

DH Lepper Trust Piggery  
Monitoring Programme  
Annual Report  
2007-2008

Technical Report 2008–16

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## Executive summary

The DH Lepper Trust operates a piggery located on Mountain and Manutahi Roads, and a farm dairy 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 2007-June 2008 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 a total of three resource consents, which include a total of 26 conditions setting out the requirements that the Company must satisfy.

The Council's monitoring programme included five inspections and one wastewater and receiving water survey for physicochemical analysis.

Because the existing treatment ponds are located in close proximity to south eastern residential properties, odour issues have become a concern within some quarters of the Lepperton community. Residential encroachment and reverse sensitivity issues in the rural countryside are also a major concern for the pork industry.

The Consent holder has installed a new anaerobic pond adjacent to the piggery buildings. This new pond will be covered and biogas collected and used to reduce the farm's existing energy requirements. More importantly odours associated with anaerobic activity will be trapped in the covered pond and prevented from being discharged to air. The existing pond system will receive effluent treated to a higher quality and effectively assist in reducing odour and allowing a cleaner discharge.

The agricultural air discharge consent expired in June 2008 and the Council has received an application for the renewal of the air discharge resource consent.

Monitoring indicated a good 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 discharge periods.

The consent holder has supplied the Council with accurate effluent discharge records, including notification of discharges to water and land.

This report includes recommendations for the monitoring programme for the 2008-2009 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 2007-June 2008 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), and the waste water treatment ponds are situated on Manutahi Road in the Waiongana catchment.

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 2008-2009 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.

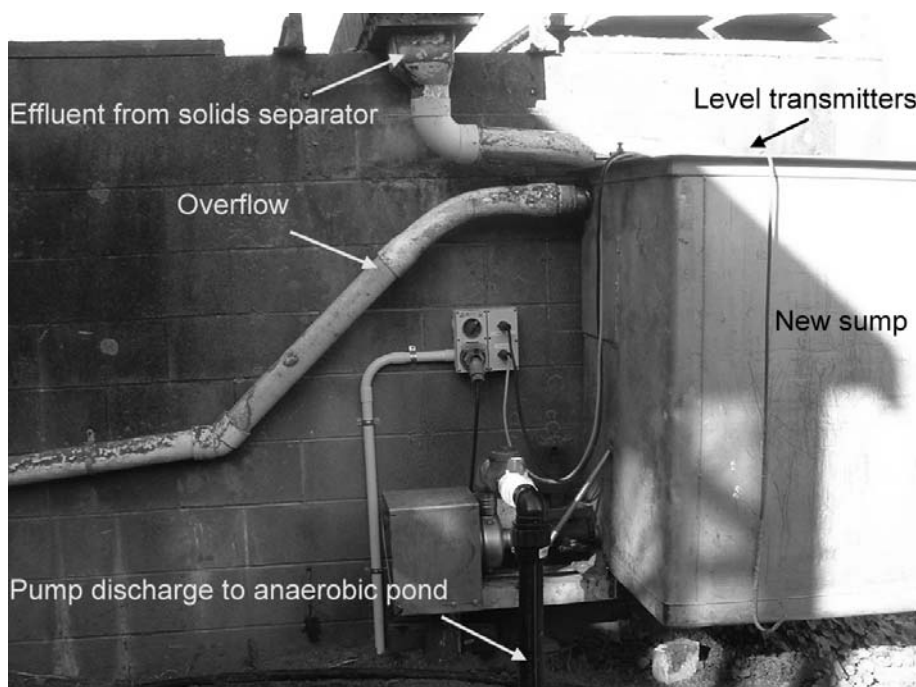
## 1.2 Process description

All raw wastewater is collected in a large holding tank. From there it is pumped through a rotating screen machine (Photo 1) which provides primary treatment by separating the solid component of the effluent.



The solids are stored in three large bins prior to being mixed 50:50 with sawdust. The mixture is transferred to a large shed where it is aerated until well composted. The end product is then bagged and sold as a soil conditioner. The screening reduces solids, biochemical oxygen demand (BOD<sub>5</sub>) and some nutrients contained in the liquid wastes which is then pumped to the treatment pond system.

