

Community liaison meeting – Christchurch ocean outfall (CRC 051724)

Manager Operations – Adam Twose

Resource Consent Compliance Coordinator - Vanessa Irvine

Risk Specialist - Nigel Grant

Process Engineer – Ramsay Huang

20th of Sep 2023

Introduction

- This meeting is to advise the CLG on CCC' compliance with CRC 051724.
- What will be covered:
 - The impact of the fire
 - Performance of the ocean outfall
 - Quality of the discharge
 - Compliance with our resource consent conditions
 - There will be opportunity to ask questions at the end and refer back through the slide pack
 - This presentation will be sent out to all email address groups

Introduction

- What will not be covered as the main part of this presentation:
 - It is not our intention to provide an update on CWTP fire recovery plan
 - It is not our intention to provide an update on CWTP fire response report (due imminently)
 - We will provide an update on odour from the ponds at the end of this presentation
 - Full information on this can be found
 - <https://ccc.govt.nz/services/water-and-drainage/wastewater/treatment-plants/christchurch-wastewater-treatment-plant/wastewaterfire>

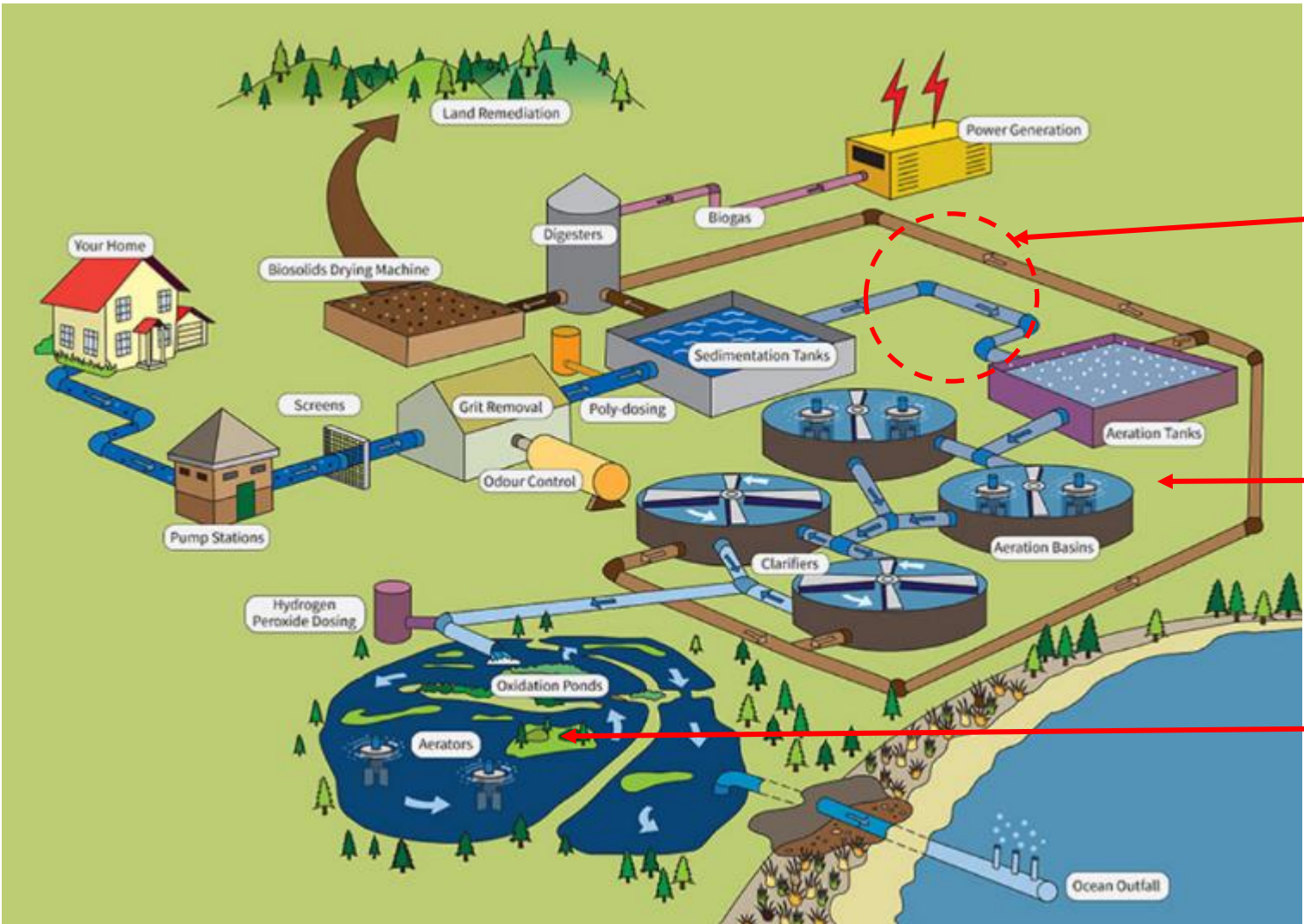
The timeline and key activities since the fire

- 1st Nov 2021 – trickling filter fire
- Aug 2022 – temporary activated sludge plant operational
- April 2023 – pond aerators installed

The impact on the ponds since the fire

- Pre-fire;
 - Ponds were maturation ponds, needing to provide disinfection only
- November 2021 to August 2022 (period between the trickling filters and the temporary activated sludge plant);
 - Ponds reverted to Oxidation Ponds due to increased load to them
- April 2023 to present (when aerators installed on Pond 1 only);
 - Pond 1 remain as an aerated oxidation pond, ponds 2 to 6 are recovering and reverting back to be maturation ponds

Key components of the CWTP Short Term Solution



Trickling Filters Removed

Temporary Activated Sludge Plant Installed

Aerator Installed on Oxidation Pond 1

Current and anticipated compliance with the resource consents

- We are currently complying with all resource consent conditions
- We are forecasting that we should maintain compliance up to and including the commission of the new trickling filter replacement process
- However, the temporary treatment systems we have installed are highly lean, with minimal redundancy, operating at its maximum capacity
- Maintaining compliance will be subject to no ***significant*** mechanical breakdown
- We have shown there is some redundancy as compliance has been maintained during minor breakdowns (i.e. only losing one of the 24 aerators installed)

Compliance review – CRC051725 - last year annual report (FY23)

- This covers the period 1st July 22- 31st June -23
- Will run through a high-level summary of all compliance against all consent conditions initially
- Then look at performance against each condition individually where there is routine monitoring

Condition 2, 3, 4, 9, 10, 12 – FY 23

Consent Condition	Parameter	Condition Detail	Condition Timeframe	Comments	Overall
2	Discharge Content	Discharge is only treated wastewater from the CWTP	Continuous	Discharge is all and only from the CWTP ponds	😊
3	Discharge Volume	Recorded	Continuous	Future slide	😊
4	Discharge Rate	Recorded	Continuous	Future slide	😊
9	Outfall Maintenance	Routine maintenance of the discharge system completed and recorded	Continuous	Discharge system is the pump station, pipeline and diffuser outlets	😊
10	Outfall Condition	Visual inspection of outfall	Five yearly	Completed in March 2022	😊
12	Pumping Pressure for a given flow	Monitored at the pump station	Continuous	Print out available	😐

Key: 😊 Full Compliance 😐 Minor, Isolated or Risk of Non-Compliance 😞 Major or Consistent Non-Compliance

Condition 15a, 16a – FY 23

Consent Condition	Parameter	Compliance Condition	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Overall
15a	Dissolved BOD ₅	Concentration does not exceed 20 g/m ³	☹️	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
	Total Suspended Solids	Concentration does not exceed 50 g/m ³	😊	😊	☹️	☹️	☹️	☹️	☹️	😊	😊	😊	😊	😊	😊
	Ammoniacal Nitrogen	Concentration does not exceed 40 g/m ³	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
16a	Faecal Coliforms	Concentration does not exceed 1,000(standard)/5,000(higher) MPN/100mL	☹️	☹️	😊	😊	😊	☹️	😊	😊	😊	😊	😊	😊	☹️
	Enterococci	Concentration does not exceed 1,500 MPN/100mL	☹️	☹️	😊	😊	😊	☹️	😊	😊	😊	😊	😊	😊	☹️

