

DH Lepper Trust Piggery  
Monitoring Programme  
Annual Report  
2009-2010  
Technical Report 2010–12

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## Executive summary

The DH Lepper Trust owns and operates a piggery located on Mountain and Manutahi Roads, and an adjoining dairy farm located on Manutahi Road, in the Waiongana catchment. The Company holds resource consents for the discharge of treated piggery and dairy effluent to water, and for the discharge of emissions into the air. This report for the period July 2009-June 2010 describes the monitoring programme implemented by the Taranaki Regional Council to assess the Company's environmental performance during the period under review, and the results and environmental effects of the Company's activities.

The Company holds three resource consents, which include a total of 24 special conditions setting out the requirements that the Company must satisfy.

The Council's monitoring programme included five inspections and several information visits to the piggery during the commissioning phase of the new covered anaerobic pond.

Because the existing treatment ponds are located in close proximity to Lepperton residential properties, odour issues had become a concern within some resident quarters, particularly those to the south east. Residential encroachment and reverse sensitivity issues in the rural countryside are also a major concern for the pork industry in many parts of New Zealand.

The consent holder, in consultation with NIWA scientists and the New Zealand Pork Industry Board has constructed a covered anaerobic pond [digester] as part of an upgrade of the piggery wastewater treatment system to help minimise ongoing odour issues and also capture and utilise extracted biogas for on site energy requirements. It is expected that the final treated wastewater that discharges into the Waiongana Stream during high river flow conditions will be of a higher quality due to the additional treatment provided via the covered anaerobic pond.

Monitoring indicated a high level of environmental performance and generally good consent compliance.

During the monitoring programme, the consent holder has ensured that consented receiving water dilution ratios were maintained throughout limited discharge periods. The consent holder has supplied the Council with effluent discharge records, including notification of discharges to water and land however the records did indicate that discharges had continued to occur when the river flow was below the allowable consented condition.

The consent holder has applied considerable effort and technology to minimise odour, reducing methane emissions, developing renewable energy resources and potentially producing a higher quality treated effluent wastewater discharge. As a result of these recent innovations the Taranaki Regional Council presented Lepper's Piggery with an 'Environmental Award' for agricultural excellence.

This report includes recommendations for the monitoring programme for the 2009-2010 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 the Annual Report for the period July 2009-June 2010 by the Taranaki Regional Council on the monitoring programme associated with resource consents held by DH Lepper Trust. The DH Lepper Trust operates a piggery situated on Mountain Road (SH3a). The waste water treatment ponds system consists of two oxidation treatment ponds situated on Manutahi Road in the Waiongana catchment and a covered anaerobic pond which is located adjacent to the piggery.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the DH Lepper Trust that relate to a discharge of water within the Waiongana catchment, and the air discharge permit held by DH Lepper Trust to cover emissions to air from the site.

One of the intents of the Resource Management Act (1991) 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 Taranaki Regional Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the consent holder's use of both water and air.

### **1.1.2 Structure of this report**

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the Resource Management Act and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by the DH Lepper 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 by the Company.

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

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

Section 4 presents recommendations to be implemented in the 2010-2011 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 Resource Management Act 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 a discharger, and may include cultural and socio-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 (e.g., recreational, cultural, or aesthetic);
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Taranaki Regional Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each discharge source. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the Resource Management Act to assess the effects of the exercise of consents.

In accordance with section 35 of the Resource Management Act 1991, the Council undertakes compliance monitoring for consents and rules in regional plans; and maintains an overview of performance of resource users against regional plans and consents. Compliance monitoring, including impact monitoring, also enables the Council to continuously assess its own performance in resource management as well as that of resource users particularly consent holders. It further enables the Council to continually re-evaluate its approach and that of consent holders to resource management, and, ultimately, through the refinement of methods, to move closer to achieving sustainable development of the region's resources.

### 1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by the DH Lepper Trust in the Waiongana catchment during the period under review, this report also assigns an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or trivial (such as data supplied after a deadline) non-compliance with conditions.
- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the year were negligible or minor at most, items of concern were resolved positively, co-operatively, and quickly, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with.

- **improvement desirable** indicates that the Council may have been obliged to record a verified unauthorised incident involving significant environmental impacts against the company, and/or abatement notices may have been issued; there were adverse environmental effects arising from activities and intervention by Council staff was required, and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at end of the period under review.
- **poor** performance is used when there were grounds for prosecution or infringement notice.

## 1.2 Process description

The piggery operates as a 'farrow to finish' breeding and fattening unit, holding approximately 400 adult pigs and 3000 growers. The Council has calculated the total pig equivalents for the piggery equals 3420 units based on 50 kg pig equivalents.

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 brought in grains and feed supplements. Recycled local waste food supplies including waste bread from local suppliers are mixed to produce a protein meal for the stock.

Stock holding pens are washed down on a daily basis and the waste is conveyed through pipes to a central collection tank. From this point, all the waste material is channelled through a solids separator contra shear screen (Photo 1) 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 50:50 with sawdust.



**Photo 1** Solids separator and collection system

This mixture is then transferred to a large covered compost bunker (Photo 2) where over a five day period it is aerated and heated to 70°C until well composted. This composting process elevates the temperature which kills harmful pathogens as well as helping to stabilize the product, and the forced aeration provides oxygen to get aerobic bacteria working.



**Photo 2** Covered aerated composting bunker

The final product, 'Grunt' is bagged and sold commercially as a soil conditioner. The screening of waste material reduces solids, biochemical oxygen demand [BOD] and some nutrients contained in the liquid effluent. Liquid piggery effluent passes through a sand trap and collection sump before being pumped to the effluent treatment system (Photo 3).

Until recently, all liquid effluent from the piggery was pumped via a pipeline directly to the off-site oxidation ponds some 1490 metres away located on the opposing banks of the Waiongana River near Lepperton for further treatment. The original oxidation pond system was established in 1981 and consists of two large ponds, an anaerobic and an aerobic pond. The design of the ponds was based upon Ministry for Agriculture and Forestry specifications as they existed at the time of construction.

The new covered anaerobic pond (Photo 4) is situated close to the piggery itself. Liquid effluent from the piggery discharges is pumped directly to the covered anaerobic pond for primary treatment prior to discharging to the two off-site oxidation ponds referred to above. Biogas is produced from the anaerobic digestion process and captured and stored beneath the plastic cover on the anaerobic pond.



**Photo 3** Collection sump and pumps



**Photo 4** Covered anaerobic pond – flexible drainage pipes hold the cover in situ

The biogas is compressed (Photo 5) and forced through a hydrogen sulphide scrubber to a converted six-cylinder diesel engine that spins a 40 kilowatt generator (Photo 6).



**Photo 5** Biogas compressor



**Photo 6** Six cylinder diesel engine and generator

This produces half of the piggery's electricity from approximately 200 m<sup>3</sup> of gas daily. Rainwater is collected from off the top of the covered anaerobic pond and is pumped back and used in the piggery.

