

DH Lepper Trust
Piggery Monitoring Programme
Annual Report
2010-2011
Technical Report 2011–34

ISSN: 0114-8184 (Print)
ISSN:1178-1467 (Online)
Document: 952869

Taranaki Regional Council
Private Bag 713
STRATFORD

January 2012

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 effluent and for the discharge of emissions into the air. This report for the period July 2010-June 2011 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 consent holder has requested that the Council consider an option to change the conditions of consent allowing for a continuous treated effluent discharge to the Waiongana Stream during the winter months and that no discharge of treated effluent shall occur during the summer, low river flow conditions.

Dairy effluent from G Lepper's 470 dairy farm shed was removed from the piggery ponds treatment system which in time should improve the treated wastewater discharge into the Wainogana Stream. A change to the consent was made to reflect the removal of dairy effluent discharge. The Council's monitoring programme included four inspections and several information visits to the piggery to discuss monitoring requirements in relation to the water discharge consent renewal process.

DH Lepper Trust 400-sow pig farm was awarded the 2010 EECA awards in the Small-Medium Business category. Taranaki Regional Council also presented Lepper's Piggery with an 'Environmental Award' for agricultural excellence in 2010. NIWA identified that anaerobic digestion in covered waste ponds holds significant potential to reduce odour and greenhouse gas emissions, while providing biogas as a local energy source, and designed the purpose built 7000m³ anaerobic effluent pond for the piggery.

Biogas is still being used at the piggery for electricity generation and heating in a combined heat and power unit. The generator provides most of the piggery's electricity needs during daytime, and waste heat from the generator is used in reticulated hot water system for keeping young pigs warm. The system is saving the piggery more than \$35,000 a year in electricity costs.

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 generally 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 for a short period when the river flow was marginally below the allowable consented condition.

No incidents associated with DH Lepper Trust Piggery were recorded by the Council.

This report includes recommendations for the monitoring programme for the 2011-2012 year.

Table of contents

	Page
1. Introduction	1
1.1 Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1 Introduction	1
1.1.2 Structure of this report	1
1.1.3 The Resource Management Act (1991) and monitoring	2
1.1.4 Evaluation of environmental performance	2
1.2 Process description	3
1.3 Resource consents	5
1.3.1 Water discharge permit	5
1.3.2 Water abstraction permit	6
1.3.3 Air discharge permit	7
1.4 Monitoring programme	8
1.4.1 Introduction	8
1.4.2 Programme liaison and management	8
1.4.3 Site inspections	8
1.4.4 Chemical sampling	8
2. Results	9
2.1 Water	9
2.1.1 Wastewater dilution establishment	9
2.1.2 Inspections	9
2.1.3 Results of wastewater and receiving water physicochemical monitoring	11
2.1.4 Receiving water monitoring	12
2.1.5 Treated effluent discharge records	18
2.2 Air	19
2.2.1 Inspections	19
2.3 Register of incidents	21
3. Discussion	23
3.1 Discussion of site performance	23
3.2 Evaluation of performance	24
3.3 Recommendations from the 2009-2010 Annual Report	26
3.4 Alterations to monitoring programmes for 2011-2012	26
3.5 Exercise of optional review of consent	27
4. Recommendations	28
Glossary of common terms and abbreviations	29
Bibliography	31
Miscellaneous references	31
Appendix I Resource consents held by Lepper Trust Piggery	33

List of tables

Table 1	Location of sampling sites	11
Table 2	Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 6 September 2010	13
Table 3	Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 17 December 2010	14
Table 4	Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 4 May 2011 (start of discharge)	15
Table 5	Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 4 May 2011 (end of discharge)	16
Table 6	Summary of treated wastewater analysis results from the DH Lepper Trust piggery/dairy for the period 1991 to January 2011 (prior to removal of dairy wastes)	17
Table 7	Summary of treated wastewater analysis results from the DH Lepper Trust piggery for the period May 2011 to June 2011 (ex removal of dairy wastes)	17
Table 8	Discharge records of piggery treated wastes to the Waiongana Stream	18
Table 9	Summary of performance for Consent 0715-3 to discharge piggery and farm dairy effluent from an oxidation pond treatment system	24
Table 10	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	25
Table 11	Summary of performance for Consent 0188-3 to take water from an unnamed tributary of the Waiongana Stream for piggery purposes	25

List of figures

Figure 1	Aerial location map of sampling sites in the Waiongana Stream	12
Figure 2	Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 06 September 2010	12
Figure 3	Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 17 December 2010	14
Figure 4	Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 04 May 2011	15
Figure 5	Odour survey monitoring locations	20
Figure 6	Odour survey monitoring sheet	20

List of photos

Photo 1	Solids separator and collection system	3
Photo 2	Covered aerated composting bunker	3
Photo 3	Collection sump and pumps	4
Photo 4	Covered anaerobic pond	4
Photo 5	Biogas compressor	4
Photo 6	Six cylinder diesel engine and generator	4

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 2010-June 2011 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 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 2011-2012 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 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 against the consent holder a verified unauthorised incident involving significant environmental impacts, 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.



Photo 2 Solids separator and collection system

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 3 Covered aerated composting bunker

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 4 Collection sump and pumps

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.

All piggery effluent passes through a sand trap and collection sump (Photo 3) before being pumped back up to the inlet of the covered anaerobic pond.