Key: 😊 Full Compliance

☹️ Minor, Isolated or Risk of Non-Compliance

☹️ Major or Consistent Non-Compliance

Condition 18 – FY23

Location	Parameter	Jul - Oct 22	Nov - Jan 23	Feb - Apr 23	May - Jun 23	Overall
South New Brighton Beach	Faecal Coliforms	☹️	☹️	☹️	😊	☹️
South New Brighton Beach	Enterococci	😊	😊	😊	😊	😊
Sumner Beach Surf Club	Faecal Coliforms	☹️	☹️	☹️	☹️	☹️
Sumner Beach Surf Club	Enterococci	☹️	😊	😊	☹️	😊
New Brighton Beach Surf Club	Faecal Coliforms	☹️	☹️	☹️	☹️	☹️
New Brighton Beach Surf Club	Enterococci	☹️	😊	😊	😊	😊

Key: 😊 Full Compliance

☹️ Minor, Isolated or Risk of Non-Compliance

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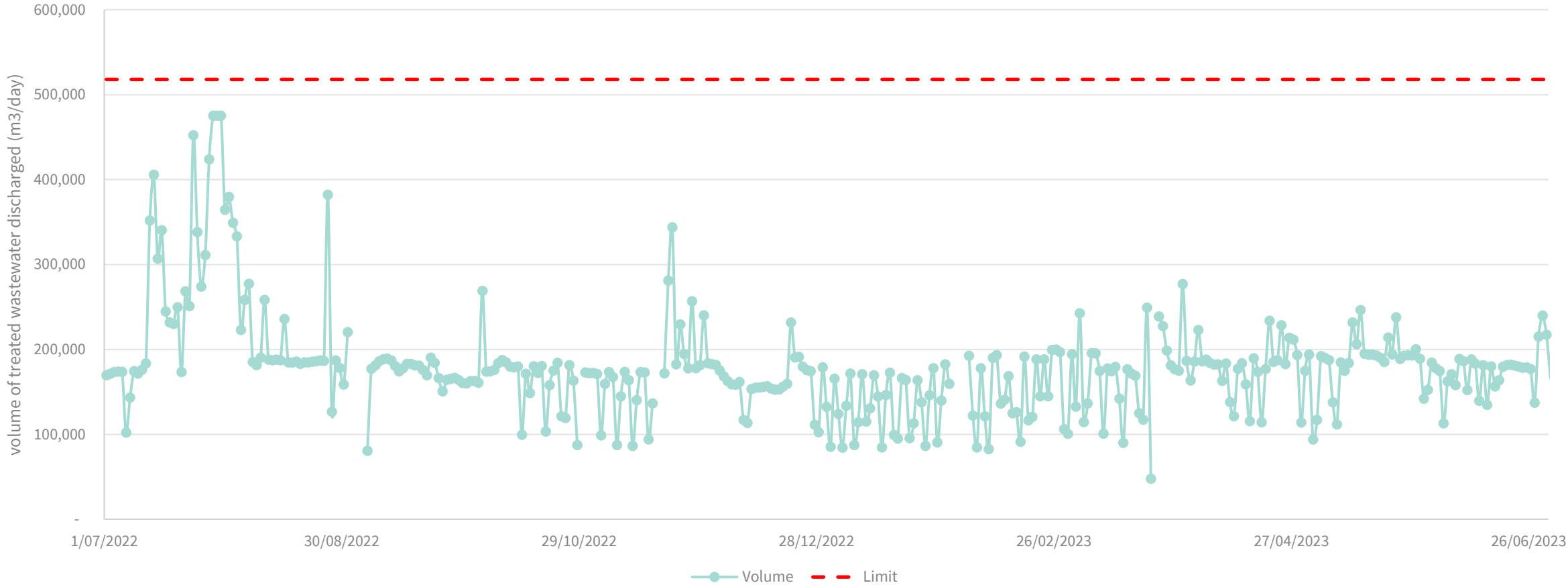
Condition 22 – FY 23

Consent Condition	Parameter	Condition Timeframe	North of the centre	South of the centre	West of inshore end	East of inshore end	Overall
22a	Temperature	Two yearly	😊	😊	😊	😊	😊
	DO	Two yearly	😊	😊	😊	😊	😊
	Salinity	Two yearly	😊	😊	😊	😊	😊
	Total Suspended Solids	Two yearly	😊	😊	😊	😊	😊
	Nitrogen Oxides	Two yearly	😊	😊	😊	😊	😊
	Ammoniacal Nitrogen	Two yearly	😊	😊	😊	😊	😊
	Dissolved Reactive Phosphorus	Two yearly	😊	😊	😊	😊	😊
	Chlorophyll-a	Two yearly	😊	😊	😊	😊	😊
	Trace Metals	Two yearly	😊	😊	😊	😊	😊
	Faecal Coliforms	Two yearly	😊	😊	😊	😊	😊
	Enterococci	Two yearly	😊	😊	😊	😊	😊
	Phytoplankton Species	Two yearly	😊	😊	😊	😊	😊

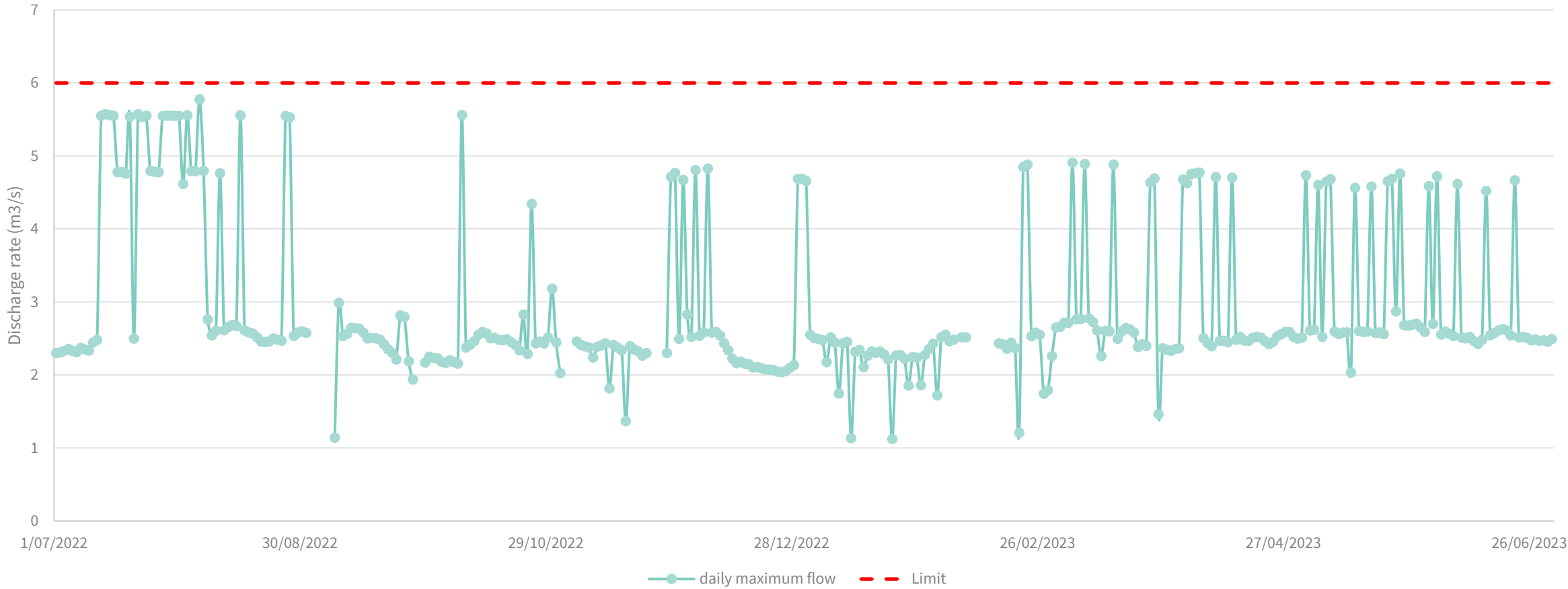
Condition 23 -36 – FY23

Consent Condition	Parameter	Frequency	Compliance Condition	
23	Marine Sediments	5-yearly	Reported	😊
25	Benthic Invertebrates	5-yearly	Reported	😊
26	Epibenthic Fauna	5-yearly	Reported	😊
27	Shellfish/Tuatua	Quarterly	ceased	😊
29	Complaints	As required	Recorded and Reported	😊
31	Annual Report	Annually	Report and information lodged with ECan	😊
32	Quarterly Report	Quarterly	Report and information lodged with ECan	😐
34	Management Plan	4 Years post commissioning	Report and information lodged with ECan – done March 2012 - 12/140121	😊
36	Community Liaison Group	Annually	Not requested in 2022 (as per ECAN agreement)	😊

