DH Lepper Trust (Piggery)
Monitoring Programme
Annual Report
2017-2018

Technical Report 2018-51

ISSN: 1178-1467 (Online)
Document: 2099712 (Word)
Document: 2115291 (Pdf)

Taranaki Regional Council
Private Bag 713
STRATFORD

November 2018

Executive summary

DH Lepper Trust (the Trust) operates a piggery located on Mountain and Manutahi Roads at Lepperton, in the Waiongana catchment. This report for the period July 2017 to June 2018 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Trust'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 Trust's activities.

The Trust holds three resource consents, which include a total of 38 conditions setting out the requirements that the Trust must satisfy. The Trust holds one consent to allow it to take and use water, one consent to discharge treated effluent into the Waiongana Stream and to land, and one consent to discharge emissions into the air from the piggery operation.

The consent to discharge effluent requires that the existing disposal system, of discharge to the Waiongana Stream at times of high flow, be converted in stages by June 2020 to a dual land/water disposal system. A minimum land area for effluent application is set, and discharge to land must be maximised. A Land Disposal Options Report, detailing the feasibility of disposing of all effluent to land, is to be produced by June 2021.

During the monitoring period, DH Lepper Trust demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included three inspections and two physicochemical water quality sampling surveys.

The monitoring undertaken during 2017-2018 indicated that the Trust has complied with the requirements of their consents

During the year, consent 0715-4.0 was amended to remove a condition limiting suspended solids and BOD allowed to enter the Waiongana Stream during discharge. The consent holder applied to change the original condition, as they considered it to not be reasonably achievable. The Council accepted this, having given consideration to the activities likely environmental effects as well as past monitoring of the activity. Both of which have indicated that this activity is not having a significant impact on the receiving environment.

Progress with implementation of the dual land/water disposal system was good. A pump, suction line and ramp had been installed during the year under review. Discharge to land is scheduled to commence in 2018-2019.

The Combined Management Plan, for operation of the dual disposal system, protection of soil, and control of odour was submitted during the review period.

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

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

This report includes recommendations for the 2018-2019 year

Table of contents

List of tables

List of figures

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 2017 to June 2018 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 15th 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 though 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 Trusts' site.

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 2018-2019 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

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

d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the Trust, 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 Trust's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

1.2 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 below 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 2018

Type of pigs	No of pigs	Average weight kg	Total weight kg	50 kg Equivalent pigs
Sows	425	162	68,850	1,377
Light porkers (3 months)	1,026	65	66,690	1,334
Store pigs (2½ months)	325	44	14,300	286
Weaners (5 – 8 weeks)	1,351	16	21,611	432
Total	3,127			**3,429**

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 m^3 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. Periodically during high river flows, the consent holder discharges treated water from the final aerobic pond into the neighbouring Waiongana Stream in compliance with the conditions of Consent 0715-4.

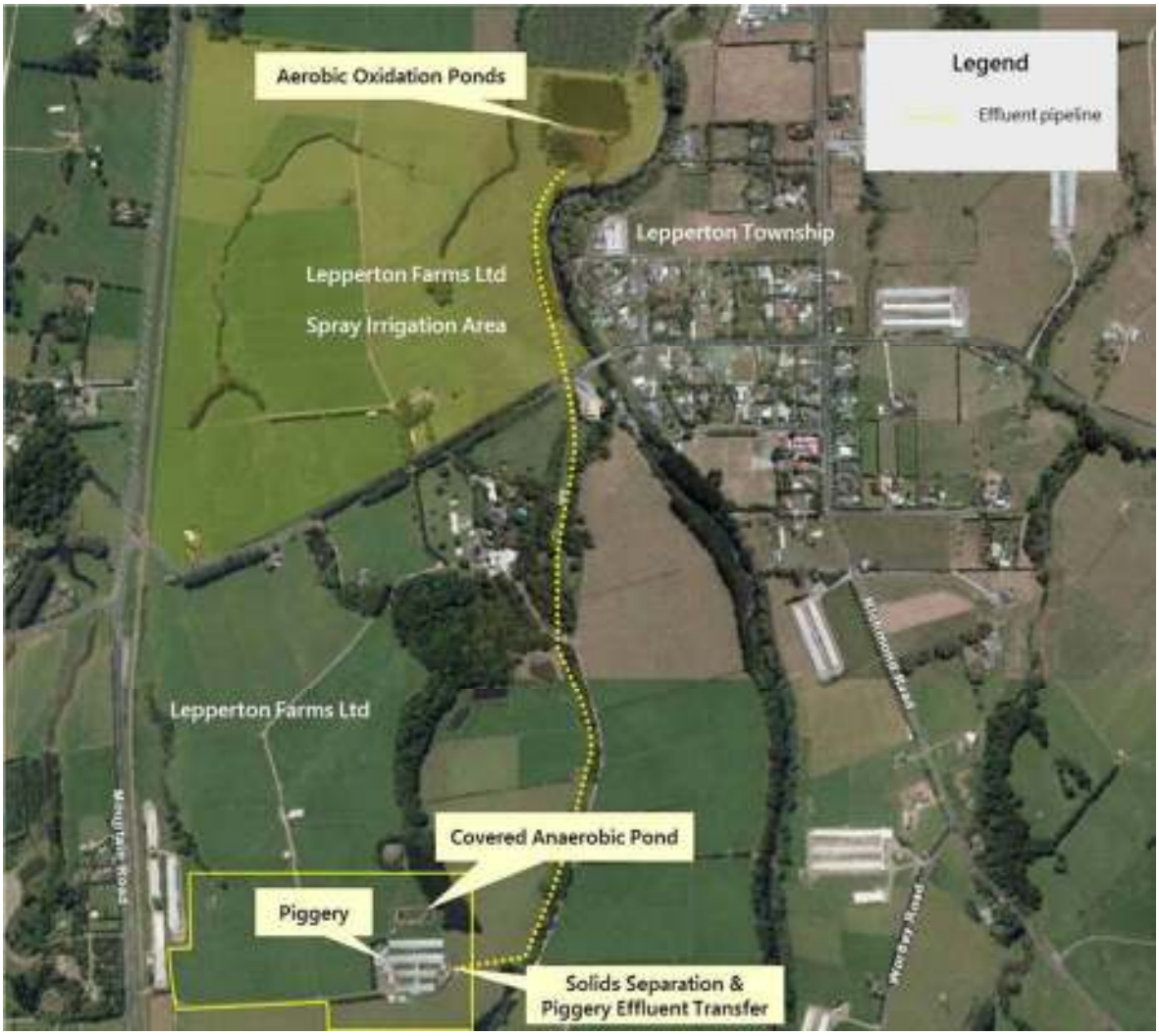

Figure 1 Location of DH Lepper Trust piggery, oxidation ponds, and Lepperton village

1.3 Resource consents

The Trust holds three resource consents the details of which are summarised in the table below and outlined in sections 1.3.1 to 1.3.3.

