

Taranaki By-Products
Monitoring Programme
Annual Report
2019-2020

Technical Report 2020-97

Taranaki Regional Council
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Executive summary

Taranaki By-Products Ltd (TBP/the Company) operates an animal rendering operation located on Kohiti Road at Okaiawa, in the Inaha catchment. Two rendering plants operate on the site: an inedibles plant owned by the TBP, and a food grade plant owned by Taranaki Bio-Extracts Ltd (TBE). A trucking firm, Jackson Transport Ltd (JTL), owned by TBP, also operate from the site.

This report for the period July 2019 to June 2020 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

TBP holds 12 resource consents, which include a total of 143 conditions setting out the requirements that they must satisfy. TBP holds two consents to allow it to take and use water, one consent for placing structures in a water course, one consent to realign a water course, two consents to discharge emissions into air at the site, four consents to discharge to the Inaha Stream and a tributary, and two consents to discharge to land.

During the monitoring period, TBP demonstrated an overall good level of environmental performance, with some variation between individual consents.

Monitoring was carried out by both the Council and TBP. TBP monitors water abstraction rates, wastewater volumes and composition, effluent loading on irrigation areas, bio-filter performance and weather conditions. The Council undertakes inspections of the plant site, irrigation and burial areas; water quality and biological monitoring of the Inaha Stream and its tributaries, riparian management, and groundwater surveys, and facilitates community and Hapu engagement meetings.

The Council's monitoring programme for the year under review included 11 inspections, 119 water samples collected for physicochemical analysis, and three biomonitoring surveys of receiving waters. In addition, one community meeting was also held. Hapu engagement had been on-going with the Company as part of the consent renewal process.

The monitoring showed that water abstraction from both the Inaha Stream and groundwater bore were within compliance limits for the full monitoring year. Cooling water discharge analysis and Company provided analysis identified the bore water discharge contained measurable ammonia from the formation extracted water. Surface water abstraction discharge was within compliance limits.

The stormwater system was upgraded to a first flush catch system, aimed at reducing the concentration of contaminants entering the firepond.

The dilution rate of the wastewater discharge to the Inaha Stream was compliant for the duration of the discharge (101 days). The analysis of the oxygen and the sodium absorption ratio of the wastewater was compliant when assessed.

The application of wastewater to land was limited to below 250 kg N/ha across all irrigation paddocks, including fertiliser. The combined volume of nitrogen discharged to land decreased by 14,000 kg N this monitoring period.

On one occasion, at two monitoring locations within the Inaha Stream, the corresponding oxygen consumption of the wastewater slightly exceeded the limit set by consent.

Groundwater monitoring indicated the concentration of nitrate nitrogen with the drinking water source, Te Koponga Spring, continues to decrease. Four monitoring wells holds value of nitrate nitrogen in excess of 50 g/m³, though three of them are beginning to plateau, which suggests the mitigation undertaken by the Company is starting to take effect.

Surface water monitoring of the Northern tributary of the Inaha Stream indicated it is at the national bottom line for nitrate nitrogen, as defined by the National Policy Statement for Freshwater Management. The Western tributary remains below the national bottom line for nitrate nitrogen. However recent results suggest an improvement with a decrease in concentration, though it remains at attribute state D for nitrate nitrogen.

Emissions to the air this monitoring period did not draw any complaints from members of the public.

On one occasion an unauthorised discharge was identified during temperature logger download, which was ceased quickly after the initial finding. This resulted in short term elevated oxygen demand and ammonia within the Inaha Stream. A follow up biological survey indicated no significant adverse effects as a process of the unauthorised discharge.

Biannual biological monitoring of the Inaha Stream did not record any significant impacts from the exercise of the consents this monitoring period. However, the gradings of the biological monitoring sites were downgraded from good to fair at and downstream of the Company site. This suggests a subtle decline.

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

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% 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 has improved in the year under review.

This report includes recommendations for the 2020-2021 year.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2019 to June 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Taranaki By-Products Ltd (TBP). TBP operates an animal rendering facility situated on Kohiti Road at Okaiawa, in the Inaha catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstractions and discharges of water within the Inaha catchment, and the air discharge permit held by the Company to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land and air, and is the 28th combined annual report by the Council for the Company.

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 through annual programmes;
- the resource consents held by the Company in the Inaha catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

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 2020-2021 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

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

- e. risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

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

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or during investigations of incidents reported to the Council by a third party. Cumulative

adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

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

Administrative performance

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

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

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

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

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.¹

1.2 Process description

The TBP plant on Kohiti Road, Okaiawa is the major animal rendering plant in Taranaki. It was established in 1936, about 60 persons are employed. Raw material comes largely from meat and poultry processing plants in the central and southern North Island. TBP also runs a dead stock collection service in Taranaki and adjacent regions. Transport of raw materials to and products from the site is undertaken by a trucking firm that operates from the site, Jackson Transport Ltd, also owned by TBP.

The site is located beside the Inaha Stream in mid-catchment, about 13 km from the sea, and less than 1 km from Okaiawa, a village of about 50 dwellings. Intensive pastoral farming, mainly dairy, occurs around the site (Figure 1).

Inedible products are manufactured, including meat and bone, poultry, feather, and blood meals, as well as tallow and chicken oil. There are three separate processing lines, a mixed abattoir material line (processing beef and mutton, hard and soft offal, and fallen stock), a poultry line (processing soft poultry offal and feathers), and a blood line. The plant is able to process up to 26 t/h of raw material, this includes 18 t/h through the mixed abattoir material line and 6-8 t/h through the poultry feather and offal line. Up to 100,000 L/day of blood can be processed.

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

The plant operates 24 hours/day, seven days/week throughout the year, with weekly maintenance shutdowns on Sunday/Monday. There is some seasonal variation in beef offal processing, the peak occurring between January and May, being earlier in dry seasons, when the availability of stock feed is reduced. Processing of fallen stock peaks in July and August, during the calving season. Poultry processing is relatively steady throughout the year, with a slight increase before Christmas and over the summer months. Poultry, originally planned to be phased out in the 2015-2016 monitoring year, has been retained by the facility. However the collection and processing of poultry is limited to deliveries from within the Taranaki region.



Photo 1 Aerial imagery of Taranaki By-Products and Taranaki Bio-Extracts

Animal rendering is essentially a two stage process, involving separation of fat and drying of the residual solids. The TBP process is largely continuous low temperature (below 100°C) dry rendering with mechanical de-watering by screw press, and some thermal de-watering. Indirect (Rotadisc) steam-heated driers are employed. The dried product is milled, sieved and stored in bulk.

The mechanical de-watering of the raw material creates large quantities of stickwater, essentially the pressed-out meat juices. Waste heat exchangers dry the stickwater under vacuum to a stage where it can be incorporated back into the meal product. Washings and waste products from the stickwater system have been registered as a fertiliser (Zeal Grow) and are applied to an adjacent dairy farm owned by TBP. Solid wastes are buried in a designated area on the farm. Recent developments within the facility have reduced the output of the registered fertiliser Zeal Grow.

1.2.1 Wastewater treatment system

Wastewater from TBP's plant comprises equipment and floor washings, condensates from treatment of gas emissions, and blood decanter liquids. There is potential for stickwater and blood losses to be put through the treatment system.

The wastewater treatment system comprises a contra-shear screen, a dissolved air flotation (DAF) unit, three anaerobic ponds (ponds 1-3), an aeration pond (pond 4), a settling pond (pond 5), and a large aerobic pond (pond 6).

All wastewater from the plant (except condensate wastewater from the waste heat exchanger) is pumped through the rotary screen, then a 100 m³/h DAF unit to which flocculent is added to assist in recovery of solids. The wastewater then moves sequentially through ponds 1 to 3, with a total volume of about 15,000 m³, where anaerobic activity breaks it down. The condensate wastewater from the plant is pumped directly to pond 1. Ponds 1 and 2, on the northern side of the plant, may be operated in parallel, depending on loadings. The wastewater from pond 2 enters wet well pump station 1, from where it is pumped to pond 3, at a higher level on the southern side of the plant.

From pond 3, the wastewater discharges to an aerated lagoon (pond 4) with a volume of 8,000 m³. Aerators of about 315 kW total capacity assist in the reduction of biochemical oxygen demand (BOD) and of ammonia concentration. The wastewater finally passes, via a small settling pond (5), into a large aerobic pond (6), with an area of 1.04 ha and a nominal volume of 30,000 m³, with four brush aerators each of 17.5 kW capacity. The purpose of the aerobic pond is to allow further treatment of the effluent, and to provide for storage of treated wastewater. Pond 6 is also used as a source of scrubbing water in the odour control system.

The treated wastewater is discharged either to the Inaha Stream directly or to adjacent land by spray irrigation. This 'dual' wastewater disposal system addresses the limited capacity of the Inaha Stream to assimilate the treated wastewater, while promoting grass growth for dairy production on land that is well suited to irrigation. The total area utilised for irrigation increased from 269 ha in 2011-2012 to 291 ha in 2012-2013. This was further extended in the 2015-2016 monitoring year to a total area of 340 ha.

The facility is evolving its wastewater and stickwater discharge. In order to achieve this the Company has installed a vibratory shear enhanced processing technology (VSEP) within the TBE and TBP plants. The VSEP systems utilise membrane filtration system to provide filtration at varying grades to concentrate solids and associated contaminants, for reuse back in the processing plant. Significant investment was required to bring this on line.

The results of the system have significantly reduced the quantity of stickwater put to land and the facility is currently expanding the process to its wastewater discharge, whereby a reduction of 45% of the current wastewater produced is proposed when functioning.

1.2.2 Bio-extracts plant

In April 2003, an edible (food grade) tallow and gelatine bone chip recovery plant was commissioned adjacent to the existing rendering plant at Okaiawa. A new company, Taranaki Bio Extracts Ltd (TBE), was established for the venture that is owned by TBP and Riverlands Eltham Ltd in equal partnership.

The TBE operation involves the processing of boning-room waste that has been separated from other raw offal at meat processing plants. The rendering and drying is carried out at lower temperatures than at the inedibles plant, resulting in less odour generation and heat emission. Certain utilities are shared between the two plants, including the steam generators and the wastewater treatment plant. The bio-filters used to be shared by both plants, but now they have been separated.

1.2.3 Odour management

The rendering operations have potential to generate offensive odour. Sources include the raw materials, rendering processes, wastewater treatment and disposal systems, odour control system, and solid waste burial areas. The generation of odour is controlled through the quality and preservation of raw materials, design and operation of the rendering processes, maintenance of the buildings, treatment of odorous emissions, and management of the wastewater treatment, disposal systems and burial areas.

Odour extraction, cooling and biofilters are the main components of the odour control systems that are operated at the TBP and TBE plants. There are four extraction systems, one each for concentrated odour

sources in the two plants, and two independent factory building air systems (FA1 and FA2) at the TBP plant to capture fugitive emissions that are not collected by the concentrated sources (CS) biofilter.

Concentrated odorous gases from the TBP bovine, poultry and feather rendering (but not blood) lines are collected at source, then cooled and scrubbed in two water spray condenser towers before being discharged to the biofilter. Hot exhaust gases, from pre-cookers and driers, are passed through three waste heat evaporators to concentrate stick liquor, then a vertical condenser, before going to the spray towers with the other concentrated emissions.

The FA1 ventilation system extracts air from above the mixed abattoir and poultry rendering lines in the northern part of the TBP building. The FA2 system collects air from the dead stock pre-breaker, blood drying processes within the blood room, meal mill exhausts and the poultry dryer room, in the southern part of the building, and passes the air through a wet scrubber.

At the TBE plant, humid odorous air streams from the concentrated sources are extracted, and cooled and scrubbed, before being ducted to the CS biofilter. TBE building air is vented directly to atmosphere as it contains no significant odour.

There are three biofilter systems, comprising two factory air biofilters, and a concentrated sources biofilter. The FA1 biofilter is of coarse bark set in the ground, with three parallel zones that are each 30 m x 40 m x 1.5 m (total volume of 5,400 m³). FA2 biofilter is also formed of coarse bark, set above ground over pea gravel with two zones 25 m x 30 m x 1 m (1,500 m³). The CS biofilter has two parallel beds 25 m x 20 m x 0.7 m (700 m³) of coarse bark overlaid with fine bark compost. The locations of the biofilters are given in Figure 1, labelled BF1 and BF2.

The CS biofilter was repaired in November 2010, when two sides of both beds were replaced. Bed 3 of FA1 biofilter was reconstructed between July and December 2011, improving the pipework for air distribution and for drainage of liquids. The remainder of FA1 biofilter was reconstructed between October 2012 and April 2013, the corrosion-prone corrugated iron manifolds being replaced with concrete pipes, and bark replacement being delayed by problems with supply.

Upon upgrade of FA1 biofilter, the concentrated sources air flow from the TBP plant was redirected to it temporarily, reducing heat load on the designated CS biofilter, now dedicated to the TBE plant. At the end of the 2012-2013 review period, construction began on the fourth zone for FA1 biofilter, intended to receive the TBP plant concentrated sources (CS) streams.

The CS biofilter was completed and operational prior to Christmas in 2013, and presently both TBE and TBP have independent biofilters.

As part of TBP's consent to emit emission and odour to the air, TBP must receive certification from a suitably qualified independent person that the works, processes and equipment relevant to all discharges to air from the site are operational in accordance with good engineering practice. In the 2018-2019 monitoring year TBP engaged Golder Associates to undertake the certification of the process. This was the fourth occasion this certification of apparatus associated with odour control has been undertaken by Golder Associates.

1.3 Resource consents

The Company holds 12 resource consents, the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

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

Table 1 Summary of resource consents held by the Company

Consent number	Purpose	Granted	Next review date	Expiry date
Water discharge permit				
2049-4	Discharge treated wastewater to Inaha Stream	October 2006	2017	2019*
5426-1	Discharge stormwater to Inaha tributary	May 1999	2017	2019*
2050-4	Discharge cooling/backwash water to Inaha Stream	May 1999	2017	2019*
Water take permit				
2051-4	Take from Inaha Stream	January 2015	2017	2019*
9756-1	Take groundwater	February 2014	2017	2029
Discharge to land permit				
3941-2	Discharge treated wastewater to land	November 2009	2014	2019*
5495-1	Discharge meat wastes by burial into land	August 2000	2017	2019*
Air discharge permit				
4058-4	Discharge emissions to air from rendering operations	October 2011	2015	2024
10054-1	Discharge emissions to air from burning	January 2015	2017	2029
Land use permits				
6431-1	Place culverts in Inaha Stream	October 2004	2017	2023
7234-1	Disturb to realign Inaha Stream	March 2009	2017	2023
7329-1	Discharge sediment during Inaha Stream realignment	June 2008	2017	2023
*indicates the consent is under the renewal process at present				

In addition, TBP holds consents **2446** and **3117** to discharge untreated farm dairy effluent by irrigation to land. Consent 2446 was exercised until the 2004-2005 dairy season, when dairy operations were consolidated at a new shed on Kohiti Road from which wastewater is transferred to the treatment system for the nearby rendering operations. Consent **3117** now applies to a small shed used for sick cows on Katotauru Road.

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 Company site consisted of five 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 Site inspection

The site was visited on eleven occasions during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the Company 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.

1.4.4 Chemical sampling

Compliance sampling is undertaken by the Council to assess the Company's discharges to receiving waters. The Company operates a dual wastewater disposal system. The system discharges wastewater from the final (aerobic pond) pond 6 (Table 2 and Figure 1). The pond 6 discharge is either directly to the Inaha Stream under a 300:1 minimum dilution ratio, when flow rates are appropriate as defined by consent, or through land application. The land application is undertaken through the use of travelling irrigators, on to and into the Company irrigation area (Figure 1). Land application occurs mainly in the summer months when the flow rates within the Inaha Stream are insufficient to meet the consent 300:1 dilution rate.

In terms of monitoring of the dual wastewater system, the main focus of the sampling undertaken by the Council is to assess the likely effects associated with exercise of this system across the discharge mediums of surface water and soil/groundwater.

Surface water sampling focuses on sampling the Inaha Stream and associated tributaries (Northern and Western) (Table 3 and Figure 1) to firstly assess the likely effects of the discharge on the Inaha Stream when the site is discharging. Secondly, it is undertaken when the Company is discharging to land to assess the likely contribution from the irrigation areas' discharge to the groundwater (Figure 2) which may result in surface water interaction. Surface water analytes are provided in Table 4 also.

In terms of the irrigation areas, the Council samples groundwater monitoring bores to assess the likely effects of the wastewater discharge on the groundwater across these areas. Groundwater analytes are provided in Table 4.

The site also operates a waste burial area, whereby if mechanical breakdown of the plant results in un-processable product, this material may be buried in a specific consented area. As a result the Council monitors the burial pit monitoring wells to assess the likely effects of the process (Figure 2).

In addition, three temperature recorders (one installed in the cooling water tributary and the others upstream and downstream of the confluence of the Inaha Stream and its tributary) were run continuously and downloaded as required. The Company took responsibility for this monitoring in July 2010, and

forwarded the data to Council monthly. The responsibility was returned to the Council in September 2013, at the request of the Company.

Table 2 Taranaki By-Products point source monitoring location key

Site	Description	Map reference, NZTM		Site code
		Easting	Northing	
A	Aerobic pond effluent	1703086	5623907	IND004004
B	Cooling water discharge	1702015	5623991	IND002004
C	Stormwater, firewater, coolant and groundwater seepage from reservoir	1701968	5624052	IND001014
D	Stormwater, firewater, coolant and groundwater seepage to Inaha	1701894	5624084	IND001015
E	No 1 stormwater: main reception, garage and yard to firewater reservoir	1702022	5623983	STW001075

Table 3 Inaha Stream and associated tributaries sampling locations key

Site	Description	Map reference, NZTM		Site code
		Easting	Northing	
1	Ahipaipa Road	1703013	5625271	INH000334
3	Bridge, 420 m u/s Kohiti Road	1702138	5624345	INH000348
4	Unnamed northern tributary at Inaha confluence	1701947	5624362	INH000397
5	Kohiti Road	1701874	5624322	INH000400
6	110 m d/s cooling water discharge and 30 m d/s pond 6 discharge	1701861	5623980	INH000408
7	500 m d/s pond waste discharge	1702021	5623745	INH000420
8	Normanby Road bridge, 1,450 m d/s discharges	1701650	5623262	INH000430
9a	Unnamed western tributary, 3,500 m u/s Inaha confluence	1701109	5625496	INH000433
9	Unnamed western tributary 2,550 m u/s Inaha confluence	1700816	5624558	INH000435
10	Unnamed western tributary 250 m u/s Inaha confluence	1701518	5623227	INH000440
11	State Highway 45	1700393	5620330	INH000470

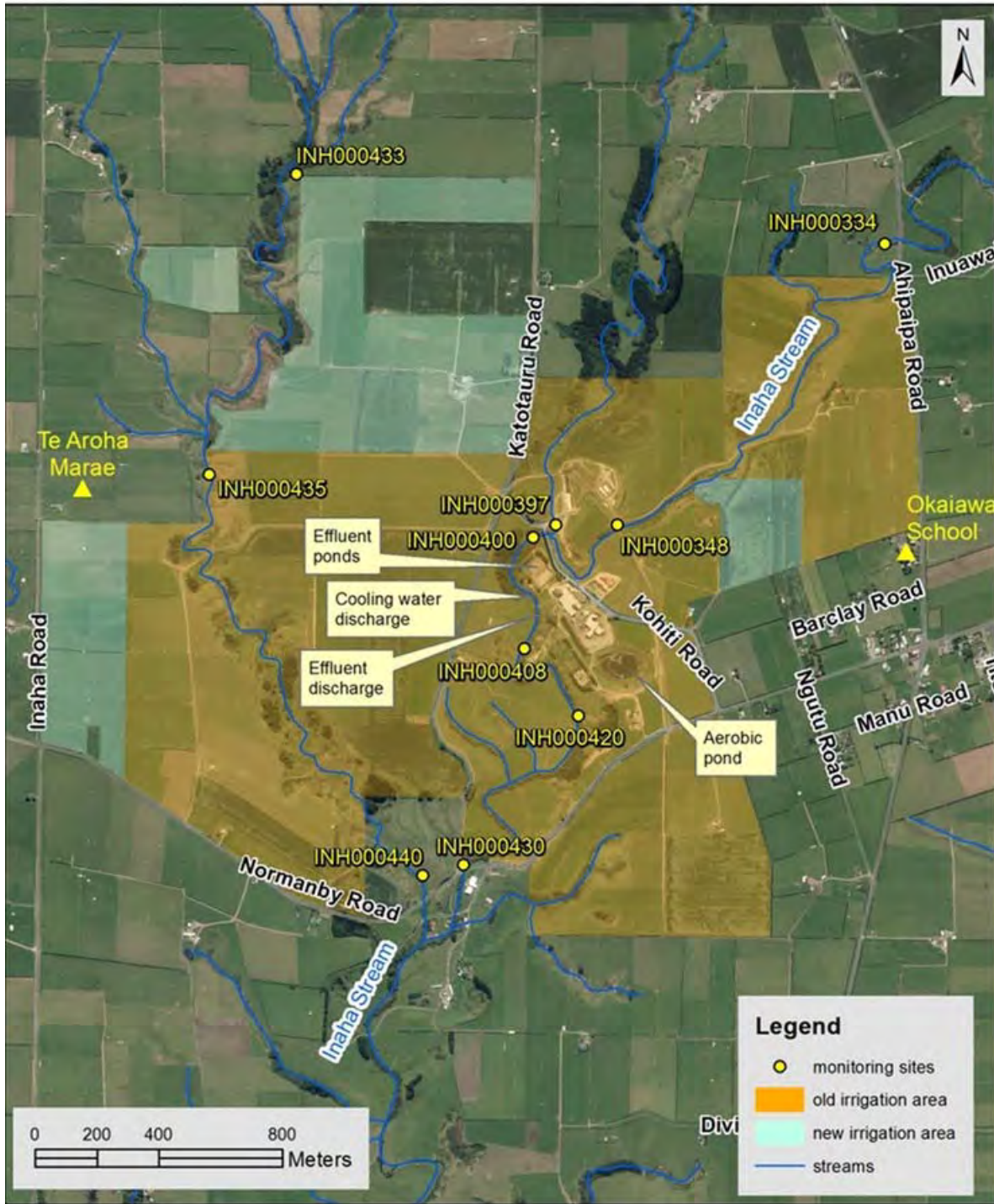


Figure 1 Inaha Stream and tributary surface water monitoring locations

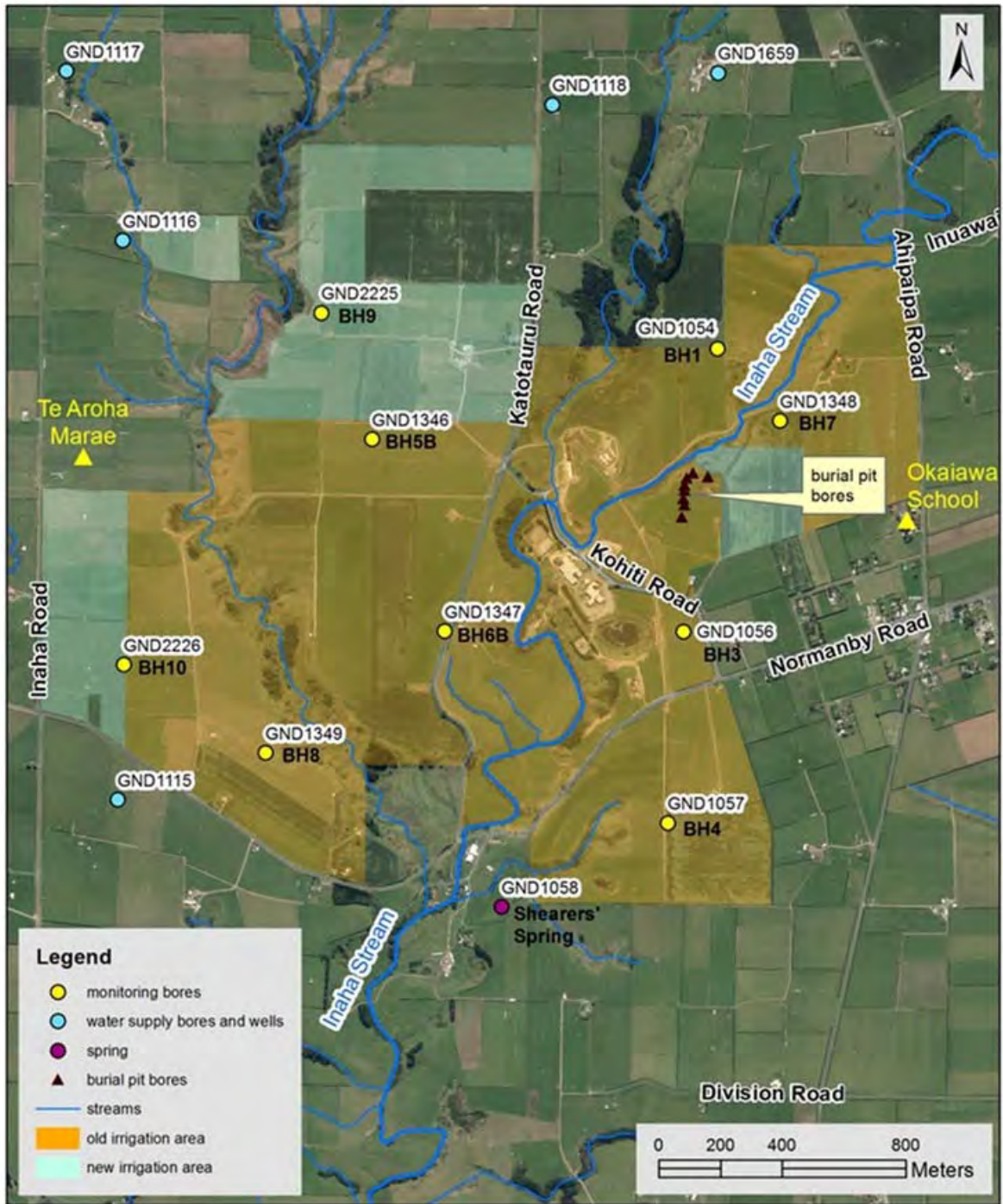


Figure 2 The locations of the associated groundwater monitoring wells

Table 4 Monitoring analyte by medium

Parameter	Description	Units	Medium
BOD	Biochemical oxygen demand 5day	g/m ³	SW/DS
CL	Chloride	g/m ³	DS
CONDY	Conductivity @ 25°C	mS/m@25°C	SW/GW*/DS
DO	Dissolved oxygen	g/m ³	SW/DS
DRP	Dissolved reactive phosphorus	g/m ³ P	SW/DS
E-Coli	<i>E. coli</i>	/100 ml	DS
NH ₃	Un-ionised ammonia	g/m ³	SW
NH ₄	Ammoniacal nitrogen	g/m ³ N	SW/GW*
NNN	Nitrite/nitrate nitrogen	g/m ³ N	SW/GW*
NO ₂	Nitrite nitrogen	g/m ³ N	DS
NO ₃	Nitrate nitrogen	g/m ³ N	DS
PERSAT	Dissolved oxygen saturation %	%	SW/DS
pH	pH	pH	SW/GW*/DS
TEMP	Temperature	°C	SW/GW*/DS
TURBY	Turbidity	NTU	SW/DS
BODCF	Bioch.Ox.Demand, \filt\Ninh	g/m ³	SW/DS
FLOW	Flow	m ³ /s	DS
LEVEL	Water level	m	GW*
ALKT	Alkalinity total	g/m ³ CaCO ₃	GW/DS
CA	Calcium	g/m ³	GW/DS
COD	Chemical oxygen demand	g/m ³	GW*/DS
HCO ₃	Bicarbonate	g/m ³ HCO ₃	GW/DS
K	Potassium	g/m ³	GW/DS
KAR	Potassium adsorption ratio	None	DS
MG	Magnesium	g/m ³	GW/DS
NA	Sodium	g/m ³	GW/DS
SAR	Sodium adsorption ratio	None	DS
SO ₄	Sulphate	g/m ³	GW/DS
SS	Suspended solids	g/m ³	DS
ST	Sulphide total	g/m ³	DS
TG	Total grease	g/m ³	DS
TN	Total nitrogen	g/m ³ N	DS
TP	Total phosphorus	g/m ³ P	DS
O&G	Oil and grease	g/m ³	DS

GW=Groundwater/ DS=Discharge/ SW=Surface water/GW*=Burial pit groundwater

1.4.5 Biomonitoring surveys

Two surveys of biological communities at up to eight sites in the Inaha Stream and a major tributary were scheduled this year as part of the compliance monitoring program. These surveys assessed the effects of the Company discharges (point source discharges and any diffuse source discharges as a result of spray irrigation) on benthic invertebrate communities of the stream. A summary of these reports is provided in Section 2.4.6.

The main reports are prepared separately and are available on request.

1.4.6 Monitoring by Taranaki By-Products

The Company regularly supplies the Council with monthly reports. These reports provide information detailed in the irrigation management plan as required by consent 3941-1 condition 3. The monthly reports provide discharge information, including location, duration, stream flow (L/s), nitrogen wastewater strength, method of application and loading information.

1.5 Monitoring programme air

1.5.1 Introduction

The air quality monitoring programme for the TBP site consisted of three primary components.

1.5.2 Programme liaison and management

This portion of the monitoring programme was combined with that for the water monitoring programme, and involved discussion and liaison with Company staff, both on site during regular inspections and at the Regional Council's and the Company offices.

1.5.3 Site inspections

The TBP site was inspected on 11 occasions during the 2019-2020 monitoring period as part of the annual monitoring programme. An additional number of inspections were undertaken in response to complaints received, this is addressed further in Section 2.5.1 and 2.7.

The main points of interest were plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, and noxious or offensive emissions.

As far as was practicable, inspections in relation to air emissions were integrated with inspections undertaken for other purposes for example water monitoring or in response to complaints. A list of incidents which led to complaints is summarised in Section 2.7 of this report if they occurred.

1.5.4 Monitoring by Taranaki By-Products

From 2 February 2012, the Company was required, under the new (at the time) air discharge permit 4058-4 to operate in accordance with an Air Discharge Management Plan. In respect of monitoring, the plan included the production of a daily activities log, the requirement to conduct ambient odour surveys, and maintenance of a register of complaints. The monitoring components of the plan had been in place for several years.

The daily activities log presents a checklist of operational monitoring items that must be recorded on a routine daily basis, such as climatic data, condition of the wastewater and odour treatment systems, cleaning and maintenance of plant, and various process records such as temperature in the driers and blood coagulator.

The results of bio-filter and weather monitoring, and comment from the daily activities log on events affecting environment quality, were forwarded to the Council on a monthly basis. Odour survey reports and the complaints register are made available during site inspections.

In addition to the plan there is also a consent defined requirement that an audit of odour controls systems be undertaken on a biennial basis by a suitably qualified consultant.

There is also a requirement to meet with representatives of the local community to discuss site activities and also specifically those relating to the exercise of this consent (4058-4). This is proposed to be a biannual meeting, to discuss odour both prior and post summer.

2 Results

2.1 Water

2.1.1 Inspections

Compliance monitoring inspections were undertaken at approximately monthly intervals throughout the monitoring period. Inspections pertaining to water related matters were undertaken in conjunction with air quality inspections (Section 2.5.1).

A total of 11 routine inspections were undertaken during the 2019-2020 year. The Council holds a record of detailed inspection notes which are available by request. They are also presented in Section 2.4.6. Additional inspections were carried out in response to public complaints as they arose. Inspections were also carried out at the times of effluent and receiving water chemistry monitoring. During or immediately after each inspection, an officer of the Council made contact with a Company representative to discuss the findings if required.

During inspections particular attention was given to the following items:

- rendering processes;
- air emission control systems;
- load-in and load-out areas;
- workshops;
- truck depot;
- chemical and oil/fuel storage areas;
- stormwater system;
- wastewater treatment system;
- land irrigation system;
- waste burial areas.

2.2 Water abstraction monitoring

2.2.1 Surface water abstraction – Inaha Stream

The water take from the Inaha Stream resulted in no compliance issues with regard to the maintenance of the minimum flow (25 L/s downstream of the abstraction point) required under special condition 2 of consent 2051-4.

In terms of the abstraction rate and specifically the limit of the abstraction rate, consent 2051-4 allows for maximum daily abstraction rate of 2,160 m³ /day or 25 L/s on average, and an instantaneous maximum of 50 L/s. TBP continuously operate one of two pumps rated at 33 and 25 L/s, with the larger pump as the primary supply.

Under the Resource Management Regulations 2010 (Measurement and Reporting of Water Takes), TBP has been required since 10 November 2012 to take continuous measurements and keep daily records of volume taken, and thereafter supply, by 31 July each year, the record of the preceding 1 July to 30 June period. TBP installed a flow measurement and recording system as required. Verification of the accuracy of the system was carried out by an approved certifier.