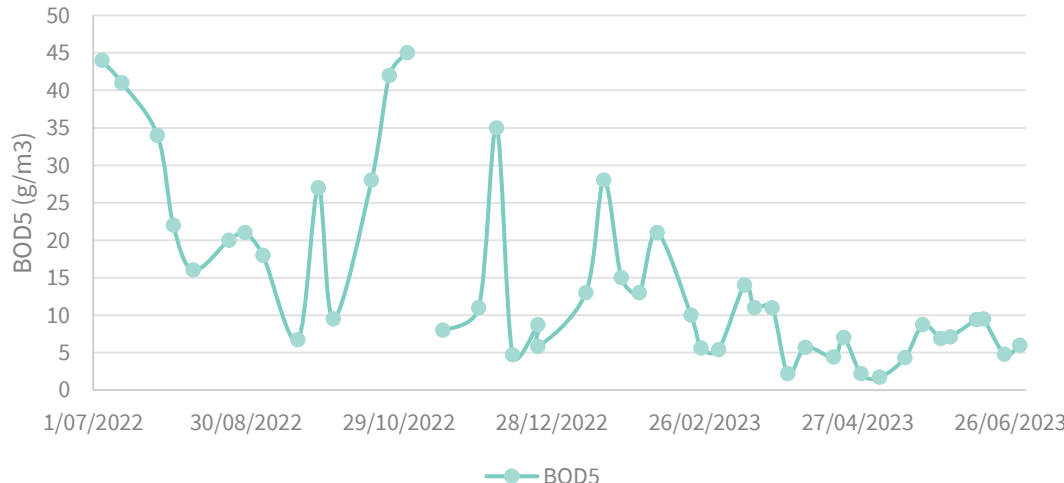
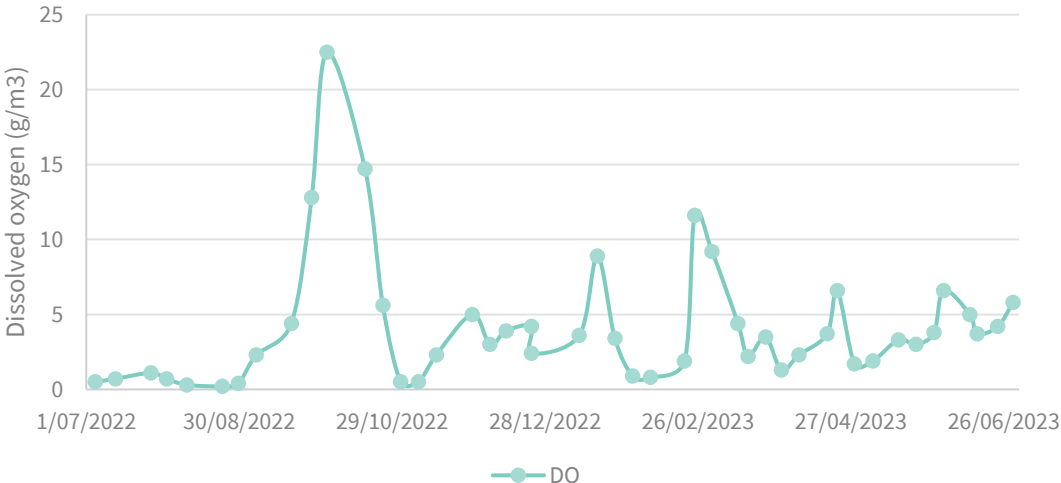
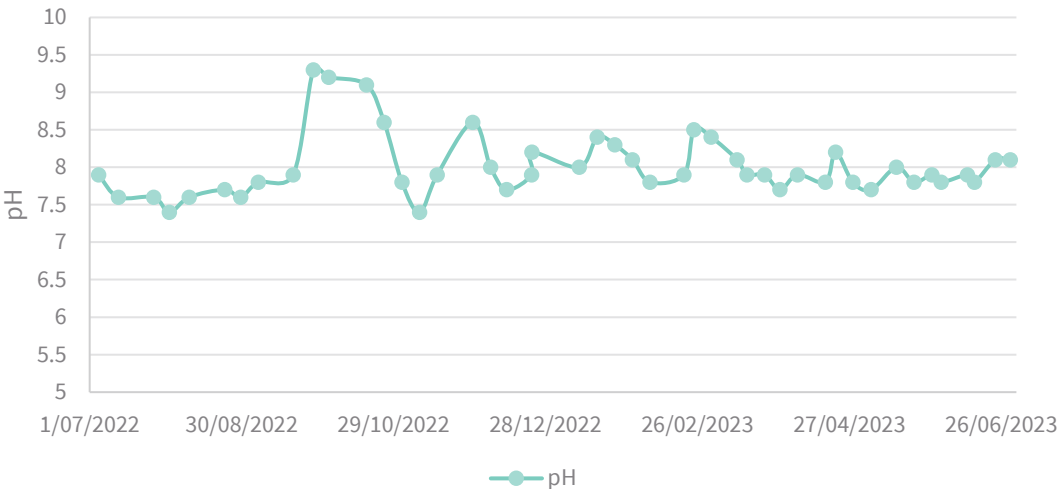
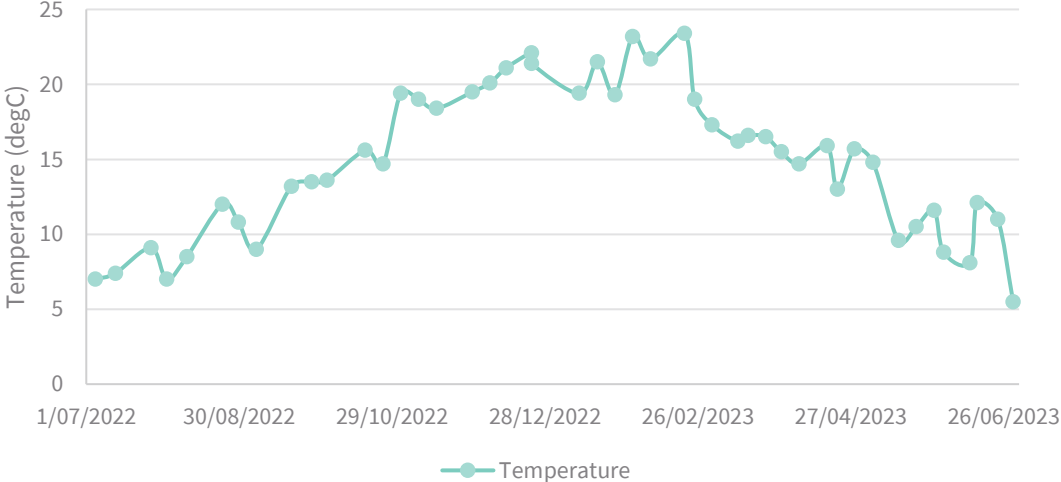
Condition 3 – discharge volume – FY 23



