South Taranaki District Council

Kaponga, Manaia, Pātea, and Waverley WWTPs Monitoring Programme Annual Report 2023/24

Technical Report 2024-42

Taranaki Regional Council

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Executive summary

South Taranaki District Council (STDC) operates eight wastewater treatment plant (WWTP) systems within the district of South Taranaki. This report addresses performances of four of these systems, located in the Kaponga, Manaia, Patea and Waverley townships[1].

This report for the period July 2023 to June 2024 describes the monitoring programme implemented by Taranaki Regional Council (the Council) to assess STDC's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of STDC's activities.

During the monitoring period, STDC demonstrated an overall high level of environmental performance and high level of administrative performance.

STDC holds seven resource consents for the Waverley, Kaponga, Manaia and Patea wastewater treatment plants, which include a total of 92 conditions setting out the requirements that they must satisfy. Four consents allow STDC to discharge treated wastewater from the various municipal oxidation ponds sewage treatment systems, one consent is held to discharge treated stock truck effluent (Waverley), one consent covers the discharge of untreated municipal sewage in emergencies (Patea), and one consent allows for the placement and use of a discharge structure in the Coastal Marine Area (Patea).

Monitoring was undertaken to ensure continued maintenance and efficient operation of all treatment systems, plus compliance with discharge permit conditions.

During the year, STDC demonstrated a high level of environmental and high level of administrative performance with the resource consents held in relation to the Kaponga WWTP. The Kaponga WWTP was well maintained and operated, and performed satisfactorily throughout the monitoring period. The effluent quality data was indicative of well-treated wastewater, with parameters typical of a municipal oxidation pond system receiving minimal industrial waste loadings. No significant impacts on the Kaupokonui River were recorded from the physicochemical parameters analysed during the mid-summer survey conducted in January 2024, when a low discharge rate of well-treated wastewater characterised this system. No significant impacts of the effluent discharge were indicated by MCI scores through the reach of the river surveyed.

During the year, STDC demonstrated a good level of environmental and a high level of administrative performance with the resource consents held in relation to the Manaia WWTP. The Manaia WWTP was generally well maintained and operated and performed satisfactorily throughout the monitoring period. Although localised impacts of the pond discharge on the receiving waters have reduced markedly following the incorporation of wetlands into the treatment system, impacts from the discharge in relation to bacteria and aesthetic water quality of the Manaia Creek were observed.

During the year, STDC demonstrated a high level of environmental and administrative performance with the resource consents in relation to the Patea WWTP. The Patea WWTP and emergency overflow was well maintained and operated, and performed satisfactorily throughout the monitoring period. Since the upgrade to the system and the pumping station, the discharge effluent quality has shown marked improvement over the quality typical of the previous single pond treatment system receiving minimal industrial waste loadings. There were no emergency discharges during the year. No significant impacts

[1] The Eltham, Wai-inu, Hawera, and Opunake Wastewater Treatment Plants are the subject of separate reports by Taranaki Regional Council.

associated with the discharges were measured on the bacteriological quality of the lower reaches of the Patea River.

During the year, STDC demonstrated a high level of environmental and a high level of administrative performance with the resource consents in relation to the Waverley WWTP. The Waverley WWTP was well maintained and operated, and performed satisfactorily throughout the monitoring period. The performance of the system was considered to be typical of a biological treatment system receiving essentially domestic wastes, and continued to show some improvements compared to historical wastewater quality. Minor impacts from the discharge were noted on the water quality of the Wairoa Stream tributary. However, these and other effects were readily assimilated, first by the aquatic weed growth in the tributary, and then in the extensive Ihupuku Wetland area located downstream of Beach Road.

This report also addresses monitoring of the use of STDC stock truck wastewater disposal system near Waverley, where the consent allows for on-site land discharge of anaerobic-aerobic ponds' treated stock truck effluent. The presence of appropriate signage and surveillance by the consent holder have been effective in maintaining compliance at the facility. Increased monitoring of this facility was instigated by the Council and will continue in conjunction with the programme for the Waverley municipal oxidation ponds system (where the stock truck wastes were disposed of originally).

For reference, in the 2023/24 year, consent holders were found to achieve a high level of environmental performance and compliance for 864 (89%) of a total of 967 consents monitored through the Taranaki tailored monitoring programmes, while for another 75 (8%) of the consents a good level of environmental performance and compliance was achieved. A further 26 (3%) of consents monitored required improvement in their performance, while the remaining two (<1%) achieved a rating of poor.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance is improving.

This report includes recommendations for the 2024/25 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2023 to June 2024 by Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by STDC for four of these wastewater treatment plants (WWTPs). These plants are located at Kaponga, Manaia, Patea, and Waverley. The Waverley programme also includes the consent held for the discharge of treated stock truck effluent from the SH3 system to land in the Waitotara catchment. The municipal systems located at Wai-inu Beach, Eltham, Hawera and Opunake are reported on separately by the Council.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by STDC that relate to discharges of wastewater in the Kaupokonui (Kaponga), Waiokura/Motumate (Manaia), Patea (Patea), and Wairoa (Waverley) and Waitotara (Waverley Stock Truck) catchments. This is the 29th annual report to be prepared by the Council for STDC.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the *Resource Management Act 1991* (RMA) and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by STDC;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Kaponga, Manaia, Patea, and Waverley WWTPs.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2024/25 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;
c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by the consent holders, this report also assigns a rating as to each Company's environmental and administrative performance during the period under review. The rating categories are high, good, improvement required and poor for both environmental and administrative performance. The interpretations for these ratings are found in Appendix II.

For reference, in the 2023/24 year, consent holders were found to achieve a high level of environmental performance and compliance for 864 (89%) of a total of 967 consents monitored through the Taranaki tailored monitoring programmes, while for another 75 (8%) of the consents a good level of environmental performance and compliance was achieved. A further 26 (3%) of consents monitored required improvement in their performance, while the remaining two (<1%) achieved a rating of poor.[2]

1.2 Resource consents

STDC holds seven resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in in the 'Evaluation of performance' section of the relevant treatment plant.

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all permits held by STDC during the period under review.

Table 1 Resource consents held by STDC in relation to the Kaponga, Manaia, Patea and Waverley WWTP's

Consent number	Purpose	Granted	Review	Expires
Water discharge permits				
0067-3	To discharge up to 455 cubic metres per day of treated municipal wastewater from the Patea WWTP into the Coastal Marine Area of the Patea River	July 2007	-	June 2028
0072-3	To discharge up to 450 cubic metres per day of treated municipal wastewater from the Waverley municipal oxidation ponds system into an unnamed tributary of the Wairoa Stream	August 2017	-	June 2022*
0145-2	To discharge untreated municipal sewage in emergencies only into the Coastal Marine Area of the Patea River	July 2007	-	June 2028

[2] The Council has used these compliance grading criteria for more than 20 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

Consent number	Purpose	Granted	Review	Expires
0861-3	To discharge up to 500 cubic metres per day of treated wastewater from the Kaponga WWTP into the Kaupokonui Stream	June 2007	-	June 2029
1204-4	To discharge up to 600 cubic metres per day of treated municipal wastewater from the Manaia WWTP into an unnamed coastal stream between the Waiokura Stream and the Motumate Stream	June 2007	-	June 2029
Discharges of waste to land				
6621-1	To discharge treated stock truck effluent from an oxidation pond treatment system onto and into land in the vicinity of the Waiau Stream in the Waitotara catchment	Sept 2005	-	June 2022*
Coastal permit				
4576-2	To erect, place and maintain an oxidation pond discharge structure and an emergency overflow discharge structure as part of the Patea WWTP within the coastal marine area of the Patea River	Nov 2005	-	June 2028

* renewal underway, consent continues to operate under s.124

1.3 Monitoring programme

1.3.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

1.3.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.3.3 Kaponga WWTP

1.3.3.1 Site inspections

The Kaponga WWTP was visited three times during the monitoring period, with each inspection conducted during early to mid-morning. With regard to consents for the discharge to water, the main points of interest were maintenance and operating condition of the WWTP, and the discharge of treated wastewater. Air quality surveys for odours associated with the system were included with each inspection. Inspections provided for the operation, internal monitoring, and supervision of the plant to be reviewed by the Council. Sources of data being collected by STDC were identified and accessed, so that performance in respect of

operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.3.3.2 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge point and mixing zone.

The primary oxidation pond was sampled for dissolved oxygen and microfloral component on three occasions.

Water quality samples were collected from upstream and downstream sites in the Kaupokonui River during the winter and late autumn inspections. Samples were analysed for filtered uninhibited biochemical oxygen demand (filtered BOD), pH, turbidity, temperature, unionised ammonia (NH_3), and ammonia-N (NH_4).

The treated pond effluent and three sites on the Kaupokonui River were sampled on one occasion in mid-summer under low river flow conditions. The samples were analysed for total and filtered BOD, chloride, conductivity, dissolved oxygen, *E. coli* bacteria, pH, suspended solids (SS), turbidity, temperature, dissolved reactive phosphorus (DRP), unionised ammonia (NH_3), ammonia-N (NH_4), and nitrate-nitrite nitrogen (NNN).

1.3.3.3 Biomonitoring surveys

A biological survey was performed on one occasion at three sites in the Kaupokonui River to determine whether or not the discharge of treated effluent from the Kaponga WWTP has had a detrimental effect upon the communities of the stream.

1.3.4 Manaia WWTP

1.3.4.1 Site inspections

The Manaia WWTP was visited three times during the monitoring period, with each inspection conducted during early to mid-morning. With regard to consents for the discharge to water, the main points of interest were maintenance and operating condition of the WWTP and associated wetlands, and the discharge of treated wastewater. Air quality surveys for odours associated with the system were included with each inspection. Inspections provided for the operation, internal monitoring, and supervision of the plant to be reviewed by the Council. Sources of data being collected by STDC were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.3.4.2 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge point and either side of the mixing zone.

The primary oxidation pond was sampled for dissolved oxygen and microfloral component during each of the inspections. Water quality samples were also collected from upstream and downstream sites in the Manaia Creek, and either side of the mixing zone in the Tasman Sea. The freshwater samples were analysed for chloride, conductivity, faecal coliform bacteria, turbidity, and temperature. The sea samples were analysed for conductivity, faecal coliform bacteria, and temperature.

The primary pond and the treated wetlands effluents were sampled on one occasion in early summer during low river flow conditions. The samples were analysed for total and filtered BOD, chloride, conductivity, dissolved oxygen, *E. coli* bacteria, pH, suspended solids, turbidity, temperature, unionised ammonia (NH_3), and ammonia-N (NH_4).

1.3.4.3 Biological inspection

A low tide beach ecological inspection was performed on one occasion in autumn 2024 to assess the impact of the discharge on the marine environment.

1.3.5 Patea WWTP and emergency outfall

1.3.5.1 Site inspections

The Patea WWTP and Emergency Overflow were visited three times during the monitoring period, with each inspection conducted during mid-morning. With regard to consents for the discharge to water, the main points of interest were maintenance and operating condition of the WWTP, and usage and maintenance of the emergency overflow system. Air quality surveys for odours associated with the system were included with each inspection. Inspections provided for the operation, internal monitoring, and supervision of the plant to be reviewed by the Council. Sources of data being collected by STDC were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.3.5.2 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge point and either side of the mixing zone.

The primary oxidation pond was sampled for dissolved oxygen, microfloral component, total and filtered BOD, chloride, conductivity, dissolved oxygen, faecal coliform bacteria, pH, suspended solids, turbidity, temperature, unionised ammonia (NH_3), and ammonia-N (NH_4) during the summer inspection. During two of the three inspection occasions, water quality samples were also collected from upstream and downstream sites in the Patea River. These samples were analysed for conductivity, *E. coli* and enterococci bacteria, turbidity, and temperature. In addition, analyses for BOD, chloride, ammonia-N (NH_4), DRP and pH were included in the summer samples.

Contact recreational bacteriological water quality at Patea Boat Ramp and Mana Bay was monitored by the Council on 21 occasions between early November 2023 and late March 2024. The samples were analysed for conductivity, *E. coli* and enterococci bacteria, and temperature.

Additional monitoring was undertaken upstream and downstream of the discharge at the request of STDC. This data will be used to get a better understanding of the river water quality as part of determining the best option for upgrading the WWTP in the near future.

1.3.6 Waverley WWTP and stock truck wastes disposal

1.3.6.1 Site inspections

The Waverley WWTP was visited three times during the monitoring period. These inspections were conducted during mid-morning, and focused on the maintenance and operation of the treatment plant and any effects on the receiving environment. Air quality surveys associated with the operation of the plant were included with each inspection.

The nearby stock truck effluent disposal was inspected four times throughout the year.

1.3.6.2 Chemical sampling

The second cell of the oxidation pond was sampled for dissolved oxygen, temperature, and microfloral component during each of the three inspections.

The Council undertook sampling of the discharge from the site and water quality upstream and downstream of the discharge during low flow conditions on one occasion in mid-summer, in conjunction with sampling from the oxidation pond. The discharge and receiving water samples were analysed for ammonia (NH_3 and NH_4), total and filtered BOD, chloride, conductivity, dissolved oxygen, DRP, *E. coli* bacteria, pH, suspended solids, temperature, and turbidity.

1.3.6.3 Biomonitoring surveys

A biological survey was performed on one occasion at three sites in an unnamed tributary of the Wairoa Stream to determine whether or not the discharge of treated effluent from the Waverley WWTP has had a detrimental effect upon the communities of the stream.

2. Kaponga WWTP

The Kaponga WWTP is a single oxidation pond system (constructed in 1971) that has been separated into two sections by a wooden dividing barrier. The pond is gravity-fed mainly domestic wastes from a population of approximately 330 people, although it was designed for a population of 650. A sludge survey performed by consultants for the consent holder (MWH, 2005) found that there had been a slow rate of sludge accumulation and at such a rate, it was estimated that the system would not require desludging for another 17 years. Sludge surveys will be repeated at five-yearly intervals (STDC, 2015). Issues of stormwater infiltration, improved mixing within the ponds' system, and reduction of the microfloral component of the treated wastewater discharge, were identified in consideration of upgrading the treatment system during the consent renewal process in the 2007/08 period (CH2M Beca Ltd, 2006). Upgrades to the system were completed by late May 2008. Infiltration remedial work has a lesser priority for the Kaponga township collection system than elsewhere in South Taranaki.

Riparian fencing and planting of the river margin adjacent to the ponds system has also been undertaken. The installation of a mechanical step-screen at the inlet was undertaken during the latter months of the 2012/13 monitoring period. This screen system has telemetry alarming. A flow meter was installed on the pond inlet in the 2017/18 year as per consent conditions.

Photo 1 Kaponga WWTP

2.1 Inspections

20 July 2023

The step screen was operating and wastes were fully contained. The pond influent flow was reasonably clear with an estimated flow rate of 10L/s. The pond appearance was light green-brown and slightly turbid, while pond 2 was light green and a relatively clear. Approximately 60 ducks were observed on the ponds.

The discharge flow rate into the Kaupokonui River was estimated at 8L/s with no noticeable environmental effect on the receiving waters. The Kaupokonui River was running at a moderate swift flow and was clear and uncoloured.

The WWTP surrounds were found to be satisfactory.

25 January 2024

The step screen was operating and wastes were fully contained. The influent flow rate was estimated at 2L/s. Pond 1 was bright green and turbid. In excess of 300 ducks were observed on the pond surface.

The effluent discharge into the Kaupokonui River was estimated at <1L/s (a trickle), with a very small reduction in the black disc measurement downstream.

The WWTP surrounds were found to be satisfactory and no significant odour was noted.

6 June 2024

The step screen was operating and wastes were fully contained. The influent flow was reasonably clear and a light grey colour with an estimated flow rate of 2L/s. The ponds were turbid with a green-brown colour. Several mallard ducks were present.

The discharge flow rate into the Kaupokonui River was estimated at 2L/s with no visual environmental effects on the receiving waters observed.

The surrounds were tidy.

2.2 Results of effluent monitoring

Effluent monitoring was carried out in the second section of the oxidation pond, adjacent to the outlet, for the purpose of monitoring the effectiveness of the WWTP up to that point. Along with a visual survey of each component of the system, dissolved oxygen levels (DO) and the microfloral component of the pond were measured during each inspection. These are discussed in Sections 2.2.1 and 2.2.2 respectively.

The primary pond was sampled for total and filtered BOD, chloride, conductivity, dissolved oxygen, faecal coliform bacteria, pH, suspended solids, turbidity, temperature, dissolved reactive phosphorus (DRP), unionised ammonia (NH_3), ammonia-N (NH_4), and nitrate-nitrite nitrogen (NNN) during the summer inspection, with a reduced suite of analyses undertaken on the autumn sample. The results of these surveys are presented in Table 2 and compared with the results from previous monitoring years.

The effluent quality data was indicative of well-treated wastewater, with parameters typical of a municipal oxidation pond system receiving minimal industrial waste loadings. The majority of the measured parameters were within the ranges of median values monitored to date for this system. The exception to this was unionised ammonia, which was much higher than recorded historically.

Table 2 Results of effluent monitoring for the Kaponga WWTP

Site		OXP002004		
Date		25 January 2024	6 June 2024	2000-2023 Range
Parameter	0840	0840	1005	
Flow	L/s	0.2	1.5	0.1 - 15
BOD	g/m³	19	-	12 - 140
BODF	g/m³	1.9	-	0.7 - 5.8
Chloride	g/m³	29	-	12 - 34
Conductivity	mS/m@25°C	23.8	-	17.0-26.0
DO (concentration)	g/m³	14.7	13.2	1.7 - 17.6
DO (saturation)	%	165	116	18 - 190
E. coli	/100ml	8,660	-	210 - 38,000*
pH	pH	9.5	8.7	7.4 - 10.3
SS	g/m³	68	-	38 - 320
Turbidity	FNU	50	46	30 – 350
Temperature	°C	19.6	9.2	6.5 - 25.4
Nutrient Analyses				
NH_3	g/m³ N	0.44	0.106	0.006 - 0.0988
NH_4	g/m³ N	0.83	1.3	<0.010 - 2.090
NNN	g/m³ N	0.29	-	<0.001 - 0.160
NO_3^-	g/m³ N	<0.001	-	< 0.0001 - 0.009
NO_2^-	g/m³ N	0.062	-	<0.001 - 0.004
DRP	g/m³ P	0.008	-	<0.003 - 6.38

* parameter previously measured as faecal coliforms

2.2.1 Dissolved oxygen levels

The dissolved oxygen concentration in WWTPs varies both seasonally and during the day as a result of a combination of factors. The photosynthetic activity of the pond's microflora together with fluctuations in influent waste loadings on the system are the major influencing factors. Minimum dissolved oxygen concentrations are generally recorded in the early hours of daylight, and therefore pond performance has been evaluated by standardising sampling times toward mid-morning for all regular inspection visits during the monitoring period.