Partially treated effluent from the covered anaerobic pond is gravity feed via a pipeline directly to the off-site treatment ponds some 1500 metres away located on the opposing banks of the Waiongana River near Lepperton for further treatment.



Photo 5 Covered anaerobic pond



Photo 6 Biogas compressor



Photo 6 Six cylinder diesel engine and generator

The covered anaerobic pond (Photo 4) is situated close to the north side of the piggery. Biogas is produced from the anaerobic digestion process and captured and stored beneath the plastic cover on the anaerobic pond. 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).

This produces half of the piggery's electricity from approximately 200 m³ 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.

Dairy effluent from G Lepper's 470 dairy shed on the adjoining property was removed from the piggery ponds treatment system which in time should improve the treated wastewater discharge into the Waiongana Stream. A change to the consent was made to reflect the removal of dairy effluent discharge and G Lepper now discharges treated dairy effluent to an unnamed tributary of the Waiongana Stream as per consent **7775-1**.

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.

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.

On February 1 2011 the Taranaki Regional Council partially transferred consent **0715-3** to DH Lepper Trust as requested by the consent holder. Consent **0715-3** remains under the name of DH Lepper Trust, while the transferred part of the consent [dairy discharge] is now under consent **7775-1**. The transfer became into effect from 1 February 2011. No change to Consent **0715-3** special conditions was required as the removal of farm dairy effluent should improve the wastewater loading on the existing pond treatment system.

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 of 1 part effluent to 250 parts receiving water at all times.

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 piggery was visited four 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 consent holder 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 as part of the monitoring inspection.

1.4.4 Chemical sampling

Sampling of both the discharge from the site and the water quality upstream and downstream of the discharge point and mixing zone was undertaken on three separate occasions. On the May 2011 sampling occasion, samples were collected at the beginning of and towards the end of a discharge event.

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.

To determine for environmental effects when discharging to the Waiongana Stream, sampling at the beginning and the end of the discharge period was considered necessary for the Council to have sufficient water quality data available in preparation for the next consent renewal process. (Consent 0715-3 expires 2013 with no provision for a review).

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 - (ref: Colebrock-White equation and chart).

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) 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 is automatically entered via the Council database. The data is tabulated every two hours and a graph is provided within ten minutes of downloading.

The consent holder also has available HydroTel text messaging and is signalled when the Waiongana Stream flow has reached 5m³/sec and again when the stream flow has receded below this point.

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

27 July 2010

This first compliance inspection for the monitoring period was carried after a site meeting was held at the piggery. The purpose of the meeting was to discuss issues relating to wastewater dilution rates and a proposed change of the resource consent conditions allowing the consent holder to discharge treated effluent into the Waiongana Stream (excluding summer low flow river conditions) on a continual basis (refer to Liaison with consent holder on page 24).

Weather conditions at the time of inspection were overcast, with a slight breeze coming from the north western quarter.

The effluent drainage and collection system behind the piggery was found to be satisfactory and maintenance had recently been carried out on the sump pump. The solids separator contra-shear was operating and liquid waste was draining freely back to the collection sump. The covered anaerobic pond showed pockets of encapsulated methane gas and the genset was operating producing 40 kilowatts of power. In general the piggery was found to be tidy with minimal piggery odour emanating downwind of the facilities.

The effluent pond treatment system was also inspected. The first anaerobic pond showed some light microbial activity and was brown in colour. The second aerobic pond was light green in colour. Both ponds were at normal operating levels.

Slightly noticeable odour was found to be emanating directly from off the first pond but an odour survey conducted out around the Sissons & Smith Streets found no odour present.

26 November 2010

This inspection was carried out during fine weather conditions with a strong, gusty wind blowing from the south west direction.

Wastewater collection facilities around the piggery were found to be tidy. The solids separation and composting area was well maintained with all liquids flowing directly back to the collection sump. No odour was noticed from around the anaerobic pond level sump and minimal piggery odour were emanating at the various sites around the piggery in general. The genset had been operating daily with methane gas extracted from off the covered anaerobic pond.

Both the lower treatment ponds were found to be full although sufficient freeboard was showing. No odour was found to be drifting from off the ponds and both ponds were showing anaerobic conditions with only a slight colouring in the first anaerobic pond.

The Waiongana Stream level was seasonally low at the time of inspection (0.396m^3 per second @ 1130 hrs NZST), slightly lower than the mean annual low flow measured at 0.396m^3 per second.

3 February 2011

This inspection found that normal to slight piggery odour detected at various sites around the piggery. The solids separator and composting areas were found to be tidy and all liquid waste was flowing freely back towards the collection sump.

The covered anaerobic pond cover was partially inflated with biogas. Warmer summer temperatures maximised the anaerobic digestion process producing abundant methane gas allowing the genset to operate for extended periods.

The wastewater discharge from the covered anaerobic pond was noticeably clearer and the lower two oxidation ponds were operating satisfactory. No odour was found to be emanating from off the ponds adjacent to the Lepperton Township.

It was intended that the dairy shed effluent from G Lepper's farm would discontinue discharging to DH Lepper's ponds from the end of the month.

28 June 2011

This final inspection for the monitoring period was carried out during fine weather conditions after a heavy rainfall event throughout the catchment. A light breeze was blowing in from the north western quarter.

