Kāpiti Coast
DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

Ōtaki Wastewater Treatment Plant

Resource Consent Annual Compliance Report 2023-24

[FINAL FOR SUBMISSION]

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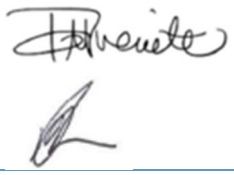
Prepared by	Tess Drewitt, Compliance Consultant Ben Thompson, Water Conservation & Trade Waste Officer		11/09/2024
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Executive Summary

This report has been compiled in accordance with the reporting requirements in Condition 43 of resource consent WGN160002 that authorises discharges to land and air from the Ōtaki Wastewater Treatment Plant (WWTP) at Riverbank Road in Ōtaki. The Council must provide an Annual Report to Greater Wellington Regional Council (GWRC) for the previous financial year by 30 September each year.

The following table summarises compliance with consent conditions for 2023/24.

Resource consent condition	No.	Compliance
General conditions	1 & 2	🟢
Land Discharge & Treatment Area (LDTA) optimisation study and report	3, 4 & 5	🟢
Operations and maintenance manual	6, 7 & 8	🟢
Maximum discharge rate	9 & 10	🟢
Wet weather storage capacity	11	🔴
Wastewater volume measurement	12 & 13	🟢
Monitoring wastewater flows	14	🟢
Monitoring pond effluent quality	15 & 16	🟢
Treated effluent standards:		
• ScBOD5	17(a)	🟢
• TSS	17(b)	🟢
• E. coli	17(c)	🟢
• NH4-N	17(d)	🔴
• DRP	17(e)	🟢
Monitoring groundwater and spring water	18, 19 & 20	🟢
Attenuation equilibrium	21	🟢
Inspection records and operational logs	22	🟢
Monitoring requirements	23	🟢
Performance and maintenance of the distribution system:		
• Maintenance of infiltration discharge area	24	🔴
• Perimeter bunding and setback distances	25 & 26	🟢
Reserve area for effluent discharge	27	🟢
Inflow and infiltration investigations, works and report	28	🟢
Odour management	29, 30, 31 & 32	🟢
Planting within the LDTA	33, 34 & 35	🟢
Perimeter planting	36	🟢
Fencing and signage	37	🟢
Iwi consultation	38 & 39	🟢
Community Liaison Group (CLG)	40	🟢

Resource consent condition	No.	Compliance
Complaints	41	
Incident notification	42	
Annual Report	43	

The Council is largely compliant with the consent conditions, except for:

- **Condition 11** regarding wet weather storage capacity – Wet weather storage capacity was less than 5,000 m^3 during Q1 of 2023/24. The Council implemented measures to ensure that capacity would be above 5,000 m^3 for the remainder of 2023/24.

- **Condition 17(d)** Limit 2 for Ammoniacal Nitrogen (NH_4-N) – Limit 2 was exceeded three times in 2023/24, which is one more exceedance than authorised by the consent conditions. The Council is upgrading the aerators in 2024/25, which will contribute towards ensuring that the discharge stays within the consented limits for NH_4-N going forward.

- **Condition 24** relating to the performance of the distribution system – The Council estimates approximately 30% of the LDTA is receiving effluent, which is less than 70% required by the consent conditions. The Council has proposed to upgrade the laterals in 2024/25, which will improve this to near 100%. These works are subject to GWRC granting a change to consent conditions.

- **Condition 42** relating to incident response and notification – The Council did not notify GWRC of the NH_4-N exceedance within 24 hours or provide an incident report within 7 days. The Council has revised its procedures to ensure timely notification of all incidences and non-compliances. This is a technical non-compliance.

The Council has also undertaken an upgrade of inlet screen at the WWTP in 2023/24, which will improve performance of the WWTP over 2024/25. The Council has also planned for further upgrades in 2024/25, the most significant being upgrades to the distribution system and LDTA. These upgrades seek to address the ongoing issue with DRP in the downgradient monitoring bores and will significantly improve the effectiveness and efficiency of the distribution system and LDTA.

1. Introduction

1.1 Background

The Kāpiti Coast District Council (the Council) holds a resource consent from Greater Wellington Regional Council (GWRC) to discharge treated effluent to land and contaminants to air from the operation of the Ōtaki Wastewater Treatment Plant (WWTP) (WGN160002). As part of this consent, the Council must provide a compliance report on the performance of the plant against the parameters presented in the permit.

1.2 Annual Report requirements

Condition 43 of the consent requires the Council to provide the compliance report for the previous financial year, and present it to the Manager, Environmental Regulation, GWRC by 30 September. The Annual Report must include the following information at a minimum:

(a) A summary of all monitoring undertaken in accordance with the conditions of this consent, and an analysis of the information in terms of compliance.

(b) A discussion of the results of pond effluent quality and groundwater and spring water quality monitoring throughout the year, including a trend analysis of the data to identify any ongoing changes over time. Included shall be a discussion of any identified trends, and actions taken to maintain compliance (if required).

(c) Any reasons for non-compliance or difficulties in achieving compliance with the conditions of this consent.

(d) Any measures that have been taken or are proposed to be undertaken in the upcoming 12 months, to improve the environmental performance of the wastewater treatment and discharge system.

(e) Any recommendations on alterations/additions to the monitoring programmes.

(f) A schedule of any complaints recorded during the year and any follow up actions undertaken.

(g) A discussion of wastewater inflow volumes and whether these are consistent with predicted inflow volumes (as detailed in the resource consent application), including the extent as to which the storage volume was used within the year.

(h) A summary of the review of the Operations and Maintenance Manual and recommended changes including a copy of the updated manual (**not required for 2023/24**).

(i) Details of infiltration and inflow investigations and work (**not required for 2023/24**).

1.3 Purpose

This report provides an assessment of the Council's compliance with resource consent WGN160002 in 2023/24. The period covered in this report is 1 July 2023 to 30 June 2024.

2. Monitoring & Analysis

This section covers Conditions 9-21 of the resource consent related to flow and treated effluent / bore quality monitoring and compliance.

2.1 Maximum discharge rate

Condition 9 and 10 authorise the discharge of treated wastewater from the Ōtaki wastewater treatment plant into the Land Discharge and Treatment Area (LDTA), at a maximum rate of 2,820m³/day and the hydraulic application rate shall not exceed a maximum effluent depth of 155mm/day. **Figure 1** shows that the discharge to the LDTA was within the consent limits throughout 2023/24. The discharge was closest to the limit in April 2024, which coincided with high rainfall.

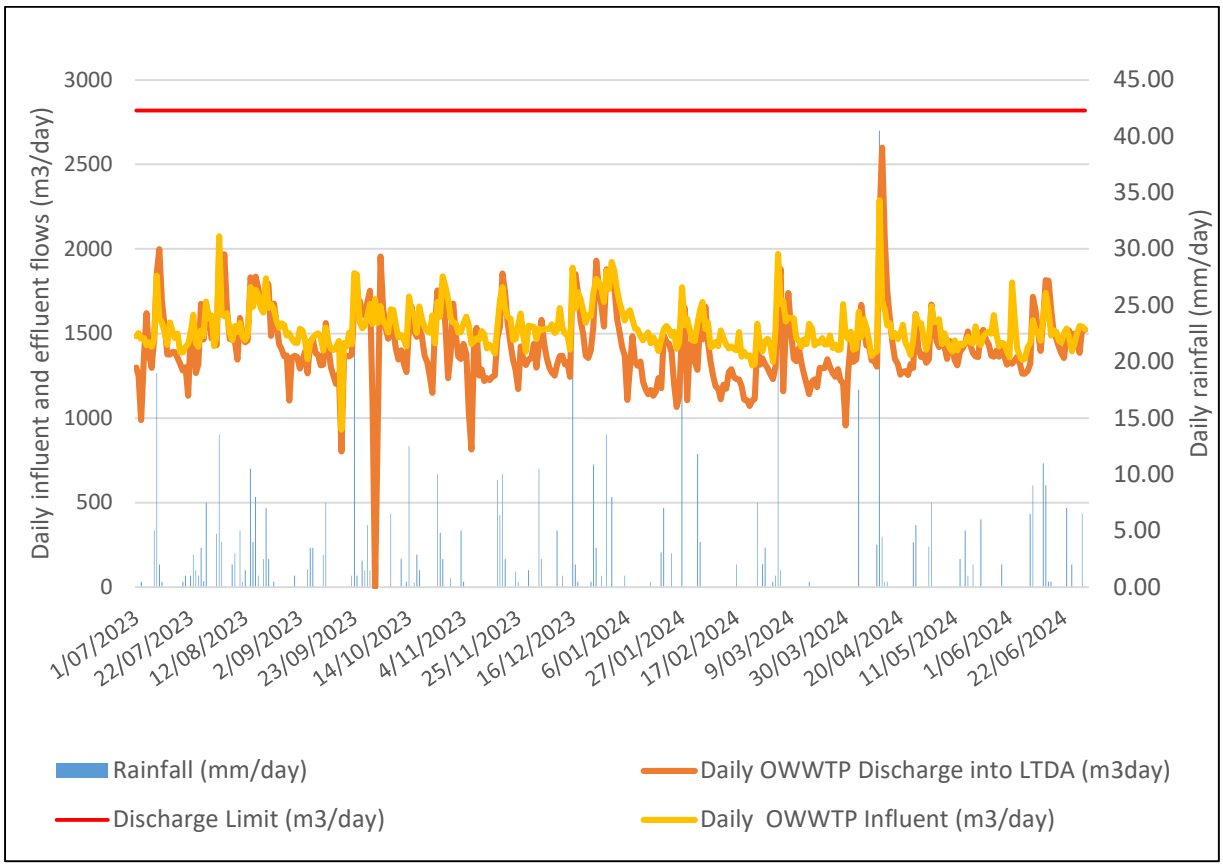

Figure 1: OWWTP discharges to LDTA over 2023/24

Table 1 and 2 show a large reduction in daily inflows and discharges to the LTDA compared to previous years. While the dry weather over 2023/24 contributed to this reduction, a repair at a pump station prevented groundwater entering the wastewater network, which would have also impacted flows.

Table 1: Maximum influent and effluent flows for the OWWTP Plant

Year	Max Daily Influent (m^3/day)	Daily discharge to LTDA (m^3/day)	Max Annual Rainfall (mm)
2019/2020	3,332.8	3,316.2	45.0
2020/2021	4,906.5	3,490.4	52.5
2021/2022	6,447.3	3,698.4	63.5
2022/2023	5,492.1	3,535.2	51.0
2023/2024	2,290.0	2,600.6	40.5

Table 2: Average influent and effluent flows for the OWWTP Plant

Year	Ave Daily Influent (m^3/day)	Ave Discharge to LTDA (m^3/day)	Ave Daily Rainfall (mm)
2019/2020	1,621.5	1,590.1	2.2
2020/2021	1,767.7	1,728.9	2.5
2021/2022	1,873.4	1,812.1	3.2
2022/2023	2,138.8	2,019.1	3.1
2023/2024	1,529.1	1,417.3	1.6

2.2 Wet weather storage

Condition 11 requires 5,000m^3 of wet weather storage capacity at the WWTP, and an assessment of predicted inflow volumes and population.

Prior to 2023/24, the Council had historically maintained the storage with a minimum of 10% of the pond volume occupied with “residual material” (i.e. a mixture of treated wastewater and rainwater). This was to prevent the liner being displaced by groundwater or uplifted during high wind. The resulting capacity in the pond had therefore typically been around 4,700m^3. However, the 2022/23 Annual Report raised the issue of whether the Council was complying with Condition 11 of the consent. The Council therefore revised its operating procedure for managing storm flow capacity in 2023/24. The Council upgraded the level setting in the SCADA control system in September 2024 to ensure that the maximum volume in the storm flow buffer during normal weather conditions is 200m^3, leaving at least 5,000m^3 storage remaining.

This management approach is reflected in **Figure 2**, which shows capacity in the pond below 5,000m^3 at times prior to September 2024. During September 2024 and for the remaining of 2023/24, the storm storage capacity consistently exceeded 5,000m^3. While capacity dropped below 5,000m^3 a handful of times since September 2024, this was related to high rainfall on the previous day and not discharges from the WWTP.

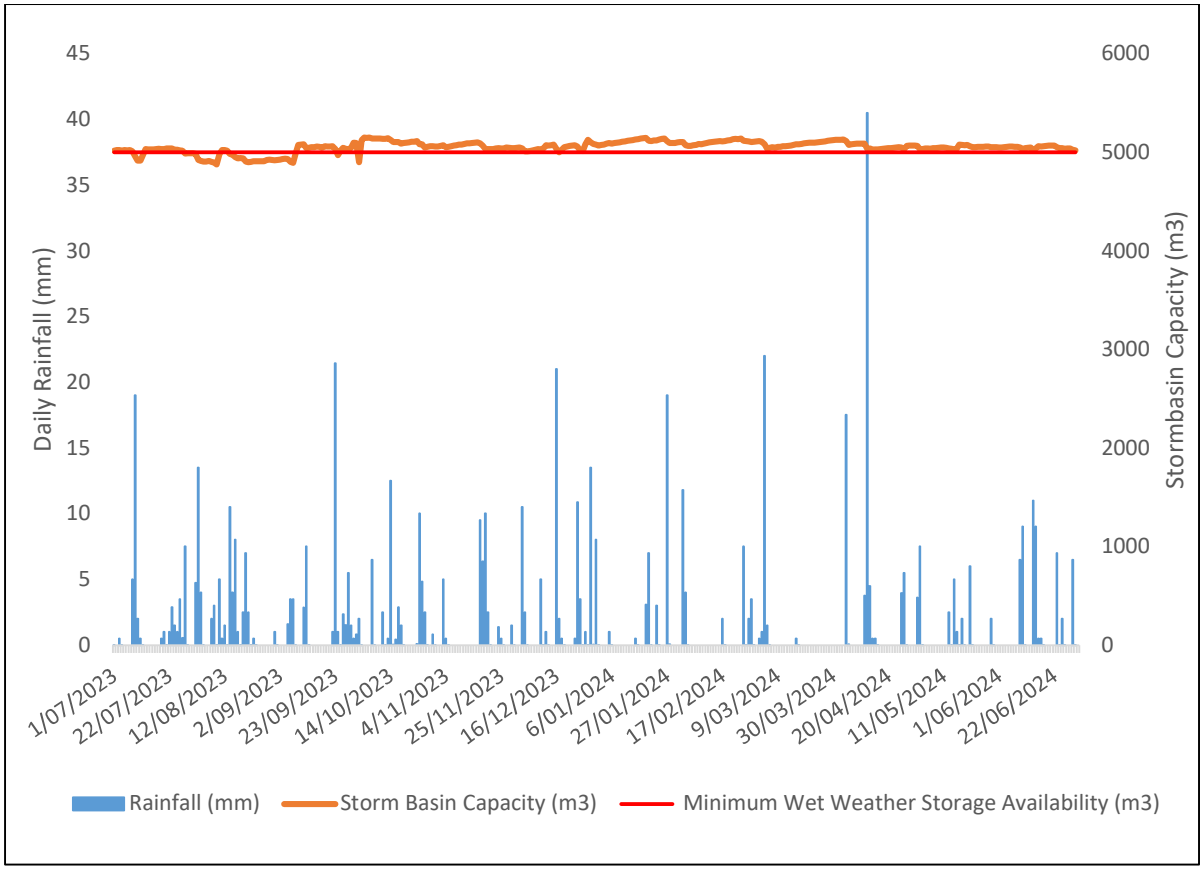

Figure 2: Wet weather storage capacity - 2023/24

In 2024/25, the Council undertook sewer network upgrades to accommodate flow from future growth. The network upgrades included the construction of a new gravity sewer main from Aōtaki St to Ōtaki Racecourse and an upgrade of the Riverbank pumpstation with new wet well. The Council anticipates these upgrades will reduce the need for increased storage at the WWTP. Further, the Council desludged both the oxidation ponds and aeration lagoon to ensure the treatment system maintains its design capacity. Both oxidation ponds have capacity to accommodate future growth, and the full capacity can be achieved through installation of additional weirs. The Council will continue to monitor wet weather storage requirements throughout 2024/25.

2.3 Wastewater volume measurement

Condition 12 and 13 require the Council to maintain flow meters on the inlet to the WWTP and the outlet to the LDTA. The Council is required to verify the accuracy of these devices on a 5-yearly basis. These meters were last verified in June 2023. The verification reports are included in **Appendix B**.

2.4 Wastewater flows

Condition 14 requires the Council to maintain daily records of influent wastewater flow, the treated effluent volume discharged to the LDTA, and which zones were irrigated, and provide these as part of the Annual Report. The Council monitors and records wastewater flows through Water Outlook and these reports are available to GWRC through Water Outlook. The Water Outlook reports for 2023-24 are provided in **Appendix A**.