The Kaponga WWTP effluent was analysed for dissolved oxygen and temperature, and the results are displayed in Table 3.

Table 3 Dissolved oxygen measurements from the Kaponga WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m³)	Saturation (%)
20 July 2023	1040	11.4	11.8	110
25 January 2024	0840	19.6	14.7	165
6 June 2024	1005	9.2	13.2	116

The dissolved oxygen concentrations measured during inspections were very high throughout the monitoring period (between 110% and 165% saturation). Super-saturation is a common occurrence in this pond, with median and average dissolved oxygen saturation levels of 101% (from 108 samples collected since February 1988).

2.2.2 Microfloral component

Photo 2 Algal bloom on the surface of the pond caused by high microfloral levels

Pond microflora are very important for the stability of the symbiotic relation between aerobic bacteria in the primary pond. These phytoplankton may be used as a bio-indicator of pond conditions, for example cyanobacteria are often present in under-loaded conditions and chlorophyceae are present in overloaded conditions. To maintain facultative conditions in a pond system there must be an algal community present in the surface layer.

The principal function of algae is the production of oxygen which maintains aerobic conditions while the main nutrients are reduced by biomass consumption. Elevated pH (due to algal photosynthetic activity) and solar radiation combine to reduce faecal bacteria numbers significantly.

Samples of the primary pond effluent were collected on all inspections for chlorophyll-a analyses. Chlorophyll-a concentration can be a useful indicator of the algal population present in the system. Pearson (1996) suggested that a minimum in-pond chlorophyll-a concentration of 300mg/m^3 was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 4 together with field observations of pond appearance.

Table 4 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period July 2013 to June 2023	
				Range	Median
20 July 2023	1040	Turbid, green-brown	430	0.6 - 1,100	400
25 January 2024	0840	Turbid, bright green	490		
6 June 2024	1005	Turbid, dark green	1,500		

Levels of chlorophyll-a in the primary pond were high in all samples collected, all above the historical median, with the sample collected on 6 June 2024 the highest level of chlorophyll-a recorded to date. The median of 400mg/m^3 and average of 444mg/m^3 in the samples collected prior to the current monitoring period (n=30) suggests that the Kaponga WWTP is maintaining stable conditions with regards to the algal population.

2.3 Results of receiving environment monitoring

Monitoring of the impacts of the Kaponga WWTP on the receiving waters was measured using both chemical analyses of the receiving waters of the Kaupokonui River beyond the boundary of the mixing zone, and biological monitoring surveys at the same locations. Chemical sampling was carried out on three occasions during the 2023/24 period (Section 2.3.1 and 2.3.2). One biomonitoring survey was conducted during summer 2024 (Section 2.3.3). The locations of sampling sites are listed in Table 5 and displayed in Figure 1 below.

Figure 1 Aerial location map of sampling sites in relation to Kaponga WWTP

Table 5 Sampling sites for Kaponga WWTP

Site Code	Description	Location
KPK000500 (site 1)	Approximately 250m upstream of the WWTP discharge	Kaupokonui River
OXP002004	Adjacent to outlet of second section of the oxidation pond	Effluent
KPK000520 (site 2)	50m downstream of the WWTP discharge	Kaupokonui River
KPK000550 (site 3a)	Approximately 1km downstream of the WWTP discharge	Kaupokonui River

2.3.1 Receiving water surveys of July 2023 and June 2024

Receiving water samples were collected on 20 July 2023 and 6 June 2024 at two sites in the Kaupokonui River, upstream and downstream of the Kaponga WWTP discharge point. The results of these surveys are displayed in Table 6.

Table 6 Receiving water results July 2023 and June 2024

Date		20 July 2023		6 June 2024		Consent limits
Parameter	Unit	Upstream KPK000500	Downstream KPK000520	Upstream KPK000500	Downstream KPK000520	
Time		1030	1050	0930	1020	-
BOD	g/m^3	<1.0	<1.0	<1.0	<1.0	2.0
pH	pH	7.7	7.7	7.5	7.5	-
Turbidity	NTU	0.12	**0.30**	0.36*	2.0*	Less than 50% increase
Temperature	°C	9.2	9.3	7.1	7.4	-
NH_3	g/m^3 N	<0.00008	< 0.00009	<0.00005	<0.00005	0.025
NH_4	g/m^3 N	<0.010	< 0.010	<0.010	<0.010	-

* turbidity was incorrectly measured as FNU by the lab

There were no significant effects noted in the Kaupokonui River in relation to the parameters tested. BOD_5, and unionised ammonia (NH_3) complied with consent conditions. Turbidity exceeded the consent limits of less than 50% increase in the sample collected on 20 July 2023 however, at 0.30NTU the downstream level is still very low and it is unlikely that this would result in any adverse effects on water quality. Turbidity also increase downstream in the sample collected on 6 June 2024 however, the lab mistakenly used FNU which cannot be assessed against the consent condition, which specifies NTU.

2.3.2 Low flow receiving water survey January 2024

A late summer low flow assessment of the impact of the WWTP's effluent discharge on the receiving waters of the Kaupokonui River was performed on 25 January 2024, 54 days after a significant river fresh (three times median flow). Results of the survey are displayed in Table 7. There was a very low rate of discharge from the ponds system (a trickle <1L/s) at the time of the survey. The river flow was gauged at $0.65m^3/s$ upstream of the discharge.

The trickle of discharge from the ponds resulted in a large amount of dilution, with a small decrease in clarity of the stream immediately downstream of the discharge point (5% decrease in black disc clarity). A black disc measurement was not able to be obtained at the lower downstream site. Suspended solids levels were similar and low at all sites. There was a 33% increase in turbidity between the upstream (KPK000500) and downstream (KPK000520) sites (0.75 to 1.0FNU), dropping down to 0.46FNU at the lower downstream site (as above, this has been measured in FNU instead of NTU so is indicative only and cannot be assessed against the consent condition). Turbidity levels of 1.0FNU and below indicated good water quality.

No significant impacts on the river were recorded for all other parameters measured (Table 7) with minimal or no increases in measured levels of conductivity, bacteria, BOD, pH and nutrients (including un-ionised ammonia). These results were indicative of compliance with Special Conditions 9, 11, and 12 of the consent.

Dissolved oxygen concentrations exceeded 100% saturation at all sites upstream and downstream of the discharge.

Table 7 Low flow receiving water results January 2024

		KPK000500		KPK000520		KPK000550	
Date		25 Jan 2024	2000-2023 Range	25 Jan 2024	2000-2023 Range	25 Jan 2024	2000-2023 Range
Parameter	0845	0805		0825		0915	
Flow	L/s	650	329-858	-	-	-	-
Black disc	m	3.10	2.55-6.20	2.95	2.44-5.75	-	2.00-4.86
BOD	g/m³	<0.8	<0.5-0.6	<0.8	<0.5-0.8	<0.8	<0.5-0.9
BODF	g/m³	<0.8	<0.5-0.9	<0.8	<0.5-0.5	<0.8	<0.5-0.5
Chloride	g/m³	7	7.0-10.2	7	7.0-9.0	7	7.2-8.9
Conductivity	mS/m@25°C	8.5	9.3-10.1	8.5	7.8-10.2	8.5	8.6-10.2
DO (conc)	g/m³	10.3	9.46-11.1	10.3	9.7-11.2	10.4	9.6-11.2
DO (saturation)	%	102	97-106	103	98-107	105	100-108
E. coli	/100ml	249	93-700*	248	61-630*	162	52-540*
pH	pH	7.8	7.3-8.0	7.8	7.4-8.4	8.0	7.6-8.2
SS	g/m³	<3	<2.0-4.0	<3	<2	<3	<2-4
Turbidity	FNU	0.75	0.25-1.4	1.0	0.4-1.8	0.46	0.35-1.3
Temperature	°C	13.5	3.4-19.2	13.9	3.4-19.6	14.8	10.1-19.8
Nutrient Analyses							
NH_3	g/m³	<0.00015	0.00001-0.00021	<0.00017	0.00002-0.0024	<0.0003	0.00005-0.0014
NH_4	g/m³ N	<0.010	<0.003-0.016	<0.010	<0.003-0.043	<0.010	<0.003-0.030
NNN	g/m³ N	0.093	0.07-0.3	0.083	0.07-0.29	0.072	0.06-0.28
NO_3^-	g/m³ N	<0.001	0.069-0.299	<0.001	0.069-0.189	<0.001	0.059-0.279
NO_2^-	g/m³ N	<0.001	<0.001-0.002	<0.001	<0.001-0.002	0.001	<0.001-0.002
DRP	g/m³ P	0.009	0.003-0.023	0.006	<0.003-0.030	0.007	<0.003-0.022

* parameter previously measured as faecal coliforms

2.3.3 Biological monitoring survey

The Council's standard 'kick-sampling' technique was used at three established sites (Table 5, Figure 2) on 14 March 2024 to collect streambed macroinvertebrates from the Kaupokonui River. Samples were processed to provide the number of taxa (richness), MCI score, SQMCI score, and percentage EPT taxa for each site (Figure 2).

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. It may provide more relevant information in relation to non-organic impacts. Differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Macroinvertebrate taxonomic richness was moderate and remained similar at all sites. Site 1 and 3a had 23 taxa, and 2 had 22 taxa. Further, the MCI scores were similar at all three sites and indicative of 'good' macroinvertebrate community health.

The SQMCI scores were 4.1 units, 4.8 units and 5.0 units at sites 1 to 3a, respectively. The scores categorised sites 1 and 2 as having 'fair' macroinvertebrate community health and site 3a as having 'good' health, with a significant difference between sites 1 and 3a. The low SQMCI scores at site 1 (the control site) and site 2 (just below the discharge point) were unlikely a result of the WWTP discharge since the scores of these two sites are relatively comparable.

In summary, the SQMCI index was the only metric that differed considerably between sites in the current survey. Site 1, the control site had a significantly lower SQMCI score than site 3a. However, this was likely due to environmental differences between the two sites.

Overall, there was no evidence suggesting that the Kaponga WWTP discharge had caused any recent adverse impacts on the Kaupokonui River macroinvertebrate community.

A copy of the biomonitoring report for this site is available from the Council upon request.

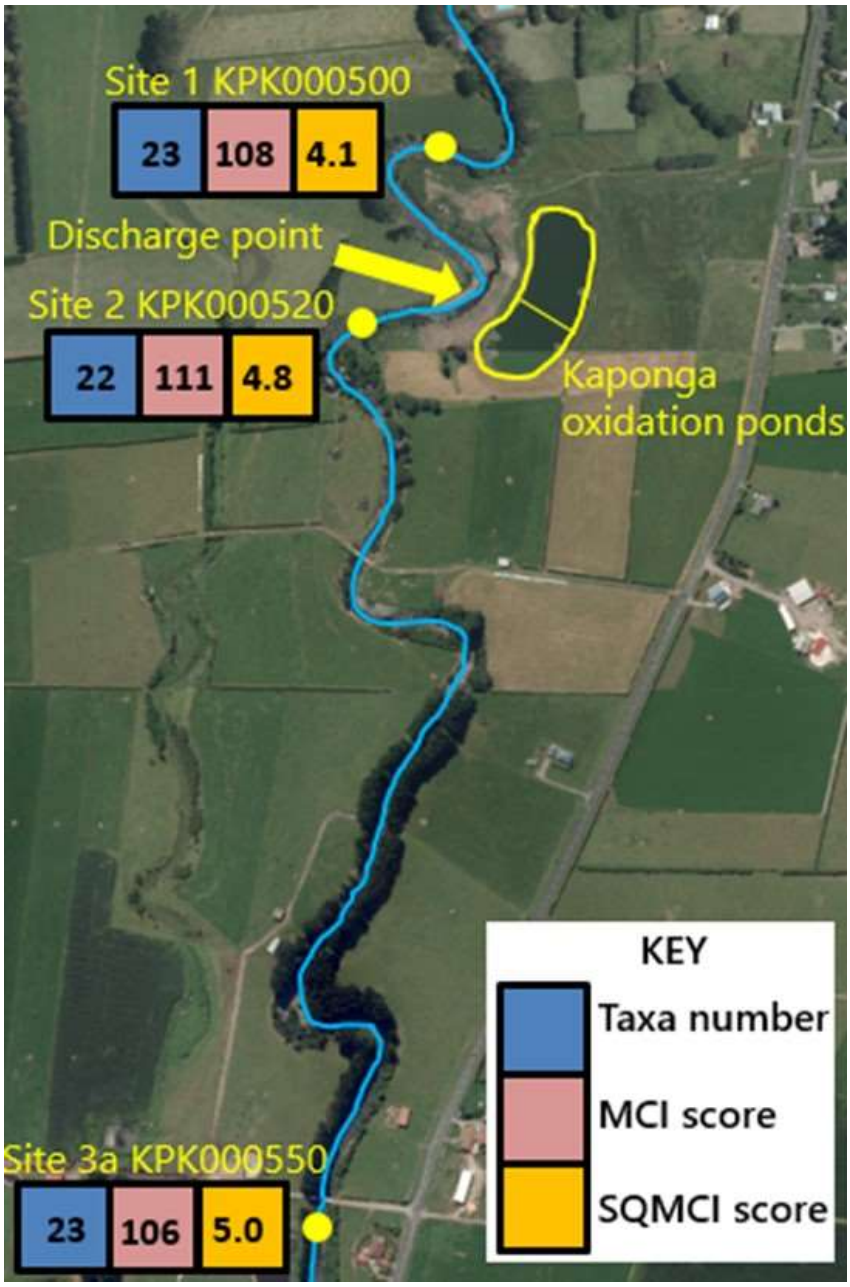

Figure 2 Biomonitoring sites in the Kaupokonui River in relation to the Kaponga WWTP discharge with results for each site

2.4 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with STDC. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2023/24 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with STDC's conditions in resource consents or provisions in Regional Plans for the Kaponga WWTP.

2.5 Discussion

2.5.1 Discussion of site performance

The Kaponga WWTP was well maintained and operated, and performed satisfactorily throughout the monitoring period.

The effluent quality data was indicative of a well-treated wastewater with parameters typical of a municipal oxidation pond system receiving minimal industrial waste loadings. All measured parameters were within the ranges of median values monitored to date for this system. Monitoring of the microfloral component of the second pond by means of chlorophyll-a measurements indicated effective pond performance with all of the concentrations above the historical median, and a new maximum recorded.

Previous flow monitoring has indicated inflow and infiltration into the sewage system however, investigative work (such as smoke testing for damaged or illegal pipework and gully traps, and CCTV of pipework) was not undertaken in the Kaponga district during 2023/24 as other areas are deemed more urgent with Kaponga currently scheduled last for this work.

2.5.2 Environmental effects of exercise of consents

No significant impacts on the Kaupokonui River were recorded from the physicochemical parameters analysed during the mid-summer survey conducted in January 2024. There were no significant changes in the measured concentrations of almost all parameters downstream under low receiving water flow conditions, mainly due to the small amount of high quality effluent discharging at the time.

The Kaupokonui River continued to have high aesthetic water quality in the reaches near the Kaponga township and for one kilometre downstream of the oxidation pond discharge under summer low flow conditions.

A summer macroinvertebrate survey found no evidence to suggest that the discharge had caused a significant decline in macroinvertebrate health in the Kaupokonui River. The absence of heterotrophic growths on the river's substrate was evidence of no acute impacts of the discharge on the biological communities of the Kaupokonui River.

2.5.3 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 8.

Table 8 Summary of performance for Consent 0861-3

Purpose: To discharge treated municipal wastewater from the Kaponga Wastewater Treatment Plant into the Kaupokonui River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Upgrade to plant within one year	Reporting by consent holder; upgrade completed	Yes
2. Exercise in accordance with documentation	Liaison with consent holder and inspections	Yes

Purpose: To discharge treated municipal wastewater from the Kaponga Wastewater Treatment Plant into the Kaupokonui River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
3. Minimisation of effects	Inspections and sampling	Yes
4. Limits on volume	Reporting by consent holder and inspections	Yes
5. Implementation of a management plan	Plan updated May 2024	Yes
6. Provision of operator	Liaison with consent holder	Yes
7. Maintenance of aerobic ponds conditions	Inspections, sampling and data provided by consent holder	Yes
8. Trade wastes connections	Liaison with consent holder	N/A
9. Limits on receiving water effects	Inspections and physicochemical sampling and biomonitoring	Yes
10. Monitoring provisions	Physicochemical sampling and biomonitoring	Yes
11. Limits on receiving water effects for ammonia and filtered BOD_5	Physicochemical sampling	Yes
12. Limits on aesthetic water effects	Physicochemical sampling	**Mostly. One very minor non-compliance recorded**
13. Provision for lapse of consent	Consent exercised	N/A
14. Optional review provision re environment effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

During the year, STDC demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Appendix II.

2.5.4 Recommendations from the 2022/23 Annual Report

In the 2022/23 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation one was implemented, while it was not considered necessary to carry out further investigations or interventions as per recommendation two.

2.5.5 Alterations to monitoring programmes for 2024/25

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

No planned changes have been made to the 2024/25 monitoring programme.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2024/25.

2.5.6 Recommendations

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

3. Manaia WWTP

The Manaia WWTP (Photo 3) is a single treatment oxidation pond (constructed in 1984), followed by twin wetlands (in parallel) receiving mainly domestic sewage together with trade wastes from the bakery industry. These trade wastes are regulated by the STDC Trade Waste Bylaw 2017.