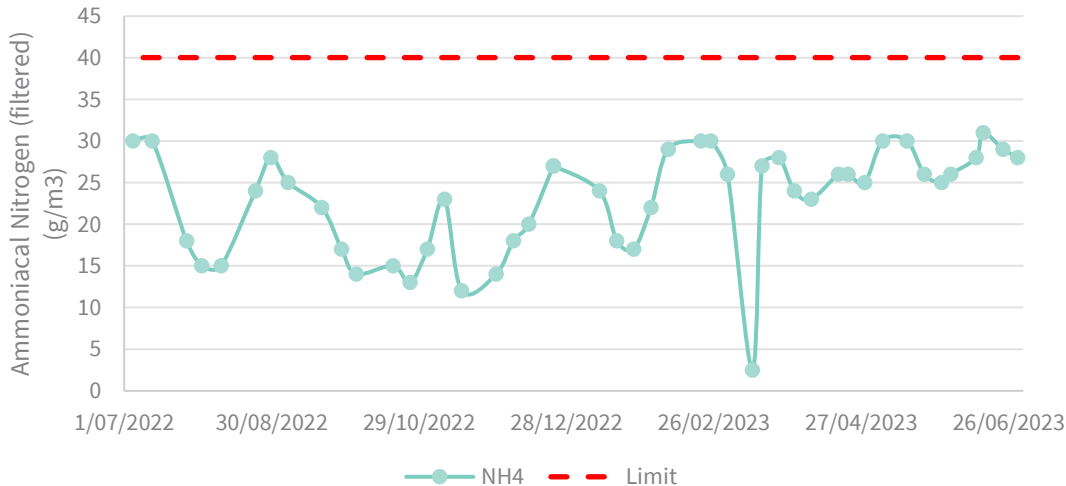
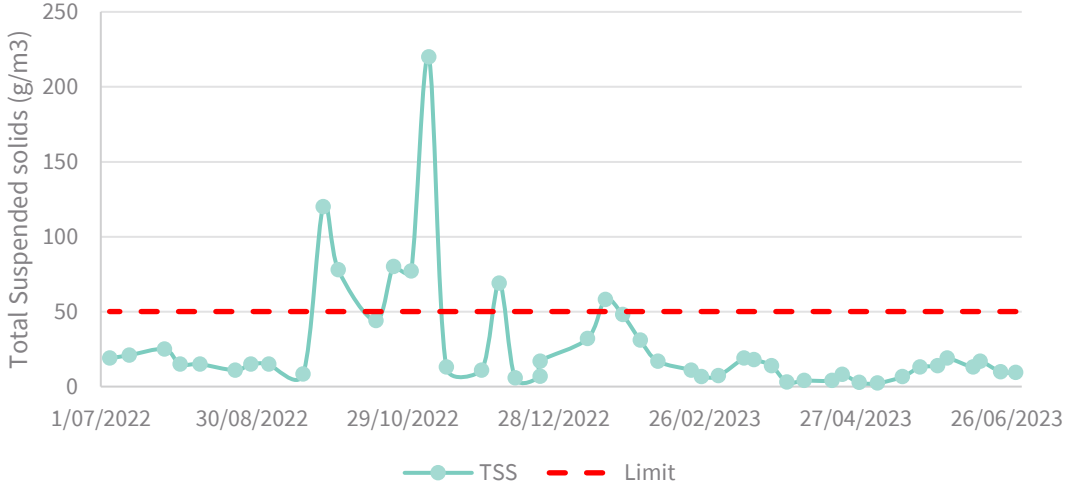
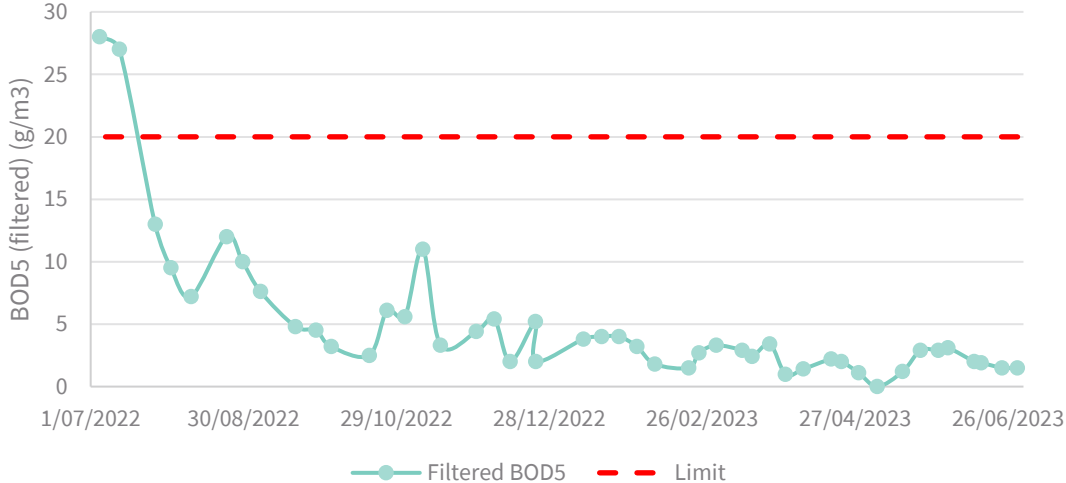
Condition 4 – discharge flow rate - FY 23



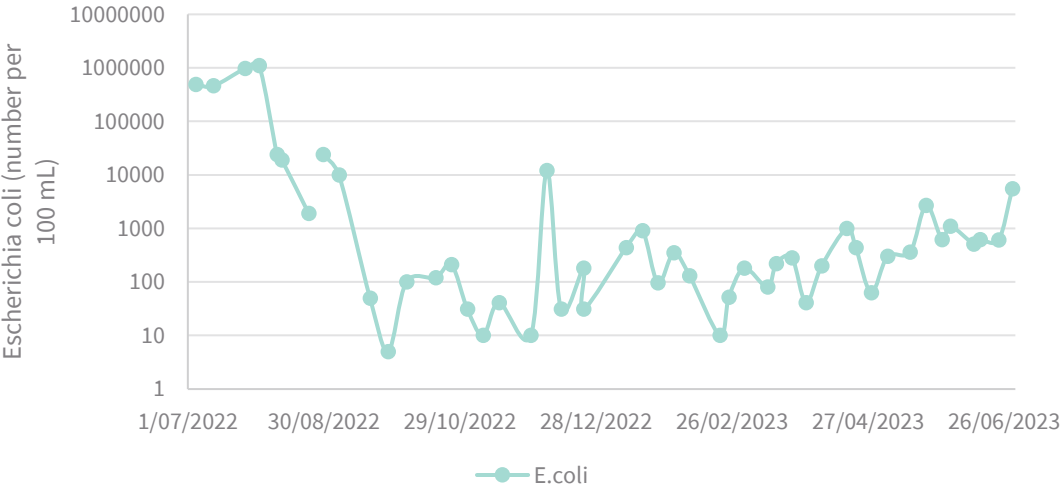
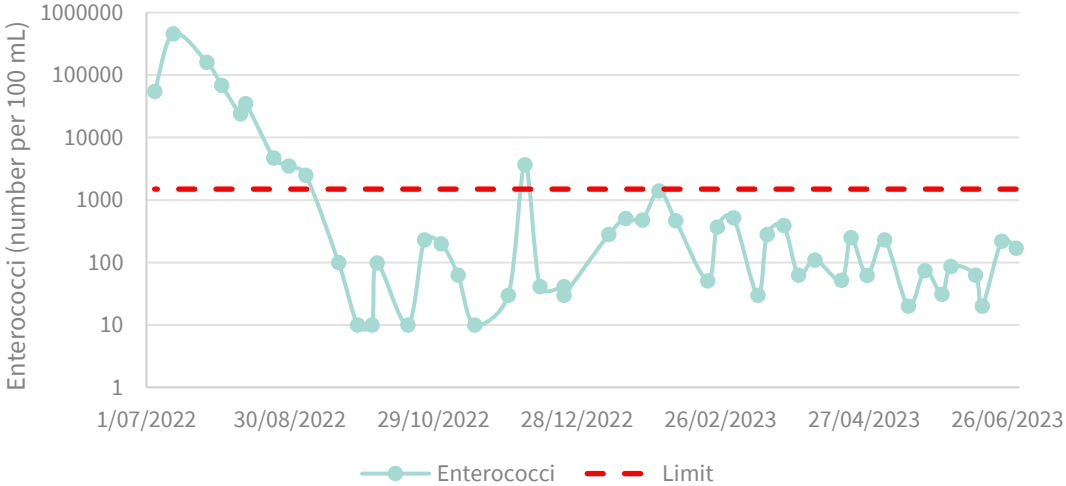
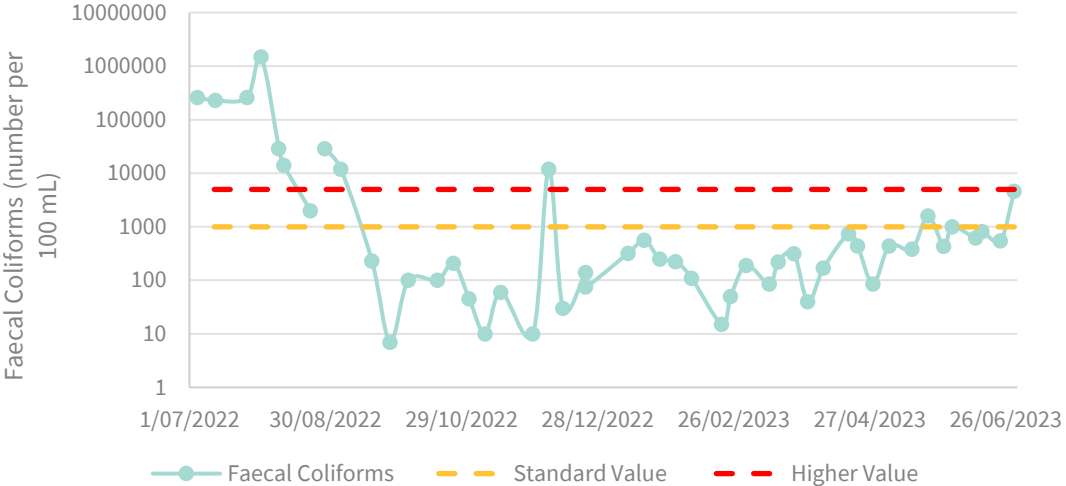
Condition 13c – Weekly Monitoring - FY 23