2.5 Pond effluent monitoring

Condition 15 requires the Council to maintain weekly records of dissolved oxygen, weather conditions (temperature), pond appearance, and odour. The Council records this information through the Water Outlook report, as provided in **Appendix A**. Condition 16 requires the Council to monitor the pond effluent quality for the following parameters monthly:

- BOD5 (mg/L)
- Non-filterable residue (suspended solids) (mg/L)
- E. coli (MPN/100mL)
- Faecal coliforms (MPN/100mL)
- Ammonia (mg/L)
- Nitrate (mg/L)
- Nitrite (mg/L)
- Total Nitrogen (mg/L)
- Total Phosphorus (mg/L)
- Dissolved Reactive Phosphorus (DRP) (mg/L)
- pH

The Council monitors and records this information through Water Outlook. Refer to the Water Outlook Report for 2023-24 in **Appendix A**.

2.6 Pond effluent standards

2.6.1 Standards

Condition 17 of the resource consent requires that the treated effluent meet the standards set out in Table 3 prior to discharge to the LDTA.

Table 23: Pond effluent standards

Parameter	Acronym	Units	33rd Percentile Limit (Limit 1)*	83rd Percentile Limit (Limit 2)**
Soluble Carbonaceous Biochemical Oxygen Demand	scBOD	mg/L	33	45
Total Suspended Solids	TSS	mg/L	100	150
Faecal Coliforms	-	cfu/100mL	50,000	120,000
Ammoniacal Nitrogen	NH_4-N	mg/L	23	30
Dissolved Reactive Phosphorus	DRP	Mg/L	5	11

* 8 out of 12 (33.3%) consecutive samples must not exceed the 33rd Percentile.

** 2 out of 12 (83.3%) consecutive samples must not exceed the 83rd Percentile.

The following sections graphically demonstrate the compliance of the treated effluent standards for scBOD, TSS, faecal coliforms, ammoniacal nitrogen and DRP, prior to discharge to the Land Discharge and Treatment Area, as specified in Condition 17.

2.6.2 Soluble Carbonaceous Biochemical Oxygen Demand (scBOD)

Condition 17(a) requires the concentration of scBOD in pond effluent not to exceed 35 g/m^3 in more than 8 out of 12 consecutive samples (Limit 1), or 45 g/m^3 in more than 2 out of 12 consecutive samples (Limit 2). **Figure 3** demonstrates full compliance in terms of scBOD against consent limits for the combined effluent from Ponds A and B.

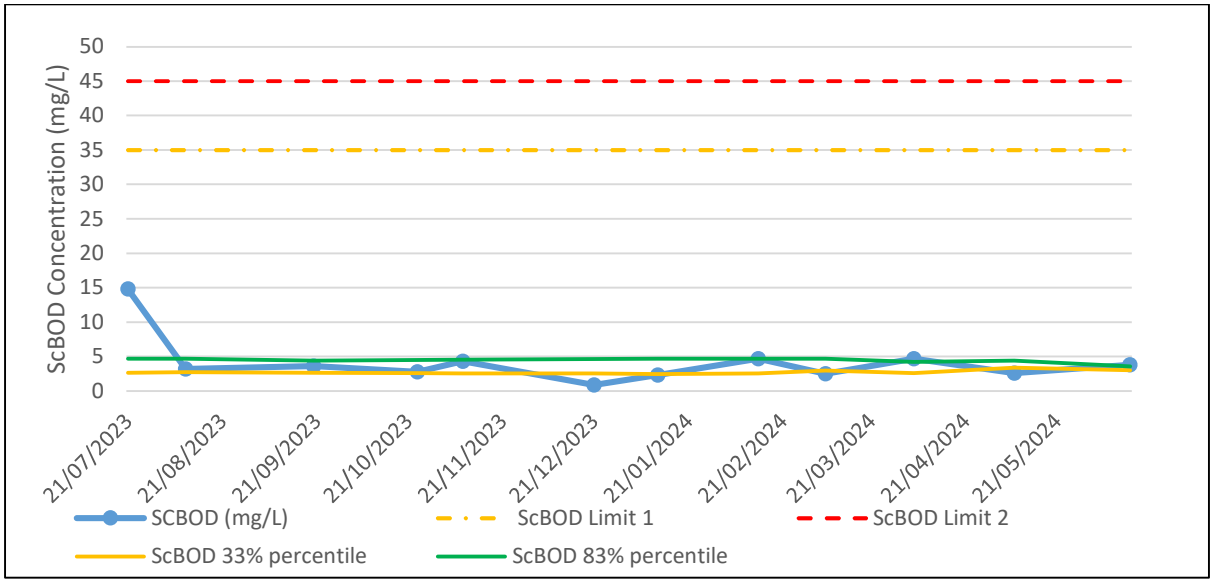

Figure 3: Treated effluent scBOD concentration in combined pond effluent (mg/L) – 2023/24

2.6.3 Total Suspended Solids (TSS)

Condition 17(b) requires the concentration of TSS in pond effluent not to exceed 100 g/m^3 for more than 8 out of 12 consecutive samples (Limit 1), or 150 g/m^3 in more than 2 out of 12 samples (Limit 2). **Figure 4** demonstrates full compliance in terms of TSS against consent limits for the combined effluent from Ponds A and B. Limit 1 for TSS was exceeded once in December 2023, which was likely due to high rainfall at the time.

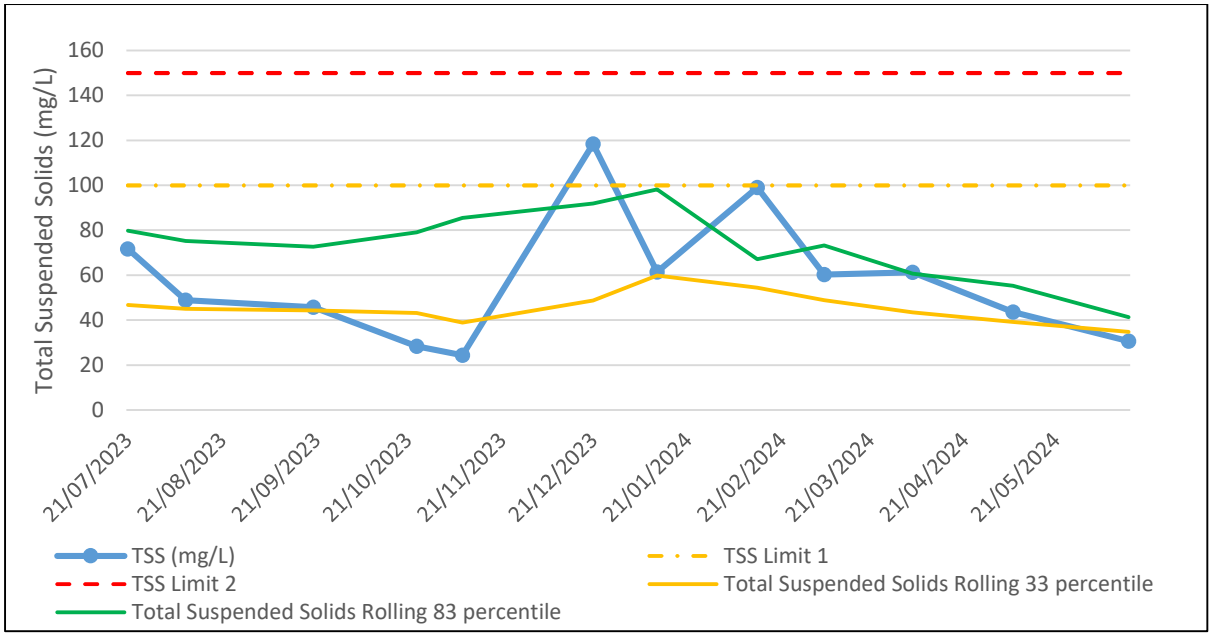

Figure 4: Treated effluent TSS concentration in combined pond effluent (mg/L) - 2023/24

2.6.4 Faecal Coliforms

Condition 17(c) requires the concentration of faecal coliforms in pond effluent not to exceed 50,000 cfy/100 mL for more than 8 out of 12 consecutive samples (Limit 1), or 120,000 cfu/100 mL in more than 2 out of 12 consecutive samples. **Figure 5** and **Figure 6** demonstrate overall compliance in terms of faecal coliform against consent limits for the combined effluent from Ponds A and B. Faecal coliform Limit 1 was exceeded twice in the past 12 months; Limit 2 was not exceeded. The exceedances were likely due to organic matter within the sample taken at the time (for example, a deceased eel).

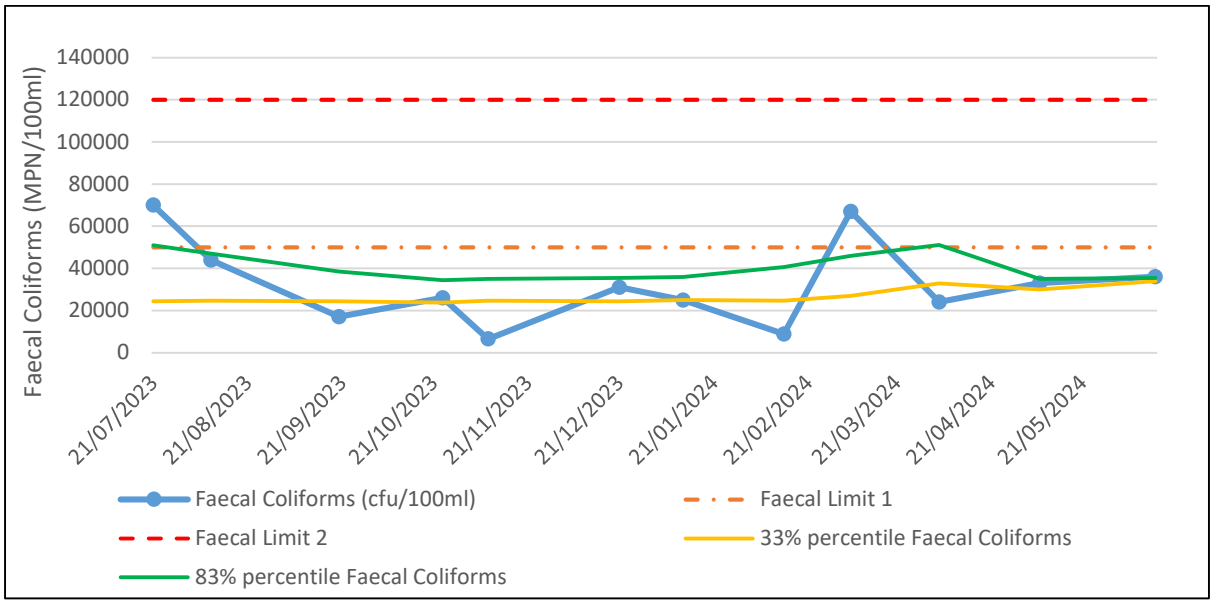

Figure 5: Treated effluent faecal coliforms in combined pond effluent (cfu/100mL) – 2023/24

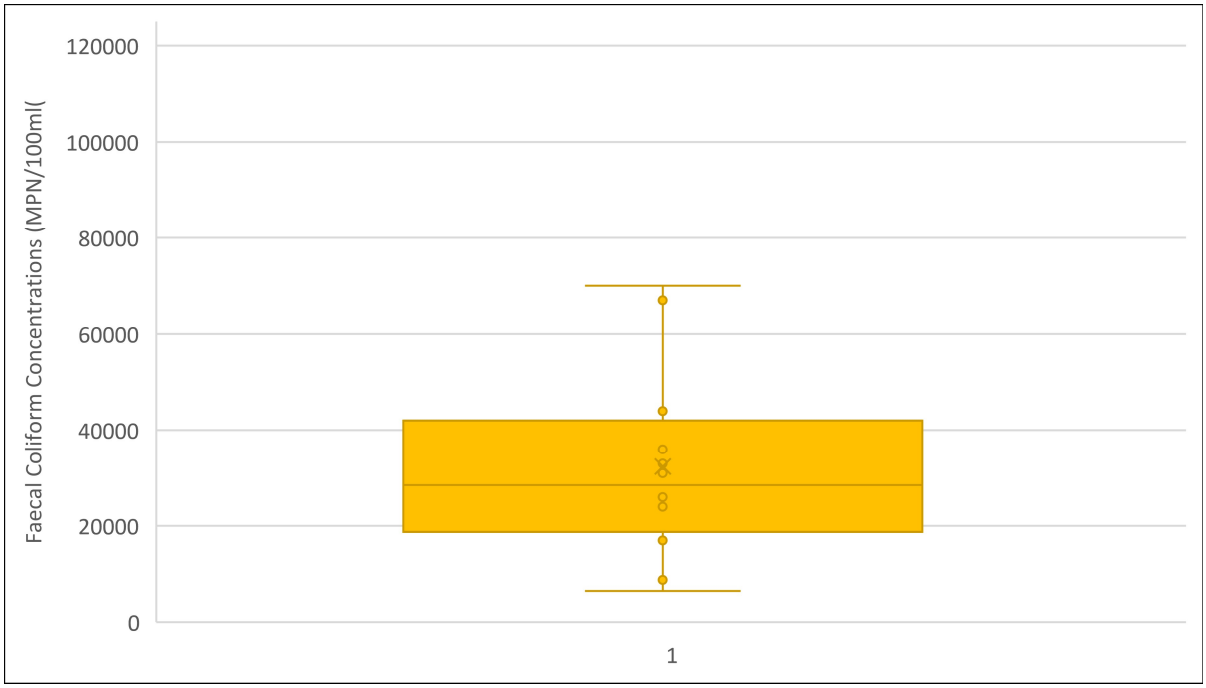

Figure 6: Box plot of treated effluent faecal coliforms in combined pond effluent (cfu/100mL)

2.6.5 Ammoniacal Nitrogen

Condition 17(d) requires the concentration of NH_4-N in pond effluent not to exceed 23 g/m^3 for more than 8 out of 12 consecutive samples (Limit 1) or 30 g/m^3 in more than 2 out of 12 consecutive samples (Limit 2). **Figure 7** and **Figure 8** show NH_4-N monitoring results over 2023/24. As shown in **Figure 7**, Limit 2 was exceeded three times in 2023/24, which is a non-compliance with the consent conditions.

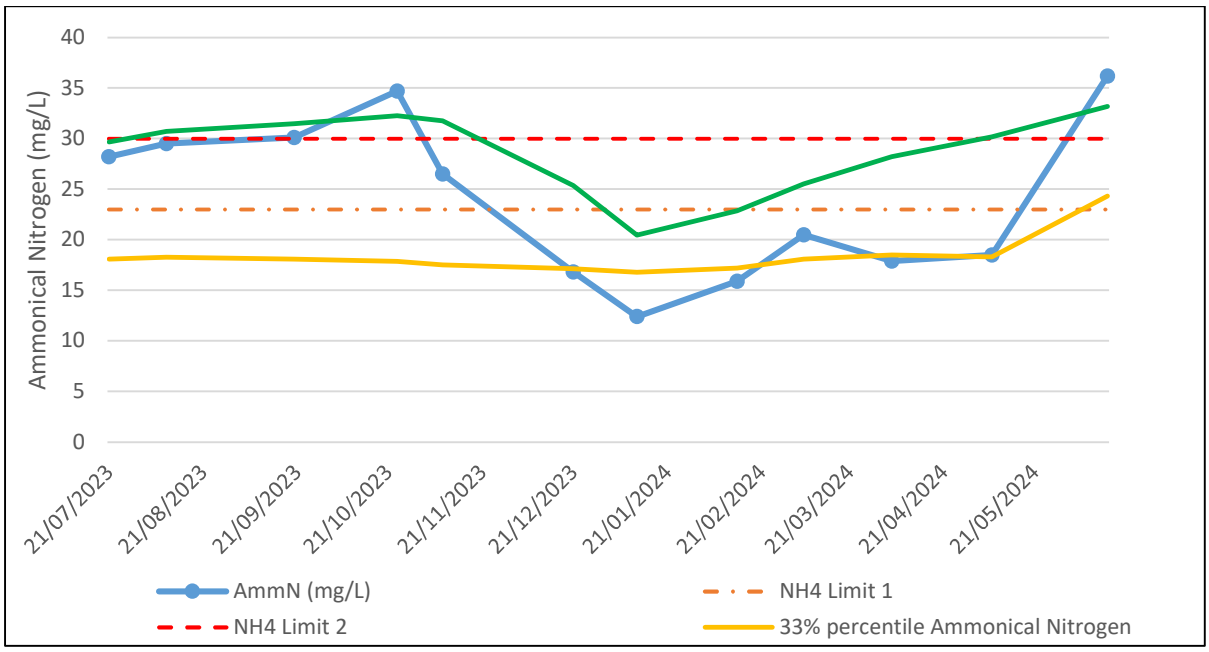

Figure 7: Treated effluent NH4-N in combined pond effluent (mg/L) – 2023/24

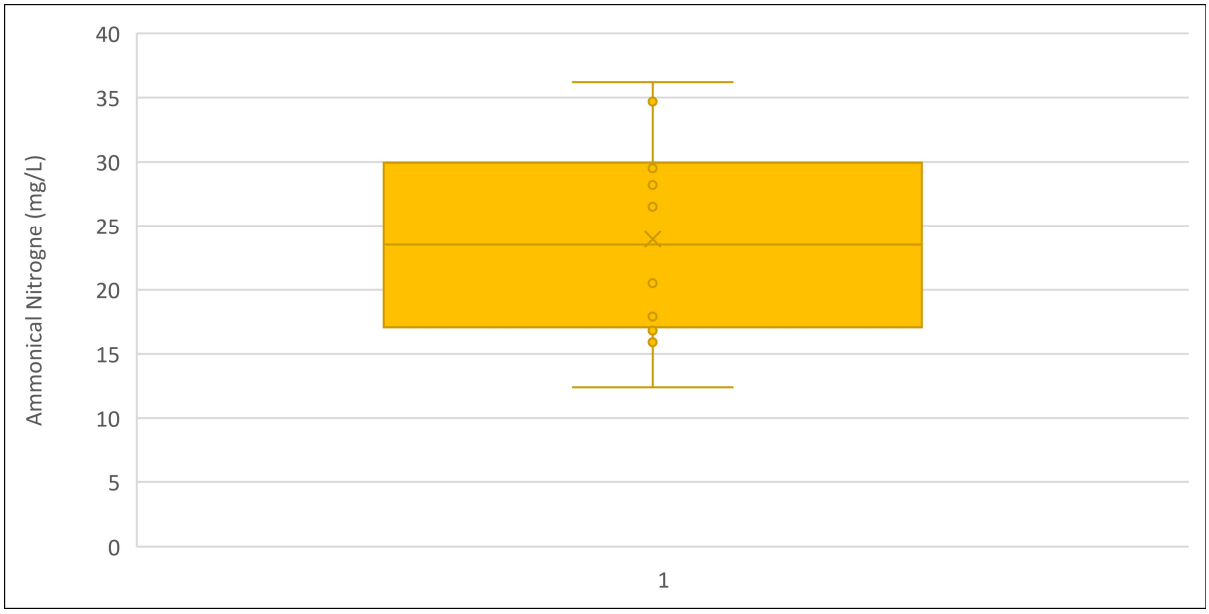

Figure 8: Box plot for treated effluent NH4-N in combined pond effluent (mg/L) – 2023/24

