

DH Lepper Trust (Piggery)
Monitoring Programme
Annual Report
2018-2019

Technical Report 2019-29

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Taranaki Regional Council
Private Bag 713
STRATFORD
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Executive summary

DH Lepper (the Trust) operates a 'farrow to finish' piggery breeding and fattening unit situated on Mountain Road Lepperton, in the Waiongana catchment. The facility includes a solids composting process and an anaerobic biogas digester that generates about half of the total electricity usage for the site. Effluent from the piggery is now largely irrigated to land, a recent innovation in effluent management on the site.

The Trust holds three consents-to abstract water from the Waiongana Stream, to discharge treated effluent to land and to the river during periods of high flows, and to discharge emissions to air.

During the monitoring period, D H Lepper Trust (piggery) demonstrated an overall high level of environmental performance.

Progress with the construction of the spray irrigation system was largely in accordance with the Implementation Plan submitted with the application for consent 0715-4.1 Discharging effluent to land had commenced mid-February 2018, starting at the north western blocks near the oxidation ponds.

For the 2018-2019 period, record of pig numbers and effluent discharges were provided, as required. The piggery size and number of 50 kg equivalents remain mainly unchanged and met the consent limit.

The calculated volume of effluent discharged to Waiongana Stream was significantly lower than the previous two years, due largely to the commencement of irrigating treated effluent to land.

The Waiongana Stream flow rate was above the minimum rate required on each discharge occasion.

Overall the piggery effluent trends in terms of carbonaceous biochemical oxygen demand, conductivity and suspended solids, continue to show a decreasing concentration. Chloride has shown a slight increasing concentration, though more recent results suggest a slight plateau occurring. Conductivity and turbidity measurements appear to be stable over time.

Inspections of the piggery found the production facility and effluent treatment system to be operated in accordance with best practice, with no significant generation of odour off site.

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

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

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

This report includes recommendations for the 2019-2020 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 2018 to June 2019 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by DH Lepper (the Trust). The Trust operates a piggery situated on Mountain Road at Lepperton, in the Waiongana catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Trust that relate to discharges of treated piggery effluent to water and land within the Waiongana catchment, and the air discharge permit held by the Trust 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 Trusts use of water, land and air, and is the 16th combined annual report by the Council for the Trust.

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 Trust in the Waiongana 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 2019-2020 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

- a. The neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
- b. Physical effects on the locality, including landscape, amenity and visual effects;
- c. Ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;

- d. Natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- e. Risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

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

1.2 Process description

The Trust operates a 'farrow to finish' piggery breeding and fattening unit. The approximate weights and numbers of the pigs are shown in Table 1 and the location of the piggery, land and wastewater treatment system within the Lepperton Township are shown in Figure 1.

The pigs are housed in purpose-built sheds with controlled heating and ventilation systems that regulate the internal environment to optimise conditions for stock production.

A feed mill located on site mixes the majority of the piggery's food requirements with grains and feed supplements. Recycled local waste food supplies, including waste bread, waste sausages and chicken by-products from local suppliers, are mixed to produce a protein meal for the stock.

Table 1 Piggery composition as at 30 June 2019

Type of pigs	No of pigs	Average weight kg	Total weight kg	50 kg Equivalent pigs
Sows	402	162	65,124	1302
Light porkers (3 months)	1075	65	69,875	1397
Store pigs (2½ months)	425	44	18,700	374
Weaners (5 – 8 weeks)	1380	16	22,080	442
Total	3,282			3,516

Stock holding pens are washed down on a daily basis and the waste conveyed through pipes to a central collection tank. From this point, all waste material is channeled through a solids separator (contra shear screen) which provides primary treatment by separating out the solid component from the piggery slurry.

Solid waste is stored in three large bins prior to being mixed at a ratio 1:1 with sawdust. This mixture is then transferred to a large covered compost bunker where over a 40 day period it is aerated and heated to 70°C until well composted. The composting process elevates the temperature which kills harmful pathogens as well as helping to stabilise the product. The forced aeration provides oxygen for bacterial action. The final product is bagged and sold commercially as a soil conditioner.

After solids have been removed, the piggery wastewater drains to a liquids sump and is pumped to the inlet of the covered anaerobic pond.

Biogas is produced from the covered anaerobic pond digestive process and captured and stored beneath the plastic cover on the anaerobic pond. The biogas (approximately 200 m³ of gas daily) is compressed and forced through a hydrogen sulphide scrubber, powering a six-cylinder biogas engine that drives a 40 kilowatt generator, which generates half of the piggery's electricity needs.

Partially digested effluent from the covered anaerobic pond is gravity-fed via a pipeline directly to the off-site treatment ponds, approximately 1.5 km away. The ponds are located on the true left bank of the Waiongana Stream near Lepperton.

Bacteria present in the two off-site treatment ponds break-down the contents of the effluent further.

The consent holder discharges treated water from the final aerobic pond to land via spray irrigation or periodically during high river flows, into the neighbouring Waiongana Stream in compliance with the conditions of Consent 0715-4.1.

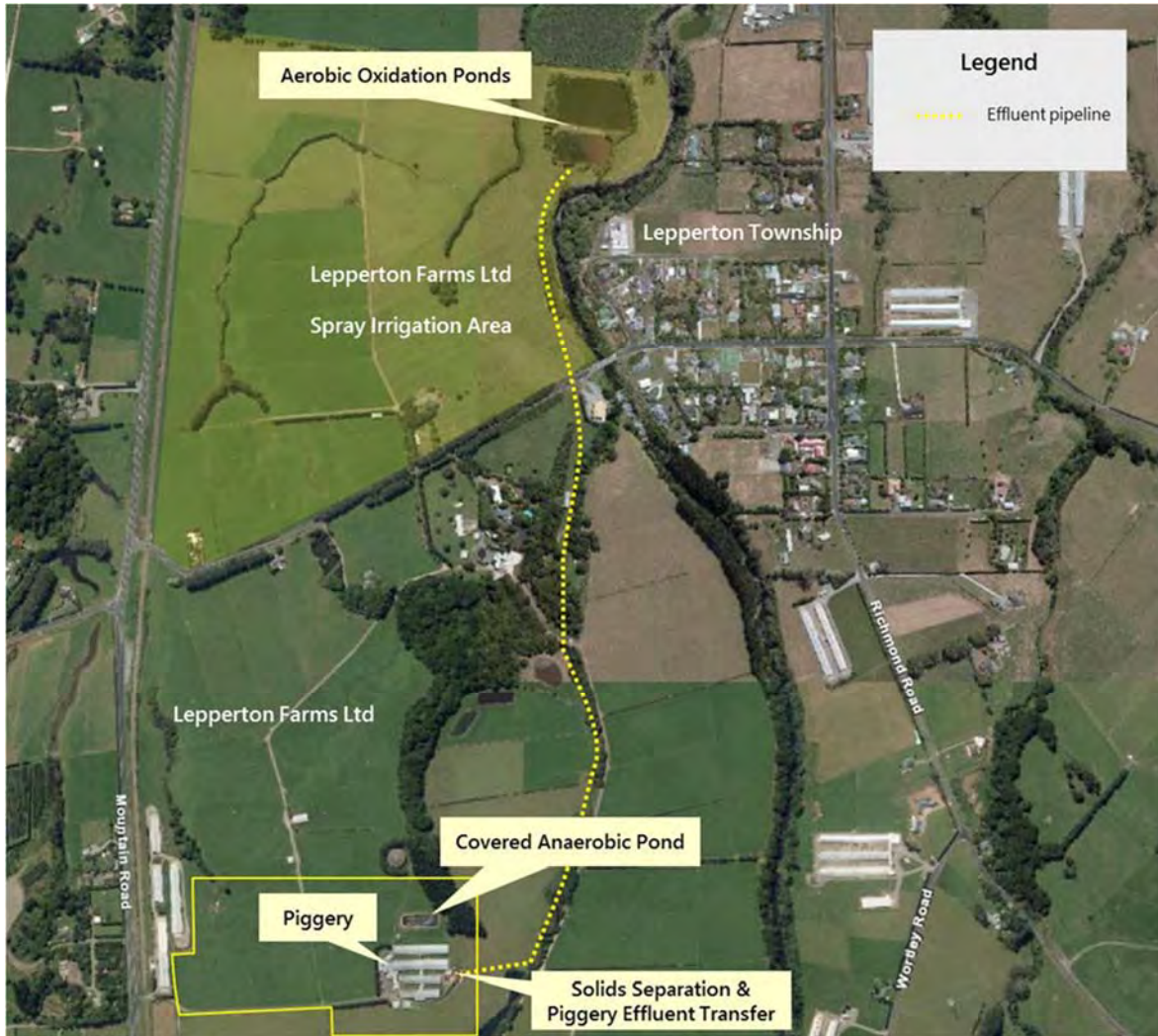


Figure 1 Location of DH Lepper Trust piggery, oxidation ponds, and Lepperton village

1.3 Resource consents

The Trust holds three resource consents, the details of which are summarised in the table below.

Table 2 Summary of consents held by the DH Lepper Trust piggery

Consent number	Purpose	Granted	Review	Expires
<i>Water Use Permits</i>				
0188-3	To take water from an unnamed tributary of the Waiongana Stream for piggery operation purposes.	9 Jan 2001	N/A	1 June 2020
<i>Discharge Permits</i>				
0715-4.1	To discharge treated piggery effluent from an oxidation pond system to land and into the Waiongana Stream during high flow conditions.	29 Sep 2015	June 2021	1 June 2026
5206-1	To discharge emissions to air from a piggery operation and associated practices.	29 Sep 2015	June 2020	1 June 2026

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 piggery consisted of three 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 inspections

The piggery site was visited four times during the monitoring period. With regard to consents for the discharge to water or land, 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. This included the commencement of the first stage of the spray irrigation to land, which required an Irrigation and Odour Management Plan prior to commencement. Sources of data being collected by the Trust 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

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

The piggery discharge was sampled on two occasions, and the samples analysed for conductivity, chloride, turbidity, suspended solids, BOD₅ (total carbonaceous) and temperature. The Waiongana Stream, upstream and downstream of the discharge point, was sampled on two occasions, and the samples analysed for conductivity, chloride, turbidity, suspended solids, BOD₅ (filtered carbonaceous), ammonia-N, DRP and temperature.