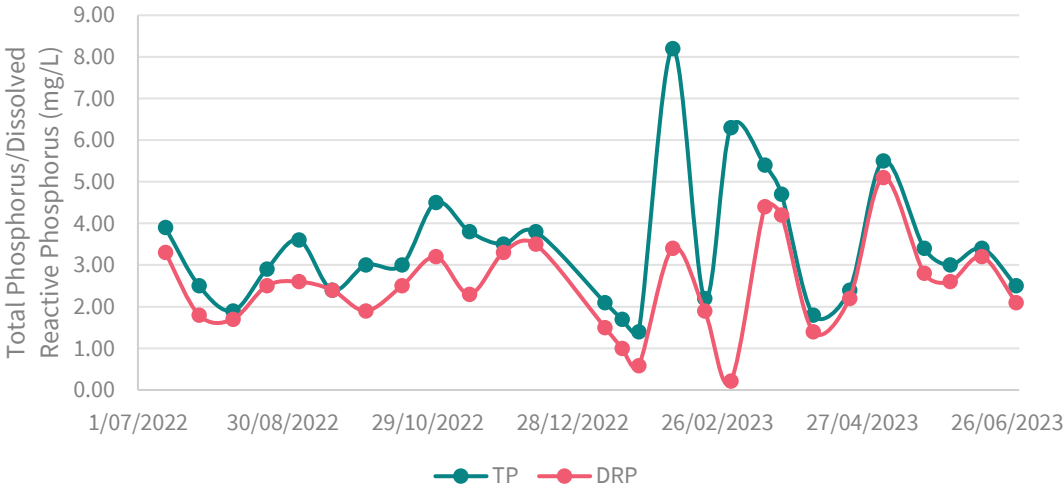
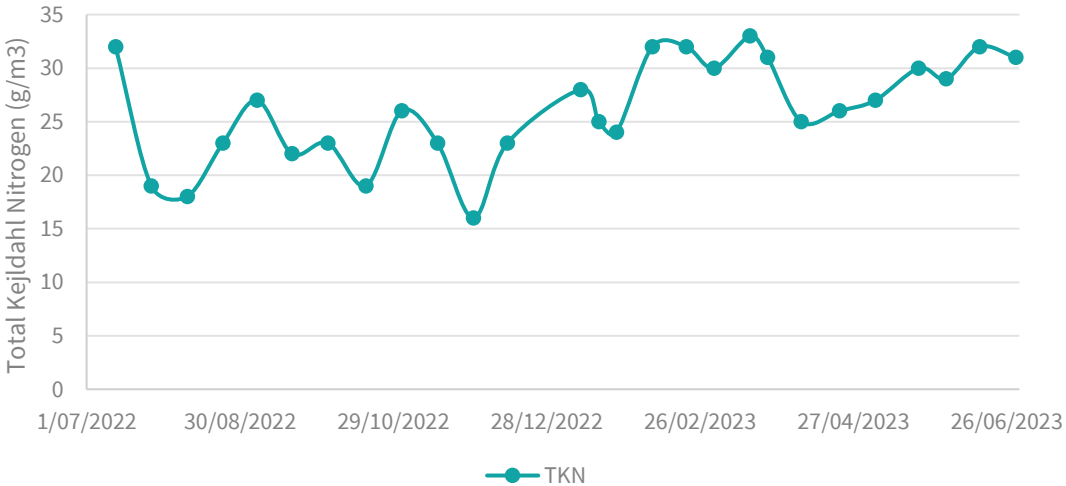
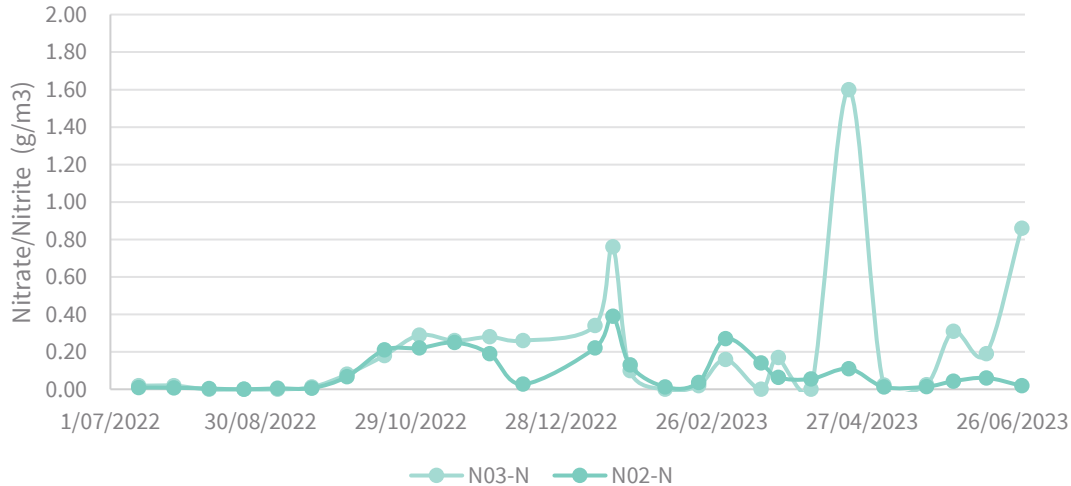
Condition 13c/15a – Weekly Monitoring - FY 23



Condition 13c/16a – Weekly Monitoring - FY 23



Condition 13d – Two Weekly Monitoring – FY 23



Condition 13e – Annually Monitoring – FY 23

Date	Salmonella sp.	Campylobacter sp.	Giardia	Cryptosporidium	Adenovirus	Enterovirus
	MPN/100 mL	MPN/100 mL	Count/10L	Count/10L	Quantitation by culture	Quantitation by culture
14/4/2023	<0.3	0.4	0.67	<0.67	8	0

