

New Plymouth District Council
Inglewood WWTP
Monitoring Programme
Annual Report
2021-2022

Technical Report 2022-36



Working with people | caring for Taranaki



Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

The New Plymouth District Council (NPDC) operates a municipal wastewater treatment plant (WWTP) located on Lincoln Road at Inglewood, in the Kurapete catchment. This report for the period July 2021 to June 2022 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess NPDC's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of NPDC's activities.

During the monitoring period, NPDC demonstrated a high level of environmental performance and high level of administrative performance.

NPDC holds one resource consent to intermittently discharge treated wastewater to the Kurapete Stream, which includes a total of nine conditions setting out the requirements that they must satisfy.

The Council's monitoring programme for the year under review included five inspections, wastewater effluent analyses, three water samples collected from the Kurapete Stream for physicochemical analysis, and one biomonitoring survey of receiving waters.

NPDC's maintenance programme continues to generally enhance the operation and appearance of the plant and effectively control any produced odour. No complaints were received in relation to the operation of the WWTP. Regular inspections indicated no immediate problems with the performance of the plant.

Four consented overflows were recorded during the monitoring year. No adverse environmental impacts were observed in the receiving waters as a result of these.

During the year, NPDC demonstrated a high level of environmental and administrative performance with the resource consents.

For reference, in the 2021-2022 year, consent holders were found to achieve a high level of environmental performance and compliance for 88% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 10% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance remains at a high level.

This report includes recommendations for the 2022-2023 year.

Table of contents

	Page	
1	Introduction	1
1.1	Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1	Introduction	1
1.1.2	Structure of this report	1
1.1.3	The Resource Management Act 1991 and monitoring	1
1.1.4	Evaluation of environmental performance	2
1.2	WWTP system	2
1.2.1	Inflow and infiltration reduction	3
1.3	Resource consents	4
1.4	Monitoring programme	4
1.4.1	Introduction	4
1.4.2	Programme liaison and management	5
1.4.3	Data Review	5
1.4.4	Site inspections	5
1.4.5	Chemical sampling	5
1.4.6	Biological monitoring	5
2	Results	6
2.1	Inspections	6
2.2	Results of effluent monitoring	7
2.2.1	Dissolved oxygen levels	7
2.2.2	Microfloral component	8
2.3	Emergency overflow monitoring	9
2.3.1	Effluent monitoring	10
2.3.2	Receiving environment	10
2.3.2.1	Receiving water quality	10
2.3.2.2	Macroinvertebrate monitoring	11
2.4	Incidents, investigations, and interventions	12
3	Discussion	14
3.1	Discussion of site performance	14
3.2	Environmental effects of exercise of consents	14
3.3	Evaluation of performance	14
3.4	Recommendations from the 2020-2021 Annual Report	16
3.5	Alterations to monitoring programmes for 2022-2023	16

4	Recommendations	17
	Glossary of common terms and abbreviations	18
	Bibliography and references	20
Appendix I	Resource consents held by NPDC	
Appendix II	Categories used to evaluate environmental and administrative performance	

List of tables

Table 1	Resource consent held by NPDC in relation to the Inglewood WWTP	4
Table 2	Dissolved oxygen measurements from the Inglewood WWTP	8
Table 3	Chlorophyll-a levels and main pond appearance	9
Table 4	Overflow sampling, 10 February 2022	10
Table 5	Water quality monitoring, 10 February 2022	11
Table 6	Biomonitoring sites in the Kurapete Stream	12
Table 7	Summary of performance for consent 1449-5	14
Table 8	Evaluation of environmental performance over time	15

List of figures

Figure 1	Sampling sites in the Kurapete Stream in relation to Inglewood oxidation ponds with taxa number, MCI scores and SQMCI scores for each site	12
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List of photos

Photo 1	Inglewood WWTP	3
Photo 2	The Inglewood WWTP main pond	7
Photo 3	Dissolved oxygen monitoring	8

1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2021 to June 2022 by the Council describing the monitoring programme associated with resource consents held by New Plymouth District Council (NPDC). NPDC operates a municipal wastewater treatment plant (WWTP) situated on Lincoln Road at Inglewood.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consent held by NPDC that relates to the intermittent discharge of treated wastewater in the Kurapete catchment. This is the 35th annual report to be prepared by the Council to cover NPDC's discharge and its effects.

