

EPL 283 2021 - 2022 Monitoring Report



Reporting Period: 24th November 2021 – 24th November 2022

Date Submitted: 5th December 21

Version Number: 1

Submitter Details: Kane Taylor, Paspaley Pearling Company Pty Ltd



Executive Summary

This report outlines the following in relation to Environmental Protection Licence 283 for the reporting period of November 24, 2021, until November 24, 2022:

- Monitoring objectives and plan
- Monitoring results
 - Presentation
 - Tabular representation
 - Graphical representation
 - Water discharge log
 - Quality assurance/Quality control evaluation
- Discussion and Interpretation of results
 - Exceedance report for Total Suspended Solids
 - Exceedance report for Total Phosphorous
 - Exceedance report for Ammonia
- Conclusion and proposed actions

Monitoring Plan and Objectives

The monitoring conditions are specified in sections 23, 24, 25, 26, 27, 28 and 29 in the Environmental Protection Licence (EPL 283). The specific details of the surface water monitoring plan are as follows:

				Sample Locations ¹			
Site Code				TSF Discharge 1 (Discharge Pond - Monitoring point for assessment of discharge water quality)	TSF Ambient 1 ² (Compliance point – where discharge water enters the Blackmore River)	TSF Ambient 3 (Monitoring point for assessment of background ambient water quality in Darwin Harbour)	INLET (Monitoring point for water being pumped into the facility)
Longitude				130.912222	130.910639	130.901938	130.908591
Latitude				-12.568233	-12.575809	-12.591187	-12.565763
Parameter	Abbreviation	Units	Trigger Values ³				
In situ (field) Measurements							
pH	pH	pH units	6.0-8.5	W	M	M	W
Electrical Conductivity	EC	µS/cm	NA	W	M	M	W
Dissolved Oxygen	DO	% saturation	80-100%	W	M	M	W
Turbidity	NTU	NTU	<4 ⁴	W	M	M	W
Temperature	T	°C	NA	W	M	M	W
Parameters to be assessed at a NATA accredited laboratory							
Biological Oxygen Demand	BOD	mg/L	NA	M	M	M	M
Total Suspended Solids	TSS	mg/L	<10	M	M	M	M
Filterable Reactive Phosphorous	FRP	µg/L	<10	M	M	M	M
Total Phosphorous	TP	µg/L	<30	M	M	M	M
Ammonia	NH ₃	µg/L	<20	M	M	M	M
Total Nitrogen	TN	µg/L	<300	M	M	M	M
Total Oxidised Nitrogen	NO _x	µg N/L	<20	M	M	M	M
Nitrate	NO ₃	µg/L	NA	M	M	M	M
Nitrite	NO ₂	µg/L	NA	M	M	M	M
Chlorophyll-a	Chl-α	µg/L	<4	M	M	M	M

W = Weekly during operation, when actively discharging wastewater in accordance with Table 2.

M = Monthly during operation, when actively discharging wastewater in accordance with Table 2.

NA = Not Available

¹ Monitoring Locations are shown in Attachment 3.

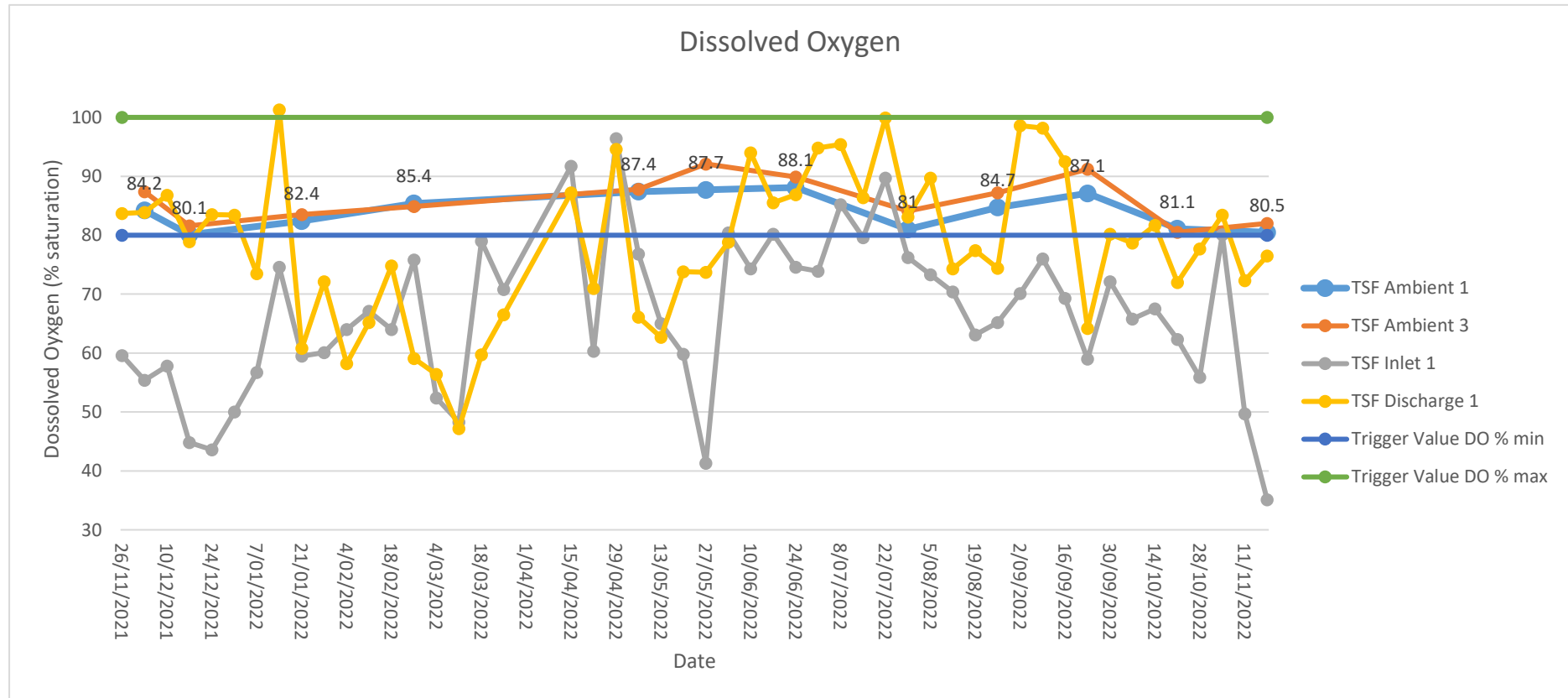
² For monitoring at this location, the sample must be collected during an outgoing or turning tide (not an incoming tide).

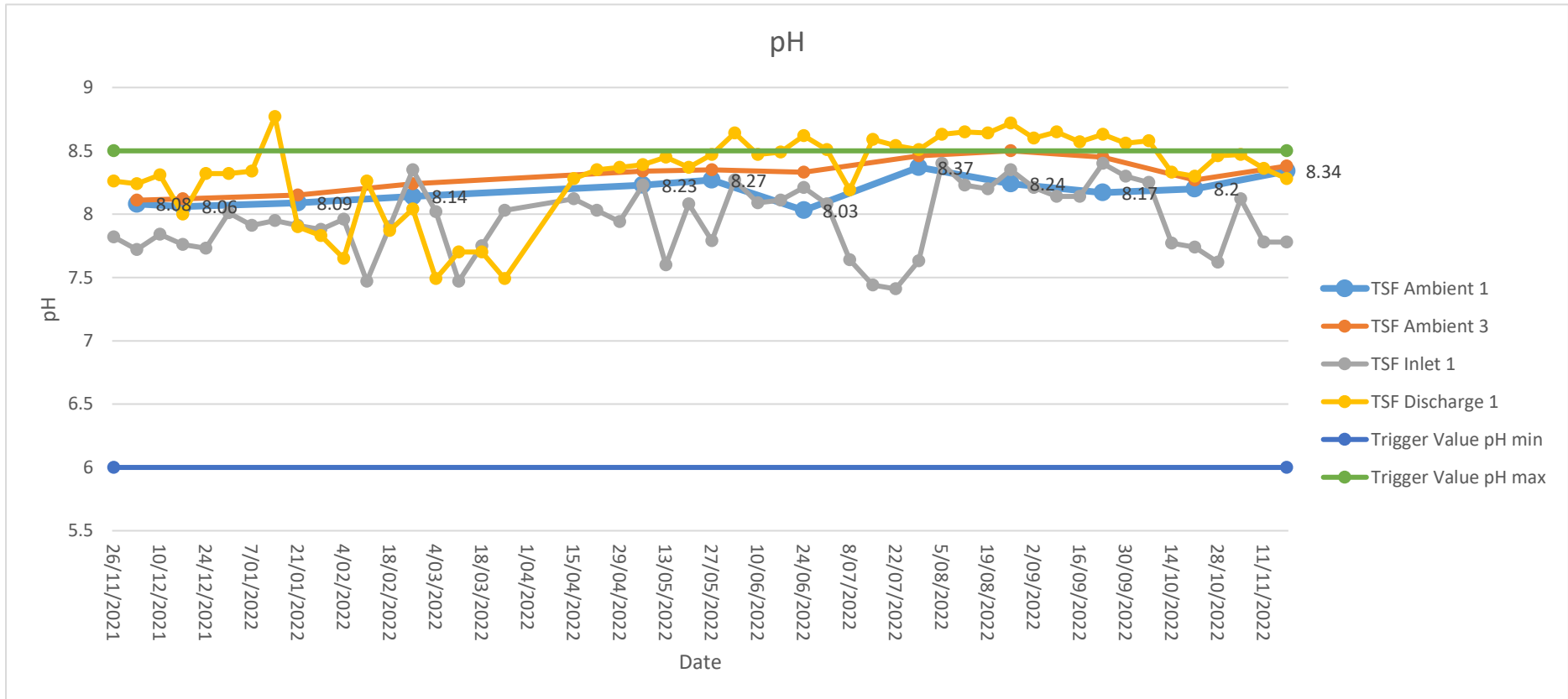
³ Water Quality Objectives for the Darwin Harbour Region – Blackmore River Estuary, to be applied to the compliance point (TSF Ambient 1).