A tank has been installed to store collected recycled water from the anaerobic pond discharge and flush out the piggery sheds. Effluent is piped back to the anaerobic pond.

G Lepper also farms 500 dairy cows on the adjoining property. Effluent from the dairy shed undergoes a primary anaerobic treatment in a settling pond referred to as 'the dairy pond'. The dairy effluent then flows into the effluent pipeline from the piggery and the mixed effluent stream is transported to the existing oxidation ponds near Lepperton for secondary treatment.

Bacteria present in the two off-site oxidation ponds break-down the contents of the effluent further. Periodically during high river flows, the applicant discharges treated water from the final aerobic pond into the neighbouring Waiongana Stream in compliance with the conditions of consent 0715.

Occasional de-sludging and effluent removal is required as part of the maintenance of the pond system. The material removed from this process is spread onto the applicant's surrounding farmland as a fertiliser. An annual practice has developed whereby effluent from the original anaerobic pond is applied to land in late autumn under suitable weather conditions and neighbours are notified of this event in advance. The activity is carried out in order to meet the conditions of Rule 40 of the Regional Air Quality Plan [RAQP].

## 1.3 Resource consents

### 1.3.1 Water discharge permit

Section 15(1) (a) of the Resource Management Act 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.

DH Lepper Trust holds consent **0715-3** to discharge treated piggery and farm dairy effluent from a treatment ponds system into the Waiongana Stream during fresh (high flow) conditions. This renewed consent was issued by the Taranaki Regional Council on 19 December 2002 as a resource consent under Section 87(e) of the Resource Management Act. It is due to expire on 1 December 2013.

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 (e.g. appearance, turbidity) while biological effects may be more subtle.

Eleven special conditions are included in Resource Consent 0715-3:

Special condition 1 relates to the operation of the piggery and associated activities and discharges.

Special condition 2 defines the point of discharge.

Special condition 3 requires the maintenance of a minimum dilution rate at all times in the receiving water.

Special condition 4 defines a minimum flow in the Waiongana Stream at which the discharge may occur.

Special conditions 5 and 6 define the mixing zone and prohibit a number of effects.

Special condition 7 requires the consent holder to operate and maintain the treatment and discharge system to ensure compliance.

Special condition 8 requires the consent holder to monitor and maintain records of the discharge.

Special conditions 9 and 10 require effluent from the aerobic pond to be discharged onto and into land via irrigation at least once annually during the summer/autumn period and notification to be provided prior to any irrigation.

Special condition 11 provides for review of the consent.

The permit is attached to this report in Appendix I.

### 1.3.2 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 categories set out in Section 14.

DH Lepper Trust holds consent **0188-3** to cover the take of water from an unnamed tributary of the Waiongana Stream for piggery operation purposes.

This permit was re-issued by the Council on 09 January 2002 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.

### **1.3.3 Air discharge permit**

Section 15(1)(c) of the Resource Management Act 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.

DH Lepper Trust holds air discharge permit **5206-2** to discharge emissions into the air from a pig farming operation and associated practices, including solids composting, effluent treatment and other waste management activities. This permit was issued by the Taranaki Regional Council on 13 November 2008 as a resource consent under Section 87(e) of the Resource Management Act.

Ten special conditions are attached to the consent.

Special condition 1 requires the number of pigs [equivalent = 50kg per pig] on the property at any one time shall not exceed 3500 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 the new anaerobic pond to be covered and biogas utilised as an energy source.

Special condition 4 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 5 requires the consent holder to minimise the emissions and impacts of air contaminants discharged into air from the site.

Special condition 6 restricts odours at or beyond the boundary of the site.

Special condition 7 allows intermittent offensive and objectionable odour, beyond the property boundary for a limited period while anaerobic to aerobic pond conditions settle.

Special condition 8 outlines odour emission reporting which may be deemed offensive or objectionable.

Special condition 9 requires an Odour Management Plan outlining how odorous emissions beyond the boundary are minimised.

Special condition 10 provides for review of any or all of the conditions of the consent.

The permit is attached to this report in Appendix I.

## **1.4 Monitoring programme**

### **1.4.1 Introduction**

Section 35 of the Resource Management Act sets out an obligation for the Taranaki Regional Council to: gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region.

The Taranaki Regional 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 DH Lepper Trust site consisted of three primary components.

### **1.4.2 Programme liaison and management**

There is generally a significant investment of time and resources by the Taranaki Regional Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application, in discussion over monitoring requirements, preparation for any reviews, renewals, or new consents, advice on the Council's environmental management strategies and the content of regional plans, and consultation on associated matters.

### **1.4.3 Site inspections**

The DH Lepper Trust site was visited seven times during the monitoring period, five of which were compliance monitoring inspections. The main point of interest was the development of the new covered anaerobic pond and utilization of recovered biogas, solids separator and composting system and treatment ponds system with associated actual and potential emission sources and characteristics.

### **1.4.4 HSNO inspections**

In addition to RMA compliance monitoring inspections, the Council carried out HSNO (Hazardous Substances and New Organisms Act) compliance inspections at various sites during 2008-2009. The piggery site was visited 5 times during the monitoring period. Visits were aimed at providing HSNO-related advice and

information to companies; assisting them to understand relevant requirements and helping them progress towards achieving compliance within a reasonable period of time. For reasons of efficiency inspections were generally undertaken in conjunction with RMA compliance inspections.

#### **1.4.5 Physicochemical sampling**

The Taranaki Regional Council sampled the discharges from the treatment ponds system and the water quality upstream of the discharge point and downstream of the designated mixing zone on three occasions.

The new covered anaerobic pond wastewater discharge was sampled on five separate occasions to evaluate and assess the ponds performance.

The monitoring programme allows for the effluent discharge and receiving water to be sampled on two occasions. When discharging to the Waiongana Stream the consent holder advises the Council staff, who undertake sampling if required.

Because no physicochemical sampling was performed during the 2008-2009 monitoring period an extra sample run was performed during the 2009-2010 monitoring period. Low river flow conditions during the 2008-2009 period prevented suitable discharge opportunities to the stream. It also took several weeks to establish an operating level in the new covered anaerobic pond.

Wastewater sampling from the covered anaerobic pond discharge was performed on five occasions to determine the nutrient value (NPK) of the wastewater and to ascertain potential improved downstream effects regarding odour and BOD.

## **2. Results**

### **2.1 Water**

#### **2.1.1 Wastewater dilution establishment**

The wastewater discharge flow from the aerobic pond has been calculated at 14 litres per second.

Flow rates in the Waiongana Stream are recorded at the SH3a hydrological site. The consent holder has access to the Taranaki Regional Council web site ([www.trc.govt.nz](http://www.trc.govt.nz)) which provides current river flow and water levels for the Waiongana Stream recorded at SH3a upstream of the pond discharge point. The information allows the consent holder to monitor and discharge during optimum river flow conditions in compliance with Special Consent condition 4.

The river level and flow data are automatically entered on the Council database. The data is analysed every two hours and a graph is provided within ten minutes of downloading.