**Photo 1** Solids separation and collection system



**Photo 2** New sump and pump

The effluent treatment includes the new anaerobic pond situated adjacent to the northern side of the piggery and connects to the existing pond system. This new pond will be covered and biogas collected and used to reduce the farms existing energy requirements. More importantly odours associated with anaerobic activity will be trapped in the covered pond and prevented from being discharged to air.

The existing ponds will receive effluent treated to a higher quality and effectively assist in reducing odour.

The final effluent is discharged from the ponds system to the Waiongana Stream when flows permit (consent requirement of a minimum flow of 5m<sup>3</sup>/s in the stream). The discharge occurs through a diffuser anchored to the bed of the stream and, as this lies beneath the stream under fresh flow conditions, all sampling of the treated wastewater is from within the final (aerobic) pond, adjacent to the outlet. The pond system is cleaned out annually by contractors and irrigated to the consent holder's surrounding dairy pasture. The ponds are stirred and pumped for 1 to 2 days, which allows for some solids to be removed and for a reduction in volume. Due to the size of the treatment ponds they are not completely emptied, to do so would be impractical and would take too long.

Because of the treatment ponds' close proximity to the eastern neighbouring residents, odour issues remain a concern. Residential encroachment and reverse sensitivity issues in the rural countryside are also a major concern for the pork industry.

The ponds system was designed to MAF specifications and constructed around 1981. They are located 1.2 km from the piggery, on the banks of the Waiongana River and surrounded by land owned by the consent holder. Effluent from both the piggery [3,500 animals] and a dairyshed [400 cows] is treated in the ponds system, with treated effluent being discharged to the Waiongana River during consented, high river flow conditions.

## **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 **5206-1** to discharge emissions into the air from a pig farming activity and associated practices, including solids composting, effluent treatment and other waste management activities. This permit was issued by the Taranaki Regional Council on 4 February 1998 as a resource consent under Section 87(e) of the Resource Management Act. This consent **5206-2** expired on 1 June 2008 and a new consent is presently being processed.

Twelve special conditions are attached to the consent.

Special Condition 1 requires the consent holder to adopt the best practicable option to prevent or minimise any actual or likely adverse effects.

Special Condition 2 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 3 requires the consent holder to minimise the emissions and impacts of air contaminants discharged from the site.

Special Condition 4 requires the consent holder to operate the piggery and associated activities in accordance with information provided.

Special Condition 5 restricts odours at or beyond the boundary of the site.

Special Condition 6 limits the discharge of suspended or deposited dust at or beyond the boundary of the site.

Special Condition 7 prohibits any significant adverse ecological effect on any ecosystems in the Taranaki region.

Special Condition 8 requires the consent holder to submit a maintenance and landscaping plan for the effluent ponds.

Special Condition 9 requires the consent holder to maintain and operate the effluent ponds system and associated activities in compliance with the plan required by Special Condition 8.

Special Condition 10 requires the consent holder to advise neighbours of any scheduled land application of effluent or sludge onto a property.

Special Condition 11 requires the consent holder to minimise effects upon neighbours and the land uses of neighbouring properties.

Special Condition 12 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 five times during the monitoring period. The main points of interest were the collection area, the separator and composting system and treatment ponds system with associated actual and potential emission sources and characteristics, including discussion on any recent odour complaints.

### **1.4.4 Physicochemical sampling**

The Taranaki Regional Council undertook sampling of the discharges from the treatment ponds system and the water quality upstream of the discharge point and downstream of the designated mixing zone.

The effluent discharge was sampled on one occasion, and the sample analysed for carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>), chloride, conductivity, suspended solids and turbidity.

The Waiongana Stream was sampled on one occasion, upstream and downstream of the discharge, and analysed for filtered carbonaceous biochemical oxygen demand (FCBOD<sub>5</sub>), chloride, conductivity, dissolved reactive phosphorus, unionised ammonia, ammoniacal nitrogen, pH, suspended solids, turbidity and temperature.

The monitoring programme allows for the effluent discharge and receiving water to be sampled on three occasions. When discharging to the Waiongana Stream the consent holder advises the Council staff, who undertake sampling if required. Discharge and receiving water sampling was only undertaken on one occasion due to drought conditions causing low river flows and also the new anaerobic pond took several weeks to fill which resulted in no discharge during this period.