The locations of the water sampling locations are illustrated in Figure 7. Water quality sampling is generally performed by starting at the upstream monitoring site (WGA000361), followed by the piggery wastewater discharge (PGP002002), then sampling at the downstream monitoring site (WGA000363). Wastewater discharge samples are collected from the pond edge as near as possible to the discharge outlet.

2 Results

2.1 Water

2.1.1 Inspections

4 December 2018

The consent holder had notified the Council that the piggery was discharging treated wastewater into the Waiongana Stream. Samples were collected on a rising fresh when the river was approximately 9.5 m³/sec. The final pond discharge rate was estimated to be 14 L/s (0.014 m³/sec). No adverse environmental impacts were observed downstream from the discharge point due to the turbid stream conditions. Strong microbial activity was observed on both ponds due to the warmer weather conditions. A slightly noticeable odour was emanating from the ponds in an easterly direction but not noticeable beyond the farm boundary. The consent holder had kept the Council fully informed with the progress of the land irrigation programme. There was no noticeable off-site odour emanating downwind from the piggery ponds along Smith Street and Sisson Terrace (Lepperton township) whilst an odour survey was conducted. The consent holder was notified once samples were collected as the river level had started to drop quickly. A staff gauge was delivered and will be erected in the final pond near the irrigation pumps.

15 February 2019

Discussions were held in respect to the progress on the dual wastewater disposal system, whereby the land application system was in the process of being deployed. Council staff observed the series of hydrant type pumping points in each of the consent holder's paddocks, which will transfer the treated wastewater, from the holdings ponds across the consent holder's site. At the time, the staff on site were attempting to set an automatic pump cut off to the travelling irrigator in the event the irrigator finishes its irrigation run, or in a worst case scenario, the pump hose to the travelling irrigator fails. A trenching device, tasked with digging the trench associated with the irrigator pump lines was also observed. Discussions were also held in respect to the consented capacity in terms of the pigs on site, with the consent holder noting that this number is defined in the annual audit of stock undertaken each monitoring period, in May. The site wastewater ponds were observed, as was the pumping station.

The main piggery was then briefly observed, this included the main covered anaerobic pond which captures gases released from the decomposition of pig manure in a non-oxygen environment. The gas produced is then utilised by the facility to drive the gas powered generator associated with sterilising the pig feed. Noting that pig feed is composed of a variety of sources, one of these sources was observed during the inspections, whereby sausage meat was in the process of being unloaded from a truck for subsequent inclusion in the meal. The main holding pens were observed, as were the final product of pig manure, post composting and stabilisation for customer collection.

Waste water collection drains, swales and sumps were discharging to the final sump. No recent overflows were observed. The Waiongana Stream was running at a very low flow, 0.286 m³/sec at 1100 hrs NZST recorded at Waiongana SH3a (telemetry station).

The piggery treated effluent diffuser discharge pipe was clearly visible on the river bed. The treatment pond surfaces were flat, some microbial activity was noticeable on the first pond but little activity was observed on the final pond. Very light odour was emanating from off the ponds. No odour was noticed to be emanating downwind of the spray irrigator which was an encouraging sign that the anaerobic digester may be working in removing the odorous H₂S component (rotten egg type odour) from the gas stream. The nutrient balance, pump running hours and volume irrigated are yet to be determined.

2 May 2019

An inspection was carried out at the Trust's piggery to assess consent conditions. The effluent system appeared to be operating normally, with effluent being directed to the aerobic storage ponds on the dairy farm downstream of the Waiongana Stream Bridge. There were no odours in the immediate vicinity of the effluent ponds or beyond the boundary of the piggery. Compliance was achieved with all consent conditions that were inspected.

21 June 2019

The consent holder informed the Council they were discharging piggery effluent. The Waiongana Stream flow was recorded at 6.592 m³/sec at 1030 hrs. Water quality samples were collected on a receding fresh. River conditions recorded were moderate swift flow and turbid brown. The piggery discharge was estimated at 14 L/s, light brown in colour and nil odour was recognised from the sample bottle. The final pond level was normal showing adequate freeboard. Minimal microbial activity was displayed on both ponds due to lower temperatures. Very light odour was distinguishable around the pond perimeter although no odour was recognised around the Lepperton Township. Piggery effluent has recently been spray irrigated to pasture. An increase in the length of effluent irrigation line is to be installed when weather conditions improve. Waste water discharge to water records have been received by the Council.

2.1.2 Wastewater trends over time

Wastewater quality data recorded for the piggery treatment system between May 2011 and June 2018 have been summarised in the table below. This covers the period since dairy wastes were removed from the system.

Table 3 Summary of the treated wastewater analysis results from the DH Lepper Trust piggery, May 2011-June 2018 (conductivity @ 20°C) and June 2018 (conductivity @ 25°C)

Parameter	Unit	Number of samples	Range		Median
Conductivity @ 25°C (June 2018)	mS/m	3	245	340	294
Conductivity @ 20°C (2011-2018)	mS/m	25	212	313	274
pH	pH	25	7.6	8.3	8.0
Carbonaceous BOD ₅	gO ₂ /m ³	25	35	240	110
Ammoniacal nitrogen	g/m ³ N	17	84	294	201
Turbidity	NTU	24	0.59	180	115
Suspended solids	g/m ³	24	75	350	250
Chloride	g/m ³	24	190	475	282
Total nitrogen (N)	g/m ³ N	8	95.4	358	260
Total phosphorus (P)	g/m ³ P	8	50	70	56
Potassium (K)	g/m ³	8	192	306	240

Trends in various parameters are graphed in the following figures: Figure 2 – Figure 6.

A marked improvement in terms of median wastewater concentrations were apparent for carbonaceous BOD₅ (35% reduction) (Figure 2) and suspended solids (40% reduction) (Figure 5) following the removal of dairy wastes from the treatment system, although the concentrations for the parameters remain typical of piggery pond treated wastewater which is particularly high in nutrient levels.

For context with respect to these nutrient levels, sampling of the final aerobic pond wastewater discharge for nutrients was carried out on five separate occasions during 2013-2014 monitoring period. This was undertaken to evaluate the following nutrients: nitrogen (N), phosphorus (P) and potassium (K) when spray irrigation of effluent to land commenced.

The results from discharged wastewater indicated that the proposed annual loading to land at the time, would have been as follows: Total nitrogen (N) = 3,551 kg, phosphorus (P) = 764 kg and potassium (K) = 3,277 kg.

Given these tentative values and the proposed irrigation area of 41.7 Ha, the potential loading values indicate that the proposed land application of piggery effluent may be undertaken in a sustainable manner without over loading of key nutrients. However, the consent holder will undertake a land disposal options investigation, which will be provided to the Council in the 2020-2021 monitoring year. This will be in the form of a report. This investigation will seek to further assess feasibility options of the proposed land application development. This is further discussed in Section 2.1.5.

In terms of the average discharge volume, over the past ten years this was calculated to be 13,912 m³ per annum (276 actual discharge hours x 14 L/s discharge flow rate). If the current monitoring period discharge volume was compared to this average (10,294.2 m³), the volume discharged reduced by 26% when compared to the long term average. This reduction in part is due to the introduction of land based disposal.

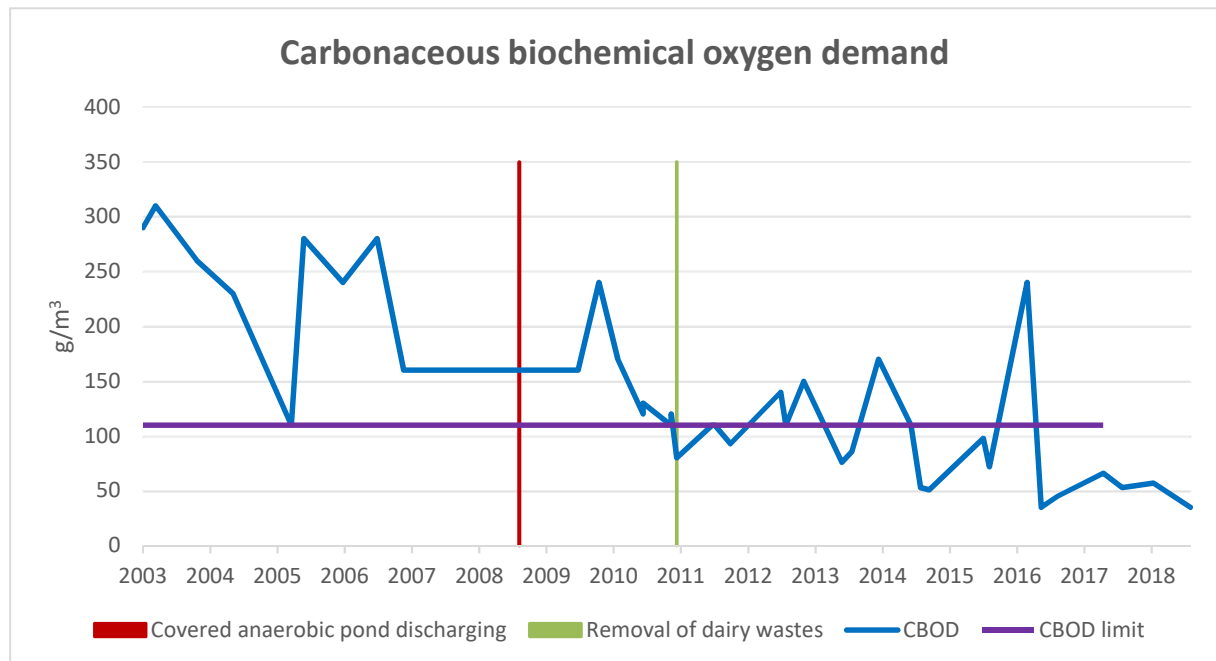


Figure 2 Wastewater carbonaceous biochemical oxygen demand levels, g/m³, 2003-2019

(Note that the CBOD level of 110 gm³ has recently been removed from the consent conditions)

Since the wastewater system upgrade in 2008 and the removal of dairy shed effluent in 2011 the observed CBOD concentrations in the discharge have been steadily decreasing. The odd spike, as seen in 2016 has been reported. Results from the 2018-2019 monitoring period indicate a decreasing concentration trend as shown in Figure 2.

