Duvauchelle Wastewater Treatment Plant

Annual Report
July 2023 to June 2024

CRC230358

Christchurch City Council

Contents

1. Introduction

1.1 Background

The settlement of Duvauchelle lies at the northern end of Akaroa Harbour on State Highway 75. It is a popular destination particularly in summer when the use of holiday houses and the local campground increases the population. Christchurch City Council (Council) operates the Duvauchelle Wastewater Treatment Plant (WWTP) located at 6137 Christchurch Akaroa Road. Treated wastewater is discharged into Akaroa Harbour via a 1750m long outfall pipeline of 150mm diameter. Figure 1-1 shows the location of the WWTP, associated infrastructure including catchment pump stations and outfall. The boundary between the Class Coastal Recreation (CR) water quality area (to the north of the line) and Class Shellfish Gathering (SG) water quality area (to the south of the line) as prescribed in the Canterbury Regional Coastal Environment Plan, is also shown.

1.2 Description of Wastewater Scheme

The Duvauchelle WWTP was commissioned in 1988 at the location shown in Figure 1-1. There were minor upgrades in 1996 and 2002. The WWTP serves a community of approximately 180 permanent residents. In summer, the population increases significantly due to visitors to the campground and holiday homes. There are approximately 250 dwellings within the settlement. The peak design capacity population is just under 900 population equivalents (PE). The plant can accommodate a peak flow of at least 600m3/day1. Raw wastewater is pumped to the WWTP from two pumping stations (PS 608 and PS 609) which are fed by the local gravity sewerage network. These pumping stations are located on SH75 near the garage (to the south of the Akaroa

Golf Club) and in the campground. Figure 2-1 shows the catchment served by the WWTP. Currently, the incoming wastewater receives both primary and secondary treatment (which comprises initial screening, primary sedimentation, rotating biological contactors, secondary sedimentation tanks and sludge decant tanks), followed by UV disinfection before discharge through an outfall into Akaroa Harbour. Sludge is stored on site in sludge decant tanks and is periodically trucked to the Christchurch WWTP for processing into biosolids.

2. Conditions Monitored for Annual Report

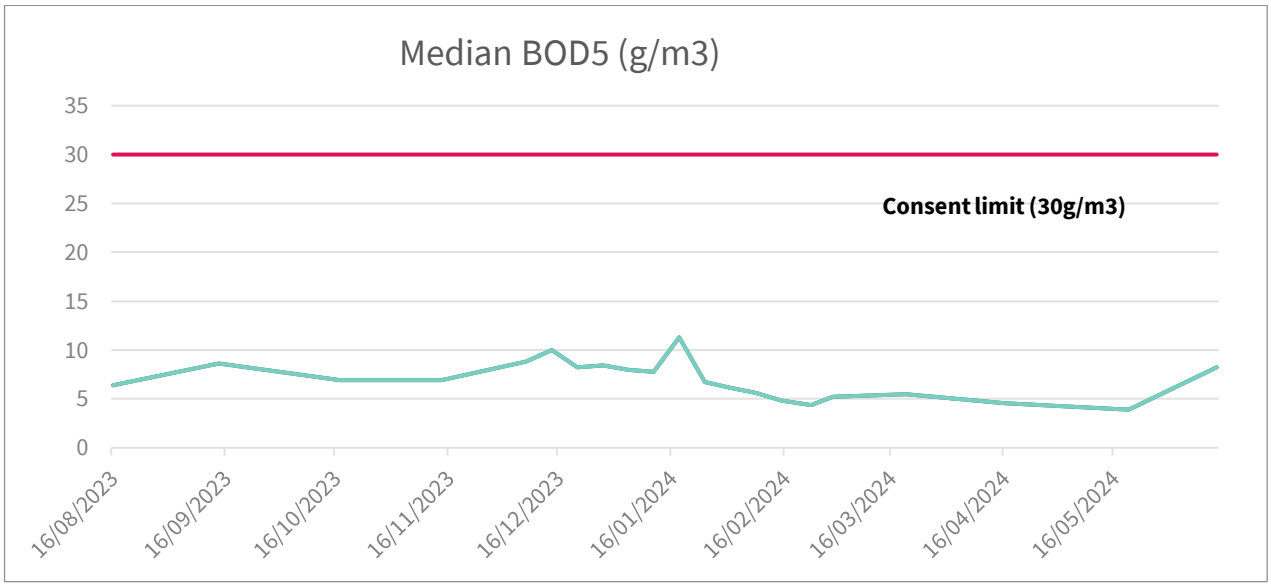
Conditions 22a and 22b

results of the monitoring required under this resource consent undertaken in the previous year from 1 July to 30 June.

