

South Taranaki District Council
Kaponga, Manaia, Patea, and Waverley WWTPs
Monitoring Programmes
Annual Report
2018-2019

Technical Report 2019-41

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Executive summary

The 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 townships¹. This report for the period July 2018 to June 2019 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company'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.

STDC holds seven resource consents for the Waverley, Kaponga, Manaia and Patea 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).

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

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 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 a 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 February 2019, when a moderately high discharge rate of well-treated wastewater characterised this system. No impacts of the effluent discharge were indicated by MCI scores through the reach of the river surveyed.

During the year, STDC demonstrated a high level of environmental and 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 increased turbidity and bacteria levels were noted. This does not appear to be entirely as a result of the WWTP discharge, and further investigations associated with upstream water quality and bacterial marker source tracking are proposed.

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. No significant impacts associated with the discharges were measured on the bacteriological quality of the lower reaches of the Patea River.

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

During the year, STDC demonstrated a high level of environmental and 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, mainly in relation to increases in turbidity and *E. coli* and significant decreases in dissolved oxygen saturation and black disc measurement. 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. No re-occurrences of past dumping of human wastes into the system were recorded in 2018-2019, and previous issues with maintenance of the roadside facilities had been well addressed. 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 ten years previously 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 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.

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 remains at a high level.

This report includes recommendations for the 2019-2020 year, including a recommendation relating to an optional review of consent 0072-3.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

South Taranaki District Council (STDC) operates eight wastewater treatment systems within its district. This report is for the period July 2018 to June 2019 by the 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.

This report covers the results and findings of the monitoring programmes implemented by the Council in respect of the consents held by the 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 24th 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 through annual programmes;
- the resource consents held by STDC in the six catchments;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at STDC's sites.

Section 2 presents the Kaponga WWTP monitoring results, and discusses their significance and presents recommendations for the next monitoring year.

Section 3 presents the Manaia WWTP monitoring results, and discusses their significance and presents recommendations for the next monitoring year.

Section 4 presents the Patea WWTP and emergency outfall monitoring results, and discusses their significance and presents recommendations for the next monitoring year.

Section 5 presents the Waverley WWTP and stock truck wastes disposal monitoring results, and discusses their significance and presents recommendations for the next monitoring year.

Section 6 presents a summary of the recommendations for each WWTP to be implemented in the 2019-2020 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' inasmuch 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 and administrative performance

Besides discussing the various details of the performance and extent of compliance by the Company, this report also assigns them a rating for their environmental and administrative performance during the period under review.

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.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.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 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 the Company during the period under review.

² The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

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

Consent number	Purpose	Granted	Review	Expires
<i>Water discharge permits</i>				
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 2022	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 2020	June 2022
0145-2	To discharge untreated municipal sewage in emergencies only into the Coastal Marine Area of the Patea River	July 2007	June 2022	June 2028
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 2023	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 2023	June 2029
<i>Discharges of waste to land</i>				
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
<i>Coastal permit</i>				
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 2022	June 2028

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 discharge 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 Kaipokonui River during the spring and late autumn inspections. Samples were analysed for filtered uninhibited biochemical oxygen demand (filtered BOD), pH, turbidity, temperature, unionised ammonia (NH₃), and ammonia-N (NH₄).

The treated pond effluent and three sites on the Kaipokonui 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 (NH₃), ammonia-N (NH₄), and nitrate-nitrite nitrogen (NNN).

1.3.3.3 Biomonitoring surveys

A biological survey was performed on one occasion at three sites in the Kaipokonui 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 three 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, *E. coli* bacteria, turbidity, and temperature. The sea samples were analysed for conductivity, *E. coli* 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 (NH₃), and ammonia-N (NH₄).

1.3.4.3 Biological inspection

A low tide beach ecological inspection was performed on one occasion in autumn 2019 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 (NH₃), and ammonia-N (NH₄) 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 (NH₄), DRP and pH were included in the summer samples.

Contact recreational bacteriological water quality at Patea Boat Ramp, Mana Bay and Patea Beach was monitored by the Council on 20 separate occasions between early November 2018 and late March 2019. The samples were analysed for conductivity, *E. coli* and enterococci bacteria, and temperature.

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 three times throughout the year, in conjunction with each WWTP visit.

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 (NH₃ and NH₄), total and filtered BOD, chloride, conductivity, dissolved oxygen, DRP, *E. coli* bacteria, pH, suspended solids, temperature, and turbidity.

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 about 370 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 2007-2008 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 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 2012-2013 monitoring period. This screen system has telemetry alarming. A flow meter was installed on the pond inlet in the 2017-2018 year as per consent conditions.



Photo 1 Kaponga WWTP

2.1 Inspections

11 September 2018

The step screen was operating and wastes were contained. The primary pond influent flow was a clear, light grey with an estimated flow rate of 4 L/s. The pond was pale green and relatively clear.

The secondary pond was also pale green and relatively clear. Ten mallard ducks were present.

The discharge flow rate into the Kaipokonui River was estimated at 4 L/s, with no visual environmental effects on the receiving waters noted. The WWTP surrounds were being grazed by sheep at the time of the inspection.

8 February 2019

The step screen was operating and wastes were fully contained. A mag flow meter had been installed on the WWTP influent line. The influent flow rate was estimated at 2.0 L/s. The primary pond was turbid and a bright green/yellow colour. Numerous (400+) paradise ducks were present. It was noted that the access to the pond effluent sampling site was compromised by the wooden gangway, which had deteriorated and required immediate maintenance work (replacement of rotten foot boards).

The effluent discharge into the Kaipokonui River was estimated at 1.5 L/s and was having a visible impact on the stream. There was a noticeable reduction in the black disc measurement 175 m downstream from the discharge at monitoring site KPK000520 (upstream = 3.73m, downstream = 3.10 m).

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

16 May 2019

The step screen was operating and wastes were contained. The influent flow was light grey and reasonably clear, with an estimated flow rate of 8 L/s. The primary pond was green/brown and turbid. The secondary pond was dark green and turbid with approximately 150 mallard ducks on the surface. The foot board on the pond effluent sampling platform had been replaced as requested in the previous inspection.

The discharge flow rate into the Kaipokonui River was estimated at 10 L/s with no visual environmental effect on the receiving waters noted. The surrounds were being grazed by sheep at the time of inspection and no issues were noted.

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 (NH₃), ammonia-N (NH₄), and nitrate-nitrite nitrogen (NNN), on one occasion during the summer inspection. The results of this survey are presented in Table 2 and compared with the results from previous monitoring years.

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.

Table 2 Results of summer effluent monitoring for the Kaponga WWTP

Site		OXP002004	
Date		8 Feb 2019	2000-2018 Range
Parameter	Unit	0900	
Flow	L/s	0.25	0.1 - 15
BOD	g/m ³	13	12-140

Site		EXP002004	
Date		8 Feb 2019	2000-2018 Range
Parameter	Unit	0900	
BODF	g/m ³	0.9	0.7-5.8
Chloride	g/m ³	25	11.9-33.5
Conductivity	mS/m@25°C	26.0	-
DO (concentration)	g/m ³	7.35	1.7-17.6
DO (saturation)	%	79.9	18-190
<i>E. coli</i>	/100ml	5,480	210-38,000*
pH	pH	9.7	7.4-10.3
SS	g/m ³	99	38-320
Turbidity	NTU	157	30-350
Temperature	°C	18.3	6.5-25.4
Nutrient Analyses			
NH ₃	g/m ³ N	<0.007	0.0102-0.0988
NH ₄	g/m ³ N	<0.010	0.005-2.090
NNN	g/m ³ N	0.0010	<0.001-0.160
NO ₃ ⁻	g/m ³ N	0.003	0.003-0.009
NO ₂ ⁻	g/m ³ N	0.0016	<0.001-0.004
DRP	g/m ³ P	1.03	<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/m ³)	Saturation (%)
11 September 2018	0950	11.4	2.9	28
8 February 2019	0900	18.3	7.4	80
16 May 2019	1015	12.8	9.1	89

There was a relatively wide range of dissolved oxygen concentrations (between 28% and 89% saturation) found in the surface layer of the primary pond near the outlet. The highest DO readings were recorded during late summer/autumn, in conjunction with high chlorophyll-a levels (indicating a significant phytoplankton component).

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 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 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 2000 to June 2018	
				Range	Median
11 September 2018	0950	Relatively clear, pale green	3.0	0.6 - 1,100	394
8 February 2019	0900	Turbid, bright green/yellow	380		
16 May 2019	1015	Turbid, green/brown	460		

There was a wide range of concentrations of chlorophyll-a in the primary pond, with the lowest algal concentration occurring while dissolved oxygen concentrations were also low (2.9 mg/L and 28% saturation). This occurred in early spring and indicates high stormwater loadings on the pond.