Photo 3 Manaia WWTP

3.1 Background

Issues relating to the historical operation and performance of the reticulation and treatment system have been presented in previous annual reports (TRC Technical Report 2004-30 and TRC Technical Report 2007-53 in particular).

Consent renewal (1999) issues relating to the upgrade of the treatment plant are also summarised in previous reports and the final design of the required upgrade was addressed by the consent renewal in 2007. An assessment of the wastes loadings to the pond system was also included in this process. The upgrade now provides additional screening of the influent and wetlands polishing of the final effluent principally to improve the bacteriological quality of the treated wastewater prior to discharge. Desludging of the oxidation pond was also a component of the upgrade, and was completed in November 2007 with the last of the de-watered sludge used onsite as a base for the constructed wetlands.

The installation of the mechanical screening at the plant was completed by June 2009. The wetlands installation was completed by early summer 2009 with the planting of 24,000 reeds followed by filling with water. The northern wetland was lined with water treatment plant sludge to prevent seepage. Hedging was planted along the northern and eastern boundary of the WWTP.

Both wetlands were commissioned in the 2010/11 period. The consent holder constructed an emergency high level overflow pipe between the oxidation pond and the northern wetland in August 2010 (see TRC Technical Report 2011-18) to prevent overtopping of the pond onto neighbouring farmland. This pipe has been used only occasionally following heavy rainfall periods (e.g. September, 2010 and August, 2011) with a gate-valve installed to provide greater pond storage before use.

The Manaia WWTP is located adjacent to an eroding coastal cliff face, and regular cliff erosion topographical surveys are carried out by STDC's consultant, the most recent occurring in 2014.

3.2 Inspections

9 August 2023

The influent screen was operating and wastes were fully contained. The pond level was normal and there had been a recent discharge via the high level discharge pipe to the wetland pond. The influent flow rate was estimated at 10L/s. The aeration sparge was operating at the influent end. The pond had a turbid appearance and was light brown in colour. Minimal odour was noted. Wildlife consisted of approximately 70 ducks and several black swans.

The northern wetland pond had a level of 1.60m, while the southern pond remained isolated. Pond effluent was relatively clear with a light pale green colour. The treated wastewater discharge flow into the Manaia Creek was estimated at 9L/s, with no visual environmental impact on the receiving water. The Manaia creek was running at a moderate swift flow and was clear and uncoloured.

The ponds and surrounds were found to be tidy.

2 February 2024

The influent screen was operating and wastes were fully contained. The air sparge system at the influent end was operating. The influent flow rate was estimated at 2L/s. The pond was slightly turbid and brown in colour with a slightly noticeable odour. Several paradise ducks and black swans were observed.

The northern wetland pond level was 1.60m and wastewater was discharging via the weir. The southern pond remained empty. The pond effluent was slightly turbid and light brown in colour. Wildlife consisted of numerous frogs. The treated wastewater discharge flow rate to the stream was estimated at 2L /s and there was a slight visual discolouration at the downstream site when compared to the upstream site.

Coastal seawater samples were collected either side of the tributary, although it was noted that the coastal track required remedial works to make it safe. The ponds and surrounds were tidy.

30 May 2024

The influent screen was operating and wastes were fully contained. Aerator lines were operating in the inlet section of the pond. The influent flow rate was estimated at 3L/s. The pond was turbid and green-brown in colour with a slightly noticeable odour. No wildlife was observed. The pond level was normal and there was no discharge via the overflow to the wetland.

The northern wetland pond level was 1.60m, while the southern pond was isolated. The pond effluent was slightly turbid and green-brown in colour. The treated wastewater discharge flow rate to the stream was estimated at 3L/s and there was a slight visual impact noted in the receiving waters.

Coastal seawater samples were not collected due to the coastal track being considered unsuitable to provide safe access. The ponds and surrounds were tidy.

3.3 Results of effluent monitoring

Effluent monitoring was carried out from both the primary oxidation pond, adjacent to the outlet, and the final discharge from the wetlands for the purpose of monitoring the effectiveness of the treatment plant. Sampling sites for both effluent monitoring and receiving water monitoring are described in Table 9 and displayed in Figure 2. Measurements of dissolved oxygen levels (DO) and the microfloral component of the primary pond (Sections 3.3.1 and 3.3.2 respectively) were taken on each of the three inspections.

Table 9 Sampling site locations for the Manaia WWTP

Site code	Location	Site
MNA000090	5m upstream of the WWTP discharge	Manaia Creek
OXP003001	WWTP oxidation pond effluent at outfall	Effluent
OXP006005	WWTP wetland at outfall	Outlet
MNA000093	10m downstream of the WWTP discharge	Manaia Creek
SEA905086	200m east of mouth of Manaia Creek	Tasman Sea
SEA905080	200m west of mouth of Manaia Creek	Tasman Sea

The primary pond and wetland discharge were sampled for total and filtered BOD, chloride, conductivity, dissolved oxygen, *E. coli* bacteria, pH, suspended solids, turbidity, temperature, dissolved reactive phosphorus (DRP), and ammonia-N (NH_4) on one occasion during the summer inspection. The results of this survey are presented in Table 10.

Figure 3 Aerial location map of sampling sites in relation to Manaia WWTP

Table 10 Results of summer effluent monitoring for the Manaia WWTP

Site		OXP003001		OXP006005	
Parameter	Unit	2 February 2024	2000-2023 Range	2 February 2024	2000-2023 Range
Time		0950	-	0935	-
BOD	g/m³	140	11-90	29	4.0-34
BODF	g/m³	15	2.0-54	5.5	2.0-13
Chloride	g/m³	46	38-66	49	37-53
Conductivity	mS/m@25°C	46.2	34.7-46.2	44.2	34.1-37.6
DO (concentration)	g/m³	7.2	0.22-17.9	5.7	0.55-6.0
DO (saturation)	%	83	2-179	65	4-65
Faecal coliforms	/100ml	380,000	2,500-340,000	1,500	7-16,000
pH	pH	7.4	6.8-8.8	7.4	6.8-7.6
SS	g/m³	107	8.0-230	31	3.0-63
Turbidity	FNU	36	4.3-191	16	2.0-81
Temperature	°C	21.1	7.4-25.3	20.5	8.4-20.5
Nutrient Analyses					
NH_4	g/m³ N	13	1.8-17.8	7.1	2.6-19.5
DRP	g/m³ P	2.8	0.446-4.89	3.3	0.59-3.06

Results of effluent monitoring show that the primary pond effluent quality was typical of a municipal single oxidation pond system receiving a relatively low industrial waste component coincidental with variable pond microfloral populations and a relatively typical bacterial level.

Comparison with previous results shows that the early summer pond effluent quality was within the historical range for most of the parameters.

Results from the treated wetland discharge were within the expected range.

Variability in the pond's microfloral population (Table 12) has contributed to differences in effluent quality over the period since monitoring commenced.

3.3.1 Dissolved oxygen levels

The Manaia WWTP effluent was analysed for dissolved oxygen and temperature, and the results are displayed in Table 11.

Table 11 Dissolved oxygen measurements from the Manaia WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m³)	Saturation (%)
9 August 2023	0945	10.4	2.38	21
2 February 2024	0950	21.1	7.23	83
30 May 2024	1115	10.3	3.96	35

Results indicate a very wide range of dissolved oxygen concentrations (between 21% and 83% saturation) in the surface layer of the primary pond near the outlet. These results are slightly lower than usual (the mean of previous results is 65%, with around 25% of results recording super-saturation).

3.3.2 Microfloral component

Samples of the primary pond effluent were collected on all inspections for chlorophyll-a analyses. Chlorophyll-a concentration can be a useful indicator of the algal population present in the system. Pearson (1996) suggested that a minimum in-pond chlorophyll-a concentration of 300mg/m^3 was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 12 together with field observations of pond appearance.

Table 12 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period July 2013 to June 2023	
				Range	Median
9 August 2023	0945	Slightly turbid, light brown	6.4	0.4 - 2,850	160
2 February 2024	0950	Turbid, dark green-brown	1,000		
30 May 2024	1115	Turbid, green-brown	410		

There was a wide range of concentrations of chlorophyll-a in the primary pond, with a very low level recorded in August 2023. The results are consistent with historical chlorophyll-a data for the Manaia WWTP which shows a clear seasonal pattern of lower values recorded in winter (95mg/m^3 average) and spring (114mg/m^3 average), increasing over summer (350mg/m^3 average) with the highest levels recorded in autumn (888mg/m^3 average).

3.4 Results of receiving environment monitoring

Monitoring of the impacts of the Manaia WWTP on receiving waters is measured using chemical analyses of the Manaia Creek upstream and downstream of the final wetlands discharge, and beyond the boundary of the mixing zone with the receiving waters of the Tasman Sea. An annual biological inspection is also carried out on the intertidal zone at the boundary of the mixing zone. Chemical sampling was carried out on three occasions during the 2023/24 period (Section 3.4.1). One biomonitoring inspection was conducted during autumn 2024 (Section 3.4.2). The locations of sampling sites are listed in the previous section, in Table 9 and Figure 2.

3.4.1 Receiving water surveys

Receiving water samples were collected on 9 August 2023, and 2 February and 30 May 2024 at two sites in the Manaia Creek upstream and downstream of the Manaia WWTP discharge point, and two coastal sites in the Tasman Sea, either side of the boundary with the mixing zone. The results of these surveys are displayed in Tables 13 and 14.

Table 13 Receiving water results for Manaia Creek

Site		MNA000090				MNA000093			
Date/time		9 Aug 2023	2 Feb 2024	30 May 2024	2000-2023 Range	9 Aug 2023	2 Feb 2024	30 May 2024	2000-2023 Range
Parameter	Unit	0955	0820	1125		1005	0830	1130	
Chloride	g/m^3	44	54	34	34.0-142	44	52	40	31.8-85.1
Conductivity	mS/m@25°C	40.6	45.1	29.6	29.1-70.4	41.2	44.3	40.1	31.1-64.4
Faecal coliforms	/100ml	200	370	1,300	50-33,000	200	250	2,000	68-260,000

Site		MNA000090				MNA000093			
Date/time		9 Aug 2023	2 Feb 2024	30 May 2024	2000-2023 Range	9 Aug 2023	2 Feb 2024	30 May 2024	2000-2023 Range
Parameter	Unit	0955	0820	1125		1005	0830	1130	
Turbidity	FNU	1.7	7.0	2.5	1.2-70	2.0	7.7	11	1.6-75
Temperature	°C	10.9	20.3	10.5	8.2-18.6	10.5	20.8	10.5	8.0-19.2

Effects were noted on the Manaia Creek with increased faecal coliforms and turbidity downstream. However, there were no breaches of consent conditions as the receiving water is considered to be the Tasman Sea.

Table 14 Receiving water results for Tasman Sea either side of Manaia Creek mouth

Site		SEA905080				SEA905086			
Date/time		9 Aug 2023	2 Feb 2024	30 May 2024*	2000-2023 Range	9 Aug 2023	2 Feb 2024	30 May 2024*	2000-2023 Range
Parameter	Unit	1025	0855	-		1020	0900	-	
Conductivity	mS/m @25°C	5,130	5,100	-	849-5,340	5,120	5,120	-	858-5,330
Faecal coliforms	/100ml	<10	13	-	<1-1,300	6	<1	-	1-300
Temperature	°C	12.1	20.1	-	7.5-23.3	12.1	20.1	-	7.6-24.4

* samples not collected on 30 May 2024 as the access track was deemed unsafe

These results show good water quality was achieved in the Tasman Sea either side of the boundary of the mixing zone at the mouth of the Manaia Creek. Levels of faecal coliforms found at both sites were fairly low, with none of the results exceeding the median MPN of 14/100ml, or the maximum (no more than 10% of samples to exceed MPN 43/100ml).

These results indicate compliance with condition 10 (iii) of the consent which requires compliance with the guideline for shellfish gathering waters as specified in the document 'Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas'. However, the guidelines note that 'a sufficient number of samples should be gathered throughout the gathering season to provide reasonable statistical power in testing for compliance for both the median limit and the 90% samples limit'. Assessing the entire data set (from 1999), and data from the previous five years, the median for both sites is under 14/100ml. The number of samples exceeding 43/100ml was 15% (entire data set) and 7% (previous five years) at SEA905080. While at SEA905086 it was 25% (entire data set) and 20% (previous five years). As the area around the outfall is not regularly used for shellfish gathering, testing is only carried out occasionally so the data is best used as a guide rather than an assessment with the guidelines.

As of May 2024 the track used to collect the sea samples has been deemed too unsafe to provide access to the beach. An attempt to find as alternate access point was unsuccessful and as such no further samples have been collected. The implications of this is discussed further in section 3.6.2 below.

3.4.2 Biological inspection

During the monitoring period under review, one beach ecological inspection was performed. This survey was performed in autumn 2024, and provided a qualitative assessment of the intertidal area for species present and also to assess the general 'ecological health' of the area. The results of the inspection are discussed below.

A marine ecological inspection of the rocky intertidal shore in the vicinity of the discharge from the Manaia Oxidation Ponds was carried out on 10 April 2024 at 2.30pm. Low tide on this day was at 3.15pm, at a height of 0.14m above chart datum.

The weather was fine and sunny at the time of the inspection, with a light breeze. No rainfall preceded the inspection and the sea was clear along the coast in both directions with little swell. There was a low flow in the Manaia Creek (Unnamed Stream 27, Photo 4) which was clear with no foam or obvious odours at the time of inspection. There was a slight green discolouration of the water on the high shore reef area within five metres of the stream discharge. No foam or odours detected in the stream, or on the reef during the inspection.

Photo 4 Manaia Creek waterfall (Unnamed Stream 27), and discharge onto reef, 10 April 2024

High in the intertidal zone, within the direct influence of Manaia Creek, the diversity of algae and animal species was relatively low (Photo 5). Algal species included *Ulva* sp., *Ulva intestinalis,* and *Ralfsia* sp. Animal species included the limpet *Cellana radians,* and the periwinkle snail *Austrolittorina antipodum*. The top shell snail *Diloma aethiops* was highly abundant, and there was a moderate coverage of the barnacle species *Austrominius modestus*.

Photo 5 Examples of species found in the high shore intertidal zone in the direct influence of Manaia Creek

Low in the intertidal zone, within the direct influence of Manaia Creek, the overall diversity of algae and animal species increased (Photo 6). Algal species present at this site included *Ulva* sp., *Ulva intestinalis*, *Ralfsia* sp., *Gelidium* sp., and *Corallina* paint. Various molluscs present included *A. antipodum, Cellana ornata*, *C. radians, D. aethiops, Haustrum scobina*, the little black mussels *Xenostrobus pulex,* and the Pacific Oyster *Maggalana gigas*. The barnacles *A. modestus*, *Chamaesipho columna* and *Epopella plicata* were also observed in abundance downshore.

Photo 6 Examples of species found in the low shore intertidal zone in the direct influence of Manaia Creek

In the high intertidal zone 50m west of the Manaia Creek stream mouth, the diversity of algae was similar to that of the corresponding site in the influence of the stream and included *Ulva* sp. and *Ulva intestinalis*. The assemblage of animal species however, was slightly more diverse than that in the influence of the stream and included the polychaete tubeworm *Spirobranchus cariniferus*, the molluscs *C. radians, Chiton glaucus, D. aethiops*, *Siphonaria australis*, and the barnacles *A. modestus*, and *C. columna.* Patches of cyanobacterial mats were also noted on a few rocks.

In the low intertidal zone 50m northwest of the stream mouth, there was a higher diversity of algae and animal species than at the low shore site with direct influence from the stream. There were ten algal species at this site, *Corallina* paint and turf, *Dictoyota* sp., *Gelidium* sp., *Laurencia thyrsifera*, *Ralfsia* sp., *Ulva* sp., *Polysiphonia* sp. and also included *Hormosira banksii* and *Champia* sp. Algal biomass was much higher here than at the other sites surveyed (Photo 7). Animal species identified at this site were similar to the corresponding downshore site. These included the molluscs *C. ornata*, *C. radians, D. aethiops, H. scobina, S. australis*, *A. modestus*, *M. gigas,* and the green lipped mussel *Protothaca canaliculus,* polychaete worms *S. cariniferus* and *Neosabellaria kaiparaensis*, and the barnacles *C. columna,* and *E. plicata*. Cyanobacterial mats were also present on some rocks in this area.

In summary, the discharge from Manaia Creek appears to have a small localised effect on the intertidal reef ecology within its direct influence. The most notable difference in the high intertidal zone was the slightly lower animal diversity in the direct influence of the creek and the absence of barnacles *C. columna*. In the low intertidal zone there was higher algal and animal diversity and algal biomass away from the influence of the creek. Overall the effects of the stream on the reef do not appear to extend beyond the designated mixing zone, and are typical of that found at other reef sites around Taranaki.

A copy of the full marine inspection report for this site is available from the Council upon request.

Photo 7 Examples of species found in the low shore intertidal zone, 50m northwest of Manaia Creek

3.5 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with STDC. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2023/24 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with STDC's conditions in resource consents or provisions in Regional Plans for the Manaia WWTP.

3.6 Discussion

3.6.1 Discussion of site performance

The Manaia WWTP was generally well maintained and operated, and performed satisfactorily throughout the monitoring period. The performance of the oxidation pond showed typical seasonal variability, with aerobic conditions occurring throughout the monitoring period with variable dissolved oxygen levels.

The limit on the volume discharged (maximum 600m^3/day unless there is rain on any of the previous three days), was breeched on 17 days. This is 95% compliance and no significant adverse effects are expected as a result of these exceedances.

Wetland effluent surveys, which have been conducted since completion of the upgrade, have shown wastewater parameter concentrations indicative of a well-treated effluent. It can be concluded that the pond continues to perform adequately and that the addition of the wetlands has improved wastewater quality in the interim in terms of bacteriological numbers, BOD_5, suspended solids, and turbidity levels.

Stormwater inflow and infiltration works undertaken during the 2023/24 monitoring year consisted of 543m of sewer pipe relining.

3.6.2 Environmental effects of exercise of consents

Water monitoring continues to record marked improvements in the aesthetic water quality of the Manaia Creek, following incorporation of the wetlands into the system. Impacts of the wetlands discharge on the water quality of the Manaia Creek into which the effluent discharges were recorded visually (colour and turbidity), along with increased bacteria numbers.