- See attached excel document for these records in full.

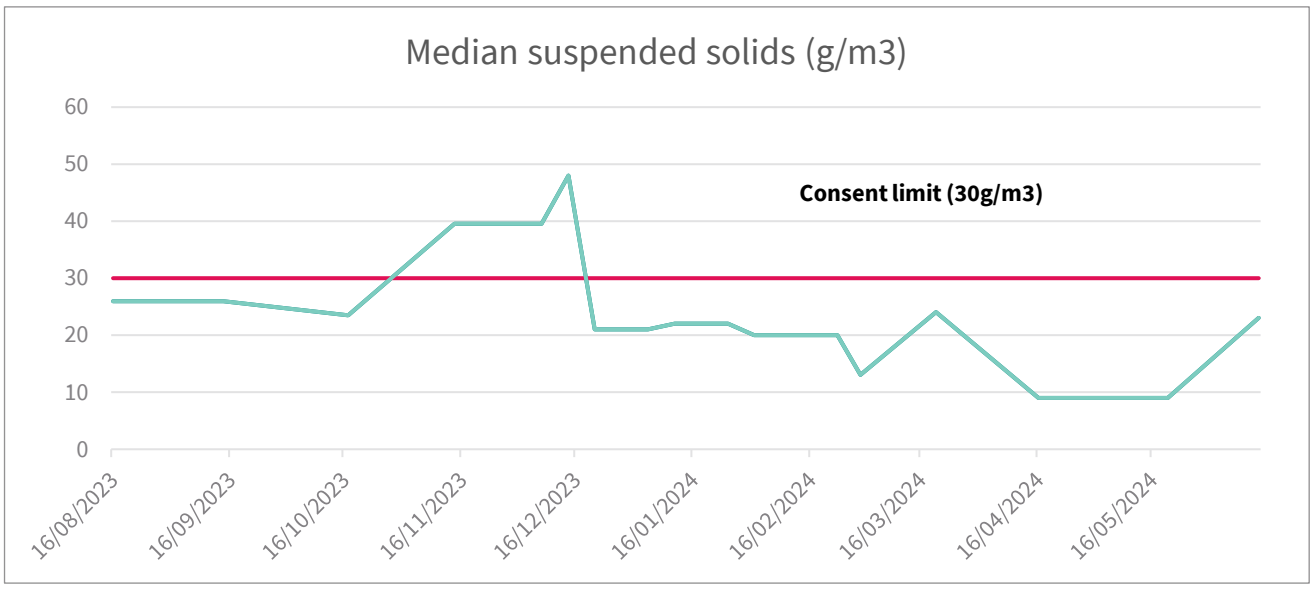
Graph of flow (250m3 /day, rain 750m3 /day)

BOD5



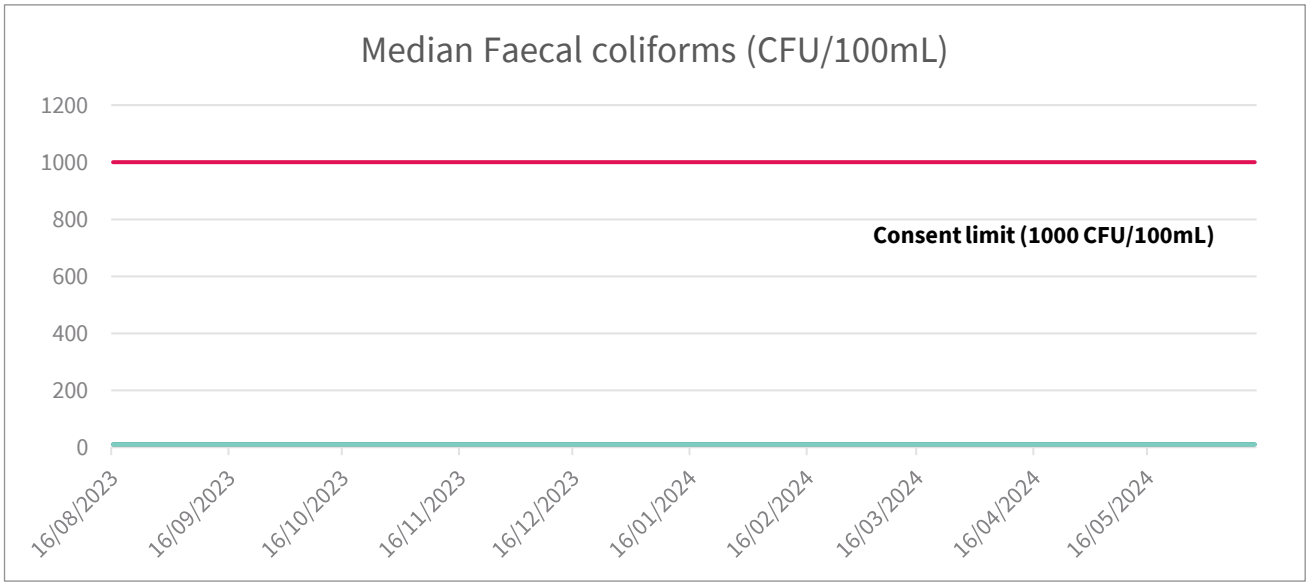
There have been no exceedances of the consent Limit of 30 g/m3 during this reporting period.