## **2. Results**

### **2.1 Water**

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

To determine flow rates in the Waiongana Stream, a rating curve of flow against water depth is maintained by the Council. This enables the consent holder to assess treated wastewater discharge compliance with the minimum dilution ratio of 1:250 (one part effluent to two hundred and fifty parts of receiving water flow).

The wastewater discharge flow from the aerobic pond was established at 15 litres per second by calculating the conductivity ratios of the receiving water. To ensure that the dilution ratio is being met during a moderate fresh, the discharge flow can be controlled by reducing the flow via a control valve.

A staff gauge was installed at old Manutahi Road bridge which provided the consent holder with the stream level (or height) and a rating chart produced by the Council shows water flow rates at any given stream depth. This rating was reviewed during February 2008.

The consent holder had access to the Taranaki Regional Council web site ([www.trc.govt.nz](http://www.trc.govt.nz)) which provided current river flow and water levels for the Waiongana Stream recorded at SH3a at the time of discharging.

The river level and flow data are automatically forwarded to the Council computer database. The data is analysed every two hours and a graph is provided within ten minutes of downloading. Because of the time lag between the pond discharge point and downstream flow at Waiongana SH3a, the staff gauge provides the consent holder with accurate 'real time' river conditions.

#### **2.1.2 Inspections**

The first inspection for the monitoring period of the piggery and ponds system was carried out on 12 October 2007 during windy conditions following heavy rain. The ponds were discharging at inspection and samples were taken. The staff gauge was reading 0.75 metres. The piggery was operating normally and there were noticeable piggery odours onsite. The composting area looked good, all wastes were contained and the piggery operational area was found to be satisfactory.

The inspection on 29 November 2007 found the piggery to be operating normally. All piggery wastes were well contained with liquids being directed back to the effluent sump. A large pile of sawdust used for the composting process of piggery wastes was stockpiled, ready for use. Slight odours were noted around the ponds system. The odours were noticeable, emanating from the anaerobic pond. The aerobic ponds were operating effectively and the level in this pond was quite low. No treated effluent was being discharged into the Waiongana Stream.

Inspection of the piggery and ponds system was carried out on 11 February 2008 during rain. The ponds were not discharging and there was a strong odour coming off the anaerobic ponds. An odour survey was carried out in the Lepperton Township but no odours were noted. The solids separating area looked well

managed, there were normal piggery odours in the general area and the system appeared to be working well.

An inspection carried out on 13 May 2008 was undertaken to check the progress of proposed works for the new effluent treatment system. A new anaerobic pond had been constructed adjacent to the north side of the piggery. The pond measured approximately 15 metres wide, 52 metres long and 6.5 metres deep. The consent holder had informed a Council Officer that piggery effluent would be directed to the pond shortly, and would take up to five weeks to fill. Once the anaerobic pond was full the pond effluent would discharge into the current pond system. The anaerobic pond is to be covered and biogas collected and used to reduce the farm's existing energy requirements.

The final inspection of the piggery for the year was carried out on 11 June 2008. There was no wind at the time of inspection and normal piggery odours were noted. Raw untreated piggery effluent was discharging into the new pond at the time of inspection. The pond was approximately one quarter full. The new pumping system had been set up on the stainless steel vat below the solids separator. There had been no effluent go to the old pond system and no discharge to the river from the old ponds for some time. The old ponds looked good and there were no noticeable odours noted. An odour survey was carried out in the Lepperton Township and no odours were noted.



Photo 3 New anaerobic pond

### 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 one of these occasions for physico-chemical analysis in the Taranaki Regional Council IANZ-registered laboratory. Sites sampled were located as listed in Table 1 and illustrated in Figure 1.

