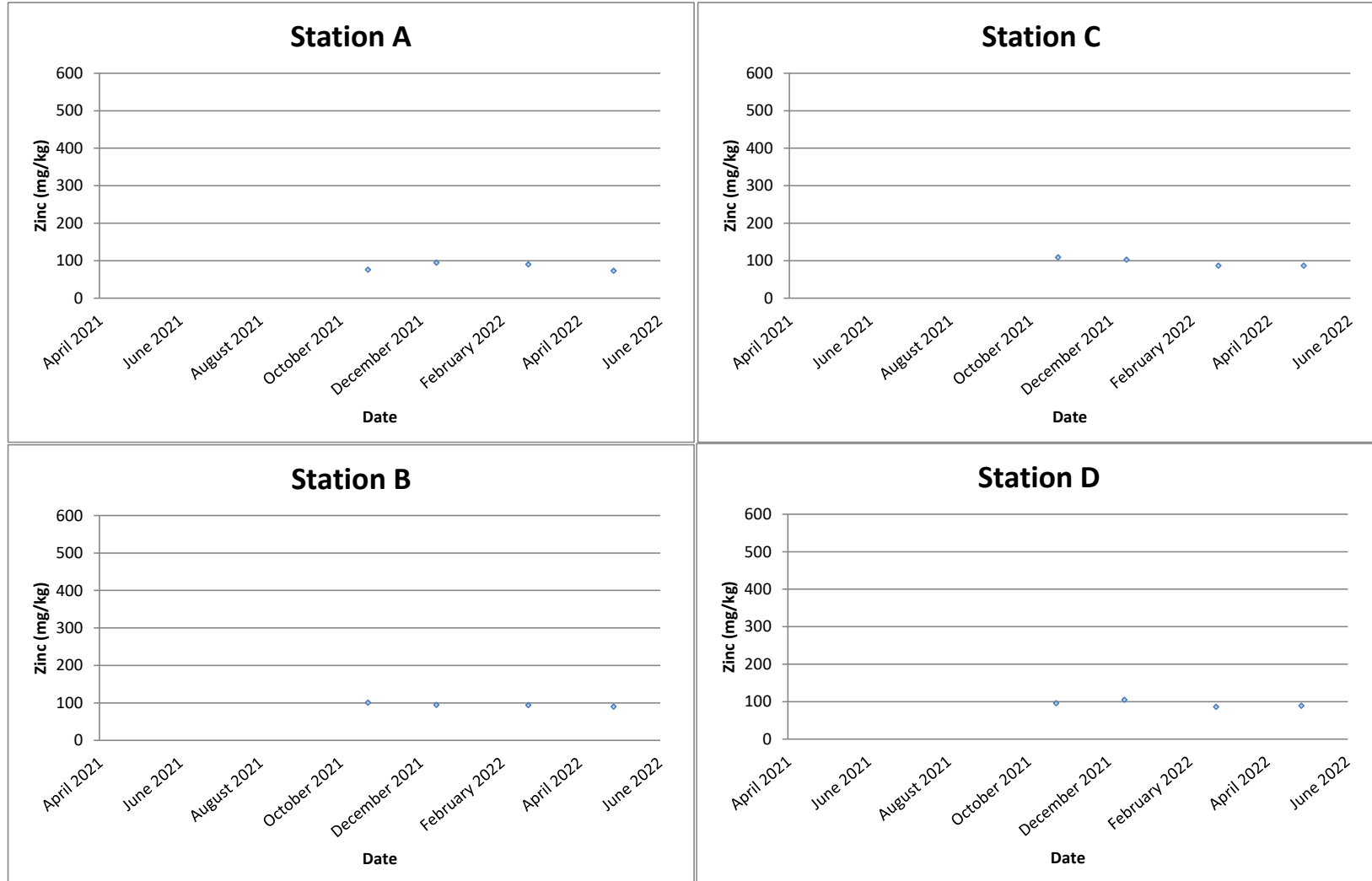
Nickel (mg/kg)



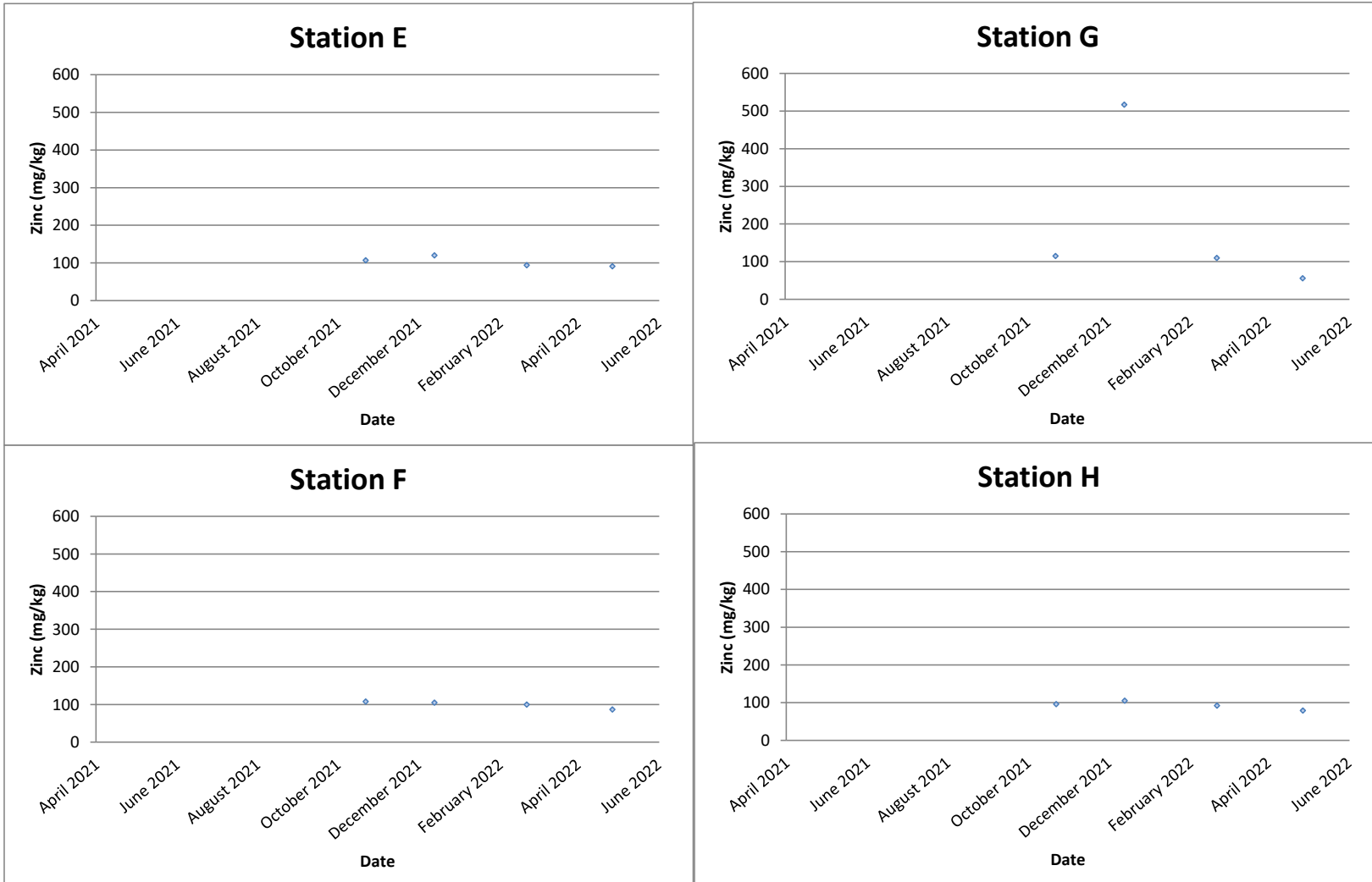
Nickel (mg/kg)



Zinc (mg/kg)