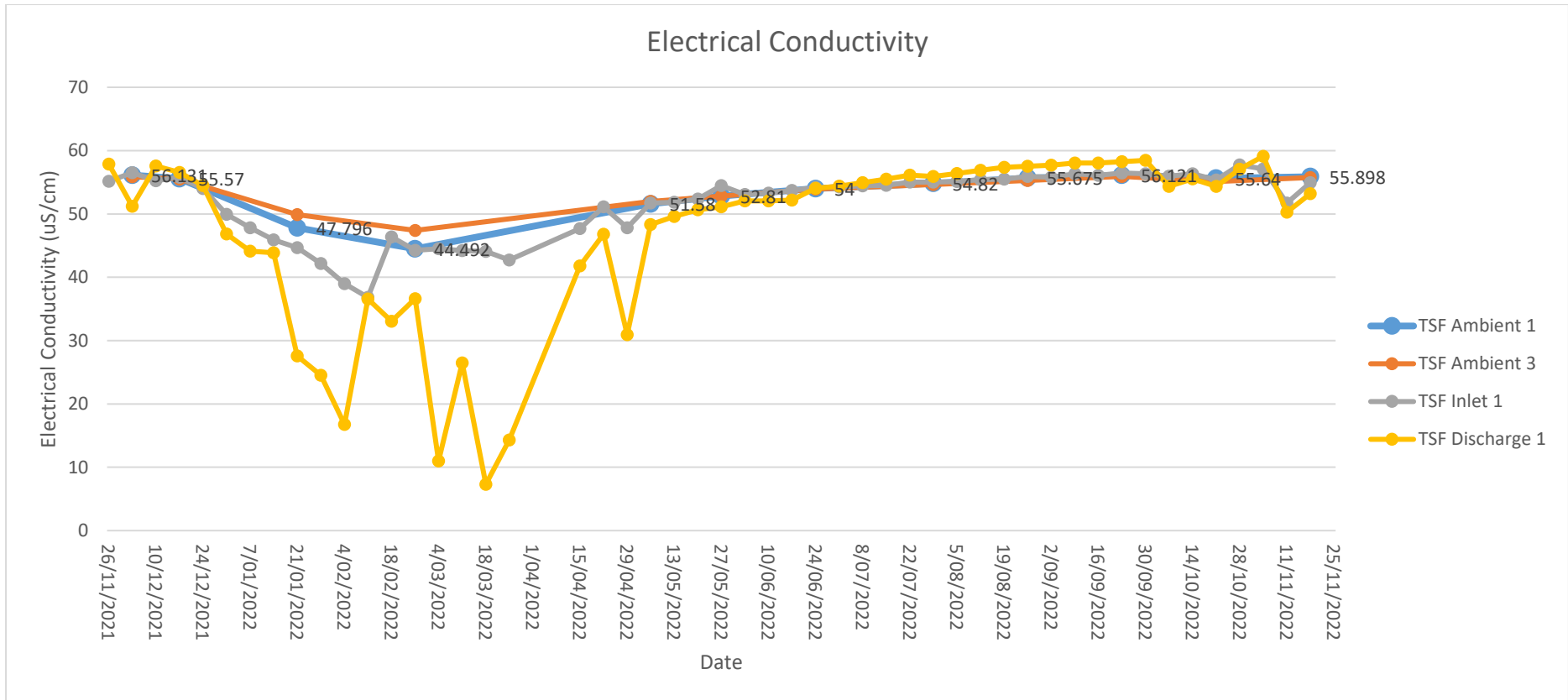
⁴ Only applies where the turbidity value at TSF Discharge 1 is greater than the INLET on same sampling occasion.