The Waiongana Stream rise and fall is usually rapid, typical of all Taranaki mountain ring plain streams, and the actual opportunity where treated effluent can be discharged to the stream is limited.

#### **2.1.2 Inspections**

##### **25 August 2009**

The first inspection for the monitoring period was carried out during fine weather to look at the piggery operation in general in relation to the effluent collection and disposal systems including the solids separation, composting and treatment ponds system.

The covered anaerobic pond was producing biogas which was being temporarily vented to atmosphere until such time as the downstream generating facilities are installed.

The anaerobic pond discharge was greyish in colour, with a moderate odour from around the open discharge sump and vent. The sump below the solids separation area required cleaning out to allow only treated effluent to go to the lower oxidation ponds. Throughout the inspection there were only normal odours at the various sites around the piggery.

The old anaerobic pond had microbial activity occurring (bubbling). There were noticeable, but not offensive odours from this pond. The final pond was full awaiting discharge to the Waiongana Stream during the next high river flow conditions.

##### **18 November 2009**

This inspection was carried out after the consent holder had informed TRC that the piggery was discharging treated effluent into the Waiongana Stream. The river was running at a high flow, peaking at 34 m<sup>3</sup>/sec, due to recent wet weather conditions. Water quality samples of the discharge and receiving waters were collected on this

occasion. The lower aerobic ponds appeared to be operating effectively after contractors had recently desludged the ponds. Effluent was spray irrigated to a nearby maize crop. Slight odour was noticed downwind from the first downstream pond and there was very little odour emanating from the final pond. It was also noted that the piggery in general had normal odours at various sites around the piggery perimeter but more noticeable at the wastewater collection sump below the composting area. There were slight odours coming from the covered anaerobic pond vent. Methane gas was being vented to atmosphere in a controlled fashion to prevent too much gas build up beneath the cover which may have caused damage if left unvented. The recent improvement to the wastewater treatment system appeared to have significantly reduced odour from ponds system resulting in no recent odour complaints from around the Lepperton township. It was also noted that the piggery was very well managed.

### **17 February 2010**

Normal piggery odours were detected at various sites around the piggery. The covered anaerobic pond was producing biogas and was being fed to the new generator. [The biogas is initially compressed, scrubbed to remove traces of hydrogen sulphide, then used as fuel to a power a six cylinder diesel engine that generates up to 40 kilowatt of power]. No hydrogen sulphide odour was detected coming from the genset emissions.

An odour survey was carried out around the Lepperton township with no downwind odour being noticed. The aerobic ponds appeared to be working effectively.

### **21 April 2010**

This annual inspection of the cowshed and the piggery oxidation ponds was carried out during fine weather conditions. A light westerly breeze was blowing. No treated effluent was being discharged from the final pond into the Waiongana Stream at the time of inspection. The aerobic ponds appeared to be all working satisfactory, emitting no odour. An inspection of the piggery was not required on this occasion.

### **17 May 2010**

A compliance monitoring inspection and sampling run was carried out during fine weather after the consent holder had informed TRC that treated piggery effluent was being discharged into the Waiongana Stream. The stream was running high and receding after a fresh. Water quality samples were collected upstream and downstream from the point of discharge in the Waiongana Stream including samples from the treated effluent and covered anaerobic pond discharge. There was no visual environmental impact noted at the downstream monitoring site.

An inspection was carried out around the perimeter of the pond system which found no offensive odour from the ponds under a very slight northerly breeze. The final pond level was 650mm and the discharge valve was fully open.

An odour survey was conducted around Sission & Smith Streets including Burkhart's engineering workshop to check for any recent odour problems. Only occasional silage and general cattle odours had been noticed and no piggery odour.

The drainage and effluent collection systems behind the piggery were also inspected. The separator and the genset unit was operating at the time of inspection.

In general the piggery was found to be tidy with normal piggery odours noticed around the buildings with some odour at the anaerobic pond discharge sump although quickly dissipating.

### 2.1.3 Analytical results of wastewater and receiving water physicochemical monitoring

During the monitoring period, five inspections of the piggery site were conducted by Taranaki Regional Council staff. Samples were collected on three of these occasions for physicochemical analysis in the Taranaki Regional Council IANZ- registered laboratory.

Samples were also collected from the covered anaerobic pond effluent discharge on five separate occasions to establish the nutrient values for irrigation purposes and to assess reductions in waste loadings.

Sampling sites are located as listed in Table 1 and illustrated in Figure 1.

**Table 1** Location of sampling sites

Site	Site code	GPS reference	Location
Waiongana Stream	WGA000361	N1704445 E5676110	100 m u/s of discharge
Piggery final treated effluent	PGP002002	N1704469 E5676207	Aerobic pond adjacent to outlet
Piggery wastewater effluent	PGP005001	N1704076 E5674877	Covered anaerobic pond discharge (at piggery)
Waiongana Stream	WGA000363	N1704466 E5676273	50 m d/s of discharge

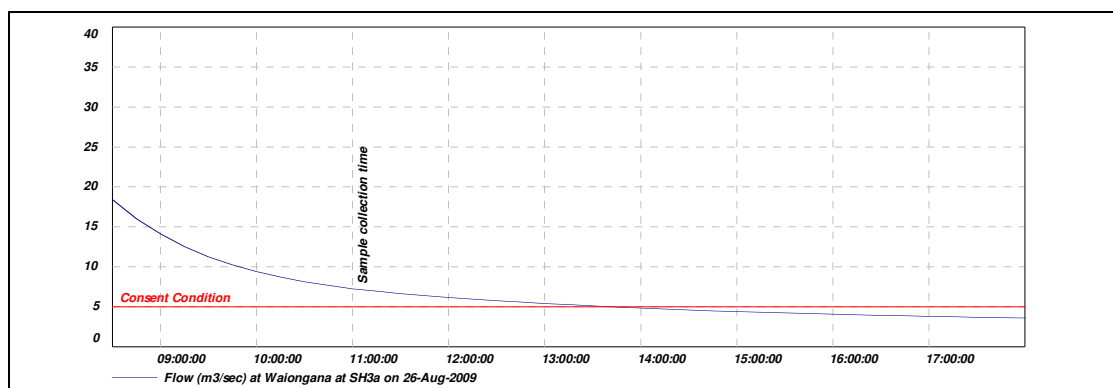


**Figure 1** Aerial location map of sampling sites in the Waiongana Stream

## 2.1.4 Receiving water monitoring

### Survey of 26 August 2009

The initial receiving water monitoring survey was performed after the consent holder had informed the Council that the piggery was discharging treated effluent to the Waiongana Stream. Samples were collected during fine weather on the recession river flow after a heavy rainfall event throughout the catchment. Prior to the discharge of treated effluent, a maximum river flow of  $87\text{m}^3/\text{sec}$  was recorded. River flow was  $17.5\text{ m}^3/\text{sec}$  when the discharge commenced (Figure 2).



**Figure 2** Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 26 August 2009

Sampling was performed only in the receiving waters of the Waiongana Stream at a flow of approximately 7m<sup>3</sup>/sec, some two and a half hours after the discharge commenced. Results of the survey are presented in Table 2.