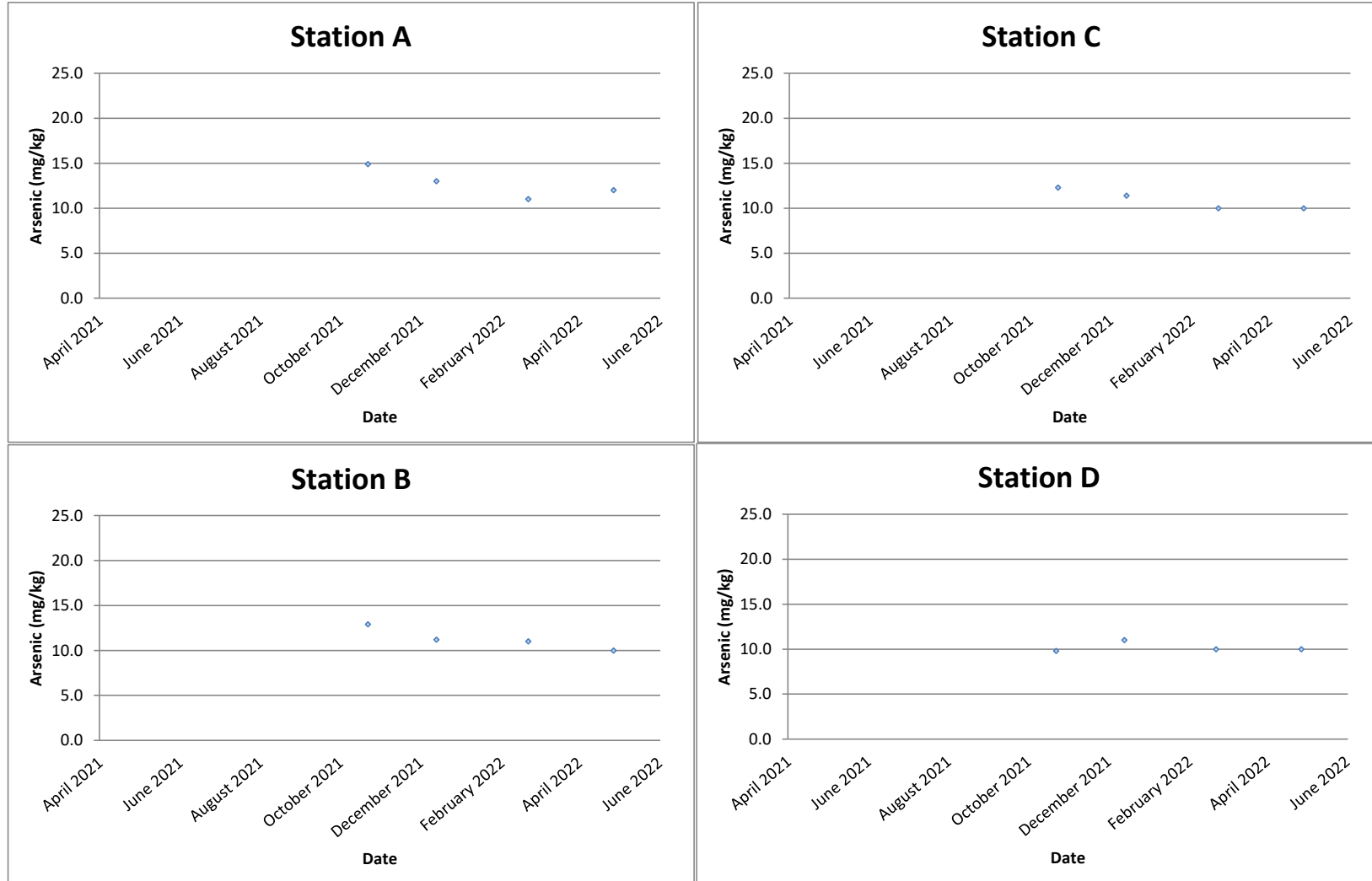


Zinc (mg/kg)