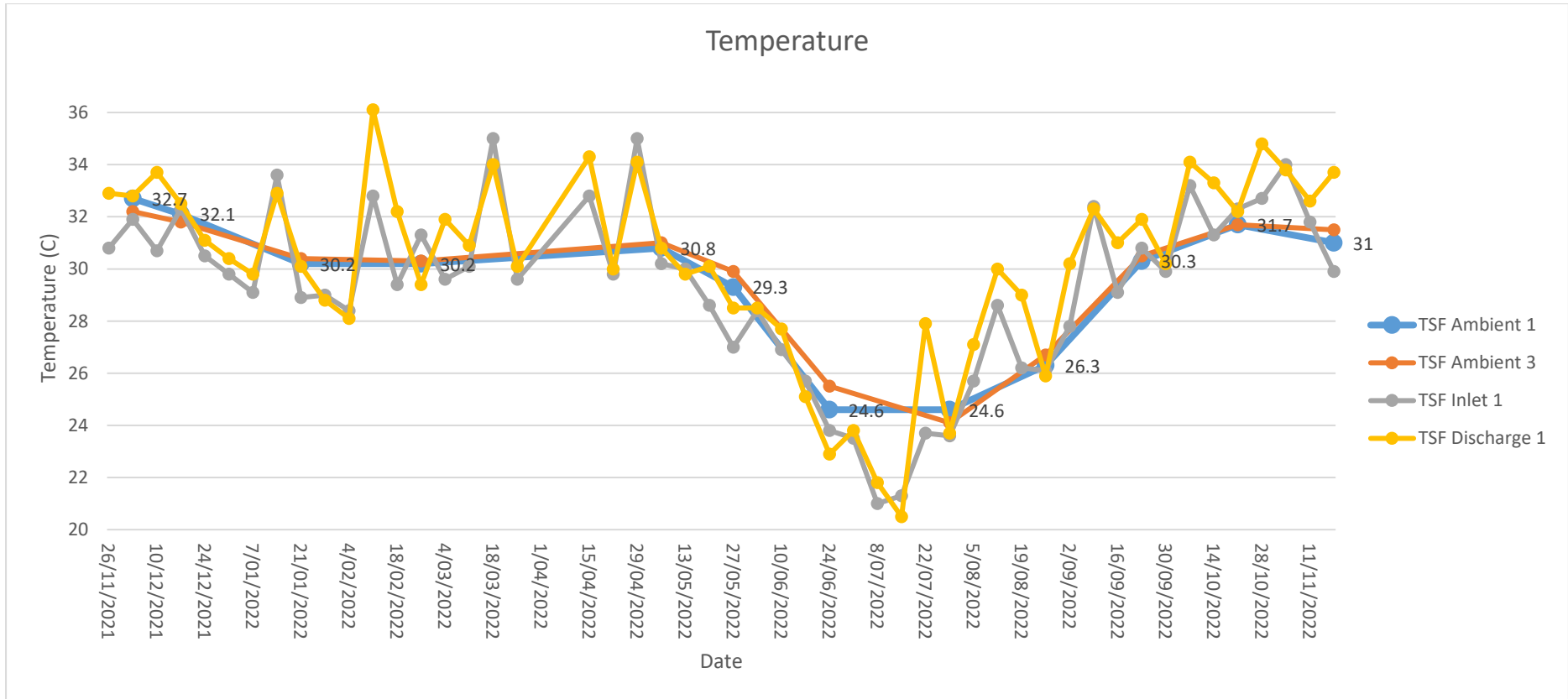


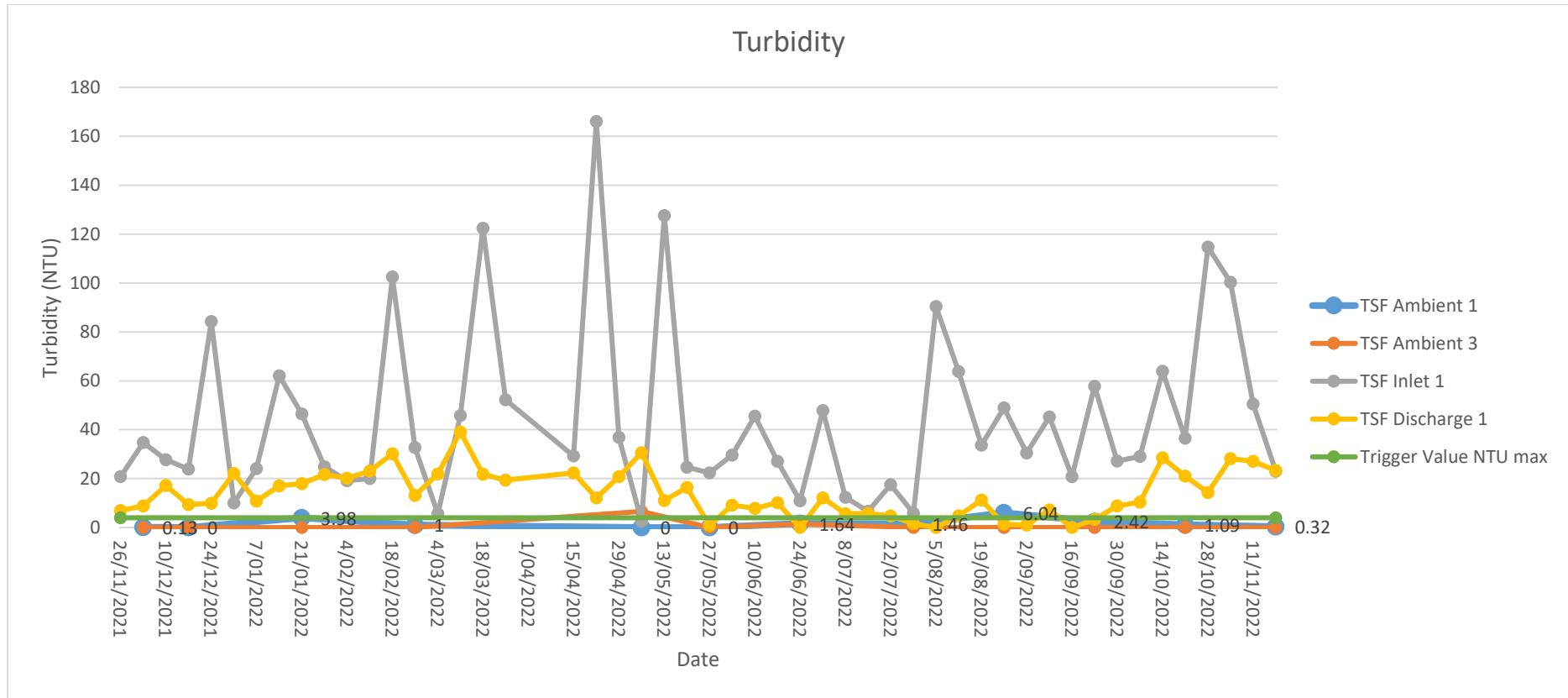
Graphs of Results

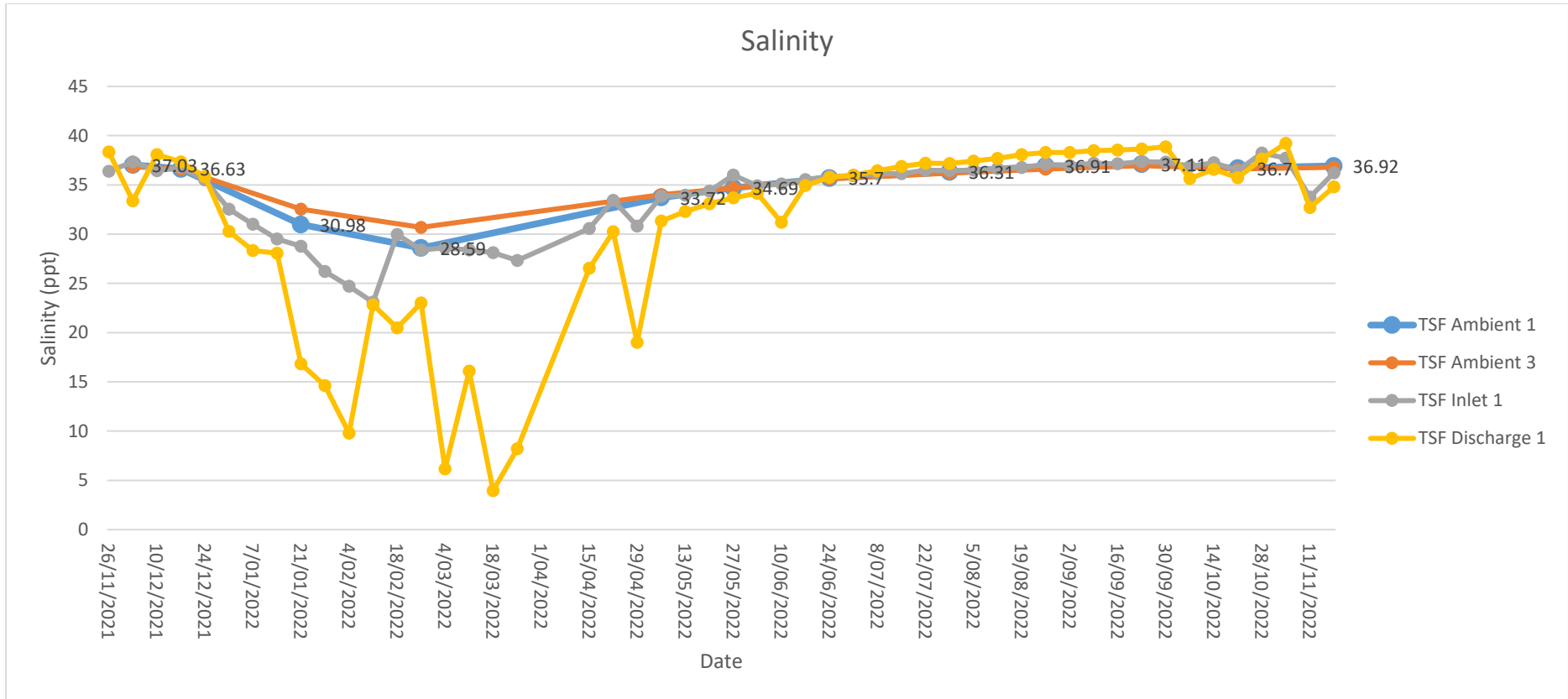