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 Kaipokonui 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 2018-2019 period (Section 2.1.3.1). One biomonitoring survey was conducted during summer 2019 (Section 2.1.3.2). 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	Approximately 250 m upstream of the WWTP discharge	Kaupokonui River
OXPO02004	Adjacent to outlet of second section of the oxidation pond	Effluent
KPK000520	50 m downstream of the WWTP discharge	Kaupokonui River
KPK000550	Approximately 1 km downstream of the WWTP discharge	Kaupokonui River

2.3.1 Receiving water surveys of September 2018 and May 2019

Receiving water samples were collected on 11 September 2018 and 16 May 2019 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 September 2018 and May 2019

Parameter	Unit	11 September 2018		16 May 2019		Consent limits
		Upstream KPK000500	Downstream KPK000520	Upstream KPK000500	Downstream KPK000520	
Time		0930	1010	1000	1040	-
BOD	g/m ³	<1.0	<1.0	<1.0	<1.0	2.0
pH	pH	7.9	7.6	7.4	7.4	-
Turbidity	NTU	0.66	0.57	0.64	1.37	Less than 50% increase

Date		11 September 2018		16 May 2019		Consent limits
Parameter	Unit	Upstream KPK000500	Downstream KPK000520	Upstream KPK000500	Downstream KPK000520	
Temperature	°C	8.0	8.1	11.1	11.1	-
NH ₃	g/m ³ N	<0.00014	<0.00014	<0.00006	<0.00006	0.025
NH ₄	g/m ³ N	<0.010	0.015	<0.010	<0.010	-

There were no significant effects noted in the Kaipokonui River in relation to most of the parameters tested. The BOD₅ concentration was well within the 2.0 gm² limit imposed by special condition 11, as was unionised ammonia (NH₃). The increase in turbidity downstream on 16 May 2019 was 114%, well above the consent condition which specifies no more than a 50% increase. The discharge was noted as being dark green and turbid at the time of sampling and chlorophyll-a levels were high indicating a large algae population. The inspecting officer did not note any significant visual effects on the receiving water at the time.

2.3.2 Low flow receiving water survey February 2019

A late summer low flow assessment of the impact of the WWTP's effluent discharge on the receiving waters of the Kaipokonui River was performed on 8 February 2019, 25 days after a significant river fresh. Results of the survey are displayed in Table 7. There was a low rate of discharge from the ponds system (estimated at approximately 1.5 L/s) at the time of the survey. The river flow was gauged at 0.42 m³/s upstream of the discharge. The flow of 0.75 m³/s recorded in the lower reaches of the river (TRC Glenn Road recorder) was well below the average February mean monthly flow (1.57 m³/s) and only slightly above the minimum February mean monthly flow (0.68 m³/s) for the period 1978 to 2019.

As a result of the large dilution afforded to the discharge, there was moderately small decrease in clarity of the stream downstream of the discharge point as emphasised by the 17% decrease in black disc clarity and 16% increase in turbidity between the upstream (KPK000500) and downstream (KPK000520) sites. No significant impacts on the river were recorded for all other parameters measured (Table 7) with minimal or no increases in measured levels of pH, conductivity, suspended solids, bacteria, BOD, 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 February 2019

		KPK000500		KPK000520		KPK000550	
Date		8 Feb 2019	2000-2018 Range	8 Feb 2019	2000-2018 Range	8 Feb 2019	2000-2018 Range
Parameter	Unit	0915		0935		1000	
Flow	L/s	416	329-820	-	-	-	-
Black disc	m	3.73	2.55-5.73	3.10	2.44-4.47	2.94	2.00-4.81
BOD	g/m ³	<0.8	<0.5-0.6	<0.8	<0.5-0.6	<0.8	<0.5-0.7
BODF	g/m ³	<0.8	<0.5-0.5	<0.8	<0.5-0.5	<0.8	<0.5-0.5
Chloride	g/m ³	7.6	7.0-10.2	7.2	7.0-9.0	7.8	7.2-8.9

		KPK000500		KPK000520		KPK000550	
Date		8 Feb 2019	2000-2018 Range	8 Feb 2019	2000-2018 Range	8 Feb 2019	2000-2018 Range
Parameter	Unit	0915		0935		1000	
Conductivity	mS/m@25°C	10.1	-	9.9	-	10.2	-
DO (concentration)	g/m ³	10.6	9.46-11.1	10.5	9.7-11.2	10.3	9.6-11.2
DO (saturation)	%	106.4	97-105	105.7	98-106	103.8	100-106
<i>E. coli</i>	/100ml	210	120-700*	206	80-630*	166	71-540*
pH	pH	8.0	7.3-8.0	8.0	7.4--8.4	8.0	7.6-8.2
SS	g/m ³	< 3	<2.0-4.0	< 3	<2	< 3	<2-2
Turbidity	NTU	0.56	0.25-1.4	0.65	0.4-1.8	0.70	0.35-1.3
Temperature	°C	14.7	3.4-19.2	15.0	3.4-19.6	15.4	10.1-19.8
Nutrient Analyses							
NH ₃	g/m ³	<0.0003	0.00001-0.00021	<0.0003	0.00002-0.0024	<0.0004	0.00005-0.0014
NH ₄	g/m ³ N	< 0.010	<0.003-0.016	< 0.010	<0.003-0.043	< 0.010	<0.003-0.030
NNN	g/m ³ N	0.104	0.07-0.23	0.094	0.07-0.22	0.104	0.06-0.22
NO ₃ ⁻	g/m ³ N	0.102	0.069-0.189	0.092	0.069-0.189	0.102	0.059-0.120
NO ₂ ⁻	g/m ³ N	0.0017	<0.001-0.002	0.0015	<0.001-0.002	0.0015	<0.001-0.002
DRP	g/m ³ P	0.011	0.003-0.023	0.014	<0.003-0.030	0.011	<0.003-0.022

* parameter previously measured as faecal coliforms

2.3.3 Biological monitoring survey

The biomonitoring survey associated with the receiving waters of the Kaipokonui River was undertaken under low, recession flow conditions on 1 March 2019, at identical sites to the physicochemical survey (Figure 2) of 8 February 2019.

The Council collected streambed macroinvertebrates from the Kaipokonui River to investigate the effects of wastewater discharges from the STDC's Kaponga oxidation pond system on macroinvertebrate health. The different types of macroinvertebrate from samples were identified, the number of different types counted (taxa richness), and 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 accounts for 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.

Taxa richness at all sites was moderate with no major changes from the last monitoring year; however, sites 1 and 2 had a significant drop in MCI (34 and 22 units respectively) from the previous survey. Additionally, SQMCI at all sites dropped dramatically compared to the previous survey. Despite the substantial decreases in MCI (Sites 1 & 2) and SQMCI scores, neither of the downstream sites (sites 2 & 3) showed a significant decrease in MCI or SQMCI scores when compared to the control site (site 1).

Closer inspection of the macroinvertebrate community structure shows a slight decrease in the number of 'highly sensitive' taxa as well as decreases in abundances throughout the entire community. This is likely due to relatively low flows prior to the 2019 survey (182 days since a fresh in excess of 7x median flow) compared with the 2018 survey (10 flow events in excess of 7x median flow within 182 days prior to the 2018 survey). Moreover, the control site was the only MCI score that was significantly lower than the historical median, indicating that any effects, in addition to low flow, causing a decrease in macroinvertebrate health would have come from further upstream. Therefore, it is unlikely that discharges from the Kaponga Municipal Wastewater Treatment System into the Kaipokonui River had a role in any of the decreases observed across sampling sites.

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

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 2018-2019 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 refurbished wavebands, dividing wall, and replacement outlet grid have functioned successfully since the 1998-1999 monitoring period and continued to do so throughout the current 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 microfloral population concentrations within the historical range. The lowest microfloral population (and reduction in dissolved oxygen saturation) occurred in early spring following colder, wetter weather conditions.

2.5.2 Environmental effects of exercise of consents

No significant impacts on the Kaipokonui River were recorded from the physicochemical parameters analysed during the mid-summer survey conducted in February 2019, when a moderately high discharge rate of well-treated wastewater characterised this system. There were no significant changes in the measured concentrations of almost all parameters downstream under low receiving water flow conditions, mainly due to the very high effluent quality occurring at the time. Both this survey and two other receiving water surveys found compliance with all limits set by special conditions at all times.

The Kaipokonui River continued to have high aesthetic water quality in the reaches near the Kaponga township and for 1 km downstream of the oxidation pond discharge under summer low flow conditions.

Changes in macroinvertebrate community structure during the summer survey were attributed to the low flows prior to the survey. No impacts of the effluent discharge were indicated by MCI scores through the reach of the river surveyed. The absence of heterotrophic growths on the river bed was consistent with these findings.

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 Kaipokonui 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
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	Provision by consent holder	Yes
6. Provision of operator	Liaison with consent holder	Yes
7. Maintenance of aerobic ponds conditions	Inspections and sampling	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 – results of one sample over
13. Provision for lapse of consent	Consent exercised	N/A

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?
14. Optional review provision re environment effects	Next optional review scheduled in June 2023	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 Section 1.1.4.

2.5.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, 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 2.

2.5.5 Alterations to monitoring programmes for 2019-2020

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.

It is proposed that for 2019-2020, monitoring of the Kaponga WWTP continues at the same level as in 2018-2019.

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 2019-2020.

2.5.6 Recommendations

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, 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 currently un-regulated but with the proposed introduction of a planned trade waste by-law, restrictions and standards are intended to be imposed by the consent holder (STDC, 2013).



Photo 3 Manaia WWTP showing view of wetlands

3.1 Background

Issues relating to the historical operation and performance of the reticulation and treatment system have been presented in previous annual reports (see TRC, 2004 and TRC, 2007 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 2010-2011 period. The consent holder constructed an emergency high level overflow pipe between the oxidation pond and the northern wetland in August 2010 (see TRC, 2011) 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.

No stormwater infiltration/inflow work was performed on the Manaia sewerage reticulation in the 2018-2019 period (mainly due to the greater priorities at Hawera and also because there had been no issues with manholes surcharging in recent years).

Desludging and pond enhancement bacteria continue to be dosed into the oxidation pond.

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. The coastal access track also requires regular checks and maintenance.