Limit 2 for NH_4-N was exceeded on 20 September 2023, 21 October 2023 and 14 June 2024. The Council's quarterly report for Q4 provides discussion around these exceedances. In summary, NH_4-N levels in the oxidation ponds are typically elevated in the winter months when pond temperatures are lower. This is because colder climates slow biological activity in the aerated lagoon and oxidation ponds (BOD5), which increases ammonia. NH_4-N levels start to increase around May/June and decrease again around December/January. This seasonal pattern likely contributed towards elevated NH_4-N levels in September and October 2023, and again in June 2024.

The Council also undertaken several works programmes at the WWTP that would have impacted NH_4-N levels throughout 2023/24:

- In February 2023, the Council de-sludged the aeration lagoon. During this works period, screened wastewater bypassed the aeration lagoon and went straight to the clarifier and then the oxidation ponds. This would have resulted in a lower level of biological treatment of this wastewater at the time, which could have increased NH_4-N in the treated effluent. It is also possible that the works released additional ammonia from accumulated solids within the lagoon.
- In February 2024, the Council commenced works to replace the inlet screen. These works were signalled to the CLG and GWRC at the annual meeting in November 2023. During the three month works period, unscreened wastewater bypassed to the aeration lagoon and then went straight to the spitter box and oxidation ponds. This resulted in a higher organic load in the wastewater effluent, which also would have increased NH_4-N in the treated effluent.

This is the first time Limit 2 has been exceeded over the past three years. This trend suggests an increasing issue with NH_4-N in the treated effluent. Now that the inlet screen has been replaced, the Council is progressing through further upgrade works at the WWTP, including:

- Works to install concrete lining in the aeration lagoon – anticipated for spring 2024.
- Works to upgrade the aerators – to commence after the lagoon is lined, anticipated from January 2025.

The Council anticipates that these projects will improve aeration in the lagoon and ensure ongoing compliance with NH_4-N limits through 2024/25 and for the remainder of the consent term. In the meantime, we are currently running all three aerators in the lagoon to maximise aeration.

2.6.6 Dissolved Reactive Phosphorus

Condition 17(e) requires the concentration of DRP in pond effluent not to exceed 5g/m^3 for more than 8 out of 12 consecutive samples, or 11g/m^3 in more than 2 out of 12 consecutive samples. **Figure 9** demonstrates full compliance in terms of DRP against consent limits for the combined effluent from Ponds A and B.

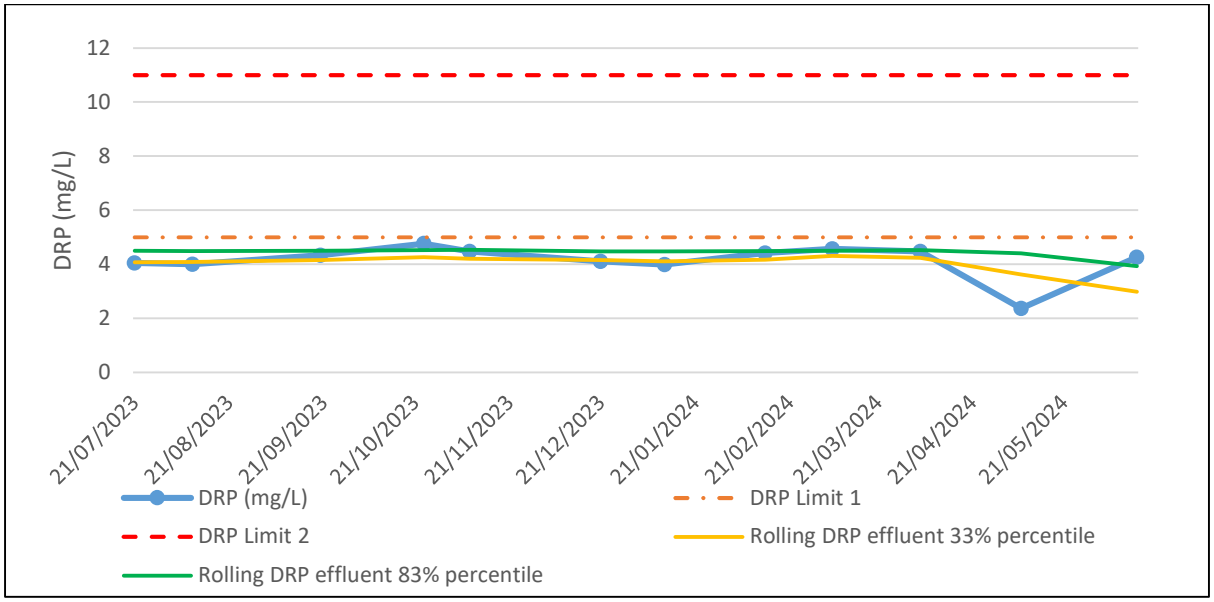

Figure 9: Treated effluent DRP in combined pond effluent (mg/L) – 2023/24

2.7 Groundwater and Spring Water Quality

Condition 18 specifies monitoring of groundwater levels and water quality at bores 1, 2, 3, 4, 5, 6, 7 and water quality in the spring, for the following parameters:

- BOD5 (mg/L)
- Chloride (mg/L)
- E. coli (cfu/100mL)
- Ammonia (mg/L)
- Nitrate (mg/L)
- Dissolved Reactive Phosphorus (mg/L)
- Total Phosphorus (mg/L)
- Temperature (°C)
- pH
- Conductivity (µs/cm at 25°C)

Full bore monitoring records are provided in the Water Outlook Report in **Appendix A**. This section provides discussion on the monitoring results and assesses compliance against Conditions 18, 19 and 20.

2.8 E. coli and Soluble Inorganic Nitrogen Content

Condition 19 specifies the following limits for water quality monitoring in bores 4 and 5 (from Condition 18):

- E. coli (100 MPN/100ml (100cfu/100mL))
- Soluble Inorganic Nitrogen (11.3mg/L as N)

Condition 20 requires the Council to notify GWRC of a breach of Condition 19, within 24 hours, and provide an investigation report within 10 working days.

Table 4 demonstrates that sampling of bores 4 and 5 were in full compliance with the limits stated by Condition 19. The Council's laboratory monitors E. coli levels using the Standard Method 9222D membrane filtration for faecal coliforms. If faecal coliforms are present, the filter is then transferred onto a media to determine if the faecal colonies are E. coli (Standard Methods 9222I). Where there is a dash (-) in the data, there were not faecal coliforms present, thus there was not transfer to the media to determine E. coli as no colonies were present. The Council did not need to notify GWRC of any breaches in 2023/24.

Table 34: Groundwater E. coli and Soluble Inorganic Nitrogen monitoring results

Date	Bore OT4		Bore OT4	
	E. Coli (MPN/100ml)	Soluble Inorganic Nitrogen (mg/L)	E. Coli (MPN/100ml)	Soluble Inorganic Nitrogen (mg/L)
27/07/2023	<1	2.15	2	2.35
22/08/2023	<1	2.90	<1	2.65
25/09/2023	<1	3.02	<1	3.23
12/10/2023	<1	2.36	<1	3.01
15/11/2023	<1	2.46	<1	3.02
7/12/2023	<1	2.60	3	2.59
24/01/2024	<1	2.07	<1	2.66
20/02/2024	<1	2.79	<1	2.42
11/03/2024	<1	1.74	<1	1.49
22/04/2024	<1	1.82	<1	1.74
10/05/2024	<1	1.73	<1	1.84
19/06/2024	1	2.53	1	2.21
Limit	**100**	**11.3**	**100**	**11.3**

2.9 Groundwater attenuation equilibrium

2.9.1 Standard

Condition 21 requires the Council to monitor, and report on water quality data from bores 4, 5 and surface water spring, against contaminant trigger levels. The Council must undertake an investigation into whether the attenuation equilibrium of the soil has been breached if three consecutive monitoring rounds reach the following limits:

- Total Nitrogen (11.3 mg/L)

- Dissolved Reactive Phosphorus (0.1 mg/L)
- E. coli (100 cfu/100mL)

2.9.2 Monitoring results

Table 5 shows the monitoring results for groundwater bores 4 and 5 and spring water quality in 2023/24. The following sub-sections discuss the compliance with the attenuation equilibrium in Bores 4 and 5, and the Spring for Total Nitrogen (TN), Dissolved Reactive Phosphorus (DRP), and E. Coli, as specified in Condition 21.

Table 45: Groundwater and spring water quality monitoring results – 2023/24

Date	Bore OT4			Bore 5			Spring		
	TotalN (mg/L)	DRP (mg/L)	E. Coli (cfu/ 100ml)	Total N (mg/L)	DRP (mg/L)	E. Coli (cfu/ 100ml)	Total N (mg/L)	DRP (mg/L)	E. Coli (cfu/ 100ml)
27/07/2023	2.8	0.22	<1	2.4	0.17	2	1.2	<0.05	<1
22/08/2023	3.1	0.21	<1	2.7	0.17	<1	1.2	<0.05	77
25/09/2023	3.1	0.20	<1	3.5	0.15	<1	0.7	<0.005	310
12/10/2023	2.5	0.18	<1	3.6	0.13	<1	0.9	<0.005	4
15/11/2023	2.4	0.19	<1	3.3	0.14	<1	0.8	<0.005	25
7/12/2023	2.7	0.20	<1	2.6	0.13	3	0.2	<0.005	3
24/01/2024	2.3	0.20	<1	3.1	0.14	<1	0.8	0.005	1370
20/02/2024	3	0.23	<1	2.8	0.16	<1	Spring too dry to sample		
11/03/2024	2.1	0.21	<1	1.5	0.15	<1	0.7	<0.005	490
22/04/2024	1.7	0.20	<1	1.9	0.14	<1	Spring too dry to sample		
10/05/2024	1.8	0.20	<1	2.5	0.14	<1	Spring too dry to sample		
19/06/2024	2.3	0.20	1	2.4	0.14	1	Spring too dry to sample		
Limit	**11.3**	**0.1**	**100**	**11.3**	**0.1**	**100**	**11.3**	**0.1**	**100**

2.9.3 Total nitrogen

The monitoring results complied with the TN attenuation equilibrium limit for bore 4, bore 5, and the spring water quality for the July 2023 to June 2024 period. As such, no further actions were required.

2.9.4 E. coli

The monitoring results complied with the E. coli attenuation equilibrium limit for bore 4, bore 5, and the spring water quality for the July 2023 to June 2024 period. The E. coli trigger was exceeded on three different occasions, although this was not consecutive and therefore did not require the Council to take further actions. The trigger exceedances in January and March 2024 were at a time when the spring was drying up due to warmer months, which likely contributed to elevated E. coli in the spring. The September 2023 exceedance was likely due to organic matter in the sample. We will continue to monitor E. coli trends throughout 2024/25 and report on any exceedances requiring further investigation.

2.9.5 Dissolved Reactive Phosphorous

As with previous years, the DRP results in bores 4 and 5 continue to exceed the trigger limits in Condition 21. In 2023/24, the Council engaged Stantec New Zealand Limited (Stantec) to investigate the ongoing exceedance and provide recommendations on actions to reduce DRP. The Council is in the process of implementing several of these actions, including:

- bulk earthworks to replenish the contaminated soil and increase thickness of the LDTA,
- upgrading the laterals with sprinklers to achieve maximum spread, near 100% of treatment area,
- planting the LDTA and perimeter bunds,
- concrete sealing of the aeration lagoon to prevent soakage to ground, and
- upgrading the aerators.

The Council anticipates that these works will improve the effectiveness of the LDTA and reduce DRP downgradient of the WWTP. If successful, the improvement should show up in the monitoring results 3-4 years after completing the works. As the DRP exceedances have been investigated and recommendations are being implemented, the Council is now compliant with Condition 21 with regards to DRP.

3. Other compliance matters

3.1 LDTA Optimisation Study and Report

Condition 3 and 4 required the Council to prepare an Optimisation Study and Report for the LDTA in collaboration with Nga Hapu o Ōtaki. The Optimisation Study was completed in February 2018, in collaboration with Nga Hapu o Ōtaki. The Optimisation Study and Report was approved by GWRC in 2019. Condition 5 required the Council to implement any changes set out in the approved Optimisation Report. The LDTA changes have been implemented and are operational. The Council has therefore complied with conditions 3-5.

3.2 Operations and Maintenance Manual

Conditions 6-8 refer to the Operations and Maintenance Manual (OMM) for the Ōtaki WWTP. The OMM needs to be updated once the LDTA Optimisation Report has been approved, or at least 3-yearly from 2019 onwards. The consent did not require the OMM to be reviewed in 2023/24. The next review is due in 2025. The Council proposes to amend the OMM as part of resource consenting for the proposed LDTA upgrade works. The proposed amendments to the OMM will be shared with GWRC and Nga Hapu o Ōtaki as part of the consenting process.

3.3 Performance and Maintenance of the Distribution System

Condition 24 refers to the operation and maintenance of the distribution system. The Council is required to operate and maintain the distribution system to ensure that infiltration of the discharge area is maintained by:

- Ensuring there is distribution uniformity across the discharge area by having no more than a 25% variance in application depth along the distribution pipes.
- Ensuring that effluent is applied to no less than 75% of the nominated discharge area, with variability between areas over a rolling 12-month period not exceeding 25%.
- Ensuring there is no ponding in a distribution zone prior to the next application.
- Ensuring that any ponding lasts for less than 24 hours under dry weather conditions.
- Ensuring there is no surface flow redistribution within the discharge area of more than 10 m under dry weather flow conditions.

As part of the investigation on DRP exceedances required under Condition 21, the Council identified that the LDTA is not operating as optimally as it could be. The distribution system may not be complying with Condition 24, specifically the requirement to discharge to 75% of the discharge area. The Council anticipates that the current system results in approximately 30% coverage; however, the upgrades will increase this to nearly 100%. The current distribution system is also contributing towards some ponding on the LDTA. The proposed upgrades to the distribution system will ensure ongoing compliance with Condition 24.

Condition 25 of the consent requires the Council to maintain bunding around the LDTA and ensure that there is no surface runoff leaving the discharge area. The LDTA is divided into 6 cells. Each cell is separated by bunding, with additional bunding running down the middle of each cell. There is also a western bund, which prevents any discharge entering the LDTA reserve area. The bunds are operating effectively and will be improved through the proposed bulk earthworks. The Council is therefore complying with Condition 25.

Condition 26 requires the Council to ensure that the discharge does not occur within 20m from any neighbouring boundary, surface water body or farm drain. The closest feature adjoining the LDTA is

Riverbank Road, which is 25m from the LDTA. However, discharge is unlikely to reach the LDTA boundary. As such, the Council continues to comply with Condition 26.