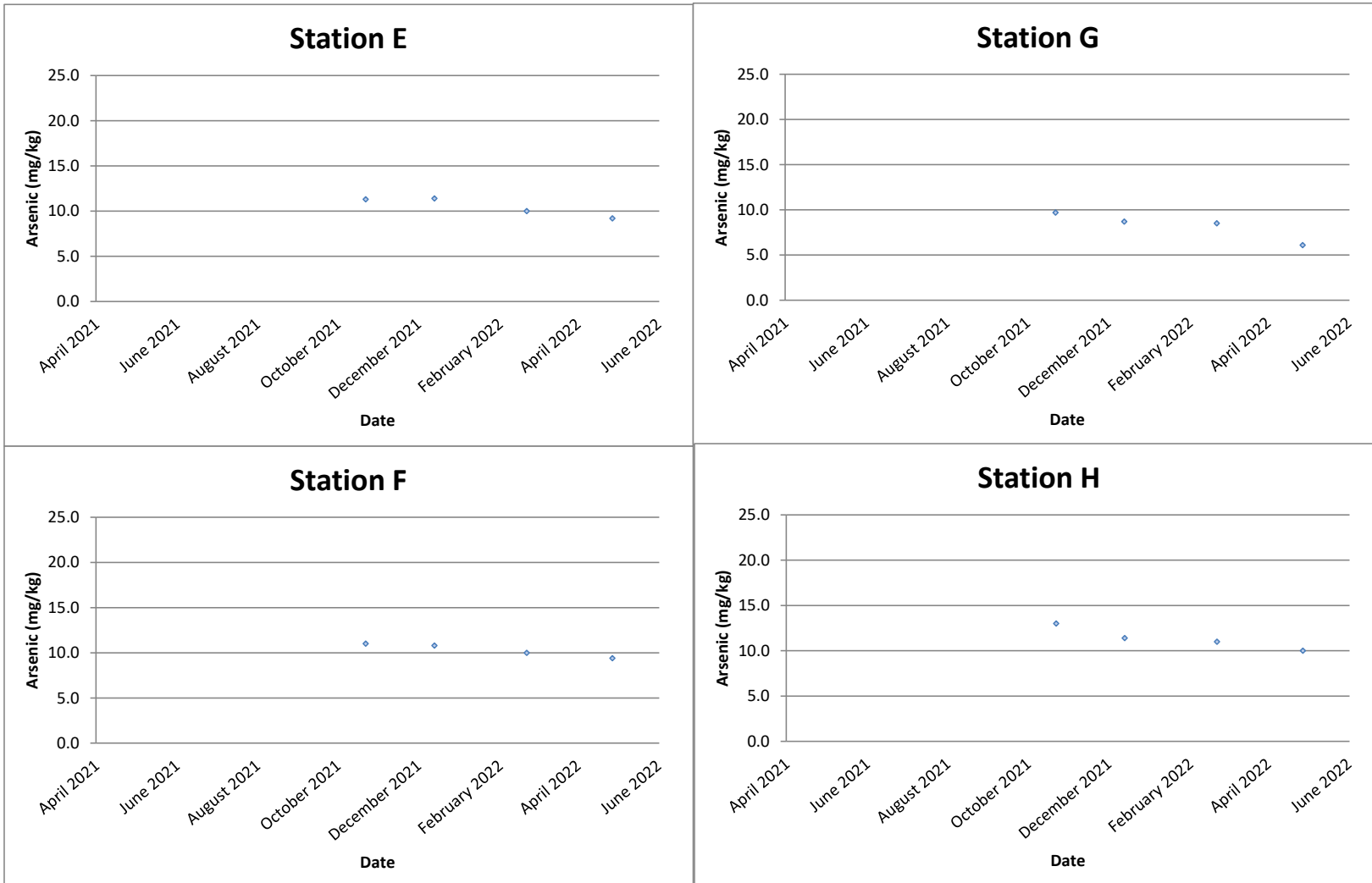




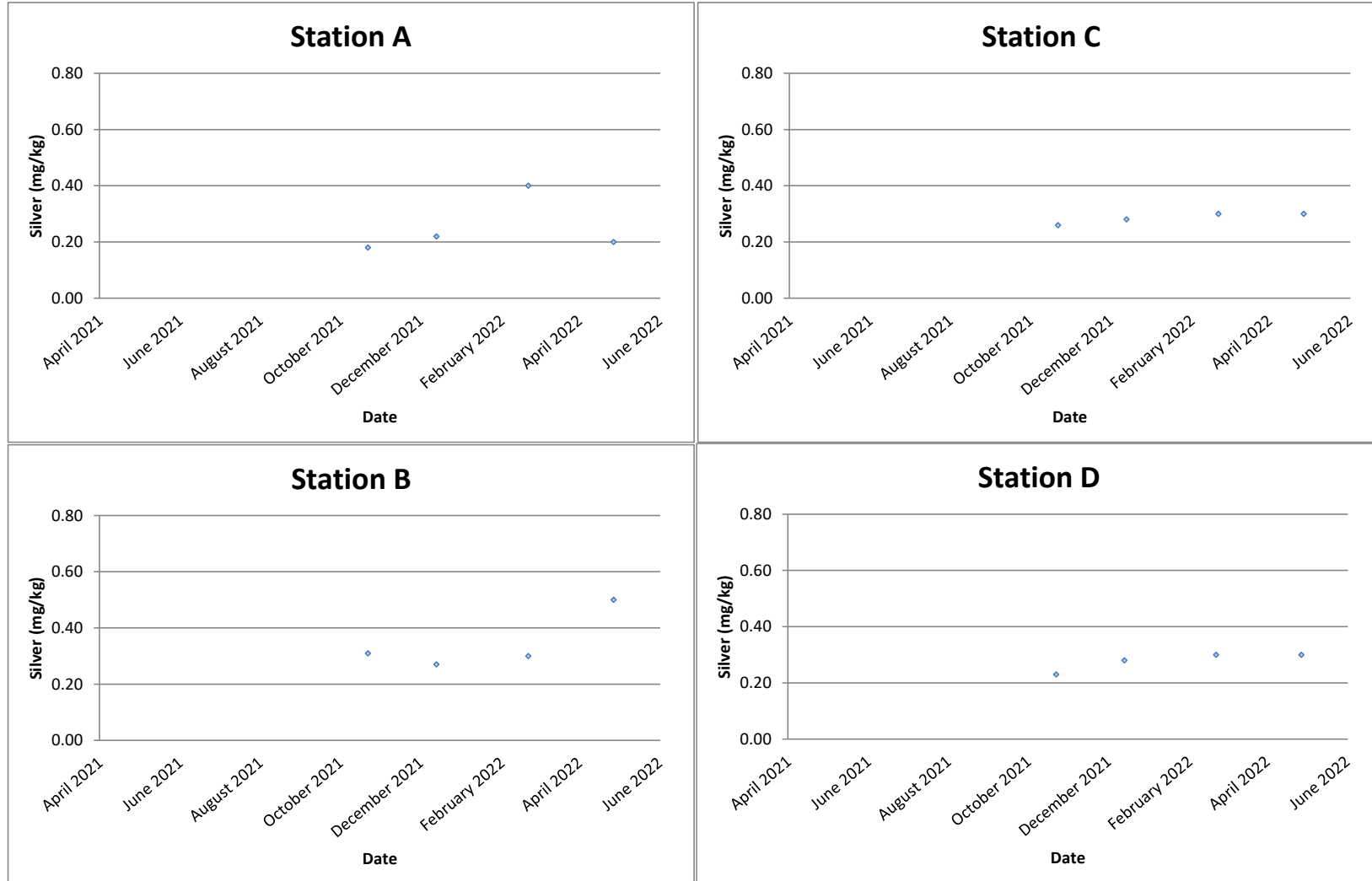
Arsenic (mg/kg)



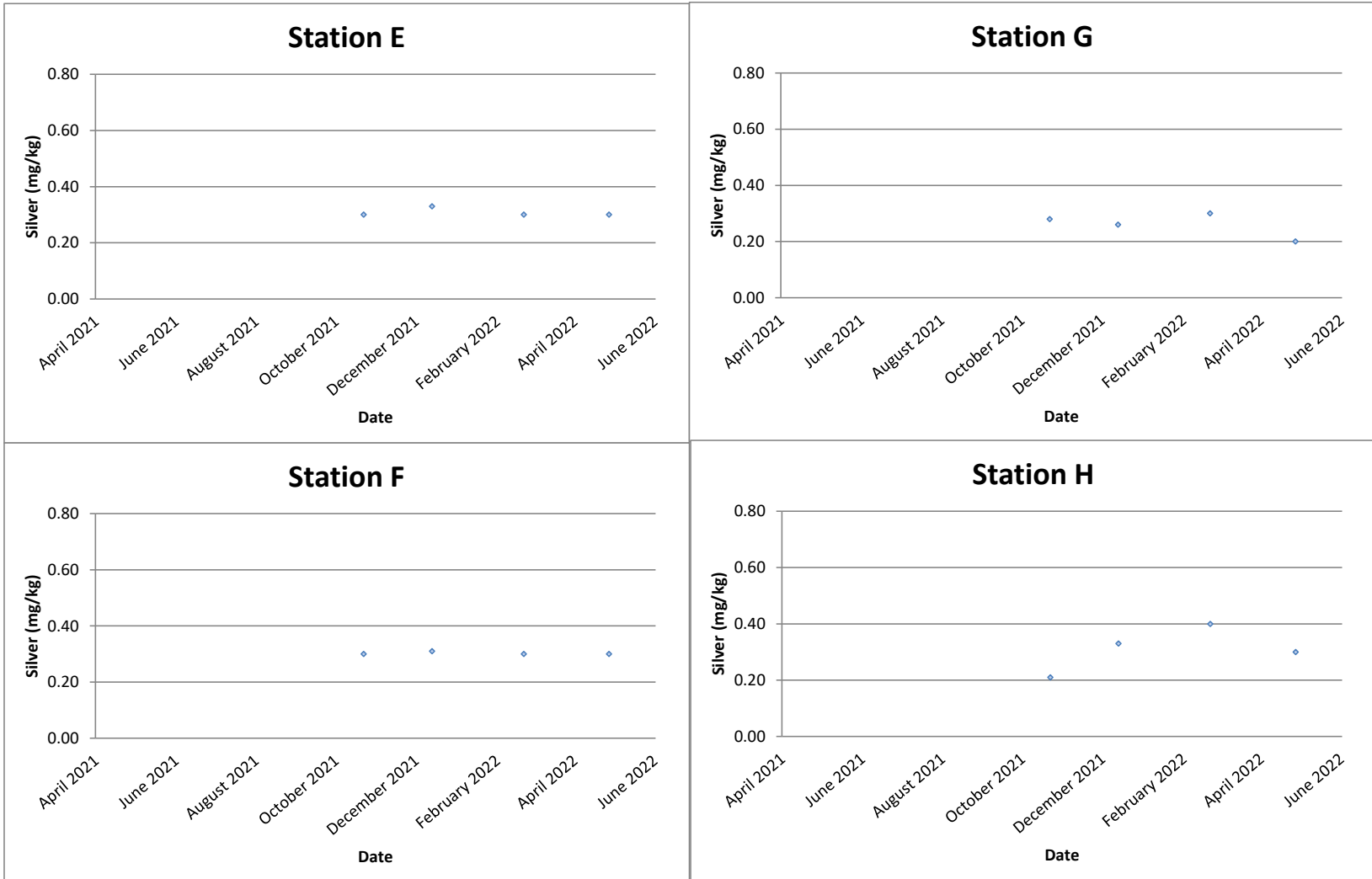
Arsenic (mg/kg)



Silver (mg/kg)



Silver (mg/kg)



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

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



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Report No.: 0041/17/ED/0670

## Appendix I Benthic Survey Report

# Benthic Survey Report (27 April 2022)

## Abundance

A total of 373 benthic organisms was recorded from the eight monitoring stations during April 2022 monitoring period. Current monitoring results showed lower total monthly abundance compared to both dry (March 2004) and wet (August 2004) seasons baseline data results (**Figure 1**). Similar with previous monitoring periods, total monthly abundance of benthic organisms exhibits significant seasonal variation (F-value = 4.54; F-crit = 1.55; p-value = 3.72E-10;  $\alpha$  = 0.05).

In terms of spatial distribution, the lowest abundance of 28 ind. was recorded in the reference station, Station G, while the highest (85 ind.) was also noted in other reference station, Station E (**Figure 2**). Total macrobenthic abundances, similar with the previous monitoring periods, showed statistically significant spatial distribution (F-value = 3.43; F-crit = 2.05; P-value = 0.002;  $\alpha$  = 0.05).