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

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

1.3.1 Water abstraction permit

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

category, DH Lepper Trust holds water permit 0188-3 to cover the take of water from an unnamed tributary of the Waiongana Stream for piggery operation purposes. This permit was issued by the Council on 09 January 2001 under Section 87(d) of the RMA. It is due to expire on 1 June 2020.

Three special conditions are attached to this consent:

Special condition 1 requires consent holder to adopt best practicable option to prevent or minimise effects.

Special condition 2 states the abstraction should not exceed 50% of the natural stream flow.

Special condition 3 is a review provision.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent which is appended to this report.

1.3.2 Water discharge permit

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.

The Trust holds water discharge permit 0715-4 to discharge piggery effluent from a treatment pond system to land and into the Waiongana Stream during fresh (high flow) conditions. This permit was renewed by the Council on September 2015 under Section 87(e) of the RMA. The consent now includes the discharge of approximately 40 % of piggery effluent to land and the remaining 60 % will continue to discharge to water.

The discharge of treated wastewater of this nature may affect the water quality of a stream, particularly if there is insufficient dilution. Some effects may be obvious (for example appearance, turbidity) while biological effects may be more subtle.

This permit was issued by the Council on 29 September 2015 under Section 87(e) of the RMA. It is due to expire on 1 June 2026. On January 23 2018 a change to consent conditions was approved and consent 0715-4.1 was issued. The change related to the removal of a condition limiting suspended solids and BOD in the discharge to the Waiongana Stream. The Trust applied for the change as the original was considered to not be reasonably achievable. The Council accepted the requested change, having given consideration to the activities likely environmental effects as well as past monitoring of the activity. Both of which indicated that this activity is not having a significant impact on the receiving environment.

Twenty six special conditions are included in Resource Consent 0715-4.1:

Special condition 1 requires that the discharge of treated effluent to land be maximised and the discharge to water to be minimised.

Special condition 2 relates to effluent produced from the allowable number of pigs (3,529 50 kg pig equivalents) on the property at any one time.

Special condition 3 requires the consent holder to adopt the best practical option to prevent or minimise any actual or likely adverse effects.

Special condition 4 requires effluent to be treated via an approved wastewater treatment system.

Special condition 5 requires the discharge is only from the aerobic pond.

Special conditions 6, 7, 8, and 9 require the consent holder to operate and maintain the treatment and discharge system to ensure compliance.

Special condition 10 requires the consent holder to monitor and to maintain records of the discharge.

Special conditions 11 and 12 require the consent to be exercised in accordance to the Piggery Effluent Disposal Management Plan and the Effluent Irrigation Management Plan.

Special condition 13 requires the consent holder to provide a Land Disposal Options Report before June 2021.

Special condition 14 requires that plans and reports are to be provided to the Chief Executive (TRC) and Fish & Game.

Discharge to water conditions

Special condition 15 defines that the discharge to water shall not exceed 16 litres per second.

Special condition 16 defines a minimum flow in the Waiongana Stream above which the discharge may occur.

Special conditions 17, 18, and 19 define the mixing zone and prohibit a number of effects.

Discharge to land conditions

Special conditions 20 and 21 require the consent holder to apply effluent evenly to land and prevent ponding.

Special condition 22 and 23 refer to the allowable application rate of potassium and nitrogen to land.

Special condition 24 requires that the discharge is not to occur within 25 meters of any surface water body.

Special condition 25 refers to procedures where partially or untreated effluent (accidental or otherwise) has escaped to surface water.

Special condition 26 provides for review of any or all the conditions of the consent.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent which is appended to this report.

1.3.3 Air discharge permit

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.

The Trust holds air discharge permit 5206-2.1 to cover discharge emissions into the air from a pig farming operation and associated practices, including solids composting, effluent treatment system, effluent application to land and other waste management. This permit was issued by the Council on 29 September 2015 under Section 87(e) of the RMA. It is due to expire on 1 June 2026.

Eight special conditions are attached to the consent.

Special condition 1 requires the number of pigs (equivalent = 50 kg per pig) on the property at any one time shall not exceed 3,529 pig equivalents.

Special condition 2 requires the consent holder to adopt the best practicable option to prevent or minimise any actual or likely adverse effects.

Special condition 3 requires consultation should any alterations occur to the pig farming and effluent disposal processes, operations, equipment or layout which might change the nature or quantity of contaminants emitted from the site.

Special condition 4 requires the consent holder to minimise the emissions and impacts of air contaminants discharged into air from the site.

Special condition 5 and 6 restrict odours at or beyond the boundary of the site.

Special condition 7 requires the consent holder to provide an Odour Management Plan in accordance with consent 0715-4.

Special condition 8 provides for review of any or all of the conditions of the consent.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent which is appended to this report.

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;
- in 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 five times 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 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, BOD_5 (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, BOD_5 (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.

The monitoring programme allows for the effluent discharge and receiving water to be sampled on three separate occasions, preferably during the summer, autumn and spring periods.

2 Results

2.1 Water

2.1.1 Inspections

3 July 2017

An inspection was carried out at the Trust's piggery while collecting discharge and receiving water samples. Photos were taken of the new pump shed and associated floating influent pontoon. A 500 m cable had been recently trenched from Manutahi Road to the pump shed, to provide power. The level of the final pond was low, this was a direct result of favourable discharge conditions. Microbial activity on both the ponds was light due to the cold winter conditions.

Results for the samples collected were included in the 2016-2017 annual monitoring report.

31 October 2017

An inspection was carried out at the Trust's piggery to assess consent conditions. It was observed that the Waiongana Stream was in normal flow, and the oxidation ponds were not discharging. There was no noticeable odours off site, and all effluent was being treated and processed as per the requirements of the consent. The site appeared well managed and maintained.

8 March 2018

An inspection was carried out at the Trust's piggery while collecting discharge and receiving water samples. The Waiongana Stream was in fresh condition, resulting from heavy rain throughout the catchment prior to this visit, making it suitable for discharge. The final pond was estimated to be discharging at 15 L/s, this discharge had an earthy odour, and this odour was found not to be travelling off site. There was no obvious signs of environmental impact downstream of the discharge point. Good progress had been made with the land irrigation programme; a pump, suction line and ramp had recently been installed. Pond level was reading at approx. 570 mm, although the gauge was hard to read. It was recommend that the Council erect a staff gauge at the pump shed end of the pond.

21 May 2018

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 pond or about the boundary of the piggery. The composting area was found to be clean and tidy and no problems were arising from the screening and discharge of effluent to the large holding pond. The site was well maintained and it was obvious that staff had a good understanding of the systems in place, and how these systems would prevent any adverse effects on the environment.