1.1.2 Structure of this report

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

- consent compliance monitoring under the *Resource Management Act 1991* (RMA) and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consent held by NPDC in the Kurapete catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Inglewood WWTP.

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

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

Section 4 presents recommendations to be implemented in the 2022-2023 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

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

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the

obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental performance

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

For reference, in the 2021-2022 year, consent holders were found to achieve a high level of environmental performance and compliance for 88% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 10% of the consents, a good level of environmental performance and compliance was achieved.¹

1.2 WWTP system

Since late 1999, municipal wastewater from the Inglewood WWTP (Photo 1) has been pumped and gravity-fed to the New Plymouth WWTP, for further treatment prior to discharge to the Tasman Sea. Due to the limited capacity of the Moa-Nui pipeline from the Inglewood WWTP, overflows are likely to occur during extreme peak flows, when stormwater and groundwater infiltration are excessive. Overflow facilities are used during peak storm flows to treat pond effluent before discharge to the stream occurs. These consist of a shallow primary aeration pond that flows into the main pond for longer-term storage prior to pumping to New Plymouth. No continuous discharge occurs from the ponds' system in the long term.

The present population serviced by the Inglewood system is close to 3,000 persons, and industrial waste is a minimal component of the wastewater loading on the system. Historical problems relating to siltation of the treatment ponds and refurbishment measures undertaken by NPDC have been documented in several annual reports prepared by the Council (TRC, 2015(b)).

No additional trade waste connections to the sewerage reticulation were recorded during this monitoring period. It should be noted that industrial waste disposal tankers are not encouraged to use the plant for disposal and treatment purposes, but preferably to utilise the New Plymouth WWTP (NPDC, pers. comm.). Controlled facilities also exist at the Stratford and Hawera oxidation ponds treatment systems for wastes disposal of this nature from within those districts.

¹ The Council has used these compliance grading criteria for more than 18 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018



Photo 1 Inglewood WWTP

1.2.1 Inflow and infiltration reduction

Development and implementation of a stormwater infiltration reduction programme, as required by Special Condition 7 of the consent was instigated by NPDC, and progress has been reported at required intervals.

Considerable work has been reported, including a manhole replacement programme, lateral replacements, ongoing sewer patching, and continued flow monitoring. NPDC have committed to reducing influent volumes to achieve a nil overflow situation. This will achieve the ultimate objective of no wastewater discharges to the Kurapete Stream. Achieving this outcome depends to some extent on the existing condition of the reticulation.

During the 2017-2018 period, an inflow and infiltration assessment was carried out using distributed temperature sensing (DTS) methodology at a cost of \$63,000. From the report it was recommended that specific investigations occur at 14 locations from which a remediation strategy can then be prepared. The recommended inspections were:

- 12 manhole inspections;
- 14 CCTV inspections over a total distance of 700 m;
- Up to 50 property inspections.

During 2018-2019 work was carried out directly related to these recommendations, with \$7,000 spent on CCTV inspections, and \$4,000 spent on smoke testing and inspections for low gully traps on properties. Remediation works including relining 112 m of pipe were also undertaken at a cost of \$27,000.

In total within the Inglewood catchment during 2018-2019:

- \$66,000 was spent on pipe lining
- \$71,000 was spent on pipeline renewals and rehabilitating defects identified during previous CCTV inspections

During the 2019-2020 year expenditure on inflow and infiltration reduction consisted of:

- \$55,030 spent on pipe lining
- \$342,498 spent on pipeline renewals

During the 2020-2021 year expenditure on inflow and infiltration reduction consisted of:

- \$322,000 spent on pipeline renewals.

Inflow and infiltration expenditure during the 2021-2022 monitoring year consisted of:

- \$3,325 spent on pipeline renewals
- \$891 spent on CCTV.