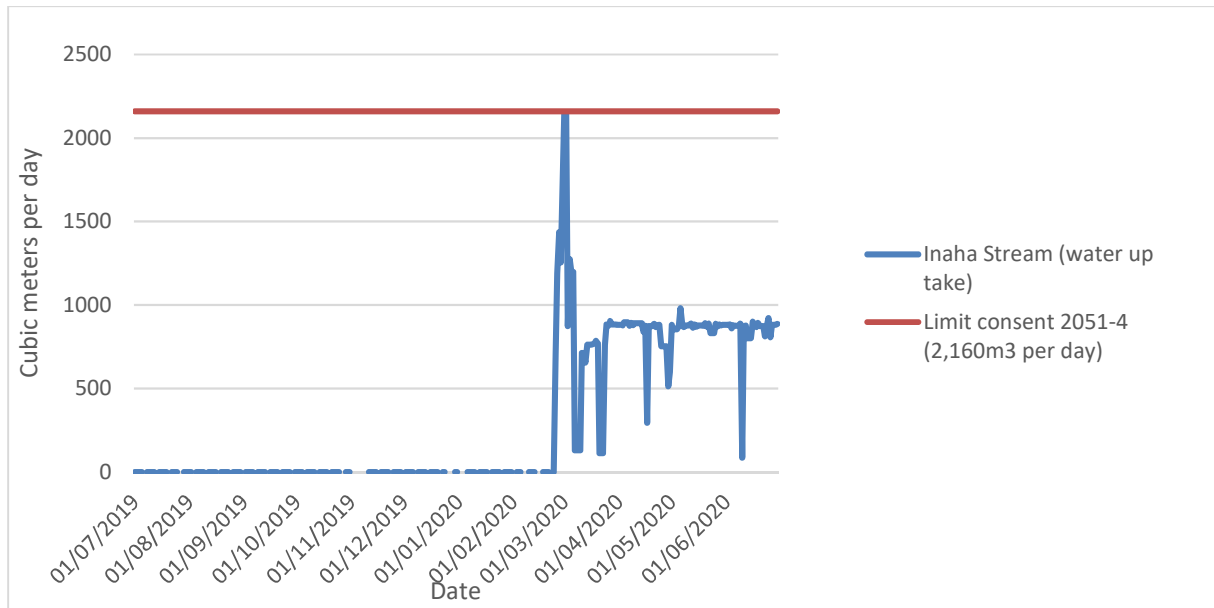


Figure 3 Consent 2051-4 abstraction data 2019-2020

The records provided by the Company (Figure 3) indicated that the consented abstraction daily maximum of 2,160 m³ was complied with for the entirety of the 2019-2020 monitoring period. This is the second consecutive year this has been compliant for the duration. On two occasions (1, 2 March 2020) the Company were close to the limit with an abstraction of 2,152 m³.

2.2.2 Groundwater abstraction

Consent 9756-1 allows groundwater abstraction at a rate not exceeding 22.8 L/s (1,970 m³/day). The consent was first exercised in February 2014, before the required installation of a flow measurement, recording and telemetry system, for which abatement and infringement notices were issued at the time. Telemetry to Council's computer system was established on 27 March 2014. Verification of the accuracy of the measurement system was undertaken by an approved certifier. The telemetered record for the period ending 30 June 2020 is presented in the following Figure 4.

The analysis provided in Figure 4 indicated that the daily maximum limit of 1,970 m³ was not exceeded for the whole of the monitoring period. The rate of abstraction was also complied with for the duration, with no exceedance of the 22.8 L/s instantaneous limit, as defined by consent 9756-1, condition 1.

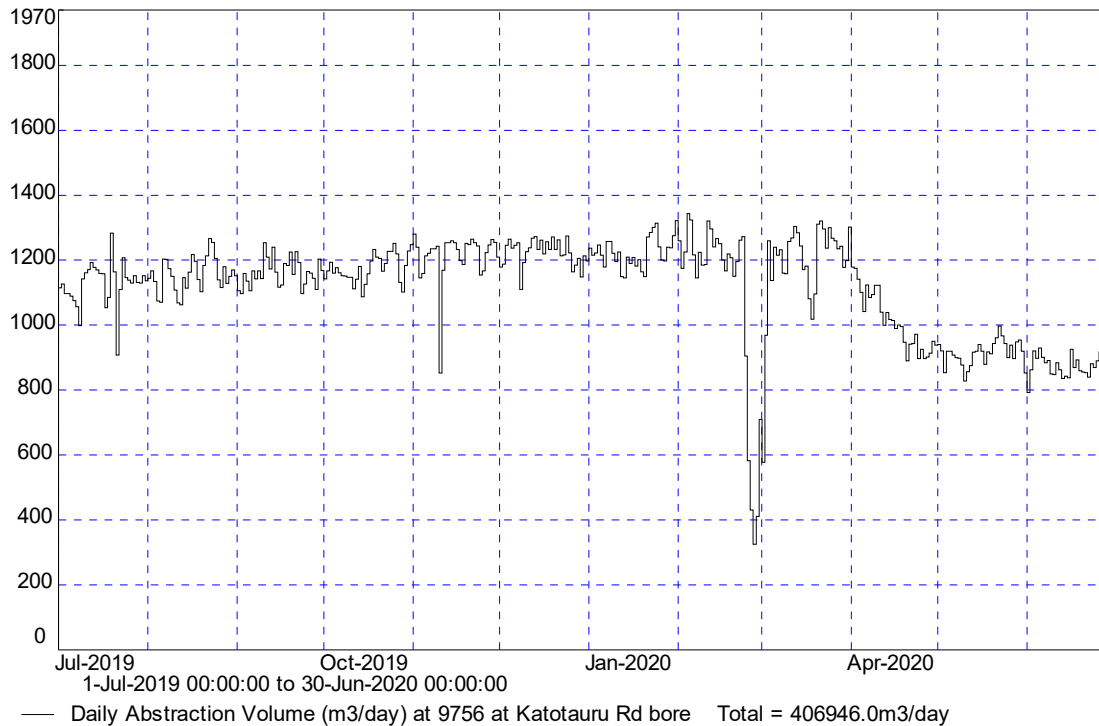


Figure 4 Daily groundwater abstraction volumes consent 9756-1 2019-2020

2.3 Wastewater discharge

2.3.1 Pond six sampling

TBP hold consent 3941-2; to discharge up to 1,400 m³/ day of treated wastewater from a rendering operation and from a dairy farm onto and into land, in the vicinity of the Inaha Stream and its tributaries. It contains specific conditions with regard to the concentration of dissolved oxygen within this wastewater as well as the sodium absorption ratio (SAR). These conditions (8 and 11) state that the level of dissolved oxygen within the wastewater should be above 1.0 g/m³ at all times and that the SAR of the wastewater should not exceed 15.

Three samples were collected from pond 6 (IND004004) in the 2019-2020 monitoring period. The analysis indicated the following:

- Dissolved oxygen was assessed on one of three occasions. The corresponding analysis indicated it was compliant with condition 8 of consent 3941-1 which requires pond 6 to maintain DO above 1.0 g/m³ at all times.
- The corresponding oxygen saturation in the same sample (September 2019) was recorded at 55.6%.
- Bicarbonate in the wastewater ranged 44-670 g/m³.
- Chemical oxygen demand (COD) ranged 530-1,110 g/m³.
- Chloride ranged 181- 300 g/m³.
- Dissolved carbonaceous biochemical oxygen demand (CBOD₅) ranged 2.5-3.3 g O₂/m³.
- Total biochemical oxygen (un-filtered) ranged from below the limit of detection to 22 g O₂/m³.
- Dissolved reactive phosphorus (DRP) remained quite steady across the three rounds, ranging 34-39 g/m³.
- Electrical conductivity (EC) ranged 237-305 mS/m.
- *E. coli* ranged from below the LOD through to 1,450 MPN/100 ml.

- In terms of nitrogen within the wastewater:
 - Free ammonia ranged 0.062-4.9 g/m³.
 - Nitrate nitrogen ranged 6.7-62 g/m³.
 - Nitrite nitrogen ranged 57-75 g/m³.
 - Nitrite / nitrate nitrogen ranged 70-137 g/m³.
 - Ammoniacal nitrogen ranged 89-141 g/m³.
 - Total nitrogen ranged 198-260 g/m³.
 - Total kjeldahl nitrogen (TKN) 122-190 g/m³.
- Oil and grease ranged from below the LOD through to 17 g/m³.
- pH ranged 6.3-7.7 pH.
- Potassium absorption ratio ranged steady across the three rounds, ranging 2-3 mmol/l
- The temperature ranged 12-27.3°C across the three rounds.
- Sodium absorption ratio ranged 6.4-10.9 SAR. The limit defined by condition 11 of consent 3941-2 is <15.
- Sulphate ranged 88-188 g/m³.
- Total alkalinity ranged 36-550 g/m³ as CaCO₃.
- Total calcium ranged 28-37 g/m³.
- Total magnesium remained relatively stable across the three rounds, ranging 12.5-14.3 g/m³.
- Total phosphorus ranged 39-48 g/m³.
- Total potassium ranged 115-1149 g/m³.
- Total sodium ranged 165-270 g/m³.
- The total sulphide screen results were below the LOD on all three occasions.
- Total suspended solids ranged 199-880 g/m³.
- In terms of turbidity, results ranged 97-420 NTU.

In terms of nitrogen concentration within pond 6 (IND004004), the following figure shows the concentration of total nitrogen (TN) since November 2001. The analysis indicated that the TN concentration within this source has remained relatively stable for the past two years, ranging to 800 g/m³.

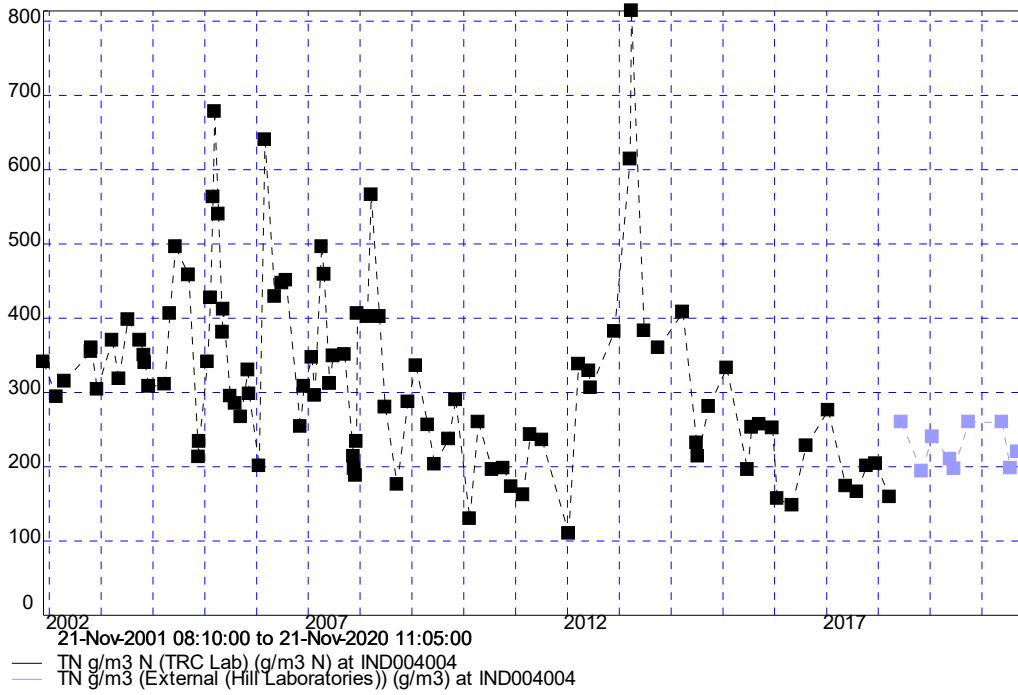


Figure 5 Long term total nitrogen monitoring IND004004

Table 5 IND004004 2019-2020 monitoring period

IND004004/ Parameter	Dissolved oxygen	Percent oxygen saturation	Bicarbonate	Chemical Oxygen Demand (COD), screen level	Chloride	Dissolved C-Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	Oil and Grease	pH	Potassium Absorption Ratio
Date	g/m ³	%	g/m ³ at 25°C	g O ₂ /m ³	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	mmol/L
30 Sep 2019	5.03	55.6	44	530	181	2.5	33	237	305	0.062	62	137	75	< 7	6.3	3
21 May 2020	NR	NR	670	630	300	3.8	39	305	1,450	4.9	6.7	70	64	6	7.7	3
20 Jul 2020	NR	NR	310	1,110	220	3.3	34	236	< 100	0.33	16.6	74	57	17	7.2	2
IND004004/ Parameter	Sample Temperature	Sodium Absorption Ratio (Total)	Sulphate	Total Alkalinity	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Total Calcium	Total Kjeldahl Nitrogen (TKN)	Total Magnesium	Total Nitrogen	Total Phosphorus	Total Potassium	Total Sodium	Total Sulphide Screen	Total Suspended Solids	Turbidity
Date	°C		g/m ³	g/m ³ as CaCO ₃	g/m ³	g O ₂ /m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	NTU
30 Sep 2019	19.2	6.4	88	36	90	13	28	122	14.3	260	39	121	165	< 0.05	199	97
21 May 2020	27.3	10.9	188	550	141	22	27	190	12.5	260	48	149	270	< 0.05	480	220
20 Jul 2020	12	8.3	166	250	89	< 20	37	124	13.2	198	48	115	230	< 0.05	880	420

NR= no result

2.3.2 Cooling water analysis IND002004

The cooling water discharge (IND002004) to the firewater pond was sampled on three occasions this monitoring period. The analysis is provided in the following Table 6. It should be noted that there are two cooling water discharges, these relate to the surface water abstraction and the bore water extraction. In this monitoring period both sources were assessed twice. On certain occasions only one may be discharging, thus only one of the sources is analysed. Bore water extraction discharge is detailed as BW below.

Table 6 Cooling water discharge IND002004

IND002004	TEMP	Electrical Conductivity (EC)	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity
Collected	°C	mS/m	pH Units	g/m ³	g O ₂ /m ³	NTU
30 Sep 2019/BW	13.7	33	7.5	1.87	0.6	10.5
21 May 2020	35	24.4	7.7	0.042	1.1	1.27
21 May 2020/BW	30.6	34.1	7.4	1.83	0.7	13.7
20 Jul 2020	11.5	22.6	7.7	0.033	0.7	10.6

The analysis indicated the following:

- Temperature within the discharges ranged 11.5-35°C.
- Electrical conductivity ranged 22.6-34.1 mS/m. The electrical conductivity was noted to be more elevated in the bore water than the surface water abstraction.
- pH remained weakly alkaline, ranging 7.4- 7.7 pH.
- Total ammoniacal nitrogen ranged 0.033-1.87 g/m³.
- Noting that higher concentrations of ammonia were recorded in the bore water samples. The Company were asked to assess the concentration of ammonia in the groundwater bore. This was undertaken and it was communicated to Council, pre cooling water system, to be a concentration of 1.24 g/m³ NH₄.
- The measurable ammonia in the discharge from the bore water is a result of the ammonia within the groundwater abstracted by the bore, rather than caused by the facility.
- Ammonia from the surface water take was within the same concentration range as the preceding water conditions.
- Total biochemical oxygen demand ranged 0.6-1.1 g O₂/m³.
- Turbidity ranged 1.27-13.7 NTU.

2.3.4 Stormwater analysis STW001075

Stormwater from the main yard, garage and raw material reception area, flow via a drain, from Kohiti Road into the firewater pond. This is monitored as it discharges in to the firepond at STW001075. The Council sampled this location three times during this monitoring period. The results of the sampling are provided in the following Table 7.

It should be noted that this system has recently been upgraded to allow the capture of the first flush from the stormwater system to be sent to the ponds on site rather than discharging into the firepond.

Table 7 Stormwater discharge STW001075

STW001075	TEMP	Electrical Conductivity (EC)	Escherichia coli	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Total Suspended Solids	Turbidity - ISO 7027 Method
Collected By	°C	mS/m	MPN/100 ml	pH Units	g/m ³	g O ₂ /m ³	g/m ³	FNU
30 Sep 2019	14.7	51.6	2420	7.4	0.98	2.3	6	6.1
21 May 2020	13.1	51.8	> 24200	7.3	6.2	68	78	37
21 Jul 2020	11.2	128.2	> 24200	6.9	8.7	13	121	61

Consent 5426-1 places the following limits on the stormwater quality:

- pH between 6-9.
- Suspended solids below 100 g/m³.
- Oil and grease below 15 g/m³.

Each of these parameters are assessed twice. pH and suspended solids are analysed from the stormwater discharge prior to the firepond. This sample is also visually assessed for oil and grease. The second assessment is undertaken at monitoring location IND001015 which is the fire pond discharge to the Inaha Stream, discussed in the next section 2.3.4.

The analysis of the three rounds indicated the following:

- The temperature ranged 11.2-14.7°C.
- The electrical conductivity ranged 51.6-128.2 mS/m.
- *E. coli* ranged from 2,420->24,200 MPN/100 ml.
- Total ammoniacal nitrogen ranged 0.98-8.7 g/m³.
- Total biochemical oxygen demand ranged 2.3-68 g O₂/m³.
- Total suspended solids ranged 6-121 g/m³.
- Turbidity ranged 6.1-61 FNU.

2.3.5 Inaha Tributary at plant site IND001015

The Council collected three samples from the tributary which runs through the firewater pond. The aim of this sampling exercise was to assess the combined discharges of the stormwater and the cooling water, as well as any seepage which may occur from the ring drain around the final pond 6, prior to discharge to the Inaha stream from the firepond. The sample location is IND001015. The resultant analysis is presented in the following Table 8.

Table 8 Inaha tributary/ fire pond IND001015

IND001015	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N	Nitrate-N
Collected	g/m ³	%	°C	g/m ³	g/m ³	mS/m	MPN/100 ml	g/m ³ at	g/m ³
30 Sep 2019	8.81	90.7	16	41	0.042	37.8	1120	0.026	1.01
21 May 2020	NR	NR	21.3	31	0.067	30.7	687	0.043	1.78
20 Jul 2020	NR	NR	12.5	31	0.054	30.7	645	0.0084	2.3
IND001015	Nitrate-N + Nitrite-N	Nitrite-N	Oil and Grease	pH	Total Alkalinity	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Total Suspended Solids	Turbidity
Collected	g/m ³	g/m ³	g/m ³	pH Units	g/m ³ as CaCO ₃	g/m ³	g O ₂ /m ³	g/m ³	NTU
30 Sep 2019	1.09	0.083	< 4	7.6	116	2	2.2	6	16.3
21 May 2020	1.83	0.046	< 4	7.5	90	1.31	1.2	3	4.5
20 Jul 2020	2.3	0.035	< 4	7.5	85	1.26	1.5	5	8.2

The analysis of IND001015 indicated the following:

- Dissolved oxygen was recorded at 8.83 g/m³ and the percentage saturation was recorded at 90.7%.
- The temperature of the firepond ranged across the three samples 12.5-21.3°C.
- Chloride concentrations ranged 31-41 g/m³, demonstrating a reducing concentration through the year.
- Dissolved reactive phosphorus (DRP) ranged 0.042-0.067 g/m³.
- Electrical conductivity (EC) remained quite stable across the three monitoring rounds, ranging 30.7-37.8 mS/m.
- *E. coli* ranged 645-1,120 MPN/100 ml. It demonstrated a reducing concentration through the monitoring year.
- In terms of nitrogen:
 - Free ammonia (NH₃) ranged 0.0084-0.026 g/m³.
 - Nitrate nitrogen ranged 1.01-2.3 g/m³.
 - Nitrite nitrogen ranged 0.035-0.083 g/m³.
 - Nitrate / nitrite nitrogen (NNN) ranged 1.09-2.3 g/m³.
 - Total ammoniacal nitrogen ranged 1.26-2 g/m³.

- On two occasions the concentration of unionised ammonia exceeded $>0.025 \text{ g/m}^3$. The concurrent analysis from the surface water monitoring did not indicate any Inaha Stream exceedance for unionised ammonia.
- Oil and grease within the fire pond was below the LOD across the three rounds. The limit imposed by consent 5426-1 is for no more than 15 g/m^3 .
- pH remained stable and weakly alkaline, ranging 7.5-7.6 pH.
- Total alkalinity ranged $85\text{-}116 \text{ g/m}^3$.
- Total biochemical oxygen demand ranged $1.2\text{-}2.2 \text{ g O}_2/\text{m}^3$.
- Suspended solids ranged $3\text{-}6 \text{ g/m}^3$. The limit defined by consent 5426-1 is set at $<100 \text{ g/m}^3$.
- Turbidity ranged $4.5\text{-}16.3 \text{ NTU}$.

During this monitoring period the Company redeveloped the stormwater discharge system, whereby a sump was installed next to the fire pond for a first flush diversion system. This system's functions are as follows:

- Stormwater which is collected from potentially contaminated areas, including the raw materials area and meal load out area is diverted to the sump, rather than the fire pond, which previously occurred.
- The diverted stormwater is settled out in the sump, floating or settled solids from the sump are then removed and the stormwater is then pumped to one of the two anaerobic ponds (ponds 1 or 2). Where it is then treated as part of the wastewater system.
- During prolonged rainfall events, post the initial first flush, the sump can be bypassed to allow the less contaminated stormwater to enter the fire pond.
- The collected solids from the settling sump are periodically removed from the sump to maintain the performance of the system.
- This upgraded system was brought online in February 2020 and the associated pump, to send the contaminated first flush fluid to the anaerobic ponds, in April 2020.

The monitoring of the IND001015 discharge post the inception of the new first flush collection sump and pump did indicate a decrease in certain parameters, chloride, *E. coli*, alkalinity, ammonia and oxygen demand. Continued monitoring over time will assess how the functionality of this new system progresses.

2.4 Results of receiving environment monitoring

2.4.1 Inaha stream flow and discharge

The flow rate of Inaha Stream is measured for the purpose of managing the dilution of TBP's treated wastewater in the stream, and also the rate of abstraction. A water level staff gauge is installed at Kohiti Road Bridge, about 300 m upstream of the TBP discharge point. Stream flow rate is calculated from a rating curve developed from manual stream gauging taken at the staff gauge site. The Council undertook three stream gaugings in the 2019-2020 reporting period. These were undertaken on 21 October 2019, 23 January 2020 and 21 May 2020.

The hydrograph for 2019-2020 monitoring period, drawn from the staff gauge readings at Kohiti Road is provided in the following Figure 6. Included to this graph is a plot of the rate of the wastewater discharge to the stream, as measured at the v-notch weir at the outlet of Pond 6.

Special condition 6 on consent 2049 requires that minimum dilution rate of 1:300 for effluent discharged to the stream be maintained at all times, and special condition 8 requires that the discharge cease when flows in the stream, as measured at Kohiti Road Bridge, decrease to below 100 L/s. Special condition 2 on consent 2051 requires that a minimum flow of 25 L/s be maintained in the stream at the point of abstraction.

The results from the monitoring of wastewater and receiving water discharge rates by TBP show that the limit on the minimum dilution rate of 300:1 fold was achieved for the whole of the 2019-2020 period (Figure 7). The discharge ceased on the 31 October 2019, and no discharge to the Inaha Stream occurred till the following monitoring period 21 July 2020. This was a period of 264 days when the wastewater discharge was irrigated to land.

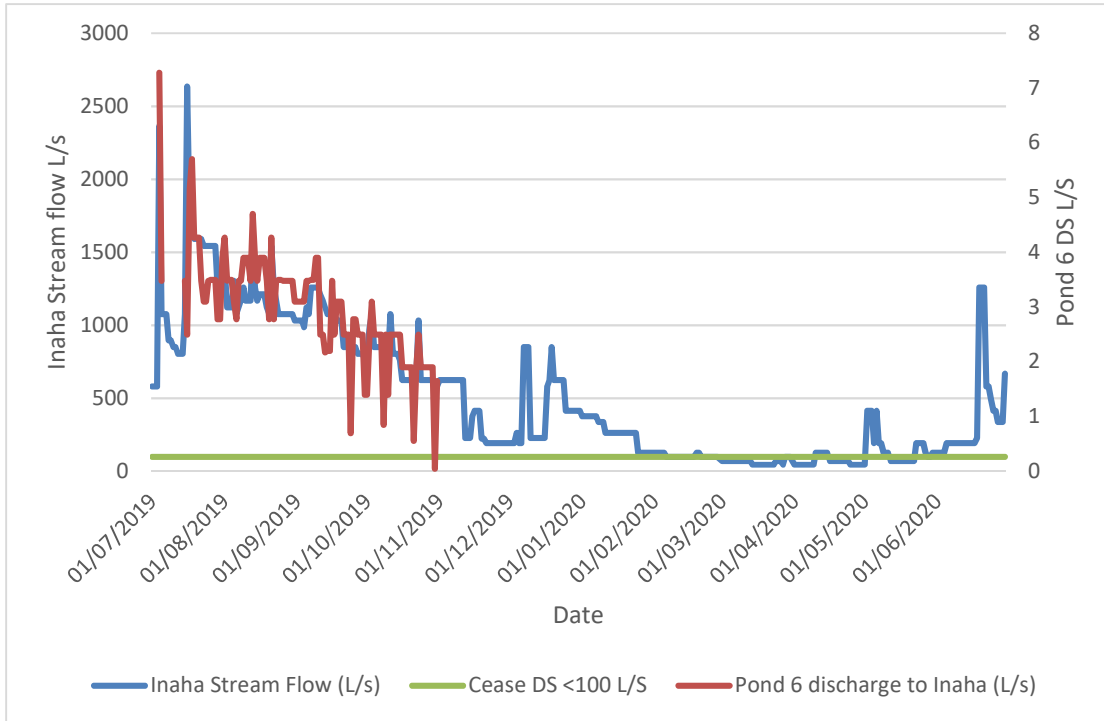


Figure 6 Hydrograph Inaha Stream flows and pond 6 discharge rate 2019 -2020 monitoring period

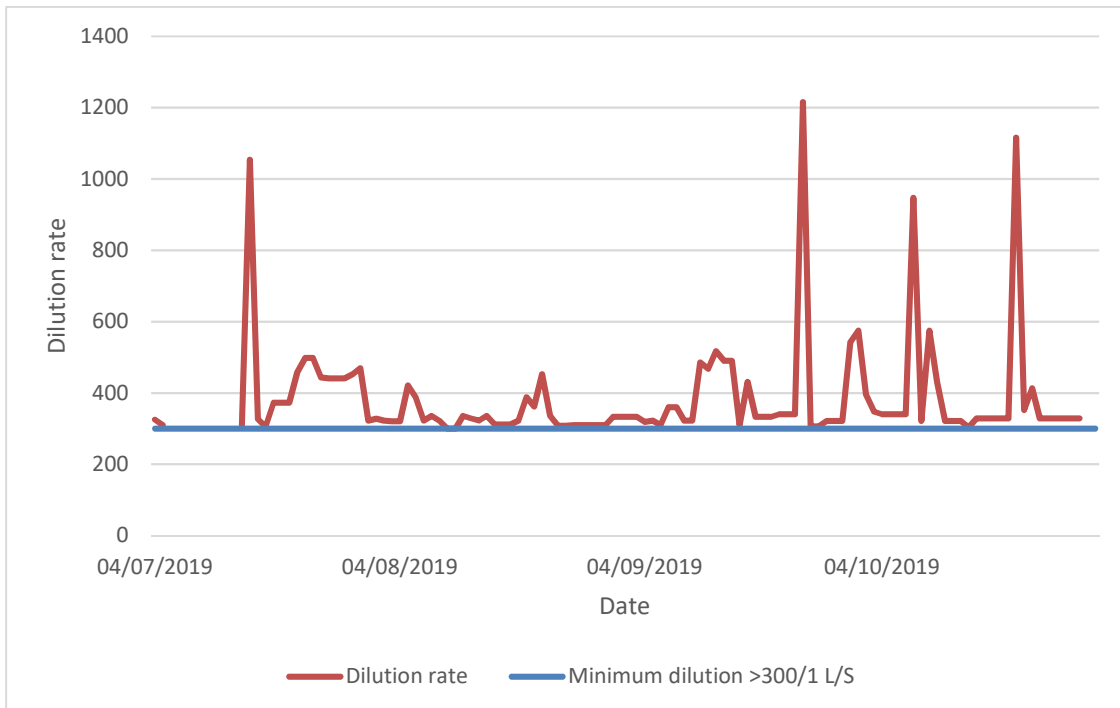


Figure 7 Dilution rate 2019-2020 monitoring period

2.4.2 Inaha Stream temperatures

In-stream temperature recorders were operated throughout the monitoring period. These monitors are located within the unnamed tributary which receives the cooling water discharge and in the Inaha Stream upstream of the confluence with the tributary, and downstream of the confluence at the end of the mixing zone. In September 2013, the Council took over the temperature monitoring from TBP, at TBP's request.

The record over the 2019-2020 monitoring period for the temperature of cooling water discharged, and the increase in Inaha Stream temperature, is given in Figure 8 and Figure 9. The error (uncertainty of measurement) on the cooling water temperature is $\pm 0.2^{\circ}\text{C}$, and the error on the in-stream temperature increase is $\pm 0.4^{\circ}\text{C}$.

For background, special condition 3 on consent 2050 requires that the temperature of the cooling water discharge must not exceed 35°C . In this monitoring period (Figure 7) the limit was not exceeded, marking the seventh year TBP has been in compliance with this cooling water temperature condition. Noted was the most elevated temperature, 33.5°C , in early December 2019.

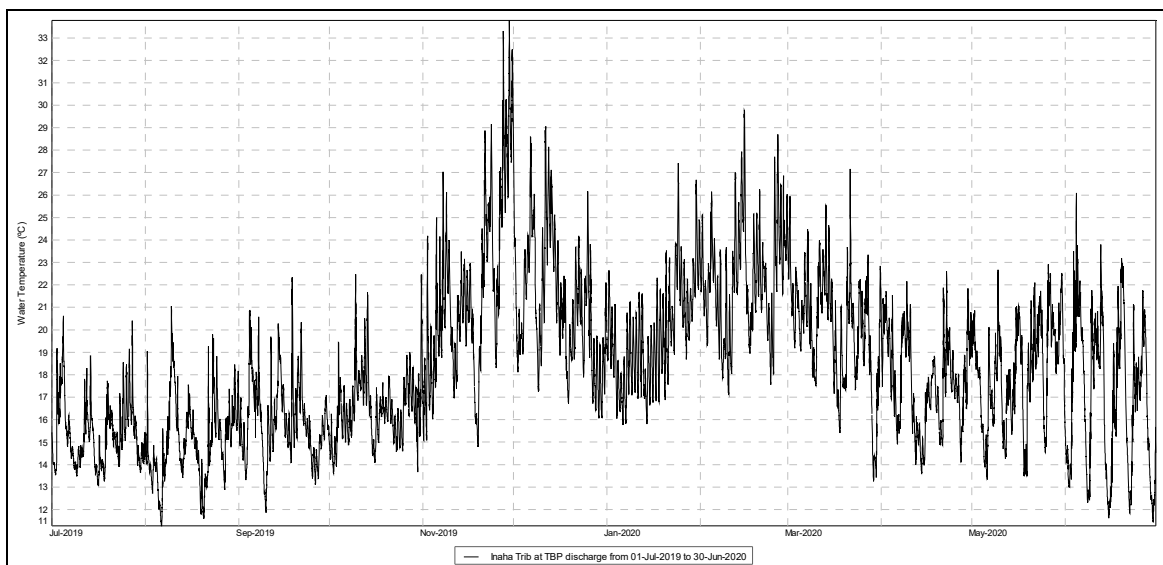


Figure 8 Cooling water temperature Inaha tributary 2019-2020

Special condition 9 (c) on consent 2049 and special condition 5 (g) on consent 2050 require that there be no more than a 3.0°C temperature differential in the receiving waters below the mixing zone as a result of the wastewater and cooling water discharges, respectively. Results presented in Figure 9 indicate compliance with this condition.