The 1998 MfE/MoH Bacteriological Water Quality Guidelines for Marine and Fresh Water guidelines (subsequently updated in 2003) are used as the basis for determining compliance with special condition 10(iii) of Consent 1204-4 for recreational shellfish-gathering purposes. Results of bacteriological monitoring conducted at the two coastal sites showed standards for shellfish gathering were complied with in regards to both the median guideline and the 90% samples limit at both of the sites either side of the stream mouth. However, care needs to be exercised in drawing too many inferences from the data due to the small sample size.

An ecological beach survey found that the effects of the stream on the intertidal zone were highly localised and did not appear to extend beyond the designated mixing zone. The diversity and abundance of intertidal communities away from the influence of the stream was typical of that found at other reef sites around Taranaki.

As of May 2024 the access track to the coast has been deemed to be unsafe and with no suitable alternate access point marine inspections and samples of the seawater are no longer available to assess condition 10. Options going forward include:

1. Seawater sampling by drone (to be investigated during 2024/25), with a visual assessment of colour and clarity change from the top of the cliff if possible.
2. Seawater sampling and marine inspections not undertaken. Wait until the consent comes up for renewal in June 2029 and change the conditions so that the downstream site in Manaia Creek is considered to be the receiving waters, with appropriate freshwater limits attached.
3. STDC applies for change to consent conditions and the conditions are changed so that the Manaia Creek is considered to be the receiving waters, with appropriate freshwater limits attached (recommended).

3.6.3 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 15.

Table 15 Summary of performance for Consent 1204-4

Purpose: To discharge treated municipal wastewater from the Manaia Wastewater Treatment Plant into the Unnamed Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Upgrade to plant within two years	Reporting by consent holder; upgrade commenced and completed	Yes
2. Provision of annual progress reports	Reporting completed by consent holder	Yes
3. Exercise in accordance with documentation	Liaison with consent holder and inspections	Yes

Purpose: To discharge treated municipal wastewater from the Manaia Wastewater Treatment Plant into the Unnamed Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
4. Best practicable option to minimise adverse effects	Inspections and sampling	Yes
5. Limits on volume	Reporting by consent holder	**No – exceeded on 17 days (95% compliance)**
6. Implementation of a management plan	Update provided May 2024	Yes
7. Provision of operator	Liaison with consent holder	Yes
8. Maintenance of aerobic ponds conditions	Sampling check and reporting by consent holder	Yes
9. Trade wastes connections	Liaison with consent holder	Yes
10. Limits on receiving water effects	Inspections and physicochemical sampling and biomonitoring	Yes
11. Monitoring provisions	Performance of tailored programme	Yes
12. Implementation of infiltration programme	Reporting by consent holder	Yes
13. Provision for lapse of consent	Consent exercised	N/A
14. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Good** **High**

N/A = not applicable

During the year, STDC demonstrated a good level of environmental and high level of administrative performance with the resource consents as defined in Appendix II.

3.6.4 Recommendations from the 2022/23 Annual Report

In the 2022/23 Annual Report, it was recommended:

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendations one was implemented, while it was not considered necessary to carry out further investigations or interventions as per recommendation two.

3.6.5 Alterations to monitoring programmes for 2024/25

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

The 2024/25 monitoring programme has been changed to remove seawater sampling and the annual marine inspection due to access issues as discussed above.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2024/25.

3.6.6 Recommendations

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2024/25 year is amended from 2023/24, with the removal of seawater samples and the annual marine inspection.
2. THAT STDC applies for change to consent conditions and the conditions are changed so that the Manaia Creek is considered to be the receiving waters, with appropriate freshwater limits attached.
3. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

4. Patea WWTP and emergency outfall

The Patea WWTP (constructed in 1973 for a population of 2,400) was originally comprised of a single large oxidation pond which was upgraded to a three cell system in 2008 (Photo 8, Figure 4). There are currently no significant industrial wastes being discharged into this system, which services a population of 1,191 (as measured in 2018). The nearby York Street pumping station has provision for river overflow via a separate outfall in the event of emergencies.

Photo 8 View of Patea WWTP

4.1 Background

Historical information relating to the operation of the WWTP, particularly the consented York Street pumping station overflow, is presented in several earlier annual reports (see TRC, 2004). Upgrades to the pump station and reticulation have significantly reduced sewage overflows to the river in recent years, to the extent that relatively few (seven), mainly short duration (less than 2 hours), overflows occurred during the six year period from mid-2004 to mid-2010. No overflows were recorded for the period mid-2010 to mid-2016.

Upgrades to the reticulation and treatment system were addressed by the consent holder and consultant in the consents' renewal process associated with the oxidation pond system and pump station. These consents were renewed in February 2006 (see section 1.1.2.4), with a minor variation granted in July 2007 to extend the date for completion of the upgrade modifications. The upgrading of all facilities was complete by June 2008 (TRC, 2008 & 2015).

Inspections of the WWTP system by the Council have also incorporated inspections of the pump station and emergency outfall area in the annual monitoring programmes since 1996 and the frequency of bacteriological receiving water quality surveys of the Patea River has increased since the 1997-1998 year and more recently since the renewal of consents in 2006. Recreational bacteriological water quality of two sites (the Lower Patea River and Mana Bay) is now also monitored as a requirement of the renewed consents.

4.2 Inspections

1 September 2023

Influent was flowing at the time of inspection, with a flow rate estimated at 4L/s. The pond was light grey and relatively clear. Small pockets of floatables were observed on the pond surface.

The final pond was a pale green colour and relatively clear. Several mallard and teal ducks, and Canadian geese were observed. The treated discharge flow rate was estimated at 5L/s, with no significant visual environmental impact noted around the outlet into the Patea River.

The WWTP surrounds and facilities were found to be satisfactory with no odours noted.

The emergency outfall and pump station was also inspected, with no evidence of any recent overflow discharge into the Patea River. The lower pump station was operating.

1 February 2024

Influent was flowing at the time of inspection. The ponds were a turbid pale green and no floatables were visible on the surface. Over 500 ducks were present.

The treated discharge flow rate was estimated at 1.5L/s with a green plume observed at the outlet into the Patea River. This dissipated around 30m downstream.

The WWTP and facilities were satisfactory and there were no odour issues noted at the time of the inspection.

The emergency outfall and pump station were inspected and found to be satisfactory. There was no evidence of any recent overflow discharge.

14 June 2024

Influent was flowing at the time of the inspection. Ponds 1 and 2 were turbid and bright green. Approximately 150 ducks were noted.

The final pond was also bright green. The treated discharge flow rate was estimated at 3L/s, with no significant visual environmental impact noted at the outlet into the Patea River. The WWTP and facilities were satisfactory and there were no odour issues noted at the time of inspection.

There was no evidence of any recent overflow discharge at the pump station and emergency overflow site.

4.2.1 Pumping station and emergency outfall

Additional pre-screening of the raw wastewater prior to the pump station, called the York St Screening Facility, was added to the system during the 2007/08 upgrades. A new emergency outlet and rock rip-rap was installed at the same time, to provide for discharge of untreated municipal sewage in emergencies only into the coastal marine area of the Patea River as per Consent 0145-2.

Inspections in the area of the flume shed, pump station, and outfall to the Patea River were made by the Council in conjunction with each inspection occasion.

No evidence of discharges to the river was found during the inspections and the visual alarm system appeared to have remained in working order. STDC advised that regular checking of the system was performed. The area was maintained in tidy condition throughout the period.

A history of recent overflows is contained in the 2014/15 Annual Report (TRC Technical Report 2015-9), and the issues pertaining to these events have been satisfactorily addressed by the consent holder.

4.3 Results of effluent monitoring

Effluent analysis was carried out at the outlet of the final treatment cell on two of the three inspection occasions. Samples were analysed for dissolved oxygen (Section 4.3.1) and microfloral component (Section 4.3.2), as well as total and filtered BOD, chloride, conductivity, dissolved oxygen, *E. coli* bacteria, pH, suspended solids, turbidity, temperature, unionised ammonia (NH_3), and ammonia-N (NH_4). The results of these surveys are presented in Table 16.

Table 16 Results of effluent monitoring for the Patea WWTP

Site		OXP008001		
Date/time		1 February 2024	2 May 2024	2000-2023 Range
Parameter	Unit	1005	1110	
BOD	g/m³	6	-	5.1-31
BODF	g/m³	<2	-	1.0-15
Conductivity	mS/m@25°C	68.6	69.0	52.4-83.6
DO (concentration)	g/m³	8.18	9.46	1.1-14.8
DO (saturation)	%	97	92	12-165
E. coli	/100ml	189	350	16-15,500
pH	pH	9.1	-	7.9-10.1
SS	g/m³	29	-	11-150
Turbidity	FNU	52	35	6.5-300
Temperature	°C	23.0	14.0	10.4-25.8
Nutrient Analyses				
NH_4	g/m³ N	0.014	-	0.014-4.09
DRP	g/m³ P	4.6	-	0.005-4.98

Effluent results indicate a relatively high effluent quality, typical of a municipal pond treatment system receiving mainly domestic wastes. Comparison with historical results shows that effluent quality was within the expected range for all parameters.

4.3.1 Dissolved oxygen levels

The Patea WWTP effluent was analysed for dissolved oxygen and temperature, and the results are displayed in Table 17.

Results indicate a wide range of dissolved oxygen concentrations (between 26% and 97% saturation) in the surface layer of the final cell near the outlet. This was typical of the results generally recorded in this oxidation pond. Monitoring by STDC showed that the pond remained in aerobic condition throughout the year.

Table 17 Dissolved oxygen measurements from the Patea WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m³)	Saturation (%)
1 September 2023	1040	13.4	2.73	26
1 February 2024	1005	23.0	8.18	97
2 May 2024	1110	14.0	9.46	92

4.3.2 Microfloral component

Samples of the primary pond effluent were collected on all inspections for chlorophyll-a analyses. Chlorophyll-a concentration can be a useful indicator of the algal population present in the system. Pearson (1996) suggested that a minimum in-pond chlorophyll-a concentration of 300mg/m^3 was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 18 together with field observations of pond appearance.

Table 18 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period 2013-mid 2023	
				Range	Median
1 September 2023	1040	Clear, pale green	0.6	0.8-930	156
1 February 2024	1005	Turbid, green	66		
2 May 2024	1110	Turbid, bright green	760		

Similar to the previous year, chlorophyll-a levels were extremely low in the September sample, the lowest recorded in the pond to date. The level had increased by January and was significantly higher than the median in the May sample. This follows the seasonal pattern found in the ponds of extremely low chlorophyll-a during mid-late winter (average 3mg/m^3), with moderate levels in spring (145mg/m^3), increasing slightly into summer (174mg/m^3), then generally much higher levels in autumn and early winter (average 435mg/m^3).

4.4 Results of receiving environment monitoring

Monitoring of the impacts on receiving waters is measured using both chemical analyses of the Lower Patea River, and contact recreational bacteriological quality surveys of the coastal marine area at the Patea Boat Ramp and the Tasman Sea at Mana Bay (Figure 4). Chemical sampling was carried out on two occasions during the 2023/24 period (Section 4.4.1). Contact recreational bacteriological water quality monitoring (section 4.4.2) at the Patea Boat Ramp and Mana Bay was carried out by the Council on 21 separate occasions between early November 2023 and late March 2024. The sampling sites are detailed in Table 19 and shown in Figure 5. Additional sampling was also carried out monthly at two river sites at the request of STDC in order to get a better understanding of the current water quality of the river prior to renewal of Consent 0067-3 (Section 4.4.3).

Table 19 Sampling site locations for the Patea WWTP

Site code	Location	Site
PAT000970	SH3 bridge, approx. 1km upstream of WWTP	Patea River
PAT000975	Approx. 500m downstream of SH3 bridge; downstream of emergency overflow	Patea River
OXP008001	Outlet of the Patea WWTP final cell	Effluent
PAT000985	Approx. 200m downstream of WWTP discharge	Patea River
PAT000995	Boat ramp (approx. 0.6km downstream of WWTP discharge)	Patea River
SEA907022	Mana Bay	Tasman Sea
SEA907020	Patea Beach	Tasman Sea

4.4.1 Lower Patea receiving water surveys

Receiving water samples were collected on the 1 February and 2 May 2024 at four sites in the Lower Patea River; upstream and downstream of the Patea WWTP discharge point and emergency overflow structure. The surveys were timed towards low tide on each occasion, the results are displayed in Table 20.

The February 2024 survey was carried out under summer low flow (below median) conditions (as measured at McColl's bridge). The discharge from the outfall was estimated at 1.5L/s at the time. Enterococci and *E. coli* bacteria numbers did not vary significantly between the sites upstream and downstream of the discharge. Chloride and conductivity increased in a downstream direction, this would be expected due to saltwater intrusion. Turbidity almost doubled at the site below the discharge, it was unclear if this was related to the discharge or tidal influence. There were no significant changes below the WWTP for the other parameters measured.

The May 2024 survey was carried out during low flow (below median) conditions (as measured at McColl's bridge). The discharge from the outfall was estimated at 2.5L/s at the time Bacterial water quality was similar at all sites. There were no significant changes below the WWTP for the other parameters measured

Figure 4 Layout of Patea WWTP

Figure 5 Map showing sampling sites in relation to Patea WWTP

Table 20 Receiving water results for the lower Patea River

Site		PAT000970			PAT000975			PAT000985			PAT000995		
Date/time		1 Feb 2024	2 May 2024	2000-2023 Range	1 Feb 2024	2 May 2024	2000-2023 Range	1 Feb 2024	2 May 2024	2000-2023 Range	1 Feb 2024	2 May 2024	2000-2023 Range
Parameter	Unit	0855	1045		0910	1030		1025	1130		0930	1015	
BOD (total)	g/m^3	0.8	-	<0.8-1.0	0.5	-	0.5-<0.8	0.9	-	<0.8	0.6	-	0.4-1.1
Chloride	g/m^3	37	-	2,900-7,700	63	-	2,200-19,600	220	-	2,700-19,100	106	-	2,700-19,000
Conductivity	mS/m @25°C	22.0	401	62.3-2,250	32.5	557	561-5,100	94.2	613	139-5,150	49.0	904	158-5,350
E. coli	/100ml	172	210	10-1,200	101	240	30-1,200	172	170	<10-1,000	173	130	<1-1,200
Enterococci	/100ml	64	300	10-500	62	280	10-1,700	57	290	<10-830	70	73	<1-20,000
Ammoniacal-N	g/m^3	<0.01	-	<0.010-0.038	<0.01	-	<0.010-0.038	<0.01	-	0.011-0.100	0.017	-	0.010-0.046
DRP	g/m^3	<0.004	-	0.006-0.04	<0.004	-	<0.04	0.005	-	<0.04	0.0064	-	0.0077-0.04
pH	pH	7.4	-	7.4-8.0	7.5	-	7.5-8.1	7.6	-	7.5-8.2	7.5	-	7.6-8.2
Turbidity	FNU	7	8	3.2-120	7	8	3.6-200	13	8	3.3-140	11	7	3-260
Temperature	°C	21.4	14.3	9.5-24.3	22.1	14.4	9.5-24.6	22.9	14.6	9.8-24.9	22.1	14.3	10.0-24.5

4.4.2 Contact recreational bacteriological monitoring

The 1998 MfE/MoH Guidelines for Bacteriological Water Quality for Marine and Fresh Waters (revised in 2003), recommend *E. coli* as the indicator bacteria for freshwater sites with a single sample 'Alert' limit of 260 per 100ml, and an 'Action' limit of 550 per 100ml (MfE, 2003). For marine waters, the recommended indicator is enterococci, with a single sample 'Alert' limit of 140 cfu per 100ml, and an 'Action' limit of 280 cfu per 100ml. There are two areas near the WWTP discharge commonly used for contact recreational purposes, one at the Patea Boat Ramp (PAT000995, Photo 9) and the other in the nearby coastal waters at Mana Bay (SEA907022), and more intensive contact recreational monitoring at these sites was programmed in relation to conditions on the renewed consents. This was integrated with the Council's contact recreational bacteriological monitoring programme 'Can I swim here?' (CISH). Samples are collected once per week on the same day, regardless of weather or tide.

Sampling at the two sites during the summer monitoring period occurred between early November 2023 and late March 2024 with 21 samples collected from each site. The results are summarised in Tables 21 and 22, and illustrated in Figures 6 and 7. Results of <10 are displayed as 5 in the graphs.