3.4 Reserve Area for Effluent Discharge

Condition 27 requires the Council to maintain a 50% (5.45 hectares) reserve LDTA close to the LDTA for future disposal capacity. The Council continues to own the field adjacent to the LDTA with a total area of 7.8 hectares, which exceeds the consent requirement. The reserve area is currently not in use and is bunded between the current LDTA boundary and currently leased. The council therefore continues to comply with condition 27.

3.5 Inflow and Infiltration Investigations, Works and Reporting

Condition 28 requires the Council to continue to investigate and implement ways and means of minimising stormwater inflow and infiltration (I/I) into the sewerage system. Condition 43 (annual report) requires that every 3 years KCDC provides an update on I/I. No updates to I&I investigations, performance, or works are required this 2023/24 fiscal year.

While the Council does not need to report on I/I this year, the Council has instigated significant reticulation capital works to:

- Upsize pipes to cater for growth and better buffer large storm events causing overflows
- Enable future works that will retire pump stations and wastewater networks adjacent to water ways.
- Remedy the I/I flows from 2024-25.

The Council has also investigated I/I from the stormwater network into the wastewater network across the district, including Otaki. The Council is now in the process of developing implementation programme that are site-specific solutions to minimise I/I. The Council will report on I/I as required by condition 28 in the next annual report.

3.6 Odour management

Conditions 29-32 refer to odour management at the site. There have been no odour complaints related to the Ōtaki WWTP during the compliance period. No alterations to the plant or process have occurred during the compliance period. Foul air from sludge handling is treated as required by the consent. Screenings are managed as required by the consent. The Council therefore continues to comply with conditions 29-32.

3.7 Planting within the LDTA

Conditions 33-35 require:

- The vegetation within the LDTA shall cover a minimum of 80% of the area.
- Invasive weed species within the LDTA are minimised.
- Dead vegetation within the LDTA shall be replanted within 12 months.

The Council continues to maintain the LDTA grass area healthy and free of weeds. As part of the proposed bulk earthworks on the LDTA, the Council will replant the cells with grasses and perimeter bunds with manuka/kanuka. The Council is liaising with Ngā Hapu o Ōtaki regarding the proposed planting plan for the LDTA.

3.8 Perimeter Planting

Condition 36 requires suitable perimeter planting. The planting shall:

- Discourage public access to the site.
- Comprise of suitable native vegetation.
- Consider any shading or windrow effects on the treatment processes.
- Not impact on the infiltration capacity of the land discharge and treatment area.

The Council has maintained perimeter planting around the LDTA throughout 2023/24. As part of the proposed bulk earthworks on the LDTA, the Council will replant the cells with grasses and perimeter bunds with manuka/kanuka. The Council is liaising with Ngā Hapu o Ōtaki regarding the proposed planting plan for the LDTA.

3.9 Fencing and signage

Condition 37 requires perimeter fencing and signage. The site is fully fenced complete with signage installed on the visible perimeter fencing. The Council therefore continues to comply with condition 37.

3.10 Iwi Consultation

Condition 38 and 39 require the Council invite Ngā Hapu o Ōtaki to a yearly briefing, inform them of any anticipated changes to the consent, and invite them to participate in the development of changes and recommendations.

The Council meets with a representative from Ngā Hapu o Ōtaki quarterly. During 2023/24, the Council met with Ngā Hapu o Ōtaki on 21 September 2023, 22 November 2023, 27 February 2024, and 15 May 2024. A Ngā Hapu o Ōtaki representative also visited the site in July 2024 to observe a trial of the new discharge laterals as part of the resource consent process. The Council has involved Ngā Hapu o Ōtaki in the development of the bulk earthworks consent application and the change to the discharge method. The Council is also working with Ngā Hapu o Ōtaki to develop a planting plan for the LDTA.

The Council is therefore complying with conditions 38 and 39.

3.11 Community Liaison Group

Condition 40 requires the Council to establish a Community Liaison Group (CLG) for the WWTP. The Council established the CLG in 2022. The second meeting of the CLG was held on 7 November 2023. The meeting for 2023/24 will be scheduled for November 2024. The Council invited all adjoining landowners to join the CLG; however, to date, only three landowners have accepted the invitation. The Ōtaki Community Board, Regional Public Health and GWRC are also members of the CLG. Ngā Hapu o Ōtaki declined the invitation to join the CLG in favour of one-on-one meetings. The invitation remains open should they chose to join. The Council is therefore complying with condition 40.

3.12 Complaints

Condition 41 requires the Council to keep a permanent record of any complaints received regarding the operation of the WWTP. The Council did not receive any complaints in 2023/24.

3.13 Incident notification

Condition 42 requires the Council to keep a permanent record of any incidents related to the consents that results, or could result, in an adverse effect on the environment beyond the site boundary. The Council is also required to notify GWRC of any such incidents within 24 hours and forward an incident report to GWRC within 7 days.

Our quarterly report for Q2 of 2023/24, issued to GWRC in January 2024, flagged a potential issue with NH4-N, whereby Limit 2 was exceeded in 2 out of 12 samples, a further exceedance resulting in a non-compliance. The quarterly report for Q4 of 2023/24, issued to GWRC in July 2024, then identified a third exceedance from 14 June 2024, resulting in a non-compliance of the consented limits. The report provided analysis on the non-compliance and signalled work that had been undertaken that could have contributed towards the non-compliance. While the incident was addressed on site and analysed through the Q4 report, the Council acknowledges that GWRC should have been notified of the 14 June 2024 exceedance earlier. The Council is therefore technically non-complying with condition 42 of the consent due to failure to report the incident on time.

The Council typically identifies exceedances through end of month reporting received through Water Outlook. This approach does not enable exceedances to be reported within 24 hours. While exceedances are rare, the Council is working with Water Outlook to update the reporting system to ensure that an automatic notification is sent to the WWTP staff advising of any exceedances of the consent limits as soon as they are identified. This approach will provide for a timelier notification to GWRC.

There were no other incidents to report in 2023/24.

4. Capital works and upgrades

4.1 Overview

This section provides a description of capital works and upgrades undertaken at the WWTP over 2023/24 and works proposed for 2024/24.

4.2 Works undertaken in 2023/24

The Council has undertaken several investigations works at the WWTP in 2023/24, including:

- In June 2024, the Council completed the works to replace the inlet screen. The highlights between old and new screen:

Flow parameter	Units	2022	Design
Average Dry Weather Flow (ADWF)	m^3/d	1,850	3,000
	L/s	23	34
Peak Wet Weather Flow (PWWF)	m^3/d	10,400	11,200
	L/s	130	160
Peak Instantaneous Flow (PIF)	L/s	120	185

- The Council undertook investigative, and design works regarding the LDTA and lateral upgrades, including survey, design and procurement. The Council also tested the proposed laterals on site in July.

- The Council received a proposal for the new aeration system in the aeration lagoon and the design for the concrete sealing of the aeration lagoon has been finalised.

4.3 Works proposed for 2024/25

During 2024/25, the Council proposes to undertake the following works:

- In early 2024/25, the Council tested the new sprinkler discharge system in Cell 3 to support the resource consent application process, including mana whenua assessments and air quality assessment.

- Upgrading the treated effluent discharge system – to commence as soon as the resource consent is granted from GWRC to authorise the upgrade. These works will significantly improve the efficiency of the effluent discharge system and the ability of the LDTA to operate effectively.

- Approval is sought to replace the existing above ground-effluent-discharge-laterals and upgrade with discharge-through-sprinkler system.

- Upgrading the LDTA (Replenishment of soil and Planting). The bulk earthworks to remove the contaminated soil (saturated with Phosphorous/Nitrogen) from treatment area and rebuild the beds to 600mm high before grassing the beds, planting on the bunds and periphery of the LDTA area. The replenishment of soil and planting will improv the ability of the LDTA to absorb nutrients, resulting in reduced nutrients into the groundwater. This work is subjected to the grant of consent (applied for) and timeline for completion is bound by the availability of suitable soil. The whole earthwork could be undertaken over a 5-year period being the latest and possibly in a year.

- Concrete sealing of the base in the aeration lagoon – anticipated for spring 2024. These works will prevent soakage into groundwater and contamination from the lagoon, including DRP. Desludging the aeration lagoon, Geotech assessment and concreting forms the main scope of work.

- Upgrading the aerators in the aeration lagoon – to commence after the lagoon base is sealed, anticipated from January 2024-25. These works will improve dissolved oxygen (DO) levels in the lagoon, which will also contribute towards reduced NH_4-N in the treated effluent.

Appendix A: Daily and Monthly Data – 2023/24

Appendix A.1 Daily influent and effluent flows entering and leaving the OWWTP.

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
1/07/2023	0.00	1484	1299
2/07/2023	0.00	1503	1252
3/07/2023	0.49	1469	988
4/07/2023	0.00	1473	1366
5/07/2023	0.00	1432	1620
6/07/2023	0.00	1448	1375
7/07/2023	0.00	1421	1296
8/07/2023	5.01	1469	1474
9/07/2023	19.00	1841	1859
10/07/2023	2.00	1589	1999
11/07/2023	0.49	1564	1692
12/07/2023	0.00	1505	1534
13/07/2023	0.00	1433	1377
14/07/2023	0.00	1564	1376
15/07/2023	0.00	1513	1391
16/07/2023	0.00	1472	1389
17/07/2023	0.00	1498	1356
18/07/2023	0.00	1389	1321
19/07/2023	0.49	1388	1281
20/07/2023	1.00	1422	1300
21/07/2023	0.00	1439	1131
22/07/2023	1.00	1502	1510
23/07/2023	2.88	1611	1471
24/07/2023	1.49	1442	1266
25/07/2023	1.00	1421	1319
26/07/2023	3.49	1518	1676
27/07/2023	0.54	1485	1464
28/07/2023	7.50	1688	1672
29/07/2023	0.02	1587	1580
30/07/2023	0.00	1607	1470
31/07/2023	0.00	1425	1471
1/08/2023	4.73	1483	1432
2/08/2023	13.50	2074	1989
3/08/2023	4.00	1611	1696
4/08/2023	0.01	1603	1969
5/08/2023	0.00	1620	1648
6/08/2023	0.00	1502	1467
7/08/2023	2.00	1460	1464
8/08/2023	3.00	1545	1454
9/08/2023	0.01	1508	1346
10/08/2023	5.01	1562	1593
11/08/2023	0.49	1481	1497

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
12/08/2023	1.49	1461	1447
13/08/2023	0.00	1489	1460
14/08/2023	10.50	1776	1832
15/08/2023	4.00	1658	1729
16/08/2023	8.01	1758	1837
17/08/2023	1.00	1728	1768
18/08/2023	0.00	1650	1663
19/08/2023	2.49	1623	1642
20/08/2023	7.01	1826	1807
21/08/2023	2.49	1650	1790
22/08/2023	0.01	1674	1486
23/08/2023	0.49	1640	1677
24/08/2023	0.00	1575	1562
25/08/2023	0.00	1534	1438
26/08/2023	0.00	1560	1406
27/08/2023	0.00	1551	1365
28/08/2023	0.00	1487	1370
29/08/2023	0.00	1501	1103
30/08/2023	0.00	1469	1358
31/08/2023	1.00	1446	1368
1/09/2023	0.00	1443	1361
2/09/2023	0.00	1527	1293
3/09/2023	0.00	1517	1333
4/09/2023	0.00	1460	1393
5/09/2023	1.58	1348	1264
6/09/2023	3.49	1445	1451
7/09/2023	3.49	1473	1468
8/09/2023	0.01	1493	1384
9/09/2023	0.00	1500	1375
10/09/2023	0.00	1482	1311
11/09/2023	2.86	1398	1315
12/09/2023	7.50	1534	1561
13/09/2023	0.02	1449	1422
14/09/2023	0.00	1410	1300
15/09/2023	0.00	1403	1249
16/09/2023	0.00	1419	1202
17/09/2023	0.00	1455	1264
18/09/2023	0.00	931	802
19/09/2023	0.00	1444	1373
20/09/2023	0.00	1423	1366
21/09/2023	0.00	1504	1364
22/09/2023	1.00	1436	1376
23/09/2023	21.43	1857	1661
24/09/2023	1.00	1848	1688
25/09/2023	0.00	1569	1692
26/09/2023	2.34	1530	1628
27/09/2023	1.51	1546	1606

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
28/09/2023	5.49	1604	1686
29/09/2023	1.49	1675	1754
30/09/2023	0.49	1556	1092
1/10/2023	0.81	1704	0
2/10/2023	2.00	1563	916
3/10/2023	0.01	1661	1956
4/10/2023	0.00	1567	1651
5/10/2023	0.00	1555	1531
6/10/2023	0.00	1508	1469
7/10/2023	6.50	1643	1578
8/10/2023	0.02	1638	1514
9/10/2023	0.00	1549	1410
10/10/2023	0.00	1477	1346
11/10/2023	2.49	1492	1401
12/10/2023	0.01	1460	1319
13/10/2023	0.49	1423	1271
14/10/2023	12.50	1719	1537
15/10/2023	0.03	1633	1660
16/10/2023	0.41	1613	1517
17/10/2023	2.89	1503	1480
18/10/2023	1.49	1659	1535
19/10/2023	0.00	1589	1485
20/10/2023	0.00	1537	1364
21/10/2023	0.00	1515	1330
22/10/2023	0.00	1505	1248
23/10/2023	0.00	1608	1148
24/10/2023	0.08	1441	1545
25/10/2023	10.01	1686	1755
26/10/2023	4.83	1599	1603
27/10/2023	2.49	1838	1752
28/10/2023	0.01	1776	1540
29/10/2023	0.00	1703	1236
30/10/2023	0.81	1590	1382
31/10/2023	0.00	1563	1678
1/11/2023	0.00	1560	1495
2/11/2023	0.00	1505	1363
3/11/2023	5.01	1509	1350
4/11/2023	0.49	1559	1439
5/11/2023	0.00	1600	1377
6/11/2023	0.00	1544	1027
7/11/2023	0.00	1439	814
8/11/2023	0.00	1456	1421
9/11/2023	0.00	1471	1532
10/11/2023	0.00	1464	1252
11/11/2023	0.00	1515	1286
12/11/2023	0.00	1496	1219
13/11/2023	0.00	1411	1235

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
14/11/2023	0.00	1432	1225
15/11/2023	0.00	1414	1243
16/11/2023	0.00	1382	1251
17/11/2023	9.50	1535	1475
18/11/2023	6.37	1695	1538
19/11/2023	10.01	1773	1855
20/11/2023	2.49	1650	1743
21/11/2023	0.01	1598	1563
22/11/2023	0.00	1588	1440
23/11/2023	0.00	1462	1343
24/11/2023	1.37	1467	1284
25/11/2023	0.49	1549	1172
26/11/2023	0.00	1618	1424
27/11/2023	0.00	1486	1347
28/11/2023	0.00	1393	1313
29/11/2023	1.49	1547	1345
30/11/2023	0.00	1543	1354
1/12/2023	0.00	1539	1438
2/12/2023	0.00	1466	1298
3/12/2023	10.50	1528	1432
4/12/2023	2.49	1520	1581
5/12/2023	0.01	1526	1443
6/12/2023	0.00	1527	1356
7/12/2023	0.00	1525	1300
8/12/2023	0.00	1553	1269
9/12/2023	0.00	1502	1252
10/12/2023	5.01	1521	1319
11/12/2023	0.01	1650	1366
12/12/2023	1.00	1535	1368
13/12/2023	0.00	1499	1318
14/12/2023	0.00	1491	1328
15/12/2023	0.00	1404	1244
16/12/2023	21.00	1889	1830
17/12/2023	2.00	1648	1851
18/12/2023	0.49	1742	1738
19/12/2023	0.00	1701	1577
20/12/2023	0.00	1637	1497
21/12/2023	0.00	1564	1369
22/12/2023	0.00	1609	1355
23/12/2023	0.49	1601	1401
24/12/2023	10.86	1741	1545
25/12/2023	3.49	1822	1931
26/12/2023	0.01	1803	1767
27/12/2023	1.00	1762	1666
28/12/2023	0.00	1686	1540
29/12/2023	13.50	1870	1879
30/12/2023	0.04	1762	1769