Condition 13f – Six Monthly Metals Monitoring – FY 23

Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
20/07/2023	0.0026	<0.001	0.0051	0.0034	<0.001	0.002	0.017	<0.00005
3/04/2023	0.002	<0.001	0.0028	0.0019	<0.001	0.014	0.009	<0.00005
24/01/2023	0.0053	<0.001	0.003	0.0032	<0.001	0.035	0.013	<0.00005
18/10/2022	0.003	<0.001	0.0022	0.0038	<0.001	0.0043	0.014	<0.00005
5/07/2022	0.0026	<0.001	0.002	0.016	<0.001	0.002	0.031	<0.00005

Condition 13g – Annually Monitoring – FY 23

Test	Result (print out is available)
Organochlorine pesticides	All below the detection limit
Organophosphate pesticides	All below the detection limit, except Hexazinone 0.72 mg/m ³
Polychlorinated biphenyls	All below the detection limit
Polycyclic aromatic hydrocarbons	All below the detection limit

Condition 21 Two Yearly Ocean Water Monitoring – FY 23

Test	North of Diffuser	South of Diffuser	West of Diffuser	East of Diffuser
Temperature (°C)	18.1	18	17.9	18.1
Dissolved Oxygen (g/m3)	9.82	9.85	9.93	9.8
Salinity	33.3	33.5	33.0	33.6
TSS(g/m3)	4.57	3.58	4.56	2.13
Oxides of nitrogen(g/m3)	0.0306	0.0383	0.0205	0.032
Ammoniacal(g/m3)	0.0053	0.0049	0.0051	0.0046
DRP (g/m3)	0.0029	0.0022	0.0022	0.0017
Chlorophyll-a (mg/m3)	2	2	2	2
Faecal coliforms (CFU/100mL)	<1	1	<1	<1
Enterococci (MPN/100mL)	<10	<10	<10	<10

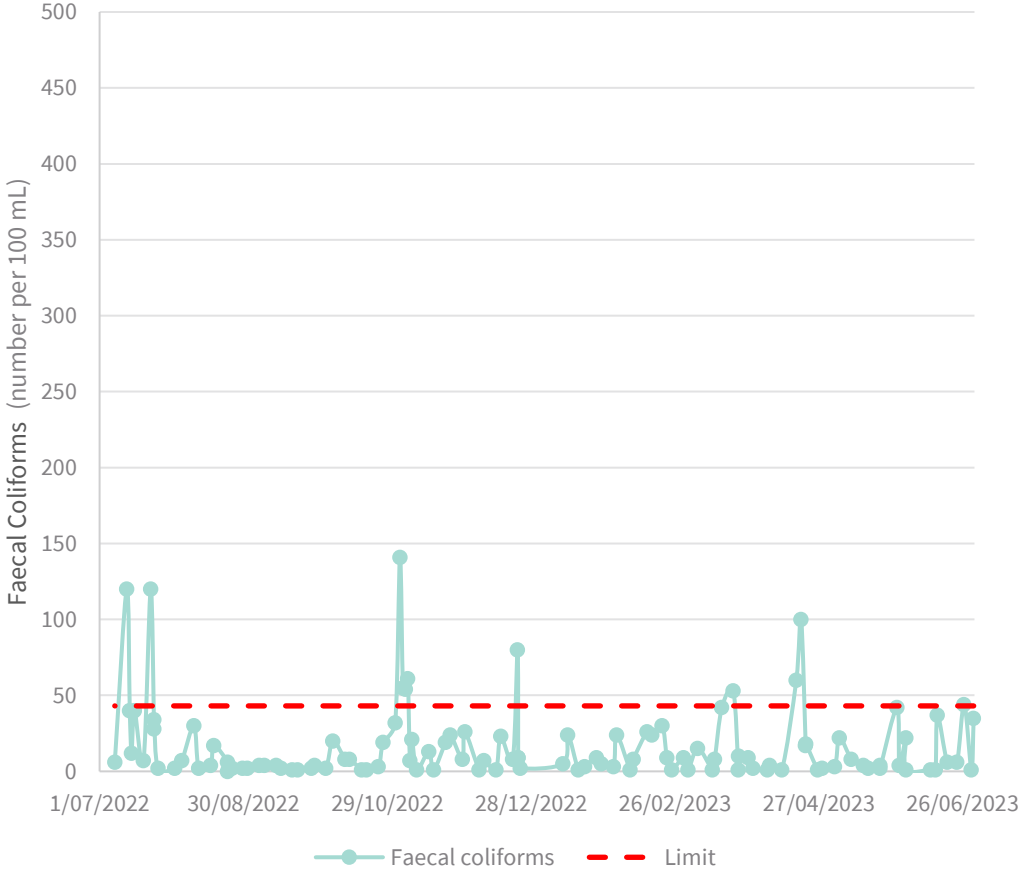
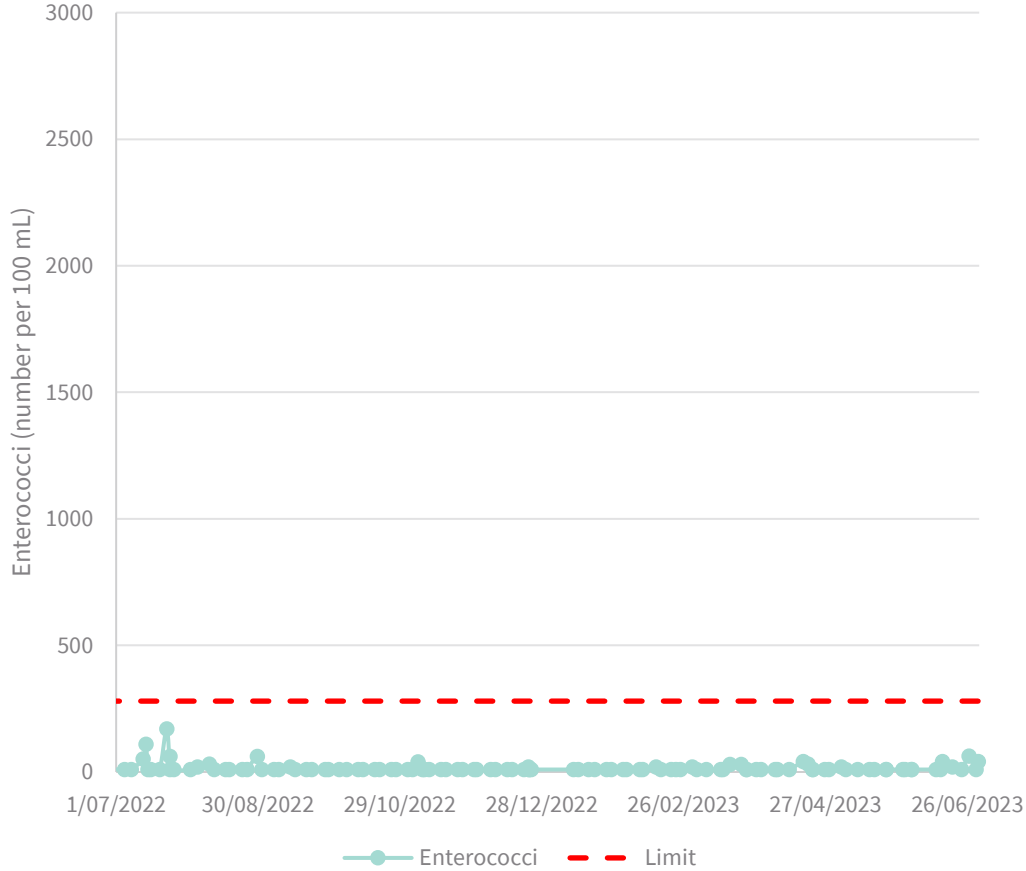
Condition 21 Two Yearly Ocean Water Monitoring – FY 23 cont.