The expenditure for pipeline renewals was entirely on project management, investigation and design. No construction occurred.

A wastewater network modelling project is underway which uses rainfall and flow data to create a calibrated digital model of the entire Inglewood wastewater network. The calibrated model will be used to assess network performance under different storm events of varying duration and return interval, along with projected growth within the catchment and the impacts of climate change.

The aim of this is to identify the underlying factors that are causing the predicted and observed overflows across the network in order to inform and guide an inflow and infiltration investigation programme. This is expected to be completed by October 2022, with concept design and infiltration investigation planning for critical issues identified expected to take a further one to two years.

1.3 Resource consents

NPDC holds one resource consent in relation to the Inglewood WWTP the details of which are summarised in the table below. A summary of the conditions attached to the permit is set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included in Appendix I, along with a copy of the permit.

Table 1 Resource consent held by NPDC in relation to the Inglewood WWTP

Consent number	Purpose	Granted	Review	Expires
1449-5	To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream	June 2016	June 2025	June 2033

1.4 Monitoring programme

1.4.1 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.

The monitoring programme for the Inglewood WWTP consisted of four primary components.

1.4.2 Programme liaison and management

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

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

1.4.3 Data Review

NPDC undertake a significant amount of self-monitoring of the performance of the WWTP. The data gathered is reported to the Council on a monthly basis, and is reviewed by the Council to determine compliance with consent conditions.

1.4.4 Site inspections

Five inspections (three scheduled and two additional, related to overflow events) were undertaken at the Inglewood WWTP during the monitoring period. The main points of interest were plant operation, maintenance, upgrades, and occurrence of any discharges of treated wastewater. These inspections provided for the operation, internal monitoring, and supervision of the plant to be reviewed by the Council.

1.4.5 Chemical sampling

The Council undertook sampling of the secondary pond effluent from the site three times, for the purposes of monitoring dissolved oxygen and algal populations in the system.

Sampling was also undertaken during an overflow event, consisting of an effluent sample and three samples of the Kurapete Stream (one upstream and two downstream sites).

1.4.6 Biological monitoring

One biological survey was performed in the Kurapete Stream to determine if the consented overflow discharge of treated wastewater from the site had had a detrimental effect upon the communities of the stream.

2 Results

2.1 Inspections

24 September 2021

The primary screen was operating and wastes were fully contained. The aerator was operating and the pond was discharging into the main pond.

The secondary pond was pale green and slightly turbid. Numerous paradise and mallard ducks were present, along with several black swans. The discharge flow rate to the NPWWTP was 158 m³/hr.

There had been no recent overflow discharge into the Kurapete Stream. The WWTP surrounds and facilities were satisfactory and no significant odour issues were noted.

2 February 2022

The primary screen was operating and wastes were fully contained. The primary lagoon was a turbid dark green brown colour. The paddle aerator was operating.

The secondary pond was light green and slightly turbid. Numerous paradise and mallard ducks were present on the surface of the pond (> 1000), along with several black swans. The discharge flow rate to the NPWWTP was 52 m³/hr. There had been no recent overflow discharge into the Kurapete Stream. The stream was running at a low flow, and was clear and uncoloured at the time of the inspection.

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

10 February 2022

The site was visited following notification from NPDC that heavy rain had caused overflow to the Kurapete Stream. The discharge had no significant visual effect downstream in the receiving waters. Samples were collected of the discharge, upstream and two sites downstream.

11 May 2022

The primary screen was operating and wastes were fully contained. The pond level had been lowered in the primary lagoon to allow a survey to be carried out around the wave band perimeter (remedial works are planned during the 22/23 summer). The pond was turbid and green-brown in colour. The aerator was not operating due to the low level. The secondary pond was light green and slightly turbid. The main pond was turbid, and light green in colour. Wildlife was abundant on the pond with more than 250 mallard ducks, and several black swans present.

The pond level was low with no discharge to NPWWTP. There had been no recent overflow discharges into the Kurapete Stream and this was running at a low flow, and was clear and uncoloured at the time of the inspection.

No significant odour issues were noted and the surrounds were tidy.