Table 21 Summary of results for lower Patea River at boat ramp (PAT000995)

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity	µS/cm@25°C	21	380	52,400	33,400
E. coli	/100ml	21	<10	1,850	85
Enterococci	/100ml	21	<10	4,110	10
Turbidity	NTU	21	3.0	63	16
Temperature	°C	21	15.5	23.1	18.7

Photo 9 View of Patea boat ramp sampling site

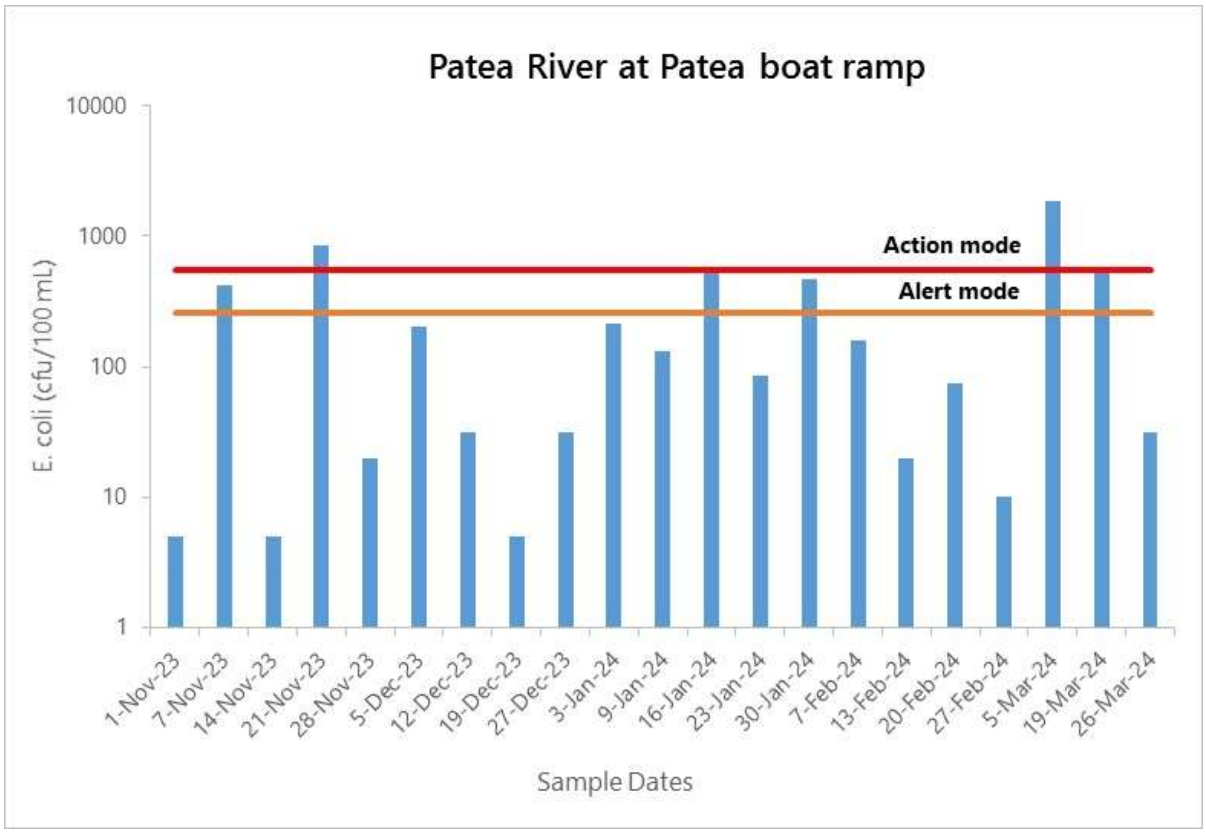

Figure 6 *E. coli* numbers for lower Patea River at the boat ramp

Bacteriological water quality was typical of the lower reaches of a large ringplain-eastern hill country catchment, with moderate numbers under river (freshwater) dominated conditions and fewer when influenced by saline penetration of the coastal seawater. The number of *E. coli* exceeded the 'Action' limit on four occasions, the lower conductivities indicating that the sample was mostly freshwater when there was the least dilution available. No bathing activity was noted during the 2023/24 period at this site, which is used mainly for boating access and occasionally for fishing and walking. The Council had undertaken microbial source tracking (MST) using DNA marker techniques over the 2011/12 period at this site and at the upstream site at SH3 bridge on two occasions (high and low tides) (see TRC, 2012). Faecal coliform bacteria were found to have been sourced predominantly from cattle on both occasions at the two sites while gulls contributed to populations at the boat ramp site under both tidal conditions. A faint trace of human source derivation was found (downstream of the Patea WWTP treated discharge) at the boat ramp site only under low tidal flow conditions.

Table 22 Summary of results for Mana Bay (SEA907022)

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity	µS/cm@25°C	21	2,400	52,400	50,600
E. coli	/100ml	21	<10	1,178	20
Enterococci	/100ml	21	<10	3,080	10
Turbidity	NTU	21	8.2	84	18.1
Temperature	°C	21	15.8	23.1	18.6

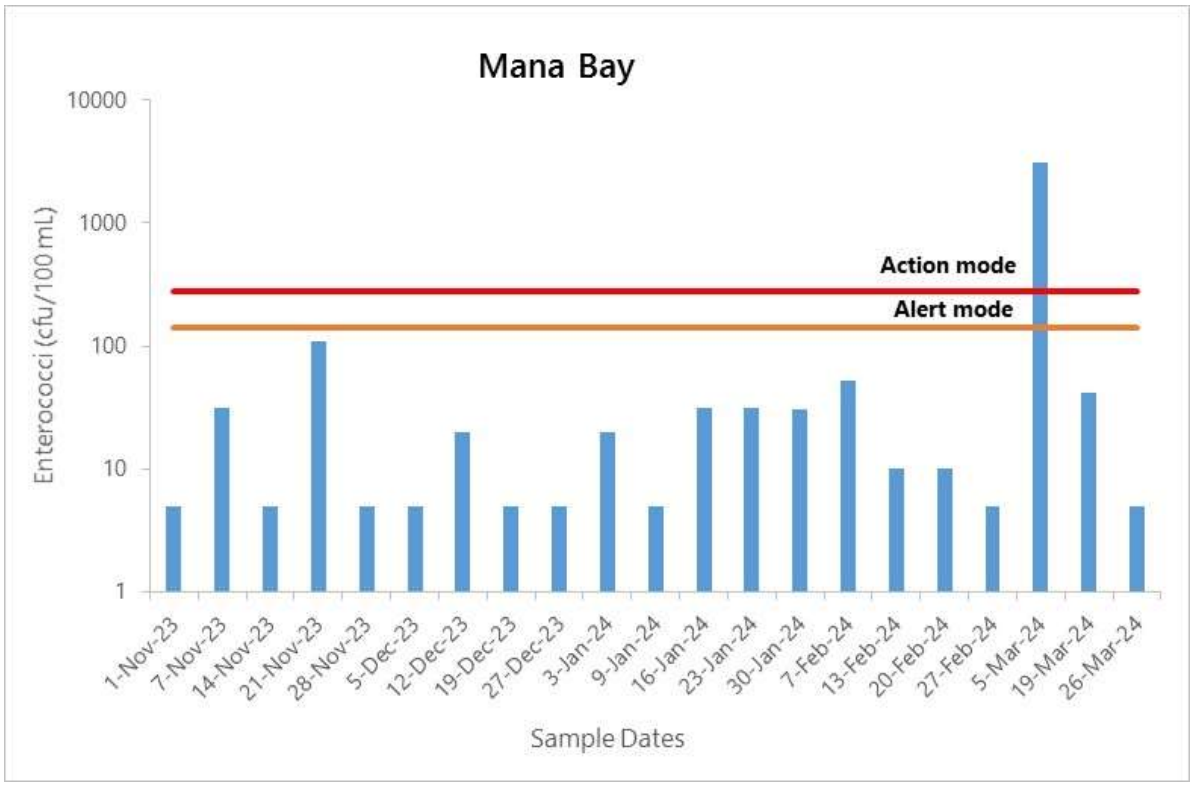

Figure 7 Enterococci numbers for Mana Bay

Water quality at Mana Bay was fairly good throughout the season, with all but one of the samples below the 'Action' level guideline. (Figure 7). Conductivity was lower than usual on this occasion indicating a high freshwater influence (there was a large volume of rain on 4 March). It is an ongoing recommendation that swimming is not undertaken after significant rainfall.

4.4.3 Additional monitoring requested by STDC

STDC are currently exploring options for the renewal of Consent 0067-3 (expiry June 2028). This will likely require an upgrade to the existing WWTP. As a part of this investigation STDC requested additional monitoring from January 2023 at sites both upstream and downstream of the WWTP in order to get a better understanding of the current water quality of the river. The sampling is carried out monthly on a mid to outgoing tide (to ensure downstream flow). Norovirus testing was undertaken in February and March 2023 but this was discontinued as norovirus was not detected in any of the samples. The results of this monitoring during 2023/24 are presented in Table 23 below with the full results attached in Appendix III.

The additional monitoring showed that chloride and conductivity increased downstream, this would be expected due to saltwater intrusion at the lower site. Temperature also increased downstream, again to be expected although the medians were very close so not much variation. Turbidity was lower downstream on all but one sampling occasion, likely due to the dilution of the river by seawater at the downstream site.

Maximum and minimum bacteria numbers were fairly similar at the two sites. The median *E. coli* was much higher upstream compared with downstream (120 cfu/100ml and 64 cfu/100ml respectively), while median enterococci numbers were similar at 30cfu/100ml (upstream) and 35cfu/100ml (downstream).

Total phosphorus was fairly similar at both sites, decreasing very slightly downstream. DRP was low and similar between sites. Total Kjeldhal Nitrogen was very similar between sites. Ammoniacal nitrogen was occasionally slightly higher downstream but the variation did not appear to be significant. Differences between Nitrite-N, Nitrate-N and Nitrate-N + Nitrite-N upstream and downstream were fairly small and varied as to whether the values were higher upstream or downstream.

Table 23 Additional monthly monitoring during 2023/24 at two sites in the Patea River; PAT000970 (u/s) and PAT000995 (d/s)

Parameter	Unit	Number of samples	Minimum		Maximum		Median	
			u/s	d/s	u/s	d/s	u/s	d/s
Chloride	g/m^3	12	15	20	9,500	12,500	1,965	3,050
Conductivity	µS/cm@25°C	12	144	163	27,200	34,200	6,535	11,380
DRP	g/m^3	12	<0.004	<0.004	<0.04	<0.04	<0.04	<0.04
E. coli	cfu/100ml	12	15	10	500	490	120	64
Enterococci	cfu/100ml	12	<10	<10	470	490	30	35
Total Kjeldhal Nitrogen (TKN)	g/m^3	12	0.15	0.17	0.36	0.35	0.215	0.205
Ammoniacal nitrogen	g/m^3	12	<0.01	<0.01	0.11	0.05	<0.01	0.022
Nitrite-N	g/m^3	12	<0.002	<0.002	0.010	0.011	0.0035	0.01
Nitrate-N	g/m^3	12	0.093	0.061	0.56	0.59	0.34	0.31
Nitrate-N + Nitrite-N	g/m^3	12	0.105	0.075	0.56	0.59	0.36	0.31
Phosphorus (total)	g/m^3	12	0.018	0.017	0.09	0.08	0.033	0.025
Turbidity	NTU	12	11	7	72	42	16	12
Temperature	°C	12	10.5	10.5	22.5	23.8	14.7	15.0

4.5 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with STDC. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2023/24 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with STDC's conditions in resource consents or provisions in Regional Plans for the Patea WWTP.

4.6 Discussion

4.6.1 Discussion of site performance

The Patea WWTP and emergency overflow was well maintained and operated, and performed satisfactorily throughout the monitoring period. Since the upgrade to the system and the pumping station, the discharge effluent quality has shown marked improvement over the quality typical of the previous single pond treatment system receiving minimal industrial waste loadings.

Sampling undertaken by both Council and STDC showed that the ponds remained in aerobic condition throughout the year.

The discharge from the plant remained below the dry weather (without rainfall in the previous three days) consented limit of 455m^3/day throughout the year.

There were no overflows to the Patea River from the York Street pump station during the 2023/24 period. A new duplicate rising main (December 2023) and meter (March 2024) were installed from the York Street pump station to the WWTP. This allows the pumped sewage to go through either or both rising mains. The use of two mains results in more volume which results in the flow rate going from 29L/s (105m^3/hr) to 59L/s (211m^3/hr). This work should aid in the reduction of occasional discharges to the river directly from the pumping station.

Inflow and infiltration work undertaken during 2023/24 consisted of 8,689m of CCTV and 119m of pipe lining.

4.6.2 Environmental effects of exercise of consents

No significant impacts associated with the discharges were measured on the water quality of the lower reaches of the Patea River. With regard to bacteriological quality, the effect of the WWTP's discharge has generally been limited to occasional small rises in bacteria numbers on the right bank Patea River site immediately upstream or downstream of the discharge (dependant on tide conditions) with the bacterial water quality measured a further 600m downstream usually similar to that measured upstream of the discharge at SH3 bridge. Minimal impacts were measured during the 2023/24 monitoring period, continuing the good performance shown during the previous period.

More intensive monitoring of the Boat Ramp and Mana Bay sites during the summer contact recreational period found that bacterial numbers exceeded the MfE/MoH's 2003 Recreational Water Quality Guidelines 'Alert' and 'Action' modes on several occasions during the summer bathing season. This was generally accompanied by low conductivity indicating a freshwater source rather than seawater however, as shown in historically, samples collected upstream of the discharge often contain more bacteria than those collected downstream making it unlikely that the WWTP discharge is a major contributor to any high numbers found.

4.6.3 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Tables 24-26.

Table 24 Summary of performance for Consent 0067-3

Purpose: To discharge treated municipal wastewater from the Patea WWTP into the Coastal Marine Area of the Patea River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision for upgrade	Upgrade completed	N/A
2. Exercise in accordance with documentation	Liaison with consent holder	Yes
3. Progress reports of upgrade	Reporting by consent holder; upgrade completed	N/A
4. Minimisation of effects	Inspections and sampling	Yes
5. Limits on volume	Reporting by consent holder	Yes
6. Implementation of management plan	Update provided May 2024	Yes
7. Provision of operator	Liaison with consent holder	Yes
8. Maintenance of aerobic pond condition	Inspections, sampling and reporting by consent holder	Yes
9. Trade wastes connections	Liaison with consent holder	Yes

Purpose: To discharge treated municipal wastewater from the Patea WWTP into the Coastal Marine Area of the Patea River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
10. Limits on receiving water effects	Inspections and physicochemical/bacteriological assessments	Yes
11. Monitoring provisions	Performance of tailored monitoring programme	Yes
12. Contact recreational monitoring provisions	Water sampling	Yes
13. Provision for lapse of consent	Consent exercised	N/A
14. Optional review provisions	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 25 Summary of performance for Consent 0145-2

Purpose: To discharge untreated municipal sewage in emergencies only into the Coastal Marine Area of the Patea River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	No discharge during monitoring period	N/A
2. Exercise in accordance with documentation	No discharge during monitoring period	N/A
3. Provision of contingency plan	Updated plan received May 2024	Yes
4. Rip rap upgrade requirements	Inspections	Yes
5. Provision for mitigation works with excessive overflow events	Liaison with consent holder, works undertaken	Yes
6. Limits upon reasons for discharge	No discharge during monitoring period	N/A
7. Discharge shall not occur during pump station maintenance	No discharge during monitoring period	N/A
8. Discharge shall not exceed 4hrs duration when practicable	No discharge during monitoring period	N/A
9. Requirements for alarm system	Liaison with consent holder, inspection	Yes
10. Maintenance requirements for alarm system	Inspections, reporting by consent holder	Yes
11. Overflow notification requirements	No discharge during monitoring period	N/A
12. Overflow recording requirements	No discharge during monitoring period	N/A
13. Provision of signage following overflow discharge events	No discharge during monitoring period	N/A
14. Notification to Taranaki Healthcare following discharge	No discharge during monitoring period	N/A
15. Triennial meetings	Liaison with consent holder and submitters	Yes
16. Receiving water monitoring	Additional monitoring not required	N/A
17. Lapse condition	Consent exercised	N/A
18. Optional review of consent	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 26 Summary of performance for Consent 4576-2

Purpose: To erect, place and maintain an oxidation pond discharge structure and an emergency overflow discharge structure as part of the Patea WWTP within the Coastal Marine Area of the Patea River		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Notification of works	Liaison with consent holder	Yes
2. Construction and maintenance in accordance with documentation	Works completed	N/A
3. Upgrade oxidation pond discharge in accordance with documentation	Upgrade completed	N/A
4. Adopt best practicable option	Inspections and liaison with consent holder	Yes
5. Minimise riverbed disturbance	No recent works undertaken	N/A
6. Maintain public access	Public walkway maintained	Yes
7. Riverbed disturbance to coincide with dry weather periods	No recent riverbed disturbance	N/A
8. Requirement for fish passage	Inspection	Yes
9. Requirements for signage during work	Liaison with consent holder	Yes
10. Removal and reinstatement requirements	Structures still in use	N/A
11. Lapse condition	Consent exercised	N/A
12. Optional review of consent	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

During the year, STDC demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Appendix II.

4.6.4 Recommendations from the 2022/23 Annual Report

In the 2022/23 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation one was implemented, while it was not considered necessary to undertake any additional investigations or interventions as per recommendation two.

4.6.5 Alterations to monitoring programmes for 2024/25

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

No planned changes have been made to the 2024/25 monitoring programme.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2024/25.

4.6.6 Recommendations

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

5. Waverley WWTP and stock truck wastes disposal

The Waverley WWTP (Photo 10) is a single oxidation pond system that is divided into two sections by a wooden/asbestos wall which has been operative since 1973. It receives mainly domestic wastes (population 820 in 2018) with a small commercial area; there is no significant industry.

It previously received wastes from the stock truck facility on SH3 sited approximately 2km south of the township. However, the stock truck wastes disposal was changed to a self-contained anaerobic-aerobic pond system, with on-site discharge to adjacent land during the 2006/07 period.

The WWTP system was reconfigured during the 2008/09 period with the existing outfall abandoned, the secondary pond converted to a primary pond with a new inlet design, repairs made to the dividing wall, and the primary pond converted to a secondary pond with a repositioned outlet connected into the original outfall to the Wairoa Stream. 'Sludge-bugs' were introduced into the system for the purpose of microbial sludge digestion in September 2013 and this was completed by December 2014 with more than 5,000m^3 of sludge removed (STDC, 2015). Inlet flow monitoring was added in 2010. Mechanical screening of the incoming wastes was installed at the inlet during the latter half of the 2012/13 period, which has associated telemetry alarming.

Photo 10 Waverley WWTP

5.1 Inspections

31 August 2023

The step screen was operating and wastes were fully contained. The influent flow rate was estimated at 3L/s. Both ponds were relatively clear and pale green in colour. Wildlife consisted of one duck.

The discharge flow rate was estimated at 3L/s, with no visual effect on the unnamed tributary of the Wairoa Stream. The discharge outlet was partially blocked and this was cleared.

The stock truck disposal facility was relatively tidy. The effluent dump grate had recently been washed down. All three ponds were near full but not discharging to land.

19 January 2024

The influent flow was estimated at 3.5L/s. The ponds were a turbid, with a dark green colour. The step screen wastes were fully contained, with a slightly noticeable odour noted in the area. Wildlife on both ponds consisted of 30 ducks.

The pond discharge was estimated to be 2.5L/s. Water quality samples were collected along the unnamed tributary of the Wairoa Stream as per the summer low flow monitoring program. No visual environmental effects from the discharge were observed at any of the monitoring sites.