Test	North of Diffuser	South of Diffuser	West of Diffuser	East of Diffuser
Cadmium acid extractable (g/m3)	0.00027	0.00026	0.00026	0.00026
Arsenic acid extractable (g/m3)	0.00418	0.00299	0.00262	0.00236
Zinc acid extractable (g/m3)	0.00444	0.00628	0.00351	0.00475
Nickel acid extractable (g/m3)	0.00106	0.00137	0.00119	0.00114
Chromium acid extractable (g/m3)	0.00050	0.00070	0.00067	0.00047
Lead acid extractable (g/m3)	0.00076	0.00050	0.00040	0.00035
Copper acid extractable (g/m3)	0.00035	0.00022	0.00020	0.00044

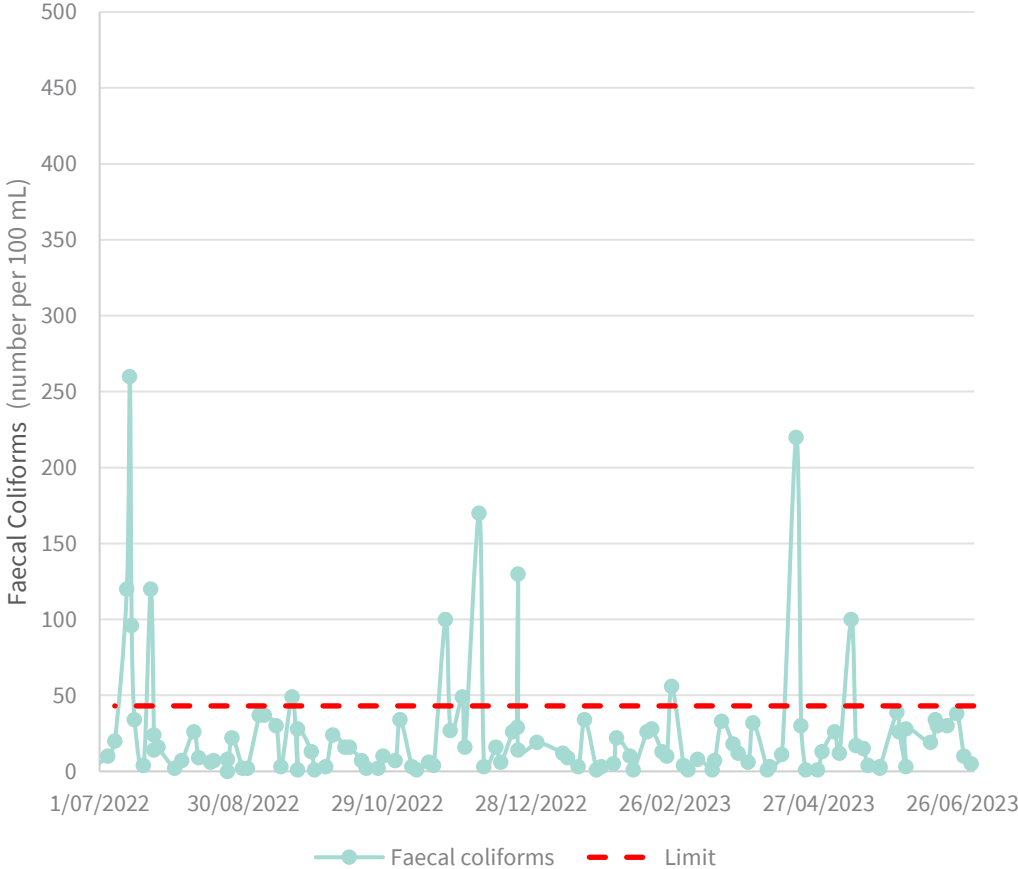
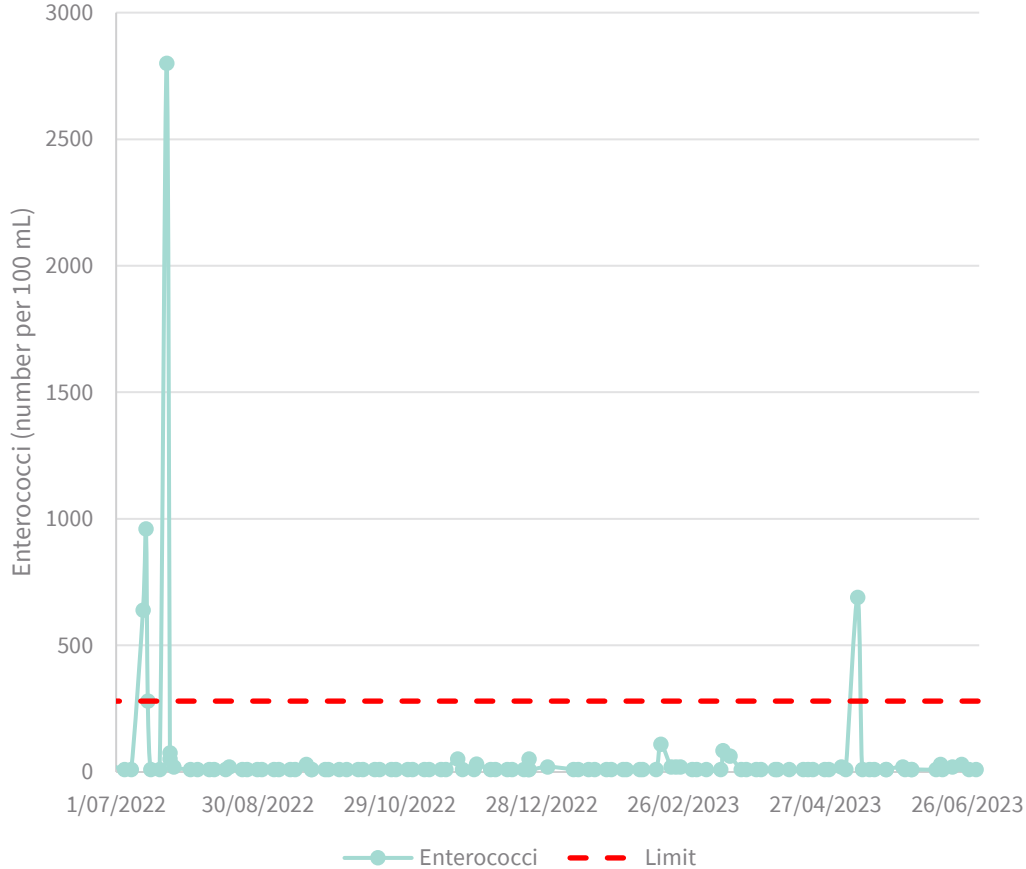
Condition 21 Two Yearly Ocean Water Monitoring – FY 23 cont.

Test	North of Diffuser	South of Diffuser	West of Diffuser	East of Diffuser
Colour (field)	Colourless	Colourless	Colourless	Colourless
Clarity	Turbid	Turbid	Turbid	Turbid
Odour	Moderate	Moderate	Moderate	Moderate
Beaufort number	2	2	2	2
Cloud cover (0-8)	2	2	2	2
Wind direction	225	225	225	225
Site Appearance	Normal	Normal	Normal	Normal
Phytoplankton (S)	Print out available			