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
31/12/2023	8.01	1923	1874
1/01/2024	0.02	1873	1783
2/01/2024	0.00	1757	1588
3/01/2024	0.00	1680	1505
4/01/2024	0.00	1626	1418
5/01/2024	1.00	1577	1368
6/01/2024	0.00	1619	1107
7/01/2024	0.00	1638	1297
8/01/2024	0.00	1583	1484
9/01/2024	0.00	1529	1331
10/01/2024	0.00	1523	1309
11/01/2024	0.00	1483	1335
12/01/2024	0.00	1460	1215
13/01/2024	0.00	1483	1172
14/01/2024	0.00	1506	1142
15/01/2024	0.49	1442	1167
16/01/2024	0.00	1478	1131
17/01/2024	0.00	1447	1157
18/01/2024	0.00	1396	1236
19/01/2024	3.08	1464	1177
20/01/2024	7.01	1526	1490
21/01/2024	0.02	1545	1450
22/01/2024	0.00	1525	1440
23/01/2024	3.00	1486	1391
24/01/2024	0.01	1511	1204
25/01/2024	0.00	1411	1065
26/01/2024	0.00	1445	1127
27/01/2024	19.00	1773	1527
28/01/2024	0.05	1548	1652
29/01/2024	0.00	1585	1106
30/01/2024	0.00	1521	1419
31/01/2024	0.00	1460	1454
1/02/2024	0.00	1455	1330
2/02/2024	11.80	1556	1285
3/02/2024	4.00	1637	1551
4/02/2024	0.01	1687	1466
5/02/2024	0.00	1525	1658
6/02/2024	0.00	1565	1447
7/02/2024	0.00	1420	1333
8/02/2024	0.00	1426	1249
9/02/2024	0.00	1450	1186
10/02/2024	0.00	1426	1174
11/02/2024	0.00	1519	1111
12/02/2024	0.00	1472	1197
13/02/2024	0.00	1434	1173
14/02/2024	0.00	1412	1273
15/02/2024	0.00	1423	1289

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
16/02/2024	0.00	1411	1242
17/02/2024	2.00	1401	1230
18/02/2024	0.01	1509	1228
19/02/2024	0.00	1363	1188
20/02/2024	0.00	1391	1109
21/02/2024	0.00	1365	1106
22/02/2024	0.00	1371	1071
23/02/2024	0.00	1311	1104
24/02/2024	0.00	1318	1112
25/02/2024	7.50	1558	1439
26/02/2024	0.02	1446	1315
27/02/2024	2.00	1395	1353
28/02/2024	3.49	1454	1319
29/02/2024	0.01	1469	1297
1/03/2024	0.00	1428	1259
2/03/2024	0.49	1332	1230
3/03/2024	1.00	1528	1306
4/03/2024	22.00	1970	1748
5/03/2024	1.49	1673	1882
6/03/2024	0.00	1691	1157
7/03/2024	0.00	1572	1526
8/03/2024	0.00	1595	1740
9/03/2024	0.00	1589	1501
10/03/2024	0.00	1590	1349
11/03/2024	0.00	1471	1336
12/03/2024	0.00	1459	1414
13/03/2024	0.00	1420	1325
14/03/2024	0.00	1465	1258
15/03/2024	0.00	1437	1199
16/03/2024	0.49	1558	1141
17/03/2024	0.00	1530	1215
18/03/2024	0.00	1429	1228
19/03/2024	0.00	1451	1182
20/03/2024	0.00	1445	1296
21/03/2024	0.00	1473	1294
22/03/2024	0.00	1434	1296
23/03/2024	0.00	1436	1347
24/03/2024	0.00	1488	1302
25/03/2024	0.00	1415	1264
26/03/2024	0.00	1434	1244
27/03/2024	0.00	1402	1289
28/03/2024	0.00	1406	1222
29/03/2024	0.00	1674	1206
30/03/2024	0.00	1493	956
31/03/2024	0.00	1467	1273
1/04/2024	0.00	1511	1454
2/04/2024	0.00	1405	1333

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
3/04/2024	0.00	1411	1345
4/04/2024	17.51	1628	1502
5/04/2024	0.05	1478	1669
6/04/2024	0.00	1584	1536
7/04/2024	0.00	1536	1429
8/04/2024	0.00	1458	1428
9/04/2024	0.00	1366	1341
10/04/2024	0.00	1385	1338
11/04/2024	3.77	1395	1305
12/04/2024	40.49	2290	2174
13/04/2024	4.49	1683	2601
14/04/2024	0.49	1643	2072
15/04/2024	0.49	1548	1750
16/04/2024	0.00	1561	1592
17/04/2024	0.00	1479	1449
18/04/2024	0.00	1503	1349
19/04/2024	0.00	1467	1319
20/04/2024	0.00	1498	1256
21/04/2024	0.00	1553	1274
22/04/2024	0.00	1445	1277
23/04/2024	0.00	1415	1255
24/04/2024	0.00	1372	1319
25/04/2024	3.96	1460	1297
26/04/2024	5.49	1612	1615
27/04/2024	0.02	1565	1414
28/04/2024	0.00	1560	1361
29/04/2024	0.00	1470	1376
30/04/2024	0.00	1404	1327
1/05/2024	3.61	1468	1346
2/05/2024	7.50	1660	1671
3/05/2024	0.02	1567	1546
4/05/2024	0.00	1570	1456
5/05/2024	0.00	1584	1420
6/05/2024	0.00	1436	1436
7/05/2024	0.00	1501	1422
8/05/2024	0.00	1453	1350
9/05/2024	0.00	1415	1456
10/05/2024	0.00	1394	1412
11/05/2024	0.00	1460	1341
12/05/2024	0.00	1401	1312
13/05/2024	2.49	1441	1391
14/05/2024	0.01	1431	1414
15/05/2024	5.01	1448	1449
16/05/2024	1.00	1480	1512
17/05/2024	0.00	1445	1430
18/05/2024	2.00	1440	1384
19/05/2024	0.01	1542	1364

Date	Rainfall (mm/day)	Daily OWWTP Influent (m3/day)	OWWTP Discharge into LTDA (m3day)
20/05/2024	0.00	1464	1361
21/05/2024	6.01	1430	1500
22/05/2024	0.02	1482	1523
23/05/2024	0.00	1502	1462
24/05/2024	0.00	1510	1437
25/05/2024	0.00	1498	1368
26/05/2024	0.00	1609	1363
27/05/2024	0.00	1495	1399
28/05/2024	0.00	1424	1364
29/05/2024	2.00	1445	1409
30/05/2024	0.01	1440	1369
31/05/2024	0.00	1393	1315
1/06/2024	0.00	1358	1331
2/06/2024	0.00	1803	1321
3/06/2024	0.00	1587	1340
4/06/2024	0.00	1413	1362
5/06/2024	0.00	1366	1324
6/06/2024	0.00	1343	1263
7/06/2024	0.00	1351	1263
8/06/2024	0.00	1420	1280
9/06/2024	6.50	1443	1323
10/06/2024	9.01	1578	1717
11/06/2024	0.02	1519	1641
12/06/2024	0.00	1511	1512
13/06/2024	0.00	1458	1396
14/06/2024	10.99	1586	1573
15/06/2024	9.01	1739	1816
16/06/2024	0.49	1633	1812
17/06/2024	0.49	1488	1644
18/06/2024	0.00	1517	1504
19/06/2024	0.00	1511	1470
20/06/2024	0.00	1457	1421
21/06/2024	0.00	1448	1384
22/06/2024	0.00	1499	1356
23/06/2024	7.01	1530	1479
24/06/2024	0.02	1479	1519
25/06/2024	2.00	1395	1471
26/06/2024	0.01	1442	1499
27/06/2024	0.00	1503	1444
28/06/2024	0.00	1544	1386
29/06/2024	6.50	1540	1531
30/06/2024	0.02	1526	1522

Appendix A.2 Pond Effluent Quality Discharged into the LTDA

Sample Date	Sample ID	pH	DO (mg/L)	TSS (mg/L)	BOD (mg/L)	SBOD (mg/L)	SCBOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	DRP (mg/L)	TotalP (mg/L)	TotalN (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (cfu /100ml)
21/07/2023	KAPITI-4838	8.2	11	71.6	46.4	14.5	14.8	28.2	0.832	0.178	4.05	5.73	41	70000	49000
9/08/2023	KAPITI-4911	7.8	10.2	48.8	29.1	7.2	3.2	29.5	0.663	0.378	4	4.95	40	44000	25000
20/09/2023	KAPITI-5097	7.9	7.7	45.8	36.2	9.8	3.6	30.1	0.698	0.16	4.33	5.29	38	17000	9000
24/10/2023	KAPITI-5256	8.1	7.4	28.4	25.8	9.1	2.8	34.7	0.593	0.16	4.77	5.97	44	26000	15000
8/11/2023	KAPITI-5306	8.1	7.8	24.4	46.7	12.5	4.3	26.5	0.715	0.361	4.47	5.42	37	6500	4300
21/12/2023	KAPITI-5504	8.1	7.48	118.4	83.6	13.6	0.9	16.8	1.11	1.77	4.11	6.05	30	31000	20000
11/01/2024	KAPITI-5573	8.5	7.2	61.4	59	13.4	2.3	12.4	0.883	0.883	3.99	5.13	22	25000	14000
13/02/2024	KAPITI-5693	8.2	8.5	99	52.3	8.3	4.7	15.9	1.09	0.613	4.42	6.2	31	8800	6800
6/03/2024	KAPITI-5821	7.7	8.2	60.2	87	16	2.5	20.5	1.05	2.73	4.57	5.79	32	67000	54000
4/04/2024	KAPITI-6087	7.4	6.2	61.2	65	11.1	4.7	17.9	2.2	2.29	4.47	5.41	33	24000	15000
7/05/2024	KAPITI-6421	7.7	8.1	43.6	86.4	11.4	2.6	18.5	1.47	2.67	2.37	3.85	27	33000	21000
14/06/2024	KAPITI-6781	8.1	7.9	30.6	34	7.6	3.8	36.2	0.403	0.053	4.26	5.32	40	36000	23000

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
Bore 1	27/07/2023	KAPITI-4868	10.3	6.3	1.5	<0.015	0.366	<0.015	0.3958	<0.05	<0.05	0.7	0	6.7	<1	105
	22/08/2023	KAPITI-4966	14.3	6.33	<1	0.018	0.399	<0.015	0.4319	<0.05	<0.05	1	0	6.5	<1	89.06
	25/09/2023	KAPITI-5109	13.1	6.5	1.5	<0.015	0.31	<0.015	0.3398	0.019	<0.05	0.7	0	6.7	<1	86
	12/10/2023	KAPITI-5205	12.6	6.4	<1	<0.015	0.351	<0.015	0.3808	<0.005	<0.05	0.4	0	8.6	<1	88.6
	15/11/2023	KAPITI-5341	12.9	6.4	<1	<0.015	0.292	<0.015	0.3218	<0.005	<0.05	0.6	0	7	<1	88.41
	7/12/2023	KAPITI-5425	12.2	6.5	<1	<0.015	0.247	<0.015	0.2768	<0.005	<0.05	0.4	0	6.4	<1	89.3
	24/01/2024	KAPITI-5617	13.2	6.1	1.7	0.02	0.323	<0.015	0.3579	0.008	<0.05	0.6	0	6.5	<1	86
	20/02/2024	KAPITI-5737	13.1	6.2	1.1	0.045	0.332	<0.015	0.3919	<0.005	<0.05	0.8	0	6.1	<1	85
	11/03/2024	KAPITI-5854	13.3	6.4	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.5	0	9.2	<1	89.1
	22/04/2024	KAPITI-6274	14.4	6.3	<1	<0.015	0.27	<0.015	0.2998	<0.005	<0.05	0.2	0	6.6	<1	83
	10/05/2024	KAPITI-6452	14.3	6.3	<1	0.024	<0.23	<0.015	0.0389	<0.005	<0.05	0.5	0	8	<1	83.2
	19/06/2024	KAPITI-6825	14.6	6.7	<1	0.022	<0.23	<0.015	0.0369	<0.05	<0.05	0.2	0	8.2	<1	80.6
Bore 2	27/07/2023	KAPITI-4864	13.1	6.1	0.9	0.017	3.14	0.023	3.18	0.563	0.601	3.2	0	24.7	4	213
	22/08/2023	KAPITI-4967	14.4	6.09	<1	0.024	4.03	0.029	4.083	0.504	0.564	4.6	0	17.9	10	248.4
	25/09/2023	KAPITI-5114	13.1	6.2	1.1	0.022	3.37	<0.015	3.4069	0.508	0.569	3.7	0	16.2	<1	221
	12/10/2023	KAPITI-5206	13.3	6.2	<1	<0.015	3.58	<0.015	3.6098	0.497	0.56	3.8	0	16.6	<1	218.8
	15/11/2023	KAPITI-5342	13.2	6.1	2.4	0.021	3.55	<0.015	3.5859	0.528	0.554	3.7	0	16.6	<1	211.3
	7/12/2023	KAPITI-5426	13.8	6.2	<1	<0.015	3.73	<0.015	3.7598	0.553	0.563	3.8	0	18.6	<1	226.1

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
	24/01/2024	KAPITI -5622	13.5	6	<1	0.03	2.94	<0.015	2.9849	0.504	0.577	3	0	18.3	1	209
	20/02/2024	KAPITI -5738	14	5.9	<1	0.034	2.49	<0.015	2.5389	0.539	0.602	2.6	0	17.8	<1	201
	11/03/2024	KAPITI -5855	15	6.3	<1	0.031	2.54	<0.015	2.5859	0.548	0.6	2.8	0	20	3	205.7
	22/04/2024	KAPITI -6279	15.4	6.1	<1	0.033	3.46	<0.015	3.5079	0.513	0.588	3.6	0	20.4	1	207
	10/05/2024	KAPITI -6459	15.2	6	<1	0.026	3.68	<0.015	3.7209	0.565	0.614	4.1	0	17.1	27	204.5
	19/06/2024	KAPITI -6830	15.5	6.4	<1	<0.015	4.64	<0.015	4.6698	0.53	0.531	4.1	0	18.7	<1	216.1
Bore 3	27/07/2023	KAPITI -4865	17.6	6.2	0.8	0.017	1.15	<0.015	1.1819	0.402	0.44	1.3	0	11.3	6	119
	22/08/2023	KAPITI -4968	11.9	6.23	<1	0.017	2.24	<0.015	2.2719	0.403	0.443	2.6	0	10.1	12	157.6
	25/09/2023	KAPITI -5116	11	6.3	<1	0.022	2.43	<0.015	2.4669	0.412	0.454	2.7	0	13.7	32	188
	12/10/2023	KAPITI -5207	11	6.4	<1	<0.015	1.38	<0.015	1.4098	0.338	0.391	1.9	0	13.6	1	150.6
	15/11/2023	KAPITI -5343	11.5	6.23	<1	<0.015	1.03	<0.015	1.0598	0.312	0.36	1.5	0	12.1	1	133.5
	7/12/2023	KAPITI -5427	12.5	6.3	<1	0.019	1.19	<0.015	1.2239	0.427	0.434	1.2	0	12.5	1	0.8
	24/01/2024	KAPITI -5623	14.7	6.1	<1	0.029	0.557	<0.015	0.6009	0.443	0.491	0.7	0	15	10	156
	20/02/2024	KAPITI -5739	15.9	6	<1	<0.015	0.33	<0.015	0.3598	0.5	0.518	0.5	0	13.3	4	146
	11/03/2024	KAPITI -5856	17.2	6.4	<1	0.017	0.343	<0.015	0.3749	0.54	0.586	0.7	0	13	4	135.7
	22/04/2024	KAPITI -6280	17.2	6.2	<1	0.023	1	<0.015	1.0379	0.495	0.557	1	0	15	1	155
	10/05/2024	KAPITI -6460	16.5	6.2	<1	0.022	0.966	<0.015	1.0029	0.493	0.547	1.4	0	14.6	5	155.6
	19/06/2024	KAPITI -6831	14.8	6.37	<1	0.023	2.5	<0.015	2.5379	0.533	0.586	3	0	17.5	4	183.5

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
Bore 4	27/07/2023	KAPITI-4863	12.6	6.2	0.8	0.023	2.11	<0.015	2.1479	0.216	0.229	2.8	2.8	11.8	<1	150
	22/08/2023	KAPITI-4969	14.9	6.15	<1	0.025	2.86	<0.015	2.8999	0.207	0.228	3.1	3.1	12.2	<1	164.6
	25/09/2023	KAPITI-5113	14	6.2	<1	0.016	2.99	<0.015	3.0209	0.196	0.225	3.1	3.1	12.7	<1	169
	12/10/2023	KAPITI-5209	13.9	6.3	<1	<0.015	2.33	<0.015	2.3598	0.177	0.215	2.5	2.5	12.6	<1	141.3
	15/11/2023	KAPITI-5344	13.7	6.16	<1	<0.015	2.43	<0.015	2.4598	0.191	0.222	2.4	2.4	11.6	<1	133.4
	7/12/2023	KAPITI-5428	13.8	6.2	<1	0.019	2.57	<0.015	2.6039	0.199	0.218	2.7	2.6	13.1	<1	167.7
	24/01/2024	KAPITI-5621	13.8	6.1	<1	0.026	2.03	<0.015	2.0709	0.199	0.238	2.3	2.2	11.9	<1	114
	20/02/2024	KAPITI-5740	13.6	6	<1	0.017	2.76	<0.015	2.7919	0.227	0.303	3	3.1	17.3	<1	128
	11/03/2024	KAPITI-5857	13.8	6.3	<1	0.028	1.7	<0.015	1.7429	0.211	0.226	2.1	2	13.3	<1	135.5
	22/04/2024	KAPITI-6278	14.5	6.1	<1	<0.015	1.79	<0.015	1.8198	0.197	0.217	1.7	1.6	11	<1	121
	10/05/2024	KAPITI-6458	14.4	6.1	<1	0.031	1.68	<0.015	1.7259	0.199	0.23	1.8	1.8	17	<1	118.4
	19/06/2024	KAPITI-6829	14.4	6.47	<1	<0.015	2.5	<0.015	2.5298	0.202	0.234	2.3	2.2	12.2	1	136
Bore 4a	27/07/2023	KAPITI-4862	13.1	6.3	0.9	<0.015	0.714	<0.015	0.7438	<0.05	0.052	0.8	0	8.2	<1	107
	22/08/2023	KAPITI-4970	14.7	6.33	<1	0.021	0.868	<0.015	0.9039	<0.05	<0.05	1.5	0	7	<1	105.7
	25/09/2023	KAPITI-5112	14.4	6.3	<1	<0.015	0.763	<0.015	0.7928	0.038	<0.05	0.9	0	7.7	<1	104
	12/10/2023	KAPITI-5210	14.3	6.5	<1	<0.015	0.973	<0.015	1.0028	0.03	0.053	1.1	0	9.6	<1	102.4
	15/11/2023	KAPITI-5345	14.6	6.31	<1	0.019	0.861	<0.015	0.8949	0.028	0.059	1.1	0	8.6	<1	101.6
	7/12/2023	KAPITI-5429	14.3	6.4	<1	<0.015	0.769	<0.015	0.7988	0.032	<0.05	0.8	0	7.7	<1	100.7

