South Taranaki District Council
Kaponga, Manaia, Patea, and Waverley WWTPs Monitoring Programme Annual Report 2017-2018

Technical Report 2018-99

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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 townships[1].

This report for the period July 2017 to June 2018 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess STDC's environmental performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of STDC's activities.

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

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 Patea Coastal Marine Area (Patea).

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

No significant impacts of the Waverley, Manaia, Kaponga, or Patea treatment systems on adjacent receiving waters were recorded during the monitoring period. The increased frequency of bacteriological receiving water surveys in the lower Patea River that was implemented following upgrades to the Patea WWTP effluent and emergency sewage outfall discharges has continued since 2008.

Localised impacts of the Manaia pond discharge on the receiving waters have reduced markedly following the incorporation of wetlands into the treatment system as a component of the upgrade. However, further investigations associated with upstream water quality and bacterial marker source tracking is proposed. There was one consented overflow event related to discharge of partially-treated effluent from the Patea WWTP during the monitoring year, following a wet weather event.

Liaison with the Council is used as a method for evaluating, and thus managing and controlling the introduction of industrial wastes into each of the WWTPs. No significant additional wastes connections were made to any of the systems during the year. The Waverley system no longer receives stock truck wastes from the nearby SH3 roadside facility as these have been directed to an on-site pond treatment system.

There was a single wet weather related overflow of partially treated wastewater from the Patea emergency pump station into the Patea River. Monitoring showed no effect on the receiving environment as a result of this. Recent upgrades to this pump station, including measures taken to reduce the frequency and duration of overflows, have been very successful in reducing overflows, during or subsequent to, wet weather events in recent monitoring years.

Additional biomonitoring of plant performance utilising regular semi-quantitative assessments of ponds' microflora has provided long-term performance information for each system. Generally, diverse algal populations have indicated relatively healthy pond systems with the dominant algal taxa varying both with the location of the pond and the loading on the system. With the establishment of a lengthy historical pond

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

microfloral record for each treatment system, this monitoring has been replaced with chlorophyll-a measurements as a component of inspectorial visits. These measurements indicated good microfloral populations in all pond systems coincidental with positive dissolved oxygen saturation levels with seasonal variability often influenced by stormwater infiltration flushing and/or cooler temperatures.

Overall, high levels of environmental performance and compliance with resource consents were achieved by STDC at each of the four WWTP systems during the monitoring period, with continued improvement in respect of environmental compliance matters at the recently upgraded Manaia treatment system. The Patea WWTP discharge met contact recreational bacteriological standards in the lower Patea River and Mana Bay throughout the summer-autumn period.

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 2017-2018, 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 nine 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 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% 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 generally high level for all consents. This report includes recommendations for the 2018-2019 year.

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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 the Annual Report for the period July 2017 to June 2018 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 included 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 23rd 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 RMA and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by the STDC in the six catchments;
- the nature of the monitoring programmes 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 2018-2019 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 STDC, 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 STDC'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 significant 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 in response to unauthorised incident reports, 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 in response to unauthorised incident reports. 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 in response to unauthorised incident reports. 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 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

1.2 Resource consents

1.2.1 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.

STDC holds water discharge permits **0861-3**(Kaponga WWTP), **1204-4** (Manaia WWTP), **0067-3** and **0145-2** (Patea WWTP and emergency outfall), and **0072-3** (Waverley WWTP) to cover the discharge of treated wastewater to a nearby waterway, or the untreated discharge of wastewater in emergencies only. These permits were issued by the Council under Section 87(e) of the RMA and are discussed in more detail below.

These summaries of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.2.1.1 Kaponga WWTP

STDC holds water discharge permit **0861-3** to discharge up to 500 cubic metres per day of treated wastewater from the Kaponga WWTP into the Kaupokonui Stream. This permit was issued by the Council on 6 June 2007. It is due to expire on 1 June 2029.

Conditions 1 and 2 detail requirements of upgrades to, and operation of, the WWTP.

Condition 3 requires the consent holder to adopt the best practicable option.

Condition 4 sets limits on the daily discharge volume.

Condition 5 details requirements of the management plan.

Condition 6 requires the use of a suitably trained operator.

Condition 7 requires the ponds to be maintained in an aerobic condition during daylight hours.

Condition 8 details requirements around new trade wastes connections to the system.

Condition 9 sets limits on effects on the receiving waters.

Condition 10 details monitoring requirements.

Conditions 11 and 12 set limits on physicochemical effects in the receiving waters.

Conditions 13 and 14 provide for lapse and review.

The permit is attached to this report in Appendix I.

1.2.1.2 Manaia WWTP

STDC holds water discharge permit **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. This permit was issued by the Council on 6 June 2007. It is due to expire on 1 June 2029.

Conditions 1 to 3 detail requirements of upgrades to and operation of the WWTP.

Condition 4 requires the consent holder to adopt the best practicable option.

Condition 5 sets limits on the daily discharge volume.

Condition 6 details requirements of the management plan.

Condition 7 requires the use of a suitably trained operator.

Condition 8 requires the ponds to be maintained in an aerobic condition during daylight hours.

Condition 9 details requirements around new trade wastes connections to the system.

Condition 10 sets limits on effects on the receiving waters.

Condition 11 details monitoring requirements.

Condition 12 details requirements of the infiltration reduction programme.

Conditions 13 and 14 provide for lapse and review.

The permit is attached to this report in Appendix I.

1.2.1.3 Patea WWTP

STDC holds coastal discharge permit **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. This permit was issued by the Council on 9 July 2007. It is due to expire on 1 June 2028.

Conditions 1 to 3 detail requirements of upgrades to, and operation, of the WWTP.

Condition 4 requires the consent holder to adopt the best practicable option.

Condition 5 sets limits on the daily discharge volume.

Condition 6 details requirements of the management plan.

Condition 7 requires the use of a suitably trained operator.

Condition 8 requires the ponds to be maintained in an aerobic condition during daylight hours.

Condition 9 details requirements around new trade wastes connections to the system.

Condition 10 sets limits on effects on the receiving waters.

Condition 11 details monitoring requirements.

Condition 12 details requirements of bacteriological monitoring of receiving water.

Conditions 13 and 14 provide for lapse and review.

The permit is attached to this report in Appendix I.

1.2.1.4 Patea Emergency Overflow

STDC holds coastal discharge permit **0145-2** to discharge untreated municipal sewage in emergencies only into the Coastal Marine Area of the Patea River. This permit was issued by the Council on 9 July 2007. It is due to expire on 1 June 2028.

Conditions 1 to 4 detail requirements of the exercise of this consent and associated contingency plans and structures.

Condition 5 sets limits on overflow frequency and details works required if this limit is exceeded.

Conditions 6 to 8 set limits on the timing and duration of overflows.

Conditions 9 and 10 require the consent holder to install and maintain an overflow alarm system.

Condition 11 relates to overflow notification requirements.

Condition 12 details overflow reporting requirements.

Condition 13 details public signage requirements following overflow events.

Condition 14 details reporting requirements to Taranaki Healthcare following overflows.

Condition 15 sets out requirements for 3-yearly meetings.

Condition 16 details monitoring requirements.

Conditions 17 and 18 provide for lapse and review.

The permit is attached to this report in Appendix I.

1.2.1.5 Waverley WWTP

STDC holds water discharge permit **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. This permit was issued by the Council on 9 August 2017. It is due to expire on 1 June 2022.

Condition 1 sets limits on the daily pond discharge volume.

Condition 2 details notification requirements following discharge exceedances.

Condition 3 sets limits on dissolved oxygen in the pond.

Condition 4 details flow meter requirements.

Condition 5 details requirements for the Operations and Maintenance Management Plan (OMMP).

Conditions 6 to 8 set limits on effects on the receiving waters.

Condition 9 details requirements of the Stream Assimilation Capacity report.

Condition 10 details requirements of the Wastewater Options Assessment Report (WOAR).

Condition 11 details requirements of the Waverley Wastewater Working Party (WWWP).

Condition 12 includes the minimum affected parties for conditions 9 to 11.

Condition 13 details riparian planting requirements for the site.

Condition 14 sets requirements for trade wastes notifications.

Condition 15 provides for lapse and review.

The permit is attached to this report in Appendix I.

1.2.2 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.

STDC holds discharge permit **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. This permit was issued by the Council on 19 September 2005 under Section 87(c) of the RMA. It is due to expire on 1 June 2022.

Condition 1 requires the consent holder to adopt the best practicable option.

Conditions 2 and 3 set limits on effects on the receiving waters.

Condition 4 details requirements of the management plan.

Condition 5 provides for review.

The permit is attached to this report in Appendix I.

1.2.3 Coastal permit (structure)

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.

STDC holds coastal permit **4576-2** to erect, place and maintain an oxidation pond discharge structure and an emergency overflow discharge structure as part of the Patea WWTP within the coastal marine area of the Patea River. This permit was issued by the Council on 16 November 2005 under Section 87(c) of the RMA. It is due to expire on 1 June 2028.

Condition 1 details requirements for notification prior to maintenance works.

Conditions 2 and 3 detail requirements around construction, maintenance, and upgrades to the structures.

Conditions 4 and 5 detail requirements around minimising disturbance from maintenance works.

Condition 6 provides for public access to and along the coastal marine area.

Condition 7 sets limits on the timing of maintenance.

Condition 8 provides for fish passage.

Condition 9 sets limits around signage requirements during maintenance works.

Condition 10 details removal and reinstatement requirements.

Conditions 11 and 12 provide for lapse and review.

The permit is attached to this report in Appendix I.

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;
- providing 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 Kaupokonui River during the spring and late autumn inspections. Samples were analysed for filtered uninhibited biochemical oxygen demand (filtered BOD), pH, turbidity, temperature, unionised ammonia (NH_3), and ammonia-N (NH_4).

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

1.3.3.3 Biomonitoring surveys

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

1.3.4 Manaia WWTP

1.3.4.1 Site inspections

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

1.3.4.2 Chemical sampling

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

The primary oxidation pond was sampled for dissolved oxygen and microfloral component during each of three inspections. During the summer and winter visits, 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 (NH_3), and ammonia-N (NH_4).

1.3.4.3 Biological inspection

A low tide beach ecological inspection was performed on one occasion in early winter 2018 to assess the impact of the discharge on the marine environment.

1.3.5 Patea WWTP and emergency outfall

1.3.5.1 Site inspections

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

1.3.5.2 Chemical sampling

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

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

Contact recreational bacteriological water quality at Patea Boat Ramp and at Mana Bay was monitored by the Council on 22 separate occasions between early November 2017 and early April 2018. The sea 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 (NH_3 and

NH_4), 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 although house inspections and smoke testing to identify faulty/illegal connections are planned for the 2018-2019 period (STDC, 2018).

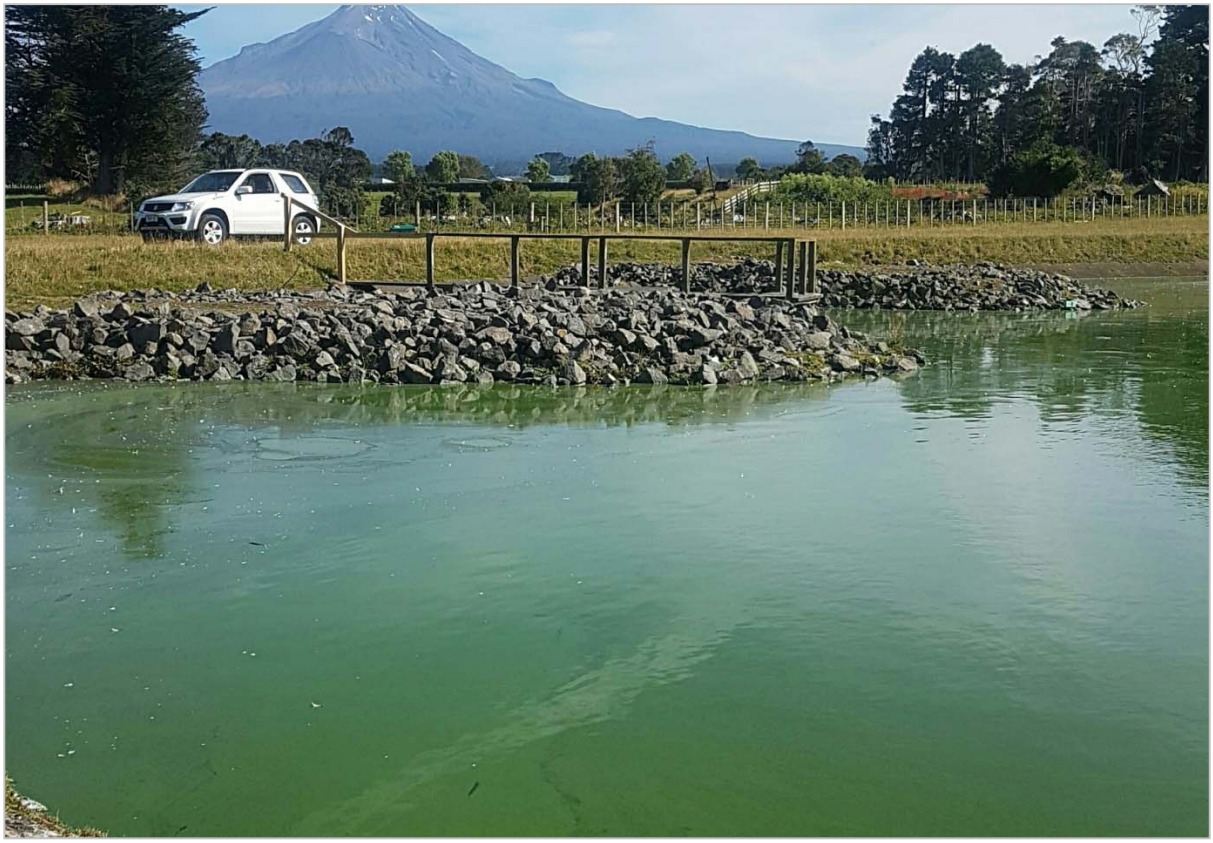

Photo 1 Kaponga WWTP

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.

2.1 Inspections

25 September 2017

An inspection was conducted in fine weather with calm wind conditions. The step screen was operating and wastes were fully contained. The primary pond influent flow was reasonably clear and measured at an

estimated flow rate of 5 L/s. The pond was a pale green colour and relatively clear with a rippled surface. Several wildfowl were noted on the pond surface.

The secondary pond was a pale green colour and relatively clear with a rippled surface. An algal sample was collected for chlorophyll – a analysis, and no birds were observed on the pond surface.