18 June 2018

An inspection was carried out at the Trust's piggery while collecting discharge and receiving water samples. This occurred after the consent holder had informed the Council that the piggery was discharging treated wastewater into the Waiongana Stream. The stream was in fresh conditions at the time of inspection and the final pond discharge rate was estimated to be 15 L/s. No adverse environmental impacts were observed downstream of the discharge point due to the turbid stream conditions. Minimal microbial activity was observed on both of the ponds due to the cooler weather and the pond level was approximately 580 mm. The consent holder has kept the Council fully informed with the progress of the land irrigation programme. A copy of all discharges from the site was also received for the 2017-2018 period. There was no noticeable off site odours emanating downwind from the piggery.

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

Parameter	Unit	Number of samples	Range		Median
Conductivity @ 20°C	mS/m	25	212	313	274
pH	pH	25	7.6	8.3	8.0
Carbonaceous BOD_5	g/m^3	25	35	240	110
Ammoniacal nitrogen	g/m^3N	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^3N	8	95.4	358	260
Total phosphorus (P)	g/m^3P	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 are apparent for total BOD_5 (35% reduction) and suspended solids (40% reduction) following the removal of dairy wastes from the treatment system. Although concentrations for the parameters remain typical of piggery ponds treated wastewaters (particularly very high nutrient levels).

For context, sampling of the final aerobic pond wastewater discharge for nutrients was carried out on five separate occasions during 2013-2014. This was to evaluate nutrients: nitrogen (N), phosphorus (P) and potassium (K) when spray irrigating effluent to land commences.

The nutrient results from discharged wastewater indicate, that the annual loading of total nitrogen (N) = 3,551 kg, phosphorus (P) = 764 kg and potassium (K) = 3,277 kg.

The average discharge volume for the past nine years has been 14,313.6 m^3 per annum (284 actual discharge hours x 14 L/s discharge flow rate).

The 2017-2018 effluent discharge volume was calculated to be 15,573.6 m^3. While the cumulative total over the last nine years of effluent discharge came to 128,671.2 m^3.

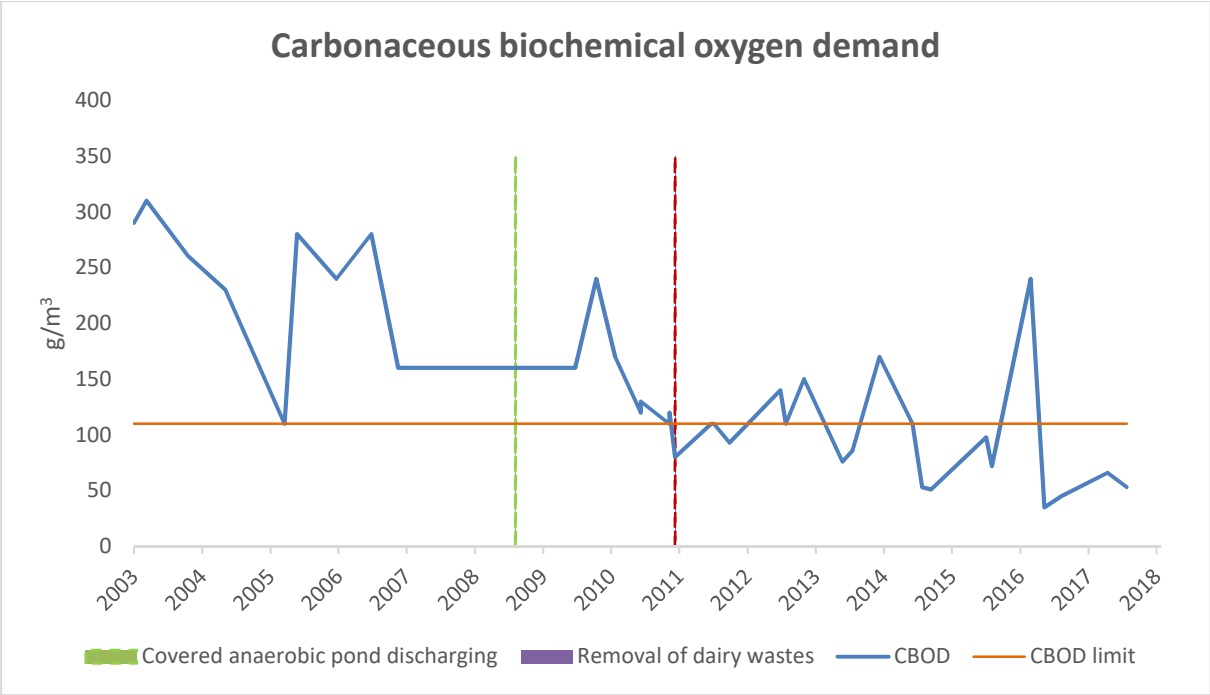

Figure 2 Wastewater carbonaceous biochemical oxygen demand levels, g/m^3, 2003-2018

(Note that the CBOD level of 110 gm^3 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 BOD concentrations in the discharge have been steadily decreasing. The odd spike, as seen in 2016 has been reported. Results from the 2017-2018 monitoring period show similar trends in decreasing concentration. In this monitoring period both discharge samples were observed to be below the BOD threshold limit of 110 m/g^3.