**Table 2** Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 26 August 2009

Site location		WGA000361 Waiongana Stream upstream	WGA000363 Waiongana Stream downstream	PGP002002 Piggery final pond effluent
Parameter	Unit			
Temperature	°C	11.5	11.6	-
Conductivity @ 20°C	mS/m	5.3	5.6	-
Chloride	g/m <sup>3</sup>	6.9	7.0	-
pH		7.0	7.0	-
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	-	-	-
Filtered carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	1.4	1.4	-
Ammoniacal nitrogen	g/m <sup>3</sup> N	0.108	0.270	-
Unionised ammonia	g/m <sup>3</sup> NH <sub>3</sub>	0.00027	0.00069	-
Dissolved reactive phosphorus	g/m <sup>3</sup> P	0.046	0.052	-
Turbidity	NTU	60	69	-
Suspended solids	g/m <sup>3</sup>	80	88	-
Appearance		N/R	N/R	

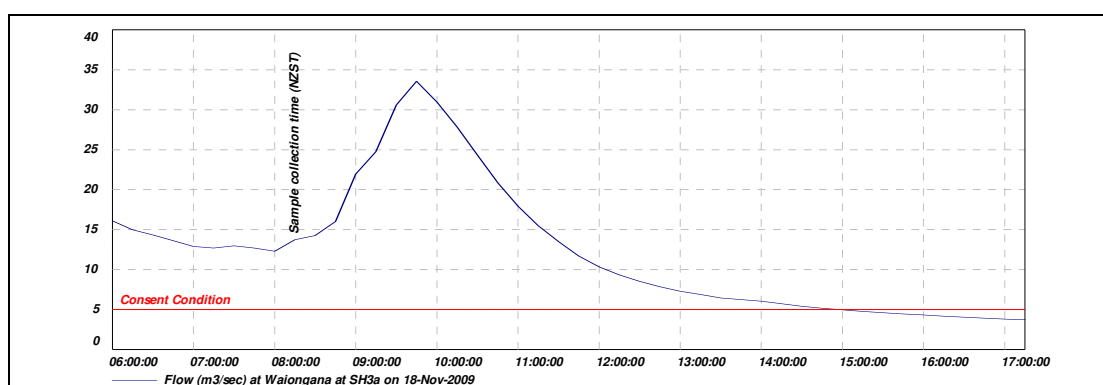
These results indicated minimal effects of the pond treated wastewater discharge to the river in terms of filtered BOD<sub>5</sub>, pH, conductivity, turbidity, suspended solids and dissolved reactive phosphorus, indicative of good dilution and in compliance with special Conditions 5 and 6 (a) and (b) of the consent at the time of the survey.

The increase in ammoniacal nitrogen did not result in a breach of special Condition 5 in terms of un-ionised ammonia, given the relatively low pH and water temperature of the receiving water under these elevated flow conditions. Although compliance with Special Condition 3 of the Consent could not be ascertained (due to the absence of wastewater survey data), historical wastewater quality data would indicate a dilution ratio in excess of 500 parts stream flow to one part effluent - at the time of the survey. Figure 1 however, indicates that the discharge continued for a period of about 4 hours in non-compliance with special condition 4.

#### Survey of 18 November 2009

The consent holder had informed the Council the piggery was discharging wastewater to the Waiongana Stream.

A compliance monitoring inspection was carried out during wet weather conditions and receiving water samples were collected on a rising fresh as illustrated in Figure 3.



**Figure 3** Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 18 November 2009

The survey was performed only in the receiving waters of the Waiongana Stream, on the rising stage of a fresh, at a flow of approximately 13 m<sup>3</sup>/sec, some two hours after commencement of the wastewater discharge. The survey results are presented in Table 3.

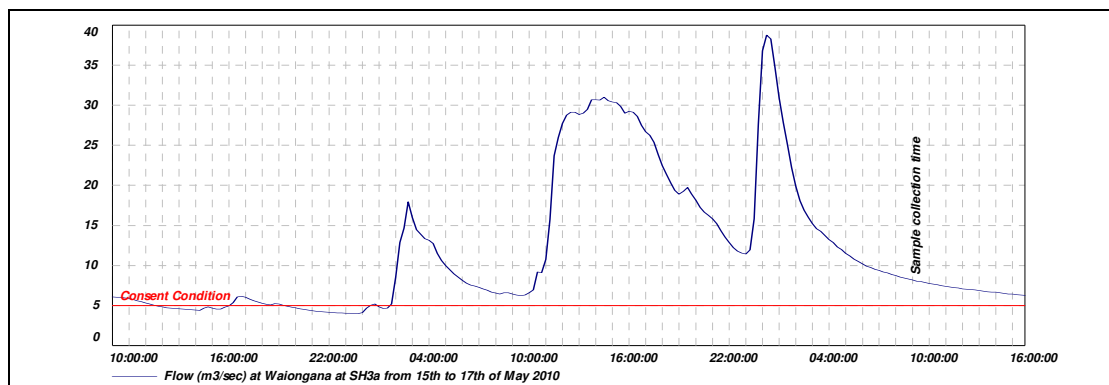
**Table 3** Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 18 November 2009

Site location		WGA000361 Waiongana Stream upstream	WGA000363 Waiongana Stream downstream	PGP002002 Piggery final effluent
<b>Parameter</b>	<b>Unit</b>			
Temperature	°C	13.0	13.0	-
Conductivity @ 20°C	mS/m	6.9	7.0	-
Chloride	g/m <sup>3</sup>	7.6	7.7	-
pH		7.1	7.3	-
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>			-
Filtered carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	2.6	2.1	-
Ammoniacal nitrogen	g/m <sup>3</sup> N	0.239	0.286	-
Unionised ammonia	g/m <sup>3</sup> NH <sub>3</sub>	0.00085	0.00162	-
Dissolved reactive phosphorus	g/m <sup>3</sup> P	0.042	0.051	-
Turbidity	NTU	71	66	-
Suspended solids	g/m <sup>3</sup>	68	66	-
Apperaance		N/R	N/R	-

No significant effects of the piggery wastewater discharge were indicated in the receiving waters of the stream in terms of conductivity, pH, filtered reactive BOD<sub>5</sub>, turbidity, suspended solids and dissolved reactive phosphorus where the variability between the two sites generally was typical of fresh flows. These results were indicative of adequate dilution of the wastewater and compliance with Special Condition 5 (despite the elevated filtered BOD<sub>5</sub> concentration in the floodwaters), and 6 (a) & (b), at the time of the survey. The increase (0.047 g/m<sup>3</sup>N) in ammoniacal nitrogen did not result in non-compliance with special condition 5 in terms of un-ionised ammonia under cool water temperature and relatively neutral pH receiving water conditions typical of elevated flow conditions and the timing of the survey. Although compliance with special condition 3 could not be specifically accessed (due to the absence of wastewater survey data), historical wastewater quality data would indicate a dilution ratio in excess of 1000 parts stream flow to one part effluent at the time of the survey. However, Figure 2 suggests that the discharge was in non-compliance with Special Condition 4 for a period of 4 hours later in the day.