The discharge flow rate into the Kaupokonui River was estimated at 8 L/s, and showed no visual environmental effect on the receiving waters. Samples were collected at two receiving water monitoring sites upstream and downstream of the WWTP discharge. The Kaupokonui River was running at a moderate swift flow - relatively clear and uncoloured. The flow rate at the Glenn Road telemetry site at the time of sampling was estimated at 3.470 m^3/s.

The WWTP surrounds were in a satisfactory condition, with sheep grazing the surrounds. No odours were detected around the boundary of the site.

29 January 2018

An inspection was conducted in fine weather with calm wind conditions. A new step screen had been installed and was operating with wastes fully contained. Contractors were onsite assessing the installation of the screen. The primary pond influent flow was reasonably clear and discharging at an estimated flow rate of 8 L/s.

The secondary pond colour was a light green colour and relatively clear, with a rippled pond surface. No wildlife were observed on the pond, and an algal sample was collected for chlorophyll-a analysis.

The discharge flow rate into the Kaupokonui River was estimated at 10 L/s, and no environmental effect on the receiving waters was noticeable. Samples were collected from the two receiving water monitoring sites upstream and downstream of the WWTP discharge, and the Kaupokonui River was running at a moderately swift flow, below three times the median flow. The river was relatively clear and uncoloured. The flow rate at the Glenn Road telemetry site at the time of sampling was measured at 2.854 m^3/sec.

The WWTP surrounds were found to be satisfactory, with sheep grazing and no odours detected onsite.

12 June 2018

An inspection was conducted in overcast weather with strong southerly wind conditions. The step screen was operating and wastes were fully contained. The primary pond influent flow was a reasonably clear light grey colour, with an estimated flow rate of 4 L/s. The pond was mainly flat, with a relatively clear, pale green colour.

The secondary pond was mainly flat, with a relatively clear, light green colour. An algal sample was collected for chlorophyll-a analysis and approximately 10 mallard ducks were observed on the pond surface.

The discharge flow rate into the Kaupokonui River was estimated at 4 L/s, and showed no noticeable environmental effect on the receiving waters. Samples were collected from the two receiving water monitoring sites upstream and downstream of the WWTP discharge. The river was running at a moderately steady flow, and appeared to be relatively clear and uncoloured. The flow rate at the Glenn Road telemetry site at the time of sampling was measured at 3.163 m^3/s.

The WWTP surrounds were in a satisfactory condition with no odours detected, and sheep were grazing the site at the time of inspection.

2.2 Results of effluent monitoring

Effluent monitoring was carried out in the second section of the oxidation pond, adjacent to the outlet, for the purpose of monitoring the effectiveness of the WWTP up to that point. Along with a visual survey of

each component of the system, dissolved oxygen levels (DO) and the microfloral component of the pond were measured during each inspection. These are discussed in Sections 2.2.1 and 2.2.2 respectively.

The primary pond was sampled for total and filtered BOD, chloride, conductivity, dissolved oxygen, faecal coliform bacteria, pH, suspended solids, turbidity, temperature, dissolved reactive phosphorus (DRP), unionised ammonia (NH_3), ammonia-N (NH_4), and nitrate-nitrite nitrogen (NNN), on one occasion during the summer inspection. The results of this survey are presented in Table 1 and compared with the results from previous monitoring years.

Table 1 Results of summer effluent monitoring for the Kaponga WWTP

Site		**OXP002004**	
Date		**29 Jan 2018**	**2000-2017 Range**
Time		**0730**	
Parameter	**Unit**		
Flow	L/s	10	0.1-15
BOD	g/m^3	16	12-140
BODF	g/m^3	0.7	0.7-5.8
Chloride	g/m^3	26.5	11.9-33.5
Conductivity	mS/m@20°C	17.5	15.5-30.3
DO (concentration)	g/m^3	8.95	1.7-17.6
DO (saturation)	%	101	18-190
E.coli	/100ml	2,400	210-38,000*
pH	pH	9.7	7.4-10.3
SS	g/m^3	105	38-320
Turbidity	NTU	200	30-350
Temp	°C	25.4	6.5-25.4
Nutrient Analyses			
NH_3	g/m^3 N	0.033	0.0102-0.0988
NH_4	g/m^3 N	0.036	0.005-2.090
NNN	g/m^3 N	<0.01	<0.001-0.160
NO_3^-	g/m^3 N	0.004	0.003-0.009
NO_2^-	g/m^3 N	<0.001	<0.001-0.004
DRP	g/m^3 P	1.38	<0.003-6.38

(* indicates 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 2.

Table 2 Dissolved oxygen measurements from the Kaponga WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m^3)	Saturation (%)
25 September 2017	0900	13.8	3.8	37
29 January 2018	0730	25.4	9.0	101
12 June 2018	1015	10.0	5.4	49

Results in Table 2 indicated a relatively wide range of dissolved oxygen concentrations (between 37% and 101% saturation) in the surface layer of the primary pond near the outlet. The occurrence of the supersaturation event in January (101% saturation) is relatively atypical of this oxidation pond (recorded DO readings are typically at their lowest during the summer period). This result is likely attributed to a high level of microbiological activity in the pond due to the under-loaded nature of the WWTP. No mechanical aeration of the pond occurs.

2.2.2 Microfloral component

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/m^3 was necessary to maintain stable facultative conditions). However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 3 together with field observations of pond appearance.

Table 3 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period July 2000 to June 2017	
				Range	Median
25 September 2017	0900	Relatively clear, pale green	2.8	2.8-1,100	397
29 January 2018	0730	Relatively clear, light green	600		
12 June 2018	1015	Relatively clear, light green	0.6		

Despite the wide range of concentrations of chlorophyll-a in the primary pond, most samples showed low concentrations including a new minimum for this pond since records began, observed on 12 June 2018. The lowest algal concentration occurred while dissolved oxygen concentrations were also low (5.4 mg/L), and indicates high stormwater loadings on the pond. The highest levels, recorded during the summer survey, indicated a significant phytoplankton component in the pond.

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

2.3 Results of receiving environment monitoring

Monitoring of the impacts of the Kaponga WWTP on the receiving waters was measured using both chemical analyses of the receiving waters of the Kaupokonui River beyond the boundary of the mixing zone, and biological monitoring surveys at the same locations. Chemical sampling was carried out on three occasions during the 2017-2018 period (Section 2.1.3.1). One biomonitoring survey was conducted during

summer 2018 (Section 2.1.3.2). The locations of sampling sites are listed in Table 4 and displayed in Figure 1 below.

Table 4 Sampling sites for Kaponga WWTP

No.	Location	Description	GPS Reference	Site Code
U	Kaupokonui River	Approximately 250 m upstream of the WWTP discharge	1698609 E 5634423 N	KPK000500
OP	Effluent	Adjacent to outlet of second section of the oxidation pond	1698629 E 5634266 N	OXP002004
D1	Kaupokonui River	50 m downstream of the WWTP discharge	1698548 E 5634263 N	KPK000520
D2	Kaupokonui River	Approximately 1 km downstream of the WWTP discharge	1698497 E 5633456 N	KPK000550

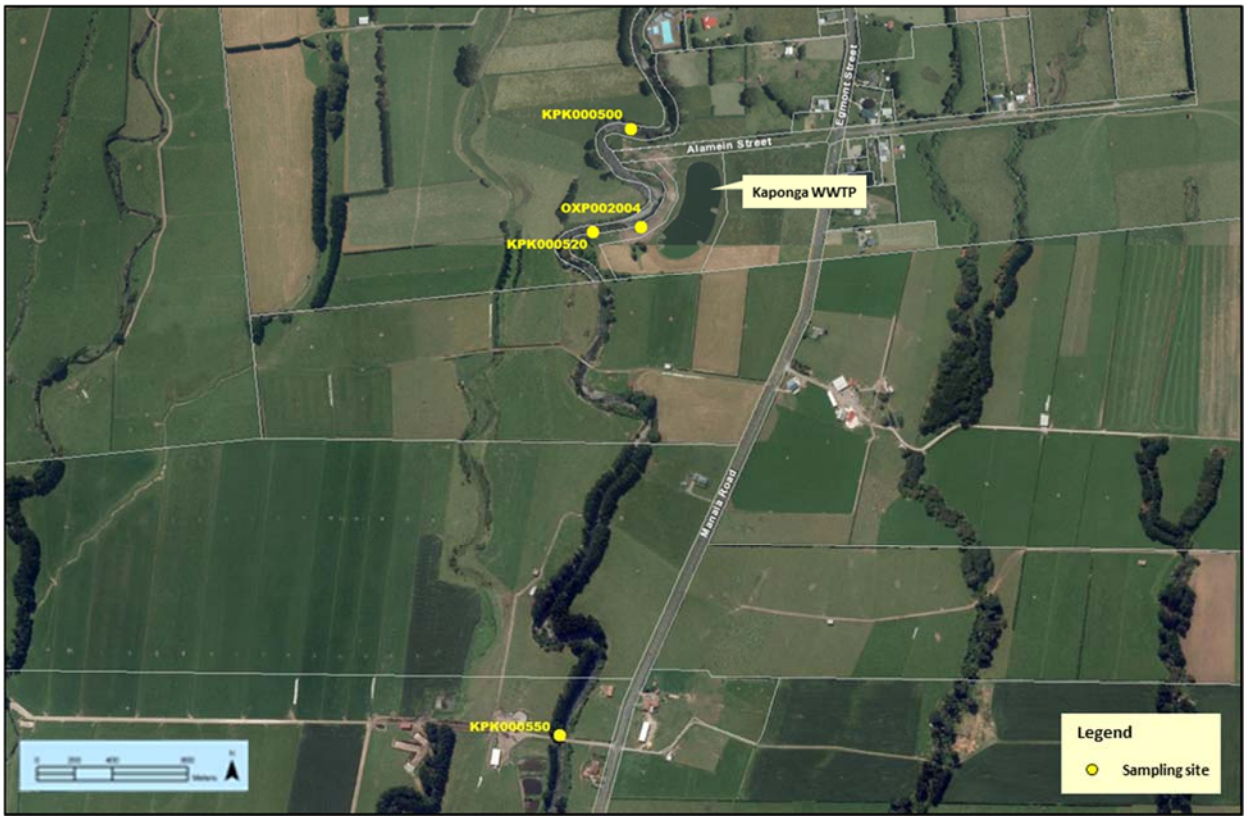

Figure 1 Aerial location map of sampling sites in relation to Kaponga WWTP

2.3.1 Receiving water surveys of September 2017 and June 2018

Receiving water samples were collected on the 25 September 2017 and 12 June 2018 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 5.

Table 5 Receiving water results September 2016 and May 2017

Site		KPK000500		KPK000520	
Date		**25 Sept 2017**	**12 Jun 2018**	**25 Sept 2017**	**12 Jun 2018**
Time		**0840**	**0930**	**0915**	**0955**
Parameter	**Unit**				
BODF	g/m^3	<0.5	<1.0	<0.5	<1.0
pH	pH	7.6	7.5	7.7	7.6
Turbidity	NTU	0.82	0.46	0.80	0.49
Temp	°C	10.5	9.4	10.7	9.5
NH_3	g/m^3 N	0.00009	<0.0010	0.0003	<0.0010
NH_4	g/m^3 N	0.01	<0.0010	0.025	0.018

These results show that there were no significant effects noted in the Kaupokonui River as a result of the WWTP discharge. Filtered BOD_5 concentration was well within the 2.0 gm^2 limit imposed by special condition 11, as was unionised ammonia (NH_3). There were slight increases in turbidity and nutrient concentrations between the two sites during both sampling occasions, but this was negligible and compliant with consent conditions.

2.3.2 Low flow receiving water survey of January 2018

A late summer low flow assessment of the impact of the WWTP's effluent discharge on the receiving waters of the Kaupokonui River was performed on 29 January 2018, 11 days after a river fresh over seven times the median flow. Results of the survey are displayed in Table 6. There was a moderately high rate of discharge from the ponds system (estimated at approximately 10 L/s) at the time of the survey. The river flow was gauged at 0.58 m^3/s upstream of the discharge. This would have provided an estimated dilution ratio of approximately 1:10 at the time of sampling. The flow of 0.92 m^3/s recorded in the lower reaches of the river (TRC Glenn Road recorder) was well below the average February mean monthly flow (1.57 m^3/s) and only slightly above the minimum February mean monthly flow (0.49 m^3/s) for the period 1978 to 2018.

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 18% decrease in black disc clarity and minimal change in turbidity between sites U and D1. No significant impacts on the river were recorded for all other parameters measured (Table 6) with minimal or no increases in measured levels of pH, conductivity, suspended solids, bacteria, BOD5, and nutrients (including un-ionised ammonia). These results were indicative of compliance with Special Conditions 9, 11, and 12 of the consent as the reduced algal component of the wastewater caused no discolouration and minimal change in turbidity beyond the mixing zone in the river. Of note were the high nutrient concentrations recorded at the upstream site, particularly the various nitrogen species which recorded new historical maximum values.

The river appearance was clear and relatively uncoloured along the reach surveyed, with high aesthetic water quality in the reaches near the Kaponga township and 1 km downstream of the oxidation pond discharge. Dissolved oxygen concentrations exceeded 100% saturation at all sites upstream and downstream of the discharge.

Table 6 Low flow receiving water results January 2018

Site		KPK000500		KPK000520		KPK000550	
Date		29 Jan 2018	2000-2017 Range	29 Jan 2018	2000-2017 Range	29 Jan 2018	2000-2017 Range
Time		0800		0845		0855	
Parameter	**Unit**						
Flow	L/s	576	329-820	-	-	-	-
Black disc	m	4.48	2.55-5.73	4.47	2.44-4.36	3.65	2.00-4.81
BOD	g/m^3	<0.5	<0.5-0.6	<0.5	<0.5-0.6	<0.5	<0.5-0.7
BODF	g/m^3	<0.5	<0.5-0.5	<0.5	<0.5-0.5	<0.5	<0.5-0.5
Chloride	g/m^3	7.8	7.0-10.2	8.1	7.0-9.0	7.9	7.2-8.9
Conductivity	mS/m@20°C	8.2	7.0-9.1	8.3	7.1-9.3	8.4	7.8-9.3
DO (concentration)	g/m^3	9.46	9.46-11.1	9.53	9.7-11.2	9.38	9.6-11.2
DO (saturation)	%	105	97-105	106	98-106	105	100-106
E.coli	/100ml	461	120-700*	326	80-630*	411	71-540*
pH	pH	7.9	7.3-8.0	8.1	7.4--8.4	8.0	7.6-8.2
SS	g/m^3	4.0	<2.0-4.0	<2	<2	2	<2-2
Turbidity	NTU	1.1	0.25-1.4	0.8	0.4-1.8	0.71	0.35-1.3
Temp	°C	19.2	3.4-16.4	19.6	3.4-17.1	19.8	10.1-16.6
Nutrient Analyses							
NH_3	g/m^3	0.0026	0.00001-0.00021	0.0024	0.00002-0.00065	0.0014	0.00005-0.00029
NH_4	g/m^3 N	0.074	<0.003-0.016	0.043	<0.003-0.030	0.030	<0.003-0.020
NNN	g/m^3 N	0.12	0.07-0.23	0.11	0.07-0.22	0.12	0.06-0.22
NO_3^-	g/m^3 N	0.120	0.069-0.189	0.11	0.069-0.189	0.120	0.059-0.110
NO_2^-	g/m^3 N	<0.001	<0.001-0.002	<0.001	<0.001-0.002	<0.001	<0.001-0.002
DRP	g/m^3 P	0.008	0.003-0.023	0.012	<0.003-0.030	0.009	<0.003-0.022

(* indicates parameter previously measured as faecal coliforms)

2.3.3 Biological monitoring survey

The biomonitoring survey associated with the receiving waters of the Kaupokonui River was undertaken under low, recession flow conditions on 1 March 2018, at identical sites to the physicochemical survey (Figure 2) of 29 January 2018. Results of the biomonitoring survey are summarised in Table 7 and compared to data obtained from previous biomonitoring surveys between March 1987 and October 2017. The full report is presented in Appendix II.