3.2 Inspections

28 August 2018

The influent screen was operating and wastes were fully contained. Influent flow rate to the primary pond was estimated at 15 L/s. The pond was light green and mostly clear. The level was relatively high and overflowing via the overflow pipe into the northern wetland pond. Approximately 15 black swans and 30 mallard ducks were present on the pond.

The northern wetland pond was 1.65 m, and the southern pond at 0.75 m. Only the northern wetland pond was operating. Pond effluent was relatively clear and pale green in colour. The treated wastewater discharge flow was estimated at 15 L/s and no significant visual environmental impact was observed in the receiving water. The ponds and surrounds were tidy.

5 December 2018

The influent screen was operating and wastes were fully contained. Influent flow rate to the primary pond was estimated at 1.5 L/s. The pond was turbid and dark green in colour with a mild but noticeable odour. No wildlife was noted on the pond surface.

The northern wetland pond was 1.50 m and discharging via the weir baffles, while the southern pond was empty. Pond effluent was slightly turbid and dark green in colour. Several pukeko were present. The treated wastewater discharge flow was estimated at 0.5 L/s and no visual environmental impact was noted in the receiving water. The ponds and surrounds were tidy.

11 June 2019

The influent screen was operating and wastes were fully contained. The influent flow rate was estimated at 10 L/s. The primary pond was turbid and green/brown in colour with no discharge occurring via the overflow to the wetland pond. It was noted that a grey scum was accumulating along the southern perimeter. Approximately 50 seagulls and several black swans were present on the pond surface. Minimal odour was noted.

The northern wetland pond was at 1.40 m, while the southern pond was isolated with minimal surface water showing. Effluent in the northern pond was slightly turbid and pale green in colour. The treated wastewater discharge flow was estimated at 8 L/s, with no significant visual environmental impact on the receiving water apart from a pale green colouring. 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	5 m upstream of the WWTP discharge	Manaia Creek
OXP003001	WWTP oxidation pond effluent at outfall	Effluent
OXP006005	WWTP wetland at outfall	Outlet
MNA000093	10 m downstream of the WWTP discharge	Manaia Creek
SEA905086	200 m east of mouth of Manaia Creek	Tasman Sea
SEA905080	200 m 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 (NH₄) on one occasion during the summer inspection. The results of this survey are presented in Table 10.



Figure 2 Aerial location map of sampling sites in relation to Manaia WWTP

Table 10 Results of summer effluent monitoring for the Manaia WWTP

Site		OXF003001		OXF006005	
Parameter	Unit	5 Dec 2018	2000-2018 Range	5 Dec 2018	2000-2018 Range
Time		0825	-	0840	-
BOD	g/m ³	33	11-90	25	4.0-34
BODF	g/m ³	12	3.2-54	7	3.1-13
Chloride	g/m ³	42	39.6-66.4	42	37.0-53.2
Conductivity	mS/m@25°C	40.7	-	42.9	-
DO (concentration)	g/m ³	15.8	0.22-17.9	6.0	0.55-4.33
DO (saturation)	%	171	2.4-179	64	3.71-46.6
Faecal coliforms	/100ml	27,000	2,500-340,000	420	7-16,000
pH	pH	8.8	6.8-8.2	7.5	6.8-7.6
SS	g/m ³	70	8.0-230	40	3.0-36
Turbidity	NTU	34	4.3-120	18.6	2.0-81
Temperature	°C	18.2	7.4-25.3	18.0	8.4-20.1
Nutrient Analyses					
NH ₄	g/m ³ N	9.8	1.78-17.8	11.3	3.28-19.5
DRP	g/m ³ P	2.0	0.446-4.89	2.4	0.593-3.06

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 all parameters apart from pH, which was higher.

Results from the treated wetland discharge were mostly within the expected range, with the exception of suspended solids which were slightly higher, and dissolved oxygen and dissolved oxygen saturation which were also higher than usual. There was a marked improvement in faecal coliform numbers in comparison with the oxidation pond effluent.

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/m ³)	Saturation (%)
28 August 2018	10:15	13.5	2.2	20
5 December 2018	08:25	18.2	15.8	171
11 June 2019	09:40	12.8	0.55	4

Results indicate a very wide range of dissolved oxygen concentrations (between 4% and 171% saturation) in the surface layer of the primary pond near the outlet. The occurrence of supersaturation during the monitoring period follows historical trends where supersaturation has been recorded in approximately 25% of the samples, although this has been less common over the previous ten years, occurring in only around 10% of the samples.

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 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 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 2000 to June 2018	
				Range	Median
28 August 2018	10:15	Relatively clear, pale green	4.9	30-2,850	337
5 December 2018	08:25	Slightly turbid, dark green	101		
11 June 2019	09:40	Turbid green/brown	95		

Results show relatively narrow range of concentrations of chlorophyll-a in the primary pond, all of which are fairly low, which is indicative of a lower phytoplanktonic component.

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 2018-2019 period (Section 3.4.1). One biomonitoring inspection was conducted during autumn 2019 (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 28 August and 5 December 2018, and 11 June 2019 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		28 Aug 2018	5 Dec 2018	11 Jun 2019	2000-2018 Range	28 Aug 2018	5 Dec 2018	11 Jun 2019	2000-2018 Range
Parameter	Unit	10:00	08:50	10:05		10:10	09:00	10:10	
Chloride	g/m ³	59	58	54	34.0-142	55	58	48	31.8-85.1
Conductivity	mS/m@25°C	45.2	44.0	40.4	29.1-70.4	42.2	44.0	39.2	31.1-64.4
Faecal coliforms	/100ml	120	1,400	190	50-33,000	200	2,200	2,000	68-260,000
Turbidity	NTU	4.2	5.0	1.4	1.6-70	5.4	5.5	5.4	1.8-75
Temperature	°C	12.9	16.2	12.6	8.2-18.6	12.6	16.4	12.4	8.0-19.2

Effects were noted on the Manaia Creek in relation to faecal coliforms (57 to 795% increases) and turbidity (10 to 285% increases). 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		28 Aug 2018	5 Dec 2018	11 Jun 2019	2000-2018 Range	28 Aug 2018	5 Dec 2018	11 Jun 2019	2000-2018 Range
Parameter	Unit	09:15	09:30	10:45		09:25	09:20	10:30	
Conductivity	mS/m @25°C	5,240	5,340	5,210	849-5,260	4,090	5,330	5,030	858-5,260
Faecal coliforms	/100ml	<18	150	2	<1-1,300	20	210	4	1-300
Temperature	°C	13.1	18.8	15.0	7.5-23.3	13.2	19.0	14.5	7.6-24.4

These results show generally 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. However, elevated levels of faecal coliforms were found at the two sites either side of the mouth of the stream in the sample collected on 5 December 2018. This sample was collected during low flow conditions and represents a 'worse-case scenario' with very little dilution of the discharge in the Manaia Creek before entering the receiving waters of the Tasman Sea. Faecal coliforms in the upstream sample were also elevated on this occasion (Table 13). For the six samples collected this would mean a breach of consent condition 10, 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', in regard to both the median being above 14/100 ml and more than 10% of samples exceeding 43/100 ml. 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'. 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.

3.4.2 Biological inspection

During the monitoring period under review, one beach ecological inspection was performed. This survey was performed in autumn 2019, 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 foreshore, in the vicinity of the discharge from the Manaia oxidation pond system, was carried out on 30 April 2019 at 13:00 (NZST). Low tide on this day was at 13:30 (NZST), at a height of 1.0 m above chart datum. The weather was fine at the time of the inspection, with a strong south easterly wind. Inshore waters were turbid grey/green along the coastline.



Photo 4 Manaia Creek flowing over the intertidal reef at Manaia

The Manaia Creek was in moderate flow during the inspection (Photo 4). As it flowed onto the reef, the stream had a slight yellow-brown colouration and some foaming was observed. The yellow-brown colouration was evident from the stream mouth to the low water mark. Some small patches of surface scum were also observed amongst the rocks on the reef (Photo 5).



Photo 5 Surface scum on the reef below the stream mouth

No sewage odours were detected. The stream appeared to have a significant effect on nearby intertidal organisms, most likely a result of the freshwater influence. Species diversity and biomass on the reef was considerably greater away from the influence of the stream. Conversely, the coverage of algal species that are indicative of nutrient enrichment, such as *Ulva spp.*, was high in the immediate vicinity of the stream mouth, but reduced markedly with distance (Photo 6). Overall, 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.

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



Photo 6 *Ulva spp.* at the high tide mark, either side of the 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 2018-2019 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.

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, BOD₅, suspended solids, and turbidity levels.

Semi-quantitative biomonitoring of the microflora component of the oxidation pond prior to the current period has found communities typical of other well-performing pond systems elsewhere in the region. Chlorophyll-a measurements recorded relatively low microfloral in the primary oxidation pond during the current monitoring period. The overall performance of the wastewater system was considered typical of a single pond system (with an industrial loading component and no mechanical aeration) followed by wetland tertiary treatment.

3.6.2 Environmental effects of exercise of consents

Impacts of the wetlands discharge were recorded on the turbidity and bacteria levels of the water quality of the Manaia Creek into which the effluent discharged.

Water monitoring continues to record marked improvements in the aesthetic water quality of the Manaia Creek, following incorporation of the wetlands into the system. However, the poor water quality often recorded upstream of the discharge warrants some investigation as this may have contributed to past 'sewage fungus' outbreaks and the potential for elevated coastal water bacteria levels on occasions. It is proposed that additional work be conducted in the 2019-2020 monitoring period to investigate the water quality upstream of the discharge.

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 for recreational shellfish-gathering purposes. Results of bacteriological monitoring conducted at the two coastal sites showed standards for shellfish gathering were exceeded 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.