### Survey of 17 May 2010

This final sampling survey in the 2009-2010 monitoring period was performed in conjunction with a compliance monitoring inspection. The consent holder had informed the Council that piggery effluent was being discharged to the Waiongana Stream. Receiving water samples were collected towards the end of the discharge period on a receding flow as illustrated in Figure 4.



**Figure 4** Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge from 15 to 17 May 2010

The survey included wastewater sampling of the final pond effluent and the receiving waters of the Waiongana Stream, on the recession stage after moderate freshes over a two-day period. Sampling was performed at a flow of approximately 8m<sup>3</sup>/sec, some 48 hours after the wastewater discharge commenced. Survey results are presented in Table 4.

**Table 4** Results from DH Lepper Trust piggery and Waiongana Stream, sampled on 17 May 2010

Site location		WGA000361 Waiongana Stream upstream	WGA000363 Waiongana Stream downstream	PGP002002 Piggery final effluent
Parameter	Unit			
Temperature	°C	13.1	13.1	13.5
Conductivity @ 20°C	mS/m	9.6	9.8	274
Chloride	g/m <sup>3</sup>	10.8	10.8	298
pH		7.4	7.4	-
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	-	-	160
Filtered carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	1.2	1.1	-
Ammoniacal nitrogen	g/m <sup>3</sup> N	0.169	0.277	-
Unionised ammonia	g/m <sup>3</sup> NH <sub>3</sub>	0.00121	0.00198	-
Dissolved reactive phosphorus	g/m <sup>3</sup> P	0.064	0.080	-
Turbidity	NTU	9.0	8.2	190
Suspended solids	g/m <sup>3</sup>	14	12	420
Appearance		turbid light brown	turbid light brown	Dark green SG=0.650mm

There were no significant impacts of the wastewater discharge on the receiving waters of the Waiongana Stream in terms of visual appearance, conductivity, pH, filtered BOD<sub>5</sub>, dissolved reactive phosphorus, turbidity, and suspended solids with the variability between the two sites > water quality generally typical of fresh flows. These results indicated a dilution ratio in excess of 1000 parts stream flow to one part effluent in compliance with Special Conditions 3, 5, 6 (a) & (b) at the time of the survey. The increase of 0.108 g/m<sup>3</sup>N in ammoniacal nitrogen did not result in non-compliance with the un-ionised ammonia limit imposed by Special Condition 5, under slightly alkaline but cool water temperature conditions typical of the flood recession conditions at the time (mid morning) of the survey. However, Figure 4 also suggests that the discharge of wastewater commenced well in advance (18 hours) in anticipation of the rising stage of the fresh and at times may have been in non-compliance with Special Condition 4 of the Consent during that period.

Piggery pond wastewater sampled at the time of the survey was very similar to median historical wastewater quality in terms of BOD<sub>5</sub>, turbidity and suspended solids concentrations.

## Evaluation of wastewater quality from components of the treatment pond system

**Table 5** Wastewater quality from D H Lepper Trust piggery covered anaerobic pond outlet [PGP005001] over the 2009-2010 period

Site location PGP005001	Date	26/08/09	02/09/09	18/11/09	28/01/10	17/05/10	Range	Median
<b>Parameter</b>	<b>Unit</b>							
Conductivity @ 20°C	mS/m	-	1060	1100	1130	1060	1060 - 1130	1080
Chloride	g/m <sup>3</sup>	660	-	562	635	438	438 - 660	599
COD	g/m <sup>3</sup>	4000	-	-	3000	3100	3000 - 4000	3100
pH	pH	6.8	-	-	7.0	7.2	6.8 - 7.2	7.0
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	-	1900	1100	680	890	680 - 1900	995
Suspended solids	g/m <sup>3</sup>	780	-	860	1100	940	780 - 1100	900
Total solids	mg/l	-	4100	-	-	-	4100	-
Volatile solids	g/m <sup>3</sup>	-	2100	-	-	-	2100	-
Total nitrogen	g/m <sup>3</sup> N	1400	1580	1380	2790	1490	1380 - 2790	1490
Total phosphorus	g/m <sup>3</sup> P	149	141	145	144	140	140 - 149	144
Potassium	g/m <sup>3</sup>	-	339	266	301	296	266 - 338	299

This data may be compared with wastewater data collected from the outlet of the final pond although the periods of sample collection do not necessary coincide (Table 6).

**Table 6** Summary of treated wastewater analysis results from the DH Lepper Trust piggery/dairy for the period 1991 to June 2010

Parameter	Unit	Number of samples	Min	Max	Median
Conductivity @ 20°C	mS/m	16	222	415	289
pH		4	8.1	8.3	8.1
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	16	110	310	170
Filtered carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	7	7.2	46	28
Ammoniacal nitrogen	g/m <sup>3</sup> N	9	189	336	257
Turbidity	NTU	14	110	450	205
Suspended solids	g/m <sup>3</sup>	17	230	840	420

Marked improvements in terms of median wastewater loadings are apparent for total BOD<sub>5</sub> (83% reduction) and suspended solids (53% reduction) through the ponds treatment system, although concentrations for the parameters remain typical of piggery ponds treated wastewaters (particularly high nutrient levels).

The results from the final aerobic pond illustrate the variability in effluent quality measured from this dairy/piggery treatment system over the period prior to the establishment of the current tailored consent monitoring programme.

Some of this variability relates to stormwater infiltration through the system and the configuration of the recent additional covered anaerobic pond preceding the final aerobic ponds provided by the treatment system over the seventeen-year period surveyed.

### 2.1.5 Treated effluent discharge records

Records of treated wastewater discharges to the Waiongana Stream supplied by the consent holder, as required by Special Condition 8 of consent 0715-3, are provided in Table 7.

**Table 7** Discharge records of piggery treated wastes to the Waiongana Stream

Discharge period	Duration (hrs)	Stream flow above 5m <sup>3</sup> /sec while discharging
26 Aug 09, 0830 hrs to 26 Aug 09, 1800 hrs	9.5	Yes
31 Aug 09, 0900hrs to 01 Sep 09, 0700 hrs	22	Yes
12 Sep 09, 0700 hrs to 13 Sep 09, 0800 hrs	25	Yes
24 Sep 09, 1630 hrs to 25 Sep 09, 1700 hrs	23.5	Yes
30 Sep 09, 0900 hrs to 01 Oct 09, 0800 hrs	23	Yes
10 Oct 09, 0800 hrs to 10 Oct 09, 1800 hrs	10	Yes
18 Nov 09, 0700 hrs to 18 Nov 09, 1815 hrs	11.15	yes
01 Dec 09, 0815 hrs to 02 Dec 09, 0700 hrs	22.45	yes
25 Feb 10, 0800 hrs to 26 Feb 10, 0700 hrs	23	No
15 May 10, 0810 hrs to 17 May 10, 1645 hrs	56	yes
24 May 10, 0800 hrs to 25 May 10, 0830 hrs	24.3	No
26 May 10, 0900 hrs to 27 May 10, 1415 hrs	29.15	yes
29 Jun 10, 0740 hrs to 30 Jun 10, 1640 hrs	33	yes

These records indicate that, on 11 out of 13 discharge occasions, the treated effluent discharge into the Waiongana Stream was well managed and that good wastewater dilution ratios have been maintained and were compliant with Special Condition 4 of consent 0715-3. However, on 2 of these occasions the discharge records indicated that discharges had occurred when the river flow was below the allowable 5 m<sup>3</sup>/sec which are non compliant with special condition 4.