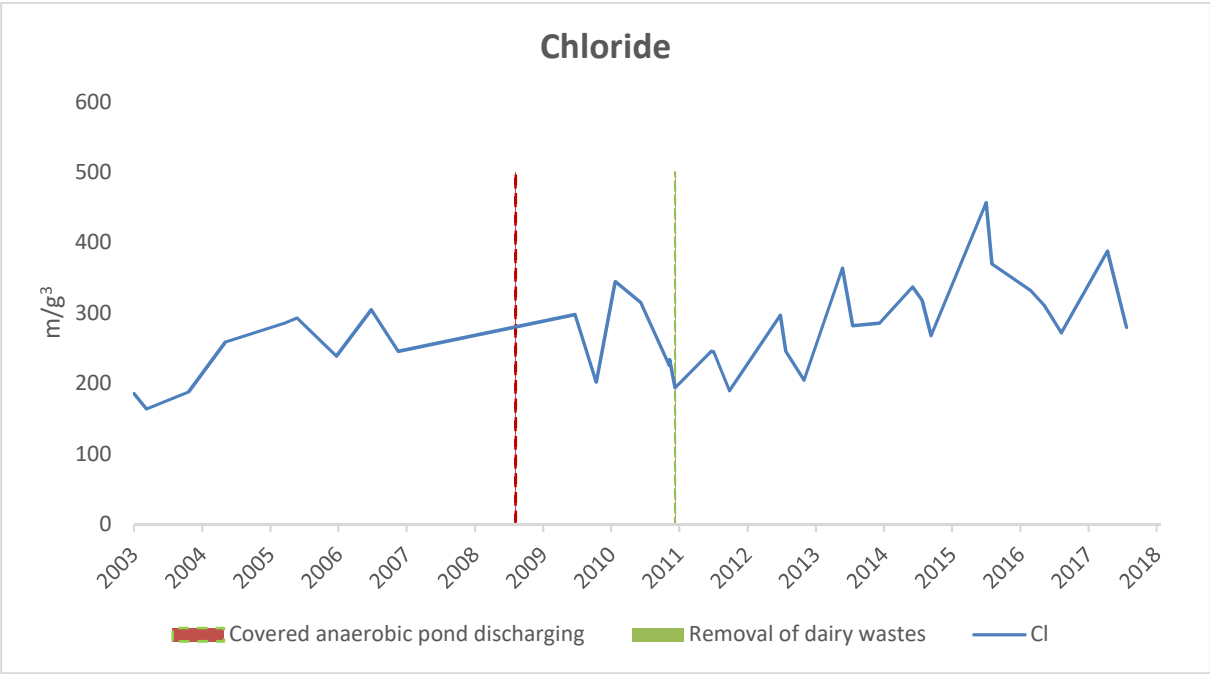

Figure 3 Wastewater chloride levels, g/m^3, 2003-2018

Chloride levels have detailed a slight increasing trend since 2013.

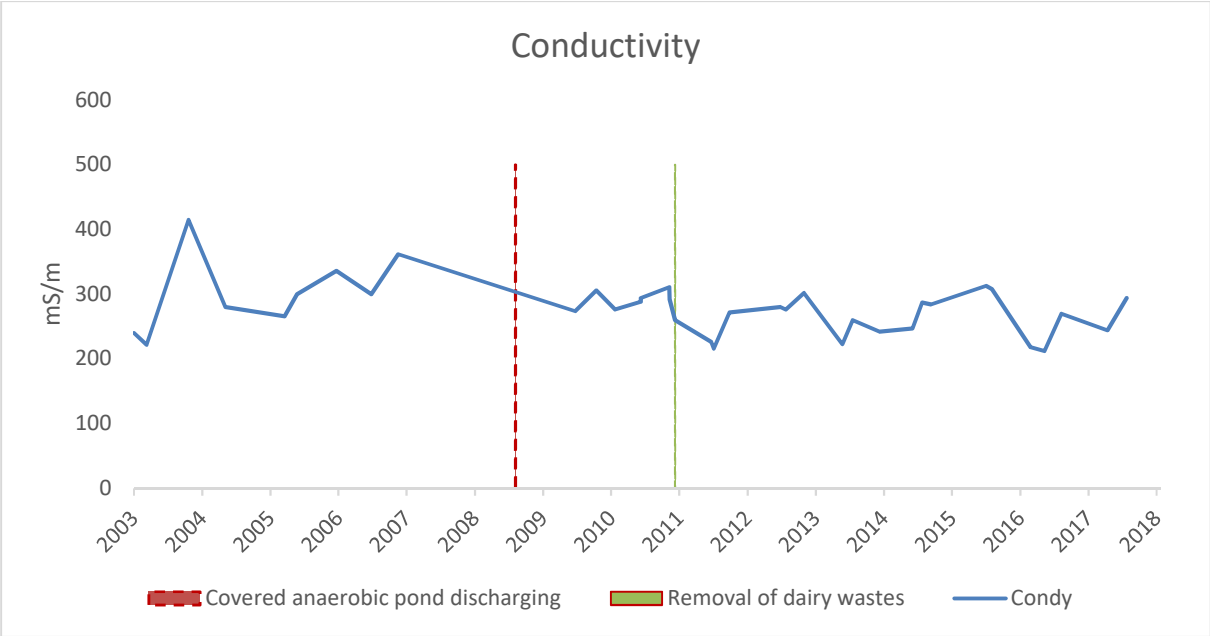

Figure 4 Wastewater conductivity measurements mS/m 2003-2018

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

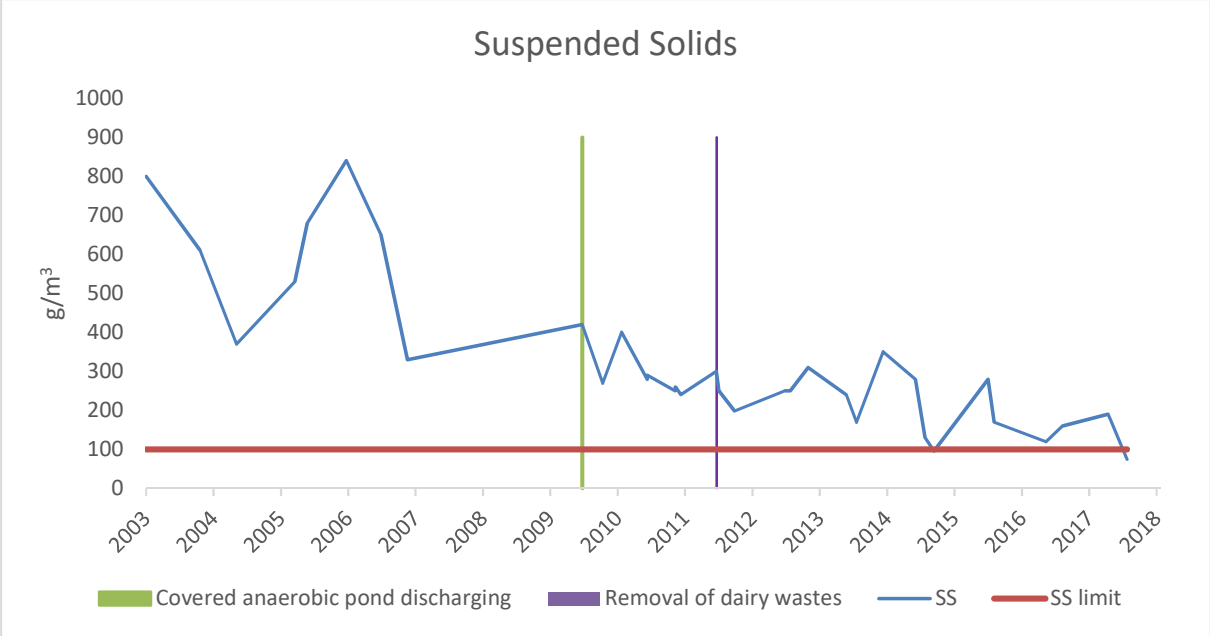

Figure 5 Wastewater suspended solids levels, g/m^3, 2003-2018

(Note that the suspended solids limit of 100 gm^3 has recently been removed from the consent conditions)