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
4. Best practicable option to minimise adverse effects	Inspections and sampling	Yes
5. Limits on volume	Reporting by consent holder and inspections	Yes
6. Implementation of a management plan	Provision by consent holder	Yes
7. Provision of operator	Liaison with consent holder	Yes
8. Maintenance of aerobic ponds conditions	Inspections and sampling	Yes
9. Trade wastes connections	Liaison with consent holder	Yes
10. Limits on receiving water effects	Inspections and physicochemical sampling and biomonitoring	Mostly – some impacts noted
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	Next optional review scheduled in June 2023	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 Section 1.1.4.

3.6.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2018-2019 year continue at the same level as in 2017-2018.

2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the Council investigates aspects of the water quality of Manaia Creek upstream of the WWTP in terms of the source of bacteria in both the stream and coastal waters, during the 2018-2019 period, subject to appropriate flow conditions.

Recommendation 1 was implemented, while it was not considered necessary to carry out further investigations or interventions as per recommendation 2. Recommendation 3 was not undertaken in the monitoring year, however preliminary work has since been carried out (July 2019) with sites established and sampling planned in conjunction with the summer low-flow survey.

3.6.5 Alterations to monitoring programmes for 2019-2020

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.

It is proposed that for 2019-2020, monitoring of the Manaia WWTP continues at the same level as in 2018-2019, with the addition of water quality investigations upstream of the WWTP discharge in the Manaia Creek.

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 2019-2020.

3.6.6 Recommendations

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the Council investigates aspects of the water quality of Manaia Creek upstream of the WWTP in terms of the source of bacteria in both the stream and coastal waters, during the 2019-2020 period, subject to appropriate flow.

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 7). There are currently no significant industrial wastes being discharged into this system, which services a population of 1,098 (measured in 2013). The nearby York Street pumping station has provision for river overflow via a separate outfall in the event of emergencies.



Photo 7 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, and is also monitored at nearby Patea beach at three-yearly intervals as a component of the coastal state of the environment programme. The latter was last monitored in the 2018-2019 period.

4.2 Inspections

23 August 2018

Influent to Pond 1 was estimated at 15 L/s. Ponds 1 and 2 were pale green and relatively clear. No floatables were observed on the surface of either pond. Over 40 mallard ducks were present. Odour was mild and only slightly noticeable.

The final pond was pale green and relatively clear. The treated discharge flow rate was estimated at 10-15 L/s with no significant visual environmental impacts observed at the outlet into the Patea River. The WWTP surrounds and facilities were found to be satisfactory. No odour issues were noted.

There was no evidence of any recent overflow discharge into the Patea River from the emergency outfall. The lower pump station was operating to pump wastewater to the WWTP.

24 January 2019

Influent was flowing at the time of the inspection. The pond was light green with no floatables visible on the pond surface. Approximately 30 mallard ducks were present.

The final pond was a pale green/blue colour and relatively clear. *Daphnia magna* (water fleas) were noticeably abundant. Work was being undertaken to repair a leak around the sump. The treated discharge flow rate was estimated at 12 L/s and no visual environmental impact was observed at the outlet into the Patea River.

There were no odour issues noted at the time of the inspection.

22 May 2019

The influent flow rate was estimated at 6 L/s. Ponds 1 and 2 were dark green and slightly turbid. No floatables were observed on the pond surface. There were in excess of 500 mallard and teal ducks present, along with three spoonbills.

The final pond was dark green and slightly turbid. Repairs to the outlet sump had been completed and all leakage was now contained. The treated discharge flow rate was estimated at 6 L/s with no visual environmental impact noted at the outlet into the Patea River. The river was running at a moderately slow flow, and was slightly turbid brown in colour.

No odour was noted around the WWTP perimeter. The WWTP surrounds & facilities, including the York St pump station and emergency outfall, were found to be satisfactory.

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 2007-2008 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.

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 2014-2015 Annual Report (TRC, 2015), and the issues pertaining to these events have been satisfactorily addressed by the consent holder. One overflow event occurred during the 2018-2019 monitoring year, on 1 April 2019. This was due to excessive ingress of

stormwater following localised heavy rainfall. The overflow lasted approximately 45 minutes with an estimated 6 m³ of material discharged. STDC immediately notified the Council and TDHB, and installed warning signage in the vicinity as per consent conditions.

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 (NH₃), and ammonia-N (NH₄). The results of these surveys are presented in Table 16.

Table 16 Results of effluent monitoring for the Patea WWTP

Site		OXPO08001		
Date/time		24 Jan 2019	22 May 2019	2000-2018 Range
Parameter	Unit	09:40	10:15	
BOD	g/m ³	8	-	9.1-31
BODF	g/m ³	3	-	1.0-15
Conductivity	mS/m@25°C	76.1	62.3	-
DO (concentration)	g/m ³	4.7	11.7	1.1-14.8
DO (saturation)	%	54.5	111	12-165
<i>E. coli</i>	/100ml	465	900	16-15,500
pH	pH	8.1	-	8.1-10.1
SS	g/m ³	12	-	13-150
Turbidity	NTU	14.1	39	6.5-240
Temperature	°C	21.6	13.0	10.4-25.8
Nutrient Analyses				
NH ₄	g/m ³ N	2.3	-	0.025-4.09
DRP	g/m ³ P	1.65	-	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. Variability in the pond's microfloral population (section 4.3.2) contributes to variation in effluent bacterial quality over the period.

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.

Table 17 Dissolved oxygen measurements from the Patea WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m ³)	Saturation (%)
23 August 2018	10:30	11.7	4.2	39
24 January 2019	09:40	21.6	4.7	55
22 May 2019	10:15	13.0	11.7	111

Results indicate a wide range of dissolved oxygen concentrations (between 39% and 111% saturation) in the surface layer of the final cell near the outlet. This was typical of the results generally recorded in this oxidation pond with supersaturation recorded around 30% of the time.

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 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 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 2000-mid 2018	
				Range	Median
23 August 2018	10:30	Relatively clear, pale brown	2.8	1.7-628	305
24 January 2019	09:40	Slightly turbid, green/blue	20		
22 May 2019	10:15	Slightly turbid, dark green	810		

Very low chlorophyll-a levels were recorded in the winter sample in August 2018, coincident with a low dissolved oxygen saturation of 39%. The levels increased into summer and then were very high (the maximum recorded to date) in late autumn, which was indicative of good microfloral populations in the final pond, consistent with visual observations, in this under-loaded system.

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 3). Chemical sampling was carried out on two occasions during the 2018-2019 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 20 separate occasions between early November 2018 and late March 2019 (TRC, 2019). The sampling sites are detailed in Table 19 and shown in Figure 3.

Table 19 Sampling site locations for the Patea WWTP

Site code	Location	Site
PAT000970	SH3 bridge, approx. 1 km upstream of WWTP	Patea River
PAT000975	Approx. 500 m downstream of SH3 bridge; downstream of emergency overflow	Patea River
OXPO08001	Outlet of the Patea WWTP final cell	Effluent
PAT000985	Approx. 200 m downstream of WWTP discharge	Patea River
PAT000995	Boat ramp (approx. 0.6 km 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 24 January and 22 May 2019 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, and results are displayed in Table 20.

The January 2019 survey was carried out under summer low flow (well below median) conditions (as measured at McColl's bridge). The discharge from the outfall was estimated at 12 L/s at the time. High conductivity values indicated saline penetration, most obvious at the lower river sites. A relatively narrow range of enterococci bacteria numbers were recorded at all four sites, with levels above the discharge being higher than those recorded below. *E. coli* however, already at fairly high levels above the discharge, increased dramatically below the discharge (from 343/100 ml upstream to 2,420/100 ml below the discharge). This was in excess of double the historical range for this site.

The May 2019 survey was also carried during a fairly low flow (as measured at McColl's bridge). The results indicated some saltwater penetration in the stream, again most obviously at the lower sites. Bacterial water quality was relatively good in the river, and comparable to past results from a similar time of year. There was a significant decrease in bacterial levels in the downstream sites which is likely attributed to a dilution effect from seawater.



Figure 3 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		24 Jan 2019	22 May 2019	2000-2018 Range	24 Jan 2019	22 May 2019	2000-2018 Range	24 Jan 2019	22 May 2019	2000-2018 Range	24 Jan 2019	22 May 2019	2000-2018 Range
Parameter	Unit	09:15	09:40		09:25	10:00		09:50	10:45		10:20	11:00	
BOD (total)	g/m ³	<0.8	-		<2.0	-		<0.8	-		<2	-	
Chloride	g/m ³	2,900	-		6,100	-		19,100	-		19,800	-	
Conductivity	mS/m @25°C	965	140	-	1,812	815	-	5,150	2,570	-	5,350	5,170	-
<i>E. coli</i> *	/100ml	156	40	31-1,200	343	50	51-1,200	2,420	20	<10-1,000	435	6	<1-1,200
Enterococci*	/100ml	44	20	12-500	46	10	11-1,700	40	40	13-830	<10	7	<1-20,000
Ammoniacal-N	g/m ³	0.038	-		0.038	-		<0.100	-		0.046	-	
DRP	g/m ³	0.010	-		<0.04	-		<0.04	-		<0.04	--	
pH	pH	7.9	-		8.0	-		8.2	-		8.2	-	
Turbidity	NTU	35	8.3	3.2-120	24	7.9	3.8-200	129	11.5	3.8-140	58	22	3.1-260
Temperature	°C	21.9	13.3	9.5-24.3	21.0	13.5	9.5-24.6	20.5	13.7	9.8-24.9	20.0	14.9	10.0-24.5

(* previously measured as faecal coliforms)

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 100 ml, and an 'Action' limit of 550 per 100 ml (MfE, 2003). For marine waters, the recommended indicator is enterococci, with a single sample 'Alert' limit of 140 cfu per 100 ml, and an 'Action' limit of 280 cfu per 100 ml. There are two areas nearby the WWTP discharge commonly used for contact recreational purposes, one at the Patea Boat Ramp (PAT000995, Photo 8) 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 also integrated with the Council's state of the environment contact recreational bacteriological monitoring programme. Another site at Patea Beach (SEA907020) is included at three-yearly intervals in the Council's recreational monitoring programme and was also surveyed in the 2018-2019 monitoring period.