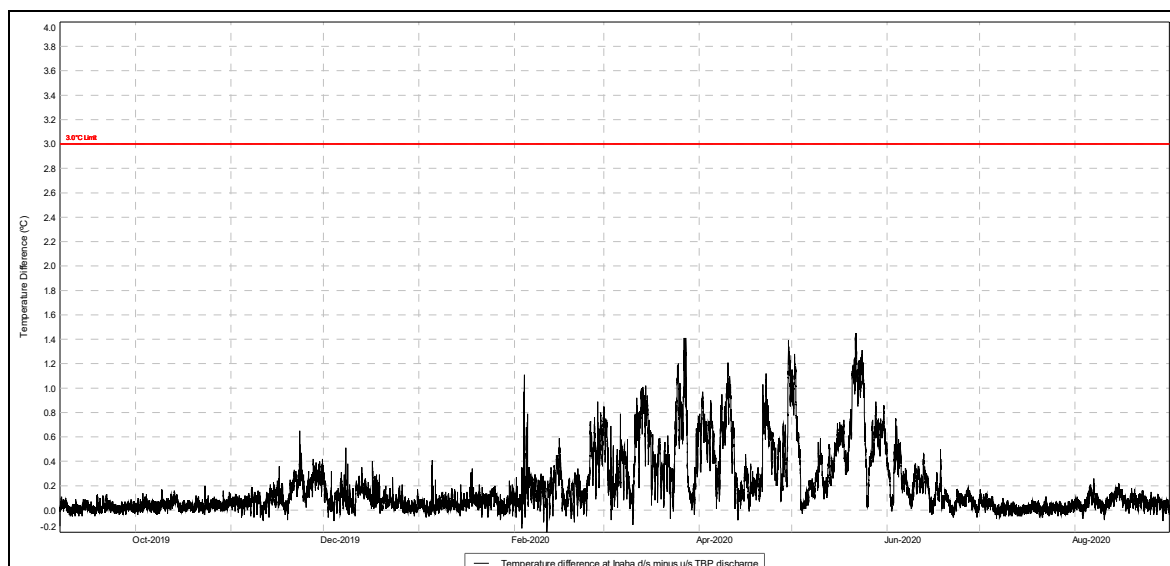


Figure 9 Inaha Stream temperature post the discharge 2019-2020

2.4.3 Water chemistry

2.4.3.1 Inaha Stream

Surface water analysis is undertaken of the Inaha Stream and associated Northern and Western tributaries. In this monitoring period three rounds of surface water sampling were undertaken. These rounds were conducted on the following dates: 30 September 2019, 21 May 2020 and 21 July.

Two reduced rounds were also undertaken in relation to a spill fatty wastewater and that will be discussed in Section 2.6, incidents.

Consent 2049-4 authorises the discharge of treated wastewater to the Inaha Stream under certain conditions. Condition 9 (below) of this consent defines effects which should not occur as a process of this discharge or in conjunction with any other discharges originating from the Company.

9. *The discharge [in conjunction with any other discharges pertaining to the same property], shall not cause or give rise to any of the following effects, at any point in the receiving waters below the mixing zone:*
- (a) a fall of more than 0.5 pH units;*
 - (b) an increase in filtered carbonaceous biochemical oxygen demand [20 degrees Celsius, 5-day test] to above 2.00 gm⁻³;*
 - (c) a temperature rise of more than 3.0 degrees Celsius;*
 - (d) a reduction in the dissolved oxygen concentration to below 80% of saturation concentration;*
 - (e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;*
 - (f) any conspicuous change in the colour or visual clarity;*
 - (g) any emission of objectionable odour;*
 - (h) the rendering of fresh water unsuitable for consumption by farm animals;*
 - (i) any significant adverse effects on aquatic life, habitats or ecology;*
 - (j) any visible bacterial and/or fungal growths in the receiving water.*

The analysis of the three rounds of surface water monitoring is provided in the following Tables 9-11.

Table 9 Inaha Stream surface water monitoring 1 30 September 2019

Inaha Stream SW 1 30 September 2019		DO	PERSAT	TEMP	Chloride	Dissolved C- Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli
Site	Collected	g/m ³	%	°C	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml
INH000334	10:07	10.2	97.7	12.2	23		0.021	21.8	980
INH000348	10:24	10.42	99.5	12.4	25		0.016	23.9	387
INH000400	10:35	10.48	98.8	12.4	26	< 1.0	0.018	24.8	308
INH000408	11:23	10.29	99.5	12.9	27	< 1.0	0.029	25.9	866
INH000420	11:59	10.24	99.6	12.5	27	<u>2.1</u>	0.072	25.8	> 2420
INH000430	12:59	10.13	98.2	13.1	29	2	0.075	26.1	> 2420
INH000450	13:05	10	98.5	13.1	31	<u>2.5</u>	0.068	28.4	> 2420
INH000470	13:35	9.96	96.9	13.4	33		0.057	29.4	517
Inaha Stream SW 1 30 September 2019		Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite- N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method
Site	Collected	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU
INH000334	10:07	0.0001	3.4	3.5	0.011	7.7	0.01	0.9	8.7
INH000348	10:24	0.0002	3.8	3.8	0.01	7.8	0.013	0.9	8.1
INH000400	10:35	0.0003	3.9	4	0.011	7.8	0.02	< 0.8	9.9
INH000408	11:23	0.0016	4.2	4.3	0.038	7.8	0.121	< 0.8	10.2
INH000420	11:59	0.0038	4.3	4.5	0.125	7.7	0.35	3.7	14
INH000430	12:59	0.0062	4.4	4.5	0.12	7.8	0.46	3.1	11.3
INH000450	13:05	0.005	5.2	5.3	0.106	7.7	0.41	3.1	12.3
INH000470	13:35	0.0012	5.1	5.2	0.095	7.8	0.08	1	12.8

The analysis of the September 2019 round indicated the following:

- Dissolved oxygen (DO) ranged 9.96- 10.48 g/m³.
- The associated oxygen saturation ranged 96.9-99.6% The consent limit requires the saturation to be greater than 80%.
- Surface water temperatures ranged 12.2-13.4°C.
- Chloride ranged 23- 33 g/m³ and demonstrated an increasing concentration down catchment.
- Dissolved (filtered) carbonaceous biochemical oxygen demand (CBOD₅) ranged from below the laboratory limit of detection (LOD) to 2.5 g O₂/ m³. This elevated figure was recorded at site INH000450. Two sites, INH000420 and INH000450 were in breach of consent 2049-4, condition 9, part b, as they recorded oxygen demand in excess of 2.0 g O₂/m³.
- Dissolved reactive phosphorus ranged 0.021-0.075 g/m³ and demonstrated an increasing concentration down gradient.
- Electrical conductivity (EC) ranged 21.8-29.4 mS/m.
- *E. coli* ranged from 308->2,420 MPN/100 ml.
- Free ammonia ranged 0.0001-0.0062 g/m³.
- Nitrate nitrogen ranged 3.4-5.2 g/m³ and demonstrated an increasing concentration down catchment.
- Nitrite nitrogen ranged 0.01-0.125 g/m³.

- Nitrate/ nitrite nitrogen (total oxidised nitrogen) ranged 3.5- 5.3 g/m³ and demonstrated an increasing concentration down catchment.
- pH remained stable and weakly alkaline, ranging 7.7- 7.8 pH.
- Ammonia ranged 0.01-0.46 g/m³.
- Total biochemical oxygen demand (non-nitrogen inhibiting) ranged from below the LOD to 3.7 g O₂/m³. The elevated concentration was recorded at INH000420, in similarity to the filtered carbonaceous.
- Turbidity ranged 8.7- 14 FNU.

Table 10 Inaha Stream surface water monitoring round 2 21 May 2020

Inaha Stream SW 2 21 May 2020		DO	PERSAT	TEMP	Chloride	Dissolved C- Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli
Site	Collected	g/m ³	%	°C	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml
INH000334	10:15	14.7	129	6.1	23		0.026	20.7	345
INH000348	10:40	12.52	104	6.7	24		0.025	21.9	111
INH000400	10:55	13.79	114	6.7	27		0.025	23.5	162
INH000408	12:30	13.03	112	8.7	28	< 1.0	0.027	25.1	121
INH000420	12:50	13.23	116	8.7	28	<1.0	0.029	25.5	161
INH000430	14:34	12.34	109	9.6	29	<1.0	0.029	25.5	219
INH000450	14:42	12.72	112	9.3	33	<1.0	0.026	27.5	185
INH000470	14:51	9.5	86.9	9.6	39		0.039	30.8	130
Inaha Stream SW 2 21 May 2020		Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite- N	Nitrite-N	pH	Total Ammoniacal- N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method
Site	Collected	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU
INH000334	10:15	< 0.00006	1.94	1.94	0.007	7.6	< 0.010	0.4	1.52
INH000348	10:40	< 0.00008	2.6	2.6	0.006	7.7	< 0.010	0.4	1.15
INH000400	10:55	0.00023	2.5	2.5	0.006	7.7	0.032	< 0.8	1.93
INH000408	12:30	0.0046	3.0	3.0	0.022	7.7	0.24	0.9	1.41
INH000420	12:50	0.00185	3.1	3.1	0.033	7.9	0.143	0.8	1.53
INH000430	14:34	0.00048	3.2	3.3	0.038	7.7	0.066	1.1	1.67
INH000450	14:42	0.00043	4	4.1	0.031	7.7	0.047	< 0.8	2.2
INH000470	14:51	0.00046	3.8	3.9	0.036	7.8	0.038	0.8	5.1

The analysis of the 21 May 2020 surface water monitoring round indicated the following:

- Dissolved oxygen in stream ranged from 9.5-14.7 g/m³. The lower concentration was recorded well downstream from the Company facility, just above State Highway 45, INH000470.
- Percentage of oxygen saturation ranged 56.9-129 %, with the lower reading recorded at INH000470.
- Temperature ranged 6.1-9.6°C. This was very close to a breach in condition 9 of consent 2049-4, as the temperature from the site above the discharge (INH000400) was recorded at 6.7°C, whereas the corresponding temperature downstream at INH000430 was recorded at 9.6°C, which is 2.9°C increase. The limit is no greater than 3°C.
- Chloride concentrations ranged 23-39 g/m³, and indicated an increasing concentration down catchment.
- Dissolved carbonaceous oxygen demand was below the LOD across the four sites assessed.
- Dissolved reactive phosphorus ranged 0.026-0.039 g/m³.
- Electrical conductivity ranged 20.7-30.8 mS/m, and demonstrated an increase down catchment.

- *E. coli* ranged 121-345 MPN/100 ml. The higher end of the results were recorded above the Company site at INH000334.
- Free ammonia ranged from below the LOD at two sites to 0.0046 g/m³, recorded at site INH000408, which is just downstream from the site discharges.
- Nitrate nitrogen ranged 1.94- 4 g/m³, and demonstrated an increasing concentration down catchment.
- Nitrite nitrogen ranged 0.007-0.038 g/m³.
- pH ranged stable and weakly alkaline, ranging 7.6-7.9 pH.
- Ammonia ranged from below the LOD to 0.24 g/m³.
- Total biochemical oxygen demand ranged from below the LOD through to 1.1 g O₂/m³.
- Turbidity ranged 1.15-5.1 FNU.

Table 11 Inaha Stream surface water monitoring round 3 20 July 2020

Inaha Stream SW3 20 July 2020		DO	PERSAT	TEMP	Chloride	Dissolved C-Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli
Site	Collected	g/m ³	%	°C	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml
INH000334	10:35	11.52	103.5	10.6	21		0.02	20.9	228
INH000348	10:46	11.41	103.3	10.8	23		0.02	21.1	160
INH000400	11:00	11.25	101.7	10.8	49	< 1.0	0.013	37.2	253
INH000408	11:45	11.47	104.9	11.2	25	< 1.0	0.022	23	203
INH000420	12:00	11.25	103.6	11.5	25	< 1.0	0.022	22.8	148
INH000430	13:25	10.9	101.3	12	26	< 1.0	0.024	22.8	168
INH000450	13:40	11.1	102.9	11.9	27	< 1.0	0.025	23.4	262
INH000470	13:50	10.57	98	11.8	30		0.033	24.8	122
Inaha Stream SW3 20 July 2020		Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method
Site	Collected	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU
INH000334	10:35	0.00005	3.3	3.3	0.008	7.3	0.013	< 0.4	13.3
INH000348	10:46	0.0001	3.4	3.4	0.01	7.5	0.015	0.5	18.7
INH000400	11:00	0.00005	5.1	5.1	0.007	7.2	0.016	0.7	9.6
INH000408	11:45	0.00012	3.3	3.3	0.01	7	0.056	3	14.7
INH000420	12:00	0.00033	3.3	3.3	0.011	7.5	0.048	1.1	13.1
INH000430	13:25	0.00017	3.4	3.4	0.013	7.3	0.045	1.3	14.8
INH000450	13:40	0.0001	3.4	3.4	0.015	7.1	0.04	0.9	13.5
INH000470	13:50	0.00016	3.5	3.5	0.018	7.3	0.036	0.6	14

The analysis of the third surface water monitoring round indicated the following:

- Dissolved oxygen ranged 11.52-10.57 g/m³.
- Percent saturation ranged 98-104.9 %.
- Temperature of the surface water ranged 10.6-12°C.
- Chloride ranged 21- 49 g/m³.
- Dissolved carbonaceous oxygen demand results were below the LOD.
- Dissolved reactive oxygen demand ranged 0.013-0.033 g/m³.
- Electrical conductivity ranged 20.9-37.2 mS/m.
- *E. coli* ranged 160-262 MPN/100 ml.

- Free ammonia ranged 0.00005-0.00033 g/m³.
- Nitrate nitrogen ranged 3.3-5.1 g/m³.
- Nitrite nitrogen ranged 0.07-0.018 g/m³.
- Nitrate. Nitrite nitrogen ranged 3.3-5.1 g/m³.
- pH ranged 7-7.5 pH, which is close to a consent breach, as a decrease of more than 0.5 pH would be a breach in consent 2049-4; condition 9, part a.
- Ammonia results ranged 0.013-0.056 g/m³.
- Total biochemical demand ranged from below the LOD through to 3 g O₂/m³. This was recorded at INH000408.
- Turbidity ranged from 9.6-18.7 FNU.

Surface water monitoring indicated that during the September 2019 sample round, a minor exceedance in dissolved oxygen consumption was recorded. Two sites, INH000420 and INH000450 (30 September 2019, Table 10) were in breach of consent 2049-4, condition 9, part b, as they recorded oxygen demand in excess of 2.0 g O₂/m³.

It was noted the facility was discharging to the Inaha Stream during the elevated oxygen demand recording.

Nitrate nitrogen results indicated a steady increase in concentration down the length of the monitoring sites. The increase of 1.5-2.0 g/m³ in nitrate was noted between top and bottom sites on two occasions of three.

Temperature monitoring of the Inaha Stream during the May 2020 monitoring round indicated an increase of 2.9°C, which is close to the thermal limit bestowed by consent, which states no increase of more than 3.0°C.

2.4.3.2 Northern tributary

The northern tributary joins the Inaha Stream immediately above Kohiti Road. It runs a distance of about 0.64 km through the Kohiti block of TBP's farm, about 0.42 km adjacent to potentially irrigated areas. The tributary is monitored at its confluence with the main stream at INH000397. The analyses of the samples collected in this monitoring period are provided in Table 12.

Table 12 Northern tributary INH000397

INH000397/ parameter	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	pH
Collected	g/m ³	%	°C	g/m ³	g/m ³	mS/m	MPN/100 ml	pH Units
30 Sep 2019	9.96	95.6	12.6	32	0.014	30.3	816	7.7
20 Jul 2020	11.02	99.1	10.6	32	0.018	28.2	158	7.4
21 May 2020	12.34	102	6.9	42	0.009	33.3	488	7.5
INH000397/ parameter	Free Ammonia as N	Nitrate- N	Nitrate- N + Nitrite- N	Nitrite- N	Total Ammoniacal- N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method	
Collected/unit	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g O ₂ /m ³	FNU	
30 Sep 2019	0.00079	4.7	4.7	0.014	0.07	1	13.1	
20 Jul 2020	0.00009	2.6	2.6	0.007	0.02	< 0.4	5.8	
21 May 2020	0.00047	2	2	0.008	0.099	0.5	1.63	

The analysis indicated the following:

- Dissolved oxygen remained above the consent limit of 80 % saturation across the three monitoring rounds and the associated concentrations ranged 9.96-12.34 g/m³.
- Surface water temperature ranged 6.9-12.6°C.
- Chloride ranged 32-49 g/m³.
- Dissolved reactive phosphorus (DRP) ranged 0.009-0.018 g/m³.
- Electrical conductivity (EC) ranged 28.2-33.3 mS/m.
- *E. coli* ranged 158-816 MPN/100ml.
- pH remained weakly alkaline, ranging 7.4-7.7 pH.
- Free ammonia was recorded at trace concentrations, ranging 0.00009-0.00079 g/m³.
- Nitrate nitrogen and nitrate/nitrite nitrogen ranged 2-4.7 g/m³.
- Nitrite was recorded at low concentrations, ranging 0.007-0.014 g/m³.
- Total ammoniacal nitrogen ranged 0.02-0.099 g/m³.
- Total biochemical oxygen demand ranged from below the LOD to 1 g O₂/m³.
- Turbidity ranged 1.63-13.1 FNU.

Noted over the past few monitoring periods has been a steady increase in the concentration of nitrate nitrogen at this monitoring location (Figure 10). The long term monitoring of this site (Figure 10) indicated a rise in nitrate concentrations in the 2010 monitoring year, with this site maintaining a minimum of 2 g/m³ +/- since that date.

The National Policy Statement for Freshwater Management (NPS-FM) for nitrate in surface water (Figure 11) indicates the site of INH000397 is in the range for the national bottom line for nitrate nitrogen in surface water.

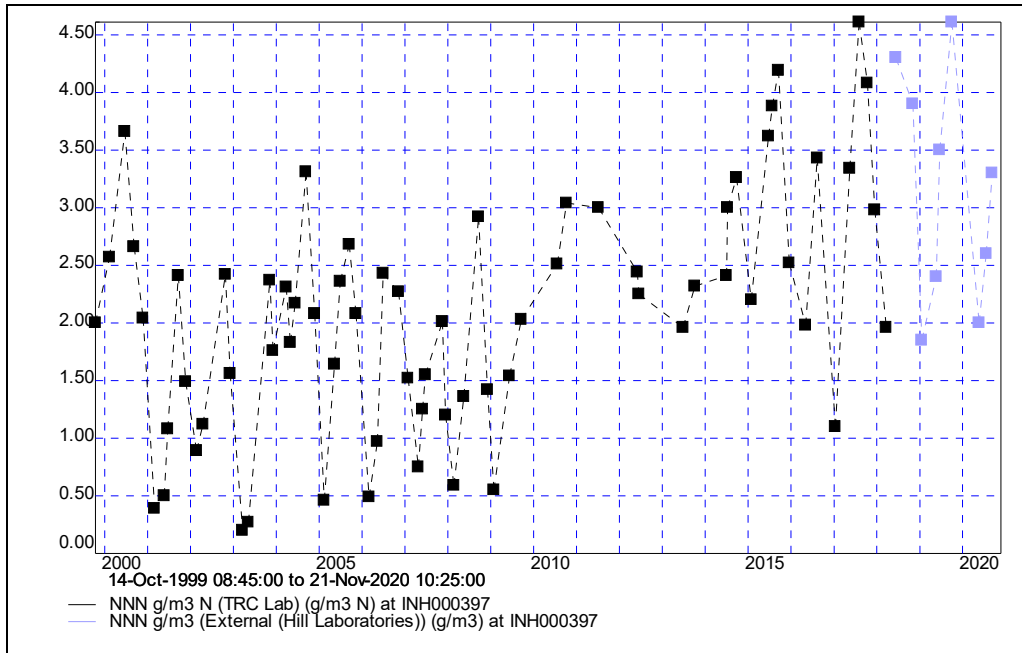


Figure 10 Long term nitrate nitrogen monitoring INH000397 1999-2020

Value (and component)	Ecosystem health (Water quality)	
Freshwater body type	Rivers	
Attribute unit	mg NO ₃ – N/L (milligrams nitrate-nitrogen per litre)	
Attribute band and description	Numeric attribute state	
	Annual median	Annual 95th percentile
A High conservation value system. Unlikely to be effects even on sensitive species	≤1.0	≤1.5
B Some growth effect on up to 5% of species.	>1.0 and ≤2.4	>1.5 and ≤3.5
National bottom line	2.4	3.5
C Growth effects on up to 20% of species (mainly sensitive species such as fish). No acute effects	>2.4 and ≤6.9	>3.5 and ≤9.8
D Impacts on growth of multiple species, and starts approaching acute impact level (that is sensitive species at higher concentrations (>20 mg/L).	>6.9	>9.8
This attribute measures the toxic effects of nitrate, not the trophic state. Where other attributes measure trophic state, for example periphyton, freshwater objectives, limits and/or methods for those attributes may be more stringent.		

Figure 11 National Policy Statement for Freshwater Management (Nitrate)

2.4.3.3 Western tributary

The Western tributary joins the Inaha Stream immediately below Normanby Road. It runs a distance of about 3.5 km through land that is irrigated on both sides with TBP wastewater. The distance between the stream in its valley to the irrigated areas on the plateau above is about 50 to 100 m.

The tributary is monitored at three points: INH000433 which is above the TBP farm; INH000435 which was the original upstream site before the irrigation area was extended, is situated 2.5 km above the Inaha confluence and INH000440 which is the final site on the Western tributary. This is located immediately above Normanby Road, about 0.22 km above the confluence with the main stem of Inaha Stream.

In this monitoring period the main stem of the western tributary (which includes three monitoring sites: INH000433/435 and 440) was monitored on three occasions (Tables 13-15), following the Inaha Stream sample collection.

Table 13 Western tributary 30 September 2019

Western Trib 30 Sep 2019	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N
Site	g/m ³	%	°C	g/m ³	g/m ³	mS/m	MPN / 100ml	g/m ³
INH000433	9.56	92.4	12.6	36	0.008	30.9	1120	< 0.00010
INH000435	9.82	95.4	13.1	40	0.009	33.8	1986	< 0.00013
INH000440	10.32	100	13.1	45	0.008	36.9	1986	< 0.00017
SW1	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method	
Site	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU	
INH000433	3.2	3.2	0.004	7.6	< 0.010	0.9	18.8	
INH000435	5.9	6	0.004	7.7	< 0.010	0.4	3.2	
INH000440	8.6	8.6	0.004	7.9	< 0.010	0.6	6.7	

Table 14 Western tributary 21 May 2020

Western Trib 21 May 2020	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N
Site	g/m ³	%	°C	g/m ³	g/m ³	mS/m	MPN /100 ml	g/m ³
INH000433	11.87	105	7.3	22	0.006	13.6	73	0.00009
INH000435	13.09	108.8	6.9	57	0.01	40.9	548	0.00026
INH000440	13.05	108	6.8	68	< 0.004	49.6	91	0.00006
SW2	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method	
Site	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU	
INH000433	0.003	0.003	< 0.002	7	0.017	0.5	2.7	
INH000435	5.1	5.1	0.016	7.8	0.031	0.9	2.8	
INH000440	12.3	12.3	0.003	7.6	0.012	2.8	3.1	

Table 15 Western tributary 20 July 2020

Western Trib 20 Jul 20	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N
Site	g/m ³	%	°C	g/m ³	g/m ³	mS/m	MPN /100 ml	g/m ³
INH000433	10.7	96.7	10.8	41	0.009	33.6	160	0.00008
INH000435	10.83	97.5	10.7	45	0.011	34.8	148	< 0.00006
INH000440	10.6	99.8	10.6	25	0.021	22.5	231	0.00008
SW2	Nitrate-N	Nitrate-N + Nitrite- N	Nitrite-N	pH	Total Ammoniacal- N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method	
Site	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU	
INH000433	2.5	2.5	0.006	7.5	0.013	0.7	30	
INH000435	3.2	3.2	0.007	7.4	< 0.010	0.4	7	
INH000440	3.2	3.2	0.008	7.4	0.016	0.5	18.9	

The analysis of the three monitoring rounds of the Western tributary indicated the following:

- Dissolved oxygen analysis recorded good oxygen saturation across all three rounds and all three sites, ranging 92.4-108.8%, the corresponding concentration ranged 9.56-13.09 g/m³.
- Surface water temperatures ranged 6.8-13.1°C.
- Chloride concentrations ranged 22-68 g/m³, and generally increased in concentration down the length of the western tributary.
- Dissolved reactive phosphorus (DRP) ranged from below the LOD- 0.031 g/m³. The long term (5 year) median value for DRP at this monitoring location indicated a value of 0.012 g/m³. This indicates the Western tributary is within attribute state C for DRP, as defined by NPS-FM.
- Electrical conductivity (EC) ranged 13.6-49.6 mS/m, and generally increased in conductivity concentration down catchment.
- *E. coli* was measurable across all samples on all three sites, ranging 91-1,986 MPN/100 ml.
- Free ammonia ranged from below the LOD – 0.00026 g/m³.
- Nitrate nitrogen as well as nitrate/nitrite nitrogen results ranged from 0.003-12.3 g/m³. On each sampling round the concentration increased down the reach of the tributary, with the largest increase (12.3 g/m³) noted in the May 2020 monitoring round. It should be further noted that the July 2020 monitoring round recorded the lowest concentration at INH000440 (lowest monitoring site on the western tributary) since July 2013.
- Nitrite nitrogen remained at low concentrations across all sites, ranging at trace concentrations, from below the LOD – 0.016 g/m³.
- pH results of the surface water ranged neutral pH 7 though to 7.9 pH.
- Total biochemical oxygen demand was measurable across all three sites and ranged 0.4-2.8 g O₂/m³.
- Turbidity ranged 2.8-30 FNU.

Additional spots samples of the lower monitoring site (INH000440) on the Western tributary are also collected to assess for further variation through the monitoring year. In this monitoring period the Council collected an additional six samples from the lower site. The analysis is provided in Table 16.

Table 16 Spot sample lower site INH000440 western tributary 2019-2020 monitoring period

INH000440	DO	PERSAT	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	
Date/unit	g/m ³	%	°C	g/m ³	g/m ³	mS/m	cfu / 100 ml	MPN/100 ml
19 Aug 2019	NR	NR	8.8	44	0.013	36.7	60	
06 Nov 2019	NR	NR	15	45	0.009	37.6	300	
12 Feb 2020	9.97	103.2	17.9	53	0.007	43.1	600	
12 Mar 2020	9.61	97.1	15	65	< 0.004	49.1		345
11 May 2020	NR	NR	12.7	63	0.009	47	220	
20 Jul 2020	10.77	95.6	10.1	50	0.011	37.2	210	
INH000440	Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite-N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method
Date/unit	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU
19 Aug 2019	< 0.00011	8.4	8.4	0.005	7.8	< 0.010	0.7	4.9
06 Nov 2019	< 0.0003	8.2	8.2	0.004	7.9	< 0.010	1	4.2
12 Feb 2020	< 0.0003	10	10	0.005	7.8	< 0.010	1	1.55
12 Mar 2020	< 0.00016	12.3	12.3	0.006	7.7	< 0.010	0.4	3
11 May 2020	< 0.00005	10.4	10.4	0.004	7.3	< 0.010	< 0.4	2.8
20 Jul 2020	0.00006	5.1	5.2	0.007	7.4	0.013	0.6	9.2

- Dissolved oxygen remained to a good standard, ranging 95.6-103, with the corresponding concentrations ranging 9.61-10.77 g/m³.
- Temperature ranged 8.8-17.9°C.
- Chloride ranged quite stable across the five samples, ranging 44-65 g/m³.
- Dissolved reactive phosphorus ranged from below the LOD – 0.011 g/m³.
- EC ranged 36.7-49.1 mS/m.
- *E. coli* ranged 60-600 cfu/100 ml, and was recorded at 345 MPN/100 ml on one occasion.
- Free ammonia was recorded below the LOD on five of six occasions, and 0.00006g/m³ on one occasion.
- Nitrate and nitrate/nitrite nitrogen ranged 5.1-12.3 g/m³ with the elevated results (12.3 g/m³) reported in the March 2020 monitoring round.
- Nitrite nitrogen was recorded at low concentrations, 0.004-0.005 g/m³.
- pH remained weakly alkaline, and ranged 7.3-7.9 pH.
- Ammoniacal nitrogen ranged from below the LOD on five occasions to 0.013 g/m³ on one occasion.

Long term monitoring of nitrate/ nitrite nitrogen at the lowest site, INH000440, is provided in the following Figure 12. The analysis in the 2019-2020 monitoring period indicated a fluctuating, though decreasing trend in concentrations of this target analyte. These preliminary results suggest a positive outcome from the Company's investment in better management of their wastewater land discharge coupled with a decrease in fertiliser application, which has reduced the total nitrogen applied to land.

For context, the Company were asked in the 2015-2016 monitoring period to better manage their applications of wastewater and fertiliser due to nitrate nitrogen emerging in the western tributary. It is noted that the elevated concentrations exceeded the national bottom line, attribute state D, for nitrate nitrogen in surface water, as defined in Figure 11, the NPS-FM.

Further monitoring of this location will determine over time, whether the Company's undertakings have been successful. The recent results are encouraging.

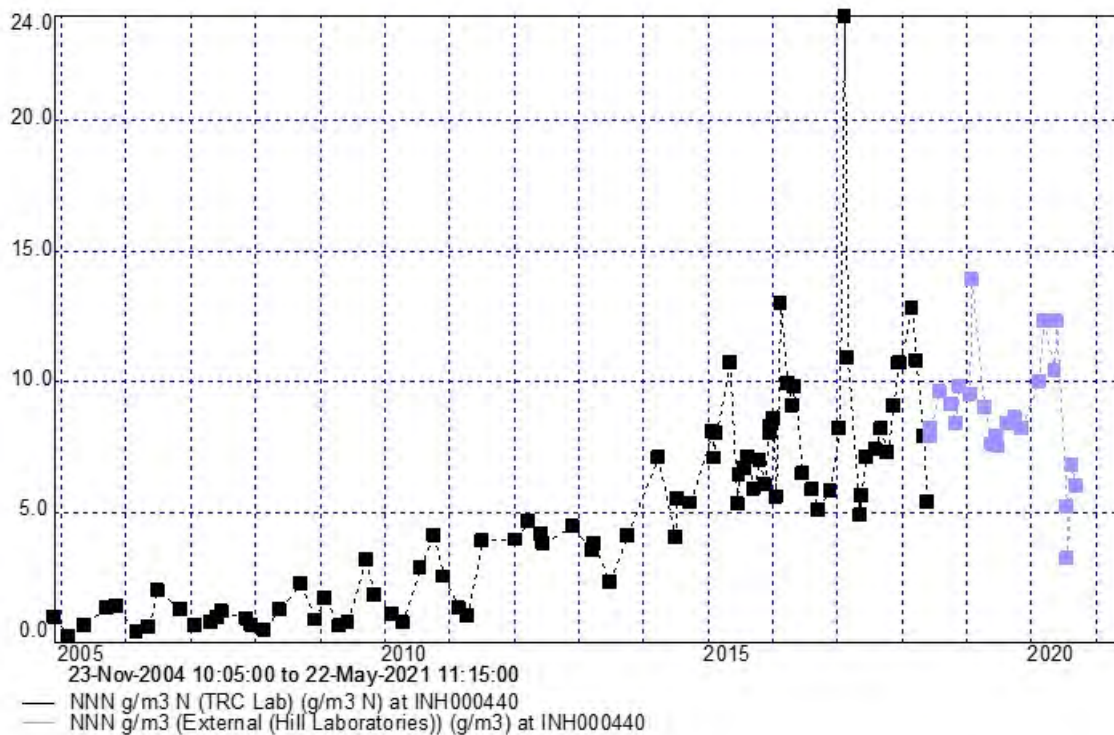


Figure 12 Long term monitoring INH000440 nitrate/nitrite 2005-2020

2.4.4 Irrigation area loading and groundwater monitoring

TBP holds consent 3941-2; this consent allows for the discharge of up to 1,400 m³/day of treated wastewater from their rendering operation onto and into the land in the vicinity of the Inaha Stream and its tributaries.

The wastewater is monitored by both TBP and the Council. TBP measures and records wastewater volumes discharged on each paddock daily, and analyses nitrogen constituents of the wastewater at approximately weekly intervals. Some soil testing has been carried out.

Monitoring by the Council included the following: inspection of the irrigation areas, effluent analysis, chemical and biological surveys of the Inaha Stream and sampling from the groundwater bores installed around the irrigation areas and of a spring (Te Kopanga), situated near an irrigation area, that is used to supply several households.

2.4.4.1 Irrigation area and system

The spray irrigation system employs low-medium pressure travelling irrigators with a 30 m or 50 m swath. Use of a 'Rotorainer' irrigator with a 100 m boom, that requires less maintenance, commenced in May 2008. A second Rotorainer was employed from January 2009.

The area irrigated has progressively increased. For more information refer to Section 2.4.4.1 Technical Report 2018-70, referenced later in this report. Note this is the 2017-2018 monitoring report for TBP.

Previous years and current year loading rates

Table 17 provides a comparison of wastewater and fertiliser loading rates to land over the past three monitoring periods. The sources of data were compiled by the Company and provided to the Council as monthly reports.