All wastewater effluent flows were flowing unimpeded back to the collection sump with no recent overflows having occurred. Normal piggery odour was noticed to be emanating from along the south side of the piggery and down towards solids separator area.

The genset was operating producing up to 60kw of power.

The treatment ponds system was also inspected with a full odour survey being conducted around the Lepperton Township, during favourable weather conditions. No odour effects from the piggery treatment ponds were found to be emanating at the air monitoring locations.

The lower anaerobic pond was showing signs of microbial activity with a slight odour emanating from along the south eastern corner of the pond. No distinguishable odour was noticed from around the remainder of the pond perimeter. The anaerobic pond was dark grey brown in colour showing normal operating level while the aerobic pond was noticeably a lighter brown colour compared to previous inspections. The pond level staff gauge was reading 660mm.

No wastewater discharge from the final pond to the Waiongana Stream was occurring and the outlet valve from the pond was found to be in the closed position.

The piggery and surrounding facilities were found to be exceptionally tidy considering the amount of recent heavy rain.

2.1.3 Results of wastewater and receiving water physicochemical monitoring

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

No samples from the covered anaerobic pond discharge were collected during the 2010-2011 monitoring period. The collections of analytical data to evaluate nutrient values for irrigation purposes and to assess reductions in waste loadings was completed during the 2009-2010 monitoring period. (see TRC, 2010)

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

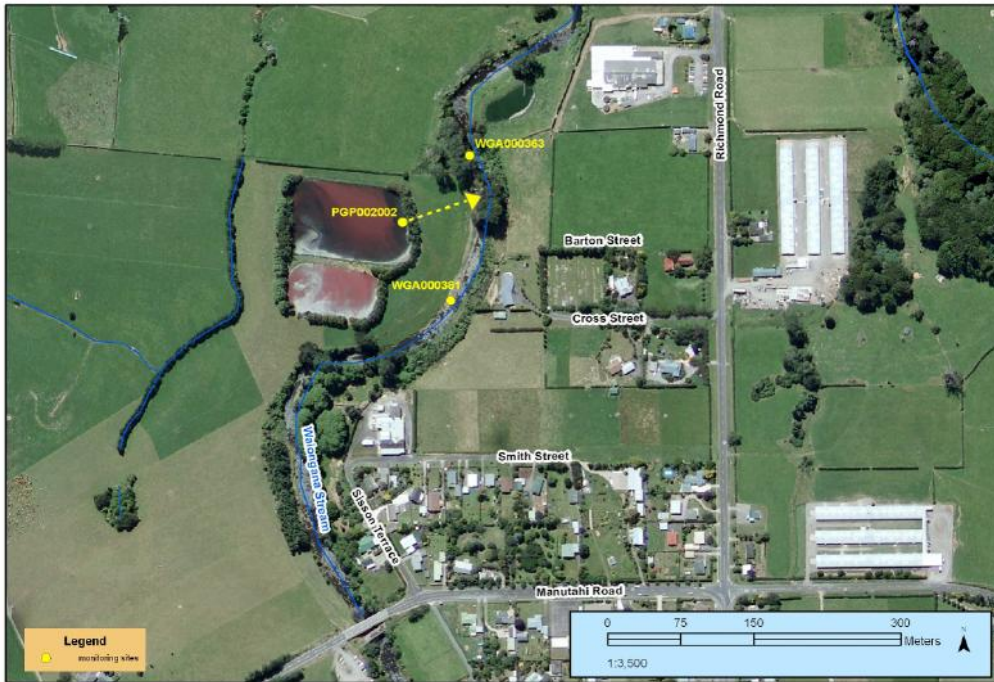


Figure 1 Aerial location map of sampling sites in the Waiongana Stream

2.1.4 Receiving water monitoring

Survey of 6 September 2010

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 wet weather conditions on a rising flow toward the peak of a fresh after a heavy rainfall event throughout the catchment. Four hours after the commencement of the discharge of treated effluent, a maximum river flow of 115m³/sec was recorded. River flow was 80m³/sec when the discharge commenced receding to 7 m³/sec at the completion of the discharge (Figure 2). Sampling was performed in the receiving waters of the Waiongana Stream at a flow of approximately 100m³/sec, some three hours after the discharge commenced.

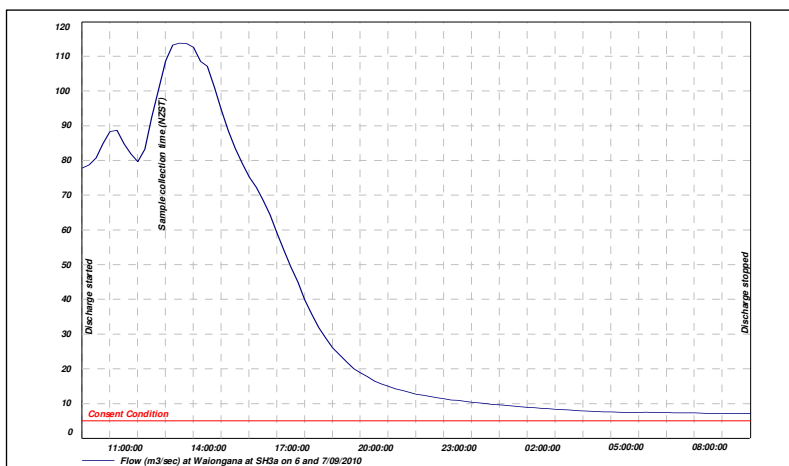


Figure 2 Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 06 September 2010

Results of the survey are presented in Table 2.