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

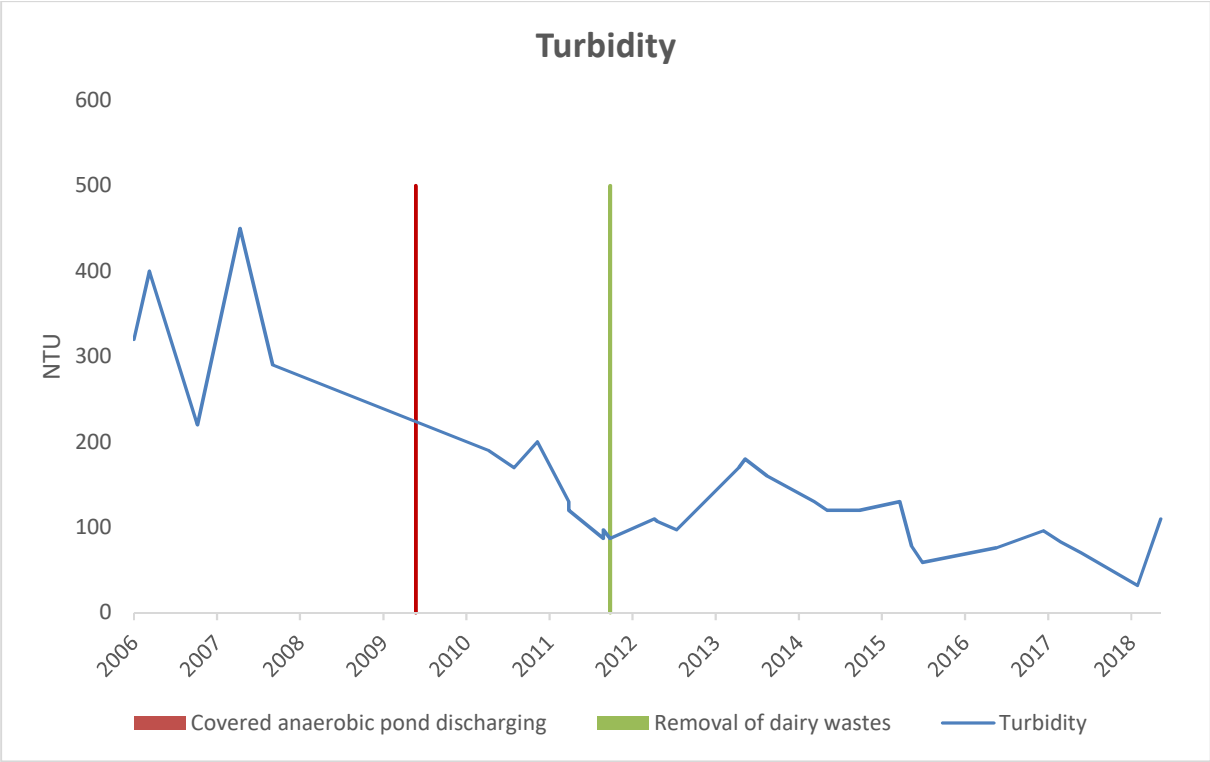

Figure 6 Wastewater turbidity levels, NTU, 2003-2018

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, five surveys of the piggery site were conducted by the Council. 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 to17. The physicochemical analysis of the samples was undertaken in the Council's IANZ registered laboratory.

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 08 March 2018

Samples were collected approximately five hours after the discharge had commenced 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 13 m^3/s. The stream was turbid and green brown in colour. The piggery wastewater flow rate from the final pond was estimated to be at 15 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 15 hours, ceasing when the stream flow had fallen to 5.2 m^3/s. The pond level at the time of sampling was observed to be 570 mm.

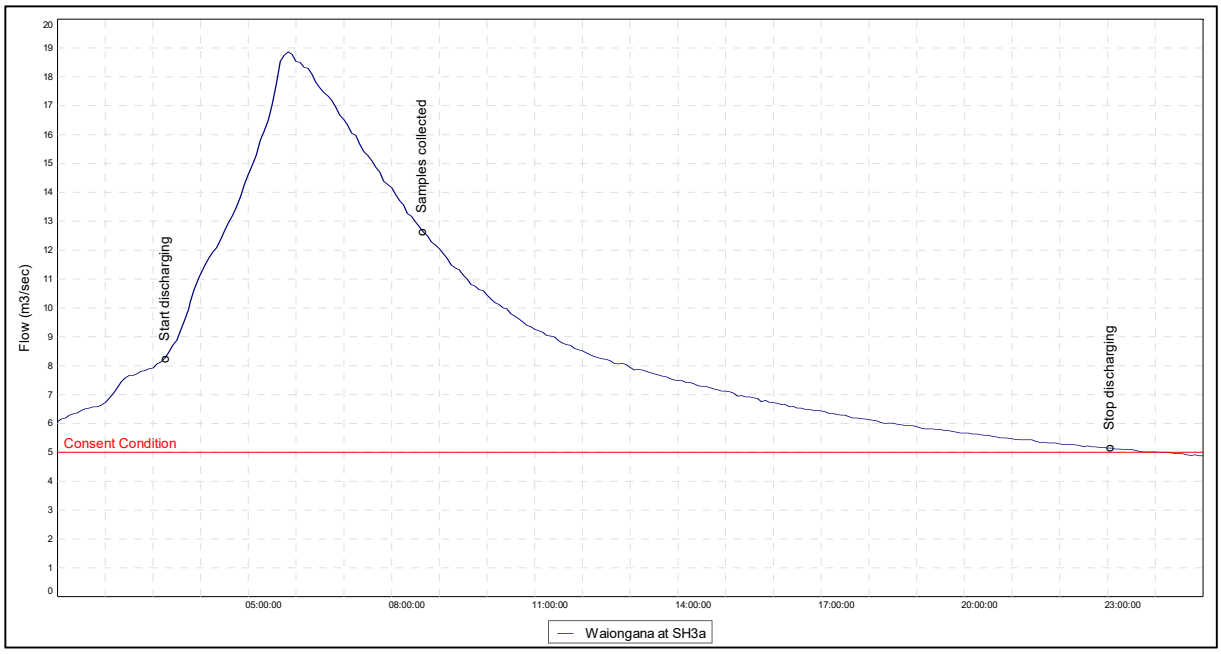

Figure 8 Flow data recorded for the Waiongana Stream during the discharge of wastewater from Leppers piggery, commencing 8 March 2018 at 0300 hrs and finishing 8 March 2018 at 2300 hrs

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 08 March 2018

Site		WGA000361	PGP002002	WGA000363	Consent
Parameter	**Unit**	**Upstream**	**Discharge**	**50 m d/s**	**limit**
Time	NZST	0845	0835	0855	
Temperature	°C	15.6	19.2	15.9	
Conductivity @ 20°C	mSm	9.3	244	9.7	
Chloride	g/m^3	11.4	388	12.2	
pH	pH	7.5	7.8	7.5	
BOD_5 (total carbonaceous)	g/m^3	-	66	-	
BOD_5 (carbonaceous filtered)	g/m^3	1.1	-	1.2	2.0 g/m^3 (d/s)
Ammoniacal nitrogen	g/m^3N	0.250	91.9	0.385	
Un-ionised ammonia	g/m^3N	0.00271	2.55699	0.00426	0.025 g/m^3 (d/s)
Dissolved reactive phosphorus	g/m^3P	0.067	-	0.123	
Suspended solids	g/m^3	79	190	80	
Turbidity	NTU	49	110	51	
Appearance		Turbid, brown	Turbid, green/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 m^3/s. That is, a minimum dilution ratio of 312.5:1.