Table 17 2017-2020 comparison loading rates of wastewater and fertiliser

Parameter	2017-2018 loading rates	2018-2019 loading rates	2019-2020 loading rates
Utilised land application area	302.54 ha	322.76 ha	337.91 ha
Total applied nitrogen (stickwater)	11,483 kg N/pa	10,067 kg N/pa	2,121 kg N/pa
Total nitrogen (wastewater)	33,727 kg N/pa	43,738 kg N/pa	36,994 kg N/pa
Combined nitrogen	45,210 kg N/pa	53,805 kg N/pa	39,115 kg N/pa
Calculated average loading rate	149 kg N/ha/pa	167 kg N/ha/pa	116 kg N/ha/pa
Highest application wastewater	Paddock 22 295 kg N/ha/pa	Paddock 35 299 kg N/ha/pa	Paddock 13 248 kg N/ha/pa
Highest application stickwater	Paddock 1 250 kg N/ha/pa	Paddock 32 205 kg N/ha/pa	Paddock 27 36 kg N/ha/pa
Highest combined loading rate	Paddock 31 306 kg N/ha/pa	Paddock 20 386 kg N/ha/pa	Paddock 13 248 kg N/ha/pa

The data provided by the consent holder for irrigation of wastewater and fertiliser to land indicated the following:

- The total volume of wastewater discharged to land reduced by 6,744 kg N, when compared to the 2018-2019 monitoring period.
- The total volume of the fertiliser, stickwater, decreased significantly by 7,946 kg N.
- The combined wastewater and stickwater discharged to land was reduced by 14,690 kg N in this monitoring period, when compared to the 2018-2019 monitoring period.
- No paddock exceeded 250 kg N/ha this monitoring period, Figure 13.
- The highest application was to paddock 13 which received wastewater only, 248 kg N, Figure 13.

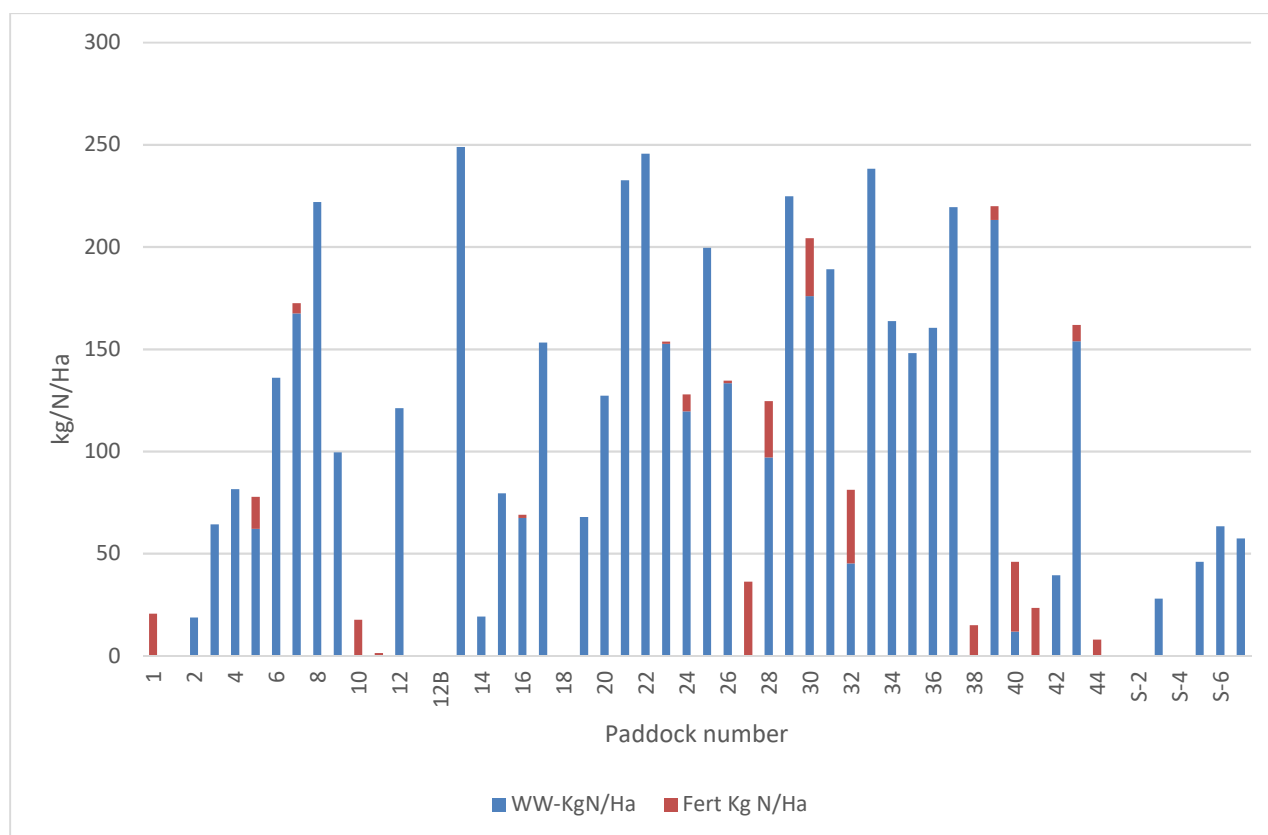


Figure 13 2019-2020 wastewater and fertiliser application kg N by paddock

2.4.4.2 Groundwater monitoring of the irrigation areas

Groundwater sampling of the irrigation areas commenced in February 2000 and was undertaken on a monthly basis until June 2006, when the frequency was reduced to two-monthly. Initially, four bores on Kohiti and Normanby Road blocks and a spring (Te Kopanga Spring) on Shearers' property were monitored. In September 2001, two bores were commissioned on Katotauru block, four months before irrigation started there. In January 2005, two bores were drilled in proposed new irrigation areas, at least one year before irrigation commenced, and two existing bores were replaced because of access difficulty.

In October 2011, two further bores were drilled, at the downslope boundaries of the "Kingi" and Inaha Road blocks at the northern and western extents, respectively, of the irrigation area. The locations of the groundwater monitoring bores and spring are described below in Table 18 and shown in Figure 2.

Table 18 Irrigation area groundwater monitoring well information

Site name	Site code	Depth m	Grid reference, NZMP	
			Easting	Northing
BH1	GND1054	13.5	1702469	5624829
BH3	GND1056	12.8	1702359	5623913
BH4	GND1057	11.0	1702308	5623294
Te Kopanga	GND1058		1701770	5623022
BH5B	GND1346	8.6	1701352	5624536
BH6B	GND1347	12.2	1701586	5623914
BH7	GND1348	13.5	1702671	5624594

Site name	Site code	Depth m	Grid reference, NZMP	
			Easting	Northing
BH8	GND1349	13.6	1701013	5623526
BH9	GND2225	11.5	1701186	5624945
BH10	GND2226	10.4	1700548	5623806

Bore 1 and Bore 5 (now obsolete) were installed as control sites, situated at the (then) upslope boundaries of Kohiti and Katotauru blocks, respectively. Bore 5B was placed up-gradient of Bore 5 after a new farm track covered it in September 2004. Bore 2 was on the flat beside an unnamed tributary of Inaha Stream, at the bottom of Kohiti block. Bore 3 is beside Kohiti Road on the south-eastern plateau above TBP's plant. Bore 4 is in the centre of Normanby block. Bore 6 is in a swale beside the road at the downslope boundary of Katotauru block. Bore 6B was emplaced on the flat above Bore 6 after a series of flood events by ponded rainfall and wastewater. Bore 7 is down gradient of the southern side of the Ahipaipa block. Bore 8 is down gradient of the western side of the Katotauru/Normanby Roads block. Bore 9 is down gradient of the eastern side of Kingi block. Bore 10 is down gradient of the "Maori Trustee" block beside Upper Inaha Road.

Background

Monitoring of the irrigation area was undertaken to assess for the effects of the land-based applications of wastewater through irrigation and injection spreading of fertiliser (Zealgrow/stickwater). As previously discussed the TBP site operates a dual wastewater disposal system. The disposal of diluted effluent to the Inaha stream was previously discussed in section 2.4.1. In this section the groundwater monitoring of the irrigation area is presented. Specific effects are related to nitrate impacts in the groundwater and the analyte nitrite/nitrate nitrogen (NNN) is the main analyte of concern, as it appears to be leading to an increase in surface water values, specifically in the Western tributary which was discussed in Section 2.4.3.3.

In this monitoring period six rounds of groundwater monitoring were proposed, however only four could be undertaken. The results of the four monitoring rounds are provided in the following tables.

GND1054: The control bore. The analysis of the four rounds of monitoring is provided in the following Table 19. Groundwater level ranged 1.64 m across the four rounds. The temperature remained quite stable, with a range of 0.8°C. Chloride analysis remained stable, with a range of 5 g/m³ Electrical conductivity (EC) also remained stable, with a range of 0.6 mS/m. *E. coli* was below the LOD on all four occasions. Nitrate/nitrite nitrogen (NNN) indicated a slight increasing trend through the monitoring period, rising by 1.2 g/m³. pH results were weakly acidic, with a stable range of 0.2 pH. Total ammoniacal nitrogen results were below the LOD across the four rounds.

Long term analysis of NNN concentrations are provided in Figure 14. This figure indicates a slow, but steady increase in NNN concentrations over time, though it should be noted that the concentrations of NNN remains below 10 g/m³.

Table 19 GND1054 2019-2020 monitoring period

GND1054	Unit/Date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	6.76	7.81	7.88	8.4
TEMP	°C	13.8	14.6	14.6	14.4
Chloride	g/m ³	44	45	47	49
Electrical Conductivity (EC)	mS/m	34.3	33.7	33.7	33.9
Escherichia coli	cfu / 100 ml	< 1	< 1	< 1	1
Nitrate-N + Nitrite-N	g/m ³	7.3	7.8	7.8	8.5
pH	pH Units	6.6	6.4	6.5	6.5
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

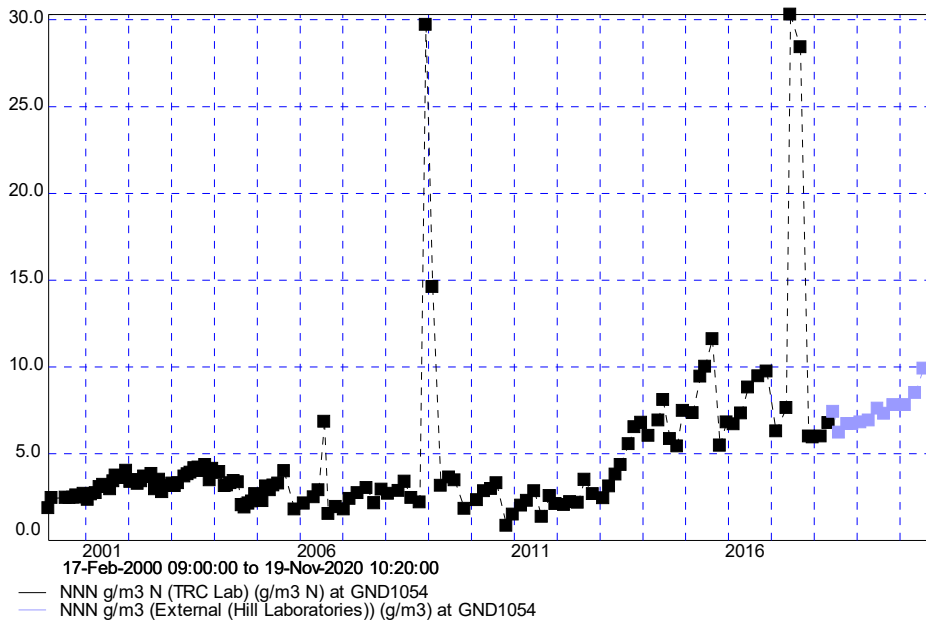


Figure 14 Long term NNN concentrations GND1054

GND1056: Located to the south east of the facility in paddock 12. Paddock 12 received wastewater applications only during this period, at a quantity of 121 kg N per ha. The results of the four rounds are provided in Table 20. Groundwater level fluctuated 1.87 m this monitoring period. The associated temperature ranged 0.9°C. Chloride results remained relatively stable, ranging 2 g/m³. Similarly, conductivity ranged 1.8 mS/m.

E. coli results ranged from below the LOD to 2 cfu/100 ml. Nitrate/nitrite (NNN) nitrogen results remained low and demonstrated a reducing trend in this monitoring period, with a reducing range of 0.6 g/m³. pH results remained stable and weakly acidic, ranging 0.2 pH. Total ammoniacal nitrogen results were below the limit of detection (LOD) across all four rounds.

Long term monitoring of target contaminant NNN is provided in Figure 15. This figure indicates the contaminant remains at a low concentration within this monitoring well.

Table 20 GND1056 2019-2020 monitoring period

GND1056	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	01 May 2020
LEVEL	m	9.43	8.41	9.29	10.28
TEMP	°C	14.3	14.6	15.1	15.2
Chloride	g/m ³	43	41	41	41
Electrical conductivity	mS/m	27.3	27.9	26.7	26.1
Escherichia coli	cfu/100 ml	< 1	1	< 1	2
Nitrate-N + Nitrite-N	g/m ³	3.3	3.7	3.1	2.7
pH	pH Units	6.6	6.7	6.5	6.5
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

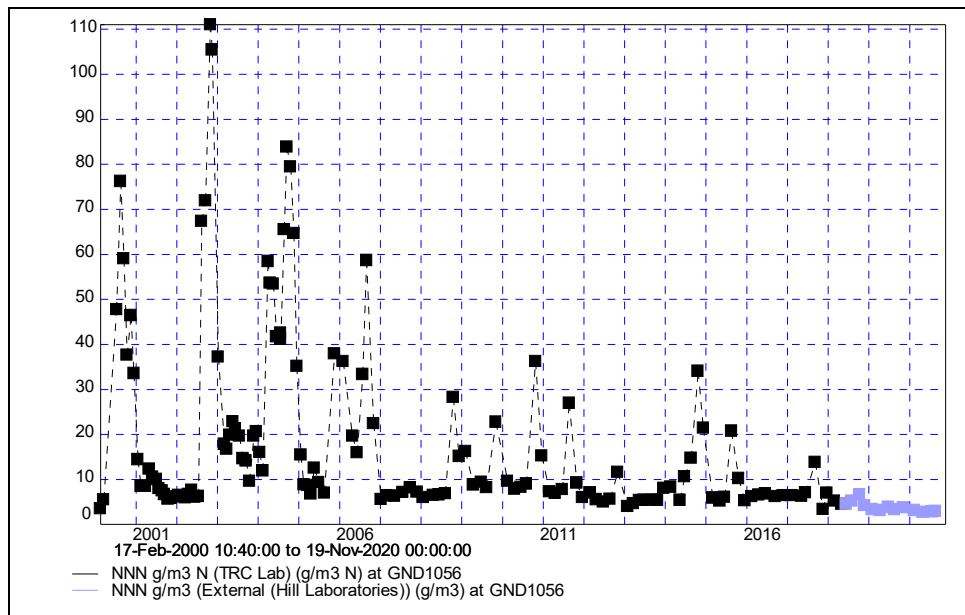


Figure 15 Long term NNN monitoring GND1056

GND1057: Located in paddock 14, which is to the south-south east of the facility. This paddock received 19 kg N/ha this monitoring period of wastewater only. The results of the four rounds are provided in Table 21.

Groundwater level fluctuated 2.23 m this monitoring period. The associated temperature range was 1.3°C. Chloride results varied over a greater range, 21 g/m³, though demonstrated a reducing concentration through the monitoring period. Electrical conductivity ranged 12.4 mS/m and also demonstrated a reducing concentration. *E. coli* results were measured in two of four samples, though at low concentrations with the final two monitoring rounds not recording *E. coli* above the LOD.

Nitrate/nitrite nitrogen (NNN) ranged 8.2 g/m³, and demonstrated a reducing trend in this monitoring period. Long term monitoring of NNN concentrations is provided in Figure 16. This figure indicates a slight increasing trend with time.

pH remained weakly acidic and stable with a range of 0.1 pH. Total ammoniacal nitrogen was below the LOD in all four rounds.

Table 21 GND1057 2019-2020 monitoring period

GND1057	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	5.25	5.89	6.6	7.48
TEMP	°C	14.4	14.7	15.7	15
Chloride	g/m ³	68	52	52	41
Electrical conductivity	mS/m	53.7	44.1	44.9	41.3
Escherichia coli	cfu/100 ml	1	3	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	23	16	18	14.8
pH	pH Units	6.4	6.4	6.5	6.5
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

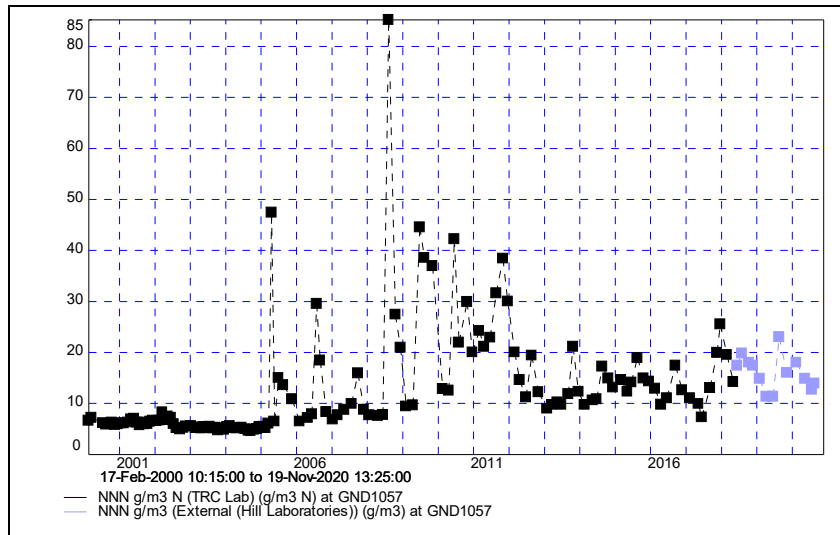


Figure 16 Long term NNN monitoring GND1057 2000-2020

GND1058: This monitoring location is called Te Kopanga Spring. It supplies a number of houses with water in the near vicinity. It also holds significant value for the local Hapu, Ngati Manuhiakai. No water level is obtained from this spring water source. It is located on the boundary of paddock 17 and 16. In this monitoring period, paddock 17 received 153 kg N/ha of wastewater, while paddock 16 received a combined application of 69 kg N/ha.

Temperature of this location ranged 2.3°C. The chloride concentration ranged 6 g/m³, while the associated conductivity ranged 1.3 mS/m. *E. coli* was below the LOD on all four occasions. Nitrate/nitrite nitrogen demonstrated a reducing range of 0.6 g/m³. pH remained stable and weakly acidic at pH 6.7. No ammonia was recorded above the LOD.

Long term monitoring data for key contaminant NNN is provided in Figure 17. The analysis has indicated a recent reduction in NNN concentrations. A reduction in NNN concentration in this location was a key requirement bestowed on the Company. So far the actions undertaken by the Company appear to be reducing the NNN concentration in this spring.

Table 22 GND1058 2019-2020 monitoring period

GND1058	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	NR	NR	NR	NR
TEMP	°C	14.7	15.4	17	15.2
Chloride	g/m ³	54	54	54	48
Electrical conductivity	mS/m	32.7	33.8	33.7	34
Escherichia coli	cfu/100 ml	< 1	< 1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	4.7	4.8	4.6	4.1
pH	pH Units	6.7	6.7	6.7	6.7
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

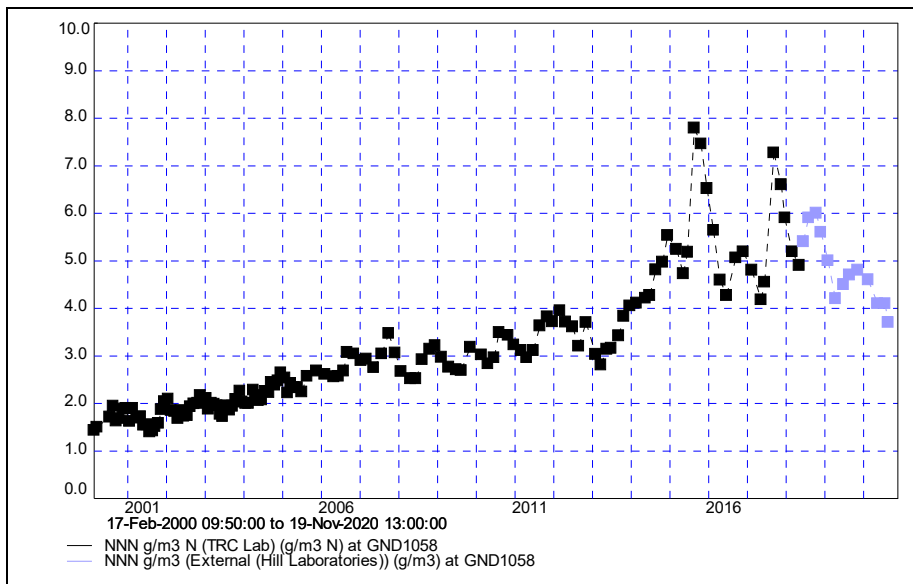


Figure 17 Long term NNN monitoring 2000-2020

GND1346: This monitoring location is located to the north west of the facility in between paddocks 35 and 36. Paddock 35 received 148 kg N/ha, while paddock 36 received 160 kg N/ha. The results are provided in Table 23. Groundwater ranged 2.83 m. The corresponding temperature ranged 1.0°C across the four rounds. Electrical conductivity remained relatively stable and ranged 4.4 mS/m. *E. coli* was below the LOD across all four monitoring rounds.

Nitrate/nitrite nitrogen remained significantly elevated, with all results above 60 g/m³, with a range of 10 g/m³. pH remained stable and weakly acidic, ranging 0.1 pH.

Total ammoniacal nitrogen was below the LOD on four occasions sampled.

Long term analysis of NNN in this monitoring location is provided in Figure 18. The recent analysis indicated a slight plateau in NNN concentrations, with the long term figure detailing a cyclical rise and fall of nitrogen concentration.

Table 23 GND1346 2019-2020 monitoring period

GND1346	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	3.3	4.75	5.6	6.13
TEMP	°C	13.9	14.6	14.9	14.7
Chloride	g/m ³	110	114	107	103
Electrical conductivity	mS/m	100.4	104.1	102.5	99.7
Escherichia coli	cfu/100 ml	< 1	< 1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	61	70	69	71
pH	pH Units	6.4	6.3	6.3	6.3
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

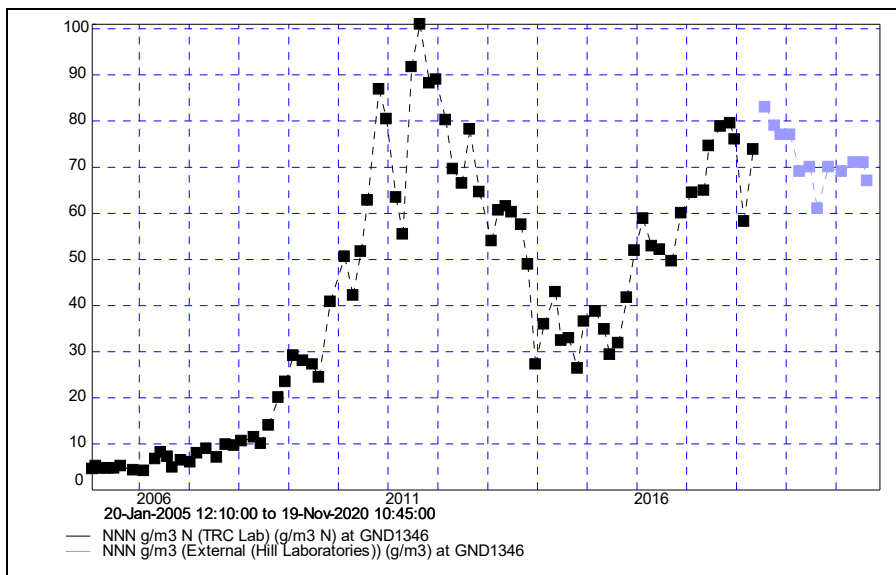


Figure 18 Long term NNN concentration GND1346 2005-2020

GND1347: This bore is located to the west of the facility, close to the Shearer 200 kg nitrogen block, however not within it, on the eastern side of paddock 21. The paddock loading was recorded at 232 kg N/ha from wastewater only. The analysis of the four monitoring rounds is provided in Table 24.

Groundwater level ranged 2.97 m this monitoring period. The associated temperature of the groundwater ranged 0.9°C. Chloride results showed an increasing trend through the monitoring period, ranging 32 g/m³. Electrical conductivity also demonstrated an increasing concentration, with a range of 21.7 g/m³. *E. coli* was below the LOD on all four occasions. Nitrate/nitrite nitrogen concentrations demonstrated an increasing trend through the monitoring period, ranging 21 g/m³

pH results were stable and weakly acidic, ranging 0.1 pH. Total ammoniacal nitrogen was not recorded above the LOD on all four occasions. Long term analysis of NNN in this monitoring well is provided in Figure 19. The long term analysis indicates a slight plateau in results, fluctuating between 50-70 g/m³

Table 24 GND1347 2019-2020 monitoring period

GND1347	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	6.49	7.42	8.51	9.46
TEMP	°C	14.3	14.6	15.2	14.8
Chloride	g/m ³	79	99	98	111
Electrical conductivity	mS/m	71.2	89.8	91.1	92.9
Escherichia coli	cfu/100 ml	< 1	< 1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	46	60	61	67
pH	pH Units	6.3	6.2	6.2	6.2
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	0.19

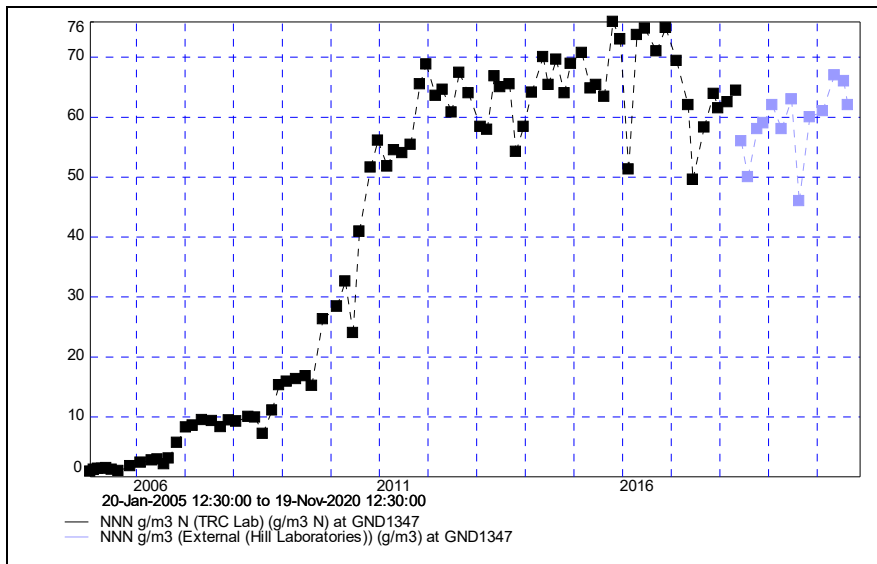


Figure 19 Long term NNN monitoring GND1347 2005-2020

GND1348: This bore is located to the north east of the facility, in paddock 8, which is close to the Inaha Stream. The associated nitrogen loading was conveyed as 221 kg N/ha of wastewater only. Monitoring of GND1348 is provided in Table 25.

Groundwater level ranged 1.36 m. The associated temperature ranged 0.6°C. Chloride ranged 24 g/m³ and indicated an increasing concentration through the year. Electrical conductivity ranged 19.2 mS/m.

E. coli was below the LOD on all four monitoring rounds. Nitrate nitrite nitrogen ranged 21 g/m³ and demonstrated an increasing concentration through the monitoring period. pH remained stable and weakly acidic, ranging 0.3 pH. Total ammoniacal nitrogen was below the LOD across all four monitoring rounds.

Figure 20 provides the long term assessment of NNN at this monitoring location. This shows a significant variation across the last few monitoring years. More recently the degree of variation has decreased, with a reduction in significantly elevated concentrations reducing annually.

Table 25 GND1348 2019-2020 monitoring period

GND1348	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	10.11	9.93	10.5	11.29
TEMP	°C	13.9	14.7	14.7	14.5
Chloride	g/m ³	71	76	95	84
Electrical conductivity	mS/m	65.7	71.5	84.9	88.3
Escherichia coli	cfu/100 ml	< 1	< 1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	39	42	52	60
pH	pH Units	6.5	6.6	6.4	6.3
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010

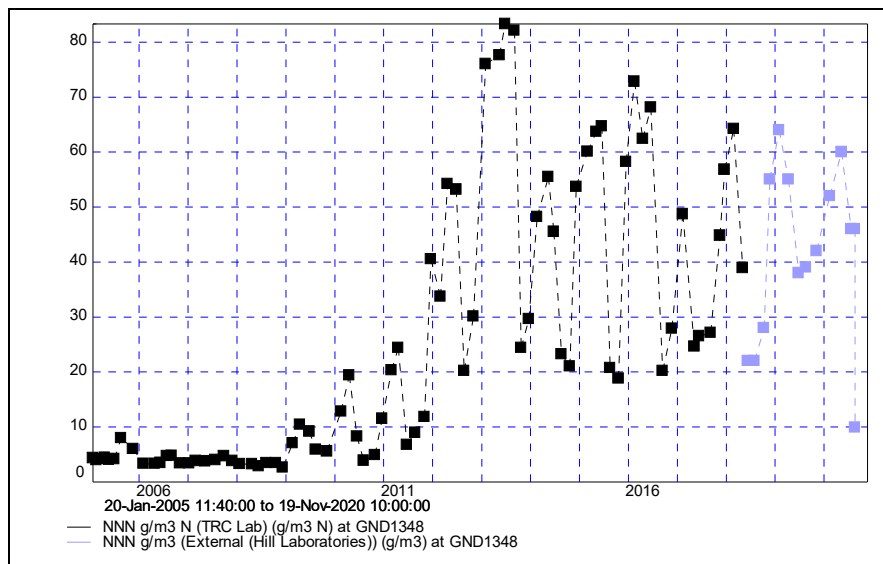


Figure 20 Long term NNN monitoring GND1348 2005-2020

GND1349: This is located on the western side of the Western tributary of the Inaha Stream in paddock 26. Paddock loading was recorded at a combined 134 kg N/ha. The four rounds of monitoring are provided in Table 26. The analysis indicated the following: Groundwater level ranged 1.16 m across the four rounds. The corresponding temperature ranged 0.8°C. Chloride reduced during the monitoring period, ranging 22 g/m³ Electrical conductivity also reduced in concentration and ranged 8.6 mS/m. *E. coli* was recorded at low concentration in two of four rounds, with a range of 4 cfu/100 ml, notably the final two rounds were below the LOD.

Nitrate nitrite nitrogen remained stable and elevated, with a range of 3 g/m³. pH was stable at 6.3 pH. Total ammoniacal nitrogen was recorded on one occasion (11 May 2020) at a low concentration, 0.012 g/m³ Figure 21 provides the long term analysis of NNN in this monitoring location. The recent analysis suggests a plateauing in NNN results, as previously, this well had observed some significant variation in NNN concentration over the past few monitoring periods. This area had also received elevated applications of combined wastewater and fertiliser in previous monitoring periods.

Table 26 GND1349 2019-2020 monitoring period

GND1349	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	11.22	10.46	11.09	11.62
TEMP	°C	14.3	14.5	15.1	14.9
Chloride	g/m ³	75	57	53	59
Electrical conductivity	mS/m	77.8	73.3	72.1	69.2
Escherichia coli	cfu/100 ml	4	1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	44	44	47	45
pH	pH Units	6.3	6.3	6.3	6.3
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	0.012

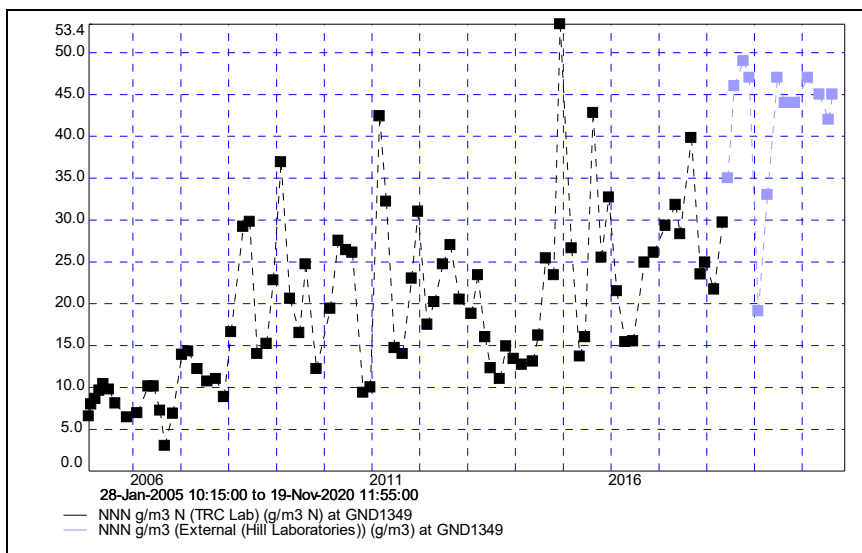


Figure 21 Long term NNN monitoring GND1349 2005-2020

GND2225: This well is located in the North Western corner of the site, within paddock 34. This paddock received 134 kg N/ha this monitoring period, of wastewater only. The results of the four rounds are provided in Table 27. The groundwater level ranged 2.09 m. The temperature ranged 0.9 °C.