Records for 25<sup>th</sup> February 2010 show that the discharge period was started during a receding high river flow (peaked @ 74.5 cumecs) then rapidly receded to below the consent limit of 5 cumecs. The treated effluent continued to discharge for a prolonged period before being stopped.

Records for the 24 May 2010 show that the discharge was started preceding a moderate river flow event and continued to discharge after a sharp river rise and fall period.

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](http://www.trc.govt.nz)) which provides current river flow and water levels for the Waiongana Stream recorded at SH3a at the time of discharging.

For the 2009-2010 period a total of 312.05 discharge hours were recorded compared to 104.25 hours recorded for the 2008-2009 period.

Records also show that contractors had desludged the anaerobic pond and spray irrigated effluent to pasture over a period of four days during October 2009.

## **2.2 Air**

### **2.2.1 Inspections**

Air quality is checked during compliance monitoring inspections, or if odour complaints are received. There were no odour complaints concerning piggery emissions from the ponds system, and routine follow-up inspections found no objectionable odour offsite. At this stage it appears that the covered anaerobic pond has been instrumental in minimising downstream odour effects.

## **2.3 Register of incidents**

The Taranaki Regional 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 'Unauthorised Incident Register' (UIR) includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2009-2010 year, there were two incidents recorded by the Council that were associated with the DH Lepper Trust Piggery. These incidents were in relation to an unauthorised piggery discharge to the Waiongana Stream when river flow conditions did not allow for a discharge to continue after a high receding river flow.

In relation to these two incidents a meeting was held with the consent holder and a letter of explanation was received and accepted by the Council.

### **2.3.1 Liaison with consent holder**

During the 2009-2010 monitoring period, the Taranaki Regional Council liaised with the consent holder regarding several operational issues, additional to those required in the monitoring programme and in particular the development of the covered anaerobic pond and monitoring of the treated effluent discharge to the Waiongana Stream.

### **3. Discussion**

#### **3.1 Discussion of plant performance**

Lepperton, like many small rural towns in New Zealand is going through a period of change. Land that was used for dairy farming is now being subdivided into smaller lots and, with the inevitable increase in population, attitudes change, forcing existing farmers such as pig and poultry growers to adapt to new regulatory conditions, and public expectations particularly by new residents surrounding long established rural activities. (Reverse sensitivity).

The Lepper family has been running a successful pig farming business for over forty years and has seen many changes through that period.

Today, Lepper's piggery operates as a breeding and fattening unit, holding up to 400 adult pigs and 3000 growers at any one time.

Until recently, piggery and dairy wastewater was treated in a two pond treatment system consisting of an anaerobic and aerobic pond with the treated wastewater being discharged periodically into the Waiongana River by submerged outlet during high flow conditions.

The two pond effluent treatment system worked reasonably effectively in the breakdown of organic contents by removing BOD, but not in removing odour under certain weather conditions. Prior to the 2008–2009 monitoring period an increasing number of odour complaints were received from neighboring residents and consequently investigated by the Taranaki Regional Council.

With a pending air consent renewal, the consent holder had to look at innovative ways of reducing odour, and at this time, investigated the feasibility of biogas production for electrical generation.

In consultation with NIWA scientists and the New Zealand Pork Industry Board, the consent holder constructed a covered anaerobic pond as part of the piggery wastewater treatment system and investigated several options for the best way to utilize extracted methane gas for the piggery operation.

Raw biogas contains 50-70% methane gas and 30-50% carbon dioxide with a trace of impurities as sulphide gases, similar to fossil natural gas. Although the raw gas can be used in boilers, space heating, cooking stoves, and stationary combustion engines that drive pumps, blowers, or electricity generators, removal of sulphides is necessary to prevent equipment corrosion.

Biogas can be collected simply by using cost-effective surface covers. These covers are secured around the pond perimeter by burying in a trench. Biogas produced at the surface of the pond is extracted from under the cover through perforated pvc piping placed around the pond perimeter. Typically the biogas is drawn off the pond by a slight vacuum using a small exhaust fan.

Key features of covered anaerobic ponds:

- low cost, advanced design
- simple operation and maintenance
- elimination of odours, flies and insects from the pond
- prevent rainwater intrusion and enables collection for beneficial use
- enhanced treatment performance and biogas production
- economically recover biogas energy
- reuse treated effluent for washdown
- storage for deferred irrigation
- reduced odour from effluent irrigation (by as much as 70%)
- reduced GHG emissions and potential for carbon credits.
- increased microbial activity in the anaerobic pond, producing a cleaner wastewater discharge.

Whether covering an existing pond or developing from scratch, anaerobic ponds are an extremely cost effective way of utilizing anaerobic digestion technology. Eminently they are more suitable for larger piggeries, dairy farms, meatworks and other agricultural processing plants needing to optimize anaerobic treatment and capture renewable energy while reducing GHG emissions.

The design for the Lepperton piggery is that gas emissions are extracted from the covered anaerobic pond and utilized for power generation which is used in the piggery's operation.

In effect, the new pond replaces the function of the existing anaerobic pond near Lepperton in terms of treating liquid effluent. Once the piggery effluent has undergone primary treatment in the covered anaerobic pond, it is piped to the existing oxidation ponds.

It appears at this stage the existing anaerobic pond has not fully reverted to aerobic conditions. Emissions of odorous hydrogen sulphide (the contaminant mainly responsible for odour complaints) have reduced significantly since the ponds system has been upgraded. Consideration of pond depth to optimize aerobic conditions may be required in the future. This could be achieved by simply lowering the pond level or possibly filling to achieve the required depth.

Marked improvements in terms of median wastewater loadings are apparent for total BOD<sub>5</sub> (83% reduction) and suspended solids (53% reduction) through the ponds treatment system, although concentrations for the parameters remain typical of piggery ponds treated wastewaters (particularly high nutrient levels).

Taranaki Regional Council presented Lepper's Piggery with an agricultural 'Environmental Award' for their recent innovations which has resulted in minimized waste odour and greenhouse gas emissions, producing electricity for the piggery and improving effluent management.

### 3.2 Environmental effects of the exercise of water and land discharge consent

Receiving water physicochemical monitoring indicated the discharge of treated piggery/dairy effluent to the Waiongana Stream generally occurred under high stream flows, and had minimal impacts on the stream and complied with the minimum dilution standard. (Table 7)

Desludging the aerobic pond reduced the frequency of discharge of effluent to water, and was likely to have improved effluent quality (through the reduction of wastes loadings on the system). Discharge to land also improves soil structure and fertility.