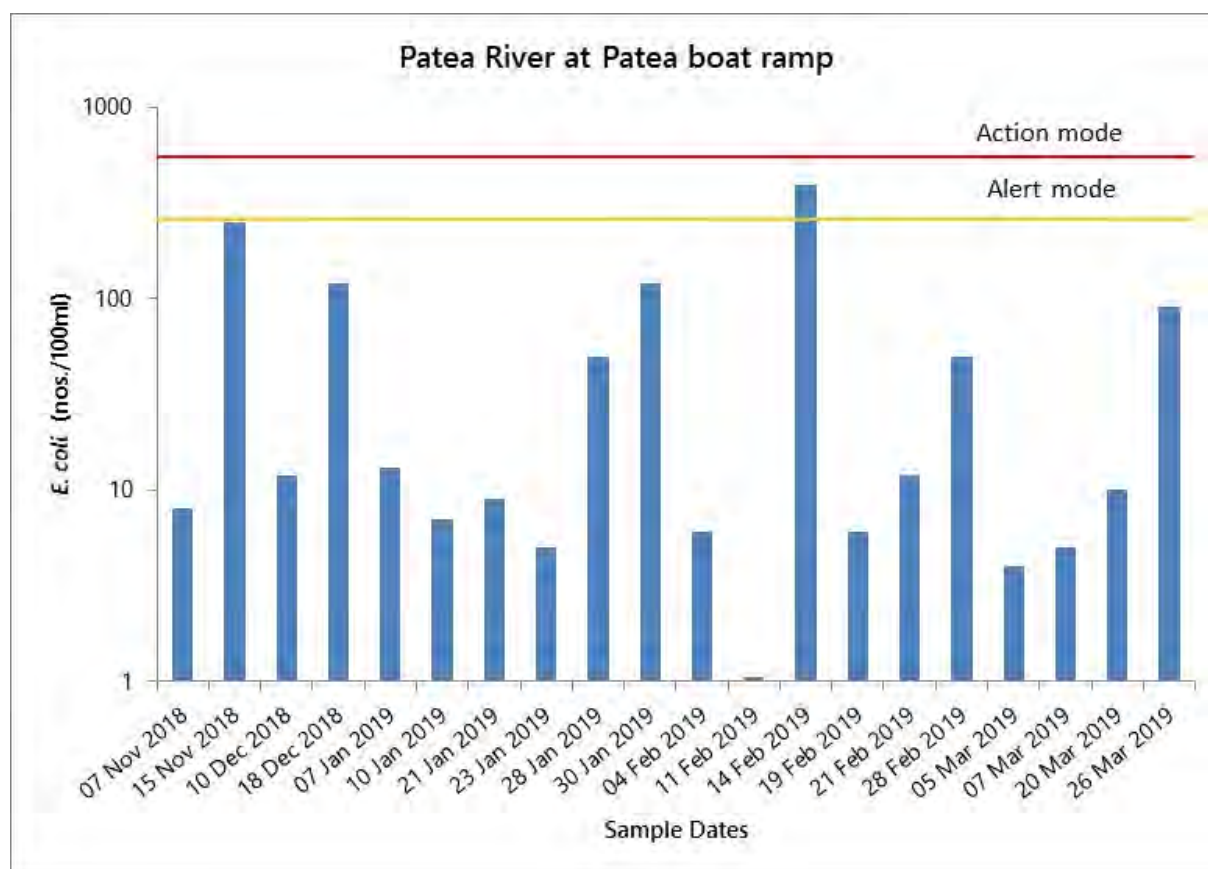
Sampling at the three sites during the summer monitoring period occurred between early November 2018 and late March 2019. It was concentrated on high tide conditions (13 samples), but also included low tide conditions on seven other occasions at the boat ramp and Mana Bay sites. The results are summarised in Tables 21, 22 and 23, and illustrated in Figures 4, 5 and 6.



Photo 8 View of Patea boat ramp sampling site

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

Parameter	Unit	Number of samples	Minimum	Maximum	Median	Medians	
						HT	LT
Conductivity	µS/cm@25°C	20	743	54,600	53,750	53,900	12,680
<i>E. coli</i>	/100ml	20	<1	390	11	7	120
Enterococci	/100ml	19	<1	54	5	5	21
Turbidity	NTU	20	2.3	33	13	17	11
Temperature	°C	20	15.9	24.3	20.6	20.5	21.4

Figure 4 *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 'Alert' limit on one occasion in February 2019, this occurred during a low tide run when there was the least dilution available. The 'Alert' limit was close to being reached on 15 November 2018 and this was also found in a low tide sample. These data were indicative of relatively good bacteriological water quality conditions and within the expected range for this site. No bathing activity was noted during the 2018-2019 period at this site, which was 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 2011-2012 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

Parameter	Unit	Number of samples	Minimum	Maximum	Median	Medians	
						HT	LT
Conductivity	$\mu\text{S}/\text{cm}@25^\circ\text{C}$	20	9,000	54,800	53,800	54,200	21,800
<i>E. coli</i>	/100ml	20	<1	600	14	9	90
Enterococci	/100ml	19	1	58	10	7	26
Turbidity	NTU	20	1	47	20	23	10
Temperature	$^\circ\text{C}$	20	16.5	24.1	20.8	20.7	21.2

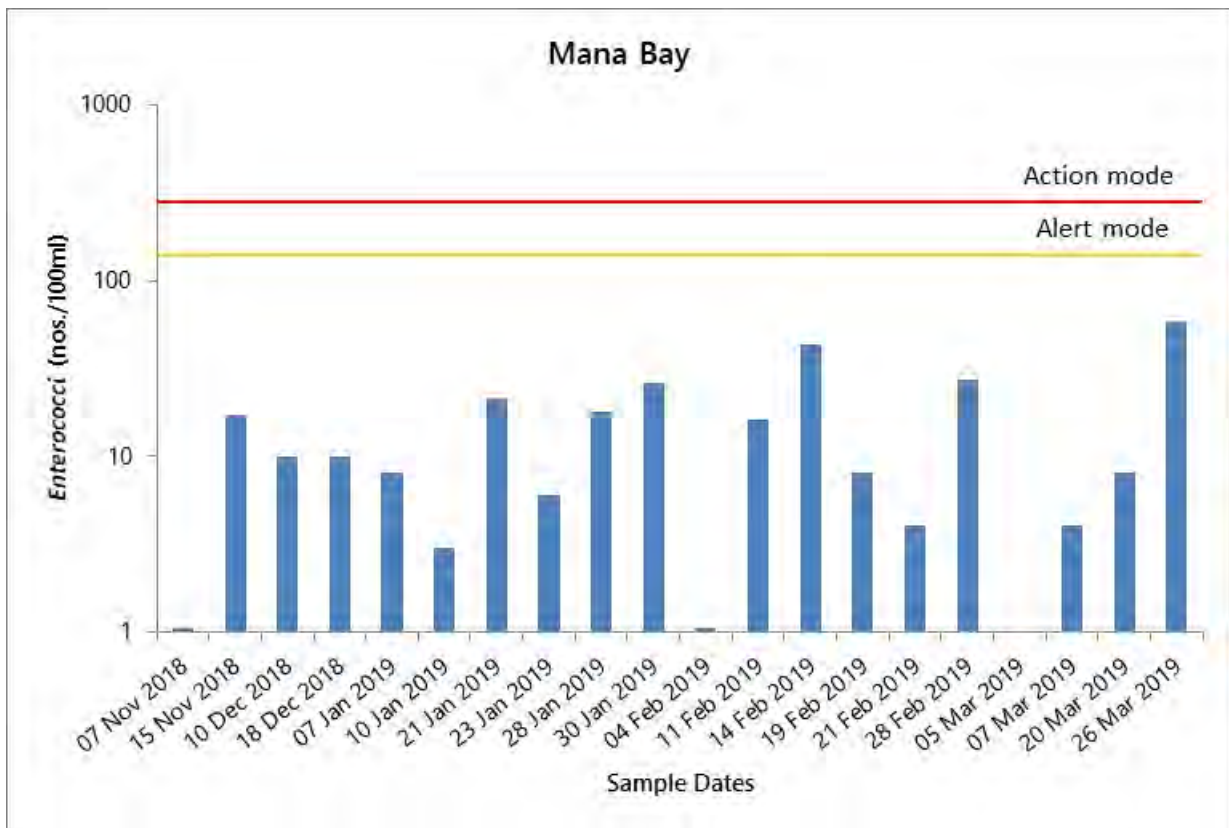


Figure 5 Enterococci numbers for Mana Bay

Water quality at Mana Bay was high throughout the season, with all samples well below the 'Alert' level guideline. (Figure 5).