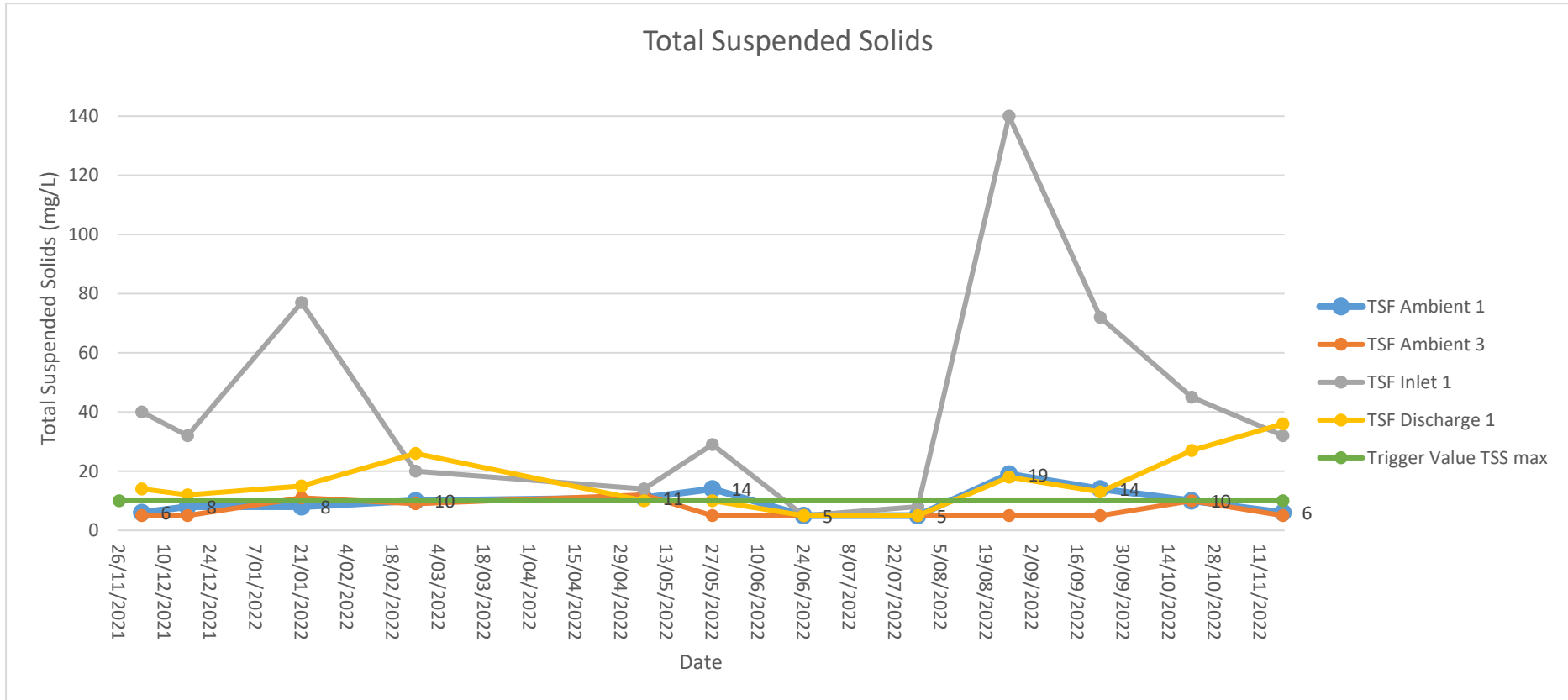


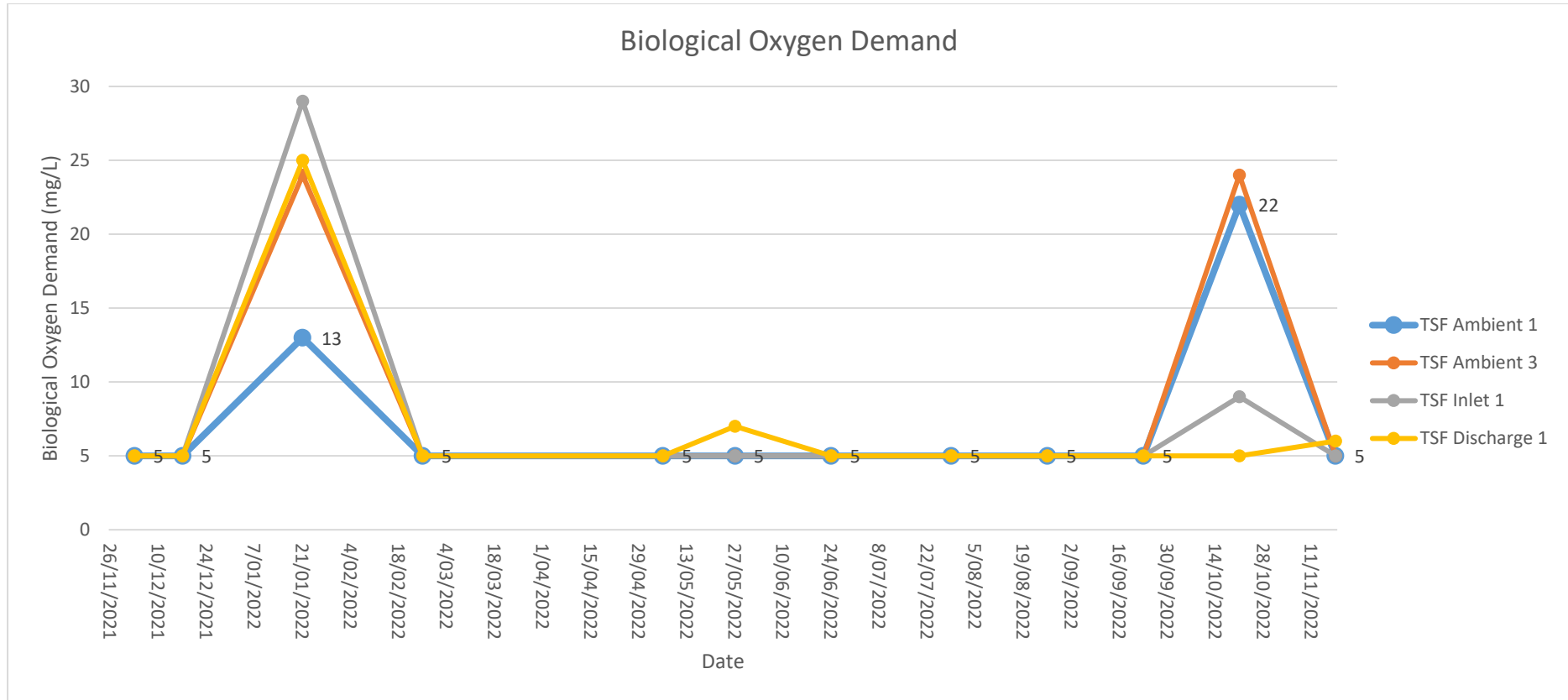


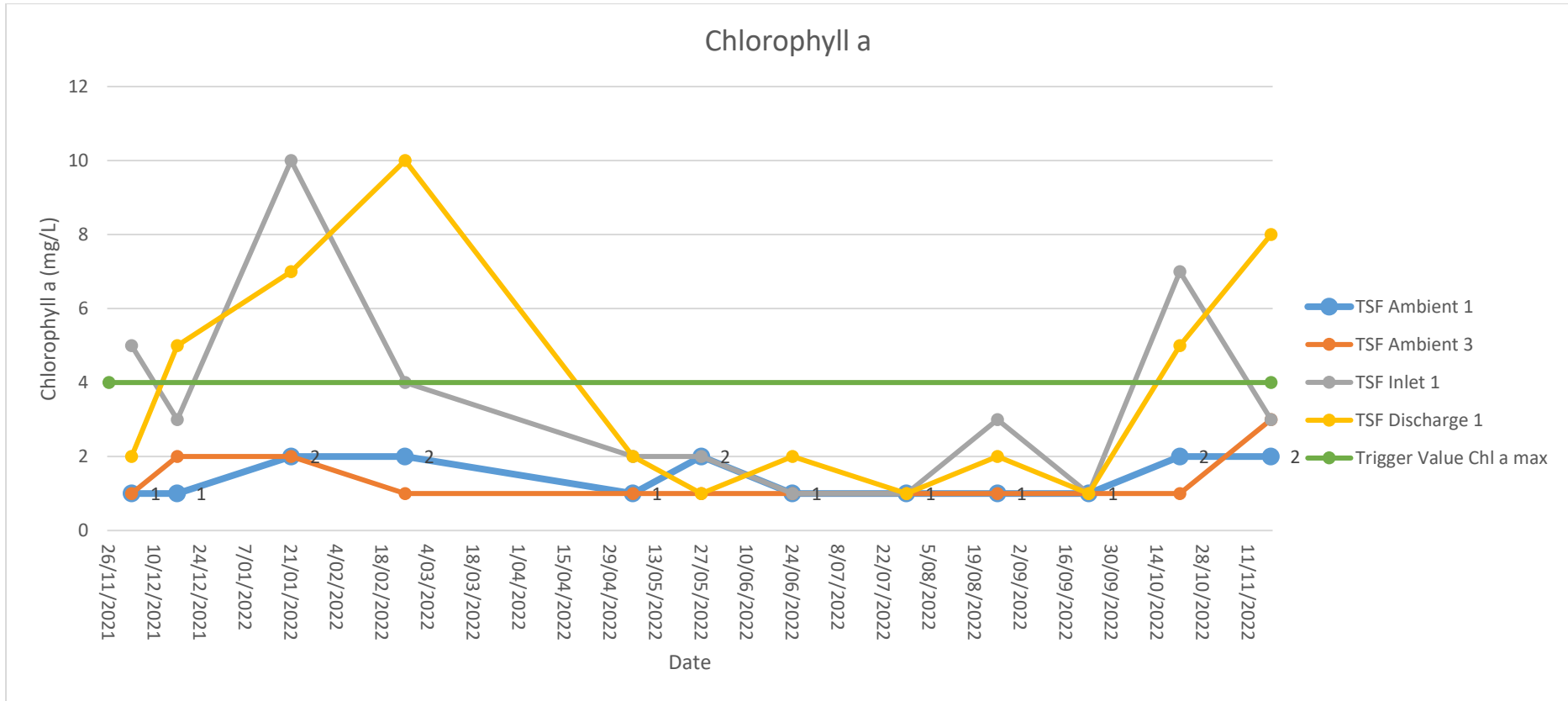


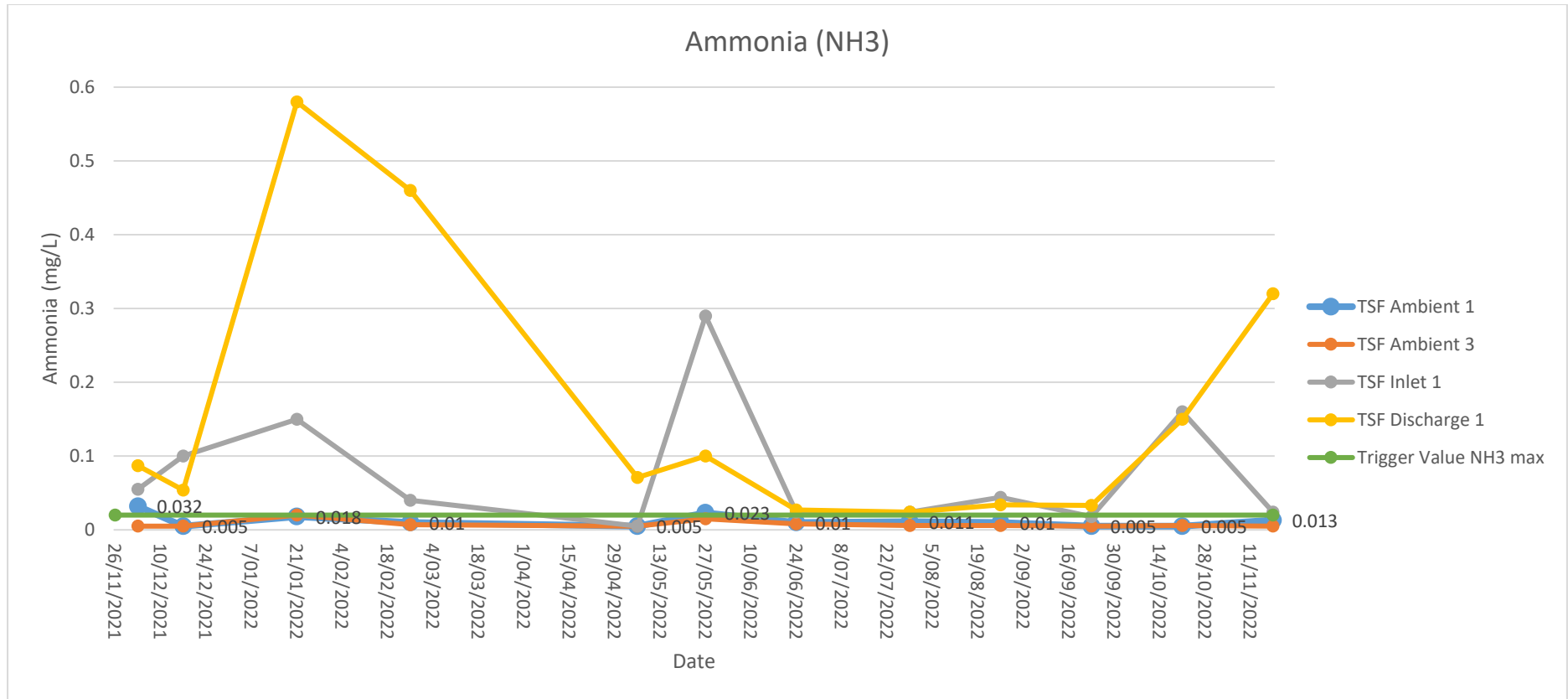