## Biomass

The total wet biomass recorded in the eight monitoring stations was 26.05 g with the highest biomass recorded in the reference station, Station E (11.26 g) while the lowest biomass was observed in another reference station, Station G (0.49 g). Relative to the February 2022 period, a general decrease in biomass was observed during the current monitoring period (**Figure 3**). Most of the current decrease was attributed to the absence of *Trypauchen* (*T. vagina*) in the benthic community.

## Taxonomic Composition

A total of six phyla comprising of 24 families and about 28 genera were identified. During the current monitoring period, the molluscs (37.27%) dominated the macrobenthic assemblage, followed by the annelids (33.78%), and arthropods (26.54%) (**Figure 4**). Relative to February 2022 community assemblage, current results showed a shift to molluscs-dominated community.

Currently, a shift in the community assemblage was noted as shift in season started (from dry season to wet season).

## Diversity

Benthic diversity index ( $H'$ ) in the impact stations ranged from 1.71 to 2.03. In the reference stations,  $H'$  values ranged from 1.74 to 2.46. Currently, reference station, Station A had the highest diversity value among the different monitoring stations, while the lowest was the impact station, Station D. In terms of evenness index ( $J$ ) values, impact Stations C and D were noted with relatively high values as compared to reference stations G, and H. Moreover, current monitoring results indicated an overall increase in both diversity and evenness values from the baseline survey condition.

## Summary Tables

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 assemblages and specimen are shown in the last pages of this benthic survey report.

# Figures

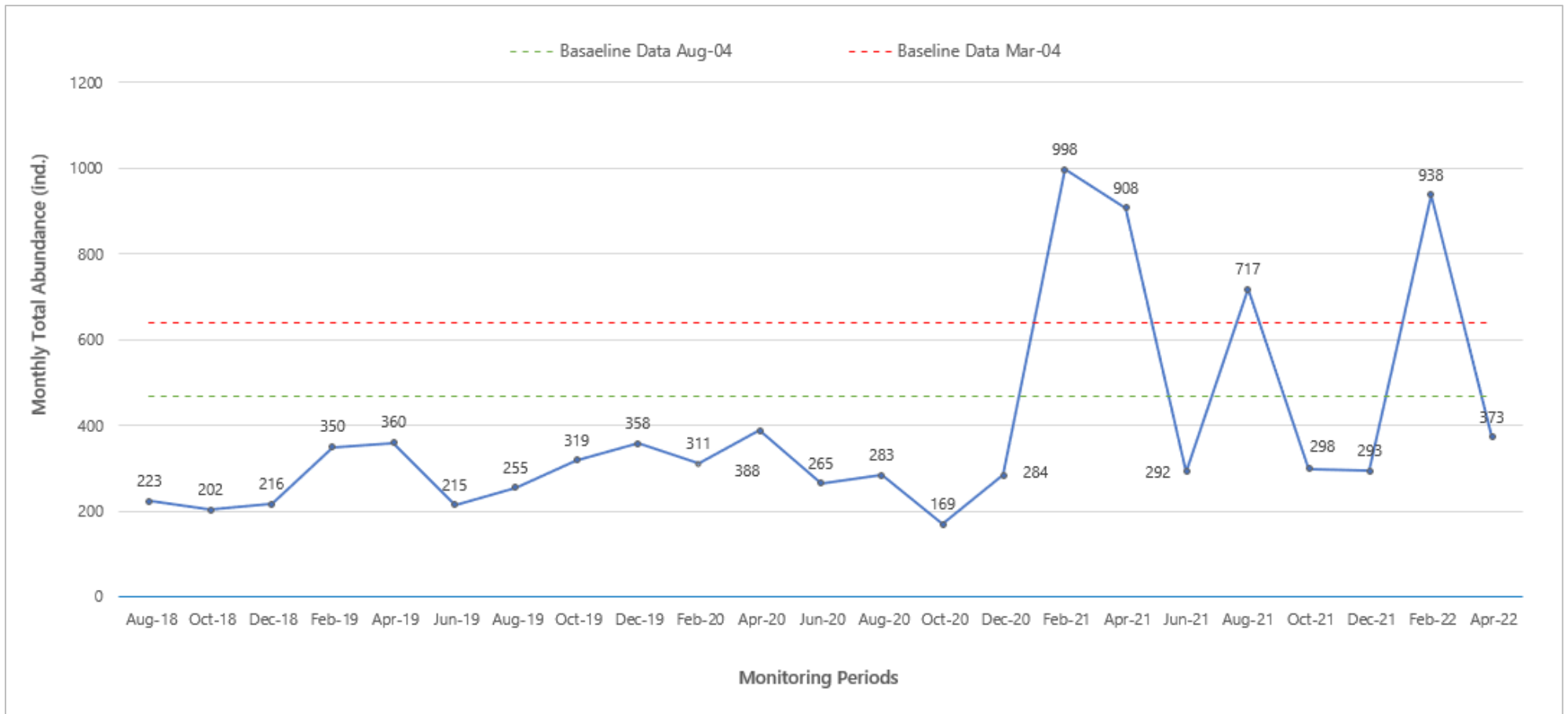


Figure 1: Monthly total abundance (ind.) of benthic organisms across monitoring periods



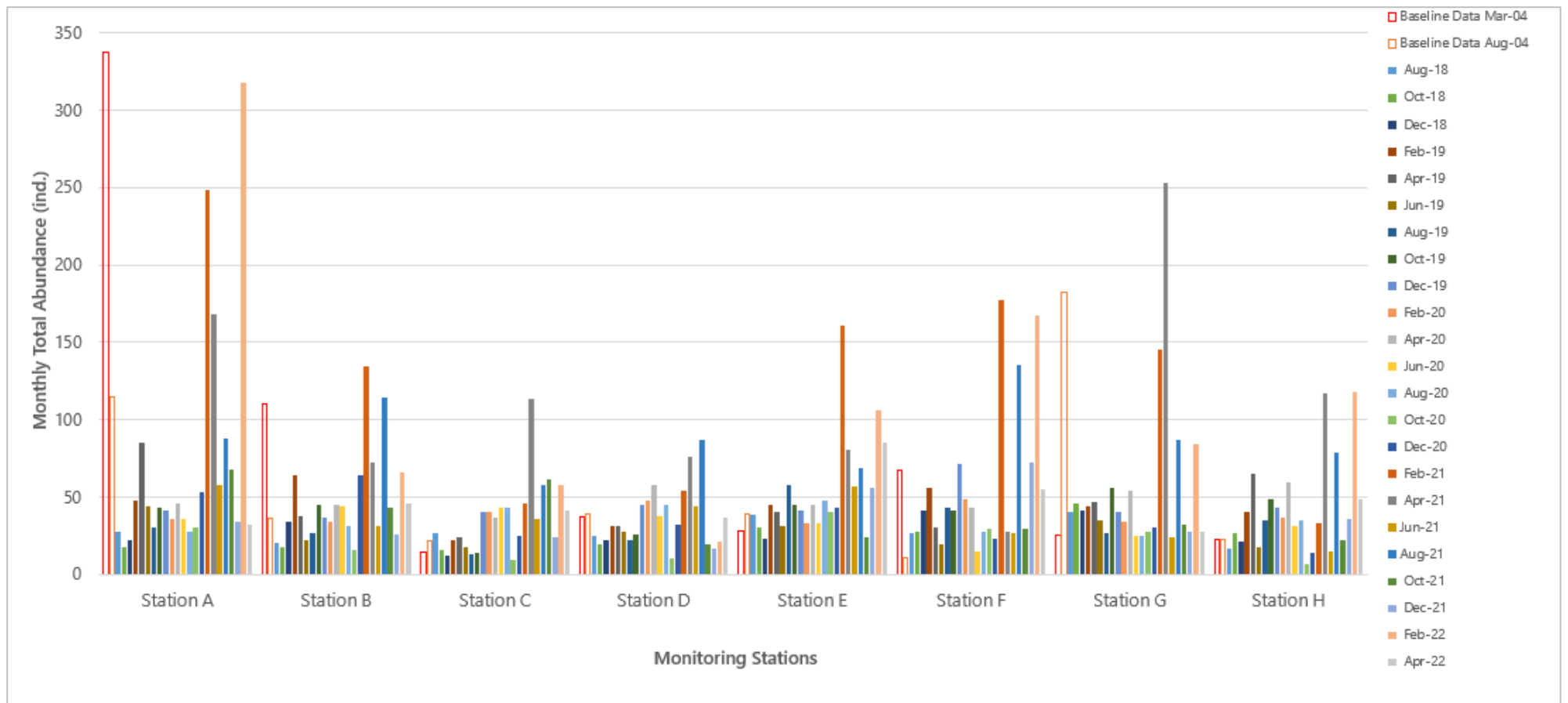


Figure 2: Monthly total abundance (ind.) of benthic organisms across monitoring stations