Total Suspended Solids (TSS)



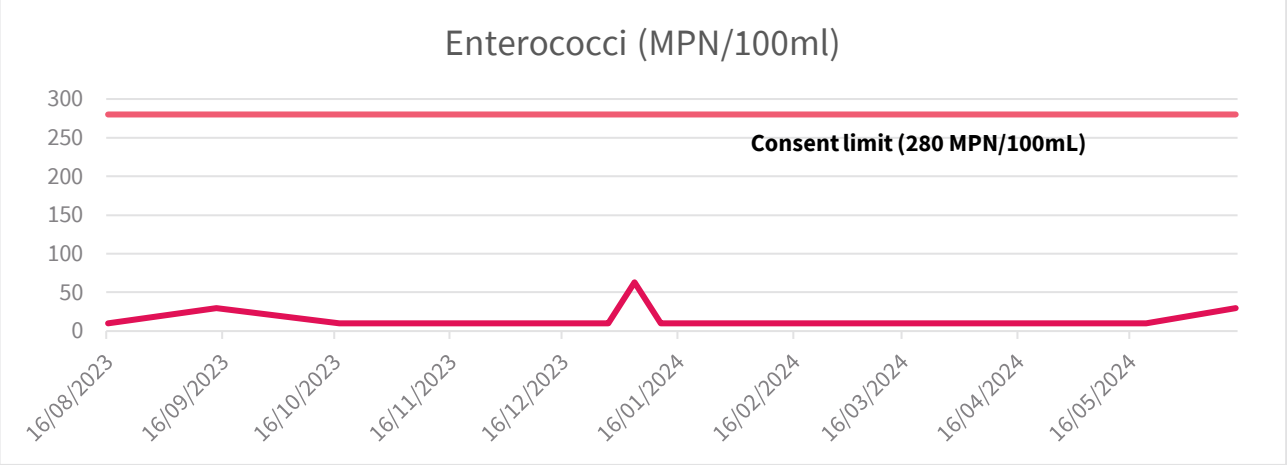
There have been three exceedances of the TSS consent Limit sampled over the year, with 39.5g/m3 on 14/11/20243 and 7/12/2023 and 48g/m3 14/12/2024. These exceedances occurred during the busy summer period where the flow through the plant is at such a high volume that the normal settling time is not achieved.

Faecal Coliforms



There have been no exceedances of the consent Limit of 1,000 CFU/100mL.