**Table 1** Location of sampling sites

Site	Site code	Map reference	Location
Waiongana Stream	WGA000361	Q19: 145-379	100 m u/s of discharge
Piggery effluent	PGP002002	Q19: 146-380	In aerobic pond adjacent to outlet
Waiongana Stream	WGA000363	Q19: 146-380	50 m d/s of discharge

**Figure 1** Aerial location map of sampling sites in the Waiongana Stream**Table 2** Results from DH Lepper Trust piggery and Waiongana Stream, sampled on 12 October 2007

Site location		WGA000361 Waiongana Stream upstream	WGA000363 Waiongana Stream downstream	PGP002002 Piggery final effluent
Parameter	Unit			
Temperature	°C	12.1	12.1	15.1
Conductivity @ 20°C	mS/m	9.1	9.3	362
Chloride	g/m <sup>3</sup>	11.1	11.1	246
pH		7.4	7.4	-
Total carbonaceous BOD5	g/m <sup>3</sup>	-	-	160
Filtered carbonaceous BOD5	g/m <sup>3</sup>	1	1.1	-
Ammoniacal nitrogen	g/m <sup>3</sup> N	0.358	0.37	-
Unionised ammonia	g/m <sup>3</sup> NH <sub>3</sub>	0.00238	0.00246	-
Dissolved reactive phosphorus	g/m <sup>3</sup> P	0.033	0.056	-
Turbidity	NTU	11.2	12.2	290
Suspended solids	g/m <sup>3</sup>	12	11	420

Under moderately high river flow conditions (>10 cumecs) the results indicated that the wastewater dilution was probably in excess of 300:1. Minimal impacts were measured in the Waiongana Stream below the mixing zone and the discharge was in compliance with all relevant Special Conditions of consent **0715-3**. Low nutrients, turbidity and suspended solids were not typical of fresh conditions in the Waiongana Stream. The wastewater total cBOD<sub>5</sub> result was comparable to previous year's results and the suspended solids concentration was also similar to previous results (slightly elevated) which would normally indicate the anaerobic pond would benefit from desludging. With a new anaerobic pond being constructed at the front end of treatment system the existing anaerobic pond may be converted to an aerobic pond. (aerobic ponds need to be de-sludged occasionally).

#### 2.1.4 Treated piggery/dairy wastewater

Prior to the 2007-2008 monitoring period, the treatment ponds system was sampled for various reasons. These results are summarised in Table 3. The sampling point was within the final (aerobic) pond, adjacent to the outlet.

**Table 3** Summary of treated wastewater analysis results from the DH Lepper Trust piggery/dairy for the period 1991 to June 2007

Parameter	Unit	Number of samples	Range	Median
Conductivity @ 20°C	mS/m	14	222 - 415	288
pH		4	8.1 - 8.3	8.1
Total carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	17	110 - 1100	180
Filtered carbonaceous BOD <sub>5</sub>	g/m <sup>3</sup>	7	3.4 - 46	24
Ammoniacal nitrogen	g/m <sup>3</sup> N	9	189 - 336	257
Turbidity (cyberscan)	NTU	12	110 - 450	220
Suspended solids	g/m <sup>3</sup>	15	230 - 840	440

These results 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 may have coincided with changes in the configuration preceding storage provided by the treatment system over the sixteen-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 4.

**Table 4** Discharge records of piggery treated wastes to the Waiongana Stream

Discharge period	Duration (hrs)	Stream flow above 5m <sup>3</sup> /sec while discharging
05 Aug 07, 1730 hrs to 07 Aug 07, 0900 hrs	43	Yes
18 Aug 07, 1730 hrs to 20 Aug 07, 0900hrs	39.5	Yes
10 Oct 07, 1800 hrs to 13 Oct 07, 0700 hrs	37	Yes
04 Nov 07, 1800 hrs to 06 Nov 0700 hrs	37	Yes
31 Mar 08, 0700 hrs to 1 Apr 08, 0800 hrs	25	Yes
15 Apr 08, 0700 hrs to 15 Apr 08, 1700 hrs	10	Yes
28 Apr 08, 1100 hrs to 29 Apr 08, 0700 hrs	20	No - drop off in river flow towards the end of discharge
1 May 08, 0800 hrs to 2 May 08, 0800 hrs	24	Yes
5 May 08, 0900 hrs to 6 May 08, 1700 hrs	32	Yes

These records indicate that, on most 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 old Waiongana River bridge was recently removed and subsequently the staff gauge for measuring river flows was displaced. A new site for a staff gauge on the Waiongana River is yet to be established. The consent holder had access to the Taranaki Regional Council web site ([www.trc.govt.nz](http://www.trc.govt.nz)) which provided current river flow and water levels for the Waiongana Stream recorded at SH3a at the time of discharging.