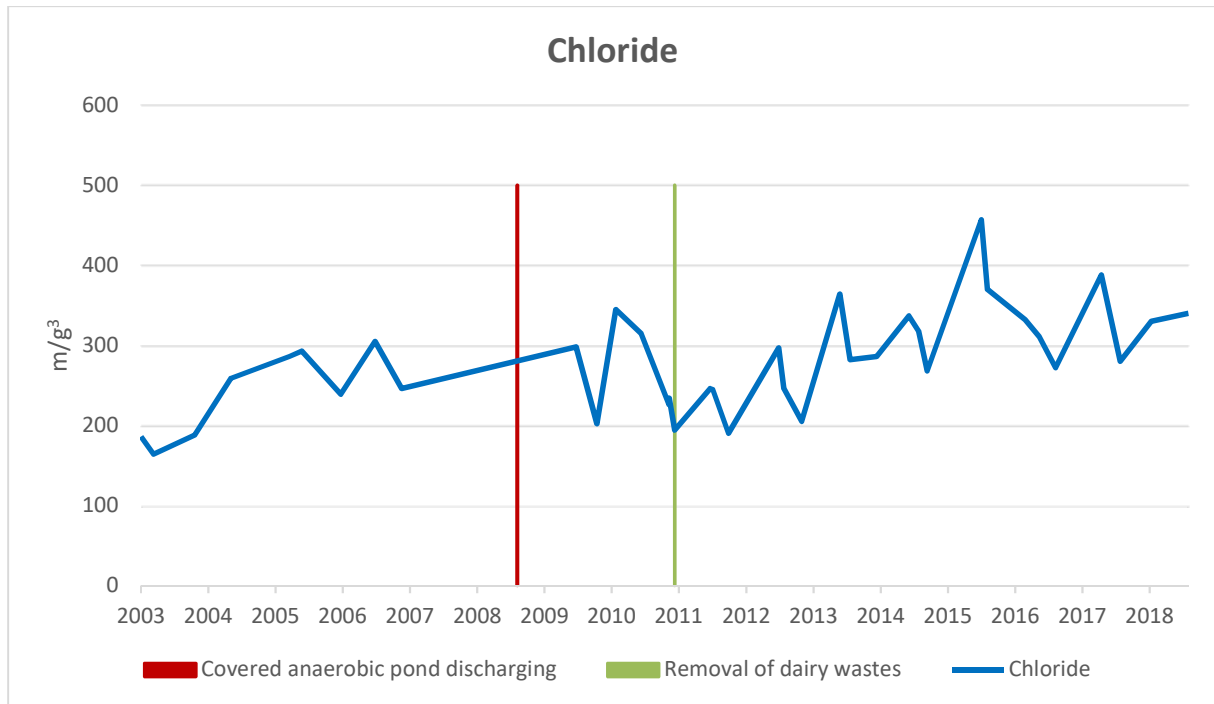


Figure 3 Wastewater chloride levels, g/m³, 2003-2019

Chloride levels (Figure 3) have since 2011 increased slightly. However, since the 2015-2016 monitoring period, the results may indicate a slight plateau in values. However, further analysis over time will allow a greater understanding of this analyte.

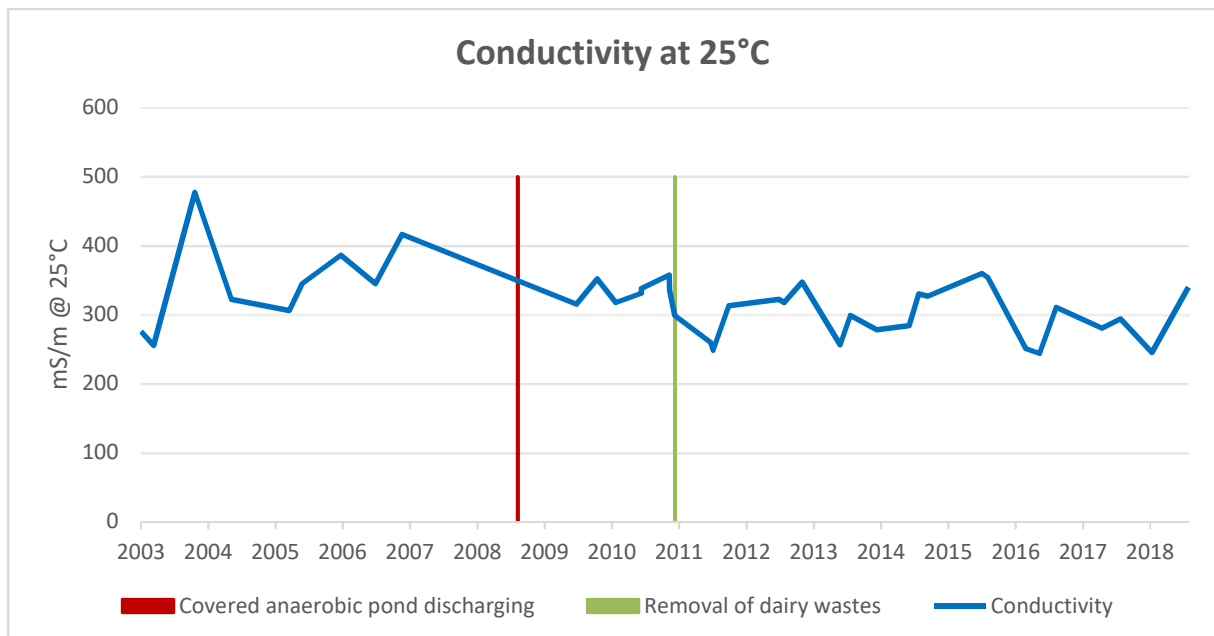


Figure 4 Wastewater conductivity measurements mS/m 2003-2019 at 25°C

Conductivity¹ measurements appear to be stable over time as observed in Figure 4.

¹ In June 2018 a change in laboratory provider occurred, resulting a slight change to the units used for conductivity. In this graph, the units mS/m at 25°C are used, and all previous results have been converted to this unit. Therefore, there may be differences between conductivity data presented in the current report when compared with reports prior to the 2018-2019 monitoring year.

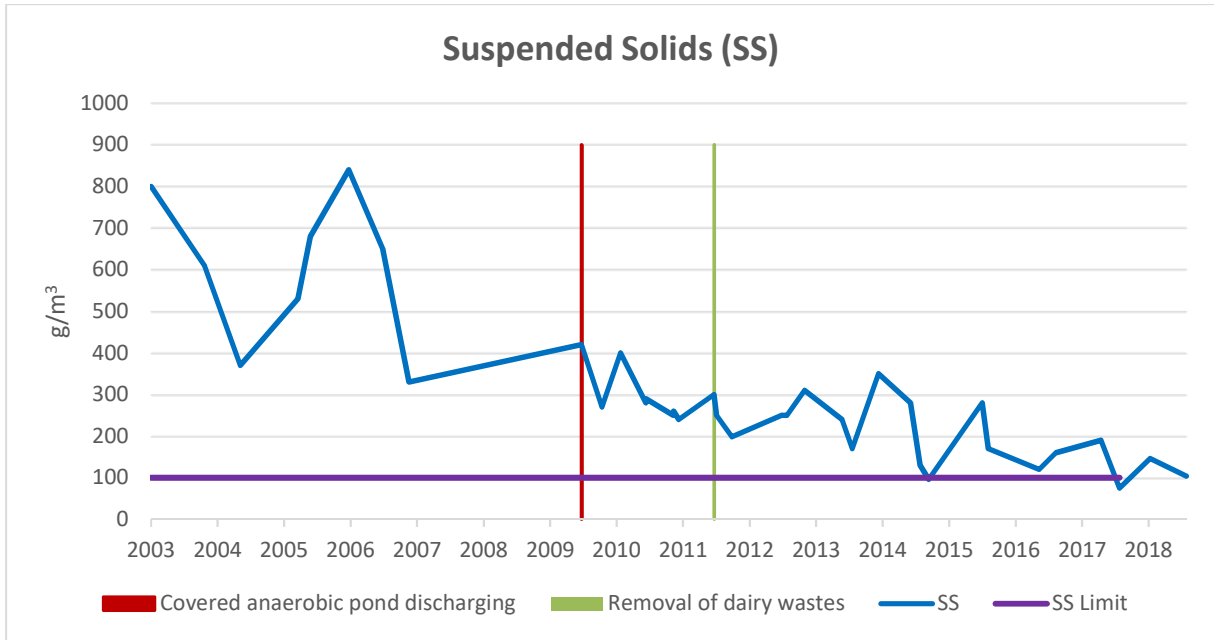


Figure 5 Wastewater suspended solids levels, g/m³, 2003-2019

(Note that the suspended solids limit of 100 g/m³ has recently been removed from the consent conditions)

Suspended solids (Figure 5) continue to show a decreasing concentration.

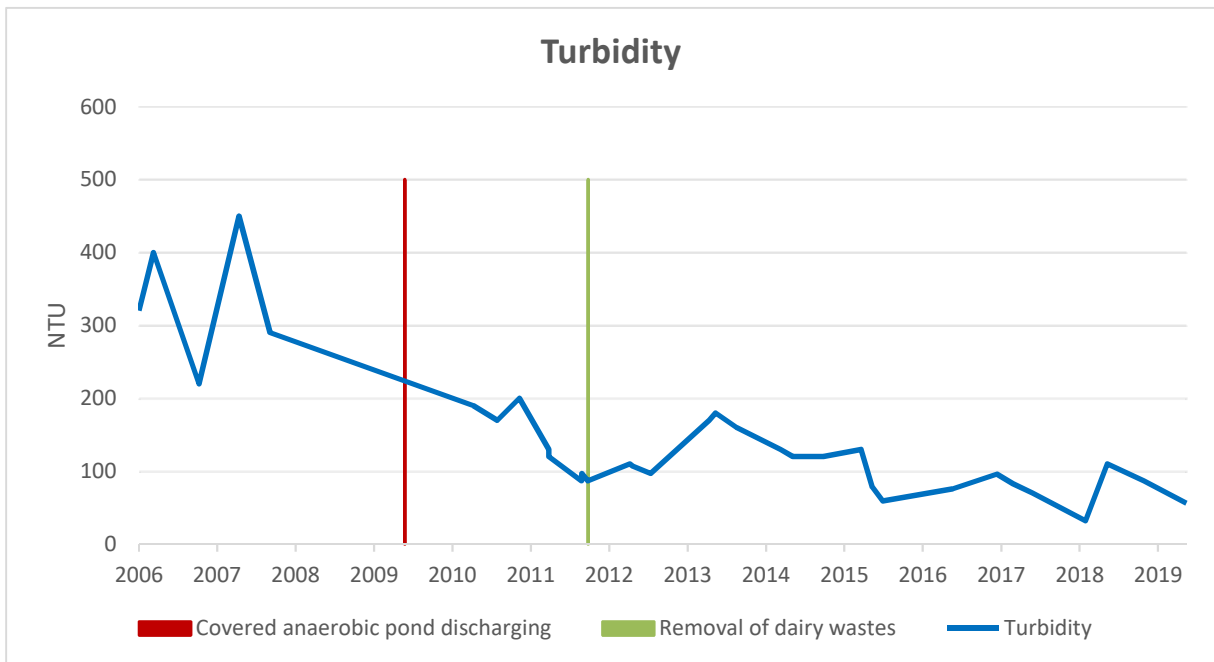


Figure 6 Wastewater turbidity levels, NTU, 2003-2019

Turbidity measurements of the effluent continue to indicate a decreasing concentration over time, as defined by Figure 6.