### 3.3 Environmental effects of exercise of air discharge permit

No complaints concerning piggery odour emissions from the pond system was received by the Council during the 2009-2010 monitoring period.

It appears that the covered anaerobic pond performance been successful in minimizing odour emissions - mainly hydrogen sulphide and methane which has resulted in minimal odour emissions emanating from the downstream ponds at the Lepperton Township.

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 0-5 scale (ambient)

0. *Not detectable – no odour*
1. *Very light – odour detected but may not be recognisable*
2. *Light – odour recognisable (i.e., discernible)*
3. *Moderate – odour very distinct and clearly distinguishable.*
4. *Strong – odour causes a person to try to avoid it*
5. *Very strong – odour overpowering and intolerable*

Duration:

- The length 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 Act or consent conditions
- A subjective assessment which can vary between individuals, but which must also be based on a 'typical' response.

Location:

- Where the odour is detected from.

- Note type of area (for example, agricultural, residential, or industrial).

No odour complaints had been received by the Council during the 2009-2010 monitoring period, all previous complainants were all local residents living within close proximity (200 metres), directly south-west of the ponds system.

The covered anaerobic pond has greatly improved the effluent quality discharge to the existing pond system and consequently minimized any down stream odour effects. It is possible that some odour emissions from the lower anaerobic pond could eventuate from time to time. It is these odours that produce emissions of odorous hydrogen sulphide, which is the contaminant mainly responsible for odour complaints.

For the 2009-2010 monitoring period the consent holder has maintained and operated the ponds system effectively, demonstrating excellent odour control.



**Figure 5** Aerial map showing wind direction in relation to ponds and township

### 3.4 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 0715-3 to discharge piggery and farm dairy effluent from an oxidation pond treatment system

	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Operation and discharge in accordance with application	Inspections of data and discharge point inspections	Yes
2. Location and position of the discharge points	Monitoring inspections	yes
3. Minimum dilution rate in receiving waters	Consent holders discharge records and monitoring	Yes
4. Discharge only when river conditions allow	Consent holders discharge records and monitoring	On most occasions
5. Maximum concentrations in receiving water after mixing	Sampling	N/A
6. Maximum concentrations in receiving water after mixing	Monitoring inspections of receiving waters	Yes
7. Operation and maintenance of treatment and discharge system	Monitoring inspections	Yes
8. Records of discharge	Records received	Yes
9. Effluent of aerobic pond discharged to land	Consent holder to notify Council	Yes
10. Notification of discharging to land	Consent holder to notify Council	Yes
11. Optional review provision	Not scheduled for consideration during year under review	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>Good</b>

N/A = not applicable

**Table 9** Summary of performance for Consent 5206-2 to discharge emissions into the air from a pig farming operation and associate practises including solids composting, effluent treatment and other waste management activities

<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Adoption of action to minimise adverse environmental effects	Monitoring Inspections	Yes
2. Consultation and approval prior to alterations to plant or process	Monitoring Inspections	Yes
3. Minimisation of impact and emissions through use of equipment and suitable methods	Monitoring Inspections	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Operation in accordance with application	Monitoring Inspections	Yes
5. Objectionable odour at site boundary not permitted	Monitoring Inspections	Yes
6. Objectionable dust levels at the site boundary not permitted	Monitoring Inspections	Yes
7. Significant adverse ecological effect on ecosystems	Monitoring Inspections	Yes
8. Maintenance and landscaping plan	Monitoring Inspections	N/A
9. Maintain and operate the effluent ponds and associated activities	Monitoring Inspections	Yes
10. Advise neighbours prior to irrigating effluent to land	Consent holder to advise neighbours and Council prior to irrigating to land	Yes
11. Particular regard to wind direction to minimise effects upon neighbours when discharging effluent	Monitoring Inspections	Yes
12. Review of consent conditions	Optional permit review June 2011	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>High</b>

**Table 10** Summary of performance for Consent 0188-3 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 review sought by Council N	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>High</b>

During the year, the Company demonstrated a high of environmental performance and compliance with the resource consents although some improvement is required regarding discharging to the Waiongana Stream during recessive flows.

### 3.5 Recommendations from the 2008-2009 Annual Report

In the 2008-2009 Annual Report, it was recommended:

1. That monitoring of air emissions and discharges to natural water from the D H Lepper Trust piggery and farm dairy in the 2009-2010 year continues at the same level as in the 2008-2009 period.

The monitoring programme was undertaken as scheduled.

### **3.6 Alterations to monitoring programmes for 2010-2011**

In designing and implementing the monitoring programmes for air/water discharges in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Resource Management Act, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community, 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 emitting to the atmosphere/discharging to the environment.

In the case of DH Lepper Trust Piggery/dairy monitoring programme, it is recommended that the programme for 2010-2011 period be reviewed to assess any environmental effects in relation to the treated effluent discharge and, as required, for the pending consent renewal process.

A recommendation to this effect is attached to this report.

### **3.7 Exercise of optional review of consent**

Resource consent 0715-3 (wastewater discharge) does not provide for an optional review and the consent expires on 1 December 2013.

Resource consent 0188-3 (water take) does not provide for a review for the 2010-2011 monitoring period.

Resource consent 5206-2 (air discharge) provides for a review of the consent in June 2011.

Condition 10 on consent 5206 allows the Council to review the consent, if there are grounds that were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued.

A recommendation to this effect is presented in Section 4 of this report.

## 4. Recommendations

1. THAT monitoring of air emissions and discharges to natural water from the DH Lepper Trust Piggery and dairy farm in the 2010-2011 year continues at the same level as in the 2009-2010 period except where noted below.
2. THAT the consent holder continues to advise the Council of all treated wastewater discharges to the Waiongana Stream and onto land and to maintain a discharge only when the Waiongana Stream flow rate is above the allowable  $5\text{m}^3/\text{sec}$ .
3. THAT the consent holder monitors and maintains discharge records and forwards these records to the Council as required.
4. THAT the consent holder monitors and maintains anaerobic biogas abstraction rates (flaring and usage) and supplies details to Council as required.
5. THAT the provisions in the monitoring programme to sample the discharge and receiving waters be reviewed as a precursor of the discharge consent renewal process.
6. THAT sampling of the covered anaerobic pond discharge be discontinued as sufficient analytical data has demonstrated the pond's water quality.
7. THAT the consent holder be required to provide the Council an odour management plan for the avoidance of any offensive or objectionable odour from the effluent ponds on neighbouring properties.
8. THAT the consent holder provides all necessary information as requested by Council in support of the discharge renewal process

## Glossary of common terms and abbreviations

The following abbreviations and terms are used within this report:

Al*	aluminium
As*	arsenic
Biomonitoring	assessing the health of the environment using aquatic organisms
BOD	biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate
BODF	biochemical oxygen demand of a filtered sample
bund	a wall around a tank to contain its contents in the case of a leak
CBOD	carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate
cfu	colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample
COD	chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction
Condy	conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
Cu*	copper
DO	dissolved oxygen
DRP	dissolved reactive phosphorus
<i>E.coli</i>	<i>escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
Ent	enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample
F	fluoride
FC	faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
fresh	elevated flow in a stream, such as after heavy rainfall
g/m <sup>3</sup>	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
l/s	litres per second
MCI	macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats
mS/m	millisiemens per metre
mixing zone	the zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point
NH <sub>4</sub>	ammonium, normally expressed in terms of the mass of nitrogen (N)
NH <sub>3</sub>	unionised ammonia, normally expressed in terms of the mass of nitrogen (N)

NO <sub>3</sub>	nitrate, normally expressed in terms of the mass of nitrogen (N)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water
O&G	oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons)
Pb*	lead
pH	a numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5
Physicochemical	measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
PM <sub>10</sub>	relatively fine airborne particles (less than 10 micrometre diameter)
resource consent	refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and including all subsequent amendments
SS	suspended solids
SQMCI	semi quantitative macroinvertebrate community index;
Temp	temperature, measured in °C (degrees Celsius)
Turb	turbidity, expressed in NTU
UI	Unauthorised Incident
UIR	Unauthorised 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
Zn*	zinc

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

For further information on analytical methods, contact the Council's laboratory.

## **Bibliography and references**

- 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
- 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 EnvioPork - 2005

## **Appendix I**

### **Resource consents held by Lepper Trust Piggery**





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

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

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**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 06-765 7127  
FAX 06-765 5097

Please quote our file number  
on all correspondence

Name of  
Consent Holder: DH Lepper Trust  
SM Lepper  
326 Wortley Road  
R D 9  
INGLEWOOD

Consent Granted  
Date: 18 December 2002

**Conditions of Consent**

Consent Granted: To discharge treated piggery and farm dairy effluent from  
an oxidation pond treatment system into the Waiongana  
Stream during fresh [high flow] conditions

Expiry Date: 1 December 2013

Review Date(s): June 2004, June 2008

Site Location: Manutahi Road, Lepperton

Legal Description: Pt Lot 2 DP 2634 Sec 185 Huirangi Dist Blk VII Paritutu SD

Catchment: Waiongana

Treatment/Discharge System[s]:	two oxidation ponds	length	width	depth	[metres]
	anaerobic pond	100	50	4	
	aerobic pond	130	80	1.2	

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

**General conditions**

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

**Special conditions**

- 1. The consent holder shall, at all times, operate the piggery and associated activities and discharges in accordance with the information provided in support of application 1649, including the management and contingency plans, except as otherwise required or directed by the conditions set out in this resource consent.
- 2. The discharge point into the Waiongana Stream shall be located at 2614557E-6237954N. The point of discharge shall be beneath the surface of the receiving water.
- 3. A minimum dilution rate of 1 part effluent to 250 parts receiving water shall be maintained at all times in the receiving water at the point of discharge, during discharge events
- 4. Discharge from the ponds 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 cumecs (5 cubic metres per second).
- 5. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not cause the receiving waters of the Waiongana Stream to exceed the following concentrations:

<b>Constituent</b>	<b>Concentration</b>
Unionised ammonia	0.025 gm <sup>-3</sup>
Filtered carbonaceous BOD <sub>5</sub>	2.0 gm <sup>-3</sup>

- 6. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Waiongana Stream:
  - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) any conspicuous change in the colour or visual clarity;
  - c) any emission of objectionable odour;
  - d) the rendering of fresh water unsuitable for consumption by farm animals;
  - e) any significant adverse effects on aquatic life, habitats or ecology.
- 7. The consent holder shall operate and maintain the treatment and discharge system to ensure that the conditions of this consent are met.

Consent 0715-3

8. The consent holder shall monitor and maintain records of the discharge including date, rate, and volume discharged to the Waiongana Stream; and date, volume and area of land discharge occurs to onto and into land; and shall make these records available to the Chief Executive, Taranaki Regional Council, upon request.
9. Effluent from the aerobic pond shall be discharged onto and into land via irrigation at least once annually during the summer/autumn period, to minimise the adverse effects on water quality in the Waiongana Stream, to the satisfaction of the Chief Executive, Taranaki Regional Council.
10. The Chief Executive, Taranaki Regional Council shall be advised in writing at least 24 hours prior to any irrigation onto and into land from the aerobic pond.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2004 and/or June 2008, 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 but not limited to:
  - a) dilution rate
  - b) maximum discharge rate
  - c) concentrations of constituents of the discharge
  - d) concentrations of constituents of the receiving water.

Signed at Stratford on 18 December 2002

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Director-Resource Management





CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7727  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

**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  
R D 9  
INGLEWOOD

Consent 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 and other waste  
management activities at or about (NZTM)  
1704054E-5674882N [Piggery] and  
1704345E-5676156N [Ponds]

Expiry Date: 1 June 2026

Review Date(s): June 2009, June 2011, June 2013, June 2016, June 2020

Site Location: Mountain Road, Lepperton

Legal Description: Lot 3 DP 21006 [Piggery] &  
Pt Lot 1491, Pt Lot 2 DP 2634 [Ponds]

*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 3500 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. Before 30 September 2009, the development of the covered anaerobic pond shall be completed. From that date gases emanating from the covered anaerobic pond shall be captured and appropriately utilised as an energy source.
4. 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.
5. 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.
6. Subject to condition 7, the discharges authorised by this consent shall not give rise to an odour at or beyond the property boundary that is offensive or objectionable.

7. To allow for the conversion of the existing anaerobic pond to an aerobic state, discharges from this pond may give rise to intermittent offensive and objectionable odour beyond the property boundary until 30 September 2009.
8. For the purposes of condition 6 and 7, 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:
    - the individuals' names and addresses;
    - the date and time the objectionable or offensive odour was detected;
    - details of the duration, frequency, intensity and nature of the odour that cause it to be considered offensive or objectionable;
    - the location of the individual when it was detected; and
    - the prevailing weather conditions during the event.
9. The consent holder shall provide an Odour Management Plan that details to the satisfaction of the Chief Executive of Taranaki Regional Council how odorous emissions beyond the property boundary will be minimised by 30 September 2009. The plan shall include:
  - i) Define the environmental effect/s being managed by the plan and the objective sought in relation to this effect;
  - ii) Identify key personnel responsible to managing the effect;
  - iii) Describe the activities on the site and describe the main potential sources of odour emissions;
  - iv) Identify and describe methods of mitigation and operating procedures including the dewatering of the anaerobic pond or during control contingency discharge events;
  - v) 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.

10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2009 and/or June 2011 and/or June 2013 and/or 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 13 November 2008

For and on behalf of  
Taranaki Regional Council



Director-Resource Management

## **Appendix II**

### **Schematic Diagram of Effluent from Lepper's Piggery and Dairy Farm**



SCHEMATIC DIAGRAM OF EFFLUENT FROM LEPPER'S PIGGERY & DAIRY FARM