Table 23 Summary of results for Patea Beach

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity	$\mu\text{S}/\text{cm}@25^\circ\text{C}$	13	53,400	54,200	54,200
Enterococci	/100ml	13	<1	80	4
Temperature	$^\circ\text{C}$	13	16.5	23.2	20.8

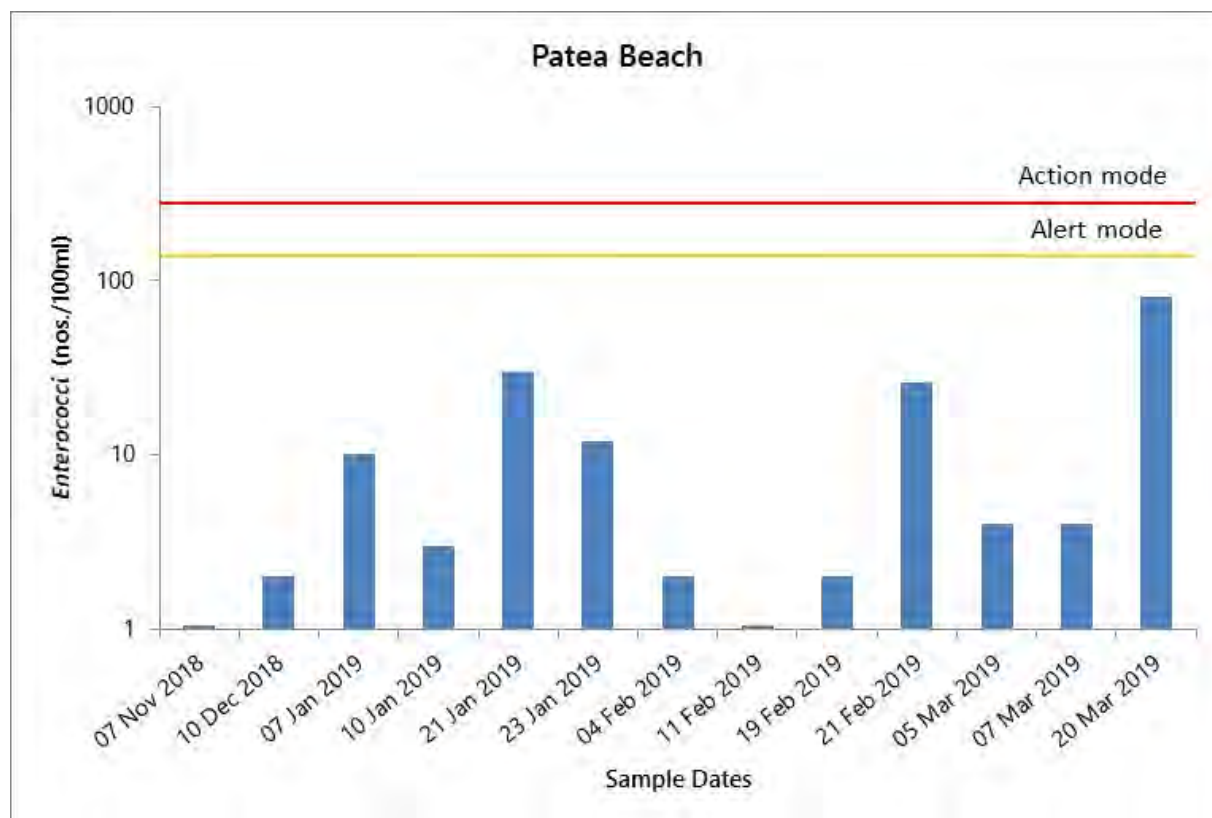


Figure 6 Enterococci numbers for Patea Beach

Water quality at Patea Beach was high throughout the season, with all results well below the 'Alert' mode (Figure 6).

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 2018-2019 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.

The pond has typically supported good algal communities, however, chlorophyll-a concentrations were very low in the spring and mid-summer samples. This may be attributed to seasonal variability with good microfloral communities present near the end of the monitoring year.

One short-duration overflow discharge of sewage (approximately 6 m³ over 70 minutes) was recorded during the monitoring period, when heavy rainfall from a passing front caused inflow of storm water to the sewers. The upgrades to the pump station alarm system in conjunction with increased storage facilities has reduced the frequency and duration of overflow events, with no overflows recorded during or following wet weather conditions during six of the fifteen monitoring periods (mid 2004 to mid-2019), and the remainder have had been very short duration since these upgrades.

4.6.2 Environmental effects of exercise of consents

No significant impacts associated with the discharges were measured on the bacteriological quality of the lower reaches of the Patea River. The effect of the WWTP's discharge has generally been limited to occasional small rises in bacteria numbers 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 600 m downstream usually similar to that measured upstream of the discharge at SH3 bridge. Minimal impacts were measured during the 2018-2019 monitoring period, continuing the good performance shown during the previous period.

More intensive monitoring of the Boat Ramp, Mana Bay and Patea Beach sites during the summer contact recreational period found that, with the exception of one sample which entered 'Alert' mode, bacterial numbers were below the MfE/MoH's 2003 Recreational Water Quality Guidelines.

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, 25, and 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

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?
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	Provision of plan by consent holder	Yes
7. Provision of operator	Liaison with consent holder	Yes
8. Maintenance of aerobic pond condition	Inspections, sampling and reporting	Yes
9. Trade wastes connections	Liaison with consent holder	Yes
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	Next optional review scheduled in June 2022	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 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	Inspection and chemical sampling	Yes
2. Exercise in accordance with documentation	Liaison with consent holder	Yes
3. Provision of contingency plan	Reporting by consent holder	Yes
4. Rip rap upgrade requirements	Inspections	Yes
5. Provision for mitigation works with excessive overflow events	One overflow reported – approximately 6 m ³ from the York St pump station in April 2019	N/A
6. Limits upon reasons for discharge	Liaison with consent holder	Yes

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?
7. Discharge shall not occur during pump station maintenance	Discharge occurred during extreme weather event only	Yes
8. Discharge shall not exceed 4 hrs duration when practicable	Liaison with consent holder – duration less than 70 minutes	Yes
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	Notification received	Yes
12. Overflow recording requirements	Records supplied by STDC	Yes
13. Provision of signage following overflow discharge events	Liaison with consent holder – signage displayed	Yes
14. Notification to Taranaki Healthcare following discharge	Notification received	Yes
15. Triennial meetings	Liaison with consent holder and submitters	Yes
16. Receiving water monitoring	Additional monitoring not required	N/A
17. Lapse condition	Consent renewed	N/A
18. Optional review of consent	Next review June 2022	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 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	No recent works undertaken	N/A
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

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?
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 works undertaken	N/A
8. Requirement for fish passage	Inspection	Yes
9. Requirements for signage during work	No recent works undertaken	N/A
10. Removal and reinstatement requirements	Structures still in use	N/A
11. Lapse condition	Consent exercised	N/A
12. Optional review of consent	Next option for review in June 2022	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 Section 1.1.4.

4.6.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, 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 2019-2020

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.

It is proposed that for 2019-2020, monitoring of the Patea WWTP and emergency outfall continues at the same level as in 2018-2019.

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 2019-2020.

4.6.6 Recommendations

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, 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 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 900 in 2013) with a small industrial waste (sawmill) component.

It previously received wastes from the stock truck facility on SH3 sited approximately 2 km 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 2006-2007 period.

The WWTP system was reconfigured during the 2008-2009 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 (Photo 9). '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 5000 cubic metres 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 2012-2013 period, which has associated telemetry alarming.



Photo 9 Waverley WWTP

5.1 Inspections

7 September 2018

The step screen was operating and wastes were fully contained. The influent flow rate was estimated at 4 L/s. The ponds were relatively clear with a light green/brown colour. No wildlife were on the ponds surface during the inspection. There was a slightly noticeable odour downwind of the ponds. Water fleas observed to be abundant. The WWTP outlet discharge flow rate was estimated at 5 L/s with no visual environmental impact on the Wairoa Stream observed. There was a hole in the waveband wall near the pond inlet that was progressively being undermined via wave action and it was noted that this required urgent attention.

The stock truck disposal facility was relatively tidy, although there were some debris (broken pallets and plastic) floating on the middle pond that required removal. All ponds were full and a yellow/brown colour. No discharge was occurring at the time of inspection. Minimal odour was noted.

29 January 2019

An inspection was carried out in fine weather with a light westerly wind. The step screen wastes were fully contained with no noticeable odour noted around this area. The influent flow was estimated at 2.5 L/s. The ponds were dark green and turbid. Discharge was estimated at 1.5 L/s. Wildlife on both ponds consisted of three black swans. The summer low flow water quality sampling was undertaken at various sites upstream and downstream of the oxidation pond discharge and no visual environmental effects were observed at any of the monitoring sites.

The stock truck disposal facility was found to be reasonably tidy although, as noted in the previous inspection, rubbish and debris were floating on the first pond and this required removal. There was a noticeable but not significant odour.

1 May 2019

The step screen had been removed for maintenance. Influent flow rate was estimated at 3 L/s. There was a mild but noticeable odour around the pond inlet and step screen areas. Both ponds were a turbid green/brown and no wildlife were observed on either pond. No noticeable odours were noted around the ponds perimeter. The discharge flow rate was estimated at 1.5 L/s and this was causing a minor visual impact in the unnamed tributary of the Wairoa Stream. Repairs to the hole in the waveband wall had been carried out (Photo 10).

The stock truck disposal was relatively tidy. All three ponds were full but not discharging to land. Floating debris was again observed in the first pond. Minimal odour was noted.



Photo 10 Repairs to Waverley WWTP wave band, April 2019

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 (NH₃ and NH₄), 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.