Table 2 Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 6 September 2010

Site		WGA000361	WGA000363	PGP002002
Location		Waiongana Stream upstream	Waiongana Stream downstream	Piggery final pond effluent
Parameter	Unit			
Time	NZST	1300	1250	1245
Temperature	°C	N/R	N/R	N/R
Conductivity @ 20°C	mS/m	5.2	5.3	306
Chloride	%	8.3	8.3	202
pH		7.1	7.1	
Total carbonaceous BOD ₅	g/m ³	-	-	240
Filtered carbonaceous BOD ₅	g/m ³	2.4	2.2	-
Ammonia-N	g/m ³ N	0.133	0.181	-
Unionised ammonia	g/m ³ NH ₃	N/C	N/C	-
Dissolved reactive phosphorus	g/m ³ P	0.051	0.092	-
Turbidity	NTU	100	100	170
Suspended solids	g/m ³	220	200	270
Appearance		N/R	N/R	N/R

[Notes: N/R = not recorded; N/C = not calculated due to absence of temperature data]

These results indicated minimal effects of the pond treated wastewater discharge to the river in terms of filtered BOD₅, pH, conductivity, turbidity, suspended solids and dissolved reactive phosphorus, indicative of good dilution and in compliance with a component of Special Condition 5 of the consent. No assessment of Special Condition 6 was made at the time of the survey, however.

Compliance with Special Condition 5 could not be assessed in terms of un-ionised ammonia, as no water temperatures were recorded in the field. However, given the relatively low pH of the receiving water under these elevated flow conditions, compliance was probably achieved. Compliance with Special Condition 3 of the consent was also achieved as wastewater quality data indicated a dilution ratio well 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 12 hours in compliance with Special Condition 4.

Piggery pond wastewater quality was within the ranges of previous effluent quality although better than the median quality in terms of BOD₅ and suspended solids concentrations

Survey of 17 December 2010

The consent holder had informed the Council the piggery had commenced discharging treated effluent to the Waiongana Stream on the recession from a fresh at a river flow of about 6m³/sec. Receiving water and treated effluent samples were collected near the beginning of the discharge period on a receding flow. The discharge ceased approximately 1 hour after the flow had receded below the allowable 5 m³/sec (see Figure 3). The discharge was re-activated later on in the day for a further 6 hour during two small freshes in accordance with Special Condition 4.

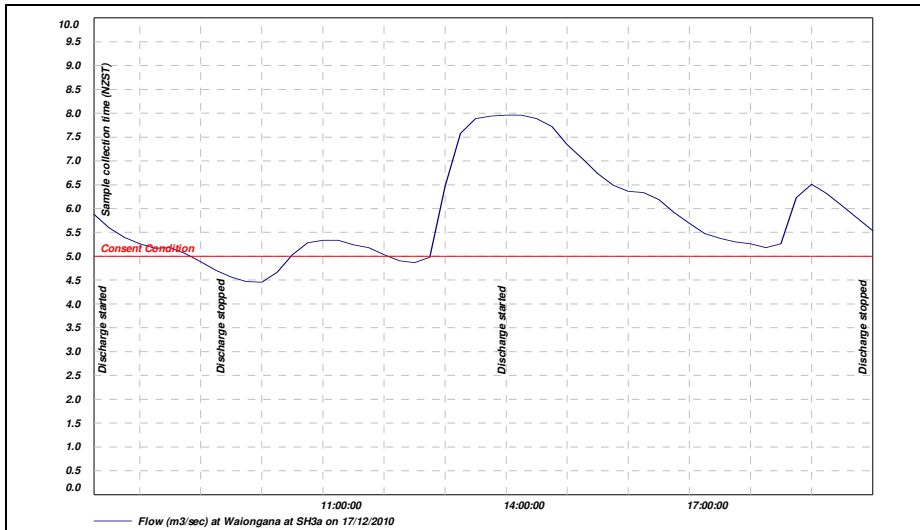


Figure 3 Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 17 December 2010

This survey included wastewater sampling of the final pond effluent and the receiving waters of the Waiongana Stream on a fresh recession stage after a prolonged period of dry, settled weather, and low river flow. Sampling was performed at a flow rate of approximately 5.8m³/second, approximately half an hour after discharge commenced. Survey results are presented in Table 3.