Table 7 Results for March 2018 survey and comparison with data from March 1987 to October 2017

Site No.	No of taxa			MCI value			$SQMCI_S$ value		
	Median	Range	Current survey	Median	Range	Current survey	Median	Range	Current survey
1	26	18-33	25	116	98-133	123	6.4	2.4-7.8	7.0
2	25	22-34	21	110	93-128	130	5.7	3.6-7.7	7.5
3a	26	15-32	22	108	92-126	122	5.7	3.1-7.5	7.5

The Council's standard 'kick-sampling' technique was used to collect streambed macroinvertebrates from the Kaupokonui River at three established sites. Each sample was processed to provide number of taxa (richness), MCI score, $SQMCI_S$ score, and % EPT taxa.

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

Taxa numbers were moderate to moderately high and were very similar to those found at previous surveys as indicated by the closeness to their respective historical medians. MCI scores indicated that the stream communities were of 'very good' generic health and there was no significant differences between the 'control' site and 'impact' site scores or to historic medians. $SQMCI_S$ scores were congruent with MCI scores and indicated 'excellent' health. There was no visual sign or microscopic evidence of any unusual heterotrophic growths present or forming on the substrate at any site.

This summer macroinvertebrate survey indicated that the discharge of treated oxidation ponds wastes from the Kaponga WWTP had not had any detrimental effect on the macroinvertebrate communities of the Kaupokonui River. No decreases in macroinvertebrate community health were found at the two sites downstream of the discharge.

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.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where STDC concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2017-2018 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 fenced riparian margin downstream of the ponds system required replanting in some areas after pine tree removal.

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. Moderate turbidity and suspended solids levels during the summer period were coincidental with a seasonal increase in abundance of microfloral taxa within the pond (as indicated by a high chlorophyll-a level). 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 winter following colder, wetter weather conditions.

2.5.2 Environmental effects of exercise of consents

No significant impacts on the Kaupokonui River were recorded from the physicochemical parameters analysed during the mid-summer survey conducted in January 2018, 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 Kaupokonui 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.

Moderate to moderately high macroinvertebrate community richnesses were found in the Kaupokonui River upstream and downstream of the oxidation pond effluent discharge during a late summer, low flow period. MCI scores were similar to scores typical of those recorded for mid-reaches of developed ringplain catchments and rivers, indicative of ‘very good’ generic biological health. 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 Kaupokonui River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Upgrade to plant within one year	Reporting by consent holder; upgrade completed	Yes
2. Exercise in accordance with documentation	Liaison with consent holder and inspections	Yes
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	Performance of tailored programme	Yes
11. Limits on receiving water effects for ammonia and filtered BOD_5	Performance of tailored programme	Yes
12. Limits on aesthetic water effects	Performance of tailored programme	Yes
13. Provision for lapse of consent	Consent holder liaison	N/A
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 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Kaponga WWTP in the 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Both recommendations were subsequently implemented and all aspects of the 2017-2018 programme were performed as required.

2.5.5 Alterations to monitoring programmes for 2018-2019

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 2018-2019, monitoring of the Kaponga WWTP continues at the same level as in 2017-2018.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2018-2019.

2.5.6 Recommendations

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 2017-2019.
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 Manaia WWTP

The Manaia WWTP 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.

The consent holder had advised that no stormwater infiltration/inflow work was performed on the Manaia sewerage reticulation in the 2007-2014 period (mainly due to the greater priorities at Hawera and also because there had been no issues with manholes surcharging in recent years). However, during the 2017-2018 period, house inspections and smoke testing for illegal connections was carried out. Twenty-eight properties were identified as needing repairs, and three of these have yet to be corrected (STDC, 2018).

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

20 September 2017

An inspection was conducted in fine weather with calm wind conditions.

The influent screen on the primary pond was operating, and wastes were fully contained. The influent flow rate was estimated at 15 L/s. The pond operating level was high and discharging via the overflow discharge pipe to the wetlands treatment system. The pond itself was a slightly turbid, pale green colour, with a small pocket of grey scum observed floating next to the pond outlet to the wetlands. An algal sample was collected for chlorophyll-a analysis.

The water level in the northern pond was measured at 1.75 m, while the southern pond was stable at 1.30 m. The southern pond had been isolated in relation to an ongoing seepage investigation by STDC, and no discharge was occurring from that outlet. The northern pond was discharging a relatively clear and pale green flow from the outlet, at an estimated rate of 15 L/s, and showed no environmental effect on the receiving waters.

The ponds and surrounds were tidy and well-managed, with no odour issues onsite.

Effluent and receiving water grab samples were not collected due to recent coastal erosion creating hazards on the access track.

7 December 2017

An inspection was carried out in fine weather with light north easterly wind conditions. Dry, drought conditions were prevailing at the time.

The influent screen on the primary pond was operating and wastes were fully contained. The influent flow rate was estimated at 2 L/s. The pond surface was mainly flat and at a normal operating level, with a few small pockets of dark grey scum floating on the surface. The pond was a turbid, dark green colour, with a slightly noticeable amine-type odour. An algal sample was collected for chlorophyll-a analysis. Approximately five black swans were observed on the pond surface.

The wetlands were inspected, and the level in the northern pond was measured at 1.20 m, while the southern pond was very low at 0.20 m. Only the north wetland pond was discharging with a trickle flow via the weir baffles. The treated wastewater was discharging at an estimated flow rate of 0.25 L/s, with a relatively clear, pale green colour, and showed no noticeable environmental impact on the receiving waters. An effluent grab sample was collected for full waste analyses from the final discharge to Manaia Creek.

Coastal seawater samples either side of the tributary discharge were collected on this occasion. Programmed maintenance was required to be completed along the Manaia coastal track.

The ponds and WWTP surrounds were found to be tidy and well-maintained.

22 June 2018

The final inspection for the year was conducted in fine weather with light northerly wind conditions.

The influent screen on the primary pond was operating and wastes were fully contained. The influent flow rate was estimated at 10 L/s. The pond had a high operating level and was a slightly turbid, green brown colour with a flat surface. It was discharging via the overflow discharge pipe into the northern wetland. A sample was collected for chlorophyll-a analysis, and six black swans were noted on the surface of the pond.

The pond level in the northern wetland pond was measured at 1.75 m, while the southern pond had been isolated and contained only minimal surface water. The pond effluent was a relatively clear, pale green colour, and grab samples were collected for partial waste analyses from the final discharge to Manaia Creek.

The treated wastewater discharge flow was estimated at 12 L /s, and showed no significant visual environmental impact on the receiving water.

Coastal seawater samples either side of the tributary discharge were collected at low tide including receiving water samples of Manaia Creek. Access to the sea sites was much improved by recent maintenance on the coastal track.

The ponds and surrounds were found to be tidy, with no odour issues.

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

No	Site	Location	GPS Reference	Site code
U	Manaia Creek	5 m upstream of the WWTP discharge	1696373 E 5618563 N	MNA000090
OP	Effluent	WWTP oxidation pond effluent at outfall	1696197 E 5618609 N	OXP003001
WET	Outlet	WWTP wetland at outfall	1696368 E 5618551 N	OXP006005
D1	Manaia Creek	10 m downstream of the WWTP discharge	1696369 E 5618539 N	MNA000093
SE	Tasman Sea	200 m east of mouth of Manaia Creek	1696641 E 5618404 N	SEA905086
SW	Tasman Sea	200 m west of mouth of Manaia Creek	1696255 E 5618419 N	SEA905080

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

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

Table 10 Results of summer effluent monitoring for the Manaia WWTP

Site		OXP003001		OXP006005	
Date		7 Dec 2017	2000-2017 Range	7 Dec 2017	2000-2017 Range
Time		0950		0920	
Parameter	Unit				
BOD	g/m³	29	11-90	24	4.0-34
BODF	g/m³	19	3.2-54	8	3.1-13
Chloride	g/m³	46.2	39.6-66.4	45.3	37.0-53.2
Conductivity	mS/m@20°C	43.4	25.9-56.8	38.0	27.5-42.6
DO (concentration)	g/m³	0.48	0.22-17.9	-	0.55-4.33
DO (saturation)	%	5.4	2.4-179	-	3.71-46.6
E.coli*	/100ml	105,000	2,500-340,000	<10	7-16,000
pH	pH	7.3	6.8-8.2	7.3	6.8-7.6
SS	g/m³	27	8.0-230	15	3.0-36
Turbidity	NTU	35	4.3-120	11	2.0-81

Site		OXP003001		OXP006005	
Date		7 Dec 2017	2000-2017 Range	7 Dec 2017	2000-2017 Range
Time		0950		0920	
Temp	°C	25.3	7.4-24.2	18.7	8.4-20.1
Nutrient Analyses					
NH_4	g/m³ N	15.4	1.78-17.8	5.17	3.28-19.5
DRP	g/m³ P	2.27	0.446-4.89	1.98	0.593-3.06

(* previously measured as faecal coliforms)

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 temperature, although chloride and conductivity were approaching the historical maximum for each.

The treated wetland discharge showed all results were within the expected range. There was a marked improvement in E.coli 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/m³)	Saturation (%)
20 Sept 2017	0930	14.5	3.6	35
7 Dec 2017	0950	25.3	0.48	5.4
22 Jun 2018	0945	10.1	9.2	82

Results indicate a relatively wide range of dissolved oxygen concentrations (between 5.4% and 82% saturation) in the surface layer of the primary pond near the outlet. There was no occurrence of supersaturation during the monitoring period, which follows historical trends where supersaturation is seldom recorded, and no mechanical aeration of the pond occurs. The lowest DO readings were recorded in the summer period, which is consistent with previous results.

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 2017	
				Range	Median
20 Sept 2017	0930	Relatively clear, pale green	38	30-2,850	404
7 Dec 2017	0950	Relatively clear, pale green	97		
22 Jun 2018	0945	Relatively clear, pale green	129		

Results show relatively narrow range of concentrations of chlorophyll-a in the primary pond, all of which are moderately low, which is indicative of a lower phytoplanktonic component. The lowest algal concentrations in the pond were associated with the low DO levels, which is indicative of the organic wastes' loadings and stormwater dilution component of this system.

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 attempted on three occasions during the 2017-2018 period (Section 2.1.3.1), and successfully carried out during two of these. One biomonitoring inspection was conducted during winter 2018 (Section 2.1.3.2). 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 7 December 2017 and 22 June 2018 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. An attempt was made to collect samples during the visit on 20 September 2017, but due to the deterioration of the coastal access track, it was deemed unsafe and the samples were not taken.

The results of these surveys are displayed in Tables 13 and 14.

Table 13 Receiving water results for Manaia Creek

Site		MNA000090				MNA000093			
Date		20 Sept 2017*	7 Dec 2017	22 Jun 2018	2000-2017 Range	20 Sept 2017*	7 Dec 2017	22 Jun 2018	2000-2017 Range
Time		-	0915	1015		-	0925	1020	
Parameter	Unit								
Chloride	g/m³	-	70.2	63	34.0-142	-	69.4	55	31.8-85.1
Conductivity	mS/m@20°C	-	43.8	45.1	29.1-70.4	-	43.8	40.7	31.1-64.4
E.coli**	/100ml	-	583	250	50-33,000	-	644	2,600	68-260,000
Turbidity	NTU	-	7.8	1.33	1.6-70	-	9.8	2.5	1.8-75
Temp	°C	-	18.6	12.0	8.2-18.2	-	17.8	10.9	8.0-19.2

(* indicates samples not collected due to unsafe access) (** previously measured as faecal coliforms)

The December 2017 results show that the WWTP discharge had a minor effect on the Manaia Creek, with a 21% increase in turbidity and 10% increase in E.coli. The June 2018 results showed a ten-fold increase in E.coli concentration downstream compared to upstream, which was likely caused by the high level of bacteria as measured in both the primary pond and wetland effluents. However, all samples were taken from within the mixing zone and were therefore compliant with consent conditions.

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

Site		SEA905080				SEA905086			
Date		20 Sept 2017*	7 Dec 2017	22 Jun 2018	2000-2017 Range	20 Sept 2017*	7 Dec 2017	22 Jun 2018	2000-2017 Range
Time		-	0940	1050		-	1030	0910	
Parameter	Unit								
Conductivity	mS/m@20°C	-	4,590	5,260	849-4,740	-	4,370	5,260	858-4,720
E.coli**	/100ml	-	<10	23	<1-1,300	-	10	24	1-300
Temp	°C	-	23.3	12.5	7.5-21.3	-	24.4	12.5	7.6-21.6

(* indicates samples not collected due to unsafe access) (** previously measured as faecal coliforms)

These results show consistently 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. Slightly elevated levels of E.coli bacteria were found at the two sites either side of the mouth of the stream, but all samples collected throughout the monitoring period were within consent conditions. No significant adverse effects were observed in the coastal waters.

3.4.1.1 Summary of impact monitoring on receiving waters

There was minimal effect of the wetlands' discharges on the receiving waters of the Manaia Creek and the coastal waters of the Tasman Sea on two of the three occasions in the monitoring period, with low numbers of faecal coliform bacteria in the discharge and no increase in turbidity downstream. A slight noticeable impact was measured in June 2018, with increased turbidity and increased E.coli downstream of the discharge point resulting in slightly elevated levels bacteria being found at the two sites either side of the mouth of the stream. No 'sewage fungus' was recorded on the streambed on either occasion.