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. There was a four month period between mid November 2007 and late March 2008 where the Waiongana Stream was running below the consent discharge conditions due to a prolonged drought.

For the 2007-2008 period a total of 267.5 discharge hours were recorded compared to 397 hours recorded for the 2006-2007 period.

## 2.2 Air

### 2.2.1 Inspections

Air quality is checked during compliance monitoring inspections, or if odour complaints are received. There were several odour complaints concerning piggery emissions from the ponds system, and routine follow-up inspections found objectionable odours off site on three occasions.

## 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 register ('unauthorised incident register') 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 2007-2008 year, there were seven incidents recorded by the Council that were associated with the DH Lepper Trust piggery.

### 2.3.1 Incidents

An odour complaint was received on 5 July 2007 and a Council Investigating Officer carried out an ambient air odour survey at the Lepperton Township and at the complainant's property. Only noticeable odours could be found offsite at time of inspection. The complainant was spoken to during the inspection and he explained that the odour had gone since the wind changed. He also said that during some winds the odour was objectionable to him. A meeting was scheduled with the piggery owners to establish what mitigation measures are being undertaken (refer to page 14, Section 2.3.2 Liaison with consent holder).

A complaint was received on 1 August 2007 by the Council that odours were emanating from the oxidation pond system. The Investigating Officer inspected the site and no odours noted. The complaint could not be substantiated.

On 1 September 2007, a complaint was received concerning odour from a piggery oxidation pond system. An inspection was carried out by a Council Officer and no odours could be found in the general area. The wind was swirling at the time of inspection and the complainant agreed there was no odour.

A complaint was received regarding odour from a piggery on 4 September 2007. An investigation by a Council officer found there was no odour at the bridge over the Waiongana Stream at Manutahi Road, Lepperton. An odour survey was carried out in the vicinity of the complainant's house and there was found to be persistent offensive odours of moderate strength during a northerly breeze. The complainant was spoken to and he advised that odours seem to have gotten worse over the last year. The odour was caused by the oxidation ponds. A meeting was scheduled with the consent holder in an attempt to address the issue (refer to page 14, Section 2.3.2 Liaison with consent holder).

An odour complaint was received by the Council on 8 September 2007 from a local resident regarding piggery odour from the effluent ponds. An odour survey was carried out in the Lepperton Township and an investigation found there was a faint, inconsistent odour along Smith Street and nothing evident along Sisson Terrace.

A complaint regarding odour was received by the Council on 13 September 2007 which was promptly investigated by an officer. Investigation found a noticeable odour in the vicinity of Sisson Terrace, Lepperton. The odour became offensive at intermittent intervals. It was explained to the complainant that a meeting had been scheduled between the Council and piggery owners to discuss the ongoing issues (refer to page 14, Section 2.3.2 Liaison with consent holder).

On 20 December 2007 a discovery was made by a Council Officer of an industrial fire being used to dispose of prohibited waste. Investigation found prohibited waste had been included in a general rubbish fire. There was dense black smoke visible for some distance. The smoke emissions ceased after a short period of time. The property owner was instructed to ensure only permitted waste was disposed of on any future fires. There was no offsite effect as a result of the fire and smoke.

### **2.3.2 Liaison with consent holder**

During the 2007-2008 monitoring period, the Taranaki Regional Council liaised with the consent holder regarding several operational issues, additional to those required in the monitoring programme.

#### **19 September 2007**

A meeting was held onsite at the piggery between the consent holder and TRC officers. This meeting was held to discuss ongoing odour problems arising from the piggery oxidation pond system. During August and September there had been 5 complaints regarding odour. The complaints on three occasions were found to be substantiated by the Investigating Officers. There appears to have been more complaints during the last two years. The consent holder had been looking into several options which may include covering the existing anaerobic pond or constructing a new covered anaerobic pond adjacent to the piggery. This new pond would be covered and biogas collected and used to reduce the farms existing energy requirements. More importantly odours associated with anaerobic activity would be trapped in the covered pond and prevented from being discharged to air. The consent holder was requested to notify the Council on a plan and time frame, after talking with consultants.