Table 3 Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 17 December 2010

Site		WGA000361	WGA000363	PGP002002
Location		Waiongana Stream upstream	Waiongana Stream downstream	Piggery final pond effluent
Parameter	Unit			
Time	NZST	0715	?	0720
Temperature	°C	18	18	20
Conductivity @ 20°C	mS/m	11.5	14.2	276
Chloride	%	9.1	10.6	345
pH		7.7	7.8	8.1
Total carbonaceous BOD ₅	g/m ³	-	*	170
Filtered carbonaceous BOD ₅	g/m ³	0.8	1.1	-
Ammonia-N	g/m ³ N	0.019	0.737	-
Unionised ammonia	g/m ³ NH ₃	0.00039	0.01879	-
Dissolved reactive phosphorus	g/m ³ P	0.048	0.227	-
Turbidity	NTU	67	69	200
Suspended solids	g/m ³	120	160	400
Appearance		N/R	N/R	N/R

[Notes: N/R = not recorded]

These results indicate that the dilution rate was slightly lower than 1 part effluent to 250 parts receiving water and therefore was in non-compliance with consent Special Condition 3 at the time of the survey and therefore probably until the discharge ceased. The marked increase of 0.718 g/m³N in ammoniacal nitrogen did not result in non-compliance with the un-ionised ammonia limit imposed by Special Condition 5 mainly as a result of the moderate water temperature (18°C) and pH (7.8) at the time of the survey. Although there was an increase of 0.3 g/m³ filtered carbonaceous BOD₅ this did not exceed the limit imposed by Special Condition 6.

The piggery pond wastewater sampled at the time of the survey was very similar to median historical wastewater quality in terms of BOD₅, turbidity, and suspended solids concentrations.

Survey of 04 May 2011

This final sampling survey for 2010-2011 monitoring period included sampling the receiving water and treated wastewater near the beginning of the discharge period and again at the completion of the discharge period as illustrated in Figure 4.

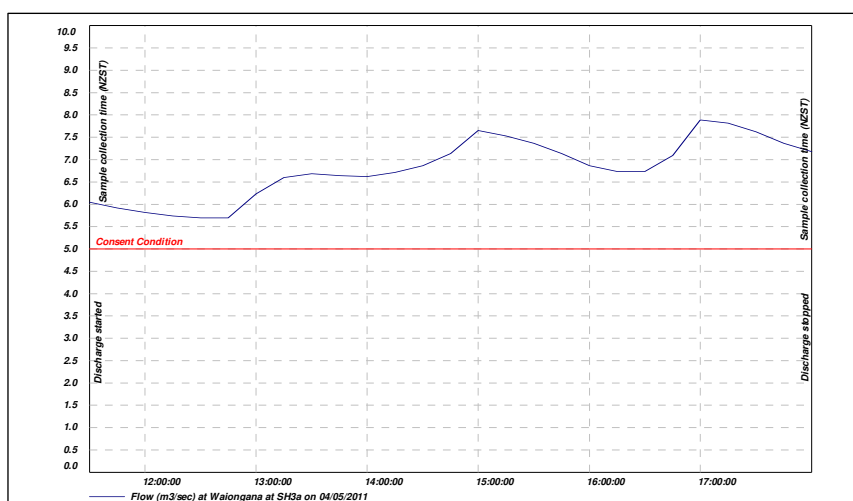


Figure 4 Flow data recorded for the Waiongana Stream for the duration of the piggery wastewater discharge, 04 May 2011

Wastewater and receiving water samples were collected near the commencement of the discharge of treated wastewater into the Waiongana Stream when the river flow was approximately 6m³/sec (Table 4). The discharge continued for a further 6.5 hours and sampling was repeated towards the completion of the discharge period (Table 5) when river flow had increased to about 7.2 m³/sec but was in recession from another small fresh as illustrated in Figure 4.

Table 4 Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 4 May 2011 (start of discharge)

Site		WGA000361	WGA000363	PGP002002
Location		Waiongana Stream upstream	Waiongana Stream downstream	Piggery final pond effluent
Parameter	Unit			
Time	NZST	1130	?	?
Temperature	°C	15.7	15.7	16.6
Conductivity @ 20°C	mS/m	12.6	16.4	294
Chloride	%	11.8	16.1	N/A
pH		7.3	7.9	8.2
Total carbonaceous BOD ₅	g/m ³	-	-	130
Filtered carbonaceous BOD ₅	g/m ³	0.6	0.6	-
Ammonia-N	g/m ³ N	0.012	2.02	-
Unionised ammonia	g/m ³ NH ₃	0.00008	0.05458	-
Dissolved reactive phosphorus	g/m ³ P	0.039	0.474	-
Turbidity	NTU	9.5	12	120
Suspended solids	g/m ³	20	26	290
Appearance		N/R	N/R	N/R

[Note: N/A = not analysed; N/R = not recorded]

These results indicated compliance with the filtered carbonaceous BOD₅ limit imposed by Special Condition 5 of the consent but marked non-compliance with the unionised ammonia limit of the same Special Condition (by more than 100%) despite the slightly alkaline conditions and moderate water temperature and indicative of limited dilution. Significant increases in most downstream parameters confirmed inadequate dilution and/or poor mixing of the wastewater despite the piggery wastewater having better than historical median quality in terms of BOD₅, turbidity and suspended solids concentrations.

A dilution ratio of less than 100 parts river flow to one part effluent, was assessed at the time of the survey which was in marked non-compliance with Special Condition 3 of the consent, also possibly indicative of incomplete mixing.

No compliance assessment could be made in respect of aspects of Special Condition 6 as no field visual comments were recorded by the sampling survey.

The piggery wastewater quality (Table 5) was very similar nearly seven hours later in the day when a dilution ratio of below 100 parts riverflow to one part wastewater was re-assessed, again well below that required by Special Condition 3 of the consent.