The stock truck disposal facility was also inspected. This facility was found to be reasonably tidy.

16 May 2024

The step screen was operating and wastes were fully contained. A mild but noticeable odour was noted to be emanating from around this area. The influent flow was estimated at 3L/s. Both ponds were turbid with a brown colour. No wildlife was noted at the time of the inspection.

The pond discharge was estimated at 3L/s with a small amount of foaming observed at the point of discharge into the unnamed tributary.

The stock truck disposal facility was also inspected. The three ponds were near full but not discharging. All of the ponds were dark brown in colour with some debris noted floating on the first two ponds. There was a mild odour in the vicinity.

5.2 Results of effluent monitoring

Effluent monitoring was carried out in the second cell of the oxidation pond, adjacent to the outlet. Along with a visual survey of each component of the system; dissolved oxygen levels (DO) and the microfloral component of the pond were measured during each inspection. These are discussed in Sections 5.2.1 and 5.2.2 respectively.

A full suite of chemical analyses was carried out on the pond effluent on one occasion in summer, with samples analysed for ammonia (NH_3 and NH_4), total and filtered BOD, chloride, conductivity, dissolved oxygen, DRP, *E. coli* bacteria, pH, suspended solids, temperature, and turbidity. The results of this survey are presented in Table 27.

The pond effluent was within the range expected for all parameters measured, and the quality was typical to the effluent from a biological treatment system receiving essentially domestic wastes, as emphasised by the fairly low filtered BOD_5 concentration, and in the absence of the disposal of stock truck or any other significant industrial wastes to the system.

Similarly to the previous monitoring period, dissolved reactive phosphorus and ammoniacal nitrogen were both quite low when compared with previous results, with both of these parameters showing a downwards trend. Unionised ammonia however, was close to the highest recorded at the site to date.

Table 27 Results of summer effluent monitoring for the Waverley WWTP

Site		OXP002005	
Date/time		19 Jan 2024	1989-2023 Range
Parameter	Unit	0920	
Flow	L/s	3.5	0.14-8.0
BOD	g/m³	18	10-66
BODCF	g/m³	5.7	3.4-14
Chloride	g/m³	60	47-76
Conductivity	mS/m@25°C	50.9	42.3-68.7
DO (concentration)	g/m³	8.74	0.9-28.5
DO (saturation)	%	107	10-318
E. coli	/100ml	275	30-82,000
pH	pH	9.6	7.7-10.2
SS	g/m³	63	11-220
Turbidity	FNU	49	9.4-210
Temperature	°C	26.2	8.2-26.0
Nutrient Analyses			
NH_3	g/m³	0.73	0.021-0.75
NH_4	g/m³ N	1.1	0.100-26.2
DRP	g/m³ P	1.90	0.63-7.98

5.2.1 Dissolved oxygen levels

The Waverley WWTP effluent was analysed for dissolved oxygen and temperature, and the results are displayed in Table 28.

The dissolved oxygen concentration in the surface layer of the primary pond near the outlet varied widely (43-107%). Super-saturation is quite common, with 32% of the samples collected by Council since 1988 greater than 100% dissolved oxygen saturation.

Table 28 Dissolved oxygen measurements from the Waverley WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m³)	Saturation (%)
31 August 2023	1130	12.0	4.46	43
19 January 2024	0920	26.2	8.74	107
16 May 2024	1145	13.0	9.97	96

STDC also undertook continuous measurement of DO in the pond, with results showing that daily values were maintained above 0g/m³.

5.2.2 Microfloral component

Samples of the primary pond effluent were collected on all inspections for chlorophyll-a analyses. Chlorophyll-a concentration can be a useful indicator of the algal population present in the system. Pearson (1996) suggested that a minimum in-pond chlorophyll-a concentration of 300 mg/m³ was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 29 together with field observations of pond appearance.

Table 29 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period 2013-mid 2023	
				Range	Median
31 August 2023	1130	Turbid, light green	3.2	5.9 -1,100	310
19 January 2024	0920	Turbid, dark green	158		
16 May 2024	1145	Turbid, brown	300		

Levels of chlorophyll-a recorded in the primary pond were fairly low during the 2023/24 year, with all results below the median of 310mg/m^3.

5.3 Results of receiving environment monitoring

Monitoring of the impacts of the Waverley WWTP on the receiving waters was measured using chemical analyses of the receiving waters of the unnamed tributary of the Wairoa Stream. Sampling was carried out on one occasion during the summer period, when stream flows were at a seasonal low. The locations of sampling sites are listed in Table 30 and displayed in Figure 8 below.

Table 30 Sampling sites for Waverley WWTP

Site code	Location	Site
WRO000069	Upstream of confluence with WWTP discharge	Unnamed trib. of Wairoa Stream
OXP002005	At outfall to stream	Effluent
WRO000077	Approx. 400m downstream of WWTP discharge (Waverley Beach Rd)	Unnamed trib. of Wairoa Stream
WRO000150	Outlet of Ihupuku Swap, approx. 3km d/s of WWTP discharge (Beach Rd)	Wairoa Stream

5.3.1 Low flow receiving water survey of January 2024

A midsummer low flow assessment of the impact of the WWTP's effluent discharge on the receiving waters of the unnamed tributary of the Wairoa Stream was performed on 19 January 2024. Results of the survey are displayed in Table 31.

A discharge rate of 3.5L/s was measured from the pond discharge at the time of the survey.

Upstream water quality (at site WRO000069) was generally good, with a dissolved oxygen saturation of 85%, and low levels of dissolved reactive phosphorus and BOD_5. The number of *E. coli* bacteria was moderate.

Due to the moderate dilution ratio, impacts of the discharge on the stream (downstream of the effluent discharge at site WRO000077) were less pronounced and included mainly small increases in conductivity and chloride and a decrease in dissolved oxygen saturation. Biochemical oxygen demand and DRP both increased significantly. *E. coli* bacteria also increased significantly despite the relatively low level in the discharge. Unionised ammonia and ammoniacal nitrogen decreased below the mixing zone. The stream was not visually impacted, with a slight increase in the black disc reading downstream. There were also only small increases in suspended solids and turbidity.

The water quality measured at the furthest downstream site (site WRO000150), after approximately 3km of the Ihupuku Swamp wetlands, continued to record a relatively low dissolved oxygen concentration and small decrease in pH, similar trends to those found by all previous years' surveys. This was in contrast to the site immediately downstream of the discharge which was similar to the upstream site in relation to these parameters. Relatively low dissolved oxygen levels are typical of outflows from extensive wetland areas, in which more stagnant, less aerated reducing conditions and lower pH are typical. Water quality of the stream

improved, when compared with upstream conditions (at site WRO000077) with regard to nutrient concentrations following filtration and nutrient uptake by wetland vegetation. Visual quality increased, with black disc and suspended solids showing improvements compared with upstream. Turbidity however, was slightly higher than recorded at both sites upstream.

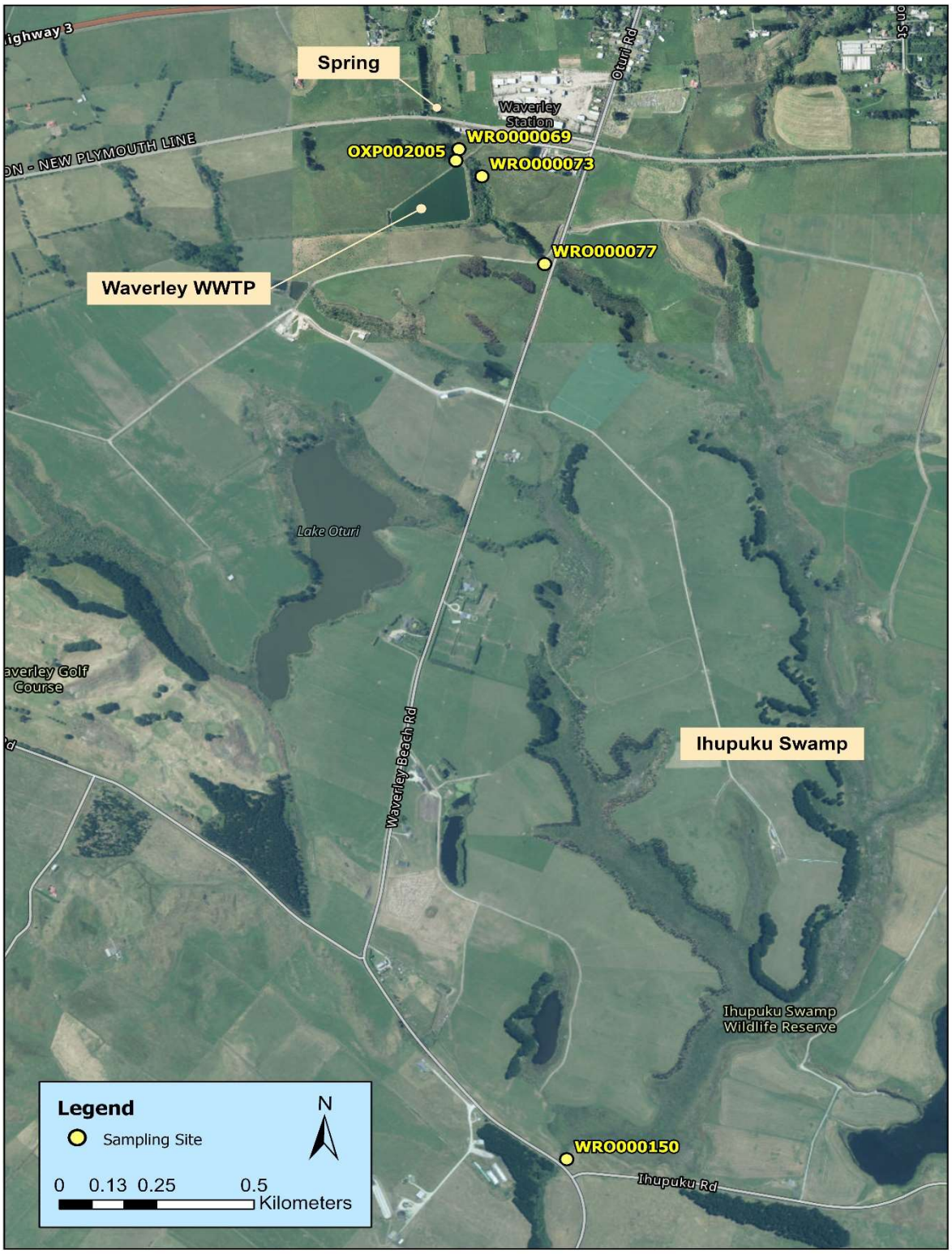

Figure 8 Aerial location map of sampling sites in relation to Waverley WWTP

Table 31 Low flow receiving water results January 2024

Site		WRO000069		WRO000077		WRO000150	
Date/time		19 Jan 2024	2000-2023 Range	19 Jan 2024	2000-2023 Range	19 Jan 2024	2000-2023 Range
Parameter	Unit	0945		1020		1100	
Flow	L/s	24	6-23	31	0.28-34	-	-
Black disc	m	1.28	0.36-1.66	1.35	0.41-1.30	1.74	0.70-1.50
BOD	g/m^3	0.6	<0.5-2.8	3.9	0.7-4.2	0.6	<0.5-1.4
BOD (dissolved total)	g/m^3	0.4	<0.4-0.8	-	<0.5-0.5	0.7	<0.5-0.6
Chloride	g/m^3	27	26-38	29	27-42	31	29.8-52.7
Conductivity	mS/m@25°C	31.0	24.0-34.9	33.9	25.7-36.9	32.3	24.3-33.5
DO (conc.)	g/m^3	7.8	8.5-9.9	6.8	4.0-8.8	2.6	2.1-4.9
DO (saturation)	%	85	87-97	73	40-91	29	23-48
E. coli	/100ml	308	118-4,700	2,420	100-4,200	816	52-3,500
pH	pH	7.9	7.5-8.0	7.9	7.2-8.0	7.5	7.2-7.5
SS	g/m^3	7	<3-35	14	4.0-32	7	5.0-27
Turbidity	FNU	2.3	1.1-20	2.7	1.8-23	3.7	2.3-15
Temperature	°C	19.2	13.0-17.7	18.7	13.4-17.9	19.6	13.3-20.7
Nutrient Analyses							
NH_3	g/m^3	0.0023	0.00023-0.00697	0.0013	0.00012-0.00218	<0.00013	0.00007-0.00023
NH_4	g/m^3 N	0.08	<0.003-0.314	0.047	0.010-0.249	<0.01	0.003-0.030
DRP	g/m^3 P	0.004	<0.003-0.033	0.22	0.053-0.455	0.035	0.024-0.064

5.3.2 Biological monitoring surveys

The Council collected streambed macroinvertebrates from three sites in an unnamed tributary of the Wairoa Stream in November 2023 and February 2024 to investigate the effects of the Waverley WWTP discharge on macroinvertebrate health. Macroinvertebrates were identified, the number of different types of taxa counted (taxa richness), and the MCI and SQMCI scores were calculated for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

Spring survey, November 2023

A low taxa richness of 7, 11, and 8 taxa were recorded at sites 1, 2, and 3, respectively. Site 3 recorded the lowest recorded taxa richness to date for that respective site. Two 'tolerant' taxa were dominant throughout all three sites, oligochaete worms and *Potamopyrgus* snails, both ranging from 'abundant' to 'extremely abundant' at all three sites.

MCI scores of 77, 67, and 63 units were recorded at sites 1, 2, and 3, respectively, indicating 'poor' macroinvertebrate community health at all three sites. Site 1 recorded the highest MCI score at that respective site to date, and scored a significant 15 units higher than the site median. There was a significant decrease in MCI scores in a downstream direction, with the 'control' site (site 1) scoring significantly higher than the most downstream site (site 3). However, this difference is likely due to habitat variations and lower taxa richness at site 1, rather than adverse effects from the WWTP.

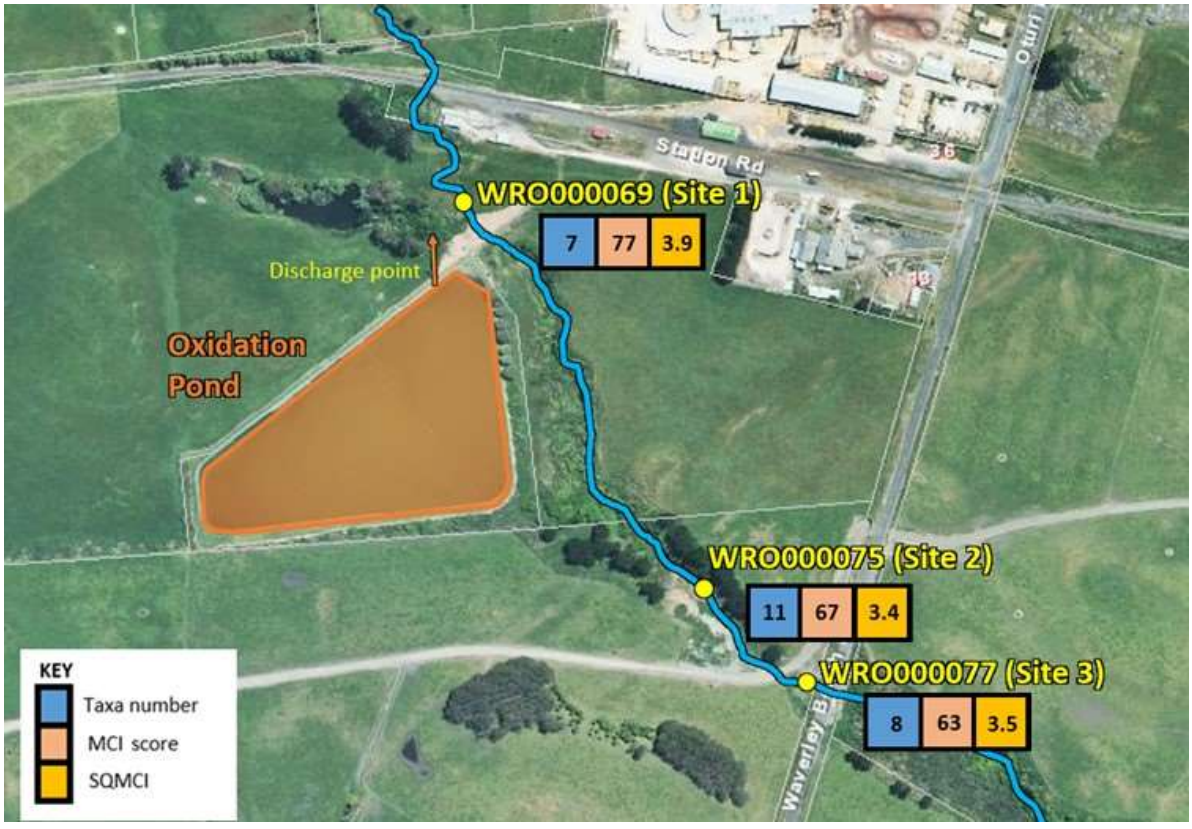

Figure 9 Taxa number, MCI scores and SQMCI scores for each biomonitoring site (November 2023)

SQMCI scores of 3.9, 3.4, and 3.5 units were recorded at sites 1, 2, and 3 respectively. All sites recorded scores that were either the same as or slightly higher than their respective site medians. There were no significant differences in SQMCI scores between sites. Similarly to the MCI scores, all sites recorded SQMCI scores reflective of 'poor' health.

Overall, the spring results showed that it is unlikely that the Waverley WWTP discharge was causing adverse effects on macroinvertebrate communities. MCI scores indicated a decrease in health in a downstream direction, however, this was likely due to minor variations in habitat and lower taxa richness at the control site compared to the downstream sites.

Summer survey, February 2024

A taxa richness of 15, 10 and 9 taxa were recorded at sites 1, 2, and 3, respectively. Site 1 recorded the highest taxa richness to date for that respective site. Two 'tolerant' taxa were dominant throughout all three sites, Oligochaete worms and *Potamopyrgus* mud snails, which both ranged from 'abundant' to 'extremely abundant' at all three sites. No EPT taxa were recorded at any site.