2.1.3 Results of discharge and receiving waters physiochemical monitoring

During the monitoring period, samples were collected on two separate occasions from three sites as shown in Figure 7 and listed in Table 4. Typically, the consent holder will notify the Council when the discharge to water is being exercised as per consent 0714-4 conditions 15 to 17. The physiochemical analysis of the samples was undertaken by R J Hill Laboratories Ltd Hamilton.

Table 4 Location of sampling sites in the Waiongana Stream

Site	Location	Site code	GPS reference
Waiongana Stream upstream	Approx. 100 m u/s discharge	WGA000361	N1704439 E5676128
Piggery pond treated effluent	Final pond treated effluent	PGP002002	N1704469 E5676209
Waiongana Stream downstream	100 m d/s of discharge – true left bank	WGA000363	N1704466 E5676274

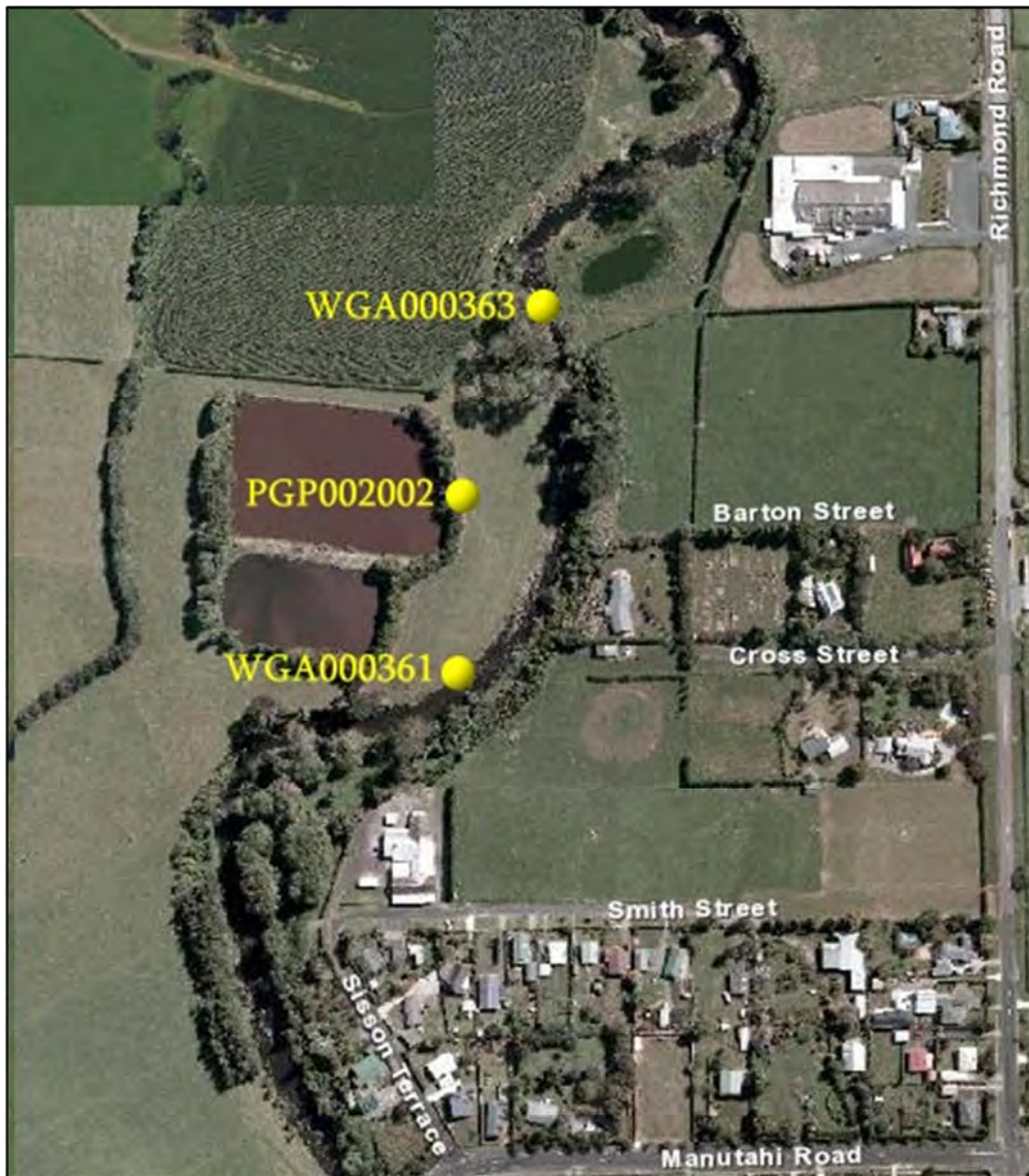


Figure 7 Location of sampling sites

Survey of 04 December 2018

Samples were collected approximately two hours after the discharge had commenced. This was during overcast but windy conditions after a period of heavy rain throughout the catchment. At the time of sampling the stream was in fresh (recession) and running at a moderately high flow rate at 7.3 m³/s. The

stream was turbid and brown in colour. The piggery wastewater flow rate from the final pond was estimated to be at 14 L/s.

The wastewater discharge from the final pond had no visual downstream environmental impact on the Waiongana Stream at the time of the survey. The consent holder continued to discharge for a further three hours, ceasing when the stream flow had fallen to 5.5 m³/s. The pond level at the time of sampling was observed to be 560 mm.

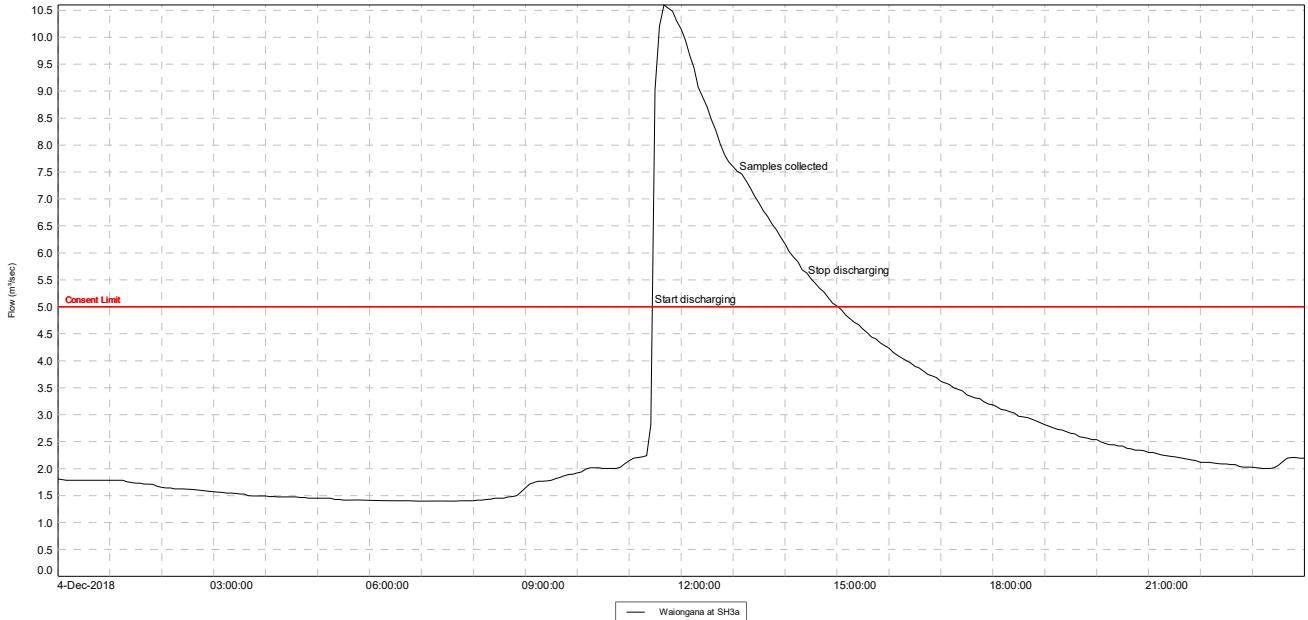


Figure 8 Flow data recorded for Waiongana Stream during the discharge of wastewater from Leppers piggery, commencing 4 December 2018 at 1130 hrs and finishing 4 December 2018 at 1430 hrs

Samples were collected upstream, downstream, and at the discharge point. The results of the samples analysed are provided in Table 5 below.