Table 5 Results from DH Lepper Trust piggery discharge to the Waiongana Stream, sampled on 4 May 2011 (end of discharge)

Site		WGA000361	WGA000363	PGP002002
Location Parameter	Unit	Waiongana Stream upstream	Waiongana Stream downstream	Piggery final pond effluent
Time	NZST	1800	?	?
Temperature	°C	15.1	15.1	16.6
Conductivity @ 20°C	mS/m	8.3	12.9	288
Chloride	%	8.8	14.8	315
pH		7.7	7.7	8.1
Total carbonaceous BOD ₅	g/m ³	-	-	120
Filtered carbonaceous BOD ₅	g/m ³	0.8	1.8	-
Ammonia-N	g/m ³ N	0.051	3.02	-
Unionised ammonia	g/m ³ NH ₃	0.00084	0.04967	-
Dissolved reactive phosphorus	g/m ³ P	0.040	0.592	-
Turbidity	NTU	8.6	10	130
Suspended solids	g/m ³	14	20	280
Appearance		N/R	N/R	N/R

All downstream parameters measured showed significant increases in concentrations with an almost 100% exceedance of the unionised ammonia limit in non-compliance with Special Condition 5. The marked increase in filtered carbonaceous BOD₅ raised the receiving water concentration to within 0.3 g/m³ of non-compliance.

These receiving water quality results were very similar (with the exception of FBOD₅) to those recorded earlier in the day under slightly lower flow conditions, and indicative of insufficient dilution and/or incomplete mixing. No field visual observations were provided at the time of either sampling survey to assist with the interpretation of the physicochemical data.

Evaluation of treatment pond system wastewater quality

Wastewater quality data recorded for the combined piggery and dairy treatment system between 1991 and January 2011 have been summarised in Table 6.

Table 6 Summary of treated wastewater analysis results from the DH Lepper Trust piggery/dairy for the period 1991 to January 2011 (prior to removal of dairy wastes)

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity @ 20°C	mS/m	18	222	415	291
pH		5	8.1	8.3	8.1
Total carbonaceous BOD ₅	g/m ³	18	110	310	175
Filtered carbonaceous BOD ₅	g/m ³	7	7.2	46	28
Ammonia-N	g/m ³ N	9	189	336	257
Turbidity	NTU	16	110	450	195
Suspended solids	g/m ³	19	230	840	420

Following removal of the dairy wastes (to a separate system) the treated piggery wastewater quality has been sampled twice (but within 7 hours on the same day). These data are summarised in Table 7.

Table 7 Summary of treated wastewater analysis results from the DH Lepper Trust piggery for the period May 2011 to June 2011 (ex removal of dairy wastes)

Parameter	Unit	Number of samples	Minimum	Maximum	Median
Conductivity @ 20°C	mS/m	2	288	294	291
pH		2	8.1	8.2	8.1
Total carbonaceous BOD ₅	g/m ³	2	120	130	125
Turbidity	NTU	2	120	130	125
Suspended solids	g/m ³	2	280	290	285

Both of these survey's results were very similar for individual parameters (as might be anticipated considering the proximity of sampling occasions). Each parameter was within the range of historical (piggery/dairy) combined results although generally better than the median values. However, more seasonal wastewater data will be necessary to ascertain the effects of reducing loadings upon the treatment ponds system.

General Comments

Receiving water quality monitoring requires the Council to ascertain field and physicochemical aspects of consent compliance. To date, not all components of consent compliance (i.e. each Special Condition (3, 5, and 6(a-e))) have been monitored on a regular basis. However, non-compliance generally has not been an issue in the early stages on each individual discharge event (i.e. on the rising stage or near the flood peak). The principal focus should now shift toward the recession period of river freshes when discharge events continue below say 10 m³/sec and approach the limit set by Special Condition 4 (5 m³/sec). Receiving water monitoring surveys during discharge events in future should be timed around these recession flows during discharge events and assess the adequacy of mixing under these

conditions. Data collected under these conditions must be assessed and compliance issues addressed immediately after each event.

Close liaison between the consent holder and the Council's Job Manager/sampling personnel will determine appropriate timing for these assessments which will be essential for future consent renewal purposes.

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 8.

Table 8 Discharge records of piggery treated wastes to the Waiongana Stream

Discharge period	Duration (hrs)	Stream flow above 5m ³ /sec while discharging
06 Sep 10, 1000 hrs to 07 Sep 10, 1000 hrs	24	Yes
13 Sep 10, 1000 hrs to 15 Sep 10, 0900 hrs	47	Yes
29 Sep 10, 0700 hrs to 30 Sep 10, 0800 hrs	25	Yes
17 Dec 10, 0715 hrs to 17 Dec 10, 0930 hrs	2.25	For most of the period
17 Dec 10, 1400 hrs to 17 Dec 10, 2000 hrs	6	Yes
19 Dec 10, 0800 hrs to 20 Dec 10, 0530 hrs	23.5	Yes
20 Dec 10, 1430 hrs to 21 Dec 10, 0530 hrs	15	Yes
28 Dec 10, 0930 hrs to 29 Dec 10, 0700 hrs	21.5	Yes
23 Jan 11, 1600 hrs to 24 Jan 11 1700 hrs	25	Yes
02 Mar 11, 1600 hrs to 02 Mar 11, 1900 hrs	3	Yes
05 Mar 11, 0615 hrs to 05 Mar 11, 2100 hrs	9.75	Yes
25 Apr 11, 0945 hrs, to 26 Apr 11, 1800 hrs	32.25	Yes
04 May 11, 1130 hrs to 04 May 11, 1600 hrs	6.5	Yes
14 May 11, 0800 hrs to 14 May 11, 1600 hrs	8	Yes
15 May 11, 1550 hrs to 18 May 11, 0630 hrs	62.5	Yes

(Note: time have been adjusted to reflect NZST)

These records indicate that, on most 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**. The discharge records indicated that all discharges had occurred when the river flow was above the allowable 5 m³/sec which was compliant with Special Condition 4.