13 June 2022

An inspection was undertaken as NPDC had notified Council on 9 June 2022 that the Inglewood WWTP was overflowing into the Kurapete Stream. The discharge into the Kurapete Stream was estimated at 40 L/sec (144 m³/hr). The discharge consisted of mainly rain water, with some partially treated wastewater. This was slightly turbid/cloudy and light greyish in colour. The Kurapete Stream was running at a moderate swift flow and there was no significant visual environmental impact of the discharge observed downstream of the WWTP discharge.

2.2 Results of effluent monitoring

In past monitoring periods, samples of the plant system's effluent have been analysed as a component of summer assessments of effects in the receiving waters of the Kurapete Stream. Since the wastewater diversion to the New Plymouth WWTP was completed prior to the summer of 1999-2000, no summer physicochemical effluent or receiving water sampling has been necessary, although regular sampling of the main pond (Photo 2) is carried out to assess the performance of the ponds. Any periods of overflow events are monitored by the consent holder (wastewater only), with samples collected and analysed by NPDC at the time of each event. There is also provision in the monitoring programme for the Council to collect samples from the discharge and from three sites in the Kurapete Stream should any significant overflow events occur.

Measurements of chlorophyll-a, dissolved oxygen and temperature were taken from the surface of the main pond (Photo 2) adjacent to the final section during each scheduled inspection. The results from this monitoring are presented in Sections 2.2.1 and 2.2.2.



Photo 2 The Inglewood WWTP main pond

2.2.1 Dissolved oxygen levels

The dissolved oxygen (DO) 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 DO 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 Inglewood WWTP effluent was analysed for DO and temperature, and the results are displayed in Table 2.

DO concentrations in the pond varied between 42% and 88% saturation in the surface layer of the main pond near the outlet (Table 2, Photo 3). These results were similar to those usually recorded at this point (the historical median is 71%, with super-saturation recorded in around 15-20% of samples), and indicated

that DO was present at all times in the surface layer of the pond. The variation in saturation levels measured to date has been typical of a biological treatment system in which the photosynthetic contribution of the microfloral population often causes wide DO variations.

Table 2 Dissolved oxygen measurements from the Inglewood WWTP

Date	Time (NZST)	Temperature (°C)	Dissolved Oxygen	
			Concentration (g/m ³)	Saturation (%)
24 Sep 2021	0830	14.0	8.8	88
2 Feb 2022	0950	25.7	4.5	55
11 May 2022	0840	13.1	4.4	42



Photo 3 Dissolved oxygen monitoring

2.2.2 Microfloral component

Pond microflora are very important for the stability of the symbiotic relation between aerobic bacteria in the 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 main pond effluent were collected during each inspection 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 the main pond effluent analyses are provided in Table 3 together with field observations of pond appearance.

Table 3 Chlorophyll-a levels and main pond appearance

Date	Time (NZST)	Appearance	Chlorophyll-a (mg/m ³)	Range for the period 2013-mid 2021	
				Range	Median
24 Sep 2021	0830	Turbid, pale green	158	<1.0-270	17
2 Feb 2022	0950	Turbid, light green	122		
11 May 2022	0840	Turbid, green-grey	10.4		

This pond historically exhibits low chlorophyll-a levels, with the levels found during the first two inspections of the 2021-2022 period high compared to previous inspections (median 17). The historical low results have been attributed to ingress and flushing of stormwater during wet weather events.

2.3 Emergency overflow monitoring

Since the wastewater diversion to the New Plymouth WWTP was completed prior to 2000, only intermittent discharges from the Inglewood WWTP to the stream have occurred, related to intense rainfall events and high stormwater inflows. Any periods of overflow events are monitored by NPDC (wastewater only), with samples collected and analysed at the time of each event.

Prior to the wastes diversion, the consent holder had been required to monitor effluent quality on a two-monthly basis, as a special condition of discharge permit 1449, and report these results to the Council. This monitoring commenced in January 1992, continuing at two monthly intervals, until the diversion of the wastewater from the stream discharge. The renewed consent does not require effluent monitoring by the consent holder.