The Ministry for the Environment and Ministry of Health (MfE/MoH, 1998) 'Bacteriological Water Quality Guidelines for Marine and Freshwater' (subsequently reviewed in 2003) are consistent with international practice and are based on the application of 'maximum acceptable' levels of bacteria for bathing in marine and fresh water and for recreational shellfish-gathering. Special condition 7 of consent 1204 has adopted the guideline levels for recreational shellfish as a standard for measuring whether compliance of the consent has occurred. The guidelines use 'faecal coliform' indicator bacteria numbers to denote the potential presence of pathogenic bacteria, viruses and protozoa. The prescribed values for recreational shellfish-gathering waters establish a median not in excess of 14 per 100 ml or not more than 10% of samples in exceedance of 43 per 100 ml. The guideline levels themselves do not guarantee that shellfish living in waters of this microbiological quality will be 'safe', rather they are intended as a management tool to measure any changes from those conditions prevailing at the time of assessment. They provide an assessment of the level of risk associated with timing of shellfish-gathering from waters being surveyed.

During the December 2017 survey, all samples were within both the ≤14 per 100 ml guideline and the <43 per 100 ml median exceedance guideline value. The results of the June 2018 survey were in excess of the <14 per 100 ml but not the <43 per 100 ml median guideline. Whilst past results of bacterial monitoring conducted at the two coastal sites either side of the mouth of the Manaia Creek to date have indicated that this particular element of compliance has not always been achieved, care needs to be exercised in drawing too many inferences from the data gathered to date. It should be noted that natural run-off from freshwater catchments may also impact upon coastal seawater bacteriological quality from time-to-time.

3.4.2 Biological inspection

During the monitoring period under review, one beach ecological inspection was performed. This survey was performed in winter 2018, 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 presented in Appendix II, and discussed below.

16 June 2017

A marine ecological inspection of the foreshore, in the vicinity of the discharge from the Manaia oxidation pond system (Photo 4), was carried out on 27 June 2018 at 1430 (NZST). Low tide on this day was at 1521 (NZST), at a height of 0.6 m above chart datum. At the time of the inspection, there was a north easterly breeze, and weather conditions were overcast. Inshore waters were very turbid during the inspection.

Photo 4 Manaia Creek flowing over the intertidal reef at Manaia

The stream appeared to have a significant effect on nearby intertidal organisms, most likely as a result of freshwater influence. *Ulva* spp. were evident along the length of the stream, although the cover was notably less dense than observed during previous surveys, and was not abundant beyond the 50 m mixing zone extending either side of the stream. Prolific growth of *Ulva* spp. is typical of nutrient enrichment. The diversity and abundance of intertidal communities, both within the influence of and away from the stream, was typical of that found at other reef sites around Taranaki (Photo 5). Species diversity appeared to have improved considerably at the Manaia Reef since the previous reef inspection, although the abundance and health of organisms were limited in the direct influence of the stream.

Photo 5 *Hormosira banksi,* in the vicinity of Manaia Creek, in the lower reaches of the shore

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.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where STDC concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2017-2018 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, BOD_5, 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 and officer observations indicated good, if relatively low, microfloral health in the primary oxidation pond on all occasions. 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

Minimal impacts of the wetlands discharge were recorded on aspects of the water quality of the Manaia Creek into which the effluent discharged during the winter survey only. 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 2018-2019 monitoring period to investigate the water quality upstream of the discharge. Notwithstanding this factor, monitoring over the 2017-2018 period continued to illustrate that there was minimal impact on the bacterial levels measured in the nearby coastal receiving waters of the Tasman Sea adjacent to the inflowing stream, although slightly elevated numbers were found in late winter.

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 7(iii) of consent 1204 for recreational shellfish-gathering purposes. Results of bacteriological monitoring conducted at the two coastal sites showed standards were met in all samples in regards to the median guideline for shellfish gathering at both of the sites either side of the stream mouth. The June 2018 survey showed that the guideline for maximum number of bacteria had been slightly exceeded. However, care needs to be exercised in drawing too many inferences from the data gathered to date, because there is currently limited information available on which to analyse the significance of variations in numbers observed in terms of wastewater impacts and/or in relation to natural background coastal seawater bacteriological levels.

An ecological beach survey (conducted in June 2018) found that the diversity and abundance of intertidal communities, both within the influence of and away from the stream, was typical of that found at other reef sites around Taranaki. Species diversity appeared to have improved considerably at the Manaia Reef since the previous reef inspection, although the abundance and health of organisms were limited in the direct influence of the stream.

3.6.3 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 16.

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. Minimisation of 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 (when discharging)	Yes – minor effects noted on one occasion
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 holder liaison	N/A

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?**
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 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. THAT in the first instance monitoring of consented activities at Manaia WWTP in the 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the reporting required by Special Condition 12 of consent 1204 shall be supplied to the Council by 30 June 2018.
4. 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 2017-2018 period, subject to appropriate flow conditions.

Recommendations 1 to 3 were subsequently implemented and the relevant aspects of the 2017-2018 programme were performed as required. Recommendation 4 was not undertaken in this monitoring year, and it is proposed that it be carried forward to the 2018-2019 year.

3.6.5 Alterations to monitoring programmes for 2018-2019

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 2018-2019, monitoring of the Manaia WWTP continues at the same level as in 2017-2018, with the addition of water quality investigations upstream of the WWTP discharge in the Manaia Creek to be determined based on results of water quality surveys.

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 2018-2019.

3.6.6 Recommendations

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.

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 6). 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 6 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 2015-2016 period.

4.2 Inspections

14 August 2017

An inspection was conducted in fine weather with light northerly wind conditions. The monthly rainfall was 146 mm as recorded at the Patea Bore 3 weather station.

The pond 1 influent flow rate was estimated at 10 L/s, and the York Street pump station was operating at time of inspection. The surface on ponds 1 and 2 was lightly rippled, and they were a relatively clear light brown colour. No debris was observed on the ponds' surfaces, which were occupied by approximately 35 mallard ducks and several black swans.

The final pond was a relatively clear, pale brown colour, with a lightly rippled surface. An algal sample was collected for chlorophyll–a analysis. Approximately 20 ducks were observed on the pond.

The treated discharge flow rate was estimated at 10 L/s at the outlet, and showed no visual environmental impact on the Patea River. There was no evidence of any recent overflow discharge into the Patea River, which was flowing at a low level and a turbid brown colour at the time, from the emergency outfall and pump station. The lower pump station was operating to pump wastewater to the WWTP.

The WWTP surrounds and facilities were in a satisfactory condition, and no offsite odour issues were noted.

16 January 2018

An inspection was conducted in fine weather with light north easterly wind conditions. The monthly rainfall was 99 mm as recorded at the Patea Bore 3 weather station.

Ponds 1 and 2 were lightly rippled, and a turbid, green brown colour. The pond influent was not discharging at the time of inspection. No debris was noted on the ponds' surface, which were occupied by 450+ birds.

The final pond was a turbid, green brown colour with a rippled surface. The pond level was normal.

Samples were collected from the pond and discharge sump for full wastewater analysis, including dissolved oxygen, bacteria and algal (as chlorophyll-a) samples.

The treated discharge flow rate into the Patea River was estimated at 0.25 L/s, showing no visual environmental impact at the outlet. Summer low flow water quality samples were collected from four river monitoring sites along with the pond effluent during low tide conditions.

The WWTP surrounds and facilities were in a satisfactory condition. No odours were noted at the time.

31 May 2018

An inspection was conducted in fine weather with calm weather conditions.

Ponds 1 and 2 were flat, and a slightly turbid, green brown colour. The pond influent was flowing at the time of inspection. No debris was observed on the pond surface, which was occupied by approximately 300+ mallard ducks.

The final pond had a flat surface and was a slightly turbid, dark green colour. DO and algal samples (for chlorophyll-a analysis) were collected from the pond.

The treated discharge flow rate into the Patea River was estimated at 20 L/s, showing no significant visual environmental impact at the outlet. The river was running three times below median flow, with a turbid brown colour. Water quality samples were collected from four river monitoring sites including the pond effluent during low tide conditions.

The WWTP surrounds and facilities, including the emergency outfall and pump station were all in a satisfactory condition. No odours were detected during the inspection.

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 2017-2018 monitoring year, on 21 February 2018. This was self-notified by STDC and was the result of power outages in South Taranaki following ex-Cyclone Gita and is discussed further in section 4.5.

4.3 Results of effluent monitoring

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

Table 16 Results of effluent monitoring for the Patea WWTP

Site		OXP008001		
Date		16 Jan 2018	31 May 2018	2000-2017 Range
Time		0805	1030	
Parameter	Unit			
BOD	g/m³	12	-	9.1-31
BODF	g/m³	2.7	-	1.0-15
Conductivity	mS/m@20°C	68.7	54.3	47.1-73.2
DO (concentration)	g/m³	1.87	11.6	1.1-14.8
DO (saturation)	%	22.8	99.1	12-165
E.coli*	/100ml	15,500		16-6,700
pH	pH	8.4	-	8.1-10.1
SS	g/m³	13	-	18-150
Turbidity	NTU	7.3	19	6.5-240
Temp	°C	25.5	8.8	10.4-25.8
Nutrient Analyses				
NH_4	g/m³ N	0.764	-	0.025-4.09
DRP	g/m³ P	3.87	-	0.005-4.98

(* previously measured as faecal coliforms)

Effluent results indicate a relatively high effluent quality, typical of a municipal pond treatment system receiving mainly domestic wastes. The E.coli bacteria numbers were significantly higher compared to historical maximums, however during this monitoring period bacteria were measured as E.coli (formerly faecal coliforms, as detailed above). This methodology is not comparable to the previous, and care should be taken when making interpretations.

Comparison with historical results shows that effluent quality was within the expected range for all other 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 (%)
14 August 2017	1000	12.4	3.0	29
16 January 2018	0805	25.5	1.9	23
31 May 2018	1030	8.8	12	99

Results indicate a moderately narrow range of dissolved oxygen concentrations (between 23% and 99% saturation) in the surface layer of the final cell near the outlet. This was typical of the results generally recorded in this oxidation pond (i.e. supersaturation is seldom recorded), and no mechanical aeration of the pond occurs. The lowest DO readings were recorded in early spring and late autumn periods, following cool, wet weather conditions.

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/m^3 was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

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

Table 18 Chlorophyll-a levels and primary pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m^3)	Range for the period 2000-mid 2017	
				Range	Median
14 August 2017	1000	Relatively clear, pale brown	7.0	1.7-628	318
16 January 2018	0805	Turbid, green brown	30		
31 May 2018	1030	Slightly turbid, dark green	314		

Very low chlorophyll-a levels were recorded in the winter sample in August 2017, coincident with a low saturation of 29%. The levels increased into summer and 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 2017-2018 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 22 separate occasions between early November 2017 and early April 2018 (TRC, 2018). The sampling sites are detailed in Table 19.

Table 19 Sampling site locations for the Patea WWTP

No.	Site	Location	GPS reference	Site code
1	Patea River	SH3 bridge, approx. 1 km upstream of WWTP	1727126E 5598189N	PAT000970
2	Patea River	Approx. 500 m downstream of SH3 bridge; downstream of emergency overflow	1727127E 5597688N	PAT000975
OP	Effluent	Outlet of the Patea WWTP final cell	1727268E 5597296N	OXP008001
3	Patea River	Approx. 200 m downstream of WWTP discharge	1727268E 5597296N	PAT000985
4	Patea River	Boat ramp (approx. 0.6 km downstream of WWTP discharge)	1727433E 5596784N	PAT000995
SMB	Tasman Sea	Mana Bay	1727532E 5596415N	SEA907022
SPB	Tasman Sea	Patea Beach	1727220E 5596442N	SEA907020

4.4.1 Lower Patea receiving water surveys

Receiving water samples were collected on the 16 January 2018 and 31 May 2018 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 2018 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 0.25 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, consistent with no impacts due to a high standard of bacterial effluent quality discharged from the re-configured ponds system.

The May 2018 survey was carried out under high winter flows (above three times median) (as measured at McColl's bridge). These results indicated no saltwater penetration under high flow and low tide conditions. 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 the high flows. Turbidity results showed very little variation between all sites, which was consistent with the high quality of the wastewater discharge.

One occasion of additional monitoring was required in the Lower Patea River in relation to the operation of the emergency overflow system, due to a single overflow occurring during the contact recreational period between November 2017 and March 2018. This is discussed further in section 4.5.

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		16 Jan 2018	31 May 2018	2000-2017 Range	16 Jan 2018	31 May 2018	2000-2017 Range	16 Jan 2018	31 May 2018	2000-2017 Range	16 Jan 2018	31 May 2018	2000-2017 Range
Time		0805	0930		0815	0945		0840	1030		0900	1110	
Parameter	Unit												
Conductivity	mS/m@20°C	1,950	16.6	7.1-2,070	4,580	18.5	7.5-2,200	4,700	42.9	7.8-2,510	4,690	77.0	11.7-4,790
E.coli*	/100ml	-	63	31-1,200	-	96	51-1,200	-	<10	54-1,000	-	16	<1-1,200
Ent*	/100ml	90	-	12-500	33	-	11-1,700	20	-	13-830	86	-	<1-20,000
Turbidity	NTU	14	9.8	3.2-120	24	8.7	3.8-200	7.9	7.8	3.8-140	9.6	10	3.1-260
Temp	°C	23.4	12.1	9.5-24.3	21.4	12.3	9.5-24.6	22.5	12.3	9.8-24.9	21.7	12.3	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 7) 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 also included at three-yearly intervals in the Council's recreational monitoring programme and was last surveyed in the 2015-2016 monitoring period.

Sampling at the first two sites during the summer monitoring period occurred between early November 2017 and early April 2018. It was concentrated on high tide conditions (15 samples), but also included low tide conditions on seven other occasions. The results are summarised in Tables 21 and 22, and illustrated in Figures 5 and 6.