Chloride results recorded a slight decrease in concentration through the monitoring period, ranging 25 g/m³. Electrical conductivity, which also decreased in concentration, ranged 8 mS/m. *E. coli* was recorded in one sample of four, at a low concentration of 8 cfu/100 ml, during the August 2019 monitoring round. The remaining three rounds did not record it above the LOD.

Nitrate nitrite nitrogen remained relatively stable, though decreased slightly in concentration, ranging 7 g/m³. pH remained stable at 6.3 pH for the duration. Total ammoniacal nitrogen was recorded on two occasions (November 2019 and February 2020) at low concentrations.

Long term analysis of NNN concentrations is provided in Figure 22. The analysis indicates that while the NNN concentrations remain elevated they are beginning to plateau.

Table 27 GND2225 2019-2020 monitoring period

GND2225	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	5.05	5.97	6.34	7.14
TEMP	°C	14.2	14.9	15	15.1
Chloride	g/m ³	99	95	95	74
Electrical conductivity	mS/m	79.1	76.6	78.2	71
Escherichia coli	cfu/100 ml	8	< 1	< 1	< 1
Nitrate-N + Nitrite-N	g/m ³	48	43	42	41
pH	pH Units	6.3	6.3	6.3	6.3
Total Ammoniacal-N	g/m ³	< 0.010	0.011	0.015	< 0.010

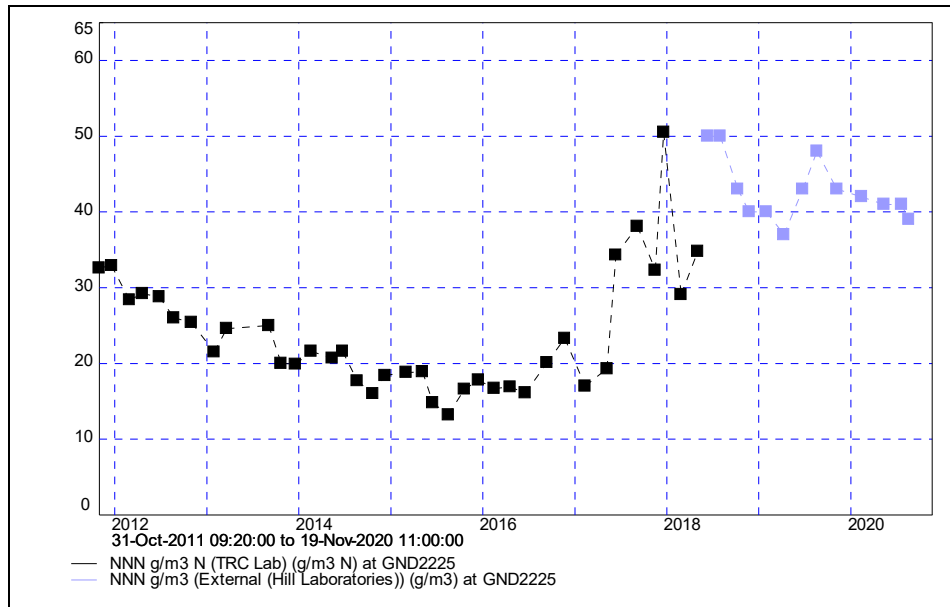


Figure 22 Long term NNN monitoring GND2225 2001-2020

GND2226: This monitoring well is located on the western side of the western tributary of the Inaha Stream, in close proximity to the Inaha Road. It is sited in paddock 29. This paddock received 224 kg N/ha this monitoring period of wastewater only.

Results of the four monitoring rounds are provided in Table 28. The groundwater level ranged 2.57 m this monitoring period. The associated temperature ranged 0.9°C. Chloride increased slightly, with a range of 7 g/m³. This slight increase was also noted in the conductivity monitoring, with a range of 0.3 mS/m.

E. coli was below the LOD on three occasions with 1 cfu/100 ml recorded in the final monitoring round. Nitrate nitrite nitrogen remained significantly elevated, though at a stable concentration, ranging 3 g/m³. pH results were stable with a range of 0.1 pH. A trace concentration of ammoniacal nitrogen was recorded in the final monitoring round.

Figure 23 is the long term monitoring of NNN. The results indicate a plateauing in elevated concentrations of NNN, whereas in previous monitoring periods, this well had recorded a steady increase in concentrations.

Table 28 GND2226 2019-2020 monitoring

GND2226	Unit/date	19 Aug 2019	06 Nov 2019	12 Feb 2020	11 May 2020
LEVEL	m	6.1	6.08	7.56	8.67
TEMP	°C	14	14.5	14.9	14.9
Chloride	g/m ³	167	167	173	175
Electrical conductivity	mS/m	132.9	133.8	138.3	133.2
Escherichia coli	cfu / 100 ml	< 1	< 1	< 1	1
Nitrate-N + Nitrite-N	g/m ³	89	88	90	91
pH	pH Units	6.2	6.2	6.1	6.1
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010	0.015

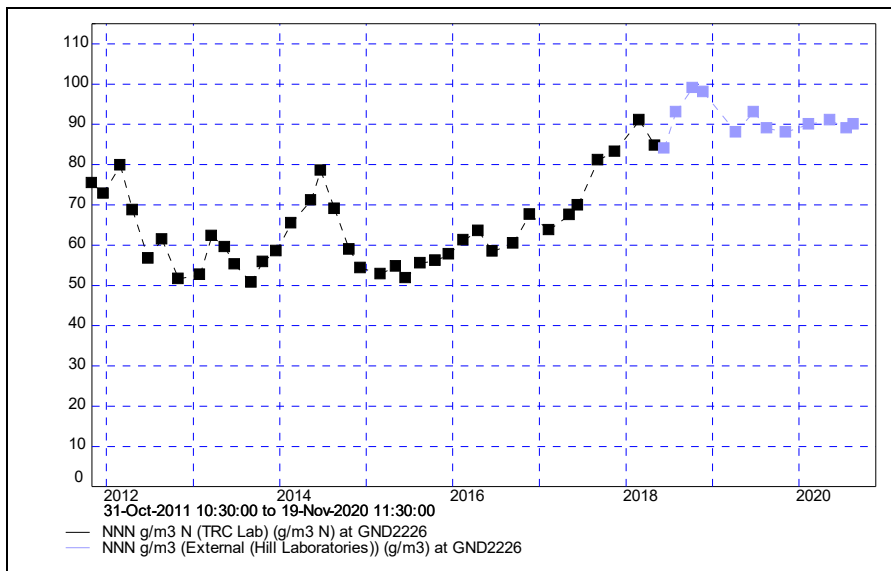


Figure 23 Long term NNN monitoring GND2226 2011-2020

2.4.5 Solid waste burial

Solid waste burial is undertaken under consent 5495-1. This consent allows for the discharge of up to 200 tonnes per day of wastes from meat and rendering operations by burial into land in the vicinity of the Inaha Stream.

The foremost reason for holding this consent was to allow contingency for the consent holder in the case of a significant mechanical malfunction with the rendering process, whereby material which cannot be processed expires, due to a requirement for material to be processed within a given time period. Thus this material is required to be buried quickly to negate odour impacts.

In this monitoring period sand trap waste was buried during January 2020. The previous use of this area was in the 2017-2108 monitoring period where sand trap waste was also buried. Currently the consent holder is undertaking a consent renewal.

The current consent requirement for this activity is a minimum of eight monitoring wells. Over time, ten wells have been constructed (Figure 24) however site operations have adversely affected the construction of some of these wells, rendering them un-useable. Currently there are five monitoring wells assessing the quality of the groundwater in the locality of the burial pits. With the advent of a new consent being issued there will be a requirement to install additional monitoring wells in future.

The analysis of the five monitoring rounds is provided in the following Tables 29-33. In this monitoring period four rounds were planned, though only three could be completed.

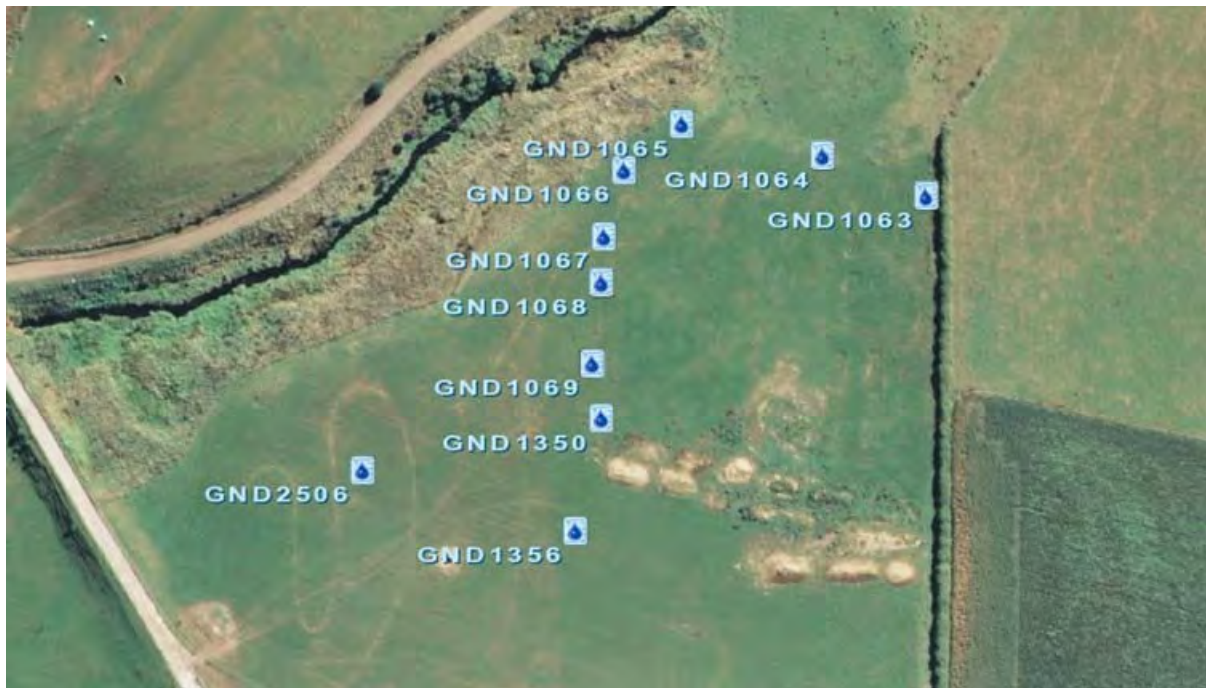


Figure 24 Burial groundwater monitoring well locations

Table 29 Burial pit monitoring well GND1063 2019-2020

GND1063	Unit/Date	19 Sep 2019	26 Nov 2019	19 Feb 2020
LEVEL	m	7.13	7.68	8.32
TEMP	°C	14.5	14.8	14.8
Chemical Oxygen Demand (COD), trace level	g O ₂ /m ³	< 6	< 6	12
Electrical Conductivity (EC)	mS/m	38.3	37.4	38.2
Nitrate-N + Nitrite-N	g/m ³	15.7	14	14.6
pH	pH Units	6.4	6.3	6.5
Total Ammoniacal-N	g/m ³	< 0.010	0.022	< 0.010

Table 30 Burial pit monitoring well GND1066 2019-2020

GND1066	Unit/Date	19 Sep 2019	26 Nov 2019	19 Feb 2020
LEVEL	m	5.45	5.73	5.82
TEMP	°C	14.8	15.7	14.9
Chemical Oxygen Demand (COD), trace level	g O ₂ /m ³	38	31	42
Electrical Conductivity (EC)	mS/m	274	306	338
Nitrate-N + Nitrite-N	g/m ³	67	32	33
pH	pH Units	6.7	6.8	6.9
Total Ammoniacal-N	g/m ³	109	163	169

Table 31 Burial pit monitoring well GND1067 2019-2020

GND1067	Unit/Date	19 Sep 2019	26 Nov 2019	19 Feb 2020
LEVEL	m	5.41	5.86	6.05
TEMP	°C	14.7	16.2	15.7
Chemical Oxygen Demand (COD), trace level	g O ₂ /m ³	< 6	9	10
Electrical Conductivity (EC)	mS/m	78.2	76	76.8
Nitrate-N + Nitrite-N	g/m ³	10.4	9.8	8
pH	pH Units	6.3	6.3	6.3
Total Ammoniacal-N	g/m ³	0.2	0.039	< 0.010

Table 32 Burial pit monitoring well GND1069 2019-2020

GND1069	Unit/Date	19 Sep 2019	26 Nov 2019	19 Feb 2020
LEVEL	m	5.22	5.92	6.2
TEMP	°C	14.7	16.4	15.4
Chemical Oxygen Demand (COD), trace level	g O ₂ /m ³	34	39	48
Electrical Conductivity (EC)	mS/m	207	245	235
Nitrate-N + Nitrite-N	g/m ³	77	11.9	11.2
pH	pH Units	6.8	6.9	6.9
Total Ammoniacal-N	g/m ³	80	160	123

Table 33 Burial pit monitoring well GND2506 2019-2020

GND2506	Unit/Date	19 Sep 2019	26 Nov 2019	19 Feb 2020
LEVEL	m	4.46	5.3	6.11
TEMP	°C	14.7	14.8	14.9
Chemical Oxygen Demand (COD), trace level	g O ₂ /m ³	< 6	13	6
Electrical Conductivity (EC)	mS/m	87.7	93.2	98.5
Nitrate-N + Nitrite-N	g/m ³	10.9	9.9	8.5
pH	pH Units	6.4	6.5	6.3
Total Ammoniacal-N	g/m ³	< 0.010	< 0.010	< 0.010

The analysis of the burial pit monitoring wells indicated the following:

- Groundwater temperature ranged 14.5- 16.2°C across the three monitoring rounds.
- Chemical oxygen demand was recorded in all monitoring wells, though on two occasions (both September 2019), in two wells, it was below the LOD (GND1063 and 2506). The range of the detected demand was 6-48 g O₂/m³. Of the five wells, GND1069 held the highest chemical oxygen demand across the three monitoring rounds (Table 32).
- Electrical conductivity ranged 37.4-338 mS/m. GND1066 held the highest conductivity, ranging 274-338 mS/m across the three rounds.
- In terms of nitrate nitrite nitrogen (NNN), which was recorded in all five wells, the range was 8-77 g/m³. Two wells (GND1066 and 1069) held a NNN concentration in excess of 50 g/m³, recorded during the September 2019 monitoring round. In both cases the following sample round recorded a decrease in concentration. The other three monitoring wells (GND1063, 1067 and 2506) held concentrations below 20 g/m³.
- pH results were all weakly acidic, ranging 6.9-6.3 pH.
- Total ammoniacal nitrogen was below the LOD in GND2506 on all occasions, and on two occasions in GND1063. Note that this well (GND1063) did record a trace value for ammonia in the November 2019 round (Table 29). GND1067 (Table 31) also had low concentrations of ammonia on two occasion and one none detect. GND1066 and 1069 held significantly elevated concentrations for ammonia in comparison to the other wells, ranging 109-169 g/m³ in the case of GND1066 and 80-160 g/m³ in the case of GND1069.

2.4.6 Biomonitoring

Taranaki By-Products Ltd holds a number of consents for discharges to land and to water associated with the operation of a rendering plant and a neighbouring farm owned and operated by the Company. The discharge consents most relevant to this biomonitoring survey are summarised in Table 34 below.

Table 34 Relevant consents to biomonitoring

Consent no.	Purpose
2049-4	To discharge up to 940 m ³ /day of treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream
2050-4	To discharge up to 2,160 m ³ /day of cooling water and backwash water from a rendering operation into an unnamed tributary of the Inaha Stream
3941-2	To discharge up to 1400 m ³ /day of treated wastewater from a rendering operation and from a dairy farm via spray irrigation onto and into land, and to discharge emissions into the air, in the vicinity of the Inaha Stream and its tributaries between 1700909E-5625245N, 1700631E-5625092N and 1700921E-5625046N
5426-1	To discharge up 1,095 L/s of stormwater from an animal rendering site into an unnamed tributary of the Inaha Stream

Biomonitoring has been undertaken at some sites in relation to the discharges from the rendering plant and associated activities since the mid-1980s. Some of the sites used for the biomonitoring of these discharges have changed over time and these changes have been documented in previous reports.

Method

This biomonitoring survey was undertaken at eight sites on 21 October 2019 (Table 2 and Figure 1). Five of the eight sites surveyed were in the Inaha Stream and the remaining sites were in an unnamed tributary of the Inaha Stream. The locations of sampling sites in relation to the discharges from the rendering plant are discussed below.

Table 35 Biomonitoring sites associated Taranaki By-Products

Stream	Site Number	Site code	Grid reference (NZTM)	Location
Inaha Stream	U	INH000334	E1703013 N5625271	Upstream of irrigation area, near Ahipaipa Road
	1	INH000400	E1701874 N5624322	Upstream of treatment ponds, Kohiti Road
	2d	INH000420	E170202 N5623745	500 m downstream of cooling water discharge
	3	INH000430	E1701650 N5623262	Upstream of Normanby Road
	4	INH000450	E1701454 N5622948	100 m downstream of 'irrigation' tributary confluence
Unnamed tributary of Inaha Stream	UT	INH000433	E1701109 N5625496	Upstream of irrigation area
	MT	INH000435	E1700827 N5624524	Middle site within the new irrigation area
	DT	INH000440	E1701518 N5623227	50m upstream Normanby Road

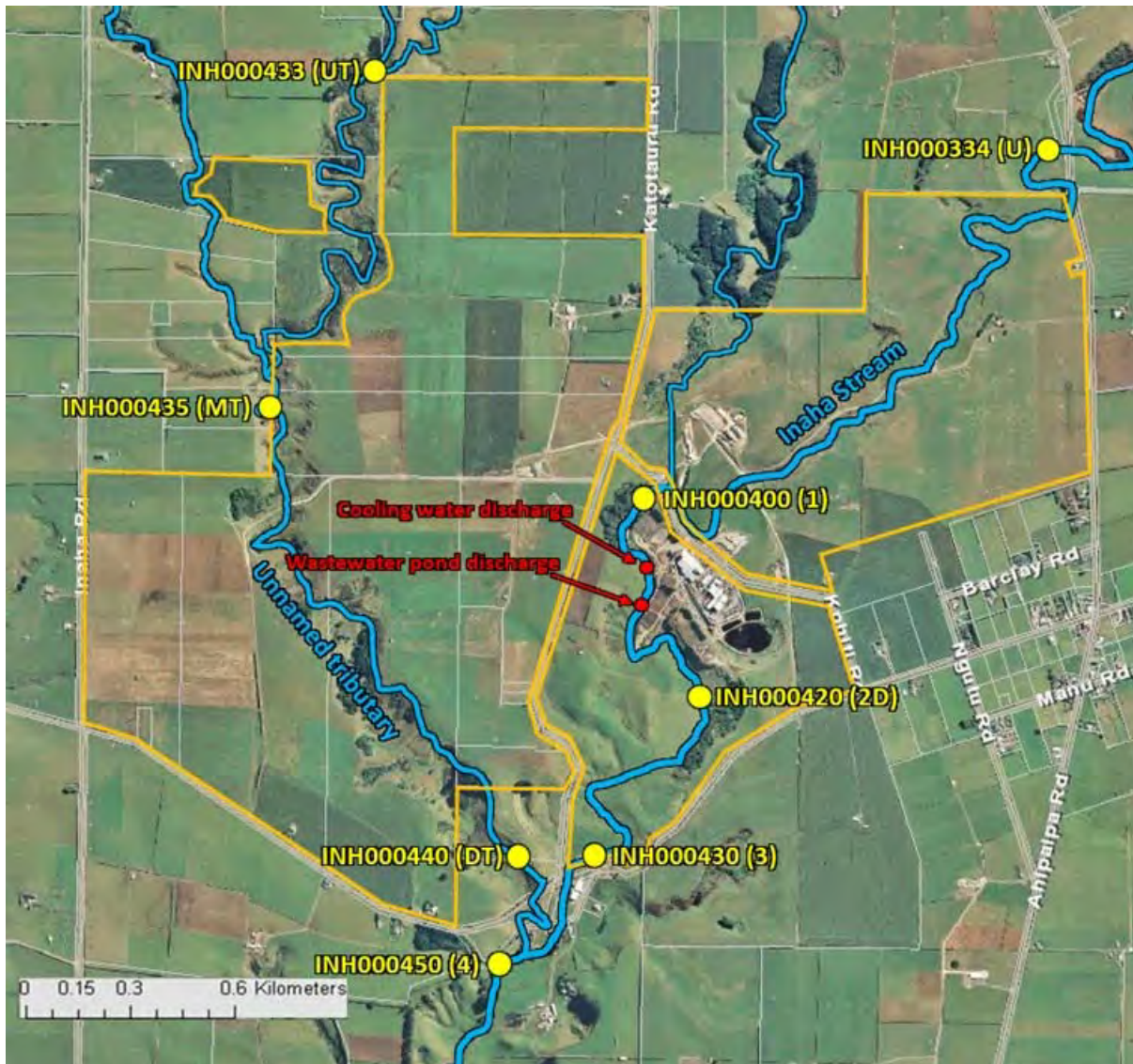


Figure 25 Taranaki By-Products biomonitoring site locations map

Two different sampling techniques were used to collect streambed macroinvertebrates in this survey. The Council's standard '400ml kick-sampling' technique was used at sites U, 1, 2d, 3,4, UT and DT, and a combination of the 'kick-sampling' and 'vegetation sweep' techniques was used at site MT. The 'kick-sampling' and 'vegetation sweep' techniques are very similar to Protocol C1 (hard-bottomed, semi-quantitative) and C2 (soft-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 70% ethanol 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 were scored based on the categories presented in Table 36.

Table 36 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)	>499

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 (Table 37). More 'sensitive' communities inhabit less polluted waterways. A difference of 10.83 units or more in MCI values is considered significantly different between individual kick samples (Stark 1998) and from past TRC experience is also significantly different between individual kick-samples and other values (medians, means, limits, expected values).

Table 37 Macroinvertebrate community health based on MCI and SQMCI ranges adapted for Taranaki streams and rivers from Stark's classification (Stark, 1985 and Stark, 1998)

TRC Grading	MCI	SQMCI
Excellent	≥140	≥7.00
Very Good	120-139	6.00-6.99
Good	100-119	5.00-5.99
Fair	80-99	4.00-4.99
Poor	60-79	3.00-3.99
Very Poor	<60	<3.00

A semi-quantitative MCI value, SQMCI (Stark 1999) 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 scores, and dividing by the sum of the loading factors. 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). A difference of 0.83 units or more in SQMCI values is considered significantly different between individual kick samples (Stark 1998) and from past TRC experience is also significantly different between individual kick-samples and other values (medians, means, limits, expected values).

Where necessary, sub-samples of algal and detrital material taken from the macroinvertebrate samples were 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 these organisms is an indicator of organic enrichment within a stream. Such heterotrophic growths have been recorded on numerous past occasions at sites downstream of the Taranaki By-Products plant as a result of organic nutrient enrichment from the wastewater discharge.

Two biomonitoring rounds were completed this monitoring period. The initial was undertaken 21 October 2019, and the follow up, 4 March 2020.

Results of the first biomonitoring survey 21 October 2019

This 21 October 2019 survey followed a period of 47 days since a fresh in excess of three times median flow in the nearby Waiokura Stream at No. 3 Fairway (the nearest appropriate water level recorder), and 97 days since a fresh in excess of seven times median flow. In the month prior to this survey, a series of smaller rain events kept flow steady and slightly above the median level. In the two days prior to the current survey, small rain events increased the flow temporarily, above the median level.

The Company's records showed that treated wastewater was discharging to the Inaha Stream at the time of this biological survey, with a period of cessation beginning on 31 October 2019. Cooling water was discharged to the stream throughout this period. The record shows that the minimum dilution of wastewater of 1:300 that is required under consent 2049-4 was maintained throughout the period.

Taxa richness was moderate to moderately low in the Inaha Stream. All five sites recorded lower taxa richness than in the previous survey and only site 1 recorded a taxa richness above the site median. The MCI scores categorised site 1 as having 'good' macroinvertebrate community health, while the remaining four sites (U, 2d, 3 and 4) as having 'fair' macroinvertebrate community health. MCI scores were relatively similar between all of the Inaha Stream sites surveyed, with no significant differences recorded. The SQMCI can be more sensitive to organic pollution compared with the MCI as it also takes into account taxa abundances. The SQMCI scores categorised sites U, 1 and 3 as being in 'good' health, while sites 2d and 4, were categorised as being in 'fair' health. There were no substantial differences in SQMCI score between sites U, 1, 3 and 4, while the SQMCI recorded at site 2d was significantly lower than that recorded at sites U, 1 and 3. Characteristic to all of the Inaha Stream sites surveyed was the 'highly sensitive' taxon, (mayfly (*Deleatidium*)) and 'moderately sensitive' taxon (caddisfly (*Pycnocentropes*)). All five sites also recorded the 'very abundant' and 'tolerant' snail (*Potamopyrgus*).

Taxa richness was moderately low in the unnamed tributary of the Inaha Stream. Site MT recorded the lowest taxa richness (10), of the three unnamed tributary sites, which was the lowest taxa richness recorded for this site to date. The MCI scores categorised sites UT and DT as having 'good' macroinvertebrate community health, and site MT as having 'fair' macroinvertebrate community health. The MCI scores recorded at sites UT and DT were not significantly different to one another, while the MCI score recorded at site MT was significantly lower than the scores at sites UT and DT. The SQMCI scores categorised site UT as being in 'very good' health, while sites MT and DT as being in 'fair' health. There were no substantial differences in SQMCI score between sites MT and DT, while the SQMCI recorded at site UT was substantially higher than that recorded at the two downstream sites.

The differences between the five Inaha Stream sites and three unnamed tributary sites surveyed, is likely a reflection of habitat differences between the sites, in particular to differences in substrate composition, shade and macrophyte and periphyton coverage; rather than to any effects related to discharges from the rendering plant and associated activities from Taranaki By-products.

A microscopic inspection of material collected from the bed of the Inaha Stream found no evidence of 'heterotrophic growths' (protozoa or fungi) at any of the sites sampled. This is an important result, as such growth is often associated with 'sewage fungus' which is an indication of high levels of organic matter and nutrient enrichment in the stream. Such growths have been recorded on many previous sampling occasions, often in abundance, particularly downstream of the plant discharges at site 2d. The presence of heterotrophic growths on the bed of the Inaha Stream was last recorded in the spring 2009 survey, and this shows an improved management of the wastewater discharge since that time. The absence of such growths is evidence that the degree of enrichment is not as severe as that recorded previously.

Overall, there was no evidence that discharges from Taranaki By-Products have significantly impacted the freshwater macroinvertebrate communities present in the Inaha Stream or unnamed tributary of the Inaha Stream.

Results of second biomonitoring survey 4 March 2020

Taxa richness was moderate in the Inaha Stream and did not vary substantially between sites. The MCI scores recorded in the current survey categorised 'control' site U, together with sites 2d, 3 and 4 as having 'fair' macroinvertebrate community health, while categorised site 1 as having 'good' health. The MCI score recorded at site 1 was significantly higher than the remaining four Inaha Stream sites surveyed. The MCI scores recorded at sites U, 2d, 3 and 4 were not significantly different to one another. The results recorded at sites U and 1 indicated that the leaching of nutrients into the Inaha Stream from the north-eastern block of land under irrigation was unlikely to be significantly affecting the health of the macroinvertebrate communities present in the Inaha Stream at the time of the survey. There was a decrease in macroinvertebrate health below site 1, downstream of the point source discharges, with a significant reduction of 17, 13 and 12 MCI units recorded at sites 2d, 3 and 4 respectively. This denoted a decrease in health from 'good' to 'fair' between site 1 and the downstream sites.

The SQMCI can be more sensitive to organic pollution compared with the MCI, as it also takes into account taxa abundances. SQMCI scores were 5.0 at site U, 5.7 at site 1, 3.6 at site 2d, 4.7 at site 3 and 5.1 at site 4. The SQMCI scores categorised sites U, 1 and 4 as being in 'good' health, while site 2d had 'poor' health, and site 3 had 'fair' health. Site 2d recorded an SQMCI score significantly lower than all other Inaha Stream sites.

There were six changes to individual taxon abundances between sites 1 and 2d. These included the significant increase of four 'tolerant' taxa (snail (*Potamopyrgus*), seed shrimp (*Ostracoda*) and midges (*Chironomus*) and (*Polypedilum*)), and the significant decrease of two 'sensitive' taxa (mayfly (*Austroclima*) and caddisfly (*Pycnocentria*)). These results, suggested some possible negative impacts on the macroinvertebrate communities of the Inaha Stream from the Taranaki By-Products rendering plant discharges. However, the presence of one 'highly sensitive' taxon at all five sites and the presence of numerous other 'sensitive' taxa, together with a lack of any heterotrophic growths were indicative of reasonable preceding water quality, and suggest no significant impacts from the rendering plant discharges.

Taxa richness was moderately low in the unnamed tributary of the Inaha Stream. Site MT recorded the lowest taxa richness (10) of the three unnamed tributary sites surveyed, which was equal to the lowest taxa richness recorded for this site to date. Upstream site UT, recorded 14 taxa, while downstream site DT recorded 16 taxa. The MCI scores recorded in the current survey categorised all three sites as having 'fair' macroinvertebrate community health. Unlike the previous survey, there were no significant differences in MCI scores between sites. The MCI scores recorded by the current survey were similar to site medians. The decrease in MCI score recorded between the current and previous survey is mainly a reflection of habitat conditions, which were impacted by low flows at the time of this survey. The SQMCI scores recorded were 5.0 units at site UT, 4.7 units at site MT and 5.1 units at site DT. The SQMCI scores categorised sites UT and DT as being in 'good' health, while site MT as being in 'fair' health. There were no substantial differences in SQMCI scores between the three sites surveyed nor were there any significant differences between the current survey results and historic site medians. Results suggested no long-term impact from the discharge of wastewater irrigation to land in the vicinity of the unnamed tributary.

A microscopic inspection of material collected from the bed of the Inaha Stream found no evidence of 'heterotrophic growths' (protozoa or fungi) at any of the sites sampled. This was an important result; as such growths are often associated with 'sewage fungus' which is an indication of high levels of organic matter and nutrient enrichment in the stream. Such growths have been recorded on many previous sampling occasions, often in abundance, particularly downstream of the plant discharges at site 2d. The presence of heterotrophic growths on the bed of the Inaha Stream was last recorded in the spring 2009 survey, and this

shows an improved management of the wastewater discharge since that time. The absence of such growths is evidence that the degree of enrichment is not as severe as that recorded previously

Overall, the macroinvertebrate communities downstream of the Taranaki By-Products discharges in both the Inaha Stream and the unnamed tributary recorded MCI scores reflective of 'fair' health, with the exception being site 1, which recorded an MCI score reflective of 'good' health. Despite a significant drop in 'health' downstream at sites 2d, 3 and 4, the results of this survey gave no clear indication that the discharges (to land and to water) from the rendering plant were having any significant adverse effect on the macroinvertebrate communities in either the Inaha Stream or the unnamed tributary.

2.5 Air

2.5.1 Inspections

21 August 2019

During an inspection the following was observed. No objectionable odours or visible emissions were found during the inspection. No factory odour was found downwind of the plant around Okaiawa Township, however, noticeable 'pond' odour was found along Kohiti Road. The Inaha Stream was in moderate flow and turbid throughout the length of the site influence. The discharge from pond 6 was observed at 12.5 cm at the v-notch. This indicated that dilution factors were being achieved. The corresponding pond height was at 0.22 m. Notably, pond 5A had recently been emptied. The sludge from it was sprayed onto the crust of pond 2. Some of the fatty crust from pond one was also recently applied to pond two to ensure the cover remained complete across the pond.

At the time six aerators were operating in pond 4, the associated dissolved oxygen (D.O) was recorded at 6.9 mg/L +/- and the surface foam was remaining localised. Pond 3 had complete pasture cover which appeared healthy. Farm dairy effluent collection areas were found to be satisfactory. Travelling irrigators were operating in two paddocks, no ponding or overland flow occurring, and all pasture appeared healthy.

No water was being abstracted from the Inaha Stream at the time of inspection, the new intake chamber was yet to have the pump installed. At the time works were continuing on the water treatment plant and the facility was expected to be operating within one month. Plans were being completed for a stormwater treatment device which was planned to be installed prior to the fire-pond. The discharge at the time of inspection was approximately 0.5 L/s and was described as clear, no adverse effects were occurring in the Inaha Stream, downstream of the fire pond input.

The load-in and factory doors were closed, and no deliveries were observed during the inspection. The blood load-in area was tidy and the bund was empty. Works were planned to occur on the TBP concentrated sources bio-filter. The bark was on-site. All the remaining bio-filter beds appeared in good order and the leachate generated was being directed to pond 3. At the time the fire pit was not in use and no product burial had occurred. No incidents were reported.

30 September 2019

During an inspection the following was observed. Odour surveys were undertaken beyond the site boundary; these found essentially no site odours other than when adjacent to ponds 1 and 2, along Kohiti Road. No processing was occurring during the inspection. Regurgitated product (paunch) was found outside the main load in doors. The doors were closed when not in use.