Plant effluent sampled during overflow events to date has had a relatively clear appearance with very good effluent quality due to the extensive dilution provided by the stormwater infiltration.

There were four consented overflow events during the 2021-2022 period. These occurred on 13 December 2021, 9 and 11 February 2022, and 9 June 2022. NPDC has a detailed incident response plan for overflows which includes: notifying the Council and TDHB, erecting signage, undertaking sampling of the effluent, and providing a written incident report to various parties. This plan was implemented in response to each overflow event during 2021-2022, with Council receiving an incident report once the discharge ceased.

Two additional compliance monitoring inspections were carried out by Council in February and June 2022 following self-notification of overflow discharges by NPDC. Discharge and receiving environment monitoring was undertaken during one of the inspections. There were no adverse effects found in the Kurapete Stream as a result of the overflow discharges.

2.3.1 Effluent monitoring

One sample of effluent was collected in response to an overflow that occurred on 9 February 2022. The results of the sample collected on 10 February 2022 are presented in Table 4.

Table 4 Overflow sampling, 10 February 2022

Parameter	Unit	OXPO02001 Secondary pond
Ammoniacal nitrogen	g/m ³ N	0.095
BOD5	g/m ³	7
CBOD5	g/m ³	<2
Chloride	g/m ³	9
Conductivity @ 25°C	µS/cm	126
DRP	g/m ³	0.004
E. coli	cfu/100ml	2,000
Nitrate/nitrite nitrogen	g/m ³ N	0.72
pH	pH	8.5
Temperature	Deg.C	24.7
Suspended solids	g/m ³	19
Turbidity	NTU	17
Un-ionised ammonia	g/m ³	0.0158
Appearance		Turbid green

2.3.2 Receiving environment

Physicochemical receiving water or biological monitoring surveys are no longer required due to the relative infrequency of overflow events and/or absence of measurable effects on receiving water quality. However, there is provision in the monitoring programme for these to be carried out should there be a significant and/or prolonged discharge to the stream. During the 2021-2022 monitoring period receiving water sampling and macroinvertebrate monitoring was undertaken in response to overflows that occurred in December 2021 and February 2022.

2.3.2.1 Receiving water quality

Samples were collected upstream and downstream of the discharge on 10 February 2022, the results are presented in Table 5 below.

The discharge was not causing significant adverse effects in the stream, with very little change observed between the upstream site and downstream sites for the parameters measured.

Table 5 Water quality monitoring, 10 February 2022

Parameter	Unit	Site		
		KRP000300 u/s discharge	KRP000311 75m downstream of discharge	KRP000330 300m downstream of discharge
Ammoniacal nitrogen	g/m ³ N	0.054	0.052	0.055
BOD5	g/m ³	<2	<2	<2
CBOD5	g/m ³	<2	<2	<2
Chloride	g/m ³	13	14	14
Conductivity @ 25°C	µS/cm	138	139	139
Dissolved oxygen	g/m ³	8.9	8.2	8.6
DRP	g/m ³	0.004	0.006	0.004
<i>E. coli</i>	cfu/100ml	1,500	1,500	1,300
Nitrate/nitrite nitrogen	g/m ³ N	1.4	1.3	1.3
pH	pH	7.4	7.5	7.5
Temperature	Deg.C	18.0	18.2	18.2
Suspended solids	g/m ³	<3	<3	<3
Turbidity	NTU	2.2	1.4	1.9
Un-ionised ammonia	g/m ³	0.00062	0.00069	0.00070
Appearance		Clear, uncoloured	Clear, uncoloured	Clear, uncoloured

2.3.2.2 Macroinvertebrate monitoring

An unscheduled provisional survey was undertaken on 13 January 2022 to assess any effects of significant discharges from the WWTP into the Kurapete which occurred as a result of a prolonged period of heavy rainfall in December 2021. From spring 2007, biomonitoring surveys were reduced from four sites to two sites in recognition of the minimal usage of the WWTP overflow facility to the Kurapete Stream in recent years, and scheduled surveys were suspended altogether from 2020. This programme has been reduced to a provisional basis, for example due to significant sewage overflows. This summer survey was undertaken at sites 1, 2, 3 and 4 (Table 6, Figure 1).