Photo 7 View of Patea boat ramp sampling site

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

Parameter	Unit	Number of samples	Minimum	Maximum	Median	Medians	
						HT	LT
Conductivity	mS/m@20°C	22	295	4,850	4,680	4,750	1,220
E.coli	/100ml	22	1	806	25	10	120
Ent	/100ml	22	1	72	13.5	13.5	-
Turbidity	NTU	22	5.8	74	17	15	21
Temp	°C	22	15.7	24.5	20.2	20.8	20.1

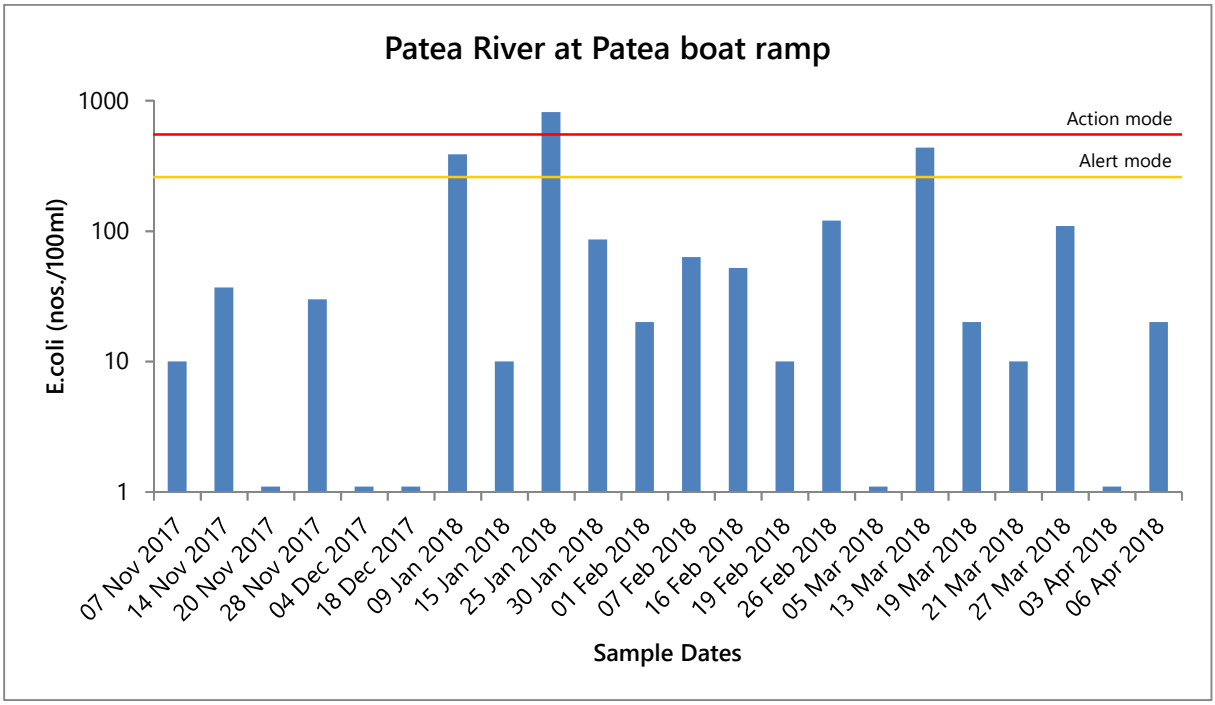

Figure 4 E.coli numbers for lower Patea River at the boat ramp

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. Numbers of E.coli exceeded the 'Alert' limit on three occasions, and the 'Action' limit on one occasion in January. Each of these exceedances occurred during a low tide run, when there was least dilution available. These data were indicative of relatively good bacteriological water quality conditions and within the expected range for this site. Some bathing activity was noted during the 2017-2018 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	mS/m@20°C	22	999	4,870	4,730	4,750	1,610
E.coli	/100ml	22	2	180	13.5	17	13
Ent	/100ml	22	1	540	15	12	40
Turbidity	NTU	22	5	88	28	38	15
Temp	°C	22	19.7	24.5	20.9	20.8	21.0

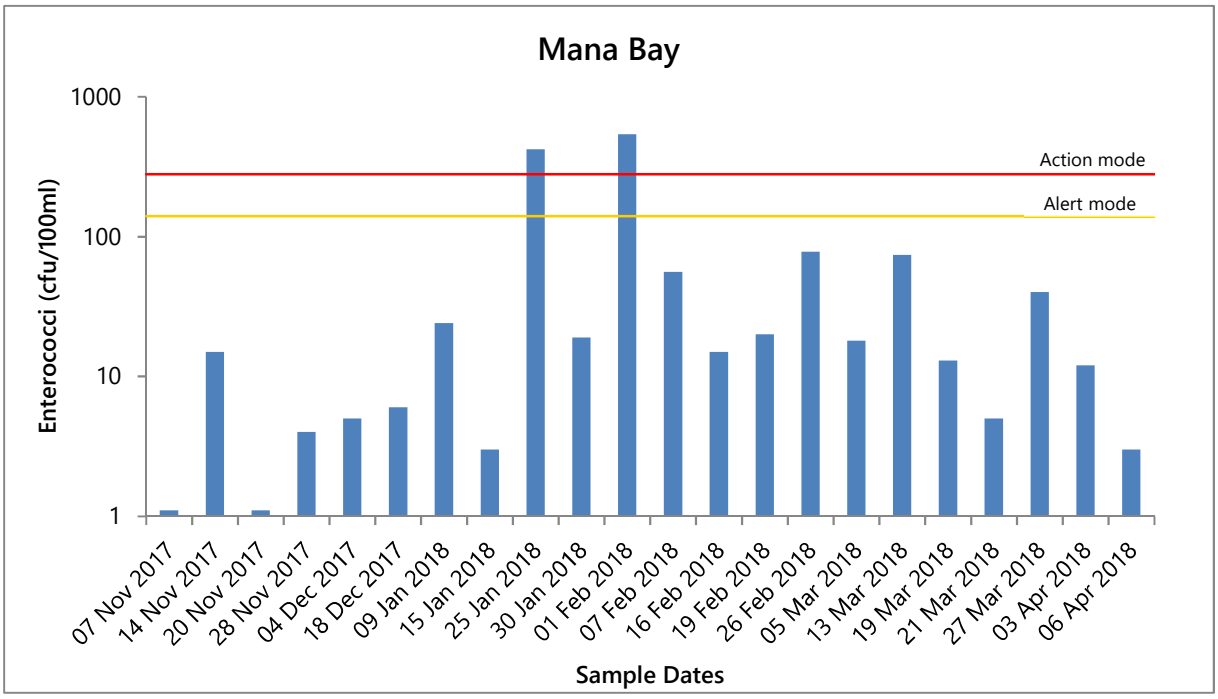

Figure 5 Enterococci numbers for Mana Bay

Water quality at Mana Bay remained relatively high throughout the season, with only two exceedances of the 'Action' level guideline. (Figure 5). The first occurred during a low flow sampling run, and the second during high tide but while the river was approaching its lowest recorded level for the bathing season. All results were within the historical range of values for this site.

In general, high water quality was found at both contact recreation sites during the annual recreational periods extending from November 2003 to April 2017. Three samples from the Patea River at the boat ramp and two from Mana Bay entered the 'Alert' mode, while two entered the 'Action' level for the monitoring period.

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.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where STDC concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2017-2018 period, the Council was required to undertake one additional investigation in association with STDC's conditions in resource consents. A consented overflow from the Patea WWTP occurred on 21 February 2018. This was self-notified by STDC and was the result of power outages in South Taranaki following ex-Cyclone Gita. STDC utilised sucker trucks to clean up any remaining overflow in the days following the discharge.

The Patea River was in high flood at the time of the overflow, and no downstream effects were noted as a result. Sampling was carried out at six sites in the Patea River and Tasman Sea, which determined that there was no impact on the receiving waters as a result of any discharge (Table 23, Photo 8). Public notification was put in place until the results of sampling were received, after which it was removed and no further action was required.

Table 23 Results upstream and downstream of the Patea WWTP overflow, collected 23 February 2018

Site		PAT000970	PAT000975	PAT000985	PAT000995	SEA907020	SEA907022
Time		1005	0955	0935	0920	1040	1025
Parameter	**Unit**						
Conductivity	mS/m@20°C	748	1,100	1,680	1,700	4,730	3,780
E.coli	/100ml	192	219	256	269	41	160
Ent	/100ml	123	291	170	134	10	97
Turbidity	NTU	19	20	15	19	51	37
Temp	°C	21.3	21.5	21.7	20.8	21.9	21.7

Photo 8 View of the discharge point from the Patea WWTP emergency overflow structure, February 2018

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 at the beginning of the monitoring period. 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 was recorded during the monitoring period, following a power outage during ex-Cyclone Gita. 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 fourteen monitoring periods (mid 2004 to mid-2018), and the remainder have had 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 2017-2018 monitoring period, continuing the good performance shown during the previous period.

More intensive monitoring of the Boat Ramp and Mana Bay sites during the summer contact recreational period found that, with the exception of four samples, bacterial numbers were below the MfE/MoH's 2003 Recreational Water Quality Guidelines.

Despite a single usage of the pump station emergency outfall during the recreational period, no impacts of the upgraded WWTP's discharges were discernible on these contact recreation water standards at the estuary or the coastal sites between November 2017 and early April 2018.

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
3. Progress reports of upgrade	Reporting by consent holder; upgrade completed	N/A

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?**
4. Minimisation of effects	Inspections and sampling	Yes
5. Limits on volume	Reporting by consent holder (after plant upgraded)	Yes
6. Implementation of management plan	Provision by consent holder after plant upgraded (updated)	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	Performance of tailored monitoring programme	Yes – only minor effects noted
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	Only one overflow reported	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	Duration of discharge managed by consent holder	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	Reporting by STDC	Yes – signage displayed
14. Notification to Taranaki Healthcare following discharge	Notification received	Yes
15. Triennial meetings	Liaison with consent holder and submitters	Yes
16. Receiving water monitoring	Bacteriological sampling as 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 renewed	N/A
12. 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

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 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Patea WWTP and emergency outfall in the 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented and all aspects of the 2017-2018 programme were performed as required.

4.6.5 Alterations to monitoring programmes for 2018-2019

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 2018-2019, monitoring of the Patea WWTP and emergency outfall continues at the same level as in 2017-2018.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2018-2019.

4.6.6 Recommendations

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.

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

16 August 2017

An inspection was conducted in cloudy weather with moderate southerly wind conditions.

The step screen was operating and wastes were fully contained. The influent flow rate into Pond 1 was estimated at 8 L/s. Ponds 1 and 2 were a relatively clear, pale green colour with a mainly flat surface. An algal sample was collected for chlorophyll-a analysis from Pond 2, while it was unoccupied by wildfowl.

The WWTP outlet discharge flow rate was estimated at 6 L/s, and no visual environmental impact on the unnamed tributary of the Wairoa Stream was observed, aside from a minor amount of foaming occurring at the discharge point.

The ponds and surrounds were tidy and no odours were noted.

The stock truck wastes disposal facility was inspected, and all three pond levels were high but not discharging. No offensive odours were noted. The unloading sump was tidy, although it was recommended that spillage be washed down as required.

26 January 2018

An inspection was conducted in overcast weather with light south easterly wind conditions.

The step screen wastes were fully contained and no noticeable odour was found to be emanating around this area as it appeared that the bins had been recently emptied. The influent flow into Pond 1 was estimated at 2.5 L/s, and the pond was a turbid, dark green colour.

Pond 2 was a dark green colour with a slightly rippled surface, and both ponds were occupied by a combination of ducks and black swans. DO and algal samples were collected from the pond, and effluent grab samples were collected from the downstream discharge for full wastewater analysis during the summer low flow period. The pond trickle discharge was volumetrically measured at 0.005 L/s. A flume and level recorder had recently been installed on the pond outlet, in compliance with the new consent conditions.

The ponds and surrounds were tidy and clear, with no odour issues noted.

Water quality samples were collected upstream and downstream of discharge into the unnamed tributary of the Wairoa Stream, including the Wairoa Stream (the outlet of the Ihupuku swamp wetlands at Beach Rd). No visual environmental effects were observed at any of the monitoring sites.

Hydrological gaugings were also performed at two monitoring sites, upstream and downstream of the WWTP discharge along the Wairoa Stream.

The stock truck wastes disposal site was inspected, and the unloading sump was tidy. There were no significant odour issues noted during the inspection.

24 May 2018

The final inspection for the monitoring period was carried out in overcast weather with southerly wind conditions.

The step screen was operating and wastes were fully contained. The influent flow rate into Pond 1 was estimated at 10 L/s. The pond was rippled, and a turbid, pale grey brown colour. Slightly noticeable odour was detected near the pond inlet and step screen.

Pond 2 was operating at a normal level with a rippled surface. It was a slightly turbid, pale green colour. No significant odour was detected around the pond perimeter. An algal sample was collected for chlorophyll-a analysis. Approximately 30 ducks were observed on the pond surface.

The WWTP outlet discharge flow rate was estimated at 10 L/s, with only a slight visual environmental impact observed on the mixing zone in the unnamed tributary of the Wairoa Stream.

The ponds and surrounds were tidy and well-maintained, with no odours noted.

The stock truck wastes disposal area was inspected. The unloading sump was clean and relatively tidy, and the effluent grate had recently been washed down. All three ponds were full but not discharging, with a dark brown colour and no debris floating on the surface. Minimal odour was noted around the site.

5.2 Results of effluent monitoring

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

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

Table 27 Results of summer effluent monitoring for the Waverley WWTP

Site		**OXP002005**	
Date		**26 Jan 2018**	**2000-2017 Range**
Time		**0945**	
Parameter	**Unit**		
Flow	L/s	1.25	0.14-8.0
BOD	g/m³	40	11-66
BODCF	g/m³	14	3.9-12
Chloride	g/m³	57.2	47.9-75.6
Conductivity	mS/m@20°C	45.6	43.3-68.7
DO (concentration)	g/m³	2.9	0.9-21
DO (saturation)	%	32	10-227
E.coli*	/100ml	26,000	11,000-82,000
pH	pH	9.1	7.7-9.5
SS	g/m³	95	11-220
Turbidity	NTU	48	9.4-210
Temp	°C	19.7	8.2-26.0
Nutrient Analyses			
NH_3	g/m³	0.2251	0.0114-0.5456
NH_4	g/m³ N	0.567	0.100-26.2
DRP	g/m³ P	4.17	1.52-7.98

(* previously measured as faecal coliforms)

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 moderately low filtered BOD_5 concentration, and in the absence of the disposal of stock truck or any other significant industrial wastes to the system.

E.coli bacteria were very high in the sample, although well within the range of previous samples, while nutrients were low to 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.

Table 28 Dissolved oxygen measurements from the Waverley WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m^3)	Saturation (%)
16 August 2017	1000	11.0	14.7	135
26 January 2018	0945	24.7	6.8	82
24 May 2018	1015	11.6	3.0	28

Results indicated a relatively wide range of dissolved oxygen concentrations (between 28% and 135% saturation) in the surface layer of the primary pond near the outlet. These were typical of the levels generally recorded in this oxidation pond (i.e. supersaturation is seldom recorded). No mechanical aeration of the pond occurs, and the lowest DO readings were recorded in the summer period, which is consistent with previous results.

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/m^3 was necessary to maintain stable facultative conditions. However, seasonal change in algal populations and also dilution by stormwater infiltration might be expected to occur in any WWTP which, together with fluctuations in waste loadings, would result in chlorophyll-a variability.