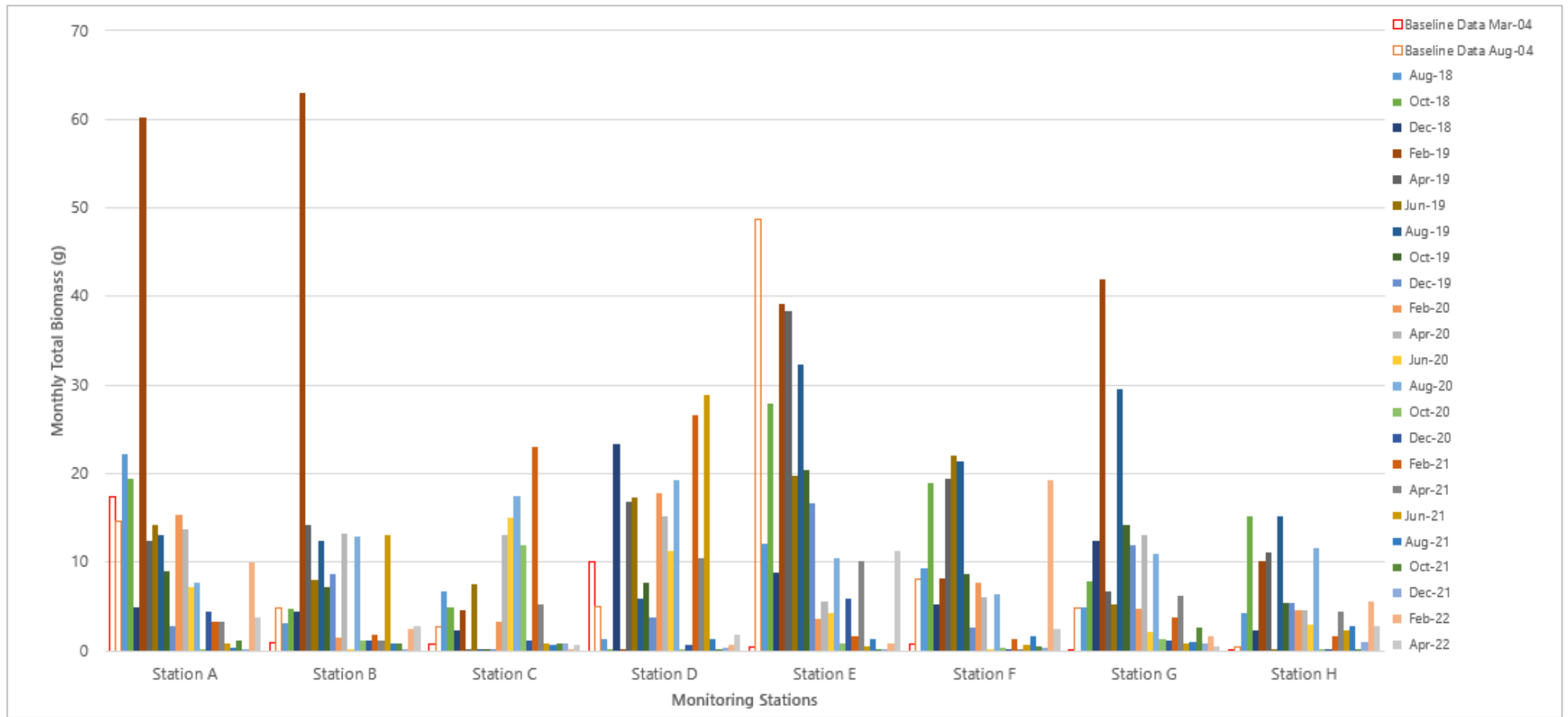


Figure 3: Monthly total biomass (g) of benthic organisms across monitoring stations

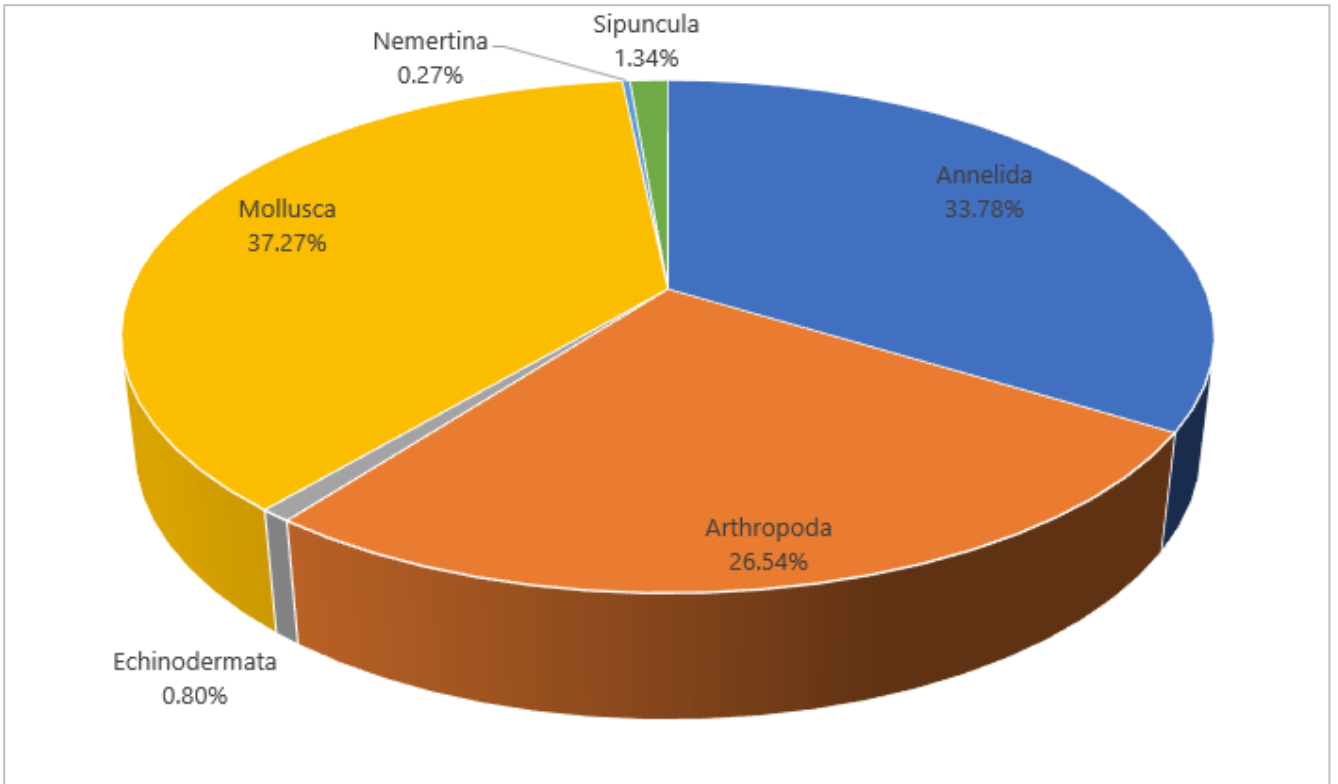


Figure 4: Percent composition of benthic organisms

# Data Summaries

Table 1: Abundance (ind.) of macrobenthic communities in the eight monitoring stations, 27 April 2022