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
	24/01/2024	KAPITI -5620	13.8	6.2	<1	0.025	0.736	<0.015	0.7759	0.037	<0.05	0.8	0	7.7	<1	98
	20/02/2024	KAPITI -5741	13.6	6.1	1.7	0.022	1.01	<0.015	1.0469	0.074	0.092	1.1	0	8.7	<1	98
	11/03/2024	KAPITI -5858	13.5	6.4	<1	0.021	0.475	<0.015	0.5109	0.035	<0.05	0.5	0	8.9	<1	98.3
	22/04/2024	KAPITI -6277	14	6.3	<1	<0.015	0.662	<0.015	0.6918	<0.005	0.052	0.6	0	7.9	<1	93
	10/05/2024	KAPITI -6457	13.7	6.3	<1	0.017	0.638	<0.015	0.6699	0.038	0.054	0.8	0	10	1	96.2
	19/06/2024	KAPITI -6828	13.3	6.65	<1	<0.015	0.614	<0.015	0.6438	<0.05	0.059	0.4	0	8.3	<1	97.2
Bore 5	27/07/2023	KAPITI -4861	10.9	6.17	1.3	0.021	2.31	0.022	2.353	0.172	0.202	2.4	2.4	20	2	258
	22/08/2023	KAPITI -4971	14.7	6.11	<1	0.016	2.61	0.021	2.647	0.169	0.178	2.7	2.7	17.4	<1	230.3
	25/09/2023	KAPITI -5111	14.2	6.2	<1	0.022	3.18	0.023	3.225	0.148	0.179	3.5	3.5	18.7	<1	237
	12/10/2023	KAPITI -5211	14.3	6.3	<1	<0.015	2.97	0.028	3.0129	0.128	0.192	3.6	3.5	19.1	<1	238.2
	15/11/2023	KAPITI -5346	14.7	6.12	<1	<0.015	2.98	0.024	3.0189	0.135	0.172	3.3	3.3	16.6	<1	231.4
	7/12/2023	KAPITI -5430	14.6	6.2	<1	<0.015	2.56	<0.015	2.5898	0.13	0.167	2.6	2.6	16.4	3	214.3
	24/01/2024	KAPITI -5626	15.4	6	<1	0.034	2.61	<0.015	2.6589	0.139	0.24	3.1	3.1	17.5	<1	218
	20/02/2024	KAPITI -5742	15.7	6	1.1	0.025	2.38	0.017	2.422	0.157	0.178	2.8	2.3	17.7	<1	223
	11/03/2024	KAPITI -5859	15.6	6.3	1	0.017	1.46	<0.015	1.4919	0.151	0.172	1.5	1.4	17	<1	219.4
	22/04/2024	KAPITI -6276	15.5	6	<1	0.016	1.71	<0.015	1.7409	0.144	0.154	1.9	1.8	19	<1	214
	10/05/2024	KAPITI -6455	14.9	6.1	<1	0.02	1.8	0.016	1.836	0.138	0.217	2.5	2	18.2	<1	213.2
	19/06/2024	KAPITI -6827	14.2	6.44	<1	0.017	2.18	<0.015	2.2119	0.136	0.171	2.4	2.3	18.6	1	201.6

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
Bore 6	27/07/2023	KAPITI-4867	15.5	6.9	1.1	<0.015	<0.23	<0.015	0.0298	<0.05	<0.05	<0.5	0	6.7	<1	56
	22/08/2023	KAPITI-4972	9.4	6.8	<1	<0.015	<0.23	<0.015	0.0298	<0.05	<0.05	0.2	0	4.9	<1	61.91
	25/09/2023	KAPITI-5118	10.5	7	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.1	0	13.2	<1	71
	12/10/2023	KAPITI-5212	10.9	7	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.5	0	10.1	<1	68
	15/11/2023	KAPITI-5347	11.9	6.8	<1	0.029	<0.23	<0.015	0.0439	<0.005	<0.05	0.4	0	6.5	<1	68.76
	7/12/2023	KAPITI-5431	13.6	6.8	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	<0.5	0	5.5	1	66.6
	24/01/2024	KAPITI-5625	15.5	6.7	<1	0.037	<0.23	<0.015	0.0519	0.013	<0.05	0.1	0	5.9	1	71
	20/02/2024	KAPITI-5743	16.9	6.4	<1	0.025	<0.23	<0.015	0.0399	<0.005	<0.05	0.2	0	5.6	1	74
	11/03/2024	KAPITI-5860	16.8	6.7	<1	0.016	<0.23	<0.015	0.0309	0.005	<0.05	0.1	1.4	6.7	<1	72.4
	22/04/2024	KAPITI-6282	16.2	6.7	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.1	0	7.3	<1	69
	10/05/2024	KAPITI-6461	14.9	6.7	<1	0.018	<0.23	<0.015	0.0329	<0.005	<0.05	0.3	0	5.6	<1	69.2
	19/06/2024	KAPITI-6835	11.5	7.13	<1	<0.015	2.05	<0.015	2.0798	<0.05	<0.05	0.1	0	7.1	<1	67.03
Bore 7	27/07/2023	KAPITI-4866	16.1	6.8	0.9	<0.015	<0.23	<0.015	0.0298	<0.05	<0.05	0.2	0	6.2	1	57.9
	22/08/2023	KAPITI-4973	9.9	6.8	<1	0.022	<0.23	<0.015	0.0369	<0.05	<0.05	0.4	0	5.5	<1	63.21
	25/09/2023	KAPITI-5117	10	6.9	<1	0.015	<0.23	<0.015	0.0299	<0.005	<0.05	0.3	0	6.7	<1	72
	12/10/2023	KAPITI-5213	10.6	6.8	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.1	0	10.6	<1	70.8
	15/11/2023	KAPITI-5348	12	6.8	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.5	0	7	<1	70.85
	7/12/2023	KAPITI-5432	13.3	6.7	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	<0.5	0	5.4	2	69.8

Appendix A.3 Bore and Spring Water Quality

Sample Site	Date	Sample ID	Temp	pH	BOD (mg/L)	AmmN (mg/L)	NitraN (mg/L)	NitriN (mg/L)	SolubleN (mg/L)	DRP (mg/L)	TotalP (mg/L)	Total N (mg/L)	Total N (0.45) (mg/L)	Faecal Coliforms (cfu/ 100ml)	E. Coli (100cfu/ 100ml)	Cond (µS/cm)
	24/01/2024	KAPITI -5624	15.5	6.6	<1	0.016	<0.23	<0.015	0.0309	<0.005	<0.05	0.2	0	6.1	1	74
	20/02/2024	KAPITI -5744	17.4	6.4	<1	0.026	0.236	<0.015	0.2769	0.007	<0.05	0.2	0	5.5	<1	76
	11/03/2024	KAPITI -5861	17.5	6.6	<1	<0.015	<0.23	<0.015	0.0298	<0.005	<0.05	0.1	0	6.9	<1	76.4
	22/04/2024	KAPITI -6281	16.9	6.8	<1	0.023	<0.23	<0.015	0.0379	<0.05	<0.05	0.1	0	6.9	24	75
	10/05/2024	KAPITI -6465	16.3	6.6	<1	0.019	<0.23	<0.015	0.0339	<0.005	<0.05	0.4	0	6	1	72.9
	19/06/2024	KAPITI -6834	12.9	6.88	<1	<0.015	<0.23	<0.015	0.0298	<0.05	<0.05	0.2	0	7	2	68.8
	27/07/2023	KAPITI -4859	10.5	6.4	1.6	0.022	0.453	<0.015	0.4899	<0.05	<0.05	1.2	0	17.5	<1	140
	22/08/2023	KAPITI -4974	13.4	6.21	<1	<0.015	0.622	<0.015	0.6518	<0.05	<0.05	1.2	0	7	77	96.67
	25/09/2023	KAPITI -5110	13.2	6.2	1.1	0.021	0.544	<0.015	0.5799	<0.005	<0.05	0.7	0	13.2	310	149
	12/10/2023	KAPITI -5214	13.4	6.4	<1	0.017	0.581	<0.015	0.6129	<0.005	<0.05	0.9	0	8.6	4	96.6
	15/11/2023	KAPITI -5349	16.3	6.17	2	<0.015	0.479	<0.015	0.5088	<0.005	<0.05	0.8	0	17.6	25	145.3
	7/12/2023	KAPITI -5433	15	6.1	<1	<0.015	0.546	<0.015	0.5758	<0.005	<0.05	0.2	0	6.6	3	96.3
Spring	24/01/2024	KAPITI -5619	18	6	1.6	0.02	0.521	<0.015	0.5559	0.005	<0.05	0.8	0	7.2	1370	99
	20/02/2024	KAPITI -5736	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11/03/2024	KAPITI -5862	15.5	6.3	1.1	0.026	0.3	<0.015	0.3409	<0.005	<0.05	0.7	0	8.2	490	97
	22/04/2024	KAPITI -6275	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10/05/2024	KAPITI -6453	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	19/06/2024	KAPITI -6836	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A.4 Daily observations of the two OWWTP Ponds

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
1/07/2023										
2/07/2023										
3/07/2023	7.97	8.33	8.2	Clear	1 - No Smell	8.34	11.43	8	Clear	1 - No Smell
4/07/2023	8.1	9	8.4	Green	1 - No Smell	8.4	14.1	8.5	Green	1 - No Smell
5/07/2023	7.9	9.3	9.6	Green	1 - No Smell	8.4	13.4	9.3	Green	1 - No Smell
6/07/2023	7.8	8.4	8.5	Green	1 - No Smell	8.6	13.4	8.4	Green	1 - No Smell
7/07/2023	7.7	9.5	8.1	Green	1 - No Smell	8.4	14.2	7.7	Green	1 - No Smell
8/07/2023										
9/07/2023										
10/07/2023	8	9.1	10.7	Clear	1 - No Smell	8.4	14.1	10.6	Clear	1 - No Smell
11/07/2023	8	8.3	10.7	Clear	1 - No Smell	8.4	12.4	10.7	Clear	1 - No Smell
12/07/2023	7.7	5.4	11.1	Clear	1 - No Smell	8.2	11.1	10.9	Clear	1 - No Smell
13/07/2023	7.5	7.2	10.1	Clear	1 - No Smell	8.1	12.6	10	Clear	1 - No Smell
14/07/2023	7.6	8.2	10.6	Clear	1 - No Smell	8.2	11.4	10.6	Clear	1 - No Smell
15/07/2023										
16/07/2023										
17/07/2023	7.8	7.2	11.2	Clear	1 - No Smell	8.4	13	11.3	Clear	1 - No Smell
18/07/2023	7.7	6.8	11.7	Clear	1 - No Smell	8.3	13.8	11.6	Green	1 - No Smell
19/07/2023	8.3	13.2	12.6	Green	1 - No Smell	7.8	8.5	12.6	Green	1 - No Smell
20/07/2023	8.1	8	13.2	Green	1 - No Smell	8.5	15.3	13.1	Green	1 - No Smell
21/07/2023	8.2	10.3	10.4	Green	1 - No Smell	8.5	8.5	10.5	Green	1 - No Smell
22/07/2023										
23/07/2023										
24/07/2023	7.8	9.2	12.3	Green	1 - No Smell	8.5	15.6	11.8	Green	1 - No Smell
25/07/2023	6.9	6.1	11.6	Green	1 - No Smell	6.9	14	11.7	Green	1 - No Smell
26/07/2023	7.7	4.5	10.7	Green	1 - No Smell	8.6	13.6	10.4	Green	1 - No Smell
27/07/2023	7.8	4.5	9.5	Green	1 - No Smell	8.9	14	9.5	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
28/07/2023	7.84	5.61	9.8	Clear	1 - No Smell	8.77	15.04	9.7	Green	1 - No Smell
29/07/2023										
30/07/2023										
31/07/2023	7.8	4.8	10.8	Green	1 - No Smell	8.6	13.9	11.2	Green	1 - No Smell
1/08/2023	7.8	6.1	11.8	Green	1 - No Smell	8.6	14.2	11.6	Green	1 - No Smell
2/08/2023	7.9	7.8	12.2	Green	1 - No Smell	8.5	11.6	12	Green	1 - No Smell
3/08/2023	7.9	5.3	11.2	Green	1 - No Smell	8.4	17.4	11.4	Green	1 - No Smell
4/08/2023	8	8.3	10.8	Green	1 - No Smell	9.1	20	10	Green	1 - No Smell
5/08/2023										
6/08/2023										
7/08/2023	7.8	6.6	10.1	Green	1 - No Smell	8.9	14.3	10.1	Green	1 - No Smell
8/08/2023	8	8.2	10.4	Green	1 - No Smell	8.9	15.8	10.5	Green	1 - No Smell
9/08/2023	7.7	4.9	9.4	Clear	1 - No Smell	8.8	15.3	9.4	Green	1 - No Smell
10/08/2023	7.7	5.3	9.6	Clear	1 - No Smell	8.6	15.1	9.5	Green	1 - No Smell
11/08/2023	7.5	4.1	9.2	Clear	1 - No Smell	8.4	13.3	9.2	Green	1 - No Smell
12/08/2023										
13/08/2023										
14/08/2023	7.8	6.1	11.4	Clear	1 - No Smell	8.8	14.5	11.2	Green	1 - No Smell
15/08/2023	8.01	9.87	11.3	Clear	1 - No Smell	8.97	17.1	11.1	Green	1 - No Smell
16/08/2023	8.1	10.9	11.5	Green	1 - No Smell	9	16.3	11	Green	1 - No Smell
17/08/2023	8	10.5	12	Green	1 - No Smell	9.2	20	12	Green	1 - No Smell
18/08/2023	8	9.5	10.4	Green	1 - No Smell	9.1	18.6	10	Green	1 - No Smell
19/08/2023										
20/08/2023										
21/08/2023	7.8	6.8	11.8	Green	1 - No Smell	9	16.2	11.7	Green	1 - No Smell
22/08/2023	8	10.4	12.2	Green	1 - No Smell	8.9	18.4	12.2	Green	1 - No Smell
23/08/2023	8.1	12.1	12.9	Green	1 - No Smell	8.8	17.5	12.5	Green	1 - No Smell
24/08/2023	7.9	9.1	11.9	Green	1 - No Smell	8.8	17	11.4	Green	1 - No Smell
25/08/2023	8.4	14.4	12.4	Green	1 - No Smell	9.21	18.8	11.2	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
26/08/2023										
27/08/2023										
28/08/2023	8.1	12.7	13	Green	1 - No Smell	8.9	14.6	13.2	Green	1 - No Smell
29/08/2023	8.2	12.3	11.1	Green	1 - No Smell	9.3	20	11	Green	1 - No Smell
30/08/2023										
31/08/2023	8.1	9.6	13	Green	1 - No Smell	9.3	19.3	12.7	Green	1 - No Smell
1/09/2023	8	5.7	13.5	Green	1 - No Smell	9	16.7	13.6	Green	1 - No Smell
2/09/2023										
3/09/2023										
4/09/2023	8.4	12.6	13	Green	1 - No Smell	9.3	18.9	13.1	Green	1 - No Smell
5/09/2023	8.1	11.8	13.1	Green	1 - No Smell	9.2	17.9	13	Green	1 - No Smell
6/09/2023	8.2	11.3	13.2	Green	1 - No Smell	8.7	15.4	13	Green	1 - No Smell
7/09/2023	8.1	12.2	13.1	Green	1 - No Smell	8.8	16.8	13	Green	1 - No Smell
8/09/2023	8.1	8.3	14.8	Green	1 - No Smell	9.1	17.1	152	Green	1 - No Smell
9/09/2023										
10/09/2023										
11/09/2023	8.3	10.7	15.9	Green	1 - No Smell	9	13.9	15.5	0	1 - No Smell
12/09/2023	7.9	5.5	13.8	Green	1 - No Smell	8.7	10.4	13.8	Green	1 - No Smell
13/09/2023	8	10.63	15.2	Green	1 - No Smell	8.6	14.71	14.8	Green	1 - No Smell
14/09/2023	8	12.3	14.9	Green	1 - No Smell	8.6	16.2	15	Green	1 - No Smell
15/09/2023	8.2	11.5	15.7	Green	1 - No Smell	8.7	15	15.3	Green	1 - No Smell
16/09/2023										
17/09/2023										
18/09/2023	8	11	14.9	Green	1 - No Smell	8.5	14	15	Green	1 - No Smell
19/09/2023	8.2	9.5	14.5	Green	1 - No Smell	8.4	11.5	14.6	Green	1 - No Smell
20/09/2023	7.9	5.1	14.7	Green	1 - No Smell	8	6.09	14.7	Green	1 - No Smell
21/09/2023										
22/09/2023	7.91	4.73	15.5	Green	1 - No Smell	7.97	4.97	15.4	Green	1 - No Smell
23/09/2023										