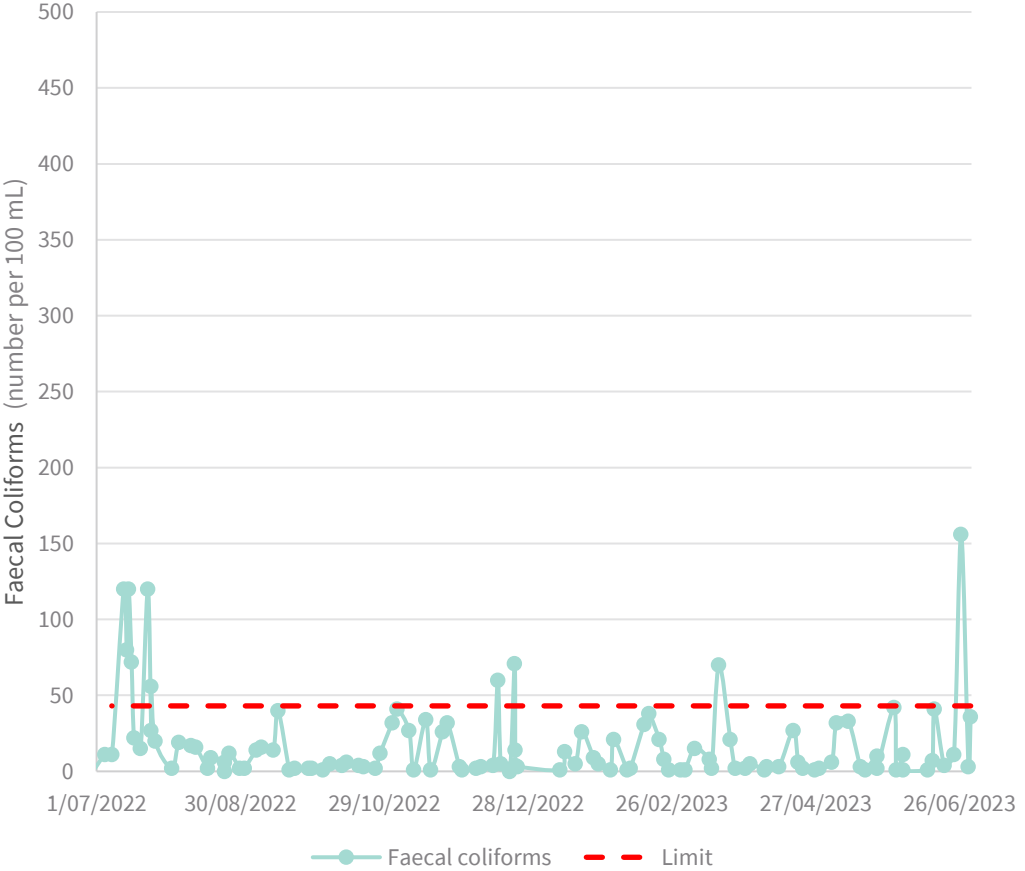
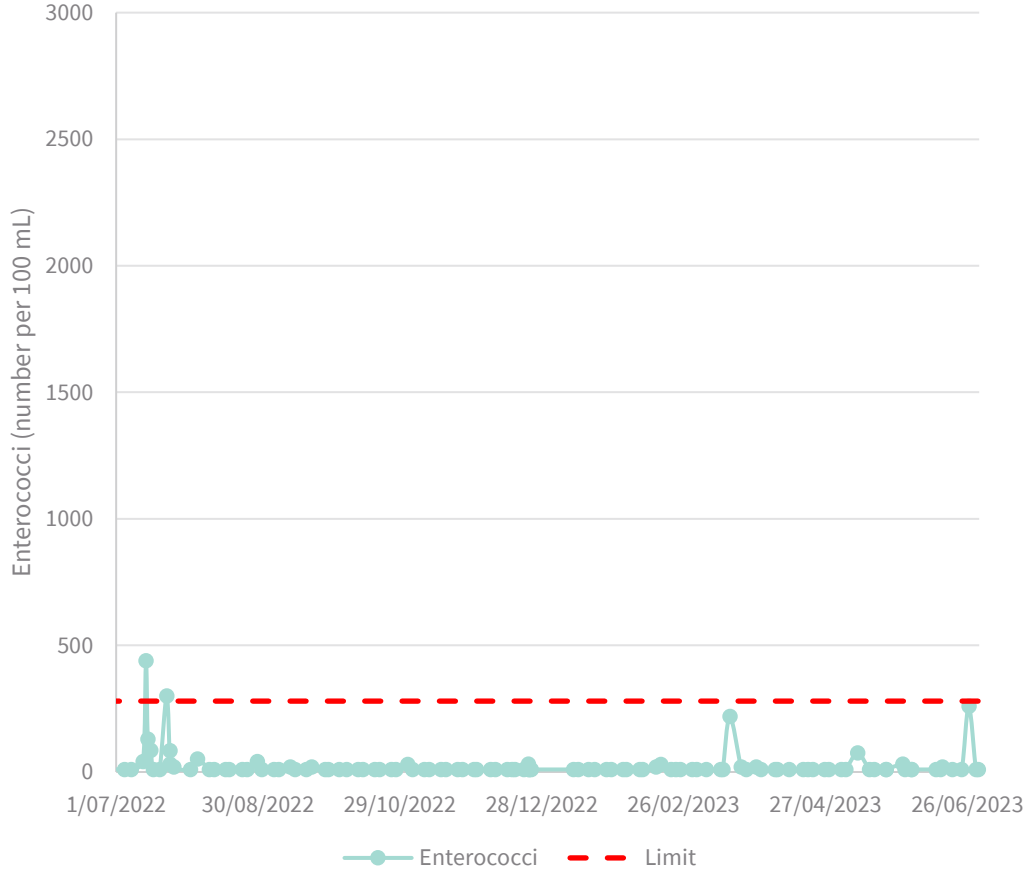
Condition 18 –Receiving Environment Monitoring New Brighton Surf Club – FY23



Condition 18 – Receiving Environment Monitoring Sumner Beach – FY23



Condition 18 – Receiving Environment Monitoring South New Brighton Beach – FY23



Condition 23-26 Five Yearly Receiving Environment Monitoring – FY 22 (print out is available)



SUMMARY

Christchurch City Council was granted resource consents from Environment Canterbury (ECAN) for the construction, operation and maintenance of a new ocean outfall in 2006. The outfall was formally commissioned on 10 March 2010. Consent no. CRC051724 requires the monitoring of effects on the receiving environment. The 2022 survey of the ocean outfall is the third survey carried out since commissioning in 2010. Prior to construction and commissioning, surveys were conducted to obtain information about the physical and chemical properties of surface sediments and biological communities.

The 2022 survey involved collection of samples of sediment and seabed biota as required by the resource consent at sites around the outfall and at a control site near the Waimakariri River mouth. Sediment samples were examined for texture, total organic carbon, nitrogen and phosphorus and trace elements. Sediment cores were examined for infauna and the epibenthic fauna was examined using dredge tows.

- Sediment contained significantly higher concentrations of TOC, nitrogen, arsenic, lead, nickel and zinc concentrations in sediments collected within 200m of the outfall, than those collected beyond 200m of the diffuser. The samples collected further away from the diffuser contained a slightly higher percentage of mud on average than samples collected close to the diffuser. The average differences in contaminants between the two groups of sediments were small.
- PCA and cluster analysis of the 2022 sediment quality data showed the outfall sites were different to the control sites based on the percentage of mud and concentrations of copper, cadmium and mercury. Sites to the west were different to those nearer the outfall and south because of elevated percentages of gravel.
- Contaminant / mud ratios showed all parameters were elevated around the outfall compared to the control sites.
- The concentration of all parameters was lower than identified ANZECC limits and therefore consent limits. The low concentrations of trace elements in sediments indicate that the sediment quality should not be having any significant adverse effects on sediment infauna.

The examination of the benthic community in 2022 has shown:

- Higher abundance and richness in the eastern sample sites.
- No significant increases in abundance or richness with distance from the outfall and no significant patterns in species diversity.
- Analysis of the benthic communities as a whole showed that only one control site was significantly different from the outfall sites and that two other sites (N2500 and N200) were significantly different from the other outfall sites.
- Abundance and richness varied significantly between survey years but fell within the range of baseline levels in 2022. The average faunal abundance had decreased at all sites compared to 2012, controls included, but were very similar to the 2018 survey.
- The benthic community was similar to the 2018 survey, but statistically different to the 2012 and 2007 surveys. Some of this difference could be attributed to some degree by variations in the level of resolution for some taxonomic groups, which provided some limitations in the detail of benthic community structure.



Sediment quality suggests that the control sites are different from the outfall sites, while benthic community structure was inconclusive with one control site not statistically separated from a large proportion of the outfall sites. The northern sites contained high abundances of the polychaete worm *Heteromastus* which is generally indicative of a disturbed environment. The lack of significant differences amongst the other sites, and the inconclusive control sites suggest factors other than the outfall and discharge have a strong influence on the benthic community. Based on the results from the 2022 survey, the discharge is not having a significant effect on the benthic community.

Current and anticipated compliance with the resource consents

- We are currently complying with all resource consent conditions
- We don't see any adverse environmental effect from our ocean outfall

Thank you for your time & attendance

- Any questions?