The results of primary pond effluent analyses are provided in Table 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 2017	
				Range	Median
16 August 2017	1000	Relatively clear, pale green	890	144-1,100	470
26 January 2018	0945	Turbid, dark green	360		
24 May 2018	1015	Slightly turbid, pale green	58		

The majority of samples of chlorophyll-a in the primary pond showed relatively high concentrations, indicative of a significant phytoplanktonic component. The colder, wetter autumn sampling period was associated with the lowest algal concentrations in the pond, which was also associated with the lowest DO saturation of 28%, and is likely related to the reduced sunlight hours.

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 6 below.

Table 30 Sampling sites for Waverley WWTP

No.	Site	Location	GPS reference	Site code
2	Unnamed trib. of Wairoa Stream	Upstream of confluence with WWTP discharge	1739148E 5596620N	WRO000069
OP	Effluent	At outfall to stream	1739140E 5596588N	OXP002005
4	Unnamed trib. of Wairoa Stream	Approx. 400 m downstream of WWTP discharge (Waverley Beach Rd)	1739367E 5596322N	WRO000077
5	Wairoa Stream	Outlet of Ihupuku Swap, approx. 3 km d/s of WWTP discharge (Beach Rd)	1739402E 5593780N	WRO000150

Figure 6 Aerial location map of sampling sites in relation to Waverley WWTP

5.3.1 Low flow receiving water survey of January 2018

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 26 January 2018. Results of the survey are displayed in Table 31.

Table 31 Low flow receiving water results January 2018

Site		WRO000069		WRO000077		WRO000150	
Date		26 Jan 2018	2000-2017 Range	26 Jan 2018	2000-2017 Range	26 Jan 2018	2000-2017 Range
Time		0910		1000		1015	
Parameter	Unit						
Flow	L/s	12	6-23	34	12-25	-	-
Black disc	m	0.87	0.46-1.66	0.83	0.41-1.30	0.92	0.74-1.45
BOD	g/m³	0.9	<0.5-2.8	1.6	0.7-4.2	0.7	<0.5-1.4
BODCF	g/m³	<0.5	<0.5-0.8	<0.5	<0.5-0.5	<0.5	<0.5-0.6
Chloride	g/m³	38.0	26.4-37.2	39.0	27.7-41.7	38.4	29.8-52.7
Conductivity	mS/m@20°C	30.5	24.0-30.4	32.6	25.7-34.1	30.7	24.3-30.7
DO (concentration)	g/m³	9.0	9.0-9.9	7.86	4.0-8.8	1.19	2.3-4.9
DO (saturation)	%	94	93-97	83	40-91	13.3	24-48
E.coli*	/100ml	471	160-4,700	695	100-4,200	1,730	52-3,500
pH	pH	7.6	7.5-8.0	7.6	7.2-7.7	7.1	7.2-7.4
SS	g/m³	16	4.0-35	20	4.0-32	9	5.0-27
Turbidity	NTU	16	2.6-20	23	1.8-21	5.7	2.3-15
Temp	°C	17.7	13.0-17.4	17.9	13.4-17.1	20.7	13.3-19.1
Nutrient Analyses							
NH_3	g/m³	0.001	0.00044-0.00697	0.001	0.00032-0.00218	0.0001	0.00007-0.00023
NH_4	g/m³ N	0.063	<0.003-0.314	0.062	0.019-0.249	0.02	0.003-0.030
DRP	g/m³ P	0.009	<0.003-0.033	0.06	0.054-0.455	0.059	0.024-0.064

(* previously measured as faecal coliforms)

A moderate discharge rate of 1.25 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 moderately low at 12 L/s. Flow measurements at the time of the survey indicated an instantaneous effluent dilution ratio of around 10:1 in the receiving waters.

Upstream water quality (at site WRO000069) was generally good, with a dissolved oxygen saturation of 94%, and relatively low level of dissolved reactive phosphorus and filtered BOD_5, 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.

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, turbidity, suspended solids, and biochemical oxygen demand; but not in ammonia concentrations. There was also a 13% decrease in dissolved oxygen saturation. E.coli bacteria did not increase significantly despite the very high level in the discharge. The relatively small variation in water

quality was a consequence of the dilution factor, and settlement and filtration by the dense weed growth and slower flow present through the reach of the stream between the outfall and the downstream site. There were no visible impacts on stream appearance at this site.

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, and nutrient concentrations (particularly ammoniacal nitrogen) following filtration and nutrient uptake by wetland vegetation. Interestingly, DRP levels were very similar to the site downstream of the discharge, which has not been the trend in recent years. E.coli concentrations also showed a 150% increase compared to the site downstream of the discharge, indicating that additional sources in the stream contribute a significant input to the downstream water quality. Black disc visibility was slightly improved compared to the equivalent value at 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.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where STDC concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2017-2018 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 continue 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.

The annual summer physicochemical survey, performed under a period of low receiving water flow conditions and a low rate of wastewater discharge, recorded a good effluent quality with low nutrients, suspended solids and BOD_5 concentrations discharged to the receiving waters of the Wairoa Stream. E.coli bacteria numbers were very high in the discharge and, although significantly reduced at site WRO00077, showed a 150% increase between the two downstream sites, indicating additional inputs to the system.

Chlorophyll-a concentrations were indicative of moderate microfloral richnesses attributable to relatively low pond loadings and zooplankton grazing from time-to-time within the system.

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, with small increases in turbidity, biochemical oxygen demand, and dissolved reactive phosphorus levels, and a small reduction in percentage dissolved oxygen saturation. 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. There was a significant increase in bacterial numbers between the site immediately below the discharge outfall and at the final downstream site, indicative of another source. 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 Table 32 and 33.

Table 32 Summary of performance for consent 0072-2

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	Inspections and reporting	Yes
2. Discharge notification requirements	No notifications received	Yes
3. Limits on dissolved oxygen	Inspections and sampling	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. Limits on turbidity in receiving waters	Sampling	Yes
9. SAS report requirements	Report commissioned	Yes
10. WOAR report requirments	Report awaiting results of SAS report	N/A
11. WWWP requirements	Working Party created	Yes
12. Minimum affected parties for WWWP	All parties included in WWWP	Yes

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?**
13. Riparian planting requirements	To be commissioned during next phase of plant upgrades	N/A
14. Trade wastes notifications	No notifications received	Yes
15. Lapse and review provisions	Consent exercised, next review scheduled for June 2020	Yes
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 reviews scheduled	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 2016-2017 Annual Report

In the 2016-2017 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 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were subsequently implemented and all aspects of the 2016-2017 programme were performed as required.

5.5.5 Alterations to monitoring programmes for 2018-2019

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 2018-2019, monitoring of the Waverley WWTP and stock truck wastes disposal continues at the same level as in 2017-2018.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2018-2019.

5.5.6 Recommendations

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.

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 2018-2019 year continue at the same level as in 2017-2019.
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.

6.2 Manaia WWTP

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.

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 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.

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 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.

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 20°C and expressed in mS/m.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.

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

*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

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)

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

Hon Chris Carter

Minister of Conservation

63-01-011/01

139518

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.

Parliament Buildings, Wellington, New Zealand Telephone: 64 4 470 6568, Facsimile: 64 4 472 8034
Email: ccarter@ministers.govt.nz Website: www.beehive.govt.nz

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.

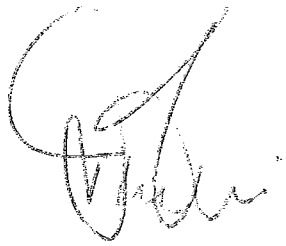
15. The consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least every three years with interested submitters to the consent to discuss any matter relating to the exercise of this consent.

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:
D L 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

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

General conditions

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

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

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

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

Special conditions

Condition 1 – changed

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

Conditions 2 to 14 – unchanged

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Signed at Stratford on 9 July 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	South Taranaki District Council 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 ± 5%, at intervals not exceeding 15 minutes. Records of the date, the time and the rate and volume of the discharge shall be made available to the Chief Executive, Taranaki Regional Council on request.

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

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

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

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

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

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

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

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

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

10. Before 1 January 2020, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council, a *'Wastewater Options Assessment Report' (W*OAR) for the Waverley WWTP. The WOAR shall document the on-going environmental effects of the discharge from the Waverley Wastewater Treatment Plant, and set out the options available to address the effects on the receiving environment resulting from the discharge. The report shall, as a minimum, address the following:

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

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

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

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

13. Subject to the agreement of the landowner, the consent holder shall, in consultation with the Council's Land Services Manager, arrange for the riparian fencing and planting to the value of $3,000, to a point no greater than 400 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

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A D McLay
Director - Resource Management

Discharge Permit

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

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

Conditions of Consent

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

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

General conditions

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

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

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

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

Special conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Signed at Stratford on 6 June 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

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

Conditions of Consent

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

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

General conditions

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

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

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

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

Special conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Signed at Stratford on 6 June 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

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

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

Conditions of Consent

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

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

General conditions

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

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

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

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

Special conditions

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

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

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

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

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

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

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

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

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

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

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

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

Signed at Stratford on 16 November 2005

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

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

Conditions of Consent

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

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

General conditions

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

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

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

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

Special conditions

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

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

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

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

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

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

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

Signed at Stratford on 19 September 2005

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix II

Biomonitoring reports

To	Rae West, Job Manager
From	Darin Sutherland, Environmental Scientist
Doc No	2081593
Report No	DS099
Date	3 July 2018

Biomonitoring of the Kaupokonui River in relation to the South Taranaki District Council's Kaponga oxidation ponds system discharge, March 2018

Introduction

This biomonitoring survey for the 2017-2018 monitoring period relates to the discharge from the Kaponga Municipal Wastewater Treatment System into the Kaupokonui River. Special Condition 9d of Consent 0861-3 requires that:

"after allowing for reasonable mixing over 50 metres downstream of the discharge point there shall be no significant adverse effects on aquatic life"

One survey is conducted during summer months to monitoring the effects of the discharge located downstream of the Kaponga township.

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from three established sampling sites in the Kaupokonui River in the vicinity of the Kaponga oxidation ponds' system (Table 1 and Figure 1), on 1 March 2018.

Table 1 Location of sampling sites in the Kaupokonui River

Site number	Site code	Grid reference (NZTM)	Location
1	KPK000500	E1698609 N5634423	approximately 250 m upstream of oxidation ponds
2	KPK000520	E1698548 N5634263	50 m downstream of oxidation ponds
3a	KPK000550	E1698497 N5633456	approximately 1 km downstream of oxidation ponds

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa abundances scored based on the categories presented in Table 2.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly `sensitive' taxa were assigned the highest scores of 9 or 10, while the most `tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. A gradation of biological water quality conditions based upon MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000) (Table 3). More 'sensitive' communities inhabit less polluted waterways. A difference of 10.83 units or more in MCI values is considered significantly different (Stark 1998).

Table 3 Macroinverbrate health based on MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2015) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000)

Grading	MCI
Excellent	>140
Very Good	120-140
Good	100-119
Fair	80-99
Poor	60-79
Very Poor	<60

A semi-quantitative MCI value ($SQMCI_s$) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 & 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the $SQMCI_s$ is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower, ranging from 0 to 10 $SQMCI_s$ units. A difference of 0.83 units or more in $SQMCI_s$ values is considered significantly different (Stark 1998).

Where necessary, sub-samples of algal and detrital material were taken from the macroinvertebrate samples and scanned under 40-400x magnification to determine the presence or absence of any mats,

plumes or dense growths of bacteria, fungi or protozoa ('undesirable biological growths') at a microscopic level. The presence of masses of these organisms is an indicator of organic enrichment within a stream.

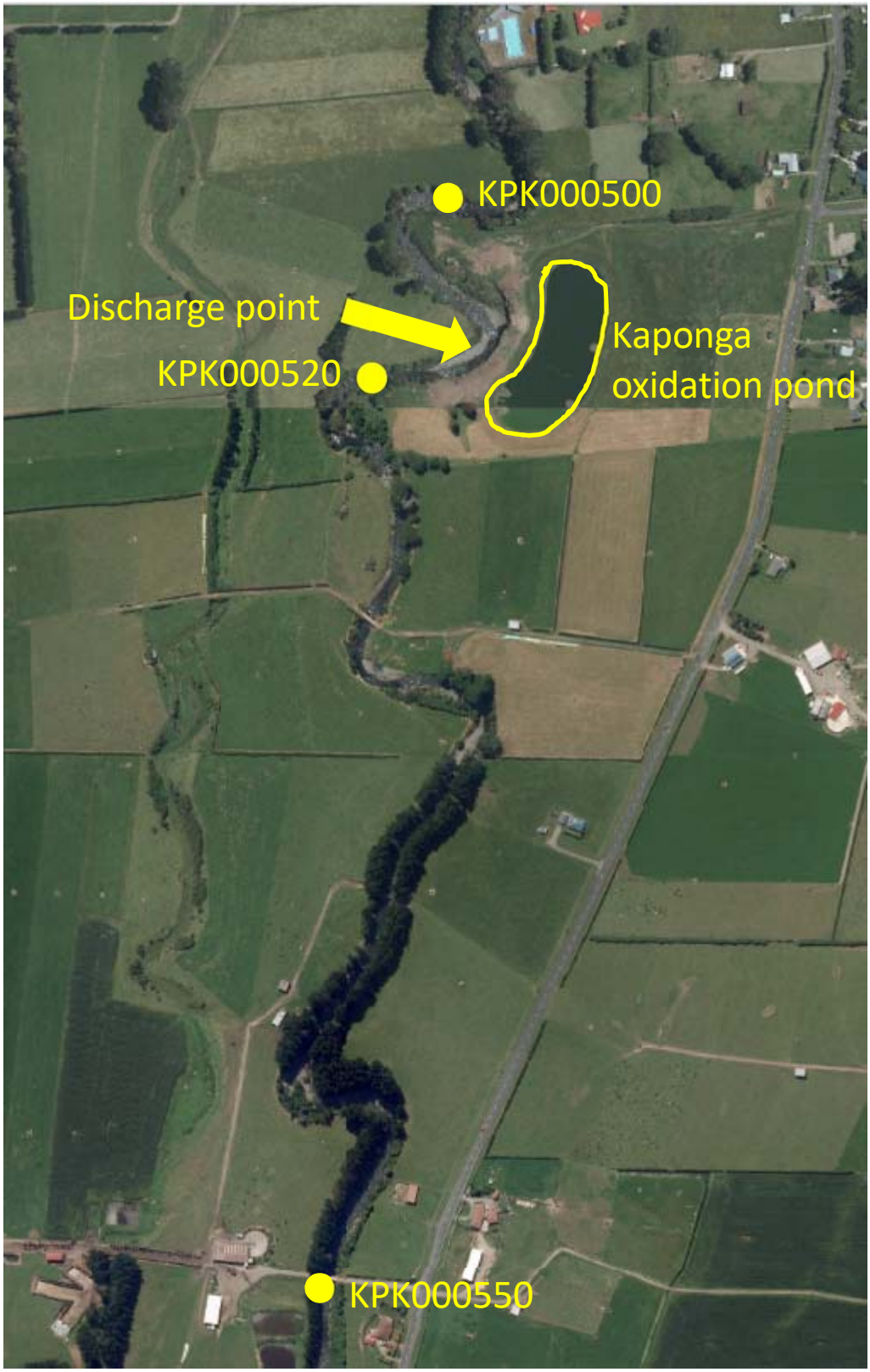


Figure 1 Biomonitoring sites in the Kaupokonui River in relation to Kaponga oxidation ponds system

Results

Site habitat characteristics and hydrology

This summer survey was performed under low flow conditions (approximately 60% of median flow), eight days after a fresh in excess of 3 times median flow and 28 days after a fresh of 7 times median flow (flow gauging at the Kaupokonui Stream at Glenn Road). The survey followed a dry late spring period though there were three significant river freshes recorded over the preceding month.