MCI scores of 61 units, 68 units, and 64 units were recorded at sites 1, 2, and 3 respectively. This categorised all three sites as having 'poor' macroinvertebrate community health. There was a minor increase in MCI scores between the 'control' site 1 and sites 2 and 3 however, there were no significant differences in MCI scores between sites. Site 1 recorded the lowest MCI score of the survey despite scoring the highest taxa richness, which could be a reflection of the high number of 'tolerant' taxa present at this site, likely due to more favourable habitat conditions for tolerant taxa rather than adverse effects from the WWTP.

SQMCI scores of 2.5 units, 3.4 units, and 3.4 units were recorded at sites 1, 2, and 3 respectively. This was reflective of 'very poor' macroinvertebrate health at site 1, and 'poor' health at sites 2 and 3. There was a significant increase of SQMCI scores between the 'control' site 1 and the downstream sites, with both downstream sites recording the same SQMCI score. The 'control' site 1 recorded the lowest SQMCI score of

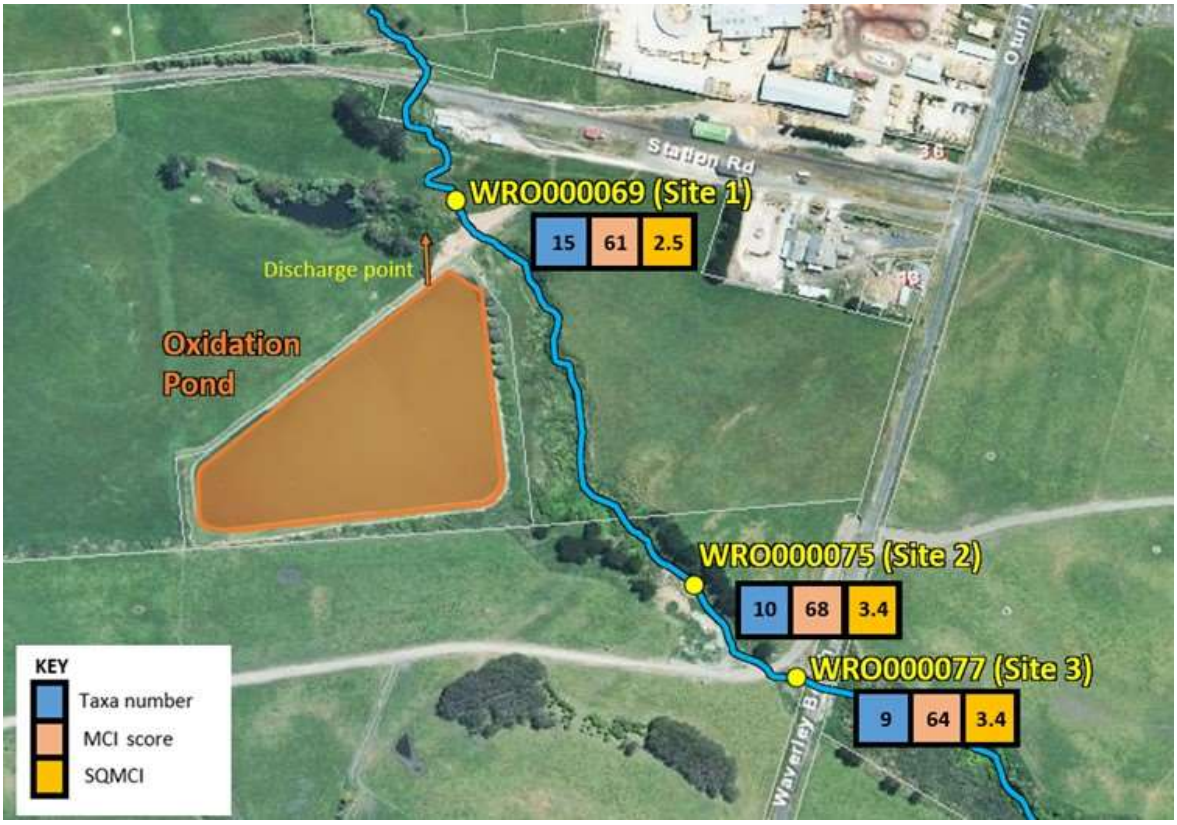

Figure 10 Taxa number, MCI scores and SQMCI scores for each biomonitoring site (February 2024)

the survey, which is likely attributed to the 'tolerant' Oligochaete worms being 'extremely abundant' at this site, but recorded in lower abundances downstream.

Overall, the summer survey found that it was unlikely that the Waverley WWTP discharge is causing adverse effects on the macroinvertebrate communities. MCI scores did not differ significantly between sites, while SQMCI scores increased significantly downstream. Differences are likely driven by habitat characteristics than the WWTP discharges.

Copies of the biomonitoring reports for this site are available from the Council upon request.

5.4 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with STDC. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2023/24 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with STDC's conditions in resource consents or provisions in Regional Plans in relation to the Waverley WWTP.

5.5 Discussion

5.5.1 Discussion of site performance

The Waverley WWTP was well maintained and operated, and performed satisfactorily throughout the monitoring period. The performance of the system was considered to be typical of a biological treatment system receiving essentially domestic wastes, and continued to show some improvements compared to historical wastewater quality.

Inflow and infiltration work carried out during the 2023/24 year consisted of 11,016m CCTV and inspections and follow up work on 78 private properties, with 55 improvements completed.

The 'Wastewater Options Assessment Report' (WOAR) required by condition 10 of Consent 0072-3 was submitted in April 2021. After consideration of the shortlist of options a renewal application for consent 0072-3 was lodged in February 2022. The agreed outcome consists of using the existing inlet screen and oxidation pond. The upgrade focuses on making minor improvements to the oxidation pond treatment system and adding tertiary treatment by way of Membrane Filtration (MFU). A block diagram and indicative schematic of the proposed upgrade is shown in Figure 11 below.

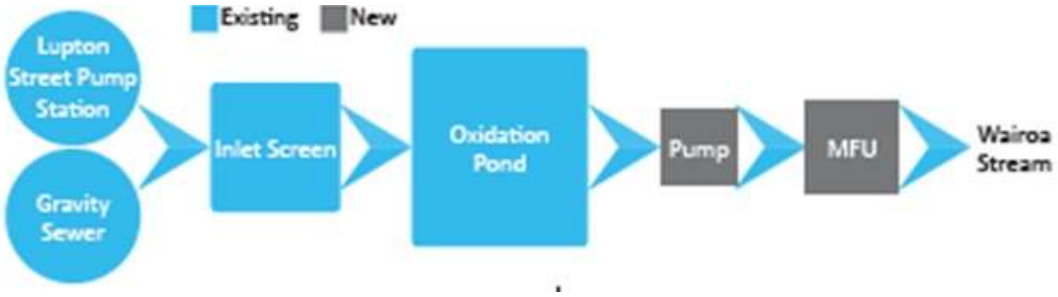

Figure 11 Block diagram of proposed Waverley WWTP upgrade

A UV trial with Novalabs patent Supercritical UV was undertaken during July and August 2023 on the treated pond effluent that showed promising results:

1. During the testing it was shown that the *Supercritical UV*™ system could reduce the *E. coli* concentration to below the concentrations found in the receiving waters across all tests conducted.
2. Based on the monitoring data supplied by STDC, the wastewater quality is expected to be more challenging at certain times with higher suspended solids and lower UVT.
3. Although performance may vary, *Supercritical UV*™ has also been tested at other pond sites where the wastewater clarity was significantly lower than that experienced during the trial at Waverley. At those sites, Novolabs high-power *Supercritical UV*™ system still achieved excellent levels of disinfection.
4. Norovirus genogroup II was present in the effluent at 117,300gc/L.
5. Literature indicates bacteriophage is somewhat harder to remove than the norovirus surrogates proposed by researchers in prior studies.
6. Testing at Waverley showed that the *Supercritical UV*™ system achieved excellent reductions of bacteriophage during the period of testing. For example, on the last day of testing, the bacteriophage concentration was reduced from approximately 140,000pfu/L to below the detection limit when operating the *Supercritical UV*™ system under the highest UV dose.
7. To achieve the highest level of disinfection it is recommended to use the high-power *Supercritical UV*™ option which, when operated at its lowest flowrate, provides the highest UV dose.

5.5.2 Environmental effects of exercise of consents

There were no 'sewage fungus' growths observed by inspections performed under varying flow conditions in the short section of the receiving tributary immediately downstream of the effluent outfall.

The discharge rate recorded during the summer receiving water survey was low, which ensured that there was sufficient dilution with the receiving waters, even during low flow conditions. This survey recorded minor impacts of the discharge on the water quality of the Wairoa Stream tributary. However, these and other effects were readily assimilated, first by the aquatic weed growth in the tributary, and then in the extensive Ihupuku Wetland area located downstream of Beach Road. Lowered pH, nutrient, and dissolved oxygen levels below the wetland were consistent with past monitoring results and typical of wetland drainage streams.

Macroinvertebrate monitoring found that there was no evidence to suggest nutrient enrichment downstream of discharges from the Waverley WWTP. Differences were likely driven by habitat characteristics than the WWTP discharges.

5.5.3 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Tables 32 and 33.

Table 32 Summary of performance for Consent 0072-3

Purpose: To discharge treated wastewater from the Waverley municipal oxidation ponds system into an unnamed tributary of the Wairoa Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limits on discharge volume	Monitoring by consent holder – 100% compliance	Yes
2. Discharge notification requirements	Liaison with consent holder	Yes
3. Limits on dissolved oxygen	Inspections and sampling, monitoring by consent holder	Yes
4. Flow meter requirements	Flow meter installed and operational	Yes
5. OMMP requirements	Plan received, inspections confirming compliance	Yes
6. Limits on nutrients in receiving waters	Sampling by Council and STDC	Yes
7. Limits on effects in receiving waters	Inspections, sampling and biomonitoring	Yes
8. Turbidity not to increase by more than 50% in receiving waters	Sampling	Yes
9. SAS report requirements	Report received	Yes
10. WOAR report requirements	Submitted April 2021	Yes
11. WWWP requirements	Working Party created	Yes
12. Minimum affected parties for WWWP	All parties included in WWWP	Yes
13. Riparian planting requirements	Liaison with consent holder	Yes
14. Trade wastes notifications	Liaison with consent holder	Yes
15. Lapse and review provisions	Consent has expired (renewal underway)	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 33 Summary of performance for Consent 6621-1

Purpose: To discharge treated stock truck effluent from an oxidation pond treatment system onto and into land in the vicinity of the Waiau Stream in the Waitotara catchment		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Inspections	Yes
2. Limits on receiving water effects	Inspections	Yes
3. Minimisation of effects	Inspections	Yes
4. Operation and maintenance requirements	Inspections	Yes
5. Optional review provision	Consent has expired (renewal underway)	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

During the year, STDC demonstrated high levels of both environmental and administrative performance with the resource consents in relation to the Waverley WWTP as defined in Appendix II.

5.5.4 Recommendations from the 2022/23 Annual Report

In the 2022/23 Annual Report, it was recommended:

1. THAT in the first instance monitoring of consented activities at Waverley WWTP and stock truck wastes disposal in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendations one was implemented, while it was not considered necessary to carry out any additional investigations or interventions as per recommendation two.

5.5.5 Alterations to monitoring programmes for 2024/25

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

No planned changes have been made to the 2024/25 monitoring programme.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2024/25.

5.5.6 Recommendations

1. THAT in the first instance monitoring of consented activities at Waverley WWTP and stock truck wastes disposal in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

6. Summary of recommendations

The following is a summary of the recommendations for each WWTP system as presented in the individual sections of this report.

6.1 Kaponga WWTP

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

6.2 Manaia WWTP

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2024/25 year continue at the same level as in 2023/24.
2. THAT STDC applies for change to consent conditions and the conditions are changed so that the Manaia Creek is considered to be the receiving waters, with appropriate freshwater limits attached.
3. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

6.3 Patea WWTP and emergency outfall

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

6.4 Waverley WWTP and stock truck wastes disposal

1. THAT in the first instance monitoring of consented activities at Waverley WWTP and stock truck wastes disposal in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E. coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.

Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NNN	Nitrate-nitrite nitrogen.
NO_3^-	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NO_2^-	Nitrite, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
WWTP	Wastewater Treatment Plant.

For further information on analytical methods, contact a manager within the Environment Quality Department.

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Appendix I

Resource consents held by STDC

(For a copy of the signed resource consent please contact the TRC Consents department)

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

Coastal Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA 4640
Change To Conditions Date:	9 July 2007 [Granted: 7 February 2006]

Conditions of Consent

Consent Granted:	To discharge treated municipal wastewater from the Patea Wastewater Treatment Plant into the Coastal Marine Area of the Patea River at or about 2637404E-6159017N
Expiry Date:	1 June 2028
Review Date(s):	June 2010, June 2016, June 2022
Site Location:	Beach Road, Patea
Legal Description:	Lot 1 DP 9100 Blk VII Carlyle SD
Catchment:	Patea

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Condition 1 – changed

1. The wastewater treatment system shall be upgraded in accordance with drawing number 77031, entitled *Patea Wastewater Treatment Plant: Pond General Arrangement and Bund Details* (dated 10.10.06) provided with application number 4617. Implementation of this upgrade shall be completed before 31 March 2008.

Conditions 2 to 14 – unchanged

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 2752. In the case of any contradiction between the documentation submitted in support of application 2752 and the conditions of this consent, the conditions of this consent shall prevail.

3. The consent holder shall supply progress reports on implementation of the upgrade referred to under special condition 1, by June 2006 and June 2007 to the Chief Executive, Taranaki Regional Council.

4. Notwithstanding any conditions within this consent, the consent holder shall at all times adopt the best practicable option or options, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from the exercise of this consent.

5. The volume of treated wastewater discharge shall not exceed 455 cubic metres per day, unless there has been rain on any of the previous three days [as measured at the Taranaki Regional Council rain gauge on Durham Street, Patea], in which case the instantaneous treated wastewater discharge flow rate shall not exceed 20 litres per second.

6. The consent holder shall implement and maintain a management plan which shall include operating procedures to avoid , remedy or mitigate against potential adverse effects arising from:

   i) operation of the wastewater treatment plant; and
   ii) plant failure.

7. The consent holder shall use a suitably trained operator to ensure proper and efficient operation and maintenance of the wastewater treatment system to the satisfaction of the Chief Executive, Taranaki Regional Council.

8. The oxidation pond shall be maintained in an aerobic condition at all times during daylight hours.

9. The consent holder shall undertake to advise and consult with the Taranaki Regional Council prior to accepting new trade wastes, which may contain toxic or hazardous wastes, into the consent holder's wastewater system.

10. After allowing for reasonable mixing, being a mixing zone extending 200 metres downstream and 200 metres upstream of the discharge point, the discharge shall not give rise to any of the following effects in any surface water body:

    a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
    b) any conspicuous change in the colour or visual clarity;
    c) any emission of objectionable odour;
    d) any significant adverse effects on aquatic life.

11. The consent holder shall, in conjunction with the Taranaki Regional Council, undertake additional chemical, bacteriological and ecological monitoring of the oxidation pond and Patea River as deemed necessary by the Chief Executive, Taranaki Regional Council subject to Section 35 (2)(d) and Section 36 of the Resource Management Act 1991.

12. As a component of the monitoring required by Special Condition 11, the consent holder shall undertake bacteriological monitoring of the receiving waters of the Patea River and at 'Mana Bay' for contact recreational purposes. The monitoring programme shall be consistent with the provisions of the 'Microbiological Water Quality Guidelines for Marine and Freshwater recreational area' [Ministry for the Environment and Ministry of Health, 2003].

13. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with an adverse effects on the environment arising from the exercise of this resource consent, which were not either foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 9 July 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 Hawera 4640	
Decision Date (Change):	9 December 2020	
Commencement Date (Change):	9 December 2020	(Granted Date: 9 August 2017)

Conditions of Consent

Consent Granted:	To discharge treated wastewater from the Waverley Municipal Oxidation Ponds System into an unnamed tributary of the Wairoa Stream
Expiry Date:	1 June 2022
Review Date(s):	As per special condition 15
Site Location:	South Road, SH 3, Waverley
Grid Reference (NZTM)	1739140E-5596588N & 1739160E-5596380N
Catchment:	Wairoa

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The discharge shall not exceed 450 cubic metres per day.

2. In the event of a recorded daily discharge exceeding 450 cubic metres/day, the consent holder shall notify the Council as soon as is practicable and, within 10 working days, investigate and report the reasons for the exceedance. The consent holder shall report the findings of the investigation to the Chief Executive, Taranaki Regional Council ('the Chief Executive') by completing and submitting the 'Notification of work' form on the Council's website (http://bit.ly/TRCWorkNotificationForm), or an alternative method that may be advised by the Chief Executive.

3. The dissolved oxygen concentration in the oxidation pond shall exceed 0 gm^{-3} during each 24-hour period.

4. From 1 January 2018, the consent holder shall install, and thereafter maintain a flow meter at the pond outlet. The flow meter shall be tamper-proof and shall measure and record the rate and volume of the discharge to an accuracy of ± 5%, at intervals not exceeding 15 minutes. Records of the date, the time and the rate and volume of the discharge shall be made available to the Chief Executive, Taranaki Regional Council on request.

   Note: Water meters must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters have a limited lifespan.

5. From 1 October 2017 the Waverley Wastewater Treatment Plant site shall be operated in accordance with an 'Operations and Maintenance Management Plan' (OMMP). The OMMP shall be prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The OMMP shall detail how the site is managed to achieve compliance with the conditions of this consent and shall include, but not be limited to:

   a) a description of the oxidation ponds including site map identifying the inlet and discharge points and monitoring sites;
   b) operational control and maintenance of the oxidation pond;
   c) general site maintenance and planned expenditure;
   d) contingency measures and procedures in the event of spillages or other non-planned for incidents;
   e) monitoring procedures covering all aspects of this discharge permit to demonstrate compliance with the conditions; and
   f) procedures to ensure that reporting requirements are met.