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 HydroTel text messaging service and is notified when the Waiongana Stream flow exceeds 5m³/sec and again when the stream flow recedes back to minimum consent conditions.

For the 2010-2011 period a total of 311.65 discharge hours were recorded compared to 312.05 hours recorded for the 2009-2010 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 the piggery emissions from the ponds system, and routine follow-up inspections found no objectionable odour offsite. The covered anaerobic pond, including the removal of cowshed effluent from the piggery effluent treatment system has been hugely instrumental in reducing odour resulting in no odour complaints for the 2010-2011 monitoring period.

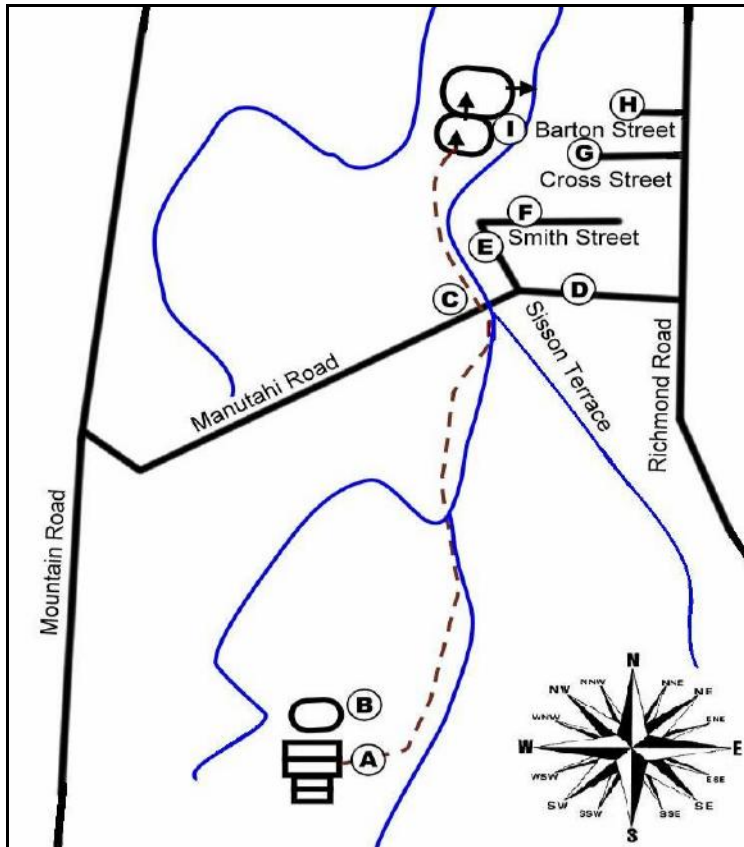


Figure 5 Odour survey monitoring locations

Odour survey sites		Time	Wind direction	Odour strength
A	Piggery operation			
B	Covered anaerobic pond			
C	Manutahi Bridge			
D	Manutahi Road			
E	Sisson Terrace			
F	Smith Street			
G	Cross Street			
H	Barton Street			
I	Oxidation ponds			

Figure 6 An example of odour survey monitoring sheet

Operations at the piggery had resulted in some odour emanating offsite from the ponds system from time to time prior to installing the covered anaerobic pond situated back at the piggery site. Odour issues were the result of general piggery operations and adverse weather conditions. As the piggery wastewater treatment ponds are located near a residential area in the Lepperton Township, there is no real buffer zone.

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 Act 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 (1991) 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.

No complaints concerning piggery odour emissions were received by the Council during the 2010-2011 monitoring period.

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 2010-2011 year, there were no incidents recorded by the Council that were associated with DH Lepper Trust Piggery.

3. Discussion

3.1 Discussion of site performance

DH Lepper Trust 400-sow pig farm was awarded the 2010 EECA awards in the Small-Medium Business category.

NIWA identified that anaerobic digestion in covered waste ponds holds significant potential to reduce odour and greenhouse gas emissions, while providing biogas as a local energy source, and designed the purpose built 7000m³ anaerobic effluent pond for the piggery.

NIWA's simple low cost cover design is effective in recovering and storing biogas, and makes it available for a multitude of uses. Biogas is used at the piggery for electricity generation and heating in a combined heat and power unit. The generator provides most of the piggery's electricity needs during daytime, and waste heat from the generator is used in reticulated hot water system for keeping young pigs warm.

The system is saving the piggery more than \$35,000 a year in electricity costs.

The consent holder has requested that the Council consider an option to change the conditions of consent allowing for a continuous treated effluent discharge to the Waiongana Stream during the winter months and that no discharge of treated effluent shall occur during the summer, low river flow conditions.

Dairy farm effluent discharge was removed from Consent 0715-3 while the transferred part of the consent [dairy discharge] is now under consent 7775-1. (There was no requirement to change the existing consent conditions).