The water temperatures during the survey were in the range 13.4-15.6 °C. Water speed was swift. The water was uncoloured and clear. The substrate comprised cobble/boulder. Site 1 had slippery mats and no filamentous algae, site 2 had patchy mats and no filamentous algae and site 3a had patchy mats and filamentous algae. Site 1 had patchy leaves, and sites 2 and 3a had patchy moss. All sites had no shading though site 3a did have some overhanging vegetation.

Macroinvertebrate communities

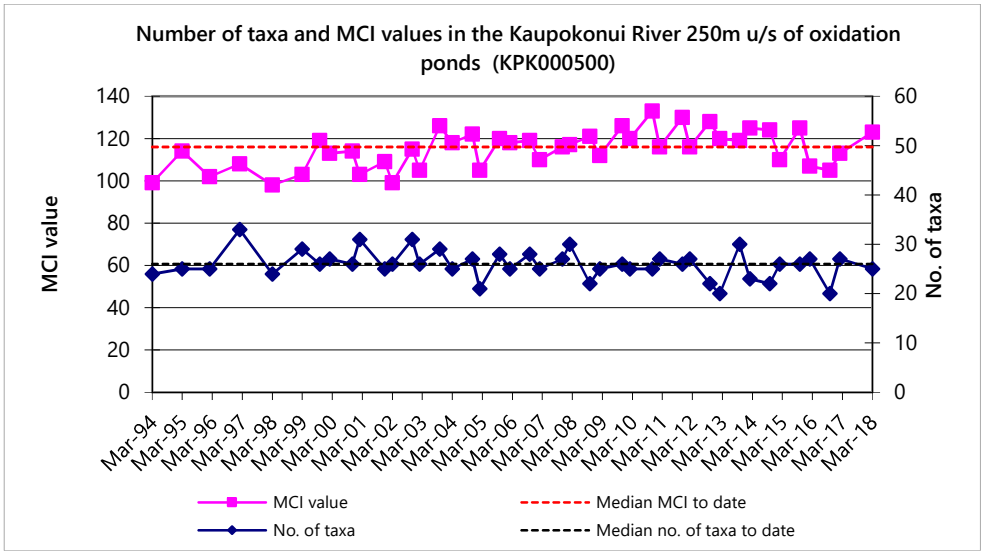
Data have been collected from various past surveys of the Kaupokonui Stream immediately upstream of Kaponga township, and 1.3 km downstream of the oxidation ponds' discharge near the more recently established site 3a.

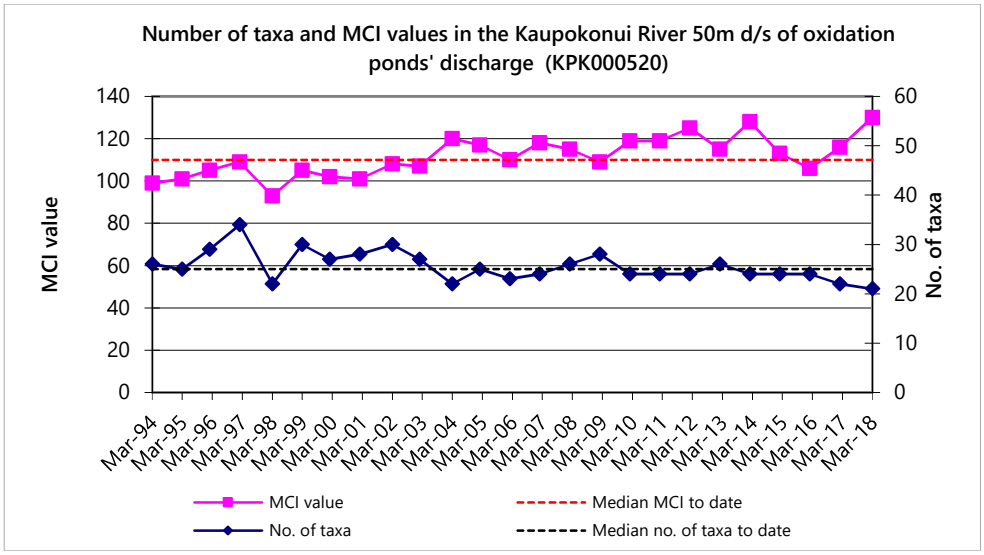
Data obtained from previous biomonitoring surveys are summarised in Table 4 and illustrated in Figure 2.

Table 4 Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between March 1987 and October 2017 and the current survey

Site No.	No of surveys	No of taxa			MCI value			$SQMCI_s$ value		
		Median	Range	Current survey	Median	Range	Current survey	Median	Range	Current survey
1	44	26	18-33	25	116	98-133	123	6.4	2.4-7.8	7.0
2	24	25	22-34	21	110	93-128	130	5.7	3.6-7.7	7.5
3a	24	26	15-32	22	108	92-126	122	5.7	3.1-7.5	7.5

The results of the current survey are presented in Table 5 and illustrated in Figure 2.





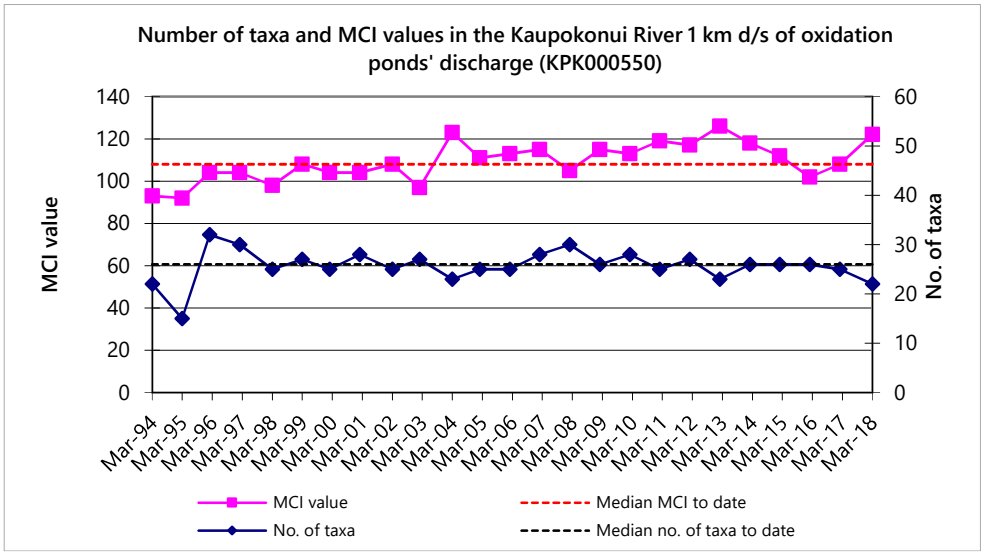


Figure 2 Taxa richness and MCI values at the three sampling sites to date

Table 5 Macroinvertebrate fauna of the Kaupokonui River in relation to the Kaponga oxidation ponds discharge sampled on 1 March 2018

Taxa List	Site Number	MCI score	1	2	3a
	Site Code		KPK000500	KPK000520	KPK000550
	Sample Number		FWB18100	FWB18101	FWB18102
ANNELIDA (WORMS)	Oligochaeta	1	-	R	R
MOLLUSCA	*Potamopyrgus*	4	R	-	R
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	A	R	C
	Coloburiscus	7	VA	A	A
	Deleatidium	8	XA	XA	XA
	Nesameletus	9	VA	A	A
PLECOPTERA (STONEFLIES)	*Megaleptoperla*	9	C	R	-
	Zelandoperla	8	R	R	R
COLEOPTERA (BEETLES)	Elmidae	6	VA	A	A
	Hydraenidae	8	C	C	R
	Ptilodactylidae	8	-	-	R
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	A	A	C
TRICHOPTERA (CADDISFLIES)	*Hydropsyche (Aoteapsyche)*	4	VA	A	A
	Costachorema	7	R	R	C
	Hydrobiosis	5	A	C	R
	Plectrocnemia	8	R	R	R
	Beraeoptera	8	A	R	A
	Helicopsyche	10	R	R	-
	Olinga	9	C	C	C
	Pycnocentrodes	5	A	-	C
DIPTERA (TRUE FLIES)	*Aphrophila*	5	VA	A	A
	Eriopterini	5	R	C	R
	Maoridiamesa	3	R	-	C
	Orthocladiinae	2	A	A	A
	Muscidae	3	R	-	-
	Austrosimulium	3	R	-	-
	Tanyderidae	4	R	R	-
	No of taxa		25	21	22
	MCI		123	130	122
	SQMCIs		7.0	7.5	7.5
	EPT (taxa)		14	13	12
	%EPT (taxa)		56	62	55

'Tolerant' taxa | 'Moderately sensitive' taxa | 'Highly sensitive' taxa

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

Site 1 (approximately 250 m upstream of oxidation ponds)

A moderately high macroinvertebrate community richness of 25 taxa was found at site 1 ('control' site) at the time of the summer survey (Table 4) which was one taxon less than the historic median (26 taxa) and two taxa less than the previous survey (27 taxa) on October 2017.

The MCI score of 123 units indicated a community of 'very good' biological health which was not significantly different (Stark, 1998) to the median MCI score of 116 units and to the previous survey score (113 units). The $SQMCI_S$ score of 7.0 units was not significantly different to the median $SQMCI_S$ score of 6.4 units but was significantly higher than the previous survey (5.4 units) (Table 4).

The community was characterised by two 'tolerant' taxa [caddisfly (*Hydropsyche-Aoteapsyche*) and midge (Orthocladiinae)], five 'moderately sensitive' taxa (mayflies (*Austroclima* and *Coloburiscus*), elmid beetles, dobsonfly (Archichauliodes), caddisflies (*Hydrobiosis* and *Pycnocentrodes*), and cranefly (*Aphrophila*)] and three 'highly sensitive' taxa [mayflies (*Deleatidium* and *Nesameletus*) and caddisfly (*Beraeoptera*)] (Table 5).

Site 2 (50 m downstream of oxidation ponds)

A moderate macroinvertebrate community richness of 21 taxa was found at site 2 ('primary impact' site) at the time of the summer survey (Table 4) which was four taxa lower than the historic median (25 taxa) and one taxon less than the previous survey (22 taxa) on February 2017.

The MCI score of 130 units indicated a community of 'very good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 110 units and to the previous survey score (116 units). This is the highest MCI score recorded at this site to date. The $SQMCI_S$ score of 7.5 units was significantly higher than the median $SQMCI_S$ score of 5.7 units but was not significantly different to the previous survey (6.9 units) (Table 4).

The community was characterised by two 'tolerant' taxa [caddisfly (*Hydropsyche-Aoteapsyche*) and midge (Orthocladiinae)], four 'moderately sensitive' taxa (mayfly (*Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and cranefly (*Aphrophila*)] and two 'highly sensitive' taxa [mayflies (*Deleatidium* and *Nesameletus*)] (Table 5).

Site 3a (approximately 1 km downstream of oxidation ponds)

A moderate macroinvertebrate community richness of 22 taxa was found at site 3a ('secondary impact' site) at the time of the summer survey (Table 4) which was four taxa lower than the historic median (26 taxa) and three taxa less than the previous survey (25 taxa) on February 2017.

The MCI score of 130 units indicated a community of 'very good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 108 units and to the previous survey score (108 units). The $SQMCI_S$ score of 7.5 units was significantly higher than the median $SQMCI_S$ score of 5.7 units but was not significantly different to the previous survey (7.1 units) (Table 4). This is equal to the highest $SQMCI_S$ score recorded at this site to date.

The community was characterised by two 'tolerant' taxa [caddisfly (*Hydropsyche-Aoteapsyche*) and midge (Orthocladiinae)], three 'moderately sensitive' taxa (mayfly (*Coloburiscus*), elmid beetles, and cranefly (*Aphrophila*)] and three 'highly sensitive' taxa [mayflies (*Deleatidium* and *Nesameletus*) and caddisfly (*Beraeoptera*)] (Table 5).

Discussion and conclusions

Macroinvertebrate richnesses were moderate to moderately high and were indicative of good community richnesses typical of sites at an altitude range of 230 to 260 m asl in the mid-reaches of a river draining a developed catchment. Richnesses were similar to historic medians, being within one to four taxa of historic medians. The 'control' site (site 1) was three to four taxa higher than the 'impact' sites (sites 2 and 3a) but the overall difference was negligible.

The MCI scores were indicative of 'very good' stream biological health. The MCI scores were not significantly different between sites indicating no significant change in macroinvertebrate health below the WWTP discharge. Furthermore, both the 'impact' sites had scores significantly higher than historic medians indicating better than normal preceding water quality.

The $SQMCI_s$ can be more sensitive to organic pollution compared with the MCI. The $SQMCI_S$ values indicated 'excellent' health at all three sites. They were not significantly different between the three sites and the two 'impact' sites had higher values than the 'control' site. Congruent with the MCI values both 'impact' sites had values significantly higher than historic medians further reinforcing the MCI results of better than normal preceding water quality.

There was no visual sign or microscopic evidence of any unusual heterotrophic growths present or forming on the substrate at any site, indicating that the Kaponga oxidation pond system discharge had had no recent impact on the riverbed microflora.

Overall, the community richnesses, compositions, and MCI scores were indicative of no recent impacts of the oxidation ponds system's treated wastes discharge on the macroinvertebrate fauna of the surveyed reach of the Kaupokonui River. The absence of heterotrophic growths on the river's substrate was further confirmation of no impacts of the discharge on the biological communities of the river.