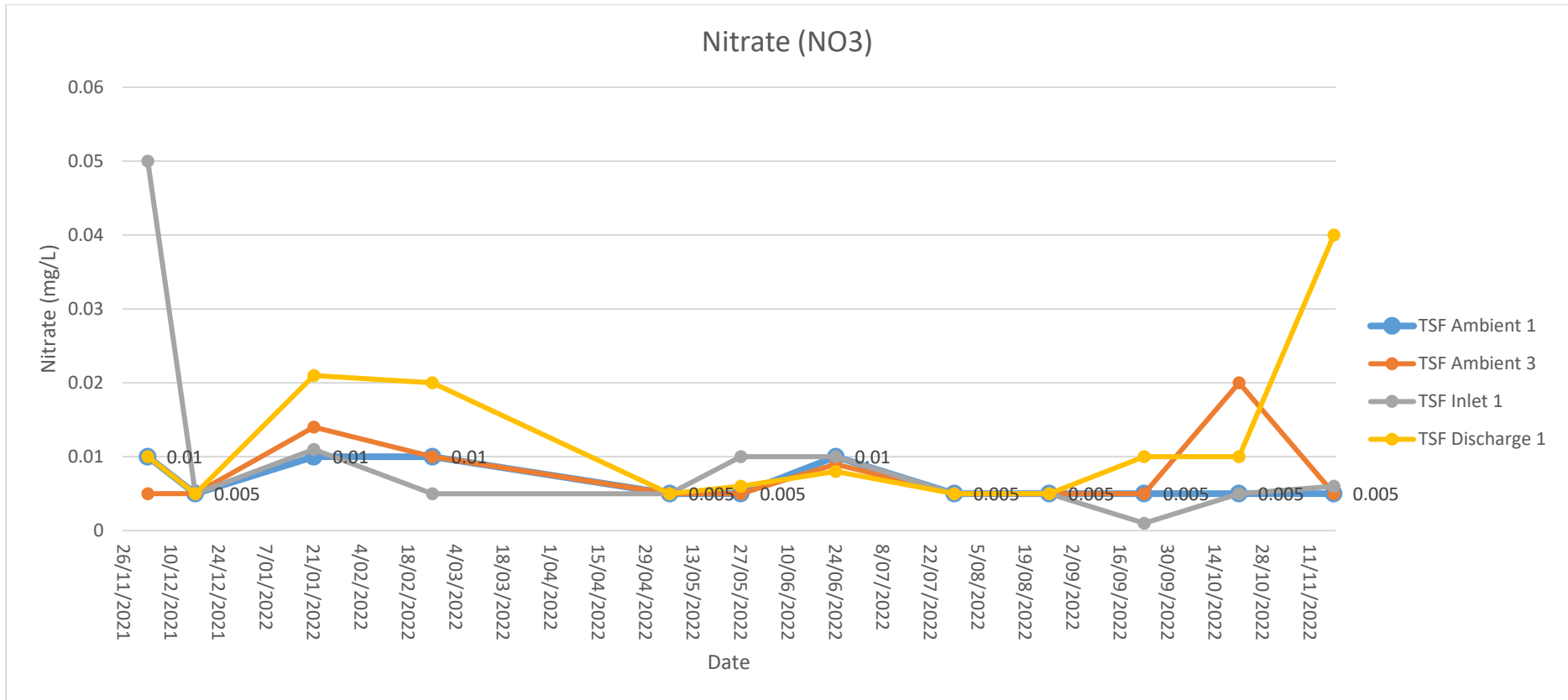


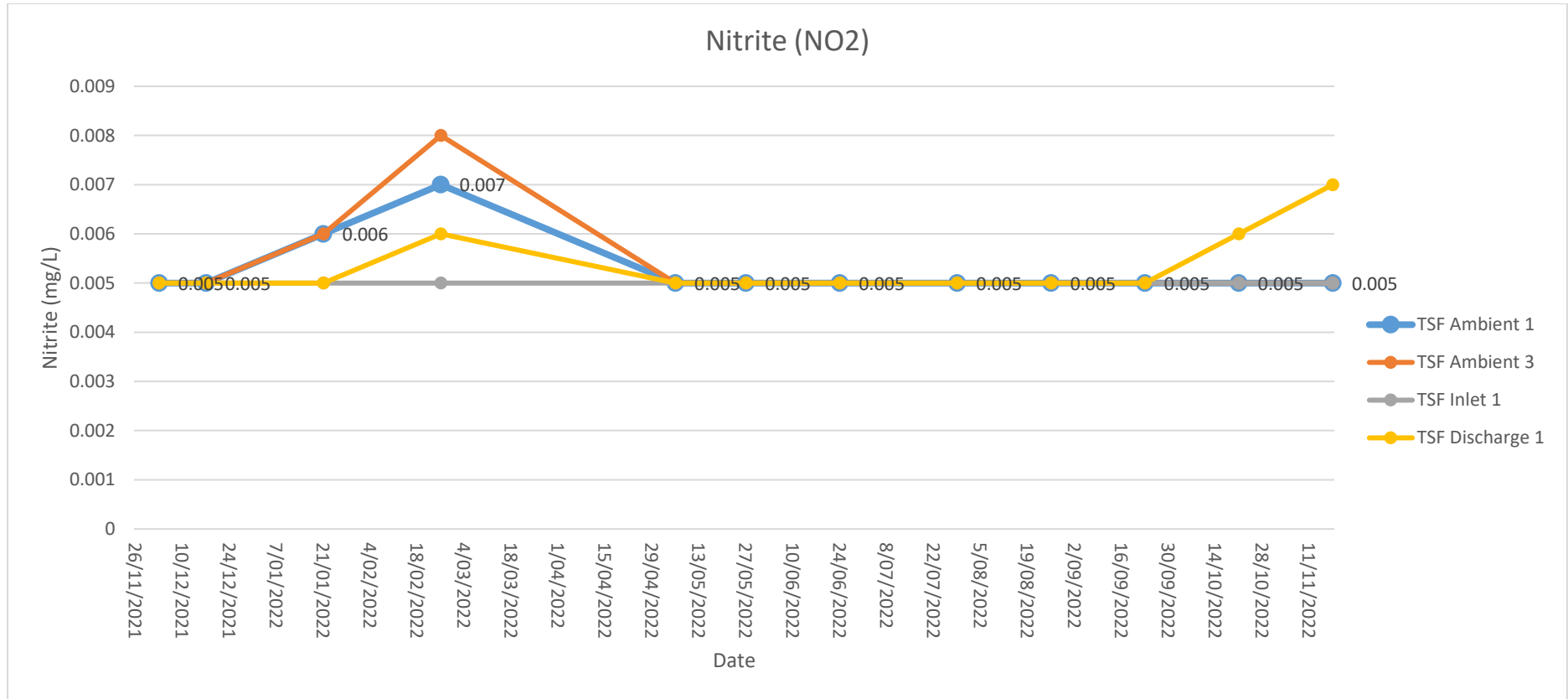


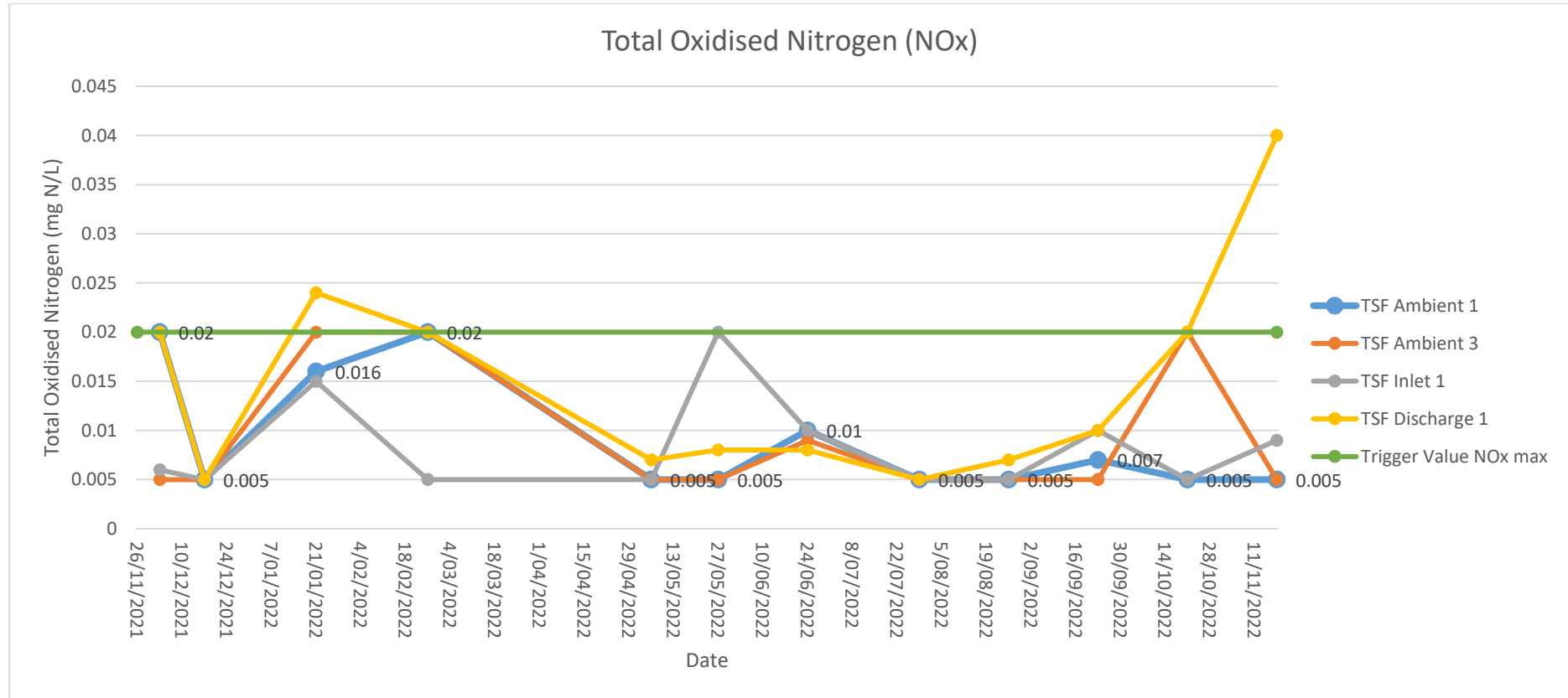