Table 5 Results of the receiving water compliance survey of 04 December 2018

Site		WGA000361	PGP002002	WGA000363	Consent
Parameter	Unit	Upstream	Discharge	50 m d/s	limit
Time	NZST	1300	1315	1330	
Temperature	°C	17.5	21.8	17.7	
Conductivity @ 25°C	mSm	14.1	245	15.3	
Chloride	g/m ³	10.6	330	12.0	
pH	pH	7.7	7.8	7.7	
BOD ₅ (total carbonaceous)	g/m ³	-	57	-	
BOD ₅ (carbonaceous filtered)	g/m ³	<1.0	-	<1.0	2.0 g/m ³ (d/s)
Ammoniacal nitrogen	g/m ³ N	0.012	60	0.29	
Un-ionised ammonia	g/m ³ N	0.00019	1.56	0.0045	0.025 g/m ³ (d/s)
Dissolved reactive phosphorus	g/m ³ P	0.040	24	0.140	

Site		WGA000361	PGP002002	WGA000363	Consent
Parameter	Unit	Upstream	Discharge	50 m d/s	limit
Suspended solids	g/m ³	91	146	88	
Turbidity	NTU	38	87	36	
Appearance		Turbid, brown	Turbid, brown	Turbid, brown	

Consent 0715-4.1 allows a maximum wastewater discharge rate of 16 L/s and requires a minimum receiving water flow of 5 m³/s. That is, a minimum dilution ratio of 312.5:1.

These results indicated that the dilution rate was about 1 part effluent to 521 parts receiving water based on flow data and assumed flow rate. Given this elevated dilution factor, the suspended solids value in the discharge (146 g/m³) would have a negligible effect on the receiving water quality throughout the discharge period.

Ammoniacal nitrogen was seen to increase by 0.278 g/m³ downstream from the discharge point, while unionised ammonia increased by 0.00431 g/m³. As pH and temperature remained relatively stable between upstream and downstream sites, it is unlikely that the ratio of ammoniacal nitrogen to unionised ammonia would change significantly. The unionised ammonia result in the downstream sample met the limit imposed by Special Condition 20 at the time of survey.

The total carbonaceous BOD₅ concentration of the discharge was measured at 57 g/m³. This concentration is well below the previous consented limit of 110 g/m³. The upstream site BOD₅ concentration was measured at <1.0 g/m³, with no measurable increase of the discharge site, suggesting that BOD₅ was having negligible effects on the receiving waters.

The discharge had minimal to no impact in terms of pH, conductivity, and suspended solids at the mixing zone boundary. The visual assessment in relation to compliance with Special Condition 11(e) indicated no change in the visual clarity or colour of the receiving waters at the boundary of the mixing zone.

Survey of 21 June 2018

Samples were collected approximately four hours after the discharge had commenced during fine weather conditions after a period of heavy rain throughout the catchment. At the time of sampling the stream was in a fresh (receding) and the flow rate was 7 m³/s, and was turbid brown. There had been a peak flow of 16.5 m³/s three hours prior to the samples being taken. The piggery discharge flow rate from the final pond was estimated at 14 L/s. The wastewater discharge from the final pond had no visual downstream environmental impact on the Waiongana Stream at the time of the survey. The consent holder continued to discharge for a further 2 hours before ceasing when the river flow had fallen to approximately 5.25 m³/s.

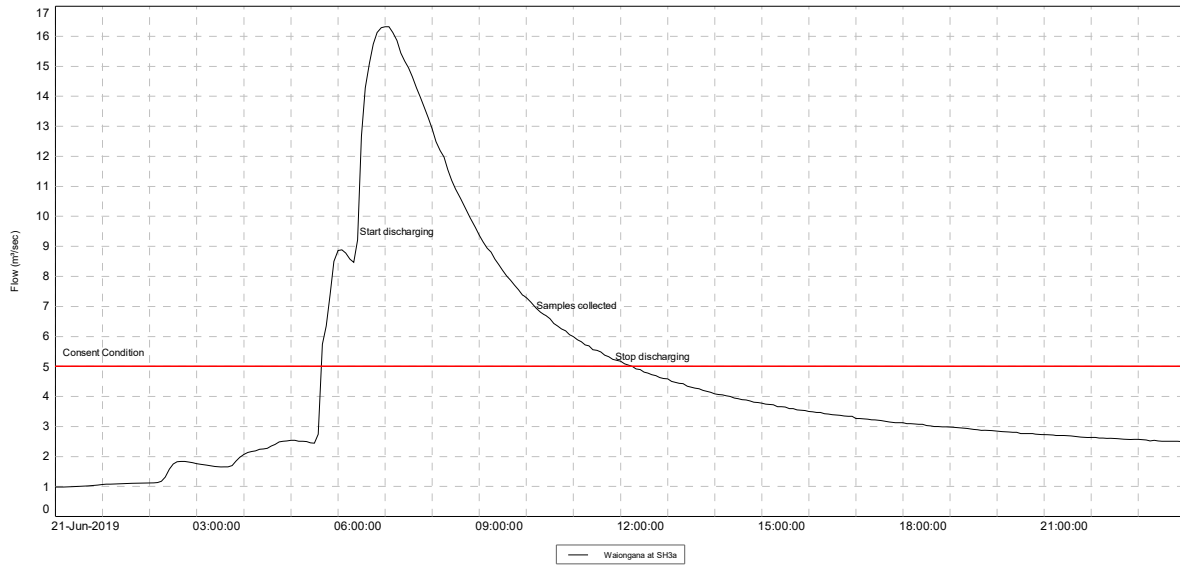


Figure 9 Flow data recorded for the Waiongana Stream during the discharge of wastewater from Leppers piggery, commencing 21 June 2019 at 0630 hrs and finishing 21 June 2019 at 1200 hrs

Samples were collected upstream, downstream and at the discharge point. The results of the samples analysed are shown in Table 6 below.

Table 6 Results of the receiving water compliance survey of 21 June 2019

Site		WGA000361	PGP002002	WGA000363	Consent
Parameter	Unit	Upstream	Discharge	50 m d/s	limit
Time	NZST	1020	1010	1030	
Temperature	°C	11.7	10.6	11.4	
Conductivity @ 25°C	mSm	10.2	340	12.0	
Chloride	g/m ³	9.1	340	10.6	
pH	pH	7.6	8.2	7.3	
BOD ₅ (total carbonaceous)	g/m ³	-	35	-	
BOD ₅ (carbonaceous filtered)	g/m ³	<1.0	-	<1.0	2.0 g/m ³ (d/s)
Ammoniacal nitrogen	g/m ³ N	0.095	210	0.99	
Un-ionised ammonia	g/m ³ N	0.00080	6.1	0.0045	0.025 g/m ³ (d/s)
Dissolved reactive phosphorus	g/m ³ P	0.036	28	0.123	
Suspended solids	g/m ³	73	104	72	
Turbidity	NTU	45	56	42	
Appearance		Turbid brown	Turbid brown	Turbid, brown	

Based on flow data at the time of sampling the dilution rate was about 1 part effluent to 500 parts receiving water and therefore well in compliance with Special Conditions 15 and 16 at the boundary of the mixing zone at the time of the survey.

An increase of 0.895 g/m³ N in ammoniacal nitrogen did not result in non-compliance with the un-ionised ammonia N limit imposed by Special Condition 19. There was no measurable increase in filtered

carbonaceous BOD₅. Generally, the discharge had minimal impact on the receiving water in terms of pH, conductivity, turbidity and suspended solids at the boundary of the mixing zone. The visual assessment in relation to compliance with Special Condition 11(e) indicated no change in the visual clarity or colour of the receiving waters at the boundary of the mixing zone.

In general, the piggery pond treated wastewater quality at the time of the survey was similar to that previously recorded in terms of pH, conductivity and chloride levels. BOD₅ was recorded at 35 g/m³ at the discharge, which is again one of the lowest values measured. Suspended solids and turbidity of the discharge were also similarly low.

2.1.4 Treated effluent discharge records

The consent holder provides data on treated wastewater discharges to the Waiongana Stream upon request, or as required. This data is presented in Table 7 below.

Table 7 Discharge records of piggery treated wastes to the Waiongana Stream, 2018-2019

Discharge date	Duration (approx. hours)	Stream flow above 5 m ³ /sec
01 July 2018	8	Yes
02 July 2018	9.5	Yes
08 August 2018	4	Yes
09 August 2018	6.5	Yes
20 August 2018	8.5	Yes
21 August 2018	12	Yes
02 September 2018	5.5	Yes
01 October 2018	4.5	Yes
12 October 2018	1.5	Yes
27 October 2018	15	Yes
04 November 2018	3	Yes
09 November 2018	18	Yes
10 November 2018	17.5	Yes
04 December 2018	3	Yes
08 March 2019	2.25	Yes
22 April 2019	7.5	Yes
10 May 2019	3.5	Yes
12 May 2019	15	Yes
13 May 2019	17.25	Yes
31 May 2019	4.75	Yes
01 June 2019	8	Yes
05 June 2019	16.25	Yes
06 June 2019	8	Yes
21 June 2019	5.25	Yes

Discharge date	Duration (approx. hours)	Stream flow above 5 m ³ /sec
Total discharge hours	204.25	

These records indicate that the treated effluent discharge into the Waiongana Stream was well managed and that good wastewater dilution ratios had been maintained and were compliant with special condition 16 of Consent 0715-4.

The discharge records indicated that all discharges had occurred when the river flow was above the consented 5 m³/s.

The Waiongana Stream hydrology displays a natural rapid rise and fall (typical of Taranaki ring plain streams) which allows for a limited window of opportunity when treated wastewater can be discharged above the minimum consent limit. The consent holder has access to the Taranaki Regional Council web site (www.trc.govt.nz) which provides current river flow and water levels for the Waiongana Stream recorded at SH3A at the time of discharging.

The consent holder also has access to the Council's Hydrotel text messaging service and is notified automatically when the Waiongana Stream flow exceeds 5 m³/s (i.e. when discharge to stream is allowed) and again when the stream flow recedes back to minimum consent conditions.

The Council's telemetered hydrology station is approximately 4 km upstream from the piggery discharge point.