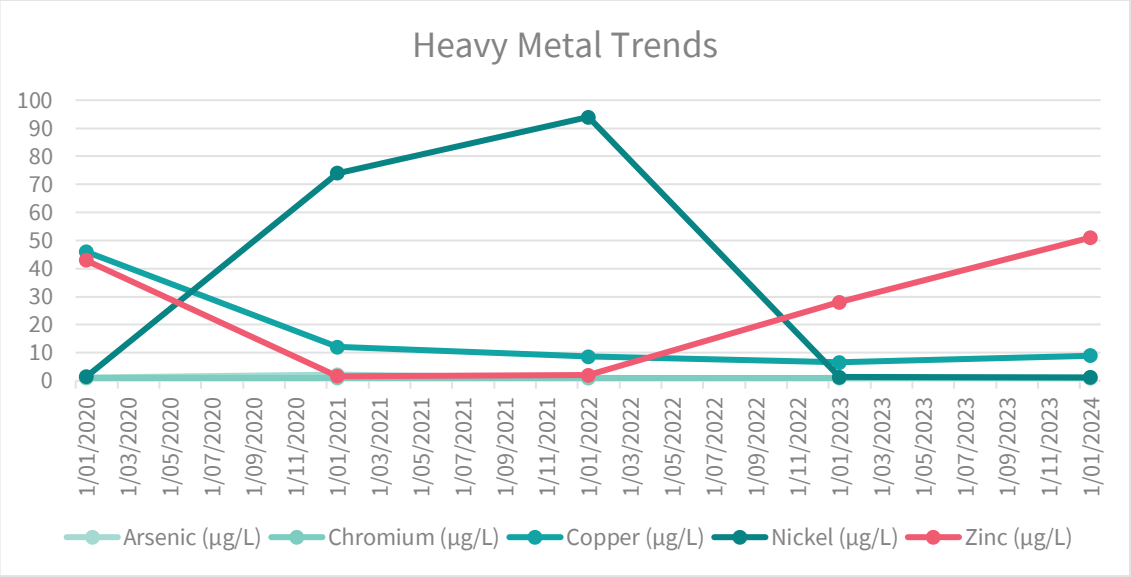
Enterococci



There have been no exceedances of the consent Limit of 280 MPN/100mL.

Heavy Metal Sampling of Treated Wastewater

Date Sampled	Arsenic (µg/L)	Chromium (µg/L)	Copper (µg/L)	Nickel (µg/L)	Zinc (µg/L)
11/1/2024	<1	<1	8.98	1.2	51
06/01/2023	1	1	6.6	1.3	28
12/1/2022	1	1	8.6	94	2
6/1/2021	2.2	1	12	74	1.6
3/1/2020	1.2	1	46	1.4	43



Guideline values for heavy metals - ANZECC & ARMCANZ (2000)

Heavy metal	Publish Date	Level of species protection	µg/L	Medium
Arsenic (AsIII)	2000	95%	24	Freshwater
Arsenic (AsV)	2000	95%	13	Freshwater
Chromium (CrIII)	2000	95%	27	Marine water
Chromium (CrVI)	2000	95%	4.4	Marine water
Copper	2000	95%	1.3	Marine water
Nickel	2000	95%	70	Marine water
Zinc	2021	95%	8.0	Marine water

It is not possible to derive DGVs that would be appropriately applicable to all estuarine waters all the time. Estuaries are typically brackish. In addition to the lack of relevant ecotoxicological data, estuarine systems are highly variable and dynamic, especially in relation to their salinity and turbidity.

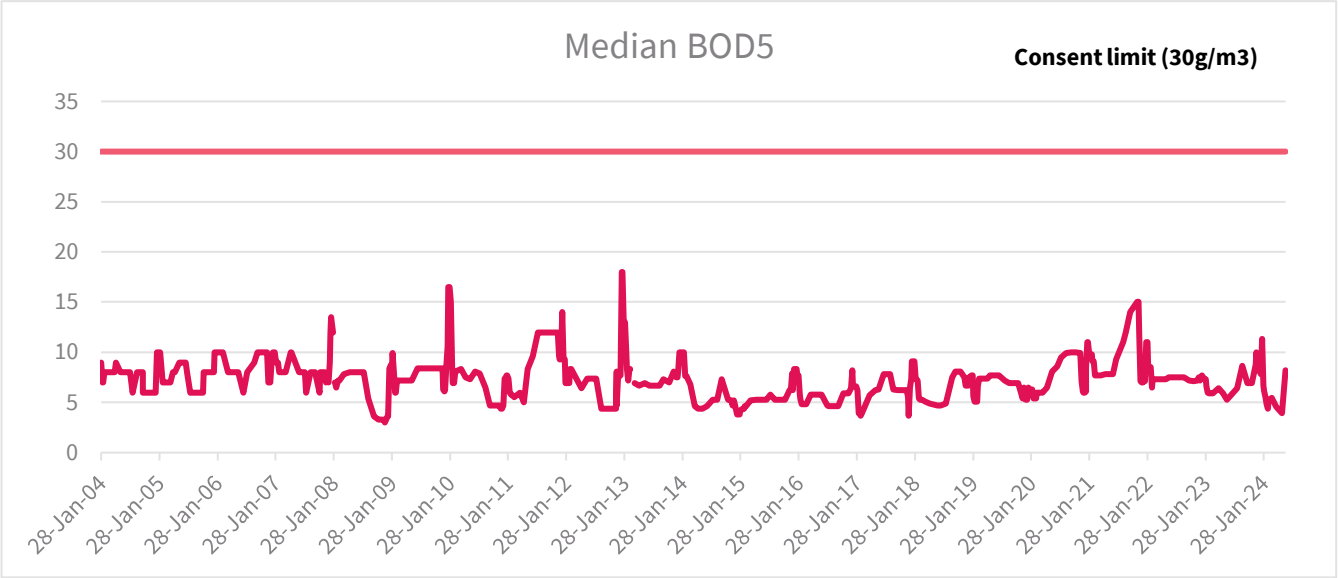
The heavy metal samples taken at the Duvauchelle WWTP are also measured at the point of discharge before the outfall. These samples do not consider the dilution factor which applies once the WWTP discharge enters the estuarine environment.