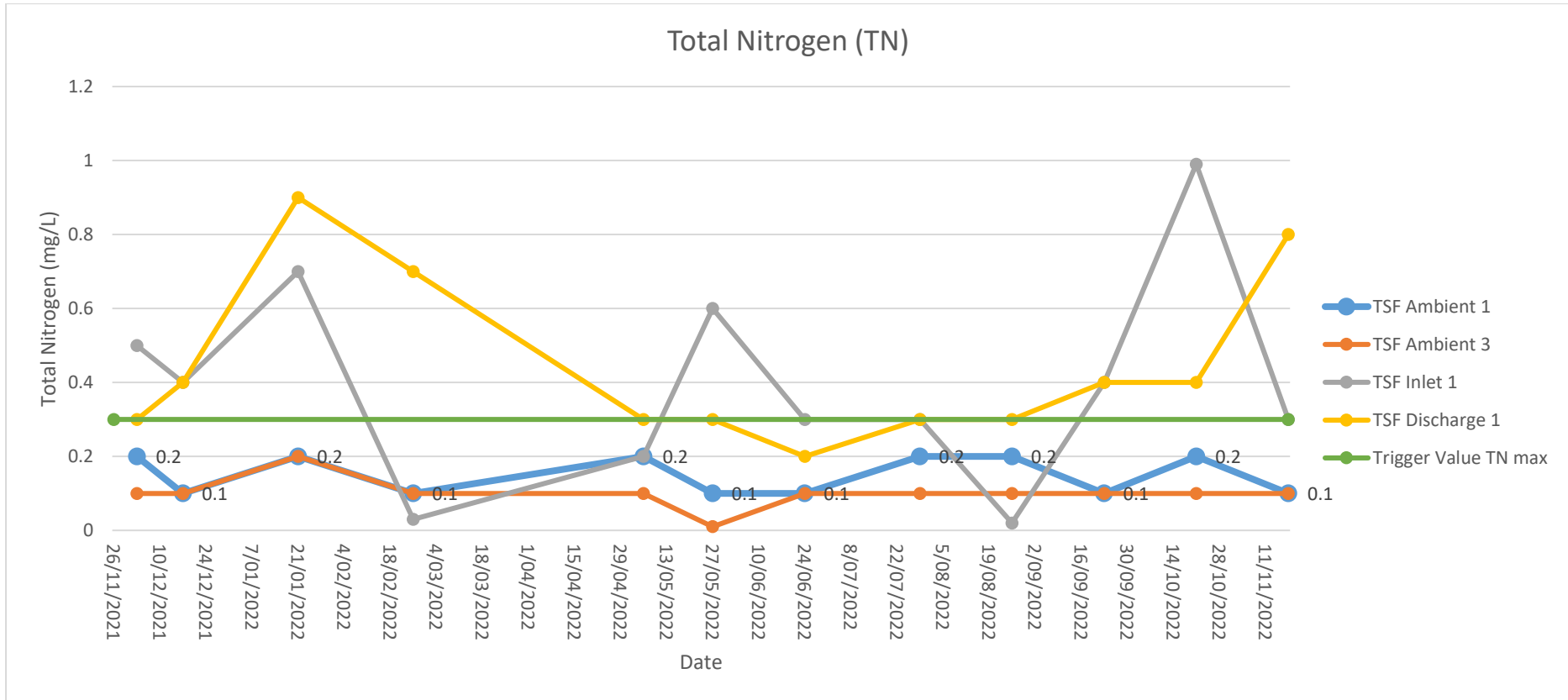


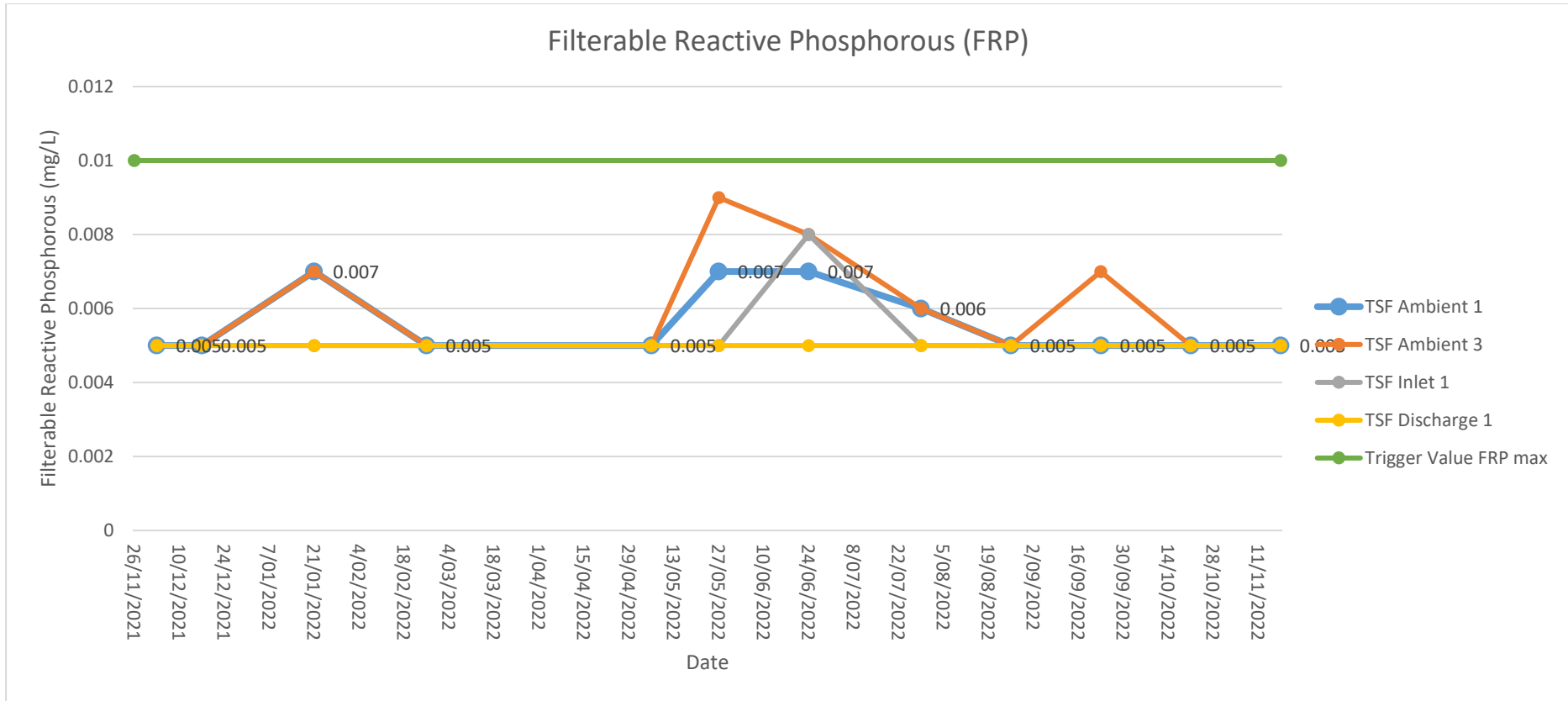


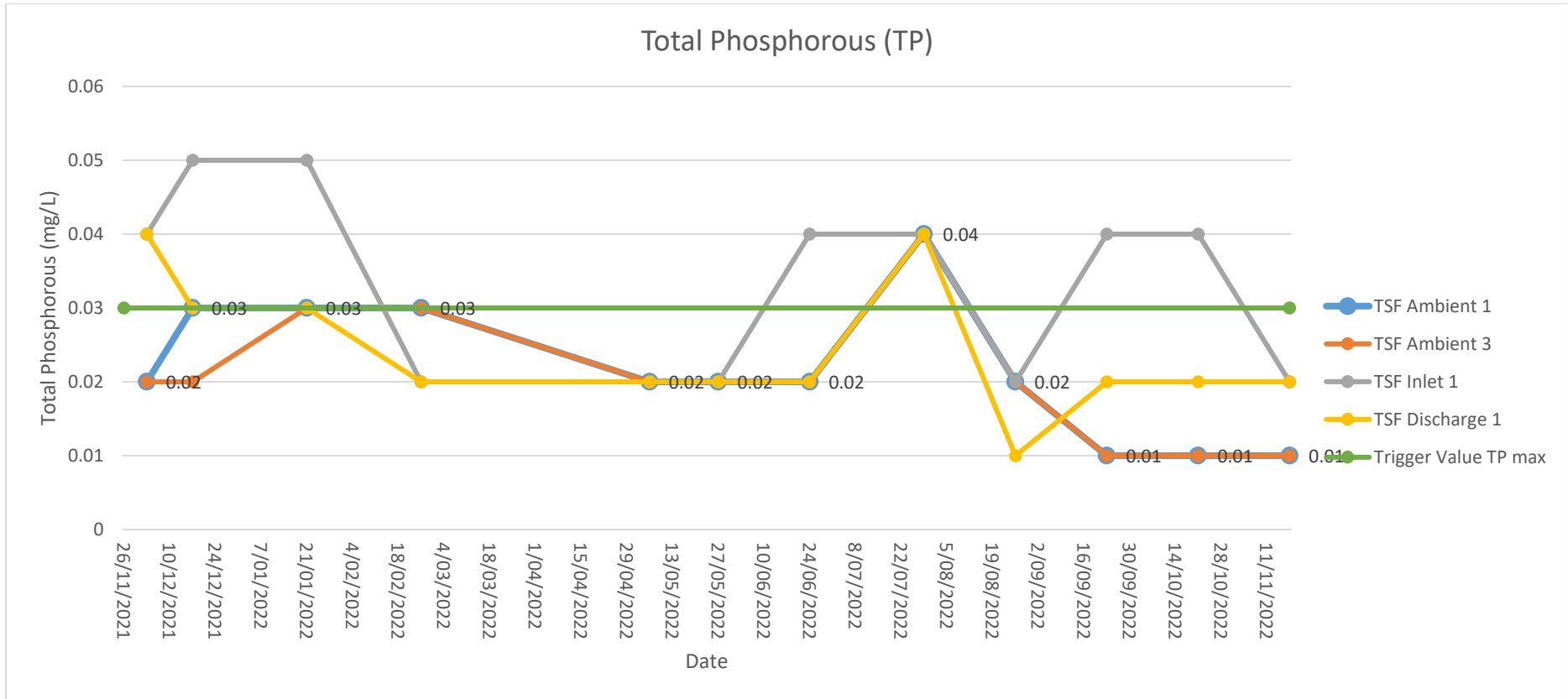














Water Discharge Log