The discharge from pond 6 was 7.5 cm and had a D.O of 5 mg/L. Receiving waters were flowing at a level of 3.02 as measured on the staff gauge. Dilution factors were being achieved and no deleterious effects were observed within the receiving waters at the time of inspection. Discharge from the fire pond was clear. The pond had a slight green tinge thought to be algae, the stormwater discharge into the pond was clear and appeared free of hydrocarbons. Works were continuing on one TBP bio-filter bed, the nova-flo pipes have been replaced with PVC laterals but bark was yet to be spread across the area. All other bio-filters were satisfactory. No visible emissions were discharging at the time of inspection. The blood load-in and surrounding area was clean. Pond 4 had 5 aerators operating and the D.O was 4.5 mg/L. Water intakes were clear of obstructions. Travelling irrigators were in use in two paddocks. The pasture was coping with the applications, with no ponding or run-off occurring. FDE management was satisfactory. No recent burials had occurred. No incidents were reported. Discharge and receiving water samples were taken during the inspection.

31 October 2019

During an inspection the following was noted. Odour surveys were undertaken beyond the site boundary, these found no objectionable odours or visible emissions. Two travelling irrigators were in operation, the pasture was coping with applications and no ponding or run-off found. Works were occurring on the storm water treatment system. It was outlined that initially the first flush will be manually managed but it will likely be automated in the future. The discharge from fire-pond was clear, no adverse effects were observed within the receiving waters and no fugitive inputs were found.

FDE management was satisfactory. Bio-filters were operational across all beds, no visible emissions were occurring at the time, and typical 'musty' odours noted around the area. The liner of pond one was inflated in the north west corner. Gas bubbles were discharging through the fat crust and typical putrid odours were prevalent downwind of the pond. Pond 3 cover was complete and the pasture appeared healthy.

Six aerators were operating in pond 4 and five were operating in pond 6. Load-in doors were closed when not in use, regurgitated material was stored outside and works were occurring on the bunker wall. The blood load-in area was tidy. No recent burial of material had occurred. It was outlined that the trials of the V-SEP system found that the filter screen was blocking. A prescreen was being engineered. No incidents were reported.

28 November 2019

During the inspection the following was noted. Odour surveys were undertaken beyond the site boundary. These found no objectionable odours relating to site activities. A very strong 'ammonia' type odour was found along Normanby Road around the old dairy factory. The inspection found the shed was being used to store regurgitated material which was not able to be processed until a later date.

The odour issue was outlined to management who immediately undertook to address a large gap at the base of the load-in doors and expanding foam was also used to seal up other holes. Three travelling irrigators were operating. No ponding or run-off was found and all receiving pasture appeared healthy.

The site was busy and the load-in doors were closed when not in use. The load-in catchment was being actively cleaned during the inspection. The inflated pond 1 liner in the north west corner was inspected and found to have been cut to stop the pressure building up. The slice in the liner was above the fat crust at the time of inspection. The issue was discussed with the plant manager who was aware of the issue. Plans are to be drawn up about how to approach fixing the issue, as the gas build up is likely caused by product rotting underneath the liner, indicating the liner is no longer impervious.

The pipe between ponds 1 and 2 had been excavated due to a un-clearable blockage. Both ponds had a complete fat crust, bubbles were discharging through pond 1 at multiple locations, and a strong putrid odour was present directly downwind at the time.

The blood load-in area was tidy and was not in use during the inspection. The new filter screen for the V-SEP was being installed. Works were continuing on the storm water first flush system. The bio-filters were in good repair, with visible emissions discharging across TBE and TBP beds. The back pressures were stable across all metered laterals. The waste management area was satisfactory, and the fire pit was not in use.

Discharges from the fire-pond were clear and no deleterious effects were observed within the receiving waters. Seven aerators were operating in pond 4. No recent burial of product had occurred. No fugitive discharges from pipelines across the stream were observed. FDE management was satisfactory at all locations. No incidents were reported.

11 December 2019

During an inspection the following was observed. Odour surveys were undertaken beyond the site boundary. These found noticeable 'putrid' pond odours along Kohiti Road. Regurgitated material odours were also prevalent on Normanby Road directly. These were adjacent to the old factory where regurgitated material was being stored.

Steam emissions from TBP had increased dramatically due to waste heat being redirected to a vent rather than back into processing. Staff outlined that a benefit had been that the cooking process had been speeded up.

The V-SEP filter screen had been installed, which resulted in the plant processing 20,000 L of wastewater per hour, which is fed to the boilers. The system is not being used at night until further automation had been installed. No recent burial of product had occurred. Discussions were held regarding the burial of sand-trap wastes currently stored adjacent to pond 1. It was agreed the material could be buried under consent 5495-1.

Pond 1 liner remained inflated in the north western corner. The slice in the liner was above the fat crust. Typical strong 'putrid' odours were noted around the area. No plans had been drawn up to address the gas build-up or replace the liner. Ponds two and three had complete cover, pond four had six aerators operating and pond six had three and pond six was not discharging into the Inaha. The fire-pond had a green appearance thought to be algae, 35 ducks were on the pond at the time of inspection, the discharge appeared clear and no deleterious effects were observed within the receiving waters. No fugitive inputs were found and the stream was running clear throughout the length of the sites influence.

Works were continuing on the first flush stormwater treatment system. The blood load-in area was in use at the time of inspection. A strong 'blood' odour was emanating from the bagging room (doors open) and the outside bin contained the screened blood materials, which was 2/3 full. It was noted that the odour was not detected beyond the site boundary.

It was outlined TBE had a boiler breakdown during the night so both factories were busy processing the materials, some deliveries had also been diverted to other factories. One travelling irrigator was in operation at the time, with no ponding or run-off occurring. All receiving pasture appeared healthy. The fire pit was not in use. The bio-filters appeared in good repair with visible emissions discharging from several beds.

8 January 2020

During the inspection the following was observed. No objectionable odours or visible emissions were found during the inspection, although noted was the evident high pressure steam discharge from the facility.

Noticeable cooking/pond/biofilter odours were found along Katotauru Road. The odour was light and intermittent. At the time the plant was busy. Staff outlined some product had been diverted to other facilities due to limitations on processing capacities and a small load of feathers were recently diverted to a composting facility rather than burying them.

A new beef dryer was on-site awaiting installation in the plant. Regurgitated material was stored outside the load-in doors, with deliveries occurring throughout the inspection. It was noted that the load-in doors were closed when not in use. Works were continuing on the stormwater treatment system. The discharge into the fire pond was clear at the time of inspection.

The fire pond had a green tinge caused by algae and there were also ducks prevalent across the pond. The discharge from the pond was clear and no adverse effects were observed within the receiving waters. Typical putrid odours were observed downwind of ponds 1 and 2. The crust was complete across both ponds, though gas bubbles were discharging through. This was observed in both ponds. The tear in pond 1 liner remains above the fat crust and nothing appeared to have discharged through the liner; management are monitoring the tear, and no plans have begun to replace/repair the liner. Pond 3 also had a complete cover.

Pond four had 6 aerators operating and the dissolved oxygen was 1.43 mg/L, with surface foam prevalent across the pond. Pond 6 was at 0.35 m with 5 aerators operating. There was no discharge into the receiving waters occurring at the time. Jackson Transport Limited's (JTL) yard was free of spills.

The blood load-in area was not in use and the equipment was clean. The blood room doors were closed. Bio-filters appeared in good repair and visible emissions were discharging across all beds. A slight ammonia odour was noted downwind of the second TBP bed. All pressure differentials across all beds were within similar ranges.

At the time the water take from Inaha Stream was not operating and the SG was reading 3.14 at the time of inspection. No fugitive inputs to the stream were found. FDE management was satisfactory. No irrigation was occurring at the time of inspection. It was noted that the ponded stormwater in paddock 27 had completely dried out. No incidents were reported.

24 February 2020

Inspection to assess compliance with consent conditions was undertaken. At the time of the inspection all assessed consent conditions were found to be compliant. No objectionable odours or visible emissions were found during the inspection. There were noticeable odours found on Katotauru Road but were defined as sporadic and confined to a small plume.

The plant appeared busy with normal operations being undertaken. The load out area was clean and tidy with no stock piled unprocessed product. Ponds 1 and 2 were well crusted and odours were present with pond 1 bubbling in some areas. The fire water pond looked satisfactory with plenty of water fowl on it. Pond 3 was completely well vegetated with ponds 4-5 being aerated. Dissolved oxygen was at 1.41 mg/L. No discharge from pond 6 was occurring at the time to the Inaha Stream. The JTL yard was clean and tidy with the blood room doors open but no odour. Bio-filters were working, with visible emissions and a slight ammonia odour. No irrigation was occurring and no incidents were reported.

25 March 2020

A follow up inspection in respect to previously identified non-compliant discharge to surface water was undertaken. Pumps had been installed and were operating as required. The discharge pipe had been blocked, however there was further actions to be undertaken to comply with abatement notice EAC-23312, which is required to be completed by 1 July 2020.

21 May 2020

A compliance monitoring inspection and surface water/discharge sampling was undertaken. At the time of inspection no sustained offensive or objectionable odours were found. There were noticeable normal cooking odours present on site. The Environmental Manager escorted the Council Officer and talked through the improvements onsite, including the new stormwater sediment chambers which were discharging at the time of inspection.

There was obvious improvement from the incoming chamber and discharge. Also there was a visual improvement in the fire water pond. Noted were a few water fowl on the fire water pond and pond 6. Deliveries of product were occurring while onsite. There was minimal detectable odour occurring from this activity, no stock piles of raw or treated product at the time, and load doors were closed when not loading.

Ponds 1 and 2 were typical in their odour but better than usual, with a fully formed crust. Pond 3 was well covered in vegetation and was sampled, with nothing unexpected visually. Aerators were in operation, the DO being 1.52 mg/L. Pond 6 was not discharging and a sample was taken from the pond near the outlet. The JTL yard was clear and tidy with a number of trucks. The bio-filters were in use with minimum operational odour. A pile of pallets was in the burn site of the storage area. The Inaha Stream staff gauge (SG) was at 3.11. The discharge into the Inaha Stream appeared as normal with no visual downstream

effects. Further samples were taken. Irrigation was occurring at the time with irrigated area visually satisfactory. Further works and refinement of the reverse osmosis plant was underway.

26 June 2020

During an inspection the following was noted. No sustained objectionable odours were found during the inspection. Visible steam was emitting from the bio-filters; the odour was described as noticeable cooking odours. Pond 1 crust is not well formed with some bubbling visible and strong odour immediately downwind. The crust on pond 2 was also patchy. Pond 3 has a well vegetated cover and aerators were in operation in ponds 4 and 6 with a DO reading of 0.40 mg/L (it was noted that the DO probe may need a clean). The V-Notch weir was at 0.4 m and pond 6 was very full.

The fire pond was looking visually clearer than the previous inspection. There was a large amount of works being conducted onsite with continual improvements. The Inaha Stream was in fresh at the time and flow was at 3.13 on the SG (flow rate of 540 L/s). The stream appeared clear for the conditions. The discharge from the fire pond was clear and non-odorous.

A check of the old dairy factory where some product was stored found that there was product spill at the main door. This was required to be addressed, as any wash off/discharge would be directly into the Inaha Stream. The JTL area was clean and tidy as was the load out area. There was some damage to the load out building where a truck had damaged the cladding and structure. Repairs were to be undertaken. Abatement Notice EAC-23312 was not fully completed (mapping of pipework) and an extension was given to comply with the date. There were no incidents to report.

29 June 2020

During an inspection the following was noted. No sustained objectionable odours were found during the inspection. Visible steam was observed discharging from the bio-filters, the odour associated with it was acceptable with noticeable cooking odours present.

The pond 1 crust was not well formed, some bubbling was visible and a strong odour was present immediately downwind. The crust on pond 2 was also patchy. Pond 3 held a well vegetated cover and aerators were in operation in ponds 4 and 6 with a DO reading of 0.40 mg/L (it was noted that the DO probe required a clean).

The V-notch weir was at 0.4 m and the pond 6 was very full. The fire pond was continuing to look visibly clearer than on previous inspections. The cooling water discharge to pond was occurring at the time. There was a large amount of works being conducted onsite with continual improvements.

The Inaha Stream was in fresh at the time and flow was at 3.18 on the staff gauge (flow rate of 759 L/s). The stream appeared clear for the conditions and the discharge from the fire pond was clear and non-odorous.

The JTL area was clean and tidy, as was the load out area. There was some damage to the load out building where a truck had damaged the cladding and structure. Repairs were to be undertaken.

Abatement Notice EAC-23312 was not fully completed (mapping of pipework) and an extension was given to allow the Company time to undertake the necessary investigations. It was noted that the storage shed on Kohiti Road required a tidy up, at the front door of the shed.

2.5.2 Provision of reports, management plans and certifications

Reports and plans.

TBP is required to provide to the Council various management plans, contingency procedures, certifications and monitoring reports under five consents, as summarised in the following Table 38.

Table 38 Requirement for reports and plans imposed by consent

Requirement	Consent Number (and Condition Numbers)	Dates(s) required	Compliance achieved
Emissions to air			
Certification that works, processes and equipment are operated according to good engineering practice	4058-4 (6)	Biennially from 30 April 2013	Audit report received 12 June 2019
Air discharge management plan	4058-4 (7)(9)	2 February 2012, annual review by 31 May, including contingency procedures	Initial plan received 3 July 2012. Annual review received 16 July 2020
Monthly report under section 3.2 of management plan on daily activities log, weather, bio-filter performance	4058-4 (7)	Monthly	Reports received, late on occasion
Wastewater to Inaha Stream			
Wastewater disposal management plan	2049-4 (13)(15)	31 December 2000, annual review from 31 May 2007	Plan received and approved Dec 2000. Annual review received 16 July 2020
Monthly report under section 5.2 of management plan on wastewater characteristics, flows and irrigated areas	2049-4 (13)(15)	Monthly	Reports received, late on occasion
Wastewater to land			
Spray irrigation management plan	3941-2 (1)(3)	31 December 2000 annual review from 31 May 2006	Plan received and approved Dec. 2000. Annual review received 16 July 2020
Annual report under section 4.3 of management plan on wastewater characteristics, flows and irrigated areas	3941-2 (1)(3)	Annually	Nitrogen budget supplied monthly
Burial pits			
(Solid) Waste burial management plan	5495-1 (1)(3)	1 November 2000, subject to review on two months' notice	Plan received and approved Oct. 2000. Review received 2 May 2014

Requirement	Consent Number (and Condition Numbers)	Dates(s) required	Compliance achieved
Stormwater to Inaha Stream			
Contingency plan for spillage or accidental discharge	5426-1 (4)	31 August 1999	Plan received and approved Nov 2000. Review received 28 May 2014

2.6 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 the Company. 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).

Table 39 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to the Company's activities during the 2019-2020 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 39 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
06 March 2020	<p>During unrelated monitoring of a rendering plant near Okaiawa it was found that the Inaha Stream was running discoloured.</p> <p>This was related to an unlicensed discharge to the Inaha Stream.</p> <p>The discharge was traced back to the rendering plant site where it was found that a discharge of process water had occurred due to a failure of the submersible pump chain. This caused the sump to overflow into an unused historical stormwater drain, which flowed directly to the Inaha Stream.</p> <p>The discharge was stopped immediately at the time of identification.</p> <p>An abatement notice was issued requiring the Company to undertake</p>	N	14 day letter, abatement notice and infringement notice issued	Discharge ceased on initial finding. Follow up pipework identification still on going for abatement notice compliance

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
	an investigation to find any further conduits for contamination, in terms of old disused pipe work on site. The drain had subsequently been blocked off. A letter of explanation was received.			

Officer's note:

On the finding of the unauthorised discharge (Table 40) to surface water on the 6 March 2020, the Council collected surface water samples of the Inaha Stream (Table 41). A rapid biological assessment of the surface water was also undertaken by one of the Council's biologist. The rapid biological survey did not find any apparent adverse effects to the in-stream biology at the time other than reduced clarity caused by the discharge.

Table 40 Discharge sample results from unauthorised discharge to Inaha Stream 06 March 2020

6 March 2020	TEMP	Chloride	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite-N
Site/unit	°C	g/m ³	g/m ³	mS/m	MPN /100 ml	g/m ³	g/m ³	g/m ³
Discharge sample	22.4	79	4.5	77.4	> 2420	0.33	0.29	1.02
	Nitrite-N	Oil and Grease	pH	Total Alkalinity	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Total Suspended Solids	Turbidity
Site/unit	g/m ³	g/m ³	pH Units	g/m ³ as CaCO ₃	g/m ³	g O ₂ /m ³	g/m ³	NTU
Discharge sample	0.73	290	7.4	300	31	510	380	410

The main parameters of concern in respect to the discharge to surface water, identified during the surface water sampling were significant oxygen demand, ammonia, ammonium and *E. coli* (Table 41).

Table 41 Inaha Stream surface water samples collected during unauthorised discharge 06 March 2020

06 March 2020 Inaha Stream surface water samples	DO	PERSAT	TEMP	Chloride	Dissolved C- Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli
Site/unit	g/m ³	%	°C	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml
INH000400	10.67	110.1	16.9	37	< 1.0	0.018	31.3	517
INH000408	NR	NR	15.1	43	43	0.7	38.1	> 2420
INH000430	9.47	99.6	15.8	47	26	0.65	40.3	> 2420
INH000450	8.18	89	18.5	45	33	0.52	39.1	> 2420
6 March 2020	Free Ammonia as N	Nitrate-N	Nitrate-N + Nitrite- N	Nitrite-N	pH	Total Ammoniacal-N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method
Site/unit	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU
INH000400	0.0012	2.7	2.7	0.007	7.9	0.048	< 0.8	1.52
INH000408	0.068	2.3	2.5	0.2	7.6	5.8	97	44
INH000430	0.113	2.7	3.9	1.19	7.9	5.2	35	17
INH000450	0.116	2.6	3.4	0.72	7.8	5.2	37	15

A follow up surface water chemical survey was conducted six days later, on the 12 March (Table 42). Following this survey the following was stated:

Overall, the effect on the surface water appeared to have been a short term impact of significant oxygen demand and some acute ammonia impacts. There was some minor ammonia values in the follow up survey (12 March 2020) which will remain on the watch list moving forward.

Table 42 Follow up surface water samples 12 March 2020

12 March 2020	DO	PERSAT	TEMP	Chloride	Dissolved C- Biochemical Oxygen Demand (CBOD ₅)	Dissolved Reactive Phosphorus	Electrical Conductivity (EC)	Escherichia coli	Free Ammonia as N
Collected	g/m ³	%	°C	g/m ³	g O ₂ /m ³	g/m ³	mS/m	MPN/100 ml	g/m ³
INH000400	10.4	103	14.9	33	< 1.0	0.017	27	326	< 0.0003
INH000408	106.1	10.23	15.4	39	< 1.0	0.028	29.8	461	0.0051
INH000420	9.17	96	15.9	39	< 1.0	0.031	30.8	579	0.00163
INH000430	108.5	10.04	16.7	40	< 1.0	0.032	30.7	727	0.0009
INH000450	9.69	107	16.3	45	< 1.0	0.03	33.1	579	0.0008
12 March 2020	Nitrate- N	Nitrate- N + Nitrite- N	Nitrite- N	Oil and Grease	pH	Total Ammoniacal- N	Total Biochemical Oxygen Demand (TBOD ₅)	Turbidity - ISO 7027 Method	
Collected	g/m ³	g/m ³	g/m ³	g/m ³	pH Units	g/m ³	g O ₂ /m ³	FNU	
INH000400	1.83	1.84	0.004		8	< 0.010	< 0.8	1.38	
INH000408	2.3	2.3	0.025	< 30	7.8	0.27	< 0.8	2.3	
INH000420	2.3	2.4	0.063	< 30	7.6	0.146	1	1.73	
INH000430	2.7	2.7	0.049		7.8	0.045	1.1	2.1	
INH000450	3.9	3.9	0.034		7.9	0.034	< 0.8	3.2	

A biomonitoring survey of receiving waters was also conducted with the Council's biologist. It was noted that two biological monitoring surveys had already been conducted on the Inaha Stream and associated tributaries in this monitoring period, with the second of the two surveys conducted some 13 days prior to the third survey. The third survey was conducted 11 days after the unauthorised discharge.

The summation from the biologist from the third survey was as follows:

Despite acute short-term effects relating to biochemical oxygen demand and ammonia, overall there was no evidence that the unauthorised discharge on 06 March 2020, from Taranaki By-Products rendering plant had significantly affected the freshwater macroinvertebrate communities present in the Inaha Stream².

Following the cessation of the discharge the Council placed the Company under abatement notice (EAC-23312). This required the Company to undertake the following:

Action 1. Undertake an investigation to identify and document all vectors of discharge, such as pipes, sumps and drains located on the operation site of Taranaki By Products Limited, Kohiti Road, Okaiawa.

Action 2. Carry out works to remove, isolate or otherwise deal with any vectors of discharge to ensure no unauthorised discharges to land or water can or are likely to occur.

At the time of this report compliance this has yet to be completed, an extension had been granted to allow the Company additional time to complete the abatement requirements.

It should be noted that the Company were proactive when the discharge was discovered and it was ceased very soon after the initial finding.

² BT116 Biomonitoring of the Inaha Stream above and below the Taranaki By-Products plant, Okaiawa, in relation to an unauthorised discharge, March 2020 (Full report available from the Council on request)

3 Discussion

3.1 Discussion of site performance

Performance will be discussed by consent.

Water takes

To take water from the Inaha Stream for a rendering operation (2051-4)

The maximum abstraction limit from the Inaha Stream was complied with for the entire monitoring period. It is noted the Company only utilised the abstraction source during the second half of the monitoring period, beginning 25 February 2020. This is the second consecutive monitoring period there has been no exceedance in surface water abstraction daily limit.

To take and use groundwater for industrial water supply (9756-1)

The maximum abstraction limit and rate from the abstraction bore, as defined by consent 9756-1, condition 1, were complied with for the duration of the monitoring period.

Discharges to water

To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)

The results from the monitoring of wastewater and receiving water discharge rates by TBP show that the limit on the minimum dilution rate of 300:1 was achieved for the whole of the 2019-2020 period. The discharge ceased on the 31 October 2019, and no discharge to the Inaha Stream occurred till the following monitoring period 21 July 2020. This was a period of 264 days when the wastewater discharge was irrigated to land.

The thermal limit (no greater than 3°C increase in receiving waters) for discharges to the Inaha Stream was not exceeded throughout the monitoring period.

Noted during inspection was the inflated liner in pond 1. This was documented throughout the monitoring period by the inspector. The November 2019 inspection noted the following:

'The inflated pond 1 liner in the north west corner was inspected and found to have been cut to stop the pressure building up, the slice in the liner was above the fat crust at the time of inspection, the issue was discussed with the plant manager who was aware of the issue.

Plans are to be drawn up about how to approach fixing the issue, as the gas build up is likely caused by product rotting underneath the liner, indicating the liner is no longer impervious.'

To date there have been no plans to replace or repair the liner. This is not best practice and the Company have been asked to develop plans to mitigate the compromised liner. During the time of preparation of this report, the company reported on works that were now being undertaking.

To discharge cooling water to an unnamed tributary of the Inaha Stream (2050-4)

There are two sources of cooling water utilised by the Company; the Inaha Stream surface water take (2051-4) and the groundwater abstraction bore (9756-1). In previous monitoring periods the concentration of ammonia had been trending up. The Council requested the Company to assess the ammonia within the abstracted water, at a point prior to the plants closed loop cooling system. The result was detections of measurable ammonia within the groundwater.

The associated surface water abstraction, discharge to the firepond, post the cooling system, did contain measurable ammonia, though this was within a similar range to the preceding water conditions of the Inaha Stream.

In terms of thermal impacts to the Inaha Stream as a process of these two discharges, surface water abstraction and groundwater abstraction, the continuous monitoring associated with the cooling water discharge was recorded below 35°C, which is in compliance with the maximum temperature requirement (<35°C).

To discharge stormwater to the unnamed tributary of the Inaha Stream (5426-1)

Stormwater discharge quality is an area which the Company has invested in this period. As previously discussed in section 2.3.3 and 2.3.4, the Company developed a first flush catch system. This has been designed to catch and divert the first flush contaminants from the stormwater system and re direct the most contaminated fluid and solids to the pond treatment system.

The initial results of the actual discharge to the firepond, post the first flush system, indicated measurable ammonia and elevated *E. coli*. However, it is the discharge from the firepond to the Inaha Stream which the Company is assessed against. All three monitoring rounds of this monitoring location were compliant with consent 5426-1, condition 2. Further monitoring of this location will attest the efficiency of this newly developed first flush catch system over time.

To discharge wastewater to land (3941-2)

One of the objectives of consent 3941-2 is to maximise the discharges of wastewater to land as opposed to the Inaha Stream. In this monitoring period the Company discharged to the Inaha Stream over a period of 101 days. This is a slight increase from the 2018-2019 monitoring period, which was reported at 99 days. This was still compliant and in keeping with the land discharge preference.

In terms of the wastewater, ongoing consent renewal discussions in respect to the discharge to surface water have proposed a limit on the concentration of ammonia within the wastewater. This, linked with the dilution ratio, 300:1 are proposed to safe guard freshwater mussel (Kakahi) populations within the Inaha Stream. The limit for ammonia discussed during the on-going renewal for the protection of Kakahi is proposed at <275 g/m³.

During this monitoring period the maximum ammonia strength recorded by the Company was 215 g/m³, during March 2020.

In terms of the paddock nitrogen loading of wastewater, it should be noted that the Company did not exceed 250 kg N/ha this monitoring period in any irrigation area paddock. This total included the fertiliser applications. In both cases, the volume of nitrogen applied to land via wastewater and fertiliser reduced significantly, with a combined 14,690 kg N reduction, when compared to the previous monitoring period.

The Company utilised 364 ha of land this monitoring period, which is an increase of 42 ha, when compared to the 2018-2019 monitoring period.

Consent currently under renewal process.

To discharge wastes from meat rendering into land by burial (5495-1)

One burial of sand trap waste was undertaken this monitoring period. This was communicated to the Inspector during the January 2020 inspection.

Required by consent is the need for eight monitoring wells. These are to be installed and maintained by the Company. Currently there are five functional monitoring wells located in the burial pit area. Over the life of the consent there have been ten wells installed, though five of them have been damaged and are no longer useable. A further three wells are required to be installed by the Company.

The consent is currently under the renewal process.

To place a culvert in the Inaha Stream (6431-2)

No performance issues were noted from the exercise of this consent in this monitoring period.

To discharge emissions to air from rendering operations (4058-4)

No complaints were received in relation to emissions to air this monitoring period. In the previous monitoring period the Company undertook the biennial audit of odour control systems. The Company is committed to implementing the recommendations of this audit moving forward.

To discharge emissions to air from the burning of pallets, paper and cardboard (1054-1)

The associated fire pit was not observed to be in use during the monitoring period. The associated waste management area was found to be satisfactory during inspections.

3.2 Environmental effects of exercise of consents

Environmental effects will be discussed by consent.

To take water from the Inaha Stream for a rendering operation (2051-4)

No environmental effects were noted as a process of the abstraction of surface water from the Inaha Stream. It was noted that the facility only utilised this cooling water source in the second half of the monitoring period.

To take and use groundwater for industrial water supply (9756-1)

Measurable ammonia had been recorded in the discharge of the groundwater derived cooling water. The source of the ammonia had been quantified by the Company to be from the groundwater source, rather than contaminated through plant processes, prior to discharge.

The daily limit (1,970 m³) for abstraction and the rate (22.8 L/s) was not exceeded for the duration of the monitoring period.

Discharges to water

To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)

Three surface water monitoring rounds were completed this monitoring period. On one of the three monitoring rounds, September 2019, the facility was discharging to the Inaha Stream. The analysis of the samples collected during the stream discharge identified elevated oxygen demand in excess of 2 g O₂/m³ in two locations.

The remaining two rounds were within specification.

The dilution rate (300:1) of the wastewater discharge to the Inaha Stream, which lasted for 101 days, was maintained for the duration.

On one occasion an unauthorised discharge of fatty liquid occurred to the Inaha Stream. This was identified by an Officer of the Council during temperature logger download. A pump malfunctioned and caused an overflow into a sump, which contained an old disused pipe which was a direct conduit to the Inaha Stream.

The resulting discharge was quickly ceased and the conduit pipe sealed with cement. The resulting discharge caused short term significant oxygen demand and elevated ammonia impacts to the Inaha Stream.

A rapid biological assessment of the Inaha Stream was conducted at the time and the findings did not indicate any significant environmental impacts. A follow up biological monitoring survey was conducted 11 days after the discharge and the results did not indicate any significant cumulative or ongoing impacts to the biological communities of the Stream.

Prior to the unauthorised discharge, two normal compliance monitoring biological surveys were undertaken. these are conducted twice annually.

The two biological surveys did not indicate any significant impacts to Inaha Stream biology from the Company. However, they did suggest a subtle decline in species richness below the discharge, this was also observed above the discharge, in close proximity to ponds 1 and 2. It is noted that the liner of pond 1 is compromised currently.

It was also noted that ammonia concentrations were measurable within the Inaha Stream and were a result of discharges from the facility. The September 2019 and March 2020 monitoring round recorded an increase in ammonia concentration, post the wastewater and cooling water discharge.

With the advent of the National Policy Statement for Freshwater Management coming into effect, the concentrations of ammonia, dissolved reactive phosphorus and *E. coli* within the Inaha Stream and compliant with the NPS will be closely monitored moving forward. This is in addition to consent defined requirements.

To discharge cooling water to an unnamed tributary of the Inaha Stream (2050-4)

The cooling water system draws water from two sources; Inaha Stream and groundwater abstraction. The resulting surface water drawn discharge was within specification on two monitoring occasions, with minimal effects noted.

The corresponding groundwater drawn cooling water recorded measurable ammonia in the discharge. The source of the ammonia has been confirmed to be present in the groundwater prior to the cooling water system, rather than due to a fault in the Company cooling system.

To discharge stormwater to the unnamed tributary of the Inaha Stream (5426-1)

The stormwater system was upgraded to a first flush catch system which is designed to catch solids and the primary load of contaminants from around the site during the first flush. It then directs it by pump, to the pond system for treatment. This system was brought on line in February 2020 and the associated pump to the pond system in April 2020.

The initial results of the discharge indicated measurable nitrogen in the form of ammonia and *E. coli*. However, the corresponding sampling of the fire pond at IND001015, which accepts both cooling water and stormwater indicated a decrease in key parameters. The clarity of the fire pond continues to improve. Continued monitoring of this source will attest the effectiveness of the upgrade over time.

To discharge wastewater to land (3941-2)

The Company records, in regard to wastewater and fertiliser discharges to land, indicated that no paddock received over 250 kg N/ha this monitoring period. This is a significant undertaking and is a direct response from the Company, to limit the loading to sustainable levels, due to the associated nitrogen from the wastewater and fertiliser emerging and elevating in the Western tributary of the Inaha Stream.

Monitoring of the Western tributary indicated one of the lowest concentrations recorded at this location since 2013, which is encouraging. However, further monitoring and diligent paddock loading will attest the quality of the consulted changes undertaken by the Company.

In terms of the National Policy Statement for Freshwater Management, recent results within the Western tributary suggest a decrease in nitrate concentrations, however, this site remains at attribute state D (i.e it is in excess of the maximum allowable concentrations). The Northern tributary is classified as attribute state C. Further improvements are required, though they have begun.

Groundwater monitoring of the irrigation area was conducted. Specifically the drinking water source at Kopanga Spring has recorded a decreasing concentration of nitrate nitrogen in this monitoring period. For context, this source had previously observed a steadily increase in nitrate concentration which was moving towards the national drinking water standard maximum allowable concentration for nitrate nitrogen.

The Company were asked as part of their mitigation of nitrogen impacts to groundwater and surface water to mitigate this. So far the results are encouraging.

The other nine monitoring locations are beginning to display the result of better wastewater discharge management. However, four wells currently still record nitrate nitrogen over 50 g/m³ +/-, though it should be noted that only one is close to 90 g/m³. The wells recording over 50 g/m³ nitrate are recording a plateau in results, which may suggest that the peak has been reached. Further monitoring over time will assess how the ongoing mitigation is functioning.

[To discharge wastes from meat rendering into land by burial \(5495-1\)](#)

Significant ammonia (>100 g/m³) was recorded in two of five monitoring wells. The only waste buried in the burial pits was sand trap waste, communicated during the January 2020 monitoring round. The previous burial of waste product was conducted in 2017.

The nearest receptor is the Inaha Stream, which has a permeant watch order placed on it by the Company to assess for any emergence of this ammonia. To date no effects have been noted in the Inaha Stream. This was also assessed by an independent consultant during the ongoing consent renewal.

The Company have applied for a renewal of consent which will see the continued use of these burial pits only as a last result. The Company has built in contingency to allow product which cannot be processed at the Okaiawa facility to be processed at other Company assets in surrounding regions if there is a mechanical breakdown.