The Council's standard 'kick-sampling' technique was used at four established sites to collect streambed macroinvertebrates from the Kurapete Stream. Samples were processed to provide the number of taxa (richness), Macroinvertebrate Community Index (MCI) score, Semi-quantitative Macroinvertebrate Community Index (SQMCI) score, and percentage EPT taxa for each site.

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

Table 6 Biomonitoring sites in the Kurapete Stream

Site No	Site code	Grid reference	Location
1	KRP000300	1705087E 5665510N	Upstream of oxidation ponds' discharge
2	KRP000311	1705337E 5665530N	75 m downstream of WWTP
3	KRP000330	1705471E 5665658N	300 m downstream of WWTP
4	KRP000660	1709239E 5667481N	Approximately 6km downstream of oxidation ponds' discharge

Macroinvertebrate taxa richness was variable among the four sites. The upper control site had moderately low taxa richness while site 2 had low taxa richness, and sites 3 and 4 had moderate taxa richness. Though site 2 had slightly lower taxa richness than site 1 there was slightly higher taxa richness at the nearby site 3.



Figure 1 Sampling sites in the Kurapete Stream in relation to Inglewood oxidation ponds with taxa number, MCI scores and SQMCI scores for each site

The MCI scores indicated 'fair' health at sites 1, 2 and 4, and 'good' health at site 3. There were no significant differences between sites and all sites had no significant differences compared with historic medians. This indicated that macroinvertebrate communities present at the time of the survey were in typical health, with no evidence of any negative effect from the Inglewood WWTP. The SQMCI scores for sites 1 and 4 indicated 'good' health, while sites 2 and 3 were in 'fair' health. There was a significant decrease between site 1 and sites 2 and 3, followed by a significant increase between site 3 and site 4. This suggested that there was a decline in macroinvertebrate community health below the discharges. All sites had significantly higher scores than historic medians indicating better than typical health, and EPT numbers and percentages at sites 2 and 3 were also similar to those at site 1.

Overall, there was insufficient evidence to indicate that the Inglewood waste water treatment plant had had detrimental impacts on the macroinvertebrate communities of the Kurapete Stream. Discharges occur during times of extreme flows when there is high dilution making acute effects on downstream macroinvertebrate communities are unlikely.

2.4 Incidents, investigations, and interventions

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 NPDC. During the year matters may arise which require

additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach, that in the first instance avoids issues occurring, is favoured.

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

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

In the 2021-2022 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

In the 2021-2022 period, the Council undertook some additional monitoring in response to three of the (consented) overflows, as provisionally provided for in the 2021-2022 monitoring programme.

3 Discussion

3.1 Discussion of site performance

The Inglewood WWTP system has continued to perform satisfactorily, with aerobic conditions maintained throughout the monitoring period.

There were four consented overflow events, as a result of extreme wet weather conditions. NPDC continues to work towards a reduction in stormwater infiltration into the Inglewood township sewerage reticulation, as required by consent conditions. Work undertaken during the 2021-2022 period consisted of project management, investigation and design for pipeline renewals and a small amount of CCTV work. The first phase of a wastewater network modelling project is also nearing completion.

The WWTP system and surrounds continue to be maintained in good condition, with no issues with the step screen or odour from the system. Diversion of wastes to New Plymouth WWTP continued, with the pumps operating at their maximum speed for 43% of the 2021-2022 year.

3.2 Environmental effects of exercise of consents

The majority of wastewater from the Inglewood WWTP was contained and diverted to the New Plymouth WWTP during the 2021-2022 period. There were no significant adverse impacts noted downstream as a result of the four consented overflow events. Monitoring of the discharge by Council and NPDC showed a good quality effluent that was well within previously measured parameters.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 7.