Nitrogen and Phosphorus

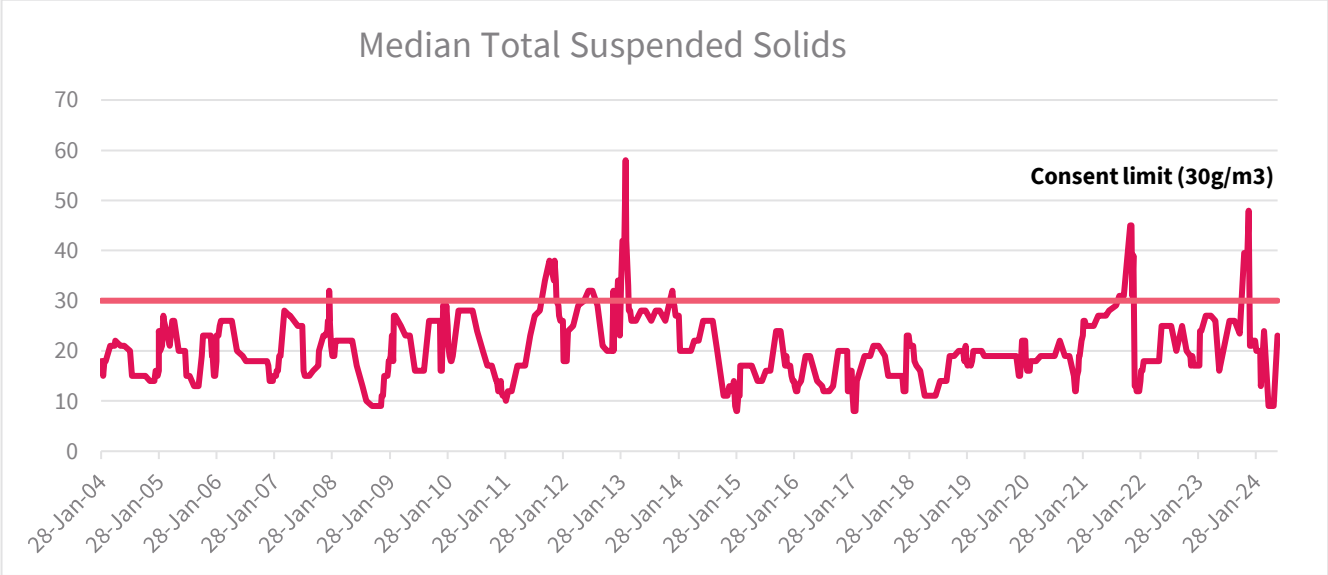
The 95th percentile of Ammonical Nitrogen, Total Nitrogen and Dissolved Reactive Phosphorus (DRP) has been calculated using at least 12 consecutive treated wastewater samples.

Date sampled	Ammonical Nitrogen 95th percentile	Total Nitrogen 95th percentile	DRP 95th percentile
16/8/2023	5.55	6.82	5.55
14/9/2023	5.55	6.8	5.55
17/10/2023	6.23	7.18	6.23
14/11/2023	6.23	7.18	6.23
7/12/2023	6.23	7.18	6.23
11/01/2024	6.23	7.18	6.23
8/02/2024	6.66	7.38	6.66
20/03/2024	6.66	7.18	6.7
16/04/2024	6.62	6.86	6.63
20/05/2024	6.63	6.78	6.63
13/06/2024	6.63	6.89	6.63
Consent Limit	**36 mg/L**	**60 mg/L**	**8 mg/L**

Condition 22c *Comparison of the monitoring results required in Conditions (4), (8), (9), (10), (11), (12), (13), (14) and (17) with historical data.*