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
24/09/2023										
25/09/2023	7.8	5.3	16.1	Green	1 - No Smell	7.9	5.1	15.9	Green	1 - No Smell
26/09/2023	7.8	3.5	14.1	Green	1 - No Smell	8	7.5	13.7	Green	1 - No Smell
27/09/2023	7.8	5.1	12.5	Green	1 - No Smell	8.1	7.8	12.8	Green	1 - No Smell
28/09/2023	7.8	3.4	12.6	Green	1 - No Smell	8.1	7.6	12.6	Green	1 - No Smell
29/09/2023	7.7	3.1	14.8	Green	1 - No Smell	8	7.8	14.6	Green	1 - No Smell
30/09/2023										
1/10/2023										
2/10/2023										
3/10/2023	7.9	3.8	12.6	Clear	1 - No Smell	8	7	12.9	Green	1 - No Smell
4/10/2023	7.7	2.4	12.1	Clear	1 - No Smell	8	8.2	12.1	Green	1 - No Smell
5/10/2023	7.6	1.2	13.8	Clear	1 - No Smell	7.9	8.2	13.9	Green	1 - No Smell
6/10/2023	7.6	0.6	15.3	Clear	1 - No Smell	8	9.4	15.2	Green	1 - No Smell
7/10/2023										
8/10/2023										
9/10/2023	7.6	1.2	14.5	Clear	1 - No Smell	7.8	6.6	14.5	Green	1 - No Smell
10/10/2023	7.6	1.4	15.6	Clear	1 - No Smell	7.7	5.5	15.5	Green	1 - No Smell
11/10/2023	7.6	1	16.9	Green	1 - No Smell	7.7	3.2	16.1	Green	1 - No Smell
12/10/2023	7.7	1.8	18.2	Green	1 - No Smell	7.6	5.4	17.2	Green	1 - No Smell
13/10/2023	7.7	1.6	17.4	Clear	1 - No Smell	7.7	2.2	16.7	Green	1 - No Smell
14/10/2023										
15/10/2023										
16/10/2023	7.8	4.8	14.7	Green	1 - No Smell	7.9	6.8	14.5	Green	1 - No Smell
17/10/2023	7.8	3.3	16.2	Green	1 - No Smell	8	6.9	16	Green	1 - No Smell
18/10/2023	7.8	2.6	18.8	Yellow	1 - No Smell	8.5	16.4	18.2	Green	1 - No Smell
19/10/2023	7.7	1.3	18	Clear	1 - No Smell	8.4	15.1	17.9	Green	1 - No Smell
20/10/2023	7.7	1.1	18.2	Clear	1 - No Smell	8.5	12.9	17.6	Green	1 - No Smell
21/10/2023										
22/10/2023										

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
23/10/2023	7.7	2.2	19.5	Yellow	1 - No Smell	9	20	19.1	Green	1 - No Smell
24/10/2023	7.7	1.1	18.2	Clear	1 - No Smell	8.8	14.3	17.7	Green	1 - No Smell
25/10/2023	7.7	1.6	18.4	Clear	1 - No Smell	8.7	16.3	18.4	Green	1 - No Smell
26/10/2023	7.6	2.1	17.8	Clear	1 - No Smell	8.6	10.2	17.4	Green	1 - No Smell
27/10/2023	7.9	6.1	16.6	Clear	1 - No Smell	8.8	16.8	16.6	Green	1 - No Smell
28/10/2023										
29/10/2023										
30/10/2023	7.8	3.5	20.5	Clear	1 - No Smell	9.2	20	19.4	Green	1 - No Smell
31/10/2023	7.7	4.6	22.7	Clear	1 - No Smell	9.3	20	22.1	Green	1 - No Smell
1/11/2023	7.7	1.1	20.6	Clear	1 - No Smell	8	6.3	19.9	Green	1 - No Smell
2/11/2023	7.7	1.6	20.3	Clear	1 - No Smell	9	14.8	20	Green	1 - No Smell
3/11/2023	7.7	2.5	21	Clear	1 - No Smell	8.8	8.5	20.4	Green	1 - No Smell
4/11/2023										
5/11/2023										
6/11/2023	7.9	5.5	19.9	Green	1 - No Smell	9	17.7	20	Green	1 - No Smell
7/11/2023	8	7.3	20	Green	1 - No Smell	8.7	14.2	19.6	Green	1 - No Smell
8/11/2023	8	6.5	18.5	Green	1 - No Smell	8.7	10.7	18.5	Green	1 - No Smell
9/11/2023	8.3	12.8	19.7	Green	1 - No Smell	9	19.5	20.1	Green	1 - No Smell
10/11/2023	8.2	8.9	18.3	Green	1 - No Smell	8.3	6.9	17.7	Green	1 - No Smell
11/11/2023										
12/11/2023										
13/11/2023										
14/11/2023	8.1	7.5	17.5	Green	1 - No Smell	8.2	5.9	17.2	Green	1 - No Smell
15/11/2023	8.2	8.2	20.4	Green	1 - No Smell	8.3	7.8	21	Green	1 - No Smell
16/11/2023	8.6	9.8	20.6	Green	1 - No Smell	8.4	11.4	21.4	Green	1 - No Smell
17/11/2023	8.4	9	20.1	Green	1 - No Smell	8.2	10.8	19.7	Green	1 - No Smell
18/11/2023										
19/11/2023										
20/11/2023	8	7.9	20.1	Green	1 - No Smell	8	9.8	19.5	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
21/11/2023	7.8	7.4	19.8	Green	1 - No Smell	8.1	10.9	19.3	Green	1 - No Smell
22/11/2023	8	8.4	20.4	Green	1 - No Smell	8.5	14.4	19.9	Green	1 - No Smell
23/11/2023	8.3	12.6	21.4	Green	1 - No Smell	8	4.8	21.1	Green	1 - No Smell
24/11/2023	8.1	9.5	21	Green	1 - No Smell	8	7.3	20.8	Green	1 - No Smell
25/11/2023										
26/11/2023										
27/11/2023	8.6	15.6	19.6	Green	1 - No Smell	8.9	18.9	18.5	Green	1 - No Smell
28/11/2023	8.2	9.6	17.9	Green	1 - No Smell	8.5	9.2	17.7	Green	1 - No Smell
29/11/2023	8.3	8.8	18.3	Green	1 - No Smell	8.4	10.4	18.1	Green	1 - No Smell
30/11/2023	8.4	10.2	18.7	Green	1 - No Smell	8.4	18.4	19.7	Green	1 - No Smell
1/12/2023	8.7	17.2	19.6	Green	1 - No Smell	9.2	20	19.3	Green	1 - No Smell
2/12/2023										
3/12/2023										
4/12/2023	8.5	10.4	20	Green	1 - No Smell	8.7	16.6	20.4	Green	1 - No Smell
5/12/2023	8.2	7.4	20.1	Green	1 - No Smell	8.7	10.7	19.6	Green	1 - No Smell
6/12/2023	8.4	8.1	20.2	Green	1 - No Smell	8.8	11.2	20	Green	1 - No Smell
7/12/2023	8.3	6.6	21	Green	1 - No Smell	8.7	8.1	20.6	Green	1 - No Smell
8/12/2023	8.7	14.4	22.6	Green	1 - No Smell	9.2	16.2	21.6	Green	1 - No Smell
9/12/2023										
10/12/2023										
11/12/2023	8.3	8.9	17.4	Green	1 - No Smell	9.1	12.5	16.9	Green	1 - No Smell
12/12/2023	8.4	9.4	18.8	Green	1 - No Smell	9	14.6	18.5	Green	1 - No Smell
13/12/2023	8.7	15.9	20.1	Green	1 - No Smell	9.2	14	19.2	Green	1 - No Smell
14/12/2023	8.2	15.4	21.4	Green	1 - No Smell	8.9	9.5	19.8	Green	1 - No Smell
15/12/2023	8.4	14.6	21.1	Green	1 - No Smell	8.7	11.7	20.2	Green	1 - No Smell
16/12/2023										
17/12/2023										
18/12/2023	7.8	5.1	18.8	Green	1 - No Smell	7.6	1.4	18.8	Green	1 - No Smell
19/12/2023	8.7	19.2	21.7	Green	1 - No Smell	9.1	20	22	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
20/12/2023	8.8	20	21.8	Green	1 - No Smell	9.2	20	22.6	Green	1 - No Smell
21/12/2023	8.7	12.08	23	Green	1 - No Smell	8.5	6.14	22.6	Green	1 - No Smell
22/12/2023	8.7	12.2	22.5	Green	1 - No Smell	8.6	7.3	22.5	Green	1 - No Smell
23/12/2023										
24/12/2023										
25/12/2023	8.6	9.8	22.4	Green	1 - No Smell	8.5	9.6	22.3	Green	1 - No Smell
26/12/2023	8.4	5	23	Green	1 - No Smell	8.1	6.6	23.2	Green	1 - No Smell
27/12/2023	8.2	6.7	24.1	Green	1 - No Smell	8	6.8	24.3	Green	1 - No Smell
28/12/2023	8.4	7.2	23	Green	1 - No Smell	8.5	6.2	23.4	Green	1 - No Smell
29/12/2023										
30/12/2023										
31/12/2023										
1/01/2024	8.9	15.6	21	Green	1 - No Smell	7.9	10.1	20.1	Green	1 - No Smell
2/01/2024	8.7	11.7	21.5	Green	1 - No Smell	8	8.2	21.5	Green	1 - No Smell
3/01/2024	8.7	10.7	22.2	Green	1 - No Smell	8.9	13.8	22.4	Green	1 - No Smell
4/01/2024	8.4	6.5	23.1	Green	1 - No Smell	8.8	10.4	23	Green	1 - No Smell
5/01/2024	8.1	2.2	22	Green	1 - No Smell	8.8	6	21.9	Green	1 - No Smell
6/01/2024										
7/01/2024										
8/01/2024	8.3	7.3	23	Green	1 - No Smell	8.1	3	21.6	Green	1 - No Smell
9/01/2024	8.7	16.6	26.2	Green	1 - No Smell	9	9.6	24.2	Green	1 - No Smell
10/01/2024	7.7	1.7	24	Green	1 - No Smell	9.5	17.8	24.1	Green	1 - No Smell
11/01/2024	7.9	2	25.2	Green	1 - No Smell	9.4	13.4	25.1	Green	1 - No Smell
12/01/2024	7.5	2.3	24.3	Green	1 - No Smell	9.2	9.2	24.6	Green	1 - No Smell
13/01/2024										
14/01/2024										
15/01/2024	7.9	8.6	23.4	Green	1 - No Smell	9.1	5.6	23.2	Green	1 - No Smell
16/01/2024	8.2	10.6	22.4	Green	1 - No Smell	7.8	4.5	22.3	Green	1 - No Smell
17/01/2024	8.62	15	23.4	Green	1 - No Smell	8.18	8.5	23	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
18/01/2024	8.3	6.7	26.1	Green	1 - No Smell	8.3	6.2	25.3	Green	1 - No Smell
19/01/2024	8.34	6.74	26.1	Green	1 - No Smell	8.27	6.23	25.3	Green	1 - No Smell
20/01/2024										
21/01/2024										
22/01/2024	8.4	8.1	26.6	Green	1 - No Smell	8.4	6.7	26.6	Green	1 - No Smell
23/01/2024	8.5	8.9	25.9	Green	1 - No Smell	8.5	7.8	26	Green	1 - No Smell
24/01/2024	8.9	10.8	26.2	Green	1 - No Smell	8.8	9.9	26.3	Green	1 - No Smell
25/01/2024	9.1	20	23.9	Green	1 - No Smell	8.3	12.4	22.9	Green	1 - No Smell
26/01/2024	9.2	16.9	21.5	Green	1 - No Smell	8.6	14	21.4	Green	1 - No Smell
27/01/2024										
28/01/2024										
29/01/2024	8.9	14.6	20.4	Green	1 - No Smell	7.6	2.5	20.1	Green	1 - No Smell
30/01/2024	9.1	16.8	21.8	Green	1 - No Smell	7.6	4.3	21.5	Green	1 - No Smell
31/01/2024	8.9	14.4	21.8	Green	1 - No Smell	7.8	9.6	22.7	Green	1 - No Smell
1/02/2024	8.8	10.6	22.2	Green	1 - No Smell	7.6	4.7	23	Green	1 - No Smell
2/02/2024	8.65	8.39	22.1	Green	1 - No Smell	7.68	4.61	22.5	Green	1 - No Smell
3/02/2024										
4/02/2024										
5/02/2024	7.9	5.3	22.2	Green	1 - No Smell	8.4	8.1	21.9	Green	1 - No Smell
6/02/2024	8.7	11.4	20.3	Green	1 - No Smell	8.1	8.8	20.4	Green	1 - No Smell
7/02/2024	8.9	14	22.5	Green	1 - No Smell	8.1	9.1	22.6	Green	1 - No Smell
8/02/2024	8.5	8.8	22.4	Green	1 - No Smell	8.4	12.4	22.1	Clear	1 - No Smell
9/02/2024	8.4	8.3	21.8	Green	1 - No Smell	8.3	10.5	21.9	Green	1 - No Smell
10/02/2024										
11/02/2024										
12/02/2024	8.6	11.5	18.9	Green	1 - No Smell	8.3	9.6	19.2	Green	1 - No Smell
13/02/2024	8.5	11.2	19.8	Green	1 - No Smell	8.5	13.1	19.6	Green	1 - No Smell
14/02/2024	8.4	9.6	20.7	Green	1 - No Smell	8.4	10.7	20.5	Green	1 - No Smell
15/02/2024	8.5	13.8	21.9	Green	1 - No Smell	8.4	12.7	21.5	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
16/02/2024	8.1	7.3	21.8	Green	1 - No Smell	8.2	8.8	21.8	Green	1 - No Smell
17/02/2024										
18/02/2024										
19/02/2024	8.2	8.9	22.6	Green	1 - No Smell	8.1	10.4	22.9	Green	1 - No Smell
20/02/2024	8.2	12.1	23.1	Green	1 - No Smell	8.2	11.6	21.8	Green	1 - No Smell
21/02/2024	8.2	9.7	19.9	Green	1 - No Smell	8.3	10.6	19.7	Green	1 - No Smell
22/02/2024	8.4	11.1	19.5	Green	1 - No Smell	8.4	11.3	19.3	Green	1 - No Smell
23/02/2024	8	5.6	21.4	Green	1 - No Smell	8	6.8	20.9	Green	1 - No Smell
24/02/2024										
25/02/2024										
26/02/2024	7.9	5.3	21.1	Green	1 - No Smell	7.9	6.6	20.7	Green	1 - No Smell
27/02/2024	7.7	2.4	21.3	Green	1 - No Smell	8.2	10.3	20.8	Green	1 - No Smell
28/02/2024	8.4	11.3	22.4	Green	1 - No Smell	8.5	14	22.2	Green	1 - No Smell
29/02/2024	8.5	13.3	22.9	Green	1 - No Smell	8.2	9.1	22.3	Green	1 - No Smell
1/03/2024	7.7	3.1	19.8	Green	1 - No Smell	7.8	5.3	19.3	Green	1 - No Smell
2/03/2024										
3/03/2024										
4/03/2024	7.7	3.9	20.2	Green	1 - No Smell	7.5	2.2	19.9	Green	1 - No Smell
5/03/2024	7.9	7.7	15.8	Green	1 - No Smell	7.6	6	15.6	Green	1 - No Smell
6/03/2024	8	7.6	15.4	Green	1 - No Smell	7.4	5.3	15.3	Green	1 - No Smell
7/03/2024	7.9	6.9	16.1	Green	1 - No Smell	7.5	5.8	15.9	Green	1 - No Smell
8/03/2024	8.5	12	19.2	Green	1 - No Smell	7.4	4.9	18.1	Green	1 - No Smell
9/03/2024										
10/03/2024										
11/03/2024	8.5	11.6	19.1	Green	1 - No Smell	7.5	6.8	19.3	Green	1 - No Smell
12/03/2024	8.5	10.9	18.3	Green	1 - No Smell	7	3.6	17.8	Green	1 - No Smell
13/03/2024	8.5	10	19.6	Green	1 - No Smell	7	4.5	19.5	Green	1 - No Smell
14/03/2024	8.5	9.6	20.2	Green	1 - No Smell	7.1	5.1	19.7	Green	1 - No Smell
15/03/2024	8.3	7.7	18	Green	1 - No Smell	7.4	6	17.8	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
16/03/2024										
17/03/2024										
18/03/2024	9	14.3	17.5	Green	1 - No Smell	9	8.4	16.9	Green	1 - No Smell
19/03/2024	9	20	20	Green	1 - No Smell	9	8.4	16.9	Green	1 - No Smell
20/03/2024	8.6	8.9	15.3	Green	1 - No Smell	7.7	6.6	14.8	Green	1 - No Smell
21/03/2024	8.6	11.1	15.1	Green	1 - No Smell	8	9.4	14.7	Green	1 - No Smell
22/03/2024	9.1	15.7	17.3	Green	1 - No Smell	8.2	10.7	16.5	Green	1 - No Smell
23/03/2024										
24/03/2024										
25/03/2024	8.3	7.7	18.3	Green	1 - No Smell	7.6	5.7	18.2	Green	1 - No Smell
26/03/2024	7.7	5.3	18.1	Green	1 - No Smell	7.2	4.9	18	Green	1 - No Smell
27/03/2024	7.2	5.5	18	Green	1 - No Smell	7.2	2.3	18	Green	1 - No Smell
28/03/2024	7.1	5.4	16.3	Green	1 - No Smell	7.1	4.3	16.2	Green	1 - No Smell
29/03/2024	7.8	5.2	14.9	Green	1 - No Smell	7.2	6.7	14.7	Green	1 - No Smell
30/03/2024										
31/03/2024										
1/04/2024	7.6	5	16	Green	1 - No Smell	7.1	5.3	16.3	Green	1 - No Smell
2/04/2024	7.6	4.8	16.6	Green	1 - No Smell	7.1	2.8	16.3	Green	1 - No Smell
3/04/2024	7.7	5.6	17	Green	1 - No Smell	7.2	4.6	17	Green	1 - No Smell
4/04/2024	7.4	2.1	17.7	Green	1 - No Smell	6.9	3.4	17.3	Green	1 - No Smell
5/04/2024	7.2	3.8	17.6	Green	1 - No Smell	7	4.8	17.2	Green	1 - No Smell
6/04/2024										
7/04/2024										
8/04/2024	8.1	0.4	16.5	Green	1 - No Smell	8.6	12.9	16.2	Green	1 - No Smell
9/04/2024	8.3	14.6	17.7	Green	1 - No Smell	8.4	11.6	17.3	Green	1 - No Smell
10/04/2024	8.2	15.3	17.6	Green	1 - No Smell	8.3	12.5	17.8	Green	1 - No Smell
11/04/2024	8.2	16.4	18.3	Green	1 - No Smell	8.2	11.8	18	Green	1 - No Smell
12/04/2024	8	15.8	18	Green	1 - No Smell	8.1	10.6	17.9	Green	1 - No Smell
13/04/2024										