Phylum	Class	Order	Family	Genus	Monitoring Stations							
					A	B	C	D	E	F	G	H
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Aglaophamus (A. lyrochaeta)</i>	2		1	1			2	2
Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Sigambra</i>	2							
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella</i>		8	9		14			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella (C. capitata)</i>		4	2		6			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Mediomastus</i>	2							
Annelida	Polychaeta	Nereidida	Nereidae	<i>Neanthes</i>			1					
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Nephtys</i>	4	11	3	3	5			4
Annelida	Polychaeta	Aciculata	Nereidae	<i>Nereis</i>								1
Annelida	Polychaeta	Scolecida	Opheliidae	<i>Ophelia</i>								1
Annelida	Polychaeta	Sabellida	Oweniidae	<i>Owenia</i>	4	5	1		1	5		5
Annelida	Polychaeta	Errantia	Phyllodocidae	<i>Phyllodoce</i>		1		2			3	
Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i>	3		2				3	3
Arthropoda	Crustacea	Decapoda	Alpheidae	<i>Alpheus</i>							3	3
Arthropoda	Malacostraca	Amphipoda	Gammaridae	<i>Gammarus</i>		5	8	13	4	21	13	22
Arthropoda	Crustacea	Decapoda	Dotillidae	<i>Ilyoplax</i>	2	1						1
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	1	1					1	
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus</i>	1				2			
Mollusca	Bivalvia	Veneroida	Tellinidae	c.f. <i>Angulus</i>	6	3			6	6		3
Mollusca	Bivalvia	Cardiida	Cardiidae	<i>Cardium</i>		3		2	9	3		
Mollusca	Scaphopoda	-	Dentaliidae	-		1	1					
Mollusca	Bivalvia	Veneroida	Veneridae	c.f. <i>Meretrix (M. lusoria)</i>	1							
Mollusca	Bivalvia	Veneroida	Dreissenidae	<i>Mytilopsis</i>			1					
Mollusca	Gastropoda	Buccinoidea	Nassariidae	<i>Nassarius</i>						5		
Mollusca	Bivalvia	Veneroida	Veneridae	<i>Paphia (P. undulata)</i>	2		11	11	5	11	1	3

Mollusca	Bivalvia	Myoida	Corbulidae	<i>Potamocorbula</i>	1	2		3	27	2		1
Mollusca	Bivalvia	Veneroida	Veneridae	<i>Ruditapes (R. philippinarum)</i>					2		1	
Mollusca	Bivalvia	Veneroida	Pharellidae	<i>Sinonovacula</i>		1				2		
Mollusca	Bivalvia	Adapedonta	Solenidae	<i>Solen</i>	1				1		1	
Nemertea	Anopla	Heteronemertea	Lineidae	<i>Cerebratulus</i>					1			
Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	<i>Sipunculus</i>			1	2	2			

Table 2: Biomass (g) of macrobenthic communities in the eight monitoring stations, 27 April 2022

Phylum	Class	Order	Family	Genus	Monitoring Stations							
					A	B	C	D	E	F	G	H
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Aglaophamus (A. lyrochaeta)</i>	0.014		0.005	0.005			0.001	0.001
Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Sigambra</i>	0.005							
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella</i>		0.027	0.025		0.041			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella (C. capitata)</i>		0.013	0.007		0.020			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Mediomastus</i>	0.003							
Annelida	Polychaeta	Nereidida	Nereidae	<i>Neanthes</i>			0.006					
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Nephtys</i>	0.029	0.079	0.025	0.022	0.036			0.029
Annelida	Polychaeta	Aciculata	Nereidae	<i>Nereis</i>								0.005
Annelida	Polychaeta	Scolecida	Opheliidae	<i>Ophelia</i>								0.136
Annelida	Polychaeta	Sabellida	Oweniidae	<i>Owenia</i>	0.056	0.075	0.014		0.015	0.075		0.076
Annelida	Polychaeta	Errantia	Phyllodocidae	<i>Phyllodoce</i>		0.001		0.003			0.004	
Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i>	0.003		0.003				0.003	0.004
Arthropoda	Crustacea	Decapoda	Alpheidae	<i>Alpheus</i>							0.006	0.008
Arthropoda	Malacostraca	Amphipoda	Gammaridae	<i>Gammarus</i>		0.006	0.007	0.014	0.004	0.022	0.013	0.025
Arthropoda	Crustacea	Decapoda	Dotillidae	<i>Ilyoplax</i>	2.235	1.163						0.393
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	0.153	0.146					0.132	
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus</i>	0.030				0.005			
Mollusca	Bivalvia	Veneroida	Tellinidae	c.f. <i>Angulus</i>	0.329	0.162			0.398	0.354		0.164
Mollusca	Bivalvia	Cardiida	Cardiidae	<i>Cardium</i>		0.489		0.321	1.422	0.451		

Mollusca	Scaphopoda	-	Dentaliidae	-		0.036	0.093					
Mollusca	Bivalvia	Veneroidea	Veneridae	<i>c.f. Meretrix (M. lusoria)</i>	0.098							
Mollusca	Bivalvia	Veneroidea	Dreissenidae	<i>Mytilopsis</i>			0.035					
Mollusca	Gastropoda	Buccinoidea	Nassariidae	<i>Nassarius</i>						0.495		
Mollusca	Bivalvia	Veneroidea	Veneridae	<i>Paphia (P. undulata)</i>	0.090		0.493	0.510	0.224	0.487	0.031	0.135
Mollusca	Bivalvia	Myoidea	Corbulidae	<i>Potamocorbula</i>	0.282	0.564		0.842	7.623	0.564		1.896
Mollusca	Bivalvia	Veneroidea	Veneridae	<i>Ruditapes (R. philippinarum)</i>					0.234		0.123	
Mollusca	Bivalvia	Veneroidea	Pharellidae	<i>Sinonovacula</i>		0.016				0.032		
Mollusca	Bivalvia	Adapedonta	Solenidae	<i>Solen</i>	0.375				1.202		0.177	
Nemertea	Anopla	Heteronemertea	Lineidae	<i>Cerebratulus</i>					0.001			
Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	<i>Sipunculus</i>			0.013	0.028	0.030			
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Aglaophamus (A. lyrochaeta)</i>	0.014		0.005	0.005			0.001	0.001
Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Sigambra</i>	0.005							
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella</i>		0.027	0.025		0.041			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Capitella (C.capitata)</i>		0.013	0.007		0.020			
Annelida	Polychaeta	Capitellida	Capitellidae	<i>Mediomastus</i>	0.003							
Annelida	Polychaeta	Nereidida	Nereidae	<i>Neanthes</i>			0.006					
Annelida	Polychaeta	Nereidida	Nephtyidae	<i>Nephtys</i>	0.029	0.079	0.025	0.022	0.036			0.029
Annelida	Polychaeta	Aciculata	Nereidae	<i>Nereis</i>								0.005
Annelida	Polychaeta	Scolecida	Opheliidae	<i>Ophelia</i>								0.136

Table 3: Summary of Benthic Survey Data, 27 April 2022

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	32	3.70	14	2.46	0.93
B	46	2.78	13	2.25	0.88
C*	41	0.73	12	2.03	0.82
D*	37	1.75	8	1.71	0.82
E	85	11.26	14	2.17	0.82
F	55	2.48	8	1.77	0.85
G	28	0.49	9	1.74	0.79
H	49	2.87	12	1.93	0.78

\*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	0.3
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 sites

Table 6: Taxonomic Composition (%) of Benthic Survey

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

Taxa	Feb-21	Apr-21	Jun-21	Aug-21	Oct-21	Dec-21	Feb-22	Apr-22
Annelida	22.75	31.72	73.63	78.52	64.43	45.05	15.57	33.78
Sipuncula	0.70	0.00	0.34	0.00	8.05	0.00	0.00	1.34
Arthropoda	70.14	55.95	10.27	9.90	11.41	36.86	78.25	26.54
Echinodermata	0.30	1.43	4.11	1.39	4.03	4.10	0.43	0.80
Cnidaria	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00
Mollusca	5.81	10.90	11.64	10.04	11.74	9.22	5.22	37.27
Chordata	0.10	0.00	0.00	0.14	0.34	0.00	0.11	0.00
Nemertea	0.00	0.00	0.00	0.00	0.00	4.10	0.43	0.27