[To place a culvert in the Inaha Stream \(6431-2\)](#)

No environmental effects were noted from the exercise of this consent in this monitoring period.

[To discharge emissions to air from rendering operations \(4058-4\)](#)

The exercise of the air discharge consent in this monitoring period did not result in any odour complaints from members of the public. The last odour complaint was received 15 February 2019. Of the two community meetings which were planned during the monitoring period, one was held, 11 December 2019, while the second, post summer, was suspended due to the Covid-19 lockdown.

Inspections noted noticeable odour around ponds 1 and 2 during the monitoring period, including noticeable odour from the old dairy factory, south of Normanby Road.

[To discharge emissions to air from the burning of pallets, paper and cardboard \(1054-1\)](#)

This consent was not observed to be actioned during the monitoring period. Pallets were noted in the area ready to be burnt, however the actual burning was not observed. The associated waste management area was observed to be in good order throughout the monitoring period.

[Officer's note](#)

The Company has demonstrated significant undertakings in this monitoring period. These include reducing total nitrogen discharged to land (<250 kg N ha), including a substantial reduction in the quantity of the fertiliser, stickwater, put to land. This has been achieved through additional engineering and processing, which has not been without fault, but they have persevered.

The independent consultant during the on-going consent renewal proposed that the nitrate concentrations within the spring water drinking source, Te Kopanga Spring would no longer increase. The monitoring suggests this is the case, though further monitoring will continue to assess this location.

Nitrate nitrogen within the Western Tributary of the Inaha Stream remains elevated, though the peak nitrogen concentration in this monitoring period was lower than the previous monitoring period. The continued reduction in this concentration is required, for compliance with the National Policy Statement for Freshwater Management.

Groundwater monitoring of the irrigation area suggests a slight plateauing in nitrate results in the elevated monitoring wells.

The upgrade of the stormwater system to a first flush catch system is proposed to improve the quality of the stormwater quality entering the firepond. The early results from the system are not conclusive, though the monitoring of the associated firepond discharge do indicate a reduction in key contaminants.

No odour complaints were received in regards to objectionable odour, beyond the boundary, from the facility, this monitoring period. This is a significant achievement and continued progress in this area is encouraged.

However, there are still areas to focus on. Notwithstanding the noted above improvements, continued adherence and further improvement is required. The surface water monitoring did indicate some elevated oxygen demand during the monitoring period during a discharge round.

The biological monitoring of the Inaha Stream suggest a subtle decline, with a move from good health, to fair health, determined by the biologist, at the sites next to the plant, by Kohiti Road Bridge and the subsequent sites downstream.

It was noted on multiple occasions during inspections that the liner of pond 1 requires significant maintenance.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 43-56.

Table 43 Summary of performance for consent 2049-4

Purpose: To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Mixing zone 30 m downstream of discharge	Site inspection and monitoring results	Yes
2. Boundaries of mixing zone to be determined by Council	Site inspection	Yes
3. Point of discharge to enter channel directly to ensure mixing	Site inspection	Yes
4. Advise Council before making changes to alter nature of discharge	Site inspection, monitoring results and liaison	Yes
5. TBP to undertake self-monitoring	Review of monthly monitoring of effluent for nitrogen. Some monitoring in management plan undertaken by Council	Yes
6. Minimum discharge dilution rate	Monitoring results	Yes
7. No discharge of stickwater, and consult with Council before increasing cow herd	Site inspection	Yes
8. Discharge to cease when flows in the Inaha Stream drop below 100 L/s	Monitoring of Kohiti Road flow gauge results	Yes

Purpose: To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream (2049-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
9. Control on effect of discharge in receiving water	Inspection, chemical sampling and bio-monitoring	No On two occasions during surface water monitoring: 30 September 2019 and 6 March 2020 elevated oxygen demand, in excess of 2.0 g O ₂ /m ³ was recorded. This also included elevated unionised ammonia >0.025 g/m ³
10. Limits on receiving water ammonia concentration	Chemical sampling	Yes
11. Recording and reporting of discharge rate	Inspection and review of records	Yes
12. Inaha Stream flow measurement device	Inspection, gaugings by Council	Yes
13. Provision of wastewater disposal plan	Plan received by Council and approved December 2000	Yes
14. Plan to be implemented	Inspections and liaison and receipt of TBP reports	Yes
15. Optional and annual reviews of wastewater plan	Annual review undertaken by TBP, provided 16 July 2020	Yes
16. Designated staff member	Part of TBP's Environmental Manager's job description, also Plant and Operations Manager's	Yes
17. Training of staff on wastewater disposal	Liaison and inspection	Yes
18. Donation to Taranaki Tree Trust	Confirmation with Council finance department that donation received	Yes
19. Optional review provision	Next review date available June 2017	Consent under renewal
Overall assessment of consent compliance and environmental performance in respect of this consent		Improvement required
Overall assessment of administrative performance in respect of this consent		High

Table 44 Summary of performance for consent 2050-4

Purpose: To discharge cooling water to Inaha tributary (2050-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Activity monitoring by TBP as required	Continuous temperature monitoring taken over by Council in September 2013, at TBP's request	Yes
2. Composition not to be different to Inaha Stream, other than heat and solids	Chemical sampling by Council	Surface water returned water within specification Ammonia within groundwater drawn via abstraction
3. Maximum temperature limit on discharge	Continuous temperature recording by Council	Yes
4. Limit on suspended solids in discharge	Sampling by Council	Yes
5. Controls on effect of discharge in receiving water	Continuous temperature monitoring, and chemical and biological sampling, by Council	Yes
6. Discharge temperature measurement and recording	Monitoring carried out by Council	Yes
7. Optional review provision	Next review date available June 2017	No review required consent under renewal
Overall assessment of consent compliance and environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		High

Table 45 Summary of performance for consent 2051-4

Purpose: To take water from the Inaha Stream for a rendering operation (2051-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Means of take satisfactory to Council	Inspection and monitoring	Yes
2. Minimum flow of 25 L/s downstream of point of abstraction	Monitoring of flow	Yes
3. Operation of an abstraction measurement device, maintain records	Review of data	Yes
4. Operation of a flow recorder at Kohiti Road, level gauge from Jan 2015	Staff gauge in stream, rated by Council. Daily level record and monthly report by TBP	Yes
5. Report on use of treated wastewater as cooling water by 31 March 2000	Report produced 13 October 2000 and recommendations implemented	N/A

Purpose: To take water from the Inaha Stream for a rendering operation (2051-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. Provision for review	Next review date available 1 June 2017	Not required under consent renewal
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

Table 46 Summary of performance for consent 5426-1

Purpose: To discharge stormwater to Inaha tributary (5426-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to changing processes that may significantly alter discharge	Inspection by Council	Yes
2. Limits on discharge composition	Chemical sampling by Council indicated compliance with this consent condition	Yes
3. Controls on effect of discharge in receiving water	Chemical and biological sampling by Council	Yes
4. Provision of spillage contingency plan by 31 August 1999	Plan produced in November 2000	N/A
5. Optional review provision	Next review date available June 2017	Not required consent under renewal
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

Table 47 Summary of performance for consent 4058-4

Purpose: To discharge emissions to air (4058-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option (bpo) to prevent or minimise adverse effects	Checking that standard operating procedures to achieve compliance with consent conditions are followed. Liaison with TBP and inspection by Council. Audit undertaken in March and April 2019, recommendations to be implemented	Yes

Purpose: To discharge emissions to air (4058-4)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
2. No offensive or objectionable odour beyond boundary	Odour surveys undertaken by Council during inspections and by TBP	Yes
3. Definition of noxious, offensive or objectionable odour		N/A
4. Designated staff member for emissions management	Part of TBP Environmental Manager's job description. Also Plant and Operations Manager's responsibility	Yes
5. Prohibition of fish rendering	Inspection by Council, no fish rendering undertaken	Yes
6. Certification processes and equipment operated according to good engineering practice biennially from 30 April 2013	Biennial certification by suitably qualified independent person. Undertaken 26 March and 3 April 2019	Yes
7. Preparation of Air Discharge Management Plan	Submission of Plan, on 3 July 2012, reviewed plan received July 2020	Yes
8. Operation in accordance with Air Discharge Management Plan	Inspection by Council	Yes
9. Annual review of Air Discharge Management Plan by 31 May	Liaison. Reviewed by TBP and submitted to Council 28 May 2019	Yes
10. Limits on dust deposition rate	Inspections disused dust in the JTL, no specific dust monitoring undertaken	N/A
11. Newsletter production, and community liaison meetings	Newsletter produced. Community liaison meeting held December 2020	Yes
12. Optional review provision to deal with significant adverse effects	Review	Review not required
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

Table 48 Summary of performance for consent 3941-2

Purpose: To discharge treated wastewater to land (3941-2)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Irrigation to defined area	Inspection by Council	Yes
2. Provision and maintenance of spray irrigation management plan	Plan received by Council and approved in October 2000	Yes
3. Plan to be followed	Liaison, inspection and provision of monitoring reports	Yes
4. Optional, and mandatory annual reviews of management plan	Revision submitted 22 May 2018	Yes
5. Designated staff member	Part of TBP Environmental Manager's job description. Also Plant and Operations Manager's responsibility	Yes
6. Adopt best practicable option to minimise adverse effects, including total nitrogen minimisation	Significant developments planned through filtration, pending. Pond 1 liner compromised	No
7. Seek permission for Inaha Stream discharge when cannot irrigate, and Inaha Stream in low flow	Liaison and inspection. Not required this period	N/A
8. Limit on dissolved oxygen in final pond	Chemical sampling of pond 6 indicated compliance with limit on occasion assessed	Yes
9. No offensive or objectionable odour beyond boundary	Inspection and complaint register	Yes
10. No spray drift beyond boundary	Inspection and complaint register	Yes
11. Limit on sodium absorption ratio	Chemical sampling indicated compliance with this limit	Yes
12. Prohibition of ponding and run-off	Inspection and complaint register	Yes
13. Spray buffer zones	Inspection and complaint register	Yes
14. Limit on nitrogen application rate	Monitoring by TBP and review of irrigation records. Record also kept of fertiliser application to establish total nitrogen loading	Yes
15. Report on reducing ammonia concentration by 15 December 2000	Report received by Council on 2 April 2001	N/A
16. Limit on application rate	Inspection	Yes
17. Limit on return period	Inspection and provision of records	Yes
18. Installation and maintenance of monitoring bores	Liaison and inspection. Environmental consultant have installed additional bores recently	Yes

Purpose: To discharge treated wastewater to land (3941-2)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
19. Baseline and operational monitoring by TBP	Results of wastewater, irrigation and soil monitoring by/for TBP reviewed by Council	Yes
20. Consultation meetings with interested parties	Ongoing consultation through consent renewal	Yes
21. Notification prior to Inaha discharge	Imposed by review of 21 December 2005. Liaison with TBP and Ngati Manuhiakai	Yes
22. Provisions for contamination of groundwater or water supply	Monitoring and sampling of groundwater	<p>Significant nitrate impacts in groundwater identified and communicated to TBP in previous monitoring periods.</p> <p>Four wells contain NNN concentrations greater than 50 g/m³.</p> <p>Elevated Nitrogen in Western Tributary.</p> <p>Remedial actions undertaken by TBP.</p> <p>Suitably qualified Environmental Consultant engaged and aiding in wastewater management.</p> <p>Ongoing for three years. Still ongoing</p>
23. Optional review provision for operational requirements	Not sought by TBP	N/A
24. Optional review provision upon receipt of ammonia reduction report	The engagement of a suitably qualified environmental consultant will seek to mitigate elevated nitrogen in groundwater	Consultant appointed
25. Optional review provision for nitrogen treatment and disposal	Review not required at this stage, consent set for renewal in 2018-2019 period	Consent under renewal
26. Optional review provision for environmental effects	Current proposed plans preferred to the review option. The review option will not be exercised this period	Not required

Purpose: To discharge treated wastewater to land (3941-2)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		Improvement required High
Overall assessment of administrative performance in respect of this consent		

Table 49 Summary of performance for consent 5495-1

Purpose: To discharge wastes from meat rendering by burial (5495-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of waste burial management plan by 1 November 2000	Plan received by Council and approved in October 2000	N/A
2. Waste burial management plan to be followed	Inspection by Council, and review of TBP records. No burial undertaken in this monitoring period	Yes
3. Optional provision for review of waste burial management plan	Not sought by TBP or Council. Revision undertaken by TBP in May 2014	N/A
4. Designated staff member	Part of TBP Environmental Manager's job description. Also Plant and Operations Managers' responsibility	Yes
5. Disposal pits not to intercept groundwater	Inspection by Council	Yes
6. Disposal pits to be constructed as undertaken in consent application	Inspection by Council	Yes
7. Notification of commencement of pit construction outside nominated area	Inspection by Council, notified during January 2020 inspection burial of sand trap waste	Yes
8. All constructed disposal pits to be inspected by Council prior to use	Inspection by Council	Yes
9. Conditions 1-4 to apply to new disposal pits	Inspection by Council	Yes
10. Discharged material to be covered within 4 hours	Inspection by Council, burial of sand trap waste	Yes
11. Soil cover requirements upon completion of each disposal operation	Inspection by Council	Yes
12. Cover material and surrounding land to be contoured to direct stormwater away	Inspection by Council	Yes
13. Site rehabilitation and pasture re-establishment	Inspection by Council	Yes
14. No irrigation of effluent onto disposal area	Inspection by Council	Yes

Purpose: To discharge wastes from meat rendering by burial (5495-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
15. No direct discharge of contaminants to surface water	Inspection and chemical/biological survey by Council	Yes
16. Installation of monitoring bores	Inspection and sampling by Council. New bore installed 11 May 2015, currently five bores active, while five bores have been destroyed. Three additional bores required	No
17. Optional review provision for operational requirements	Not sought by TBP	N/A
18. Optional review provision for environmental effects	Due to expire 1 June 2019. Renewal currently on going	Not required Renewal currently on going
Overall assessment of consent compliance and environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		High

Table 50 Summary of performance for consent 6431-1

Purpose: To place culverts in Inaha Stream (6431-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise adverse environmental effects	Liaison, and inspection by Council	Yes
2. Consent to be exercised in accordance with documentation submitted	Inspection by Council	N/A
3. Notification prior to commencement and upon completion of works	Liaison with Council. No work undertaken	N/A
4. Subsequent works prohibited between May and October, without permission	Inspection by Council. Permission for dead willow removal given 4 June 2015	Yes
5. Adoption of best practicable option to minimise discharges, bed disturbance and water quality effects	Liaison, inspection and bio-monitoring by Council	Yes
6. Minimisation of bed disturbance	Inspection by Council	Yes
7. Structure removal and area reinstatement upon redundancy		N/A

Purpose: To place culverts in Inaha Stream (6431-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Fish passage not to be restricted	Inspection by Council	Yes
9. Erection of stock-proof riparian fences on consent holders property above Kohiti Road	Implementation of riparian plan RMP938 and inspection by Council	Yes fencing completed June 2009
10. Planting of riparian margins within 4 years from 4 October 2004	Implementation of riparian plan RMP938 and inspection by Council. Some replanting/ blanking undertaken in winter 2011 and 2015	Yes planting completed June 2009
11. Placement of culvert inverts and headwall protection structures	Inspection by Council	Yes
12. Lapse of consent if not exercised	Consent was exercised	N/A
13. Optional review provision for environmental effects	Next review date available 1 June 2017	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

Table 51 Summary of performance for consent 7234-1

Purpose: To disturb and realign Inaha Stream (7234-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent to be exercised in accordance with documentation submitted	Inspection by Council	N/A
2. Notification prior to commencement of works	Notification given 17 March 2008	N/A
3. Placement and design of rock wall for bank protection	Inspection by Council	N/A
4. Works prohibited between May and October, without permission	Inspection by Council	N/A
5. Riverbed disturbance to be minimised	Inspection by Council	N/A
6. Sediment discharge and effects to be minimised	Inspection by Council	N/A
7. Fish salvage from old channel immediately upon diversion	Council carried out fish salvage on 18 April 2008	N/A

Purpose: To disturb and realign Inaha Stream (7234-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Fish passage not be obstructed	Inspection by Council	N/A
9. Vegetation removed not to be buried near stream	Inspection by Council	N/A
10. Lapse of consent if not exercised	Consent was exercised	N/A
11. Optional review provision for environmental effects	Next review date available June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Not exercised
Overall assessment of administrative performance in respect of this consent		Not exercised

Table 52 Summary of performance for consent 7239-1

Purpose: To discharge stormwater and sediment from re-contouring land and realigning Inaha Stream (7329-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent to be exercised in accordance with documentation	Inspection by Council. An erosion and sediment control management plan was provided with the application. (Sediment controls initially inadequate)	N/A
2. Limit on maximum soil area disturbed	Inspection by Council	N/A
3. Limit on maximum soil volume disturbed	Inspection by Council	N/A
4. Design criteria for run-off sediments traps to be followed	Inspection by Council	N/A
5. Sediment discharge and effects to be minimised	Inspection by Council	N/A
6. Provision of programme of works prior to exercise of consent	An erosion and sediment control management plan was provided with the application	N/A
7. Stabilisation of earthwork areas upon completion of soil disturbance activities	Inspection by Council	N/A
8. Procedure to be followed upon discovery of archaeological site	Liaison with Council (Retrospective)	N/A
9. Lapse of consent if not exercised	Consent was exercised	N/A
10. Optional review provision for environmental effects	Next review date available June 2017	N/A

Purpose: To discharge stormwater and sediment from re-contouring land and realigning Inaha Stream (7329-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		Not exercised
Overall assessment of administrative performance in respect of this consent		Not exercised

Table 53 Summary of performance for consent 9756-1

Purpose: To take and use groundwater for industrial water supply (9756-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on maximum take	Water measuring and recording required by consent conditions	Yes
2. Labelling of bore	Inspection by Council	Yes
3. Access to bore for manual measurement of water levels	Inspection by Council	Yes
4. Installation of metering and logging equipment	Inspection by Council and certification under condition 5	Yes
5. Certification of water measuring equipment	Provision of certificate. Supplied 29 May 2014	Yes
6. Installation of water level measuring equipment	Inspection by Council	Yes
7. Telemetry of monitoring data to Council	Inspection by Council and receipt of data. Water take from 27 March 2014; water level from 6 June 2014	Yes
8. Access to monitoring equipment	Inspection by Council	Yes
9. Notification of equipment failure	Inspection by Council and checking of records	N/A
10. Adoption of best practicable option	Liaison and inspection	Yes
11. Lapse of consent if not exercised	Consent was exercised	N/A
12. Optional review provision for environmental effects	Next review date available June 2017	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

Table 54 Summary of performance for consent 10054-1

Purpose: To discharge emissions into the air from the burning of pallets, paper and cardboard (10054-1)		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise adverse environmental effects	Liaison, and inspection by Council	Yes
2. Restrict on materials combusted	Inspection by Council	Yes
3. Prohibition of objectionable odour	Inspection by Council	Yes
4. Supervision of burning	Inspection by Council	Yes
5. Limit on dust deposition rate	Inspection by Council	N/A
6. Control of airborne dust components and particulate concentration	Inspection by Council	Yes
7. Prohibition of toxic components beyond boundary	Inspection by Council	Yes
8. Lapse of consent if not exercised	Consent was exercised	N/A
9. Optional review provision for environmental effects	Next review date available June 2017, no review required	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

Table 55 Overall environmental and administration grading 2019-2020 monitoring period

Consent Number	Description	Environmental compliance	Administrative performance
2051-4	To take water from the Inaha Stream for a rendering operation	High	High
2049-4	To discharge treated wastewater from a rendering operation and from a farm dairy into the Inaha Stream	Improvement required	High
2050-4	To discharge cooling water to Inaha tributary	Good	High
5426-1	To discharge stormwater to Inaha tributary	High	High
4058-4	To discharge emissions to air	High	High

Consent Number	Description	Environmental compliance	Administrative performance
3941-2	To discharge treated wastewater to land	Improvement required	High
5495-1	To discharge wastes from meat rendering by burial	Good	High
6431-1	To place culverts in Inaha Stream	High	High
7234-1	To disturb and realign Inaha Stream	Not exercised	
7239-1	To discharge stormwater and sediment from re-contouring land and realigning Inaha Stream	Not exercised	
9756-1	To take and use groundwater for industrial water supply	High	High
10054-1	To discharge emissions into the air from the burning of pallets, paper and cardboard	High	High

Table 56 Environmental performance since 2010

Year	Consent no	High	Good	Improvement req	Poor
2009-2010	2051-4			1	
	2049-4		1		
	2050-4	1			
	5426-1			1	
	4058-3			1	
	3941-2		1		
	5495-1	1			
	6431-1		1		
	7234-1	1			
	7329-1	1			
2010-2012	2051-4			1	
	2049-4	1			
	2050-4	1			
	5426-1			1	
	4058-3/4			1	
	3941-2		1		
	5495-1	1			
	6431-1		1		
	7234-1	1			

Year	Consent no	High	Good	Improvement req	Poor
	7239-1	1			
2012-2013	2051-4		1		
	2049-4	1			
	2050-4				1
	5426-1			1	
	4058-4				1
	3941-2			1	
	5495-1		1		
	6431-1		1		
	7234-1	1			
	7239-1	1			
2013-2015	2051-4	1			
	2049-4			1	
	2050-4		1		
	5426-1			1	
	4058-4			1	
	3941-2			1	
	5495-1		1		
	6431-1		1		
	9756-1	1			
2015-2016	2051-4		1		
	2049-4		1		
	2050-4	1			
	5426-1	1			
	4058-4			1	
	3941-2			1	
	5495-1		1		
	6431-1	1			
	9756-1	1			
	10054-1		1		
2016-2017	2051-4	1			
	2049-4		1		
	2050-4	1			
	5426-1		1		
	4058-4			1	
	3941-2			1	

Year	Consent no	High	Good	Improvement req	Poor
	5495-1	1			
	6431-1	1			
	9756-1	1			
	10054-1	1			
2017-2018	2051-4		1		
	2049-4		1		
	2050-4	1			
	5426-1	1			
	4058-4		1		
	3941-2			1	
	5495-1	1			
	6431-1	1			
	9756-1	1			
	10054-1	1			
2018-2019	2051-4	1			
	2049-4	1			
	2050-4	1			
	5426-1	1			
	4058-4				1
	3941-2			1	
	5495-1		1		
	6431-1	1			
	9756-1	1			
	10054-1	1			
Totals		37	21	18	3

During the year, the Company demonstrated a good level of environmental and high level of administrative performance with the resource consents overall as defined in Section 1.1.4, with some variability across individual consents.

3.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the TBP facility in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation 1 was undertaken. Recommendation 2 was required to assess the unauthorised discharge of fatty liquid to the Inaha Stream as discussed in Section 2.6.

3.5 Alterations to monitoring programmes for 2020-2021

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 2020-2021 that the monitoring programme remain unchanged from that undertaken in the 2019-2020 monitoring period.

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 2020-2021.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Taranaki By-Products in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, 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.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in $\mu\text{S}/\text{cm}$.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second ($1 \text{ m}^3\text{s}^{-1}$).
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.
F	Fluoride.
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.
$\text{g}/\text{m}^2/\text{day}$	grams/metre ² /day.
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.
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.
MPN	Most Probable Number. A method used to estimate the concentration of viable microorganisms in a sample.
µS/cm	Microsiemens per centimetre.
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).
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
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.
PM ₁₀ , PM _{2.5} , PM _{1.0}	Relatively fine airborne particles (less than 10 or 2.5 or 1.0 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
Zn*	Zinc.

*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 Taranaki By-Products Ltd

(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: Taranaki By-Products Limited
P O Box 172
HAWERA

Change to
Conditions/Review
Completed Date: 4 October 2006 [Granted: 31 May 1999]

Conditions of Consent

Consent Granted: To discharge up to 940 cubic metres/day of treated
wastewater from a rendering operation and from a farm
dairy into the Inaha Stream at or about GR: Q21:118-858

Expiry Date: 1 June 2019

Review Date(s): June 2001, June 2003, June 2005, June 2007,
June 2011, June 2017

Site Location: Kohiti Road, Okaiawa

Legal Description: Lots 1 & 2 DP 6457 Blk IV Waimate SD

Catchment: Inaha

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

Special conditions 1 – 5 (unchanged)

1. The mixing zone in each condition of this consent shall extend for a distance of 30 metres downstream of the point of discharge of treated wastewater.
2. The boundaries of the mixing zone and site of discharge shall be as physically determined by the Chief Executive, Taranaki Regional Council.
3. The point of discharge into the Inaha Stream shall be such that the discharge enters directly into a channel of the Inaha Stream in order to ensure that complete mixing occurs.
4. The consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge.
5. The consent holder shall undertake such monitoring of the activities licensed by this consent, as deemed reasonably necessary by the Chief Executive, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the Chief Executive, Taranaki Regional Council, upon request.

Special condition 6 [amended]

6. A minimum dilution rate of 1:300 shall be maintained at the point of discharge to the Inaha Stream at all times.

Special condition 7 [replaced]

7. a) No stick-water shall be discharged under this consent. Stick-water is defined as juices squeezed out of products that are rendered.
- b) This consent allows the discharge of wastewater from up to 1,200 cows. Prior to this number being increased the consent holder must demonstrate, in writing, to the satisfaction of the Chief Executive Officer, Taranaki Regional Council, that the wastewater treatment system can treat the wastewater without breaching condition 9 of this consent.

Special conditions 8- 12 [unchanged]

8. The discharge shall cease when flows decrease in the Inaha Stream, as measured at the Kohiti Road gauging site, to below 100 litres/second.
9. The discharge [in conjunction with any other discharges pertaining to the same property], shall not cause or give rise to any of the following effects, at any point in the receiving waters below the mixing zone:
 - (a) a fall of more than 0.5 pH units;
 - (b) an increase in filtered carbonaceous biochemical oxygen demand [20 degrees Celsius, 5-day test] to above 2.00 gm⁻³;
 - (c) a temperature rise of more than 3.0 degrees Celsius;
 - (d) a reduction in the dissolved oxygen concentration to below 80% of saturation concentration;
 - (e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - (f) any conspicuous change in the colour or visual clarity;
 - (g) any emission of objectionable odour;
 - (h) the rendering of fresh water unsuitable for consumption by farm animals;
 - (i) any significant adverse effects on aquatic life, habitats or ecology;
 - (j) any visible bacterial and/or fungal growths in the receiving water.
10. The discharge, in conjunction with any other discharges pertaining to the same property, shall not raise the total ammonia concentration [expressed as NH₃] in the receiving waters at any point below the mixing zone above 1.5 gm⁻³ if the pH of the receiving water is below 7.75, or above 0.7 gm⁻³ if the pH of the receiving water lies between 7.75 and 8.00, or above 0.4 gm⁻³ if the pH of the receiving water is above 8.00.
11. The consent holder shall install a metal control gate on the discharge outlet, and install and operate a v-notch weir and stage board on the outlet, to the satisfaction of the Chief Executive, Taranaki Regional Council; and shall keep records of the discharge rate during the exercise of this consent; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.
12. The consent holder shall install and maintain a stage board on the Kohiti Road Bridge and shall gauge the site for the purpose of providing a stream flow monitoring site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

Special condition 13 [amended]

13. The consent holder shall maintain a wastewater disposal management plan [the management plan] for the wastewater treatment system, to the approval of the Chief Executive, Taranaki Regional Council, outlining the management of the system, particularly the use of the spray irrigation system in combination with the pond discharge, which shall demonstrate the ability to comply with consent conditions and shall address the following matters:
- (a) monitoring of the discharge wastewater;
 - (b) monitoring of the receiving water;
 - (c) management of the wastewater treatment system;
 - (d) minimisation of nutrients in the discharge wastewater;
 - (e) treatment and disposal of stickwater;
 - (f) mitigation of the effects of the discharge;
 - (g) guidelines for use of spray irrigation or discharge to surface water; and
 - (h) reporting on the exercise of the consent.

An objective of the plan shall be to minimise discharges to surface water and to maximise discharges to land under consent 3941.

Special condition 14 [unchanged]

14. The consent shall be exercised in accordance with the procedures set out in the wastewater disposal management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, except by the specific agreement of the Chief Executive, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

Special condition 15 [amended]

15. The consent holder shall advise the Taranaki Regional Council two months prior to any changes being made to the wastewater disposal management plan. Should the Taranaki Regional Council wish to review the wastewater disposal management plan, two months notice shall be provided to the consent holder. The consent holder shall review the plan annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 May each year.

Special conditions 16-18 [unchanged]

16. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the wastewater treatment system.

Consent 2049-4

17. The consent holder shall ensure that:
- (a) the operation of the wastewater treatment system shall be carried out at all times in accordance with the requirements of the wastewater disposal management plan prepared as required in condition (13) above or subsequent version of that document which does not lessen environmental protection standards;
 - (b) all relevant site staff are to be regularly trained on the content and implementation of the wastewater disposal management plan, the maximum period between training sessions being 12 months. New staff are to be trained on recruitment and the training record made available to the Chief Executive, Taranaki Regional Council, upon request; and
 - (c) all relevant site staff are advised immediately of any revision or additions to the wastewater disposal management plan.
18. By the agreement of the consent holder, the consent holder shall mitigate the effects of the discharge by donating annually to the Taranaki Tree Trust \$2100 [goods and services tax exclusive] for the purpose of providing riparian planting and management in the Inaha Stream catchment. The amount shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation.

Special condition 19 [amended]

19. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2007, June 2011, and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this 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 4 October 2006

For and on behalf of
Taranaki Regional Council

Director-Resource Management

TRK992050

DISCHARGE PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council**

Name of
Consent Holder: TARANAKI BY-PRODUCTS LIMITED
PO BOX 172 HAWERA

Renewal
Granted Date: 31 May 1999

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO 2,160 CUBIC METRES/DAY OF
COOLING WATER AND BACKWASH WATER FROM A
RENDERING OPERATION INTO AN UNNAMED TRIBUTARY
OF THE INAHA STREAM AT OR ABOUT GR: Q21:118-858

Expiry Date: 1 June 2019

Review Date[s]: June 2001, June 2003, June 2005, June 2011 and June 2017

Site Location: KOHITI ROAD OKAIAWA

Legal Description: LOTS 1 & 2 DP6457 BLK IV WAIMATE SD

Catchment: INAHA 351.000

Tributary: UNNAMED TRIBUTARY

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

TRK992050

General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That 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) That 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. THAT the consent holder shall undertake such monitoring of the activities licensed by this consent, as deemed reasonably necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.
2. THAT the discharge shall not contain concentrations of any chemical, biological or physical contaminant [other than heat and suspended solids] greater than those found in the water abstracted from the Inaha Stream.
3. THAT the cooling water discharge to the Inaha Stream shall not exceed 35.0 degrees Celsius in temperature at the point of the discharge to the unnamed tributary of the Inaha Stream.
4. THAT the cooling water discharge to the Inaha Stream shall not contain a concentration of suspended solids in excess of 100 gm⁻³
5. THAT after allowing for a mixing zone of 45 metres extending downstream of the confluence of the unnamed tributary with the Inaha Stream, the discharge [in conjunction with any other discharge pertaining to the same property], shall not give rise to any of the following effects in the receiving waters:
 - (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
 - (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, habitats or ecology;
 - (f) any visible bacterial and/or fungal growths; and
 - (g) an increase in temperature of more than 3.0 degrees Celsius.
6. THAT the consent holder shall operate and maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a discharge temperature measuring device and shall keep records of the discharge temperature during the exercise of this consent; such records to be made available to the General Manager, Taranaki Regional Council, upon request.