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
14/04/2024										
15/04/2024	8.1	14.2	17.3	Green	1 - No Smell	8	11.6	17.1	Green	1 - No Smell
16/04/2024	8.1	10	17.8	Green	1 - No Smell	8.4	13.3	18.4	Green	1 - No Smell
17/04/2024	8	9.4	17.6	Green	1 - No Smell	8.3	11.7	16.8	Green	1 - No Smell
18/04/2024	7.8	6.9	16.9	Green	1 - No Smell	7.2	5.8	16.8	Green	1 - No Smell
19/04/2024	7.9	6.3	16.1	Green	1 - No Smell	7.1	6	15.9	Green	1 - No Smell
20/04/2024										
21/04/2024										
22/04/2024	7.7	7.2	17.3	Green	1 - No Smell	7.5	12	16.4	Green	1 - No Smell
23/04/2024	7.8	6	14.5	Green	1 - No Smell	7.6	11.4	14.4	Green	1 - No Smell
24/04/2024	7.8	4.8	15.3	Green	1 - No Smell	7.7	10.3	14.9	Green	1 - No Smell
25/04/2024	7.7	5.1	15.1	Green	1 - No Smell	7.9	9.8	15.2	Green	1 - No Smell
26/04/2024	7.9	6.6	14.8	Green	1 - No Smell	8	11.9	15.1	Green	1 - No Smell
27/04/2024										
28/04/2024										
29/04/2024	8.5	15.4	15.1	Green	1 - No Smell	8.6	11.5	13.2	Green	1 - No Smell
30/04/2024	8.3	10.6	13.8	Green	1 - No Smell	8.7	11.6	13	Green	1 - No Smell
1/05/2024	7.9	8	14.4	Green	1 - No Smell	7.7	8.1	14.1	Green	1 - No Smell
2/05/2024	7.8	6.3	14.2	Green	1 - No Smell	7.4	8.1	13.9	Green	1 - No Smell
3/05/2024	8.31	9.62	14.3	Green	1 - No Smell	8.88	12.47	14.5	Green	1 - No Smell
4/05/2024										
5/05/2024										
6/05/2024	7.9	7.5	13.5	Green	1 - No Smell	7.4	7.3	13.1	Green	1 - No Smell
7/05/2024	7.9	5.7	12.4	Green	1 - No Smell	7.7	8.4	12.2	Green	1 - No Smell
8/05/2024	8	7.7	10.6	Green	1 - No Smell	8.1	11.2	10.3	Green	1 - No Smell
9/05/2024	8	8.1	11.8	Green	1 - No Smell	8	10.2	11.3	Green	1 - No Smell
10/05/2024	8	10.3	9.8	Green	1 - No Smell	8.1	9.6	10.7	Green	1 - No Smell
11/05/2024										
12/05/2024										

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
13/05/2024	8	6.4	11.4	Green	1 - No Smell	7.9	7.2	11.1	Green	1 - No Smell
14/05/2024	8.1	10	11.9	Green	1 - No Smell	8.4	14	11.8	Green	1 - No Smell
15/05/2024	7.9	7.6	12.7	Green	1 - No Smell	7.8	9.3	12.8	Green	1 - No Smell
16/05/2024	7.9	7.6	12.7	Green	1 - No Smell	7.8	9.3	12.8	Green	1 - No Smell
17/05/2024	8	8.5	13	Green	1 - No Smell	8	11.8	13.5	Green	1 - No Smell
18/05/2024										
19/05/2024										
20/05/2024	7.9	9.9	12.9	Green	1 - No Smell	7.7	7.4	12.5	Green	1 - No Smell
21/05/2024	7.8	5.8	12.6	Clear	1 - No Smell	7.6	8.6	12.9	Clear	1 - No Smell
22/05/2024	7.7	2.2	12.2	Green	1 - No Smell	7.5	5.1	12.1	Green	1 - No Smell
23/05/2024	7.8	4.1	12.4	Green	1 - No Smell	7.5	5.6	12.4	Green	1 - No Smell
24/05/2024	7.8	5.8	12.6	Clear	1 - No Smell	7.6	8.6	12.9	Clear	1 - No Smell
25/05/2024										
26/05/2024										
27/05/2024	7.7	4	11.2	Green	1 - No Smell	7.8	5.7	10.9	Green	1 - No Smell
28/05/2024	7.7	1.5	10.7	Green	1 - No Smell	7.8	6.1	10.6	Green	1 - No Smell
29/05/2024	7.7	1.1	10.7	Clear	1 - No Smell	7.7	5.1	10.6	Green	1 - No Smell
30/05/2024	7.7	1.3	9.6	Clear	1 - No Smell	7.8	5.9	9.3	Clear	1 - No Smell
31/05/2024	7.7	2.2	10.1	Clear	1 - No Smell	7.8	6.2	10	Clear	1 - No Smell
1/06/2024										
2/06/2024										
3/06/2024	7.8	5.1	12.9	Green	1 - No Smell	7.9	6.1	12.7	Green	1 - No Smell
4/06/2024	7.7	1.6	11.4	Green	1 - No Smell	8	8.2	11.4	Green	1 - No Smell
5/06/2024	7.7	2.1	11.2	Green	1 - No Smell	7.9	8.8	11.4	Green	1 - No Smell
6/06/2024	7.9	3.4	10.1	Green	1 - No Smell	8	8	9.9	Green	1 - No Smell
7/06/2024	8	3.8	11.4	Green	1 - No Smell	8.2	12.2	11.4	Green	1 - No Smell
8/06/2024										
9/06/2024										
10/06/2024	8	3.2	12.7	Green	1 - No Smell	8	5.3	12.9	Green	1 - No Smell

Date	Pond A Daily Observations					Pond B Daily Observations				
	pH	DO (mg/L)	Temp ©	Pond Colour	Odour	pH	DO (mg/L)	Temp ©	Pond Colour	Odour
11/06/2024	7.8	4.5	13.7	Green	1 - No Smell	7.8	6.6	13.6	Clear	1 - No Smell
12/06/2024	7.8	1.9	12.6	Clear	1 - No Smell	8	6.6	12.4	Clear	1 - No Smell
13/06/2024	8	4.1	12.3	Clear	1 - No Smell	8.1	7.3	12.1	Clear	1 - No Smell
14/06/2024	8.1	5.8	12.1	Clear	1 - No Smell	8.1	8.3	11.8	Clear	1 - No Smell
15/06/2024										
16/06/2024										
17/06/2024	8.1	6.5	11.9	Green	1 - No Smell	8.1	8	11.7	Green	1 - No Smell
18/06/2024	8.2	7.5	11.8	Green	1 - No Smell	8.1	8.1	11.8	Green	1 - No Smell
19/06/2024	8.8	16.1	12.6	Green	1 - No Smell	8.7	17	12.1	Green	1 - No Smell
20/06/2024	8.4	11.1	11.1	Green	1 - No Smell	8.2	9.1	10.3	Green	1 - No Smell
21/06/2024	9	20	11.5	Green	1 - No Smell	8.6	13.8	10.3	Green	1 - No Smell
22/06/2024										
23/06/2024										
24/06/2024	8.9	20	11.2	Green	1 - No Smell	8.7	14.2	10.5	Green	1 - No Smell
25/06/2024	8.7	16.3	11.2	Green	1 - No Smell	8.7	15.4	10.9	Green	1 - No Smell
26/06/2024	8.05	7.73	10.3	Green	1 - No Smell	7.94	5.48	10.1	Green	1 - No Smell
27/06/2024	8.5	9.2	10.3	Green	1 - No Smell	8.2	8.8	10.6	Green	1 - No Smell
28/06/2024	8.3	8.3	9.6	Green	1 - No Smell	8	6.4	9.3	Green	1 - No Smell
29/06/2024										
30/06/2024										

Appendix B: Meter Verification Details

ABB MEASUREMENT & ANALYTICS | TEST REPORT

ABB Ability™

Verification for measurement devices

Verification Report for:

FEP300/500; FEH300/500

Measurement made easy

Measurement & Analytics
Service

Installation Details

Meter Owner	KCDC
Machine Name	OTAKI WWTP LDTA Flowmeter
Medium	WasteWater

Customer Details

Site Address	Kapiti Coast District Council
Telephone	
Email	

Operator Details

Date and Time	26-06-2023 10:43:42
Operator's Name	Admin
Operator's Signature	

Overall Status - Passed

The flowmeter has passed its internal continuous verification and automatic self-calibration. It is working within +/- 2% of original factory calibration.

ABB Ability Verification for measurement devices verifies the function of the measurement product within the specification limits over the lifetime of the device with a total test coverage > 90% and complies with the requirements for traceable verification according to DIN EN ISO 9001:2015 - section 8.5

Sensor Information	
Sensor Type	Process 300 series
Sensor Model	
Sensor Size	DN 150
Sensor Serial No.	1
Sensor SAP No	?
Sensor Tag	?
Measuring Range Qmax	250.000 l/s
User Span	100.000 %
Liner Material	PTFE
Electrode Material	Hastelloy C-4
Sensor Span Ss	200.100 %
Sensor Zero Sz	0.000 mm/s
First Calibration Date of Sensor	00:00:00 2000/01/01
Sensor Run Hours	9351hrs -27804mins
Actual Flow Rate	0.000 l/s

Transmitter Information	
Diagnosis Functions	Sensor Status
Empty Pipe	OFF
Sensor Measurement	OFF
Transmitter Serial No	124978
Transmitter SAP Order No	?
Tag Name	FIT-1001
Tx Firmware Version	D200S069U01_01.06.00
System Zero	0.000 mm/s
Run Hours	18736hrs 29696mins
Communication	FEX300 HART
Pulses per Unit	1.000 /m³
Pulse Width	200.000 ms

Summary Verification of the Sensor

Coil Group	PASS
Coil Resistance Factory Fingerprint	17.000 Ohms
Coil Resistance Measured	15.991 Ohms
Coil Current Measured	199.849 mA
Reference	62.867 mV
Cable Length	3.500 m

Electrode Group	PASS
Electrode Group Status	No Alarms

Sensor Group	PASS
Sensor Group Status	No Alarms

Pipe Status	INFO
Empty Pipe	**ON**
Detector	1850 Hz
Threshold	3000 Hz

Totalizer Information

	Start	End	Difference
Forward	1480349.000 m³	1480349.000 m³	0.000 m³
Reverse	0.637 m³	0.637 m³	0.000 m³
Net	1480348.000 m³	1480357.000 m³	9.000 m³

Summary Verification of the Transmitter

Output Group	

Current Output 31/32	PASS

Applied	Measured	Result
4 mA	4.000 mA	PASS
12 mA	12.000 mA	PASS
20 mA	20.000 mA	PASS

Digital Output 51/52	PASS

Applied	Measured	Result
5000 Hz	5000.000 Hz	PASS
2625 Hz	2625.000 Hz	PASS
1000 Hz	1000.000 Hz	PASS

Digital Output 41/42	NOT EXECUTED

Applied	Measured	Result
5000 Hz		
2625 Hz		
1000 Hz		

Digital Input 81/82	NOT EXECUTED
Transmitter Group	**PASS**
Transmitter Group Status	No Alarms

Transmitter Calibration Verification	PASS

	Fingerprint	Measured	Result
10 m/s	10.181450 m/s	10.179650 m/s	PASS
5 m/s	5.078596 m/s	5.067461 m/s	PASS
Common Mode Rejection	-0.001262	-0.009602	PASS

Signal Quality		INFO
NV resets	0 /s	Info Only
Signal Quality (SNR)	70.000 dB	Info Only

Comments (Installation, Grounding etc.)

1st Verification

Verification Certificate has been generated by ABB Ability Verification for measurement devices variant "Licensed software testing" (ABB FEP300/500; FEH300/500 VDF Version 03.37).

ABB Ability Verification for measurement devices Version 04.00.00.7

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To find your local ABB contact, visit:

abb.com/contacts

For more information, visit:

abb.com/measurement

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ABB

Flow Meter Calibration Verification Certificate

Customer Information		Meter Information	
Customer:	Owner	**Meter Owner:**	Owner
		Meter Type:	MagMaster
		Sensor Size / Pipe ID:	250 mm
CalMaster2 Owner:		**Pipe Status:**	Full
		Sensor Serial No.:	P/50589/5/4
Verification Date:	5/22/2023 10:47:13 PM	**Transmitter Serial No.:**	vkh022497
Report Date:	6/29/2023 11:16:35 AM	**Tag:**	TxmTag
		Location:	Location

Overall Meter: Passed

The test results verify that this flow meter is functioning within normal working limits, and is within +/-2% of original calibration certification.

Summary of Results	
Coil Group:	Passed
Electrode Group:	Passed
Sensor Group:	Passed
Transmitter Signal Group:	Passed
Transmitter Driver Group:	Passed
Transmitter Output Group:	Passed

Totaliser Information	Start:	End:	Difference:
Fwd: (m^3)	11076140	11076148	8
Rev: (m^3)	16035	16035	0
Net: (m^3)	11060105	11060113	8

CalMaster Information		Post-Processing Information	
Serial No.:	v/cm22200-2	**CalMaster2 Version:**	1.00.1062
Firmware Version:	CM1.0.1099	**Scripts Version:**	1.01.2017
Test Script Version:	Issue 20	**Processing Script Version:**	8/14/2022 8:07:30 AM
		Download Date:	6/29/2023 10:40:27 AM
Next Calibration Date:	12/12/2023 12:30:10 PM	**Number of Tests Scored:**	2

CalMaster is fully traceable to National and International Standards.
For details refer to CalMaster Traceability Documentation.

Installation Comments:

6/29/2023 11:16:35 AM

Date/Time: **Operator Signature:** **Print Name:**

QSTA1358 Iss.2

World Flow Technology Centres

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