Consent 0715-3 expires in June 2013 with no further reviews of this consent being provided for.

The consent holder has already made a significant improvement to the wastewater treatment system by installing a covered anaerobic pond to remove 60-70% of wastewater solids through sedimentation and anaerobic digestion and more recently, the removal of farm dairy effluent should further improve the wastewater loading on the existing pond treatment system.

Although the improved wastewater treatment system has been operating for approximately twenty-four months including wastewater from the dairy farm recently disconnected from the wastewater system, the Council still has insufficient wastewater quality and quantity of data to adequately identify and evaluate the effects upon the receiving waters, particularly under low flow conditions. The most effective way to monitor and collate all necessary information required by the Council is to continue to gather additional data that will be required to undertake the assessment of environmental effects as set out in the current Compliance Monitoring Programme.

The Council's policy is to promote spray irrigation to land in preference to discharge to water. However there may be an opportunity to further assess the option of partial discharge to land, although this is already required by consent (0715).

In the mid to long term the impending expiry of Consent **0715** will require a thorough investigation of effluent disposal options and methods. Therefore all investigative work carried out now regarding the discharges will be beneficial when processing the replacement consent application.

Increasing public awareness and expectations surrounding effluent disposal and it can be anticipated the options will become increasingly demanding. Therefore there is a clear need on the part of the consent holder to characterize all aspects of the discharge and to demonstrate that environmental effects are minimized.

3.2 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 9-11.

Table 9 Summary of performance for Consent 0715-3 to discharge piggery and farm dairy effluent from an oxidation pond treatment system

Condition requirement	Means of monitoring during period under review	Compliance achieved?
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 holder's discharge records and monitoring	On most occasions
4. Discharge only when river conditions allow	Consent holder's 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	On most occasions
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		Good

N/A = not applicable

Table 10 Summary of performance for Consent 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

Condition requirement	Means of monitoring during period under review	Compliance achieved?
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
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		High

Table 11 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/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

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

3.3 Recommendations from the 2009-2010 Annual Report

In the 2009-2010 Annual Report, it was recommended:

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 5m³/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.

These recommendations were implemented during the year under review.

3.4 Alterations to monitoring programmes for 2011-2012

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 monitoring programme, it is recommended that the programme for the 2011-2012 period continues as set out in the 2010-2011 compliance Monitoring Programme to assess any environmental effects in relation to the treated effluent discharge, and as required for the pending consent review process

3.5 Exercise of optional review of consent

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

Resource consent 0188 (water take) does not provide for a review for the 2011-2012 monitoring period.

Resource consent 5206 (air discharge) - no review of the consent was required in June 2011 and the next review date is June 2013

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 2011-2012 year continues at the same level as in the 2010-2011 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 5m³/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 if 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 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:

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
Condy	conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m ³ s ⁻¹)
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
FC	faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
fresh	elevated flow in a stream, such as after heavy rainfall
g/m ³	grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
l/s	litres per second
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
PM ₁₀	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
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

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

Bibliography

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

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

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

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

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

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

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

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

Miscellaneous references

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

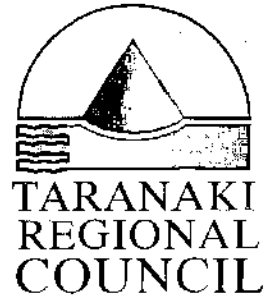
New Zealand Pork Industry Board – Pork Industry guide to Managing Environmental Effects EnvioPork – 2005

NIWA Year in Review 2011 Energy Section

Appendix I

Resource consents held by Lepper Trust Piggery

Consent 0188-3



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

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
RD 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

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



CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
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
[Trustee: Steven Maxwell Lepper]
326 Wortley Road
R D 9
INGLEWOOD 4389



Decision Date
[Change]: 23 February 2011

Commencement
Date [Change]: 23 February 2011 [Granted: 18 December 2002]

Conditions of Consent



Consent Granted: To discharge treated piggery effluent from an oxidation
pond treatment system into the Waiongana Stream during
fresh [high flow] conditions at or about (NZTM)
1704451E-5676184N

Expiry Date: 1 December 2013

Site Location: Manutahi Road, Lepperton

Legal Description: Pt Lot 2 DP 2634

Catchment: Waiongana

*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 1704451E-5676184N. 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:

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

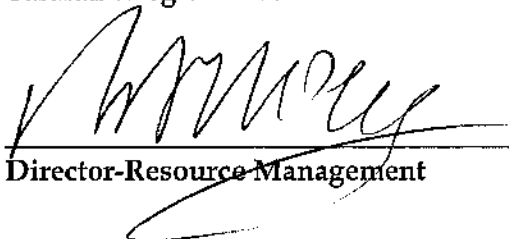
6. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Waiongana Stream:
 - a) the production of any conspicuous oil or grease films, scums or 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.

Consent 0715-3

7. The consent holder shall operate and maintain the treatment and discharge system to ensure that the conditions of this consent are met.
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 23 February 2011

For and on behalf of
Taranaki Regional Council



Director-Resource Management



**TARANAKI
REGIONAL
COUNCIL**

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

Consent 5206-2

General conditions

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

Special conditions

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.

Consent 5206-2

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