Table 27 Results of summer effluent monitoring for the Waverley WWTP

Site		OXPO02005	
Date/time		29 Jan 2019	2000-2018 Range
Parameter	Unit	08:50	
Flow	L/s	1.5	0.14-8.0
BOD	g/m ³	16	11-66
BODCF	g/m ³	6	3.9-14
Chloride	g/m ³	61	47.9-75.6
Conductivity	mS/m@25°C	60.8	43.3-68.7
DO (concentration)	g/m ³	5.2	0.9-21
DO (saturation)	%	62	10-227
<i>E. coli</i> *	/100ml	4,110	11,000-82,000
pH	pH	8.1	7.7-9.5
SS	g/m ³	35	11-220
Turbidity	NTU	20	9.4-210
Temperature	°C	23.7	8.2-26.0
Nutrient Analyses			
NH ₃	g/m ³	0.34	0.0114-0.5456
NH ₄	g/m ³ N	6.0	0.100-26.2
DRP	g/m ³ P	3.9	1.52-7.98

(* previous results measured as either faecal coliforms or *E. coli*)

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 BOD₅ concentration, and in the absence of the disposal of stock truck or any other significant industrial wastes to the system.

E. coli bacteria were the lowest recorded since 2000, well below half of the previous minimum of 11,000. Nutrients were moderately low compared to historical results.

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.

Results indicated a relatively wide range of dissolved oxygen concentrations (between 52% and 150% saturation) in the surface layer of the primary pond near the outlet.

Table 28 Dissolved oxygen measurements from the Waverley WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m ³)	Saturation (%)
7 September 2018	09:45	9.6	5.9	52
29 January 2019	08:50	23.7	5.2	62
1 May 2019	09:45	13.8	15.7	150

STDC also undertook approximately weekly sampling for DO, with 94% (48 out of 51) of the samples above 0 g/m³ (minimum was 0, maximum 21 and average 7 g/m³). The consent limit applies to a 24-hour period but these results show that the consent condition was generally complied with.

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 2000-mid 2018	
				Range	Median
7 September 2018	09:45	Relatively clear, pale green/brown	54	58 -1,100	372
29 January 2019	08:50	Turbid, dark green/brown	30		
1 May 2019	09:45	Turbid, green/brown	98		

Low levels of chlorophyll-a were recorded in the primary pond during the period under review, with the September and January results both lower than the minimum recorded to date.

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 7 below.

Table 30 Sampling sites for Waverley WWTP

Site code	Location	Site
WRO000069	Upstream of confluence with WWTP discharge	Unnamed trib. of Wairoa Stream
OXPO02005	At outfall to stream	Effluent
WRO000077	Approx. 400 m downstream of WWTP discharge (Waverley Beach Rd)	Unnamed trib. of Wairoa Stream
WRO000150	Outlet of Ihupuku Swap, approx. 3 km d/s of WWTP discharge (Beach Rd)	Wairoa Stream



Figure 7 Aerial location map of sampling sites in relation to Waverley WWTP

5.3.1 Low flow receiving water survey of January 2019

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 29 January 2019. Results of the survey are displayed in Table 31.

A moderate discharge rate of 1.5 L/s was measured from the pond discharge at the time of the survey. The receiving water flow measured upstream of the discharge in the adjacent contributing watercourse was also fairly low at 12 L/s. Flow measurements at the time of the survey indicated an instantaneous effluent dilution ratio of around 8:1 in the receiving waters.

Upstream water quality (at site WRO000069) was generally good, with a dissolved oxygen saturation of 91%, and a relatively low level of dissolved reactive phosphorus and filtered BOD₅, although there was a moderately high level of ammonia-N nutrients. There was also an elevated *E. coli* bacteria count upstream, indicative of possible stock and/or wildlife access upstream.

Table 31 Low flow receiving water results January 2019

Site		WRO000069		WRO000077		WRO000150	
Date/time		29 Jan 2019	2000-2018 Range	29 Jan 2019	2000-2018 Range	26 Jan 2019	2000-2018 Range
Parameter	Unit	08:45		09:45		10:15	
Flow	L/s	12	6-23	23	12-34	-	-
Black disc	m	2.33	0.46-1.66	0.79	0.41-1.30	1.20	0.74-1.45
BOD	g/m ³	0.9	<0.5-2.8	2.6	0.7-4.2	0.9	<0.5-1.4
BODCF	g/m ³	< 2	<0.5-0.8	< 2	<0.5-0.5	< 2	<0.5-0.6
Chloride	g/m ³	37	26.4-38.0	38	27.7-41.7	37	29.8-52.7
Conductivity	mS/m@25°C	33.9	24.0-30.5	36.9	25.7-34.1	33.5	24.3-30.7
DO (concentration)	g/m ³	8.8	9.0-9.9	6.6	4.0-8.8	2.1	2.3-4.9
DO (saturation)	%	91	93-97	68	40-91	23	24-48
<i>E. coli</i> *	/100ml	411	160-4,700	> 2,420	100-4,200	613	52-3,500
pH	pH	7.6	7.5-8.0	7.6	7.2-7.7	7.3	7.2-7.4
SS	g/m ³	< 3	4.0-35	10	4.0-32	6	5.0-27
Turbidity	NTU	1.5	2.6-20	6.4	1.8-23	3.0	2.3-15
Temperature	°C	16.5	13.0-17.7	17.2	13.4-17.9	19.2	13.3-20.7
Nutrient Analyses							
NH ₃	g/m ³	0.00023	0.00044-0.00697	0.00059	0.00032-0.00218	<0.00008	0.00007-0.00023
NH ₄	g/m ³ N	0.018	<0.003-0.314	0.045	0.019-0.249	< 0.010	0.003-0.030
DRP	g/m ³ P	0.006	<0.003-0.033	0.185	0.054-0.455	0.047	0.024-0.064

(* previously measured as faecal coliforms)

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 chloride, conductivity, DRP, suspended solids, biochemical oxygen demand and ammonia concentrations. There was a 34% decrease in dissolved oxygen saturation. *E. coli* bacteria increased significantly, with a moderately high level in the discharge. Visual impacts were noticeable, with turbidity increasing significantly, 376% which was well above the 50% increase allowed by the consent. The black disc reading also decreased significantly.

The water quality measured at the furthest downstream site (site WRO000150), after approximately 3 km 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. However, 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), in terms of decreases in chloride, conductivity, suspended solids, turbidity, *E. coli*, and nutrient concentrations (particularly ammoniacal nitrogen) following filtration and nutrient uptake by wetland vegetation. Black disc visibility was slightly improved but still only around half that of the upstream 'control' site.

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 2018-2019 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. There were no instances of large areas of scum development recorded or reported as had occasionally been the case in the past.

Rubbish and debris were noted floating in the first pond at the stock truck disposal facility during all inspections.

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, and there was no localised foaming within the mixing zone of the receiving waters.

The discharge rate recorded during the summer receiving water survey was low, which ensured that 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, mainly in relation to increases in turbidity and *E. coli* and significant decreases in dissolved oxygen saturation and black disc measurement. 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.

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 – one exceedance of 450 m ³ limit (496 m ³) 99% 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	Yes
7. Limits on effects in receiving waters	Inspections and sampling	Yes
8. Turbidity not to increase by more than 50% in receiving waters	Sampling	No – increase was 327% (only one sample collected)
9. SAS report requirements	Report received	Yes
10. WOAR report requirements	Due January 2020	N/A
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	Optional review scheduled June 2020, recommendation attached	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 and sampling	Yes
3. Minimisation of effects	Inspections and sampling	Yes
4. Operation and maintenance requirements	Inspections	Yes
5. Optional review provision	No further provision 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 Section 1.1.4.

5.5.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 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 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, 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 any additional investigations or interventions.

5.5.5 Alterations to monitoring programmes for 2019-2020

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.

It is proposed that for 2019-2020, monitoring of the Waverley WWTP and stock truck wastes disposal is altered to include biological monitoring. It is proposed that macroinvertebrate surveys are carried out once in spring and once in summer at four sites in the unnamed tributary of the Wairoa Stream. It is also proposed that an additional water quality site WRO0000073, which is 50 m downstream of the pond discharge, is added to the summer low flow survey. As discussed in section 5.5.6 below, the current mixing zone is considered to be too long and it is proposed that this will be changed to a more appropriate length when the consent is renewed in June 2022. Site WRO0000073 would be below the proposed new mixing zone and is one of the sites where macroinvertebrate data is now being collected.

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 2019-2020.

5.5.6 Exercise of optional review of consent

Resource consent 0072-3 provides for an optional review of the consent in June 2020. Condition 15 allows the Council to review the consent, for the purpose of ensuring that the conditions are adequate to deal with an adverse effects on the environment.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that changes to the consent conditions are required, particularly in relation to the mixing zone which is currently set at 400 m. A rule of thumb, mixing zones are set at approximately ten times the width of the stream and the stream which the effluent is discharged to is very small (less than 1 m wide). It is considered that a mixing zone of 20 m would be more suitable. As the consent is due for renewal in June 2022 it is sensible to address this issue at that time.

5.5.7 Recommendations

1. THAT in the first instance monitoring of consented activities at Waverley WWTP and stock truck wastes disposal in the 2019-2020 year be altered from 2018-2019 to include spring and summer macroinvertebrate surveys at four sites in the unnamed tributary of the Wairoa Stream, and an additional water quality sampling point 50 m downstream of the discharge.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 0072-3 in June 2020, as set out in condition 15 of the consent, not be exercised, on the grounds that although it is considered that the current conditions require some changes, this can be undertaken when the consent is renewed in June 2022.