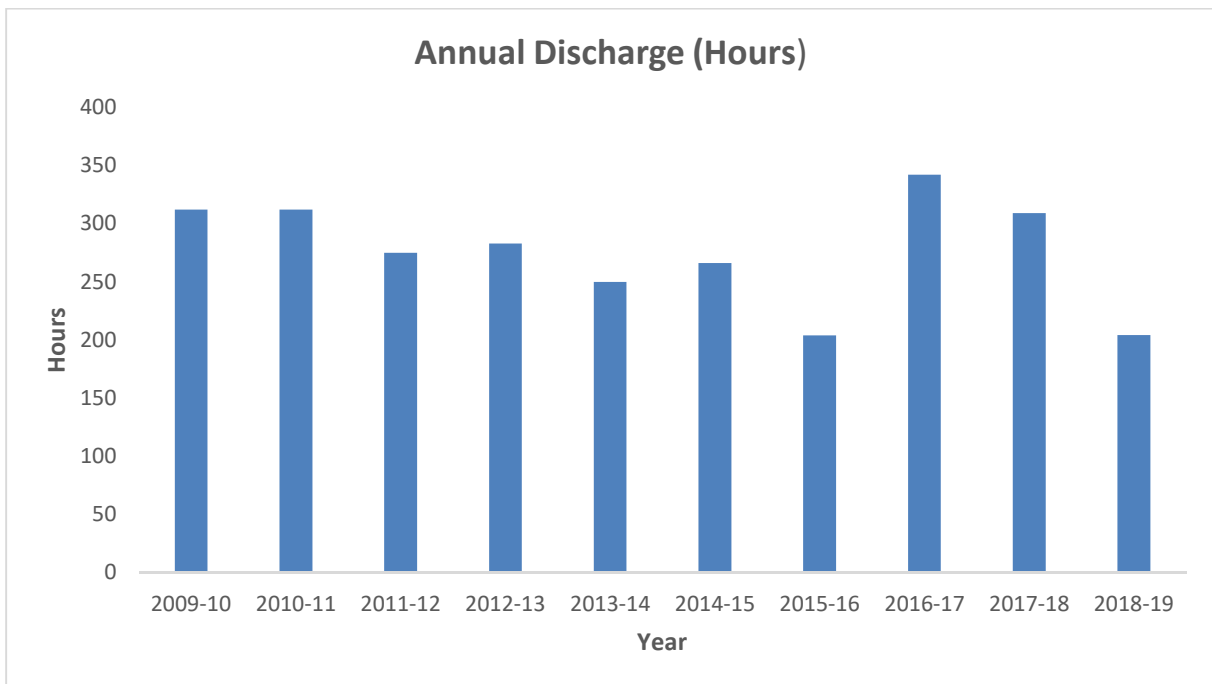


Figure 10 Yearly discharge hours

The average volume of wastewater discharged into the Waiongana Stream for the past ten years has been 13892.28 m³ per annum (275.7 actual discharge hours x 14 L/s discharge effluent flow).

For the 2018-2019 monitoring period there was a significant decrease in the volume of treated wastewater discharged into the Waiongana Stream compared to the previous year. Overall the volume is relatively low compared to earlier years. Irrigation to land in preference to discharging to water will significantly decrease going forward.

2.1.5 Implementation Plan

The implementation of the land based irrigation system, as supplied by the consent holder is to be phased in over the following five years.

Year 1 2017-2018

- Consents to land, water and air were granted.
- Study the consent conditions and begin consultation with management and staff of the dairy farm.

Year 2 2018-2019

- A pump shed at the bottom ponds housing the pump and equipment was installed.
- A power cable was installed and connected to the pump shed.
- The spray irrigation mainline and hydrants are constructed.
- Acquire the irrigator.
- Commence irrigation on the north western area of the bottom block.

Year 3 2019-2020

- Review the programme with management and staff of the dairy farm and progressively expand the existing mainline to cover the total bottom block.

Year 4 2020-2021

- With the dairy farm management and staff review the bottom block operation and plan the top block irrigation system.
- Provide a Land Disposal Options Report (LDOR) to Council.

Year 5 2021-2022

- Undertake trials to evaluate the effects of spreading anaerobic effluent onto pastures on the top block. This will include assessing the effects of different effluent application rates on dairy cow grass grazing and odour levels.

Year 6 2022-2023

- Build a storage pond/tank.
- Purchase and install a pumping station.
- Purchase an irrigator and pipeline.

The staged introduction of the effluent application plan is proposed to slowly introduce the changes to the dairy farm management and associated staff. This is suggested to incorporate the effluent spreading program into the dairy cows' paddock rotation. If it is rushed and there are any negative reactions to it the whole discharge to land may be at risk.

When the effluent spreading project is operational the Trust is planning to approach neighbouring farmers to discuss the possibility of entering into a commercial arrangement to spread the effluent on their farms. If this is successful there could be a point in time when all the effluent is discharged to land.

2.1.6 Discharge to land



Figure 11 New pump shed recently built on the final aerobic pond for spray irrigating treated piggery effluent to land



Figure 12 Pump systems from final aerobic ponds which transport effluent to the stream



Figure 13 Inside the pump shed showing the multi stage variable speed pump



Figure 14 Piping and hydrants locations of the bottom block

Total area of land available to receive the discharge to land;	
Top Block	= 17.7 ha
Bottom Block	= 29.0 ha
Total area	= 46.7 ha
Less set back areas from drains	= 5.0 ha
Total area available to receive effluent	= 41.7 ha

2.2 Air

2.2.1 Inspections

Air inspections were carried out in conjunction with all the general compliance monitoring inspections.

During the monitoring period there were no odour complaints concerning the piggery emissions from the ponds system, and routine inspections found no objectionable odour offsite. The covered anaerobic pond has had a significant effect in reducing odour.

Operations at the piggery had previously resulted in some odour travelling off site from the ponds system from time to time prior to installation of the covered anaerobic pond. As the piggery wastewater treatment ponds are located near a residential area in the Lepperton Township, there is no real buffer zone for odours that are a result of general piggery operations.

The Council uses FIDOL factors and scales to rate odour observations. The five FIDOL factors used are frequency, intensity, duration, offensiveness and location.

Frequency:

- How many times the odour is detected during the investigation.

Intensity:

- Perceived strength or concentration of the odour.
- Does not relate to degree of pleasantness or unpleasantness.
- Assessed subjectively using 0-6 scale (ambient).
 0. *Not detectable - no odour*
 1. *Very weak - odour detected but may not be recognisable*
 2. *Weak - odour recognisable (i.e. discernible)*
 3. *Distinct - odour very distinct and clearly distinguishable*
 4. *Strong - odour causes a person to try to avoid it*
 5. *Very strong - odour overpowering and intolerable*
 6. *Extremely strong - pungent, highly offensive, overpowering and intolerable*

Duration:

- The lengths of time people are exposed to odour.
- During an investigation how long does the odour persist?

Offensiveness:

- A rating of an odour's pleasantness or unpleasantness ("hedonic tone").
- This does not necessarily have the same meaning as offensiveness in the RMA or consent condition.
- A subjective assessment which can vary between individuals, but which must also be based for compliance purposes on a 'typical' response.

Location:

- Where the odour is detected from.
- Note type of area (for example, agricultural, residential, or industrial).

The RMA requires that there should be no offensive or objectionable odour beyond the boundary of the farm.

The pork industry's guide to managing environmental effects, deals with management practices ensuring the effect of odour is taken into account when undertaking activities relating to farm operations.

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

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

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

In the 2018-2019 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

In 2015, Consent 0715 was renewed to allow the Trust to continue until 2026 to discharge treated piggery effluent from an oxidation pond treatment system into the Waiongana Stream during fresh (high flow) conditions. The renewed consent also provided for disposal of the effluent to land through a spray irrigation system that was to be constructed during the term of the consent. The renewed consent requires that, within a five year period, approximately 40% of the treated effluent, which was being discharged entirely into the Waiongana Stream, be spray irrigated to land, and that full disposal to land then be instigated. Consent 5206 was changed to provide for the discharge of emissions to air from the application of effluent to land.

Consent 0715-4.1 limits the piggery to its existing size, in terms of 50 kg pig-equivalents, requiring no more than 3,529 50 kg pig-equivalents. The consent also requires that the final effluent must be treated in a system of oxidation ponds involving at least one anaerobic pond and two aerobic ponds for control of odour. An effluent irrigation system of minimum area 24.6 ha must be installed by June 2020, with discharge to land maximised and discharge to water minimised.

Under the two consents, the Trust is required to provide to the Council for approval, management plans on the operation of the dual disposal system (Piggery Effluent Disposal Management Plan), protection of soil (Effluent Irrigation Management Plan), and control of odour (Odour Management Plan). Further, a Land Disposal Options Report, which will detail the feasibility of disposing all of the effluent to land, is required to be provided by June 2021. The Effluent Plans and Options Report are to be provided to Fish and Game New Zealand for comment.

For the 2018-2019 period, records of pig numbers and effluent discharges were provided, as required. The piggery size and number of 50 kg equivalents remain mainly unchanged and met the consent limit.

Progress with construction of the irrigation system was largely in accordance with the Implementation Plan submitted with the application for consent 0715-4.1 Discharging effluent to land had commenced mid-February 2018, starting at the north western blocks near the oxidation ponds at the bottom block.

The calculated volume of effluent discharged to Waiongana Stream was significantly lower than the previous two years, due largely to the commencement of irrigating to land.

The Waiongana Stream flow was above the minimum rate required on each discharge occasion.

Overall the piggery effluent trends in terms of carbonaceous biochemical oxygen demand, conductivity and suspended solids, continue to show a decreasing concentration. Chloride has shown a slight increasing concentration, though more recent results suggest a slight plateau occurring. Conductivity and turbidity measurements appear to be stable over time.

Inspections of the piggery found the production facility and effluent treatment system to be operated in accordance with best practice, with no significant generation of odour.

3.2 Environmental effects of exercise of consents

The discharge of wastewater to Waiongana Stream was not recorded to have any impact on visual clarity, either outside or inside the mixing zone, because of the highly turbid state of the stream at the times of the discharge. Given the high flow conditions and relatively small increase in nutrients observed downstream, post the discharge, environmental effects of the discharge are considered to be negligible.

There is no biological monitoring associated with the piggery discharge. It occurs infrequently over short periods, at times of high flow, when there is a large amount of dilution. However, monitoring of benthic

macroinvertebrates and of periphyton is carried out at sites upstream (8.0 km at State Highway 3A) and downstream (6.9 km at Devon Road) of the discharge point as part of regional state of the environment monitoring programmes.

For the macroinvertebrates, MCI values have not changed significantly at either site over the last 10 years; the MCI values are within the 'fair' health category at both sites, with some deterioration in a downstream direction to a degree that is comparable to similar catchments around the ring plain over the same distance and change in elevation (TRC 2016). For periphyton, the indicative trend is that bed cover is decreasing at the upstream site and increasing at the lower site, with the (TRC) Periphyton Index score reducing in a downstream direction from 'good' to 'moderate' (TRC 2016a). Algal biomass (chlorophyll a) varies widely between years at both sites, with occasional high levels, unrelated to flow. However, currently there is insufficient data collected to determine temporal trends.