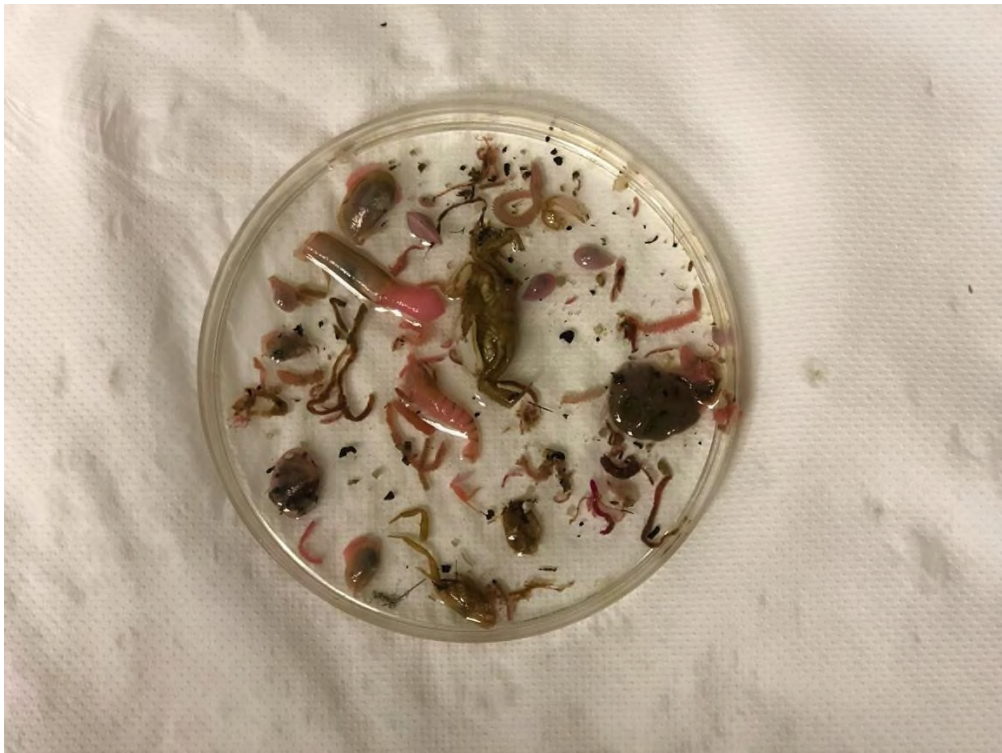


Table 7: Taxonomic Composition (Abundance) of Benthic Survey

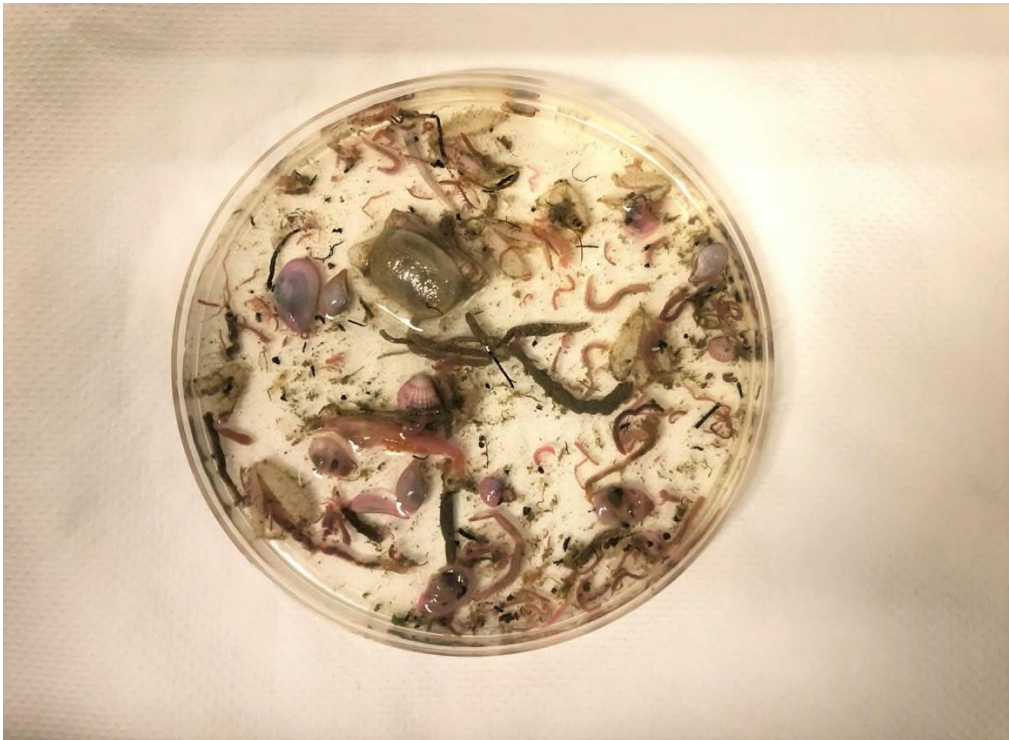
Taxa	Mar-04	Aug-04	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20	Apr-20	Jun-20	Aug-20	Oct-20	Dec-20
Annelida	514	343	253	124	164	211	214	189	219	183	179	87	143
Sipuncula	5	1	0	0	4	4	0	4	2	3	1	3	3
Arthropoda	72	88	39	17	25	63	52	43	112	22	38	32	59
Echinodermata	4	17	17	10	13	10	6	5	3	6	10	5	8
Cnidaria	11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

Taxa	Feb-21	Apr-21	Jun-21	Aug-21	Oct-21	Dec-21	Feb-22	Apr-22
Annelida	227	288	215	563	192	132	146	126
Sipuncula	7	0	1	0	24	0	0	5
Arthropoda	700	508	30	71	34	108	734	99
Echinodermata	3	13	12	10	12	12	4	3
Cnidaria	0	0	0	0	0	2	0	0
Mollusca	58	99	34	72	35	27	49	139
Chordata	1	0	0	1	1	0	1	0
Nemertea	2	0	0	0	0	12	4	1