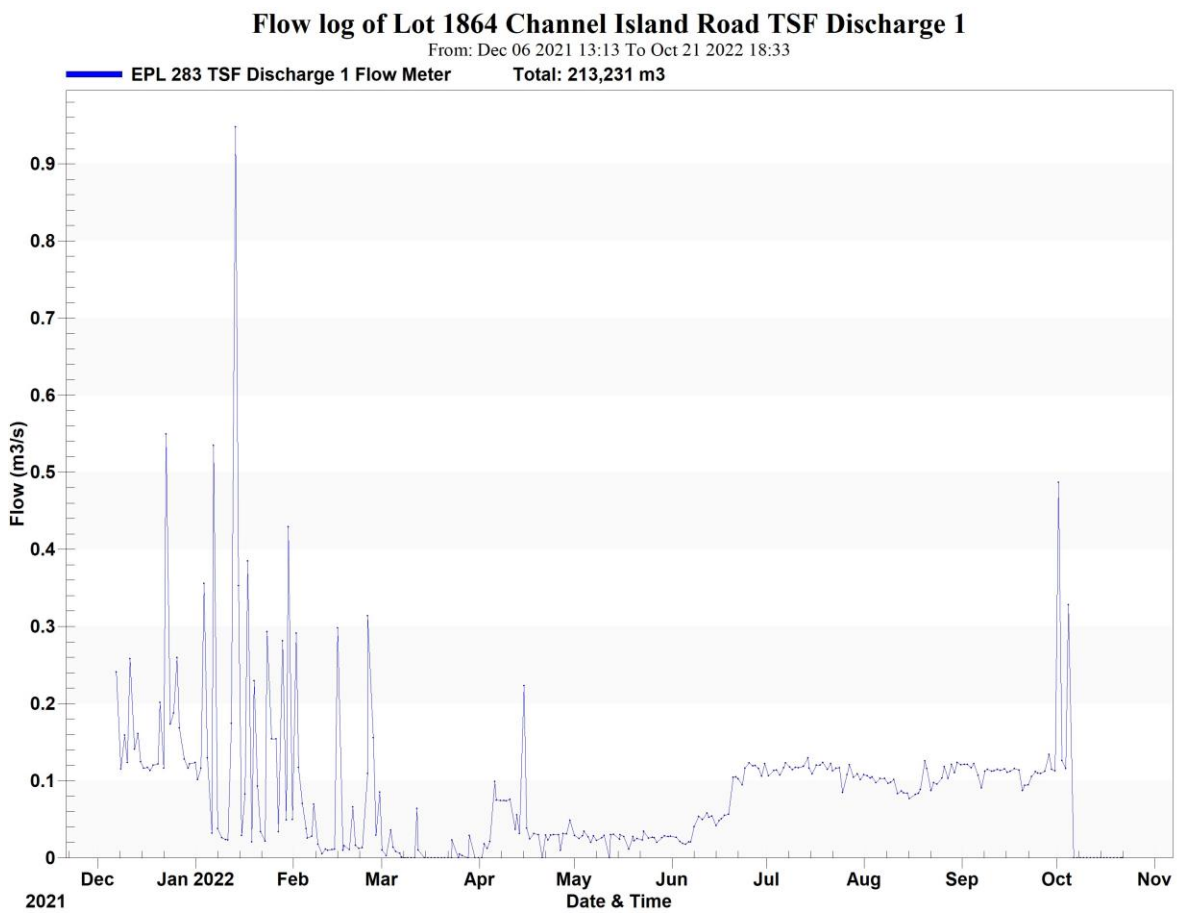
The graph below details the water discharged from the site TSF Discharge 1 as recorded by the water flow meter.