These results indicated that the dilution rate was about 1 part effluent to 866 parts receiving water based on flow data and assumed flow rate. Given this significant dilution factor, the high suspended solids values in the discharge would have a negligible effect on the receiving water quality throughout the discharge period.

Ammoniacal nitrogen was seen to increase by 0.135 g/m^3 downstream from the discharge point, while un-ionised ammonia increased by 0.00155 g/m^3. 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 BOD_5 concentration of the discharge was measured at 66 g/m^3. This concentration is well below the consented limit of 110 g/m^3. The upstream site BOD_5 concentration was measured at 1.1 g/m^3, there was an increase of only 0.1 g/m^3 downstream of the discharge site, suggesting that BOD_5 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 18 June 2018

Samples were collected approximately an hour and half after the discharge had commenced during wet weather conditions after a period of heavy rain throughout the catchment. At the time of sampling the stream was in fresh and the flow rate was 52 m^3/s, and was turbid brown. With a peak flow of 55 m^3/s not long after the samples were taken. The piggery discharge flow rate from the final pond was estimated at 15 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 25 hours before ceasing when the river flow had fallen to 5 m^3/s.

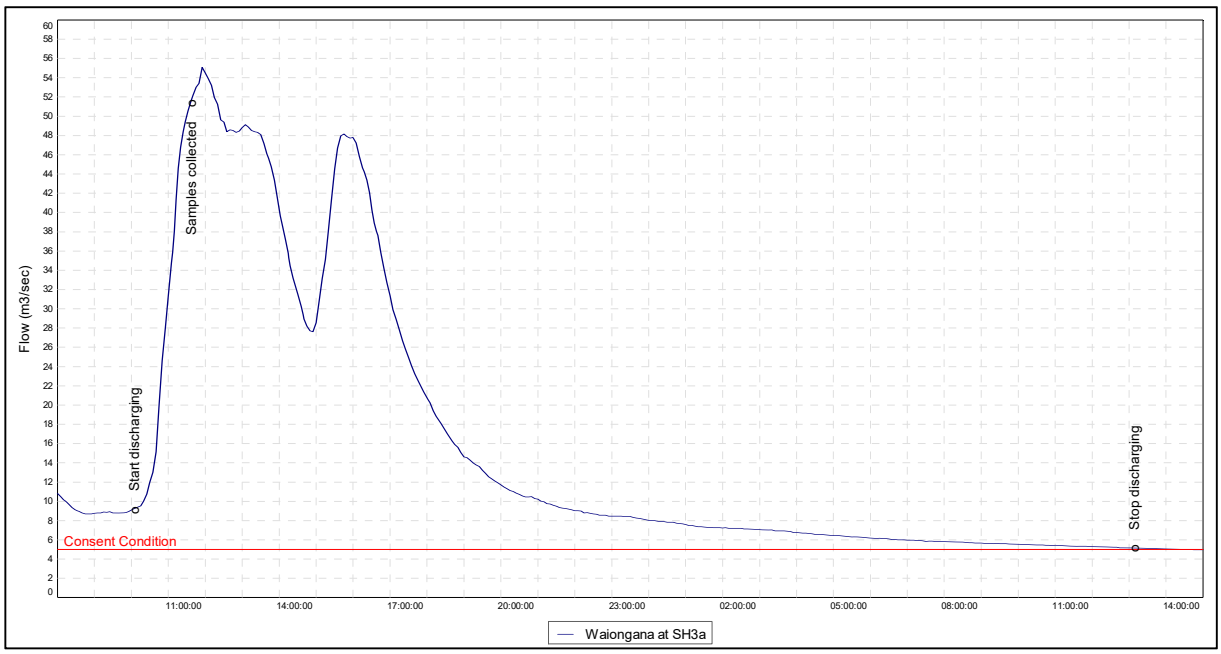

Figure 9 Flow data recorded for the Waiongana Stream during the discharge of wastewater from Leppers piggery, commencing 18 June 2018 at 1010 hrs and finishing 19 June 2018 at 1315 hrs

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 18 June 2018

Site		WGA000361	PGP002002	WGA000363	Consent
Parameter	**Unit**	**Upstream**	**Discharge**	**50 m d/s**	**limit**
Time	NZST	1130	1140	1120	
Temperature	°C	12.2	13.3	12.3	
Conductivity @ 20°c	mSm	8.5	294	9.4	
Chloride	g/m³	7.7	280	8.5	
pH	pH	7.6	8.2	7.6	
BOD_5 (total carbonaceous)	g/m³	-	53	-	
BOD_5 (carbonaceous filtered)	g/m³	<2	-	<2	2.0 g/m³ (d/s)
Ammoniacal nitrogen	g/m³N	0.184	163	0.36	
Un-ionised ammonia	g/m³N	<0.010	6.8	<0.010	0.025 g/m³ (d/s)
Dissolved reactive phosphorus	g/m³P	0.035	27	0.041	
Suspended solids	g/m³	270	75	250	
Turbidity	NTU	132	32	115	
Appearance		Turbid brown	Turbid dark green	Turbid, brown	

Based on flow data at the time of sampling the dilution rate was about 1 part effluent to 3,466 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 0.176 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 BOD_5. 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. BOD_5 was recorded at 53 g/m³ at the discharge, which is 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, 2017-2018

Discharge date	Duration (approx. hours)	Stream flow above 5 m^3/sec
1-3 July 2017 **sampled**	41	Yes
13-14 July 2017	21	Yes
21 July 2017	11	Yes
27 July 2017	9	Yes
9-10 August 2017	25	Yes
28 August 2017	8	Yes
21 September 2017	5.5	Yes
26-27 September 2017	23	Yes
3-4 November 2017	16	Yes
5 January 2018	9	Yes
18 January 2018	7	Yes
8 March 2018 **sampled**	20	Yes
22 March 2018	8	Yes
10 April 2018	5	Yes
11 April 2018	7.5	Yes
11 May 2018	7	Yes
13 May 2018	14	Yes
14 May 2018	10	Yes
15 May 2018	13	Yes
16-17 May 2018	22	Yes
18-19 June 2018 **sampled**	27	Yes
Total discharge hours	**309**	

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 m^3/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 m^3/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.