There is no indication that any individual point-source discharge is having a significant effect on the ecology of Waiongana Stream, though the combined effect of several farm oxidation pond discharges is likely to have an impact. For this reason, Council has signaled to farmers of the region that, as a general rule, farm effluent must be discharged to land (TRC 2017).

It is noted that consent 0715-4.1 was drafted to provide for the establishment of a dual land/water effluent disposal system. The objective is progressively increasing the proportion discharged to land, and a requirement to investigate discharge completely to land, thereby reducing and potentially eliminating any environmental effects on the stream.

In regard to air emissions from the piggery and effluent treatment system, there were no incidents related to odours beyond the site boundary. Inspections by Council found local odour around the effluent drains and collection area.

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 8-10.

Table 8 Summary of performance for consent 0715-4.1

Purpose: To discharge treated piggery effluent to land and water from an oxidation pond treatment system		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Maximise discharge to land and minimised discharge to water	Monitoring inspections	Yes – land application had commenced partway through the monitoring period
2. Effluent generated from allowable pig numbers	Monitoring inspections and consent holder data	Yes
3. Adopt best practical option to minimise environmental effects	Monitoring inspections	Yes
4. Effluent treated via appropriate pond system	Monitoring inspections and sampling	Yes
5. Discharge from the aerobic ponds only	Monitoring inspections	Yes

Purpose: To discharge treated piggery effluent to land and water from an oxidation pond treatment system		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. No overflows from the effluent disposal system	Monitoring inspections	Yes
7. Provide sufficient storage for effluent	Monitoring inspections	Yes
8. Minimise solids from first to second pond	Monitoring inspections and sampling	Yes
9. Operation and discharge in accordance with consent	Monitoring inspections and sampling	Yes
10. Maintain records of discharge to land and water	The consent holder to provide when requested by Council	Yes
11. Consent to be exercised in accordance of the Piggery Effluent Disposal Plan	Draft Plan to be submitted to Council	Yes
12. Consent to be exercised in accordance with the Effluent Irrigation Management Plan	Draft Plan to be submitted to Council	Yes
13. Land Disposal Options Report	The consent holder to provide by 1 June 2021	N/A
14. All plans and reports to be supplied to Fish and Game	In progress	In progress
15. Discharge rate not to exceed 16 L/sec	Monitoring inspections indicate 14 L/sec	Yes
16. Discharge only when river conditions allow	Consent holder's discharge records and monitoring	Yes
17. Location of discharge point	Monitoring inspections	Yes
18. Safe access to sampling point	Monitoring inspections and sampling	Yes
19. Maximum concentrations in receiving water	Monitoring inspections and sampling	Yes
20. Even effluent application to land	Discharge to land progressively over a 5 year period	Yes
21. No effluent ponding on land	Discharge to land progressively over a 5 year period	Yes
22. Limits on potassium applied to land	Discharge to land progressively over a 5 year period	N/A - not yet monitored
23. Limits on total nitrogen applied to land	Discharge to land progressively over a 5 year period	N/A - not yet monitored
24. No discharge within 25 m of surface water	Discharge to land progressively over a 5 year period	Yes
25. Notification of unauthorised effluent discharge	Monitoring and self-notification	Yes
26. Review of consent	Next consent review June 2021	N/A

Purpose: To discharge treated piggery effluent to land and water from an oxidation pond treatment system		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 9 Summary of performance for consent 5206-2.1

Purpose: To discharge emissions into the air from a pig farming operation and associated practices including solids composting, effluent treatment and other waste management activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Total allowable number of pigs on site	Monitoring inspections and consent holder records	Yes
2. Adopt best practical option to minimise adverse effects on the environment	Monitoring inspections and consent review process	Yes
3. Consultation and approval prior to alterations to plant and equipment	Monitoring inspections and consent review process	Yes
4. Minimisation emissions and impacts	Monitoring inspections	Yes
5. Offensive objectionable odour at site boundary not permitted	Monitoring inspections	Yes
6. Deemed objectionable odour to be offensive	Monitoring inspections	Yes
7. Odour management plan	Plan to be submitted to Council	Yes
8. Review of consent conditions	Next consent review 2020	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 10 Summary of performance for consent 0811-3

Purpose: To take water from an unnamed tributary of the Waiongana Stream for piggery purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Minimise environmental effects	Monitoring inspections	Yes
2. Water abstraction not to exceed 50% of the stream flow	Monitoring inspections	Yes
3. Optional review of consent	No further reviews	N/A

Purpose: <i>To take water from an unnamed tributary of the Waiongana Stream for piggery purposes</i>		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 11 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2010	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2011	0715	-	1	-	-
	5205	-	1	-	-
	0188	-	1	-	-
2012	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2013	0715		1	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2014	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2015	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2016	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2017	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-
2018	0715	1	-	-	-
	5205	1	-	-	-
	0188	1	-	-	-

Year	Consent no	High	Good	Improvement req	Poor
Totals		23	4	0	0

During the year, the Trust demonstrated a high level of environmental and a high level of administrative performance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2017-2018 Annual Report

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

1. THAT in the first instance, monitoring of consented activities at D H Lepper Trust Piggery in the 2018-2019 year continue at the same level as in 2017-2018 period except where noted below.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the consent holder continues to advise the Council of treated wastewater discharges to the Waiongana Stream to enable the Council to collect water quality samples as required and to maintain a discharge only when the Waiongana Stream flow rate is above the allowable 5 m³/s.
4. THAT the frequency of Inspections in the 2018-2019 monitoring programme continue at three per year, with provision for a further inspection to be performed.
5. THAT the frequency of sampling of the discharge and receiving waters be reduced to two occasions per year, with provision for an extra sample run to be performed if required.
6. THAT the effluent be monitored for nitrogen and potassium for the purpose of determining loadings in application of effluent to land.

The following recommendations were undertaken: 1, 3, 4 and 5.

Recommendation 2 was not required.

Recommendation 6 was not undertaken during the year under review, but are to be incorporated within future evaluations of the land irrigation programme.

3.5 Alterations to monitoring programmes for 2019-2020

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

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

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

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2019-2020.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at D H Lepper Trust Piggery in the 2019-2020 year continue at the same level as in 2018-2019 period except where noted below.
2. THAT should there be issues with environmental or administrative performance in 2019-20, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the consent holder continues to advise the Council of treated wastewater discharges to the Waiongana Stream to enable the Council to collect water quality samples as required and to maintain a discharge only when the Waiongana Stream flow rate is above the allowable 5 m³/s.
4. THAT the frequency of Inspections in the 2019-2020 monitoring programme continue at three per year, with provision for a further inspection to be performed.
5. THAT the frequency of sampling of the discharge and receiving waters remains at two occasions per year, with provision for an extra sample run to be performed if required.
6. THAT the effluent be monitored for total nitrogen and potassium for the purpose of determining loadings in application of effluent to land.
7. THAT effluent is discharged to land in preference to effluent being discharged to water where practicable.
8. Before 1 June 2021 the consent holder shall provide a Land Disposal Options Report (LDOR) as set out in Consent 0715 special conditions 13 & 14.

Glossary of common terms and abbreviations

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

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.
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.
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 life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
$\mu\text{S}/\text{cm}$	Microsiemens per centimetre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).

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

For further information on analytical methods, contact a Science Services Manager.

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Appendix I

Resource consents held by DH Lepper Trust

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

Consent number	Purpose	Granted	Review	Expires
0188-3	To take water from an unnamed tributary of the Waiongana Stream for piggery operation purposes.	9 Jan 2001	N/A	1 June 2020
0715-4.1	To discharge treated piggery effluent from an oxidation pond system to land and into the Waiongana Stream during high flow conditions.	29 Sep 2015	June 2021	1 June 2026
5206-1	To discharge emissions to air from a piggery operation and associated practices.	29 Sep 2015	June 2020	1 June 2026

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.

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

Name of
Consent Holder: Lepper D H Trust
 S Lepper
 326 Wortley Road
 R D 9
 INGLEWOOD

Consent Granted 9 January 2002
Date:

Conditions of Consent

Consent Granted: To take up to 75 cubic metres/day [0.9 litres/second] of
 water from an unnamed tributary of the Waiongana Stream
 for piggery operation purposes at or about GR: Q19:145-
 366

Expiry Date: 1 June 2020

Review Date(s): June 2008, June 2014

Site Location: Manutahi Road, RD 3, New Plymouth

Legal Description: Pt Sec 185 & 186 Huirangi Dist Blk VII Paritutu SD

Catchment: Waiongana

Consent 0188-3

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. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water from the unnamed tributary in the Waiongana Stream catchment, including, but not limited to, the efficient and conservative use of water.
2. That abstraction shall not exceed 50% of the natural stream flow at any time.
3. The Taranaki Regional Council may review, according to section 128 of the Resource Management Act 1991, any or all of the conditions of this consent by giving notice of review during June 2008 and/or June 2014, 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 the time.

Signed at Stratford on 9 January 2002

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: DH Lepper Trust
(Trustees: Steven Maxwell Lepper & Paul Robert Franklin)
326 Wortley Road
RD 9
Inglewood 4389

Decision Date (Change): 23 January 2018

Commencement Date (Change): 23 January 2018 (Granted Date: 8 September 2015)

Conditions of Consent

Consent Granted: To discharge treated piggery effluent from an oxidation pond treatment system to land and into the Waiongana Stream during fresh (high flow) conditions

Expiry Date: 1 June 2026

Review Date(s): June 2021, June 2023

Site Location: Manutahi Road, Lepperton

Grid Reference (NZTM) 1704471E-5676221N (Water)
1703992E-5675964N (Land)

Catchment: Waiongana

*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. This consent shall be exercised in a manner that ensures, to the greatest extent practicable, the discharge of treated effluent to land is maximised and the discharge to water minimised.
2. The effluent discharged shall be from piggery of no more than 3529 (50 kg) pig equivalents.
3. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge on the environment.
4. All effluent generated at the piggery site shall be treated in a system of oxidation ponds, involving at least one anaerobic pond and two aerobic ponds.
5. Any discharge shall be from the aerobic pond on site.
6. There shall be no overflow of effluent from any part of the effluent disposal system.
7. The consent holder shall ensure that at all times, while complying with the other requirements of this consent, there is sufficient storage available in the effluent treatment system for any reasonably likely inflow, so that there is no unauthorised discharge to land or water.
8. A flow control structure, such as a 'tee-piece' pipe or other baffle system that achieves the same outcome, shall be maintained and operated on the outlet of the first oxidation pond so as to minimise the movement of solids from the pond.
9. The effluent treatment system and disposal system shall be operated and maintained to ensure compliance with the conditions of this consent. Operation and maintenance shall include as a minimum:
 - (a) vegetation control on and around the storage facility;
 - (b) desludging;
 - (c) ensuring that there is adequate freeboard in ponds to allow for contingencies such as a pipe blockage; and
 - (d) cleaning, repairing and generally ensuring the integrity of the:
 - (i) irrigator;
 - (ii) stormwater diversion;
 - (iii) sand trap;
 - (iv) piping;
 - (v) pump(s);
 - (vi) pond wall; and
 - (vii) fences.