6. After allowing for reasonable mixing, being a mixing zone extending from the discharge point, to a point 400 metres downstream of the discharge point, the discharge shall not cause the receiving waters of the unnamed tributary of the Wairoa Stream to exceed the following concentrations:

Contaminant	**Concentration**
Unionised ammonia	0.025 gm^{-3}
Filtered carbonaceous BOD_5	2.0 gm^{-3}

7. After allowing for reasonable mixing, within a mixing zone extending 400 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:

   a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b) any conspicuous change in the colour or visual clarity;
   c) any emission of objectionable odour;
   d) the rendering of fresh water unsuitable for consumption by farm animals;
   e) any significant adverse effects on aquatic life.

8. After allowing for reasonable mixing, within a mixing zone extending 400 metres downstream of the discharge point, the discharge shall not give rise to an increase in turbidity of more than 50% (as determined using NTU (nephelometric turbidly units)) in the unnamed tributary of the Wairoa Stream.

9. Before 1 July 2019, the consent holder shall prepare and submit a '*Stream Assimilative Capacity*' (SAS) report which assesses the assimilative capacity of the receiving waters, being the unnamed tributary of the Wairoa Stream. The report shall assess the ability and capacity of the receiving waters to receive treated wastewater without significant effect on aquatic life. Once finalised, the report shall be circulated to the parties identified in condition 12, who may provide comments to the Taranaki Regional Council within 20 working days of receipt.

10. Before 30 September 2021, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council, a *'Wastewater Options Assessment Report'* (WOAR) for the Waverley WWTP. The WOAR shall document the on-going environmental effects of the discharge from the Waverley Wastewater Treatment Plant, and set out the options available to address the effects on the receiving environment resulting from the discharge. The report shall, as a minimum, address the following:

    a) Assess the environmental effects of the discharge on the Ihupuku Swamp Wildlife Management Reserve and the Wairoa Stream, including effects on water quality, periphyton growth and aquatic biota;
    b) Investigate a range of alternatives sites, options and/or methods to manage wastewater from the Waverley WWTP;
    c) Document consultation initiatives and their outcomes with potentially affected parties, as part of assessing alternative sites, options and methods; and
    d) Identify a best practicable long-term option for the treatment and disposal of Waverley wastewater.

11. Before 31st October 2017, the consent holder shall establish a Waverley Wastewater Working Party (WWWP) for the purpose of assisting the consent holder to achieve the requirements of Condition 10. The consent holder shall hold meetings no less often than every 12 months with the WWWP members for the duration of the consent, or until such time as all parties agree in writing that the WWWP can be disbanded. Those parties listed in condition 12 below shall be invited to be members of the WWWP.

12. The parties referred to in conditions 9, 10 and 11 and the Waverley Wastewater Working Party (WWWP), shall include as a minimum:

    a) Ngaa Rauru Kiitahi;
    b) The Department of Conservation (DoC);
    c) Fish and Game New Zealand (Fish and Game);
    d) The Taranaki District Health Board (TDHB);
    e) RJ and AE Bremer (adjacent landowner); and
    f) Warwick Isaac Lupton (downstream landowner).

13. Subject to the agreement of the landowner, the consent holder shall, in consultation with the Council's Land Services Manager, arrange for the riparian fencing and planting to the value of $3,000, to a point no greater than 400 metres downstream of the discharge point. The fencing and/or planting shall be completed by 1 December 2017 and confirmed in writing to the Taranaki Regional Council.

14. The consent holder shall undertake to notify and advise the Chief Executive, Taranaki Regional Council ('the Chief Executive') if trade wastes are accepted from any trade premises into the consent holder's wastewater system, for which it may be appropriate or necessary to place limits on the concentrations in the final discharge of any toxic or hazardous compounds which may be contained in that trade waste. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes. It shall be submitted to the Taranaki Regional Council by using the 'Notification of work' form on the Council's website (http://bit.ly/TRCWorkNotificationForm), or an alternative method that may be advised by the Chief Executive.

15. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:

    a) during the month of June 2018 and/or June 2020; and/or
    b) within 3 months of receiving a notification under special condition 14 above;

    for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 9 December 2020

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA 4640
Consent Granted Date:	6 June 2007

Conditions of Consent

Consent Granted:	To discharge treated municipal wastewater from the Kaponga Wastewater Treatment Plant into the Kaupokonui Stream at or about GR: P20:087-961
Expiry Date:	1 June 2029
Review Date(s):	June 2011, June 2017, June 2023
Site Location:	Egmont Street, Kaponga
Legal Description:	Pt Sec 69 Blk XI Kaupokonui SD
Catchment:	Kaupokonui

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. Within 1 year of the commencement of this consent, the wastewater treatment system shall be upgraded by:

a) the installation of stub baffles in accordance with drawing no. 6511929-CK02 provided in the *'Assessment of Environmental Effects for the Kaponga Wastewater Treatment Plant'* [CH2M Beca], March 2006.
b) Lower the discharge pipe so that all effluent if discharged at least 400mm below water level at all times.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3423. In the case of any contradiction between the documentation submitted in support of application 3423 and the conditions of this consent, the conditions of this consent shall prevail.

3. Notwithstanding any conditions within this consent, the consent holder shall at all times adopt the best practicable option or options, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from the exercise of this consent.

4. The volume of treated wastewater discharge shall not exceed 500 cubic metres per day, unless there has been rain on any of the previous three days [as measured at Taungatara, Te Kiri], in which case the instantaneous treated wastewater discharge flow rate shall not exceed 15 litres per second.

5. The consent holder shall implement and maintain a management plan which shall include operating procedures to avoid, remedy or mitigate against potential adverse effects arising from:

i) the operation of the wastewater treatment plant;
ii) the build up of sludge in the pond system; and
iii) stormwater and groundwater infiltration into the sewerage system.

6. The consent holder shall use a suitably trained operator to ensure proper and efficient operation and maintenance of the wastewater treatment system.

7. The oxidation pond shall be maintained in an aerobic condition at all times during daylight hours.

8. The consent holder shall advise and consult with the Taranaki Regional Council prior to accepting new trade wastes, which may contain toxic or hazardous wastes, into the consent holder's wastewater system.

9. After allowing for reasonable mixing, being a mixing zone extending from the discharge point, to a point 50 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in any surface water body:

   a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b) any conspicuous change in the colour or visual clarity;
   c) any emission of objectionable odour;
   d) any significant adverse effects on aquatic life.

10. The consent holder shall, in conjunction with the Taranaki Regional Council, undertake chemical, bacteriological and ecological monitoring of the oxidation pond and Kaupokonui Stream as deemed necessary by the Chief Executive, Taranaki Regional Council subject to Section 35 (2)(d) and Section 36 of the Resource Management Act 1991.

11. After allowing for reasonable mixing, being a mixing zone extending from the discharge point, to a point 50 meters downstream of the discharge point, the discharge shall not cause the receiving waters of the Kaupokonui Stream to exceed the following concentrations:

Contaminant	**Concentration**
Unionised ammonia	$0.025 gm^{-3}$
Filtered carbonaceous BOD_5	$2.0\ gm^{-3}$

12. After for allowing for reasonable mixing within a mixing zone extending 50 meters downstream of the discharge point, the discharge shall not give rise to an increase in turbidity of more than 50% [as determined using NTU (nephelometric turbidity units)] in the Kaupokonui Stream.

13. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, and/or June 2023 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 6 June 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA 4640
Consent Granted Date:	6 June 2007

Conditions of Consent

Consent Granted:	To discharge treated municipal wastewater from the Manaia Wastewater Treatment Plant into the Unnamed Stream 27 at or about GR: P21:062-803
Expiry Date:	1 June 2029
Review Date(s):	June 2011, June 2017, June 2023
Site Location:	Sutherland Road, Manaia
Legal Description:	Lot 1 DP 20670 Blk VII Waimate SD
Catchment:	Unnamed Stream 27

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. From 6 June 2009, the wastewater treatment plant shall comprise of:

(a) the existing 1ha oxidation pond with inlet screen; and
(b) two wetlands operating in parallel, each of 4800 m^2 ;

in accordance with recommended Option 3C and drawing no. 6513417/CK008 contained in the document supporting the application entitled *'Manaia Wastewater Treatment Plant Application for Discharge Permit and Assessment of Environmental Effects'* [CH2M Beca], Feb 2007.

2. The consent hold shall supply progress reports on implementation of the upgrade referred to under special condition 1, by 30 June 2008 and 30 June 2009, to the Chief Executive, Taranaki Regional Council.

3. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4068. In the case of any contradiction between the documentation submitted in support of application 4068 and the conditions of this consent, the conditions of this consent shall prevail.

4. Notwithstanding any conditions within this consent, the consent holder shall at all times adopt the best practicable option or options, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from the exercise of this consent.

5. The volume of treated wastewater discharge shall not exceed 600 cubic metres per day, unless there has been rain on any of the previous three days [as measured at the Kaupokonui, Glenn Road rain gauge station].

6. The consent holder shall implement and maintain a management plan which shall include operating procedures to avoid, remedy or mitigate against potential adverse effects arising from:

   i) the operation of the wastewater treatment plant;
   ii) the build up of sludge in the pond system; and
   iii) stormwater and groundwater infiltration into the sewerage system.

7. The consent holder shall use a suitably trained operator to ensure proper and efficient operation and maintenance of the wastewater treatment system.

8. The oxidation pond shall be maintained in an aerobic condition at all times during daylight hours.

9. The consent holder shall advise and consult with the Taranaki Regional Council prior to accepting new trade wastes, which may contain toxic waste or hazardous wastes or any significant additional organic loading, into the consent holder's wastewater system.

10. Allowing for a mixing zone of 50 metres extending either side of the mouth of the receiving stream the discharge shall not give rise to all or any of the following effects in the coastal waters of the Tasman Sea:

    i) any conspicuous change in the colour or visual clarity; and
    ii) any significant adverse effects on aquatic life, habitats, or marine ecology; and
    iii) exceedance of the guideline for shellfish gathering waters, as specified in the document 'Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas' [Ministry for the Environment, 2002].

11. The consent holder shall, in conjunction with the Taranaki Regional Council, undertake chemical, bacteriological and ecological monitoring of the wastewater treatment system, Manaia Creek and coastal receiving waters, as deemed necessary by the Chief Executive, Taranaki Regional Council, subject to Section 35 (2)(d) and Section 36 of the Resource Management Act 1991.

12. The consent holder shall implement a stormwater/groundwater infiltration reduction programme, and shall carry out all practicable actions to ensure that all unauthorised stormwater connections to the sewage reticulation system are removed and remain disconnected. The consent holder shall report on progress under this condition to the Chief Executive, Taranaki Regional Council, by 30 June 2008 and each subsequent year.

13. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, and/ or June 2023 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 6 June 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA 4800
Consent Granted Date:	16 November 2005

Conditions of Consent

Consent Granted:	To erect, place and maintain an oxidation pond discharge structure and an emergency overflow discharge structure as part of the Patea Wastewater Treatment System within the coastal marine area of the Patea River at or about GR: Q22:374-590
Expiry Date:	1 June 2028
Review Date(s):	June 2010, June 2016, June 2022
Site Location:	Beach Road, Patea
Legal Description:	Lot 1 DP 9100 Beach Road Whenuakura Dist Blk VII Carlyle SD
Catchment:	Patea

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

   i) the administration, monitoring and supervision of this consent; and
   ii) charges authorised by regulations.

Special conditions

1. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharge to water.

2. The structures authorised by this consent shall be constructed and maintained generally in accordance with the documentation submitted in support of application 2754 and shall be maintained to ensure the conditions of this consent are met. In the case of any contradiction between documentation submitted in support of application 2754 and the conditions of this consent, the conditions of this consent shall prevail.

3. The consent holder shall upgrade the oxidation pond discharge structure, substantially in accordance with recommended Option C [rock diffuser] contained in the document supporting the application entitled *'Assessment of Environmental Effects for the Upgraded Wastewater Treatment Plant'* [CH2M Beca], May 2004. Implementation of this upgrade shall be completed no later than two years from the date of issue of the consent.

4. The consent holder shall at all times during construction and maintenance works, adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the coastal marine area and any adverse effects on water quality from the exercise of this consent.

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

6. The exercise of this consent shall not restrict public access to and along the coastal marine area.

7. Any disturbance of parts of the riverbed covered by water and/or works which may result in downstream discolouration of water shall be timed to coincide, as far as possible, with dry weather periods.

8. The structures which are the subject of this consent shall not obstruct fish passage.

9. The consent holder shall install and maintain suitable signage advising the public during construction of the structure[s] or any significant maintenance works.

10. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

11. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 16 November 2005

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	South Taranaki District Council Private Bag 902 HAWERA
Consent Granted Date:	19 September 2005

Conditions of Consent

Consent Granted:	To discharge treated stock truck effluent from an oxidation pond treatment system onto and into land in the vicinity of the Waiau [2] Stream in the Waitotara catchment at or about GR: R22:525-580
Expiry Date:	1 June 2022
Review Date(s):	June 2010, June 2016
Site Location:	State Highway 3, RP352-5.070, 150 m south of State Highway 3/Waiau Road intersection, Road Reserve, Waverley
Legal Description:	Lot 2 DP 7820 Pt Lot 2 DP 84280 Blk VIII Wairoa SD
Catchment:	Waitotara
Tributary:	Waiau [2]

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in Section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge.

2. After allowing for reasonable mixing, within a mixing zone extending 50 metres below the discharge point, the discharge shall not cause the concentration of the following constituents to be exceeded in the receiving water:

Constituent	**Concentration**
Unionised ammonia	0.025 gm^{-3}
Filtered carbonaceous BOD_5	2.0 gm^{-3}

3. After allowing for reasonable mixing, within a mixing zone extending 50 metres below the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Waiau [2] Stream in the Waitotara catchment:

a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
b) any conspicuous change in the colour or visual clarity;
c) any emission of objectionable odour;
d) the rendering of fresh water unsuitable for consumption by farm animals;
e) any significant adverse effects on aquatic life.

4. The treatment and discharge system shall be designed, managed, operated and regularly maintained to ensure that the conditions of this consent are met.

5. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 19 September 2005

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects however, abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples however, the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time however, this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

Appendix III

Full results of additional monitoring at two sites in the Patea River 2023/24

Full results of additional monitoring at two sites in the Patea River; PAT000970 (upstream) and PAT000995 (downstream)

Parameter	Unit	24 Jul 2023		14 Aug 2023		12 Sep 2023		9 Oct 2023		6 Nov 2023		4 Dec 2023	
		u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s
Chloride	g/m^3	72	132	3,800	6,200	1,730	5,600	15	19	2,200	3,500	47	220
Conductivity	µS/cm@25°C	355	596	11,450	18,030	5,780	13,980	144	163	7,290	11,510	7,290	922
DRP	g/m^3	0.005	0.008	<0.04	<0.04	<0.004	<0.04	<0.004	0.005	0.006	0.006	<0.004	<0.004
E. coli	cfu/100ml	130	90	60	40	110	50	60	70	130	200	160	40
Enterococci	cfu/100ml	120	30	22	90	20	<10	20	20	70	110	30	40
Total Kjeldhal Nitrogen (TKN)	g/m^3	0.21	0.17	0.16	0.21	0.19	0.21	0.2	0.21	0.23	0.35	0.24	0.20
Ammoniacal nitrogen	g/m^3	<0.01	0.01	<0.1	<0.1	<0.010	0.026	<0.01	0.023	0.026	0.029	<0.01	<0.01
Nitrite-N	g/m^3	0.002	0.002	<0.02	<0.02	<0.002	<0.02	0.01	0.011	0.003	0.003	0.004	0.004
Nitrate-N	g/m^3	0.56	0.59	0.53	0.45	0.46	0.36	0.47	0.47	0.39	0.36	0.28	0.27
Nitrate-N + Nitrite-N	g/m^3	0.56	0.59	0.53	0.45	0.46	0.36	0.48	0.49	0.39	0.36	0.29	0.27
Phosphorus (total)	g/m^3	0.035	0.026	0.027	0.033	0.026	0.022	0.048	0.023	0.081	0.029	0.018	0.017
Turbidity	NTU	24	12	17	18	11	7.3	17	9.7	42	18	11.7	7.7
Temperature	°C	10.5	10.5	10.8	11.0	12.7	13.2	13.2	13.9	17	16.6	-	17.7

Parameter	Unit	8 Jan 2024		19 Feb 2024		18 Mar 2024		22 Apr 2024		21 May 2024		20 Jun 2024	
		u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s
Chloride	g/m^3	128	1,460	9,500	12,500	6,900	10,500	25	87	3,400	3,800	2,700	5,100
Conductivity	µS/cm@25°C	593	5,040	27,200	34,200	20,010	29,000	191	422	11,120	11,250	8,530	14,950
DRP	g/m^3	<0.004	0.006	<0.04	<0.04	<0.04	<0.04	<0.004	<0.004	<0.04	<0.04	<0.04	<0.04
E. coli	cfu/100ml	150	57	20	10	500	490	65	110	130	140	15	22
Enterococci	cfu/100ml	29	15	<10	30	470	490	53	59	160	120	11	8
Total Kjeldhal Nitrogen (TKN)	g/m^3	0.24	0.23	015	0.18	0.22	0.18	0.23	0.20	0.36	0.24	0.19	0.17
Ammoniacal nitrogen	g/m^3	<0.01	0.02	<0.1	<0.1	0.027	0.021	<0.01	<0.01	0.11	<0.1	<0.01	<0.01
Nitrite-N	g/m^3	0.002	0.002	<0.02	<0.02	<0.002	<0.02	<0.002	<0.002	<0.02	<0.02	<0.02	<0.02
Nitrate-N	g/m^3	0.22	0.21	0.093	0.061	0.184	0.148	0.24	0.25	0.35	0.33	0.33	0.28
Nitrate-N + Nitrite-N	g/m^3	0.23	0.21	0.105	0.075	0.185	0.151	0.24	0.25	0.35	0.33	0.34	0.29
Phosphorus (total)	g/m^3	0.028	0.021	0.045	0.022	0.032	0.023	0.023	0.078	0.09	0.029	0.033	0.026
Turbidity	NTU	16	12	31	7.4	15	12	15	42	72	18	13	10
Temperature	°C	22.5	23.8	22.4	22.1	17.4	17.1	16.2	16.0	12.8	12.7	11.4	11.6