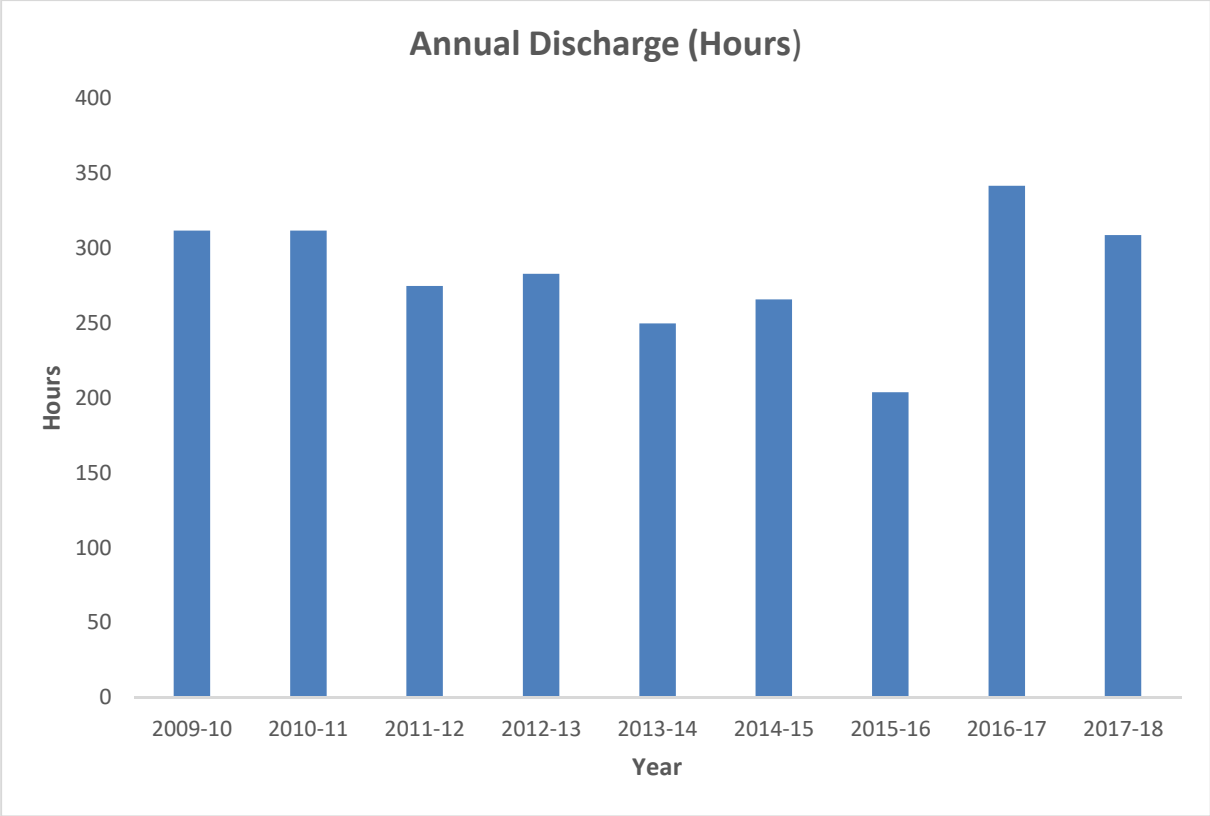

Figure 10 Yearly discharge hours

The average volume of wastewater discharged into the Waiongana Stream for the past nine years has been 14,313.6 m^3 per annum (284 actual discharge hours x 14 L/s discharge effluent flow).

For the 2017-2018 monitoring period there was a slight decrease in the volume of treated wastewater discharged into the Waiongana Stream compared to the previous year. But the overall volume is relatively high compared to earlier years.

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 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with 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.

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

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

In the 2017-2018 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Trust's piggery in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

In 2015, Consent 0715 was replaced 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. It also provides for disposal of the effluent to land through a spray irrigation system that will be constructed during the term of the consent. The new 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 aerobically, 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 2017-2018 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. All effluent was discharged to the Waiongana Stream. No discharge to land occurred, while preparations were made for construction of the land disposal system. The calculated volume of effluent discharged to Waiongana Stream was higher than usual, due largely to a wet spring. The Waiongana Stream flow was above the minimum rate required on each discharge occasion.

The piggery discharge was not shown to breach the receiving water limits on filtered carbonaceous BOD_5 or un-ionised ammonia on any of the monitoring occasions. The minimum effluent dilution requirement was achieved in each survey.

The BOD_5 values from the last two sampling runs continued the recent trend of low BOD_5.

Progress with construction of the irrigation system was largely in accordance with the Implementation Plan submitted with the application for consent 0715-4.1. A pump shed was constructed beside the final aerobic pond, and a 500-metre electric cable was laid between the shed and the newly installed power transformer on Manutahi Road. Pipework for effluent reticulation was purchased. Commissioning of the first stage of the irrigation system was planned for 2017-2018, by which time the required Effluent, Irrigation and Odour Management Plans will have been produced, in combined form.

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 upstream. Given the high flow conditions and relativity small increase in nutrients, environmental effects of the discharge are considered to be negligible.

There is no biological monitoring associated specifically with the piggery discharge, as 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. There is no indication that an individual point-source discharge is having a significant effect on Waiongana Stream. 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, with the objective of 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	No – all effluent discharged to water. Work in progress to establish land application system
2. Effluent generated from allowable pig numbers	Monitoring inspections and consent holder data	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?**
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
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	Plan to be submitted to Council	Yes
12. Consent to be exercised in accordance with the Effluent Irrigation Management Plan	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	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	N/A
21. No effluent ponding on land	Discharge to land progressively over a 5 year period	N/A
22. Limits on potassium applied to land	Discharge to land progressively over a 5 year period	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?**
23. Limits on total nitrogen applied to land	Discharge to land progressively over a 5 year period	N/A
24. No discharge within 25 m of surface water	Discharge to land progressively over a 5 year period	N/A
25. Notification of unauthorised effluent discharge	Monitoring and self-notification	Yes
26. Review of consent	Next consent review June 2021	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 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
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

During the year, 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 2016-2017 Annual Report

1. THAT in the first instance, monitoring of consented activities at D H Lepper Trust Piggery in the 2017-2018 year continue at the same level as in 2016-2017 period except where noted below.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the 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 m^3/sec.
4. That the frequency of Inspections in the 2017-2018 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.