Consent 0715-4.1

10. The consent holder shall keep accurate records of effluent application to land and water, including, as a minimum, the:
- (a) type of effluent (e.g. solid, liquid);
 - (b) volume of effluent applied;
 - (c) rate and duration of application;
 - (d) loading of potassium and nitrogen over the discharge area;
 - (e) paddock and area (ha) that the effluent was applied to;
 - (f) date the paddock received effluent;
 - (g) wind direction;
 - (h) any odour from the land application;
 - (i) any complaints received, including dates and times; and
 - (j) date, duration (start and finish times), rate and volume of the discharge to the Waiongana Stream.

This information shall be provided to the Taranaki Regional Council upon request.

11. From 1 November 2016 and subject to the other conditions of this consent, this consent shall be exercised in accordance with a *Piggery Effluent Disposal Management Plan* (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail how the consent holder will manage the dual discharge to ensure that adverse environmental effects are avoided as far as practical, and consent conditions are met and can be shown to be met. It shall address as a minimum:
- (a) methods and procedures for maximising the discharge of contaminants to land;
 - (b) methods and procedures for minimising the discharge of contaminants to the Waiongana Stream;
 - (c) the staged implementation of the discharge to land, including the amount of discharge and area of land for disposal at each stage;
 - (d) monitoring the quality and rate of the discharge;
 - (e) monitoring the quality and flow of the Waiongana Stream;
 - (f) management of the wastewater treatment system;
 - (g) minimisation of potassium, nitrogen and phosphorus in the wastewater discharge and how this is being achieved;
 - (h) methods for determining the amount of nitrogen and potassium discharged to land; and
 - (i) reporting on the exercise of the consent.

Consent 0715-4.1

12. From 1 November 2016, and subject to the other conditions this consent, this consent shall be exercised in accordance with an Effluent Irrigation Management Plan ('EIMP') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The EIMP shall detail how the application of effluent will be managed to ensure that the soil moisture deficit is not exceeded on high risk soils or soils with slopes of more than 7 degree and effluent will be retained in the top 300 mm for low risk soils including, as a minimum, details of:
- (a) area(s) to be irrigated and the method of irrigation;
 - (b) evapotranspiration and available water holding capacity of the soil(s) over the irrigated area;
 - (c) how irrigation will be scheduled to maximise the benefits of evapotranspiration and minimise subsurface drainage;
 - (d) how available soil water will be determined;
 - (e) how water is to be applied as uniformly as practicable over the irrigated area, and the uniformity of application demonstrated; and
 - (f) information to be provided to the Taranaki Regional Council to enable compliance to be checked.

Note: The 'Effluent Irrigation Management Plan' may be combined with the 'Piggery Effluent Disposal Management Plan' required by condition 11.

13. Before 1 June 2021, the consent holder shall provide a *Land Disposal Options Report* (LDOR) to the Chief Executive, Taranaki Regional Council. The purpose of the LDOR is to detail the feasibility of disposing all of the effluent to land. The report will include, as a minimum:
- (a) details of the proportion of contaminants that have been discharged to land to date;
 - (b) a general assessment of the efficacy of land disposal based on experience at the site taking into account such matters as cost and environmental benefits;
 - (c) an assessment of the land area that would be needed to dispose of all the effluent to land; and
 - (d) identification of specific areas of land that could be used for expanded land disposal.
14. Plans and reports submitted to the Chief Executive, Taranaki Regional Council in accordance with conditions 11, 12 and 13 shall also be provided to Fish and Game New Zealand at the same time. Any comments made by Fish and Game New Zealand within 15 working days of receiving a plan or report may be taken into account by the Chief Executive, Taranaki Regional Council when determining if the plan or report meets the requirements of this consent.

Discharge to water conditions

15. The rate of the discharge to water shall not exceed 16 litres/second.
16. The discharge from the pond to the Waiongana Stream shall occur only when the flow in the Waiongana Stream measured at the Taranaki Regional Council SH3A monitoring site is greater than 5 cubic metres per second.

Consent 0715-4.1

17. The discharge point into the Waiongana Stream shall be located at (NZTM) 1704471E-5676221N. This point of discharge shall be beneath the surface of the receiving water.
18. The consent holder shall ensure that there is always clear and safe access to a point where the effluent from the final pond can be sampled.
19. The discharge shall not cause the maximum concentration of any constituent shown in the following table to be exceeded in the receiving water more than 50 metres downstream of the discharge to the receiving water.

Constituent	Maximum Concentration
Unionised ammonia	0.025 gm ⁻³
Filtered carbonaceous BOD ₅	2.0 gm ⁻³

Discharge to land conditions

20. From 1 June 2020, the consent holder shall ensure that effluent application to land is as evenly as practicable over an area of no less than 24.6 hectares.
21. Discharges to land shall not result in effluent ponding on the surface that remains for more than 30 minutes.
22. Over any 12 month period the amount of potassium (K) applied to land as a result of the discharge shall not exceed 100 kg per hectare.
23. Over any 12 month period the amount of Total Nitrogen (N) applied to land as a result of the discharge shall not exceed 200 kg per hectare.
24. The discharge authorised by this consent shall not occur within 25 metres of any surface water body.
25. Where, for any cause (accidental or otherwise), untreated or partially treated effluent associated with the consent holder's operations escapes to surface water, the consent holder shall:
 - (a) immediately notify the Taranaki Regional Council on Ph. 0800 736 222 (notification must include either the consent number or farm dairy number); and
 - (b) stop the discharge and immediately take steps to control and stop the escape of untreated or partially treated effluent to surface water; and
 - (c) immediately take steps to ensure that a recurrence of the escape of untreated or partially treated effluent to surface water is prevented; and
 - (d) report in writing to the Chief Executive, Taranaki Regional Council, describing the manner and cause of the escape and the steps taken to control it and to prevent it reoccurring. The report shall be provided to the Chief Executive within seven (7) days of the occurrence.

Consent 0715-4.1

26. 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 2021 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, including consideration, following receipt of the report required by condition 13, of the feasibility of expanding the irrigation area to dispose of all effluent to land.

Signed at Stratford on 23 January 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

TRK985206

DISCHARGE PERMIT

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

Name of LEPPER D H TRUST
Consent Holder: C/- STEVEN LEPPER
MOUNTAIN ROAD RD9 INGLEWOOD

Consent
Granted Date: 4 February 1998

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE EMISSIONS INTO THE AIR FROM A PIG FARMING OPERATION AND ASSOCIATED PRACTICES INCLUDING SOLIDS COMPOSTING, EFFLUENT TREATMENT AND OTHER WASTE MANAGEMENT ACTIVITIES AT OR ABOUT GR: Q19:143-375

Expiry Date: 1 June 2008

Review Date[s]: June 1999 and June 2002

Site Location: MOUNTAIN ROAD LEPPERTON

Legal Description: PIGGERY: LOT 1 DP14585 BLK VII PARITUTU SD
DAIRY: LOT 3 PT LOT 2 DP1491 PT LOT 2 DP2634 PT
LOT 1 DP4550 LOT 2 DP15779 LOT 1 DP16835
LOT 1 DP19501 SEC 1 SO12688 NGARAUERUA
4A 4C1 BLK VII PARITUTU SD

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

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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 at all times the consent holder shall 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 into the air from the site.
2. THAT prior to undertaking any alterations to the pig farming and effluent disposal processes, operations, equipment or layout, as specified in application 142 and supporting documentation, which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the General Manager, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and its amendments.
3. THAT the consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, and emission control equipment, the methods of control, supervision and operation, the proper and effective operation, supervision, maintenance and control of all equipment and processes, and the proper care of all pigs on the site.
4. THAT the consent holder shall at all times operate the piggery and associated activities substantially in accordance with the information provided in support of application 142, except as otherwise required or directed by the conditions set out in this resource consent.
5. THAT the discharges authorised by this consent, other than emissions from the effluent ponds, shall not give rise to an odour 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 [save that for the duration of the land application of sludges and effluent from the oxidation ponds, and to a maximum of 14 days per 24 months, this condition shall not apply in respect of land application].
6. THAT 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.
7. THAT the discharges authorised by this consent shall not give rise to any significant adverse ecological effect on any ecosystems in the Taranaki region.
8. THAT within six months of the granting of this consent, the consent holder shall submit an effluent ponds maintenance and landscaping plan prepared to the satisfaction of the General Manager, Taranaki Regional Council, covering [without

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limitation] the establishment and maintenance of plantings and screening around the effluent ponds, pond management and maintenance and operation, desludging, and effluent loading on the ponds.

9. THAT the consent holder shall, upon the acceptance of the plan described in special condition 8 by the General Manager, thereafter establish, maintain and operate the effluent ponds system and associated activities in compliance with the plan, except as otherwise required or directed by the conditions set out in this resource consent.
10. THAT the consent holder shall, upon prior written request, advise neighbours at least 24 hours prior to the event, of any scheduled land application of effluent or sludge onto a property.
11. THAT the consent holder shall have particular regard to wind speed and direction, in order to minimise effects upon neighbours and the land uses of neighbouring properties, when discharging effluent or sludges onto land or into the air.
12. 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 1999 and/or June 2002, 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 not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Signed at Stratford on 4 February 1998

For and on behalf of
TARANAKI REGIONAL COUNCIL

GENERAL MANAGER