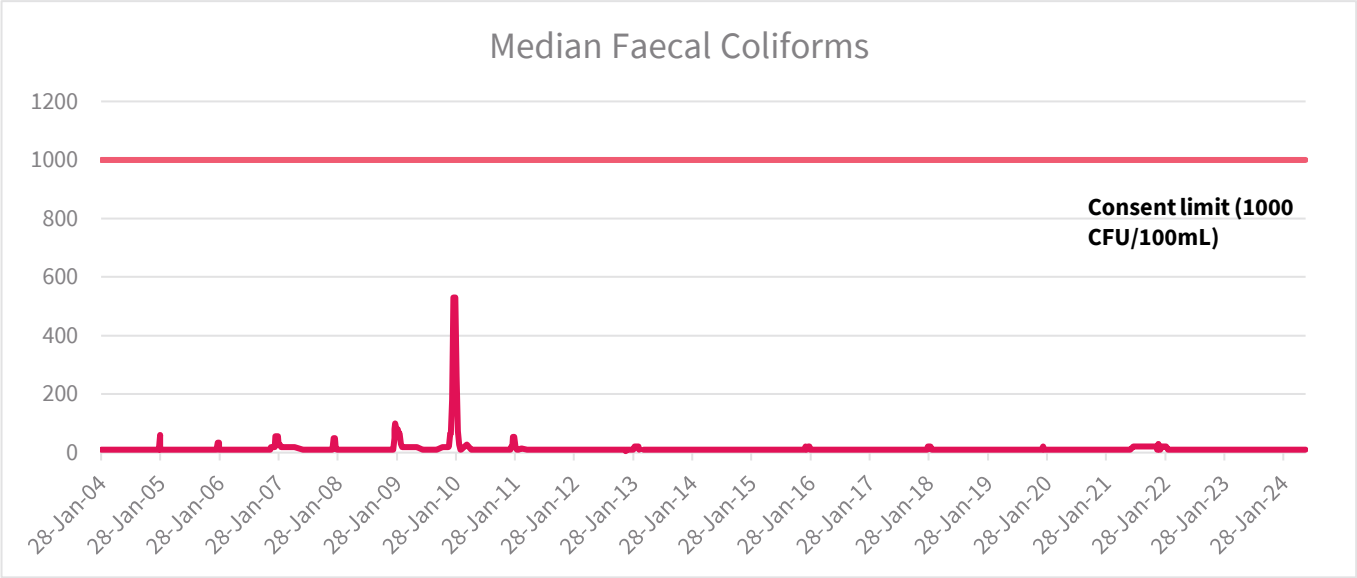


The median concentration of five-day biological oxygen demand in the treated wastewater has not exceeded the consent limit of 30 grams per cubic metre since records were kept starting in 2004.



The median concentration of suspended solids in the treated wastewater has not often exceeded the consent limit of 30 grams per cubic metre since records were kept starting in 2004.

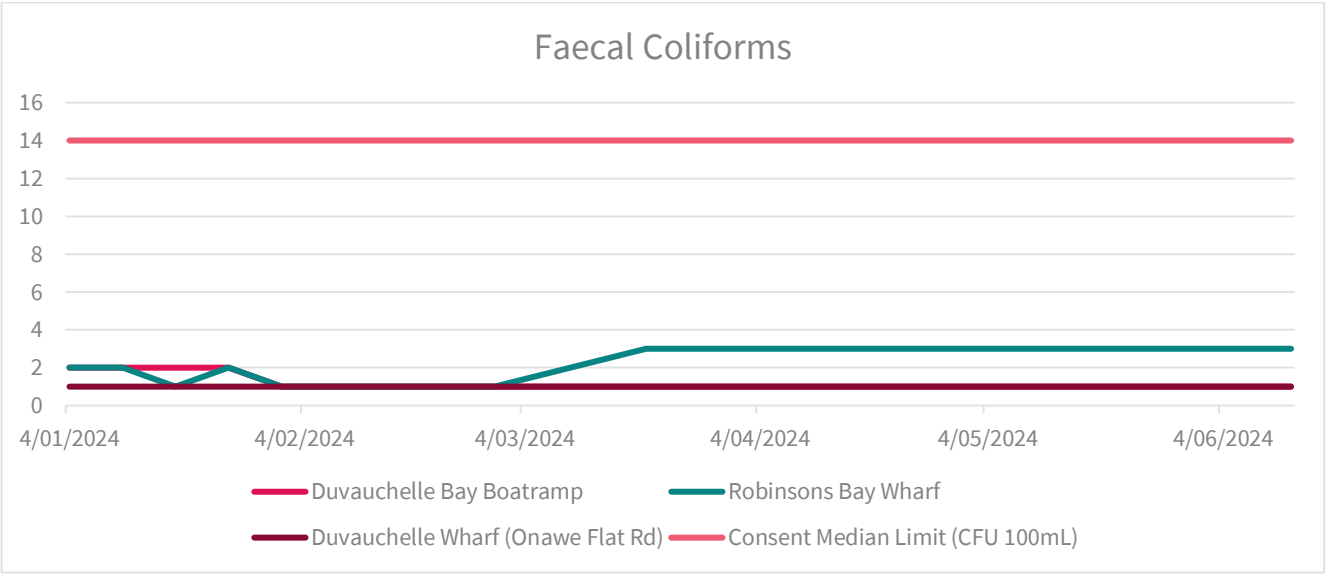
The occasional spikes of higher results have all fallen during the busy summer months, where the exponential increase in population visiting for the summer has increased the load on the WWTP. These higher TSS numbers are due to the high flows not allowing as much settling time for the wastewater.