3.5 Alterations to monitoring programmes for 2017-2018

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.

In the case of DH Lepper Trust Piggery monitoring programme, it is proposed that for the 2018-2019 period, monitoring continues as set out in the 2017-2018 compliance monitoring programme except where noted in the recommendations

With the commencement of irrigation to land in 2018-2019, provision is made for additional inspection, should a problem arise with odour. As the conditions on consent 0715-4.1 impose limits on nitrogen and potassium loadings on irrigation areas, those components in the effluent shall be monitored in 2018-2019.

The frequency of sampling the discharge to Waiongana Stream,, is high in comparison to similar discharges in the region. It is recommended that, the frequency of sampling can be reduced to biannual.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2018-2019.

4 Recommendations

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 m^3/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.

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 20°C and expressed in mS/m.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	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.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.

NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
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	*Resource Management Act 1991* 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.

Bibliography and references

Taranaki Regional Council (2017). Taranaki Regional Council Requirements for good farm management in Taranaki, March 2017

Taranaki Regional Council (2016b). DH Lepper Trust Piggery Monitoring Programme Annual Report 2015-2016 Technical Report 2016-95

Taranaki Regional Council (2016a). Freshwater Periphyton Monitoring Programme (Periphyton monitoring in relation to amenity values) State of Environment Monitoring Report 2014-2016 Technical Report 2016-34

Taranaki Regional Council (2016). Freshwater Macroinvertebrate Fauna Biological Monitoring Programme Annual State of Environment Monitoring Report 2015-2016 Technical Report 2016-33

Taranaki Regional Council (2015). DH Lepper Trust Piggery Monitoring Programme Annual Report 2014-2015 Technical Report 2015-64

Taranaki Regional Council (2014). DH Lepper Trust Piggery Monitoring Programme Annual Report 2013-2014 Technical Report 2014-28

Taranaki Regional Council (2013). DH Lepper Trust Piggery Monitoring Programme Annual Report 2012-2013 Technical Report 2013-03

Taranaki Regional Council (2012). DH Lepper Trust Piggery Monitoring Programme Annual Report 2011-2012 Technical Report 2012-33

Taranaki Regional Council (2011). DH Lepper Trust Piggery Monitoring Programme Annual Report 2010-2011 Technical Report 2011-34

Taranaki Regional Council (2010). DH Lepper Trust Piggery Monitoring Programme Annual Report 2009-2010 Technical Report 2010-12

Taranaki Regional Council (2009). DH Lepper Trust Piggery Monitoring Programme Annual Report 2008-2009 Technical Report 2009-34

Taranaki Regional Council (2008). DH Lepper Trust Piggery Monitoring Programme Annual Report 2007-2008 Technical Report 2008-16

Taranaki Regional Council (2007). DH Lepper Trust Piggery Monitoring Programme Annual Report 2006-2007 Technical Report 2007-50

Taranaki Regional Council (2006). DH Lepper Trust Piggery Monitoring Programme Annual Report 2005-2006 Technical Report 2006-61

Taranaki Regional Council (2005). DH Lepper Trust Piggery Monitoring Programme Annual Report 2004-2005 Technical Report 2005-24

Taranaki Regional Council (2004). DH Lepper Trust Piggery Monitoring Programme Annual Report 2003-2004 Technical Report 2004-79

Taranaki Regional Council (1990). Review of monitoring and inspectoral procedures for dairy shed oxidation pond waste treatment systems. Taranaki Regional Council Technical Report 90-42

Miscellaneous references

Ministry for the Environment Good Practice Guide for Assessing & Managing Odour in New Zealand – June 2003

New Zealand Pork Industry Board – Pork Industry guide to Managing Environmental Effects EnviroPork – 2005

NIWA Year in Review 2011 Energy Section

Fish & Game (Taranaki Region) Re Consent 0715-4.1 - discharge to the Waiongana Stream).

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 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 Date:	9 January 2002

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

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. 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.

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.

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 in 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.

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.

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

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):	8 September 2015
Commencement Date (Change):	29 September 2015 (Granted Date: 13 November 2008)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from a pig farming operation and associated practices including solids composting, effluent treatment system, effluent application to land and other waste management activities
Expiry Date:	1 June 2026
Review Date(s):	June 2016, June 2020
Site Location:	Mountain Road, Lepperton
Legal Description:	Pt Lot DP 2634 Sec 185 Huirangi Dist Blk VII Paritutu SD Lot 3 DP 21006 (Discharge source & site)
Grid Reference (NZTM)	1703992E-5675964N (Land & air) 1704041E-5674835N (Air)

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

General conditions

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

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

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

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

Special conditions

1. The number of pigs (equivalent 50 kg per pig) on the property at any one time shall not exceed 3529 pig equivalents.

2. Notwithstanding any other condition of this consent, 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.

3. Prior to undertaking any alterations to the piggery unit's processes, operations, equipment or layout, which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and its amendments.

4. The consent holder shall minimise the emissions and impacts of contaminants discharged into air from the site by:

    (a) the selection of the most appropriate process equipment;
    (b) process control equipment and emission control equipment;
    (c) the methods of control;
    (d) the proper and effective operation, supervision, maintenance and control of all equipment and processes; and
    (e) the proper care of all pigs on the site.

5. The discharges authorised by this consent shall not give rise to an odour at or beyond the property boundary that is offensive or objectionable.

6. For the purposes of condition 5, 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 three (3) hours continuously, or it occurs frequently during a single period of more than six (6) hours; and/or
   (c) no less than three 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:
      i. the individuals' names and addresses;
      ii. the date and time the objectionable or offensive odour was detected;
      iii. details of the duration, frequency, intensity and nature of the odour that cause it to be considered offensive or objectionable;
      iv. the location of the individual when it was detected; and
      v. the prevailing weather conditions during the event.

7. Prior to any discharge in accordance with consent 0715-4, the consent holder shall provide an Odour Management Plan which details to the satisfaction of the Chief Executive of Taranaki Regional Council how odorous emissions beyond the property boundary will be minimised. The plan shall include:

   (a) A definition of the environmental effects being managed by the plan and the objective sought in relation to this effect;
   (b) Identify key personnel responsible to managing the effect;
   (c) Describe the activities on the site and describe the main potential sources of odour emissions;
   (d) Identify and describe methods of mitigation and operating procedures including the dewatering of the anaerobic pond or during control contingency discharge events;
   (e) Monitoring methods including record keeping of maintenance and control parameters, any odour complaints received and weather conditions present at time of complaints.

   Thereafter, the piggery and associated waste management practices shall be operated in accordance with the plan.

8. 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 2016 and/or June 2020, 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 8 September 2015

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director - Resource Management