Table 7 Summary of performance for consent 1449-5

Purpose: To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder to adopt best practicable option	Inspections, liaison with consent holder	Yes
2. Limits on timing of discharges	Four discharge event during the monitoring period due to heavy rainfall	Yes
3. Requirements for outlet screening	Inspections – outlet screen in place	Yes
4. Requirements of Management Plan	Plan received	Yes
5. Requirements of overflow recording and reporting	Records provided to Council	Yes
6. Notification of overflows to TDHB	TDHB notified	Yes

Purpose: To intermittently discharge treated municipal wastewater from the Inglewood oxidation ponds system into the Kurapete Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Implementation of a stormwater reduction programme	Report on progress during the year received	Yes
8. Limits on effects in receiving waters	Inspections, sampling and biomonitoring.	Yes
9. Optional review provisions	Next optional review scheduled in June 2025	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 8 Evaluation of environmental performance over time

Year	High	Good	Improvement req	Poor
2010	1	-	-	-
2011	1	-	-	-
2012	1	-	-	-
2013	1	-	-	-
2014	-	1	-	-
2015	1	-	-	-
2016	1	-	-	-
2017	1	-	-	-
2018	1	-	-	-
2019	1	-	-	-
2020	1	-	-	-
2021	1	-	-	-
Totals	11	1	0	0

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

3.4 Recommendations from the 2020-2021 Annual Report

In the 2020-2021 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Inglewood WWTP in the 2021-2022 year continue at the same level as in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 1449-5 in June 2022, as set out in condition 9 of the consent, not be exercised, on the grounds that the current conditions are adequate.

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2022-2023

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

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

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

No planned changes have been made to the 2022-2023 monitoring programme.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2022-2023.

4 Recommendations

1. That in the first instance, monitoring of consented activities at Inglewood WWTP in the 2022-2023 year continue at the same level as in 2021-2022.
2. That should there be issues with environmental or administrative performance in 2022-2023, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

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

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
<i>E.coli</i>	<i>Escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m ³	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m ²	Square Metres.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N).

NH ₃	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NNN	Nitrate-Nitrite nitrogen
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NO ₂	Nitrite, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SQMCI	Semi quantitative macroinvertebrate community index.
SS	Suspended solids.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
WWTP	Wastewater Treatment Plant

For further information on analytical methods, contact an Environment Quality Manager.

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Appendix I

Resource consents held by NPDC

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

Water abstraction permits

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

Water discharge permits

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

Air discharge permits

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

Discharges of wastes to land

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

Land use permits

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

Coastal permits

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

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

Name of
Consent Holder: New Plymouth District Council
Private Bag 2025
New Plymouth 4342

Decision Date: 28 June 2016

Commencement Date: 28 June 2016

Conditions of Consent

Consent Granted: To intermittently discharge treated municipal wastewater
from the Inglewood oxidation ponds system into the
Kurapete Stream

Expiry Date: 1 June 2033

Review Date(s): June 2019 and 3-yearly intervals thereafter

Site Location: Lincoln Road, Inglewood

Grid Reference (NZTM) 1705219E-5665557N

Catchment: Waitara

Tributary: Manganui
Kurapete

*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 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 discharge shall only occur at times when inflow to the plant exceeds the rate that effluent can be pumped to the New Plymouth Waste Water Treatment Plant, and there is no available storage.
3. The discharge shall pass through a screen with a maximum aperture of 6 mm.
4. The site shall be operated in accordance with a 'Management Plan' prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the conditions of this consent.
5. The consent holder shall record the time and duration of each overflow to the Kurapete Stream, as authorised by special condition 2, and report these records to the Chief Executive, Taranaki Regional Council, at six monthly intervals.
6. The consent holder shall immediately notify the Taranaki District Health Board of any discharge.
7. The consent holder shall continue to implement a stormwater infiltration reduction investigation for the township of Inglewood and report annually on progress to the Chief Executive, Taranaki Regional Council for the period up to 30 June.
8. The overflow discharges shall not give rise to all or any of the following effects in the receiving waters of the Kurapete Stream 100 metres downstream of the discharge:
 - a) the production of 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 effect on aquatic life.

Consent 1449-5.0

9. 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 or review during the month of June 2019 and at 3-yearly intervals thereafter, 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 28 June 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively

adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

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

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