The graph shows a few high peaks during the annual wet seasons from rainfall events.

The rest of the year shows steady increase in discharge as more ponds are used in production. The flow rate from July until October is believed to be near maximum for the site as all ponds and tanks were being used at this time.

In early October we had a mechanical issue with the pump and the waterflow from the ponds then stopped. Unfortunately, the flow meter battery appears to have run out on Oct 21 however as with the previous few weeks only minimal water was discharged

The total discharge for this time is 213231m³.





Monitoring Results – Quality Assurance / Quality Control Evaluation

In situ (field) measurements for the surface water monitoring plan for this reporting period were conducted weekly when discharging for the TSF Inlet 1 and TSF Discharge 1 sites, and monthly for the TSF Ambient 1 and TSF Ambient 3 sites.

Parameters to be assessed at a NATA accredited laboratory were sampled monthly for all 4 sites.

The site was not in operation from the 4-3-22 until the 11-04-22. Only limited sampling occurred during this period (for interest's sake) as it is not required during these periods when not discharging.



Discussion and Interpretation of Results

In situ (field) Measurements

The readings at the compliance point for the in situ (field) measurements all fell within the trigger values for pH and dissolved oxygen. The measurements for turbidity however exceeded the trigger values on one occasion (26-8-22). At this exceedance the reading at the compliance point (6.04) was lower than the Inlet (48.9). The note to turbidity on the Surface Water Monitoring Plan states that the exceedance “only applies where the turbidity value at TSF Discharge 1 is greater than the inlet on the same sampling occasion” making the exceedance non applicable.

Parameters to be assessed at a NATA accredited laboratory

The measurements at the compliance point for the NATA assessed parameters were within the trigger values for; filterable reactive phosphorous, total nitrogen, total oxidised nitrogen, and chlorophyll a. There were exceedances in Total Suspended Solids (TSS), Total Phosphorus (TP) and Ammonia.

Exceedance – Total Suspended Solids

Sampling Date	Total Suspended Solids (mg/L)				Key
	TSF Ambient 1 (compliance point)	TSF Ambient 3	TSF Inlet 1	TSF Discharge 1	
1/12/2021	6	<5	40	14	less than trigger value at compliance point
17/12/2021	8	<5	32	12	exceedance of trigger value at compliance point
21/01/2022	8	11	77	15	non-compliance of trigger value at compliance point
25/02/2022	10	9	20	26	
6/05/2022	11	12	14	10	less than trigger value for compliance point
27/05/2022	14	<5	29	10	exceedance of trigger value for compliance point
24/06/2022	<5	<5	<5	<5	non-compliance of trigger value for compliance point
29/07/2022	<5	<5	8	<5	
26/08/2022	19	<5	140	18	
23/09/2022	14	<5	72	13	
21/10/2022	<10	<10	45	27	
18/11/2022	6	5	32	36	TSS trigger value: 10

Actual and potential causes and the contributing factors to the exceedance

The results show exceedances of the trigger values for Total Suspended Solids (TSS) at all the monitoring sites, most noticeably the TSF Inlet 1 and TSF Discharge 1. This was also reported in the EPL 283 2020 – 2021 Monitoring Report, EPL 283 2019 – 2020 Monitoring Report and frequently in reports for the previous waste discharge licence (WDL 173-05). It appears that the high TSS measurements are not a result of the ponds operation and are more likely a result of the natural environment of Darwin Harbour.

Risk of environmental harm arising from the exceedance

Nil.

Action(s) that have or will be taken to address the exceedance

Perhaps we could review Total Suspended Solids as a trigger for an exceedance and non-compliance.

If no action was taken, why was no action taken



Exceedance – Total Phosphorus

Sampling Date	Phosphorus - Total (mg/L)				Key
	TSF Ambient 1 (compliance point)	TSF Ambient 3	TSF Inlet 1	TSF Discharge 1	
1/12/2021	0.02	0.02	0.04	0.04	less than trigger value at compliance point
17/12/2021	0.03	<0.02	0.05	0.03	exceedance of trigger value at compliance point
21/01/2022	0.03	0.03	0.05	0.03	non-compliance of trigger value at compliance point
25/02/2022	0.03	0.03	0.02	0.02	
6/05/2022	<0.02	0.02	0.02	<0.02	less than trigger value for compliance point
27/05/2022	<0.02	<0.02	0.02	<0.02	exceedance of trigger value for compliance point
24/06/2022	<0.02	<0.02	0.04	0.02	non-compliance of trigger value for compliance point
29/07/2022	0.04	<0.04	0.04	<0.04	
26/08/2022	0.02	0.02	0.02	0.01	
23/09/2022	<0.01	<0.01	0.04	0.02	
21/10/2022	0.01	0.01	0.04	0.02	
18/11/2022	0.01	0.01	0.02	0.02	Phosphorus Total trigger value: 0.03

Actual and potential causes and the contributing factors to the exceedance and non-compliances

As reported in the EPL 283 2020 – 2021 Monitoring Report and the EPL 286 2019 – 2020 Monitoring Report, exceedances for Total Phosphorus are common at all monitoring sites. For this report the exceedance at the TSF Ambient 1 compliance point (29-7-22) was equal to all the other monitoring points for the same sampling period. Its therefore unlikely that the operation of the ponds is the cause of the exceedances against the trigger values and is more likely to be the result of a local condition of the environment at the time.

Risk of environmental harm arising from the exceedance and non-compliances

Nil

Action(s) that have or will be taken to address the exceedance and non-compliance

Perhaps we could review Total Phosphorous as a trigger for an exceedance and non-compliance.

If no action was taken, why was no action taken



Exceedance – Ammonia NH3

Sampling Date	Ammonia as N (mg/L)				Key
	TSF Ambient 1 (compliance point)	TSF Ambient 3	TSF Inlet 1	TSF Discharge 1	
1/12/2021	0.032	<0.005	0.055	0.087	less than trigger value at compliance point
17/12/2021	<0.005	<0.005	0.1	0.054	exceedance of trigger value at compliance point
21/01/2022	0.018	0.02	0.15	0.58	non-compliance of trigger value at compliance point
25/02/2022	0.01	0.007	0.04	0.46	
6/05/2022	<0.005	<0.005	<0.005	0.071	less than trigger value for compliance point
27/05/2022	0.023	0.015	0.29	0.1	exceedance of trigger value for compliance point
24/06/2022	0.01	0.008	0.024	0.027	non-compliance of trigger value for compliance point
29/07/2022	0.011	0.006	0.024	0.024	
26/08/2022	0.01	0.006	0.044	0.034	
23/09/2022	<0.005	<0.005	0.018	0.033	
21/10/2022	<0.005	0.006	0.16	0.15	
18/11/2022	0.013	<0.005	0.024	0.32	Ammonia trigger value: 0.02

Actual and potential causes and the contributing factors to the exceedance

Exceedances have been reported for Ammonia on the 1-12-21 and the 27-5-22. There have been no fertilizer or feed inputs to the ponds during the 2021 – 2022 or 2020 - 2021 monitoring periods. At both times of exceedance, the ammonia at the compliance point is less than that of the Inlet. It is therefore unlikely that the exceedance is caused by the operation of the ponds but rather the result of a local condition of the environment at the time.

Risk of environmental harm arising from the exceedance

Nil.

Action(s) that have or will be taken to address the exceedance

A secondary December 21 sample was taken after the exceedance on the 1-12-21 to make sure the elevated ammonia levels were not ongoing.

If no action was taken, why was no action taken

As mentioned above, the ammonia values at the compliance point are lower than the inlet values to the ponds site. It is likely not to be an impact from the site operation but rather a broader environmental issue at that point in time.



Conclusion and Proposed Actions

There have been exceedances against the trigger values for Total Suspended Solids, Total Phosphorus and Ammonia at the TSF Ambient 1 compliance point. Reasonable explanations for these are outlined above. It is of my opinion that none of these are caused by the operation of the ponds facility or would have caused any environmental harm.

A thought to review the trigger values for the Total Suspended Solids and Total Phosphorous parameters should be considered as the water quality objectives are often exceeded in all monitoring locations.