Photos of Macrobenthic Assemblages



Station A



Station B



Station C

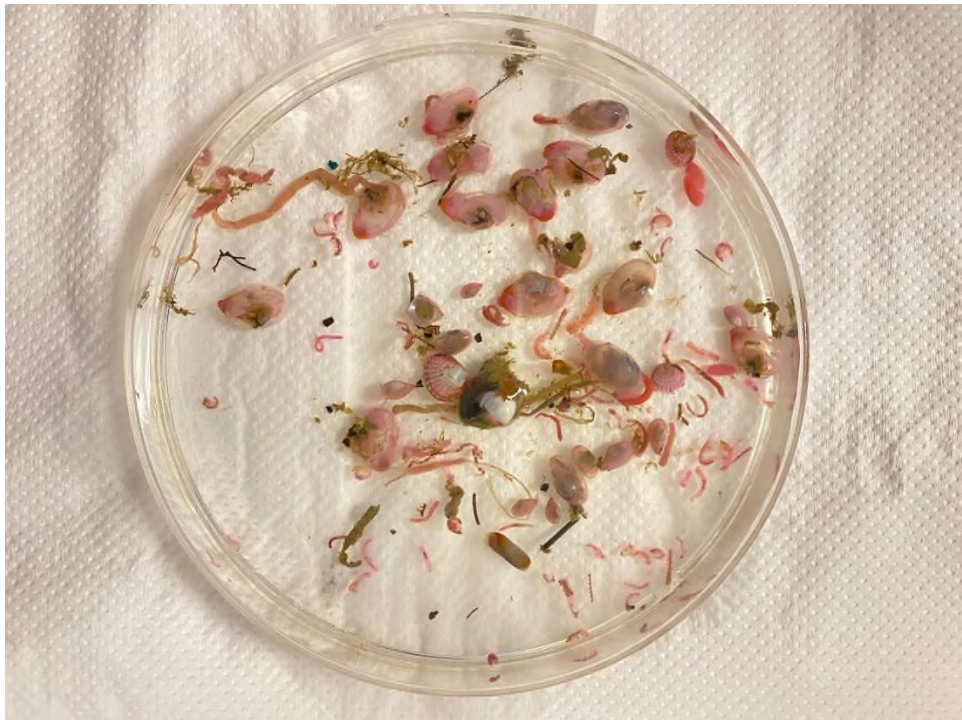


Station D





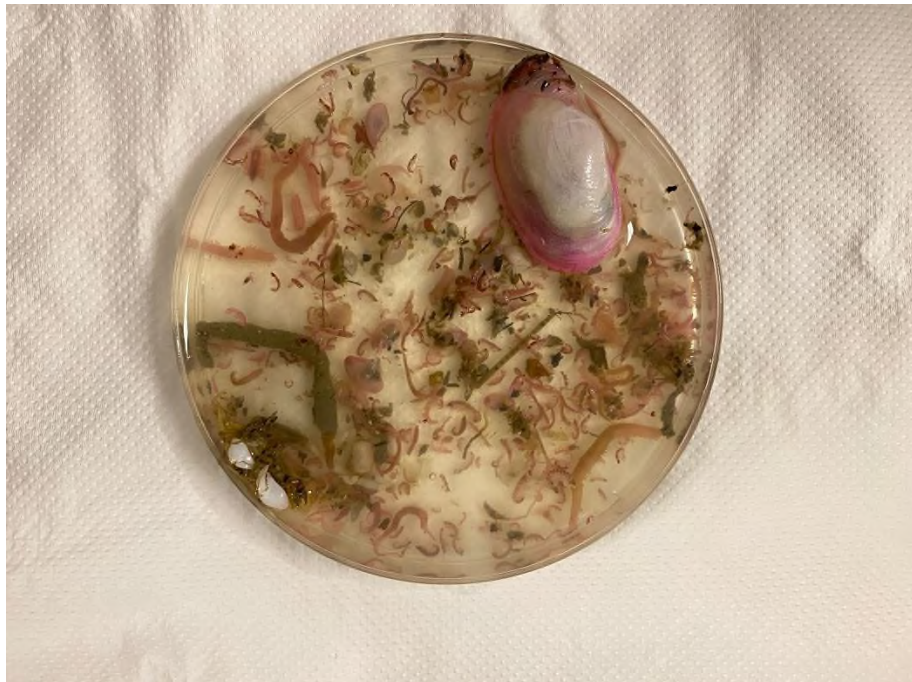
Station E



Station F



Station G



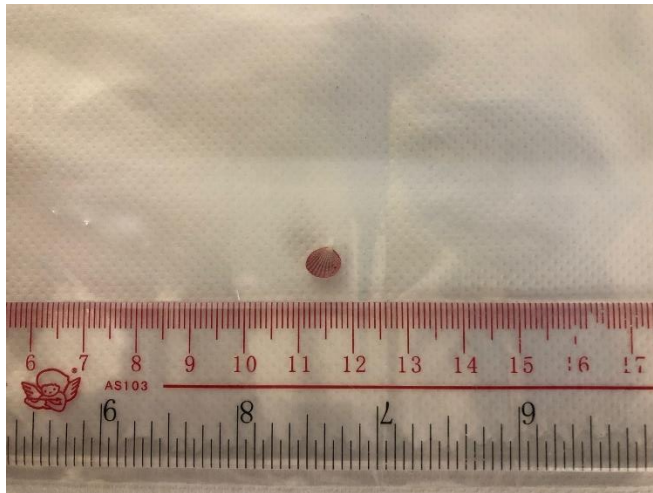
Station H



# Photos of Representative Taxa Identified



*Solen*



*Cardium*



*Ilyoplax*

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Report No.: 0041/17/ED/0670

## Appendix J

### Photos of Grab Samplers

# FUGRO TECHNICAL SERVICES LIMITED

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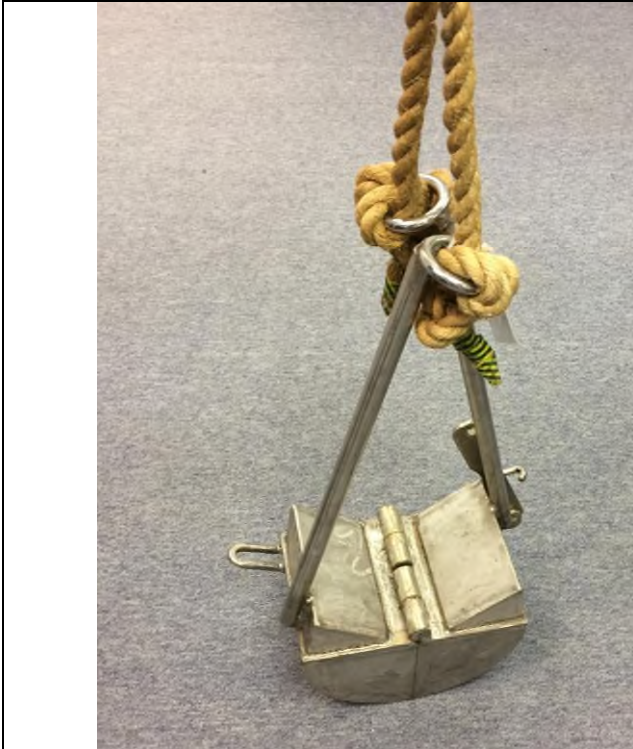


Photo 1. A ponar grab sampler

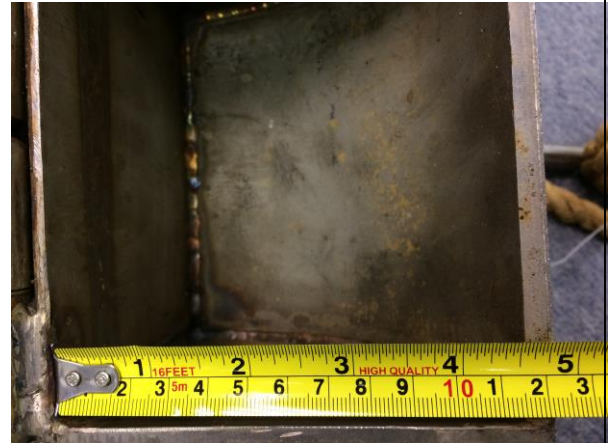


Photo 2. Grab dimension 1



Photo3. Grab dimension 2



Photo4. Grab dimension 3



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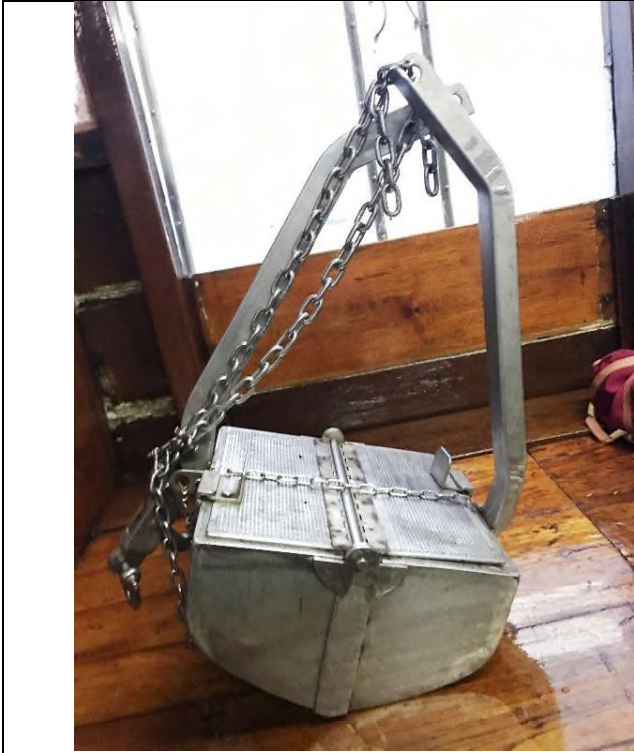


Photo 1. A modified Van Veen grab sampler



Photo 2. Grab dimension 1



Photo3. Grab dimension 2



Photo4. Grab dimension 3

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Report No.: 0041/17/ED/0670

## Appendix K Environmental Complaints Log

# FUGRO TECHNICAL SERVICES LIMITED

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Report No.: 0041/17/ED/0670

## 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 <sup>th</sup> 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.

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Report No.: 0041/17/ED/0670

## Appendix L

### Environmental Mitigation Implementation Schedule (EMIS)

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Report No.: 0041/17/ED/0670

EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
<b>Air Quality</b>					
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
<b>Water Quality</b>					
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
<b>Waste Management</b>					
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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Report No.: 0041/17/ED/0670

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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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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