TRK992050

7. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this 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 31 May 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

DIRECTOR—RESOURCE MANAGEMENT

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

Name of
Consent Holder: Taranaki By-Products Limited
PO Box 172
Hawera 4640

Decision Date
(Change): 21 January 2015

Commencement Date
(Change): 21 January 2015 (Granted: 31 May 1999)

Conditions of Consent

Consent Granted: To take up to 2,160 cubic metres/day (50 litres/second) of water from the Inaha Stream for a rendering operation

Expiry Date: 1 June 2019

Review Date(s): June 2017

Site Location: Kohiti Road, Okaiawa

Legal Description: Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457
(Site of take)

Grid Reference (NZTM) 1701884E-5624101E

Catchment: Inaha

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

General conditions

- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That 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) That 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. That the means of taking water shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 2. That a minimum flow of at least 25 litres/second shall be maintained in the stream at all times downstream of the point of abstraction.
- 3. That the consent holder shall install and operate to the satisfaction of the Chief Executive, Taranaki Regional Council, an abstraction rate measuring device and shall keep records of the dates and daily quantities of water abstracted during the exercise of this consent; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.
- 4. That the consent holder shall to the satisfaction of the Chief Executive, Taranaki Regional Council, monitor and keep daily records of the flows in the Inaha Stream at the Kohiti Road Bridge; such records to be made available to the Chief Executive, Taranaki Regional Council, upon request.
- 5. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this 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 21 January 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA 4640

Change To
Conditions Date: 9 November 2009 [Granted: 15 December 1999]

Conditions of Consent

Consent Granted: To discharge up to 1400 cubic metres/day of treated wastewater from a rendering operation and from a farm dairy via spray irrigation onto and into land, and to discharge emissions into the air, in the vicinity of the Inaha Stream and its tributaries

Expiry Date: 1 June 2019

Review Date(s): June 2011, June 2014, June 2017

Site Location: Kohiti Road, Okaiawa

Legal Description: Existing areas: Lot 1 DP 6457 Pt Sec 93 Blk IV Waimate SD [factory site], Lot 1 DP 378038, Pt Sec 93 Lots 2 & 3 DP 6457 Ngatimanuhiakai 17B2 17A2 17A3 Sec 88 Pt Sec 90 Lot 1 DP 10174 Lot 1 DP 11864 Pt Secs 90 & 94 DP SO219 Pt Sec 8 Sec 9 Pt Sec 154 Pt Sec 87 & Sec 89 Lot 2 DP 10412 Sec 92 Ngatimanuhiakai 3B Pt Sec 149 Ngatimanuhiakai 17B1 Lots 1 & 2 DP 4415 Sec 151 Blk IV Waimate SD

New areas:

Ngatimanuhiakai 3A Blk IV Waimate SD, Ngatimanuhiakai 2A & 2B Blk, Ngatimanuhiakai 4A Blk IV Waimate SD, Ngatimanuhiakai 10A2 Blk IV Waimate SD, Lot 1 DP 5153 Sec 86 Blk Waimate SD, Lot 1 DP 10412 Lot 2 DP 11864 Pt Sec 94 Blk IV Waimate SD, Ngatimanuhiakai 7C1 Blk IV Waimate SD [between the following points; NW (1700589E-5625245N), NE (1700909E-5625245N), SW (1700631E-5625092N), SE (1700921E-5625046N)]

Catchment: Inaha

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

Consent 3941-2

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

Condition 1 – new

1. The discharge authorised by this consent shall only occur on the land shown in the map labelled Figure 1 attached.

Conditions 2 to 12 [previously conditions 1 to 11] – unchanged

Management plan

2. Prior to the exercise of the consent, the consent holder shall provide, and subsequently shall maintain, a spray irrigation management plan, to the approval of the Chief Executive, Taranaki Regional Council, outlining the management of the system, which shall demonstrate ability to comply with consent conditions and shall address the following matters:
 - a) designated application areas;
 - b) selection of appropriate irrigation methods for different types of terrain;
 - c) application rate and duration;
 - d) application frequency;
 - e) farm management and operator training;
 - f) soil and herbage management;
 - g) prevention of runoff and ponding;
 - h) minimisation and control of odour effects offsite;
 - i) operational control and maintenance of the spray irrigation system;
 - j) monitoring of the effluent [physicochemical];
 - k) monitoring of soils and herbage [physicochemical];
 - l) monitoring of groundwater beneath the irrigated area [physicochemical];
 - m) monitoring of drainage water downslope of the irrigated area [physicochemical];
 - n) monitoring of Inaha Stream and relevant tributaries;
 - o) remediation measures;
 - p) liaison with submitters to the consent, and interested parties;
 - q) reporting monitoring data;
 - r) procedures for responding to complaints; and
 - s) notification to the Council of non-compliance with the conditions of this consent.

Consent 3941-2

An objective of the plan shall be to maximise discharges to land and to minimise discharges to surface water under consent 2049.

3. The consent shall be exercised in accordance with the procedures set out in the spray irrigation management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and other matters specified in the management plan, except by the specific agreement of the Chief Executive, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. The spray irrigation management plan described in special condition 2 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council. Further, the consent holder shall review the spray irrigation management plan annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 May each year.
5. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the spray irrigation system. The officer shall be regularly trained on the content and implementation of the spray irrigation management plan, and shall be advised immediately of any revision or additions to the spray irrigation management plan.
6. 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 the adverse effects of the discharges on the environment. This shall include, but not be limited to the minimisation of total nitrogen concentration in the treated effluent.
7. In circumstances where spray irrigation of wastewater is not possible, and where a dilution rate of 1:200 in the Inaha Stream cannot be maintained, the consent holder shall seek the permission of the Chief Executive, Taranaki Regional Council, prior to discharging wastewater to the Inaha Stream.

Odour and spray effects

8. The level of dissolved oxygen within the wastewater pond from which irrigation water is drawn shall be maintained above 1.0 gm^{-3} at all times.
9. There shall be no offensive or objectionable odour as a result of the irrigation of treated wastewater at or beyond the boundary of the property or properties on which spray irrigation is occurring.
10. There shall be no spray drift as a result of the irrigation of treated wastewater at or beyond the boundary of the property or properties on which spray irrigation is occurring.

Consent 3941-2

Land effects

11. The sodium adsorption ratio [SAR] of the wastewater shall not exceed 15.
12. There shall be no ponding of wastewater, and/or any direct discharge to a watercourse due to the exercise of this consent.

Condition 13 [previously condition 12 - changed]

13. The edge of the spray zone shall be at least:
 - a) 25 metres from the banks of any watercourse;
 - b) 50 metres from any bore, well or spring used for water supply purposes;
 - c) 20 metres from any public road, except as detailed in f) and g) of this condition;
 - d) 20 metres from any property boundary;
 - e) 150 metres from any dwellinghouse or place of public assembly unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance;
 - f) 200 metres from Normanby Road adjacent to the property described as Lots 3 & 4, Pt Lot 1 DP 2707, Lot 1 DP 3731, Blk IV, Waimate SD, unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance; and
 - g) 50 metres from Ahipaipa Road adjacent to the properties described as Pt Lot 1 and Lot 2 DP 3322, Lot 2 DP12129, Blk IV, Waimate SD.

Conditions 14 to 26 [previously conditions 13 to 25] – unchanged

14. The effluent application rate shall not exceed 300 kg nitrogen/hectare/year except on land described as Pt Sec 154 Blk IV Waimate SD, where the effluent application rate shall not exceed 200 kg/nitrogen/hectare/year.
15. The consent holder shall investigate, and report in writing on, options for upgrading the wastewater treatment system to reduce the concentration of ammonia in the wastewater prior to discharge; the report to be received by the Chief Executive, Taranaki Regional Council, not later than twelve months from the date the consent is granted. Any necessary works associated with the report on reduction of ammonia concentrations shall be completed within twelve months after the receipt of the report.
16. The average application rate shall not exceed 5 mm/hour.
17. The return period between applications shall be at least seven days and the application depth shall not exceed 25 mm at each application.

Monitoring and liaison

18. The consent holder shall site, install and maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, a minimum of nine monitoring bores for the purpose of determining groundwater quality in the vicinity of the discharge. The bores are to be sited in the following locations: upslope of the Kohiti Road and Katotauru Road irrigation areas (2), at the southern boundary of the western Normanby Road irrigation area (2), within the Normanby Road, Kohiti Road and Katotauru Road irrigation areas (3), at the southern boundary of the Katotauru irrigation area, and at the southern boundary of the Ahipaipa Road irrigation area. The spring downslope of the Normanby Road irrigation area, and three bores in the vicinity of Inuawai Road shall also be monitored.
19. The consent holder shall undertake such baseline and operational monitoring of the activities licensed by this consent, as deemed reasonably necessary by the Chief Executive, Taranaki Regional Council.
20. The consent holder and staff of the Regional Council shall meet as appropriate, quarterly or at such other frequency as the parties may agree, with representatives of Ngati Manuhiakai Hapu and other interested submitters to the consent, and any other interested party at the discretion of the Chief Executive, Taranaki Regional Council, to discuss any matter relating to the exercise of the resource consent, in order to facilitate ongoing consultation.
21. The consent holder shall, where practicable, advise the Chief Executive, Taranaki Regional Council, and representatives of Ngati Manuhiakai Hapu, prior to discharge to Inaha Stream under consent 2049.

Mitigation

22. Should monitoring of the discharge under conditions 14 and 18 indicate contamination of local groundwater as a result of the exercise of this consent, the consent holder shall:
 - a) undertake appropriate remedial action as soon as practicable as described in the spray irrigation management plan prepared under condition 2, or such action reasonably required by the Chief Executive, Taranaki Regional Council;
 - b) shall review the spray irrigation management plan and incorporate such reasonable modifications as are considered necessary by the Chief Executive, Taranaki Regional Council; and
 - c) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the Chief Executive, Taranaki Regional Council.

Review

23. The consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring.

Consent 3941-2

24. The Taranaki Regional Council may review conditions 7 and 14 of this consent within two weeks after the completion of works to be investigated under condition 15 of this consent, for the purpose of evaluating the appropriateness of the required dilution rate and application rate, and the effects of the discharge on the Inaha Stream and soil.
25. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2001, and/or June 2007, for the purpose of assessing the need to increase the land area for wastewater disposal, reduce nitrogen loading to land and/or increase treatment at the wastewater treatment system to reduce the nitrogen concentration of the effluent.
26. The Taranaki Regional Council may, pursuant to section 128 of the Resource Management Act 1991, review any or all of the conditions of this consent by giving notice of review during June 2001, June 2003, June 2005, June 2007, June 2009, June 2011, June 2014 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at that time.

Signed at Stratford on 9 November 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

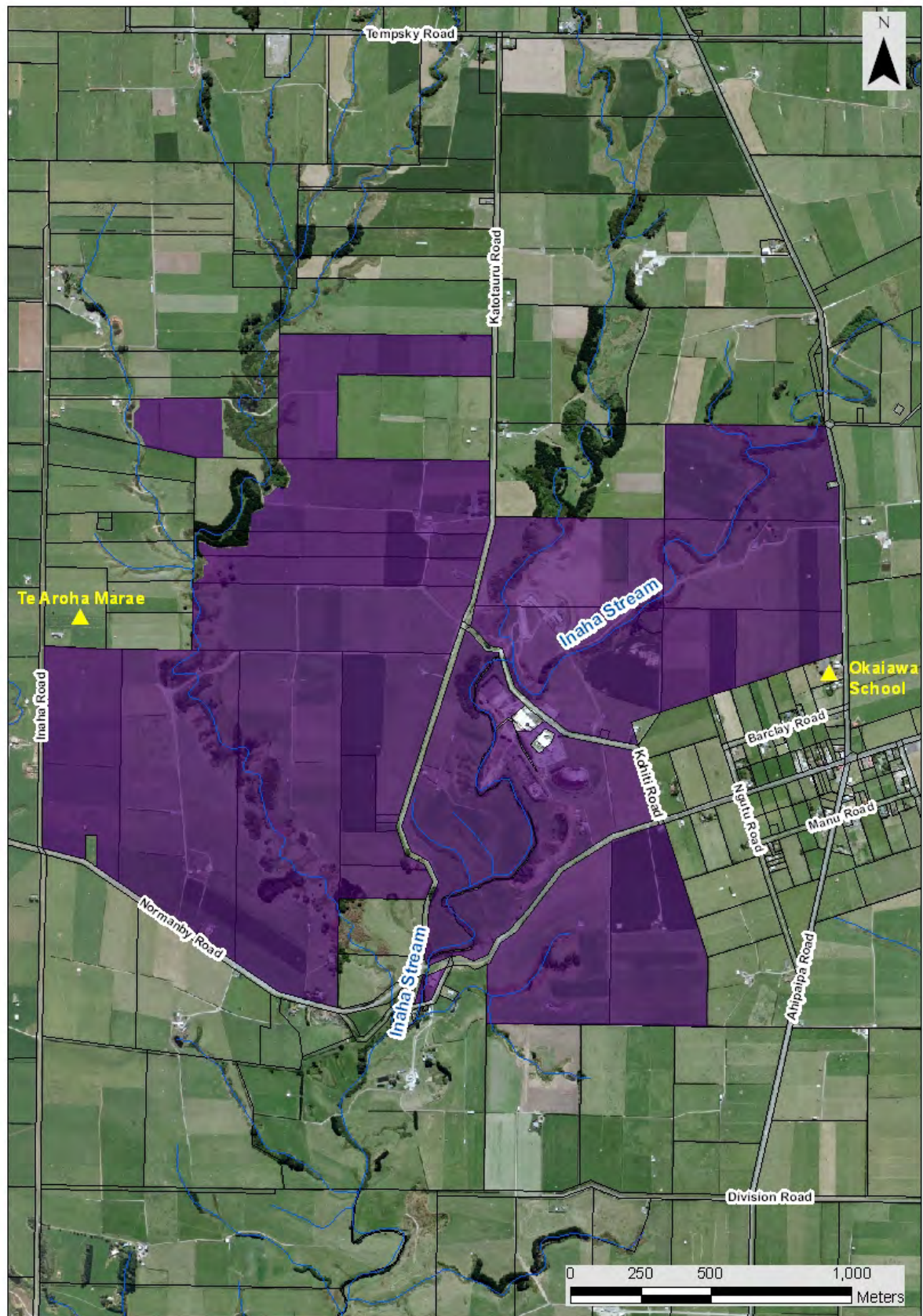


Figure 1 Location of the authorised area to receive wastewater, via spray irrigation, onto and into land

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA 4640

Decision Date: 11 October 2011

Commencement
Date: 11 October 2011

Conditions of Consent

Consent Granted: To discharge emissions into the air from rendering operations and associated processes including wastewater treatment at or about (NZTM) 1701965E-5624119N and burial of material at or about (NZTM) 1702416E-5624339N

Expiry Date: 1 June 2024

Review Date(s): June 2013, June 2015, June 2017,
June 2019, June 2021, June 2023

Site Location: Kohiti Road, Okaiawa

Legal Description: Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457, Lot 1 DP 6457 Blk IV Waimate SD, Lot 1 DP 410593 [TBE], Lot 1 DP 10174 Lot 1 DP 11864 Sec 88 Pt Sec 90 Blk IV Waimate SD

*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 to section 36 of the Resource Management Act.

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 actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
2. The discharge authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

Note: With respect to this condition, the consent holder's site is defined as the areas shown in the map attached.

3. For the purposes of condition 2, an odour shall be deemed to be offensive or objectionable if:
 - a. it is held to be so in the opinion of an enforcement officer of the Taranaki Regional Council, having regard to the duration, frequency, intensity and nature of the odour; and/or
 - b. an officer of the Taranaki Regional Council observes that an odour is noticeable, and either it lasts longer than two (2) hours continuously, or it occurs frequently during a single period of more than four (4) hours; and/or
 - c. no less than two individuals from at least two different properties, each declare in writing that an objectionable or offensive odour was detected beyond the boundary of the site, provided the Council is satisfied that the declarations are not vexatious and that the objectionable or offensive odour was emitted from the site at the frequency and duration specified in (b). Each declaration shall be signed and dated and include:
 1. the individuals' names and addresses;
 2. the date and time the objectionable or offensive odour was detected;
 3. details of the duration, frequency, intensity and nature of the odour that cause it to be considered offensive or objectionable;
 4. the location of the individual when it was detected; and
 5. the prevailing weather conditions during the event.
4. The consent holder shall continue to employ a suitably qualified and experienced person in the role of Environmental Manager, whose responsibilities shall include ensuring compliance with the conditions of this consent.
5. No fish or fish parts shall be received or processed on the premises.

Consent 4058-4

6. By 30 April 2013, and every two years thereafter, the consent holder shall provide certification by a suitably qualified independent person that the works, processes and equipment relevant to all discharges to air from the site are operational in accordance with good engineering practice.
7. Before 2 February 2012, the consent holder shall prepare an Air Discharge Management Plan for the site that, to the satisfaction of the Chief Executive of the Taranaki Regional Council, details how discharges to air from the site will be managed to ensure compliance with conditions of this consent. The plan shall include but not necessarily be limited to;
 - a. A description of the air quality objectives sought by the plan;
 - b. The identification of key personnel responsible for managing air discharges and implementing the Management Plan;
 - c. A description of the activities on the site and the main potential sources of odour emissions;
 - d. A description of storage and treatment procedures (including specification of storage times and preservative dosing concentrations) for ensuring that only high quality raw material is processed;
 - e. The identification and description of the odour and dust mitigation measures in place;
 - f. The identification and description of relevant operating procedures and parameters that need to be controlled to minimise emissions;
 - g. A description of contingency procedures for addressing situations, such as equipment failure or spillage of raw material or chemicals, which could result in a discharge to air of odorous emissions that are offensive or objectionable beyond the boundary of the plant;
 - h. A description of monitoring and maintenance procedures for managing the odour mitigation measures including record keeping of control parameters and maintenance checks; and
 - i. Details of staff training proposed to enable staff to appropriately manage the odour mitigation measures.
8. Operations on site shall be undertaken in accordance with the Air Discharge Management Plan, required by condition 7 above.
9. The Air Discharge Management Plan described in special condition 7 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council. Further, the consent holder shall review the management plan annually and provide the reviewed plan to the Taranaki Regional Council, by 31 May each year.

Consent 4058-4

10. The discharges authorised by this consent shall not give rise to suspended or deposited dust at or beyond the boundary of the site that, in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable. For the purpose of this condition, discharges in excess of the following limits are deemed to be offensive or objectionable:
 - a. dust deposition rate $0.13 \text{ g/m}^2/\text{day}$; and/or
 - b. suspended dust level 3 mg/m^3 .
11. The consent holder shall consult and inform the local community about activities on the site, specifically those relating to the exercise of this consent, by:
 - a. Four times per year, providing a newsletter to all landowners and/or occupiers of properties within 3 kilometres of the site; and
 - b. Convening a meeting with the Director - Resource Management, Taranaki Regional Council (or their delegate), and the local community annually or at such other frequency as the parties may agree.
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 2013 and/or every two years thereafter. The purpose of any review would be to ensure 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. When determining if any review is required the Council will take into account any expressed views of the Okaiawa community.

Signed at Stratford on 11 October 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

TRK995426

DISCHARGE PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991
a resource consent is hereby granted by the
Taranaki Regional Council**

Name of
Consent Holder: TARANAKI BY-PRODUCTS LIMITED
PO BOX 172 HAWERA

Consent
Granted Date: 31 May 1999

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO 1,095 LITRES/SECOND OF
STORMWATER FROM AN ANIMAL RENDERING SITE INTO
AN UNNAMED TRIBUTARY OF THE INAHA STREAM AT OR
ABOUT GR: Q21:119-858, Q21:120-858 AND Q21:121-858

Expiry Date: 1 June 2019

Review Date[s]: June 2001, June 2003, June 2005, June 2011 and June 2017

Site Location: KOHITI ROAD OKAIAWA

Legal Description: LOTS 1 & 2 DP6457 BLK IV WAIMATE SD

Catchment: INAHA 351.000

Tributary: UNNAMED TRIBUTARY

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

TRK995426

General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That 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) That 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. THAT the consent holder shall advise the Taranaki Regional Council prior to making any change in the processes undertaken at the site which could significantly alter the nature of the discharge.
2. THAT the discharge shall not exceed the following parameters:

<u>Component</u>	<u>Concentration</u>
pH range	6-9
oil and grease	15 gm ⁻³
suspended solids	100 gm ⁻³

This condition shall apply prior to the entry of the discharge into the receiving water at designated sampling point[s] approved by the General Manager, Taranaki Regional Council.

3. THAT after allowing for reasonable mixing, within a mixing zone extending 45 metres from the confluence of the unnamed tributary with the Inaha Stream, the discharge [in conjunction with any other discharges pertaining to the same property], shall not give rise to any of the following effects in the receiving waters:
 - (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 freshwater unsuitable for consumption by farm animals;
 - (e) any significant adverse effects on aquatic life, habitats or ecology; and
 - (f) any visible bacterial and/or fungal growths.
4. THAT within three months of the granting of this consent, the consent holder shall prepare a contingency plan outlining measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

TRK995426

5. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this 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 31 May 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

DIRECTOR—RESOURCE MANAGEMENT

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA

Change To
Conditions Date: 4 August 2000 [Granted: 30 March 2000]

Conditions of Consent

Consent Granted: To discharge up to 200 tonnes/day of wastes from meat rendering operations by burial into land in the vicinity of the Inaha Stream at or about GR: Q21:121-859

Expiry Date: 1 June 2019

Review Date(s): June 2001, June 2003, June 2005, June 2011, June 2017

Site Location: Kohiti Road, Okaiawa

Legal Description: Lot 1 DP 10174 Lot 1 DP 11864 Sec 88 Pt Sec 90 SO 268
Blk IV Waimate SD

Catchment: Inaha

Consent 5495-1

General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That 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) That 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

special condition 1 [amended]

1. THAT by 1 November 2000, the consent holder shall provide a waste burial management plan, to the approval of the General Manager, Taranaki Regional Council, outlining the management of the system, which shall demonstrate ability to comply with consent conditions and shall address the following matters:
 - a) nature of wastes discharged;
 - b) discharge control;
 - c) waste cover;
 - d) addition of hydrated lime to stabilise the wastes;
 - e) minimisation and control of odour effects offsite;
 - f) stormwater control;
 - g) leachate management;
 - h) monitoring of groundwater beneath the burial area [physicochemical];
 - i) site re-instatement and after care (including maintaining the integrity of the cover material);
 - j) site contouring;
 - k) reporting monitoring data;
 - l) procedures for responding to complaints; and
 - m) notification to the Council of non-compliance with the conditions of this consent.

special conditions 2-5 [unchanged]

2. THAT the consent shall be exercised in accordance with the procedures set out in the waste burial management plan, and the consent holder shall subsequently adhere to and comply with the procedures, requirements, obligations and other matters specified in the management plan, except by the specific agreement of the General Manager, Taranaki Regional Council. In case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
3. THAT the waste burial management plan described in special condition 1 of this consent shall be subject to review upon two months notice by either holder the Taranaki Regional Council.
4. THAT the consent holder shall designate an officer with the necessary qualifications and/or experience to manage the waste burial site. The officer shall be regularly trained on the content and implementation of the burial management plan, and shall be advised immediately of any revision or additions to the burial management plan.

Consent 5495-1

5. THAT the disposal pit[s] shall not intercept shallow groundwater.

special conditions 6 – 7 [amended]

6. THAT the disposal pits shall be constructed when required in general accordance with the information supplied by the applicant in support of application 1084.
7. THAT the consent holder shall notify the Council of the commencement to construct additional disposal pits outside of the disposal area indicated in the map supporting the application.

special condition 8 [unchanged]

8. THAT an officer of the Council is to inspect all constructed disposal pits prior to disposal operations.

special condition 9 [amended]

9. THAT special conditions 1 to 4 shall apply after 1 November 2000 when the disposal pit required by special condition 6 is constructed and also for all subsequent disposal pits.

special conditions 10 – 15 [unchanged]

10. THAT the discharged material shall be covered within a period of four hours or less so as to avoid the generation of offensive offsite odours.
11. THAT at the completion of the disposal operation a low permeability, clean, compacted soil cover with a minimum thickness of 1.0m be placed over the discharged wastes.
12. THAT the cover material and surrounding land shall be contoured such that all stormwater is directed away from the disposal area to the satisfaction of the General Manager, Taranaki Regional Council.
13. THAT the disposal site shall be rehabilitated and pasture re-established to the satisfaction of the General Manager, Taranaki Regional Council.
14. THAT there shall not be any irrigation of effluent under resource consent 3941 or resource consent 2466 onto the disposal area.
15. THAT the exercise of this consent shall not lead, or be liable to lead, to a direct discharge of contaminants to a surface water body.

special condition 16 [amended]

16. THAT the consent holder shall install and maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a minimum of eight monitoring bores for the purpose of determining groundwater quality in the vicinity of the discharge.

Consent 5495-1

special condition 17-18 [unchanged]

17. THAT the consent holder may apply to the Council for a change or cancellation of any of the conditions of this consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the resources of monitoring.
18. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001, June 2003, June 2005, June 2011 and/or June 2017, 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 consent, which was 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 4 August 2000

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
 P O Box 172
 HAWERA

Consent Granted 4 October 2004
Date:

Conditions of Consent

Consent Granted: To erect, place and maintain two culverts in the Inaha
 Stream for farm access purposes at or about GR:
 Q21:121-860 and Q21:125-863

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Kohiti Road, Hawera

Legal Description: Secs 89 & 90 Blk IV Waimate SD

Catchment: Inaha

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 resource consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3271. In the case of any contradiction between the documentation submitted in support of application 3271 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation 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 river bed or discharges to water.
4. Once initial work is complete, any further instream works shall take place only between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
5. The consent holder shall 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 riverbed and any adverse effects on water quality.
6. The consent holder shall ensure the area and volume of riverbed disturbance shall, so far as practicable, be minimised and any areas which are disturbed shall, so far as practicable, be reinstated.
7. The structures authorised by this consent shall be removed and the area reinstated, if and when the structures are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to removal and reinstatement.
8. The structures which are the subject of this consent shall not restrict the passage of fish.

Consent 6431-1

9. The consent holder shall prevent stock at all times from accessing all water bodies, including wetlands, on or bordering the consent holder's property, upstream of Kohete Road bridge, by constructing and maintaining fences or other controls, located to provide for the establishment of riparian margins; such means of prevention to be established within four years of the granting of this consent.
10. The consent holder shall undertake planting and subsequent maintenance of the riparian margins of the water bodies within the fenced or controlled area(s) as required by special condition 9, to the satisfaction of the Chief Executive, Taranaki Regional Council, within four years of the granting of this consent, for the purpose of enhancing water quality and aquatic habitat.
11. The invert of the culverts shall be not less than 50 mm below the bed of the stream. Appropriate headwall structures shall be constructed to protect the intake and outlet of the culverts from erosion.
12. 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.
13. 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, 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 4 October 2004

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA

Consent Granted
Date: 12 March 2008

Conditions of Consent

Consent Granted: To realign a section of approximately 350 metres of the
Inaha Stream for land improvement purposes at or about
2612637E-6186381N

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: 533 Ahipaipa Road, Okaiawa

Legal Description: Sec 89 Blk IV Waimate SD Lot 2 DP 10412 Pt Sec 87 Blk
IV Waimate SD

Catchment: Inaha

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 exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4881. In the case of any contradiction between the documentation submitted in support of application 4881 and the conditions of this consent, the conditions of this consent shall prevail.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
3. A rock wall consisting of interlocking boulders of an average diameter of at least 1 metre shall be constructed on the outside of the bend at the downstream end of the realignment to protect that bank from erosion. The rock wall and bank over this reach shall be no steeper than 2 horizontal to 1 vertical.
4. Any instream works shall take place only between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki region*, by the Taranaki Regional Council, will achieve compliance with this condition.

Consent 7234-1

7. Immediately before water is diverted away from the existing stream channel the consent holder shall ensure that fish are removed from the channel to be dewatered and released to a reach with suitable habitat. Fish to be removed shall be captured using electric fishing, or other accepted fish capture techniques that achieve similar results.
8. The stream realignment shall not obstruct fish passage.
9. Any vegetation removed during the realignment shall not be buried within 25 metres of the Inaha Stream.
10. 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.
11. 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, 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 12 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA

Consent Granted
Date: 30 June 2008

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks associated with the re-contouring of land and the re-aligning of a section of the Inaha Stream onto and into land and into the Inaha Stream at or about (NZTM) 1702455E-5624812N

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: 533 Ahipaipa Road, Okaiawa

Legal Description: Sec 89 & Lot 2 DP 10412 Pt Sec 87 Blk IV Waimate SD

Catchment: Inaha

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 exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6022. If there is any conflict between the documentation submitted in support of application 6022 and the conditions of this consent, the conditions of this consent shall prevail.
2. The discharge shall not derive from an area of soil disturbance greater than 8 hectares.
3. The discharge shall not derive from a volume of soil disturbance greater than 24, 000 cubic metres.
4. While any area of soil is exposed, all run off from that area shall pass through settlement ponds or sediment traps with a minimum total capacity of 200 cubic metres for every hectare of exposed, unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.
5. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

Subject to condition 2, undertaking work in accordance with *Guidelines for Earthworks in the Taranaki region*, by the Taranaki Regional Council, will achieve compliance with this condition.

6. At least 7 working days prior to the commencement of works the consent holder shall provide the Taranaki Regional Council with a programme for the proposed works, including: a schedule of proposed start dates and an estimation of the duration of the works, and details of the contractor including contact information for the project manager. The programme shall be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.

Consent 7329-1

7. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.
8. In the event of any archaeological site or koiwi being encountered during the exercise of this consent, activities in the vicinity of the discovery shall cease. The consent holder shall contact the Chief Executive, Taranaki Regional Council, to obtain details of the relevant iwi authority. The consent holder shall then consult with the relevant local iwi, the New Zealand Historic Places Trust and the New Zealand Police and shall not recommence works in the area of the discovery until the relevant Historic Places Trust approvals or other approvals to damage, destroy or modify such sites have been obtained, where necessary.
9. This consent shall lapse 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.
10. 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 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 30 June 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
P O Box 172
HAWERA 4640

Decision Date: 3 February 2014

Commencement Date: 3 February 2014

Conditions of Consent

Consent Granted: To take and use groundwater for industrial water supply purposes

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023

Site Location: 179 Katotauru Road, Okaiawa

Legal Description: Ngatimanuhiakai 2B (Site of take & use)

Grid Reference (NZTM) 1701636E-5624804N

Catchment: Inaha

*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 to section 36 of the Resource Management Act 1991.

Special conditions

1. The total volume of water taken from the 'Bore 3' (GND2380) at a rate not exceeding 22.8 litres per second (1,970 cubic metres per day)
2. The bore shall be easily identifiable by a permanent label, which may be welded or engraved on the casing, or on the equivalent fixed part of the well construction or associated building. The bore shall be labelled with the bore number assigned by Taranaki Regional Council - GND2380.
3. The consent holder shall ensure that there is access into the well that enables the manual measurement of static and pumping water levels.
4. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking (or a nearby site in accordance with Regulation 10 of the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time (in New Zealand Standard Time) and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

Note: Water meters and dataloggers 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 and dataloggers have a limited lifespan.

5. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):
 - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - (b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
- (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
- (iii) no less frequently than once every five years.

Consent 9756-1.0

6. Before exercising this consent, the consent holder shall install and subsequently maintain equipment to measure and record the water level within Bore 3 to an accuracy of ± 0.05 metres at intervals not exceeding 15 minutes.
7. The measurements made in accordance with condition 4 and 6 of this consent, shall be transmitted to the Taranaki Regional Council's computer system, in a format to be advised by the Chief Executive, Taranaki Regional Council, to maintain a 'real time' record of the water taken and bore water levels. The records of water taken and the water level within each bore shall:
 - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
 - (b) specifically record the water taken as 'zero' when no water is taken.
8. The water meter, level monitoring device and datalogger shall be accessible to Taranaki Regional Council officer's at all reasonable times for inspection and/or data retrieval. The data logger shall be designed and installed so that Council officers can readily verify that it is accurately recording the required information.
9. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
10. At all times the consent holder shall adopt the best practicable option (BPO) to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater, including, but not limited to, the efficient and conservative use of water.
11. This consent shall lapse on 31 March 2019, 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 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 3 February 2014

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Taranaki By-Products Limited
PO Box 172
Hawera 4640

Decision Date: 21 January 2015

Commencement Date: 21 January 2015

Conditions of Consent

Consent Granted: To discharge emissions into the air from the burning of
pallets, paper and cardboard

Expiry Date: 01 June 2029

Review Date(s): June 2017, June 2023

Site Location: Kohiti Road, Okaiawa

Legal Description: Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457
(Discharge source & site)

Grid Reference (NZTM) 1701917E-5623971N

*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 and shall include as a minimum:
 - having regard to the prevailing and predicted wind speed and direction at the time of burning in order to minimise offsite effects;
 - allowing the waste material to dry before burning;
 - starting a small fire with the driest material and adding further material once it is blazing, as opposed to igniting a large stack and leaving it unattended.
2. The materials for combustion are restricted to untreated wood or sawdust, paper and cardboard.
3. There shall be no objectionable or offensive odour to the extent that it causes an adverse effect at or beyond the boundary of the site.

Note: For the purposes of this condition:

- The site is defined as Lot 3 DP 378038 Lot 2 DP 410593 Lots 2-3 DP 6457; and
 - Assessment under this condition shall be in accordance with the *Good Practice Guide for Assessing and Managing Odour in New Zealand, Air Quality Report 36, Ministry for the Environment, 2003.*
4. The consent holder, or an authorised agent, shall supervise burning at all times.
 5. The dust deposition rate beyond the property boundary arising from the discharge shall be less than 0.13 g/m²/day or 4.0 g/m²/30 days.
 6. Any discharge to air from the site shall not give rise to any offensive, objectionable, noxious or toxic levels of dust at or beyond the boundary of the property, and in any case, suspended particulate matter shall not exceed 3 mg/m³ (measured under ambient conditions) beyond the boundary of the site.
 7. The discharges authorised by this consent shall not give rise to a level of a contaminant or contaminants at or beyond the boundary of the site that is noxious or toxic.
 8. This consent shall lapse on 31 March 2020, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 10054-1.0

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 of review during the month of 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 21 January 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