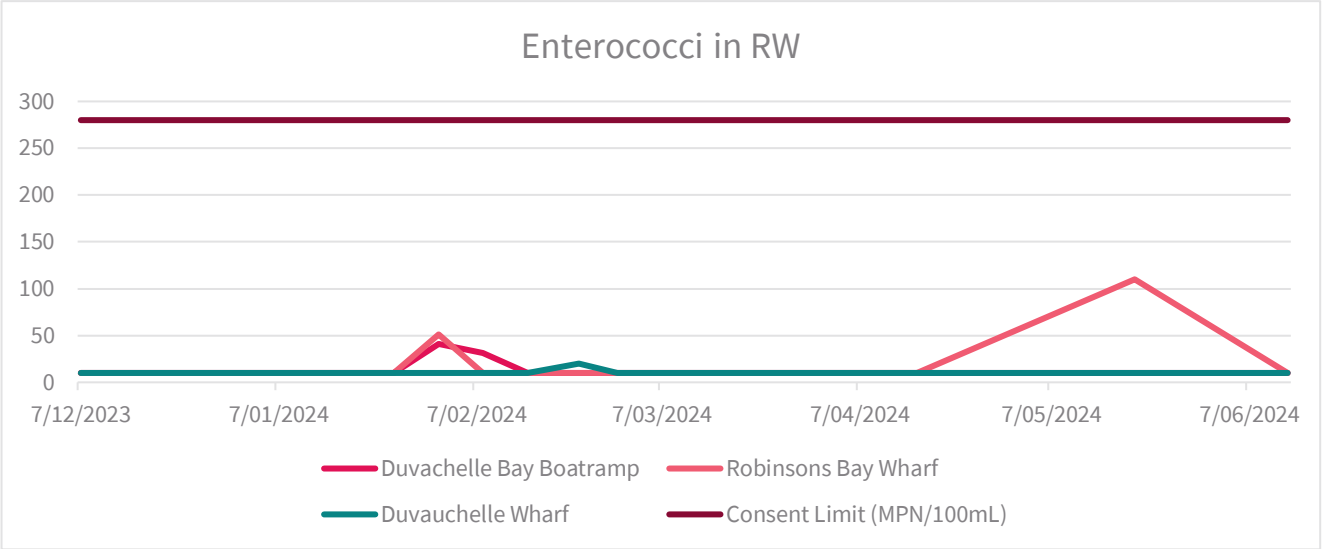


The median concentration of five-day biological oxygen demand in the treated wastewater has not exceeded the consent limit of 1,000 coliform forming units (CFU) per 100 millilitres of treated wastewater since records were kept starting in 2004.

Condition 22d *An interpretation of the monitoring results in relation to the effects of the discharge on the environment,*

The water of the receiving environment is sampled in three locations, weekly between 1 December and the last day of February, and monthly from 1 March to 30 November. These samples are analysed for faecal coliforms and enterococci concentrations. All samples collected within the period of 1 December to the last day of February each year, are further analysed to check that the concentration of faecal coliforms does not exceed a rolling median of 14 CFU per 100 millilitres based on the previous five samples.





There were exceedances of the rolling median of 14 CFU per 100 millilitres based on the previous five samples, during the week surrounding the Christmas Holiday.

There were no single sample exceeding 280 enterococci per 100 millilitres.