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 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, 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 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the Council investigates aspects of the water quality of Manaia Creek upstream of the WWTP in terms of the source of bacteria in both the stream and coastal waters, during the 2019-2020 period, subject to appropriate flow.

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 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, 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 2019-2020 year be altered from 2018-2019 to include spring and summer macroinvertebrate surveys at four sites in the unnamed tributary of the Wairoa Stream, and an additional water sample is collected from site WRO000073 during the summer low flow survey.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 0072-3 in June 2020, as set out in condition 15 of the consent, not be exercised, on the grounds that although it is considered that the current conditions require some changes, this can be undertaken when the consent is renewed in June 2022.

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.
<i>E. coli</i>	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	<i>Resource Management Act 1991</i> 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 Science Services Manager.

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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)

Consent number	Purpose	Granted	Review	Expires
<i>Water discharge permits</i>				
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 2022	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 2020	June 2022
0145-2	To discharge untreated municipal sewage in emergencies only into the Coastal Marine Area of the Patea River	July 2007	June 2022	June 2028
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 2023	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 2023	June 2029
<i>Discharges of waste to land</i>				
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
<i>Coastal permit</i>				
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 2022	June 2028

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

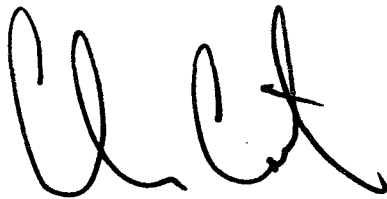
Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national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

COASTAL PERMIT

TRC – Applications: 2752
2753

Pursuant to the provisions of section 119 of the Resource Management Act 1991, I Chris Carter, Minister of Conservation, hereby grant South Taranaki District Council a coastal permit (No. SAR-05-49-04-03) to (i) discharge up to 455 cubic metres per day of treated wastewater; and (ii) discharge untreated wastewater only in emergency situations, to the Patea River, within the coastal marine area, generally in accordance with the application and subject to the attached conditions of consent.

Dated at *Wellington* this *7th* day of *February* 2006

A handwritten signature in black ink, appearing to be 'Chris Carter', written in a cursive style.

Hon Chris Carter

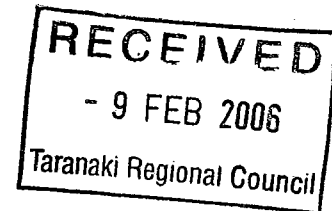
Minister of Conservation



Office of Hon Chris Carter
MP for Te Atatu
Minister of Conservation
Minister of Housing
Minister for Ethnic Affairs

- 7 FEB 2006

Peter Canvin
Consents Manager
Taranaki Regional Council
Private Bag 713
Stratford



Dear Mr Canvin

Attached for your information is a copy of the coastal permit that I have recently granted to South Taranaki District Council to discharge treated and untreated wastewater to the Patea River.

I have made the permit subject to the conditions recommended to me by the Hearing Committee.

My reasons for the decision are that:

- the upgrades are an improvement on the existing treatment system, resulting in a higher quality of effluent, and
- it meets the requirements of the: New Zealand Coastal Policy Statement; Regional Coastal Plan for Taranaki; Regional Policy Statement for Taranaki; relevant provisions of the RMA, including section 104 and Part 2.

Please note that I have advised the applicant and my appointee on the Hearing Committee, Mr Richard Heerdegen, of my decision. I understand you will be notifying other interested parties of my decision in line with the provisions of section 119A(b) and section 114 of the Resource Management Act 1991.

Yours sincerely

Hon Chris Carter MP
Minister of Conservation

Encl.

Marine Area, in respect of the matters considered under section 104 of the Resource Management Act 1991 as follows:

- *Application 2752 [to renew and change consent 0067]: To discharge treated municipal wastewater from the Patea Wastewater Treatment Plant into the coastal marine area of the Patea River;*
- *Application 2753 [to renew and change consent 0145]: To discharge untreated municipal sewage in emergencies only into the coastal marine area of the Patea River.*

10. The Hearing Committee resolved to recommend to the Minister of Conservation that the consents be granted and all members of the Committee supported the recommendations.
11. Pursuant to section 118 of the Resource Management Act 1991, the Committee's reasons for its recommendations are that:
 - a) It accepts the assessment of the application given in the Taranaki Regional Council's officer's report; and
 - b) Monitoring will continue to be undertaken by the Taranaki Regional Council to ensure that there are no significant adverse effects on the environment as a result of the exercise of this consent, should it be granted.

Recommendation of the Hearing Committee

13. The Hearing Committee recommends that the Minister of Conservation approves application 2752, to discharge treated municipal wastewater from the Patea Wastewater Treatment Plant into the coastal marine area of the Patea River, be submitted to the Minister of Conservation for approval for a period to 1 June 2028, with provision for review in June 2010 and/or June 2016 and/or June 2022, subject to the policies and conditions of the Taranaki Regional Council, including the following general conditions and special conditions:

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 wastewater treatment systems shall be upgraded, substantially in accordance with recommended Option 3 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 two years from the date of grant of this consent.
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.
 14. The Hearing Committee recommends that application 2753, to discharge untreated municipal sewage in emergencies only into the coastal marine area of the Patea River, be submitted to the Minister of Conservation for approval for a period to 1 June 2028, with provision for review in June 2010 and/or June 2016 and/or June 2022, subject to the policies and conditions of the Taranaki Regional Council, including the following general conditions and special conditions:

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 on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 2753. In the case of any contradiction between the documentation submitted in support of application 2753 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall prepare and maintain a contingency plan, to the satisfaction of the Chief Executive, Taranaki Regional Council, detailing action to be taken in the event of accidental spillage or discharge of contaminants, the initial plan to be provided no later than three months prior to the exercise of this consent.
4. In addition to the existing outfall, rip rap shall be installed adjacent to the river bank which shall be adequately maintained and cleared following any discharge authorised under this permit. The outfall upgrade shall be completed no later than two years from the date of issue of this consent.
5. If the frequency of overflows exceeds one per year, the consent holder shall implement works for reducing the frequency and mitigate the effects of such overflows by way of:
 - increasing the capacity of the pipe leading from the pump[s] to the rising main;
 - duplication of the rising main between the pump station and the oxidation pond system; and/or
 - additional storage available for treated wastewater.
6. The intermittent discharge of wastewater into the Patea River shall only occur when:
 - i. storm and groundwater inflows to the system is such that the capacity of the wastewater treated system pump station is exceeded; and/or
 - ii. pump or power failure at the pump station occurs.
7. The intermittent discharge of wastewater into the Patea River shall not occur during routine maintenance of the pump station.
8. The consent holder shall ensure that, whenever practicable, the duration of the discharge authorised by this consent shall not exceed four hours.
9. The consent holder shall install and constantly monitor an alarm system to the satisfaction of the Chief Executive, Taranaki Regional Council. The alarm shall operate when the duty pump fails to cope with the inflow.

10. The consent holder shall inspect the installation regularly and at least once per week shall check that the alarm is operative and the electrical equipment is in good working order.
11. The consent holder shall immediately notify the Chief Executive, Taranaki Regional Council, following any discharge under this permit, including the time, reason[s], and duration of wastewater discharged and remedial measures implemented by the consent holder.
12. The consent holder shall forward a summary of records referred to in special condition 11 no later than 31 July of each year to the Chief Executive, Taranaki Regional Council.
13. The consent holder shall install and maintain suitable signage advising the public of the health risk on each and every occasion that a discharge occurs in terms of this consent. Signage shall be sited at appropriate positions upstream and downstream of the discharge point and at the river mouth, to warn the public of the presence of contaminants in the river.
14. The consent holder shall immediately notify Taranaki Healthcare following any discharge under this permit, in order to enable any measures necessary for the protection of public health to be undertaken.
15. The consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least every three years with interested submitters to the consent to discuss any matter relating to the exercise of this consent.
16. The consent holder shall, in junction with the Taranaki Regional Council, undertake additional chemical, bacteriological and ecological monitoring of the 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.
17. 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.
18. 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.



Approved:
DL Lean
Chairperson
Taranaki Regional Council
Consents and Regulatory Committee and
Chairperson of the Hearing Committee

Date: 28/11/2005.

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

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.

Consent 0067-3

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.

Consent 0067-3

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

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
Chief Executive
Private Bag 902
Hawera 4640

Decision Date: 09 August 2017

Commencement Date: 09 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: 01 June 2022

Review Date(s): June 2018, June 2020

Site Location: South Road, SH 3, Waverley

Grid Reference (NZTM) 1739140E-5596588N

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 at worknotification@trc.govt.nz.
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 $\pm 5\%$, 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:
- the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - any conspicuous change in the colour or visual clarity;
 - any emission of objectionable odour;
 - the rendering of fresh water unsuitable for consumption by farm animals;
 - 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 turbidity 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 1 January 2020, 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:
- 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;
 - Investigate a range of alternative sites, options and/or methods to manage wastewater from the Waverley WWTP;
 - Document consultation initiatives and their outcomes with potentially affected parties, as part of assessing alternative sites, options and methods; and
 - Identify a best practicable long-term option for the treatment and disposal of Waverley wastewater.

Consent 0072-3.1

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 Kiiitahi;
 - 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 m 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 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, and be emailed to consents@trc.govt.nz.
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 09 August 2017

For and on behalf of
Taranaki Regional Council

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

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.

Consent 0861-3

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	0.025gm ⁻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.

Consent 0861-3

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

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

Consent 1204-4

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 m² ;

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].

Consent 1204-4

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.

Consent 1204-4

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

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

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.

Consent 4576-2

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

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]

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 Waiiau [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.

Consent 6621-1

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

Director-Resource Management