Summary

The Council's standard 'kick-sampling' technique was used to collect streambed macroinvertebrates from the Kaupokonui River at three established sites. Each sample was processed to provide number of taxa (richness), MCI score, $SQMCI_S$ score, and %EPT taxa.

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

Taxa numbers were moderate to moderately high and were very similar to those found at previous surveys as indicated by the closeness to their respective historical medians. MCI scores indicated that the stream communities were of 'very good' generic health and there was no significant differences between the 'control' site and 'impact' site scores or to historic medians. $SQMCI_S$ scores were congruent with MCI scores and indicated 'excellent' health. There was no visual sign or microscopic evidence of any unusual heterotrophic growths present or forming on the substrate at any site.

This summer macroinvertebrate survey indicated that the discharge of treated oxidation ponds wastes from the Kaponga wastewater treatment plant site had not had any detrimental effect on the macroinvertebrate communities of the Kaupokonui River. No decreases in macroinvertebrate community health were found at the two sites downstream of the discharge.

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File note

2 July 2018

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Manaia Oxidation Ponds Marine Ecological Inspection – 27 June 2018

A marine ecological inspection of the foreshore, in the vicinity of the discharge from the Manaia oxidation pond system, was carried out on 27 June 2018 at 14:30 (NZST). Low tide on this day was at 15:21 (NZST), at a height of 0.6 m above chart datum. At the time of the inspection, there was a north easterly breeze, and weather conditions were overcast. Inshore waters were very turbid during the inspection. This was the first and only intertidal inspection undertaken for the Manaia oxidation pond programme (Spordmon 3) during the 2017-2018 monitoring period. The inspection was later than usual, and followed a short dry period of weather.

The Manaia Creek (Unnamed Stream 27, Consent 1204-4) was in moderate flow during the inspection (Photo 1).

Photo 1 Waterfall in the Manaia Creek, in moderate flow (27 June 2018)

As noted in the previous inspection, the area surrounding the discharge channel had been fenced (Photo 2).

Photo 2 Fencing around the discharge channel from the oxidation ponds

The intertidal inspection consisted of a qualitative assessment of the species present on the reef. The inspection covered the area where the stream flowed across the reef (Photo 3), and an area up to approximately 50 m northwest of the stream, and included high, middle and low shore. The stream was approximately 10 m wide at the coast, and had a slight yellow-brown colouration. The water was turbid, with no surface foam present. Orange deposits coating cobbles and boulders within the influence of the stream were noted in the midshore intertidal region (Photo 4). A mild sewage odour was detected downwind of the water flow.

Photo 3 Manaia Creek flowing over the intertidal reef at Manaia

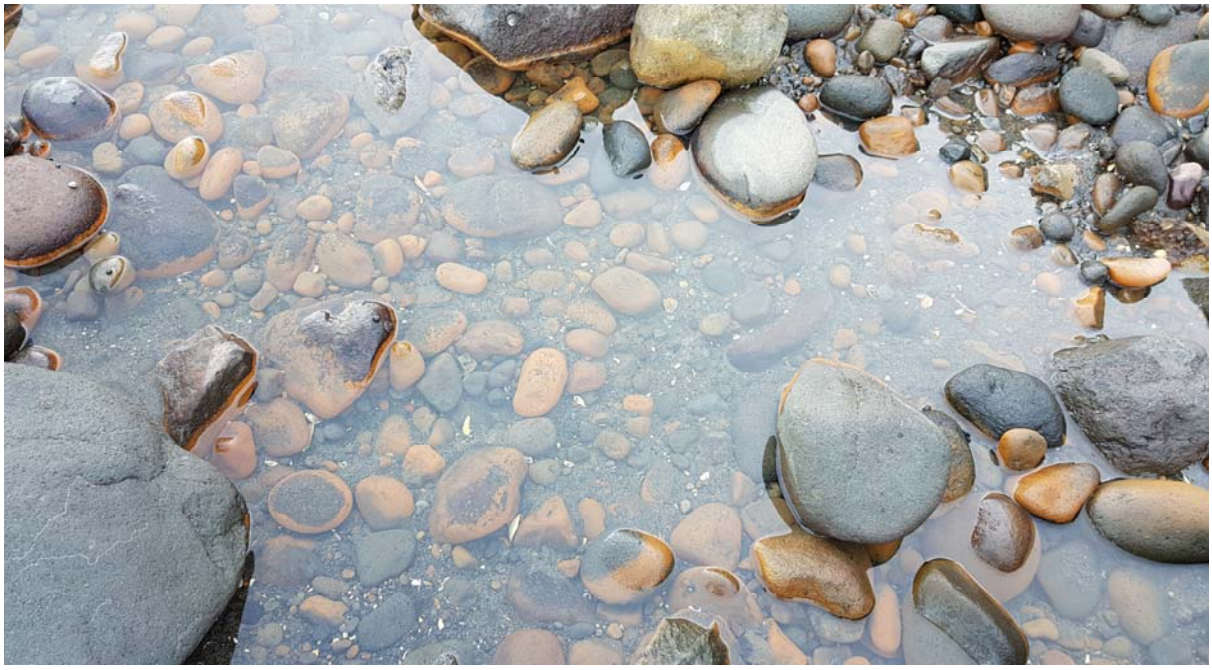

Photo 4 Cobbles and boulders within the influence of the stream, coated with yellow-orange deposits

The green macroalgal species *Ulva intestinalis* and *Ulva lactuca* stretched along the high tide mark, up to approximately 10 m east of the stream (Photo 5). These algal species are typical of freshwater influence and thrive under nutrient rich conditions. At the top of the intertidal region, within the vicinity of the stream, the gastropods *Austrolittorina cincta, Austrolittorina antipodum* and *Diloma arida* were abundant, as well as the bivalve *Xenostrobus pulex*. Other species became more abundant further away from the stream, including the limpet *Cellana radians*, the gastropods *Haustrum scobina* and *Diloma aethiops*, and the barnacles *Austrominius modestus* and *Chamaesipho columna*. Gastropods found within the immediate vicinity of the stream appeared to be unhealthy and weakly attached to the substrate. Twenty-six algal and animal species were identified in the upper shore region, in the vicinity of the stream, during the inspection (Photo 6). It should also be noted that the reef had a moderate amount of sand cover.

Photo 5 *Ulva* spp. at the high tide mark, either side of the Manaia Creek

Photo 6 A range of species identified in the vicinity of the stream, in the upper intertidal region

A greater diversity and abundance of algal and animal species occurred at the mid and low tidal regions, as typical of intertidal marine communities, and expected with the diminishing influence of the stream. At the mid and low shore elevations, 33 animal and algal species occurred within the vicinity of the stream. *Ulva* intestinalis was present within the direct influence of the stream. The algal species *Corallina officinalis*, encrusting *Corallina* spp., *Gelidium caulacantheum, Ralfsia* sp. and *Hormosira banksii* were present on boulders within the stream, becoming more abundant lower down the shore (Photo 7). As with the upper shore, some animals found within the immediate vicinity of the stream in the mid and low tidal regions appeared to be unhealthy and desiccated, including specimens of *Diloma aethiops* and *Patiriella regularis*.

Photo 7 The brown alga *Hormosira banksii,* in the vicinity of the Manaia Creek, in the lower reaches of the shore

Thirty-five species were found more than 50 m to the north west of the stream in the mid and low shore regions, with an obvious change in the appearance of the reef. Although the diversity of species was similar within and away from the influence of the stream, the abundance of organisms found away from the stream was considerably higher. The species only found away from the influence of the stream included the starfish *Coscinasterias muricata* and an unidentified species of red alga. The green lipped mussel *Perna canaliculus* was abundant at low shore both within and away from the influence of the stream.

In summary, the stream appeared to have a significant effect on nearby intertidal organisms, most likely a result of freshwater influence. *Ulva* spp. were evident along the length of the stream, although the cover was notably less dense than observed during previous surveys, and was not abundant beyond the 50 m mixing zone extending either side of the stream. Prolific growth of *Ulva* spp. is typical of nutrient enrichment. The diversity and abundance of intertidal communities, both within the influence of and away from the stream, was typical of that found at other reef sites around Taranaki. Species diversity appeared to have improved considerably at the Manaia Reef, since the previous reef inspection, although the abundance and health of organisms were limited in the direct influence of the stream.

Angela Smith

Technical Officer

Thomas McElroy

Marine Ecologist

Appendix III

STDC 2017-2018 Annual Report

882/15

17 August 2018

The Chief Executive Officer
Taranaki Regional Council
Private Bag 713
Stratford

Dear Sir

Wastewater Annual Reports - July 2017 to June 2018

This report covers the operation, maintenance, improvements, inflow and infiltration effects and actions for our municipal wastewater schemes Hawera, Manaia, Eltham, Kaponga, Waverley, Wai-inu, Patea and Opunake for the year 1 July 2017 to 30 June 2018.

Hawera Wastewater Treatment Site - **Consent 5079**

Dissolved oxygen grab sampling from the maturation cells indicates that the compliant limit of 2ppm was achieved for 90% of the time and in-line dissolved oxygen continuous recording in pond 1 was above the minima for an average of 50% of the time and pond 2 was above the 2ppm for 58% of the time. No objectionable odours were evident from either of the aerobic ponds however anaerobic pond odours were noticeable at close proximity on site although unnoticeable at the site boundaries.

A new and additional aerator, Aquarator brand, was installed in Pond 2 in May 2018 as a trial. A decommissioned brush aerator is being refurbished and is to be installed in Pond 2 to provide extra aeration capacity by September this year.

Pond 2 inlet fouled on several occasions; this affected the flow split and loading portions for the ponds at times. The fault was rectified by cleaning the internals with a water blaster. Manual flow monitoring in the open channels discharging to the two ponds is being undertaken at more regular intervals to identify any obstruction early; continuous flow indication is being investigated.

Parklink Ltd continues to carry out bacterial dosing of Pond 1 for the purpose of sludge digestion to maintain pond capacity.

No overflows took place from any of the retention basins to the environment, however the outfall discharge figures show the consented 7 day average, of 12,000m^3, being exceeded on 46 days during prolonged rainfall events. Specific reports were provided to TRC and Iwi at the time for these excursions, and the associated norovirus sampling results for reef shellfish.

Cyclonic grit removal and washing equipment was installed however is yet to be fully commissioned due to prolonged issues with the control cabinet. These are expected to be corrected by the end of 2018. The anaerobic lagoon effluent quality has been variable so performance monitoring has been increased with a view to planning improvements in conjunction with Silver Fern Farms Ltd, the prime user.

The existing tankered waste disposal structure has been in use throughout the year. Solids are separated for disposal at the Colson Road landfill, and the liquid portions are discharged either to the anaerobic lagoon or to the aerobic ponds. Dumping of less desirable wastes, fats and gross

solids, occurs from time to time, however truck operators are controlled more effectively now via Trade Waste Bylaw provisions. Use of security swipe card activated automated entry gate and on-site camera monitoring is a possibility for future.

With the introduction of a Trade Waste Bylaw in mid-2017 a Trade Waste Officer was appointed, systems were setup, consenting progressed and monitoring of trade premises is occurring with mostly positive results to date.

Data and graphical reports covering the pond dissolved oxygen levels and discharge flows continue to be posted on "WaterOutlook" cloud website which TRC officers can access. Annual summary reports are attached for reference.

The marine outfall discharge consent renewal was granted by the TRC in June 2018 and STDC are now operating under this, implementing changes, setting up interest groups and studies in accordance with the new consent conditions.

Other wastewater plant sites

A stream assessment study was initiated for Waverley's receiving waterway and the working party is established under a draft Memorandum of Understanding (MOU). A flow meter was installed on the discharge from the plant and a control valve has been installed on the outflow to maintain the discharge within consented limits. Fencing for riparian planting was carried out, and the planting has occurred. A stream assimilative study is underway as-with monitoring of the discharge and the receiving water.

Opunake's consent renewal was lodged and is being considered by the TRC officers. Performance has been satisfactory although wet weather poses difficulties with inflow and disposal to land. Resulting in an Abatement Notice issued on 15 June from the TRC. Corrective actions were put in place to alleviate occurrences of localised wetland ponding and overland flow

Eltham pond had an extra 'bubbler' aerator installed, along with a stand-by 55kW aerator loaned by Fonterra.

Manaia pond has a trial of bacterial enhancement dosing underway via ForEarth Pty Ltd Dosing and their brand of aerators was installed near the inlet. Both are performing well and have improved pond performance. The coastal cliff access track was upgraded to ease inspection and sampling.

Patea York Street pump station had an overflow for 4 hours on 10 April 2018, as result of a mains power outage during a storm. TRC, the District Health Board and the local iwi were informed and warning signs erected. A backup generator was put on stand-by at the site for later that day when storm conditions were forecasted to worsen but was not needed.

Wai-inu plant replacement was tendered and installation and commissioning is expected in 2019.

Inflow and Infiltration

Resource Consents for the following consents require progress reports covering inflow and infiltration reduction. Manaia's Consent 1204-4, condition 12; Hawera's Consent 5079-1, condition 11 and Hector Place, Opunake's Consent 1236-6, condition 13.

The table below shows pipe lining work carried out during the 2017/18 year to reduce infiltration, totalling 1,382 metres at a cost of $515,900.

Area	Street	Length (m)
Hawera	213-215 Glover Road	34
	41-49 Union Street	74
	2 Waihi Road	50
	141-151 Waihi Road	94
	100-104 Manawapou Road	93
	97-99 Camberwell Road	111
	54-64 Camberwell Road	84
	7-13 Milmoe Street	51
	3 Regent Street	44
	199-207 Glover Road	66
	70-80 Camberwell Road	71
	73-81 Camberwell Road	70
	Union Street	158
	Total	1,000
Eltham	Conway Road	166
	Total	166
Normanby	Waihi Road	204
	Kerry Lane	12
	Total	216
District	*Grand total*	**1,382**

Other infiltration reduction work consisted of:

- 1,382m of CCTV was carried out in Nolantown, Hawera, costing $83,779.
- Sub-standard manhole lids were also identified during manhole inspections of Kaponga with 9 replaced, Nolantown had 9 replaced, Patea 26 replaced, Normanby 8 replaced, Eltham 33 replaced, Manaia 7 replaced and Waverley with 4 replaced. Work is on-going in Waverley.
- Manaia house inspections and smoke testing carried out with 28 properties needing repairs; 3 have yet to be corrected.
- Nolantown and Normanby had 18 faults found during house inspections and smoke testing.

The priority for inflow and infiltration works for next year will again concentrate in Eltham, Hawera and Normanby whilst expanding to Waverley and Opunake with house inspections and smoke testing to identify and resolve faulty connections.

Yours sincerely

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Wastewater Supervisor

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