Condition 22e *Summary of what measures the Consent Holder has implemented or will implement to mitigate any adverse environmental effects as a result of the exceedances of any trigger values and to prevent a reoccurrence.*

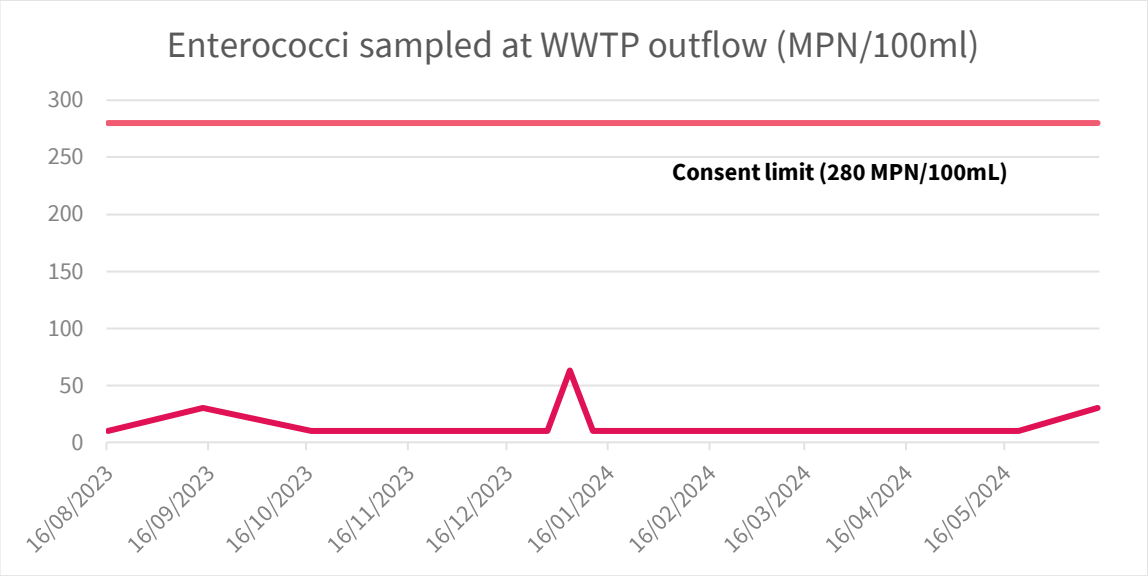
We have implemented an upgrade to the UV control, which should work to reduce levels of Enterococci once it is implemented.

Summary of CRC230358 **condition 16a. ii breach**

	Archdalls Beach					Robinsons Bay Wharf				
Sample date	Sample time	Temperature (°C)	Lab sample no.	Faecal coliforms (CFU/100mL)	Enterococci (MPN/100ml) (limit 280 MPN)	Sample time	Temperature (°C)	Lab sample no.	Faecal coliforms (CFU/100mL)	Enterococci (MPN/100ml) (limit 280 MPN)
21/12/2023	12:20	18.5	2321741	105	2800	11:30	19.1	**2319747**	1	10
28/12/2023	13:00	19.1	2321742	3	10	12:50	17.5	**2319758**	2	10

- To support the process of changing the sampling point from Archdalls Beach to Robinsons Bay Wharf, I requested that a few reference samples be taken at Archdalls Beach to show that FC and Entero levels were the same.
- The sample taken from Archdalls Beach on **21/12/2023** returned a result of **2800MPN/100mL** for Enterococci.
- We acknowledge that we didn't inform you on time about the results. Please consider that this is a new consent, with different notification requirements from the old one, as well as there being uncertainty around the sample point location.
- We failed to comply with the notification deadline, and we apologise for that.

We are **confident** that the high Enterococci result has not originated from the Duvauchelle WWTP, as the sample results for the treated effluent have been at **10 MPN/100mL** since October and were 10 MPN/100mL on the day too.



An email was sent to MKT on 15/04/2024 to see what their opinion on changing sample points would be.

Follow up email sent on 23/07/2024.

8/8/2024 – an email was received from MKT, which said that Kaitiaki for Ōnuku Rūnanga have reviewed this information and have ok'ed the proposed sampling point.

Condition 22f *Details of any changes or upgrades to the wastewater treatment plant that may affect the quality or volume of treated wastewater discharged.*

- The wastewater treatment plant was built up against the base of an old quarry. The rockface at the top of the quarry cliff has become unstable due to natural processes. This was first noticed in mid-2023, and rocks were found in the sludge tank, and PST of the line closest to the rock face. Throughout the next 12 months, we discovered that the rockface was more stable than first though and we have been able to reopen the second treatment line, with only the final sludge tank remaining closed.
- The treated water quality samples for July 2023 were not able to be taken, because at this stage access was uncertain into the treatment plant.

Condition 22g *Details of any outfall monitoring undertaken in the reporting period, required under Condition 19 (outfall pipe condition inspection)*

Outfall monitoring is set out to be undertaken every 2 years after the commencement of this consent. The next outfall monitoring is due to occur in July 2025.