#### **October 2007**

A Council Officer discussed with NPDC and others the use of potential feedstock by-product materials from other local industries which could be combined with piggery effluent and disposed of in a digester unit. Potential problems with disease transfer and issues regarding consistency, quality and quantity of a suitable material made it an unviable proposition. Discussion was also held with NPDC regarding the discharge of piggery effluent into the New Plymouth WWTP via the Lepperton sewer mains. The conclusion was that piggery effluent would be too strong (i.e. high BOD, COD levels) for the WWTP and the effluent would require some level of pre-treatment prior to disposal.

#### **4 March 2008**

A meeting was held at the TRC between the consent holder and council officers in regards to the ongoing piggery odour issues. The consent holder was going to construct a new covered pond and extract biogas which may be used to help fuel his gas boiler. The existing ponds will stay as they are, they will both be used as aeration ponds.

**21 May 2008**

Council Officers visited the Warratah Farms Piggery at Roto O Rangi, Cambridge. The purpose of the trip was to obtain technical information on an operating covered anaerobic pond similar in design to what the consent holder was constructing and to discuss issues regarding odour and methane abstraction. The covered anaerobic pond at Roto O Rangi has been very successful in odour control and had reduced odour complaints from 33 to 3, and the 3 complaints received, were due to a process malfunction during the commissioning phase of the project. NIWA scientists, Dr. Rupert Craggs and Mr Stephan Heubeck were on site to provide specialist advice and technical information as it is a scientific project jointly run by NIWA and Warratah Farms.

**30 May 2008**

Two Regional Council Officers visited Lepper's piggery to look at the new anaerobic pond and to discuss the new air discharge consent requirements. The new pond had started to fill and would discharge to the existing pond system. The new effluent pump and treatment system was inspected. It was noted that there was very little odour emanating from around the piggery sheds. The anaerobic pond was to be covered when the pond had filled. The consent holder has been requested to submit an Assessment of Environmental Effects (AEE) report to the Council as part of the ongoing air discharge consent requirement process. An Environmental Consultant (John McBride) had been engaged to liaise with affected parties within the Lepperton Township and to produce the AEE report.

### **3. Discussion**

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

The DH Lepper Trust's piggery performance has generally been good. The implementation of a tailored consent monitoring programme has shown the consent holder to have met consent conditions, including receiving water conditions (unionised ammonia and filtered carbonaceous BOD<sub>5</sub>), receiving water dilution ratios with one exception, monitoring of the wastewater disposal system, and maintenance of records. The consent holder has also advised Council on some occasions of the exercise of the consent to discharge to the Waiongana Stream, thereby assisting with components of the monitoring programme.

The piggery site has been well maintained and the use of the piggery wastes separator system assists with lowering waste loadings to the anaerobic-aerobic treatment ponds system. It also enables the use of valuable nutrients and organic material as a soil conditioner.

Several odour complaints from around the Lepperton Township were again received and investigated by the Council throughout the monitoring period. All complaints received were related to odours emanating from the oxidation ponds system and no complaints were received from the piggery operation itself.

The consent holder has constructed a new anaerobic pond adjacent to the piggery operation. The pond once covered should minimise odour and greenhouse gas emissions, produce valuable biogas. The captured biogas can be used for heating, electricity, and fuel supply for the existing package boiler or transport use at a later stage. The effluent from the covered anaerobic pond will discharge into the existing oxidation pond system back towards the Lepperton Township. At this stage of the project no modifications are planned for the existing pond system (anaerobic and aerobic), until a reasonable trial period has been carried out. Comparing physicochemical results with previous analytical data from the final treated effluent discharge and conducting frequent odour surveys during optimum weather conditions will prove if the upgrade has been successful.

#### **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 on all but one occasion. All parameters measured complied with relevant consent conditions.

Discharge of treated effluent to land from the first 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

Several complaints concerning piggery odour emissions from the pond system were received by the Council during the 2007-2008 monitoring period. Two complaints investigated by the Council were recorded as 'light' odours, one of the odour complaints reported was recorded as 'strong' odour and one complaint investigated was a 'moderate' odour, and there were two complaints where no odour was noted. For all complaints the strength of odours recorded were as perceived by the Investigating Officer at or beyond the boundary of the piggery site.

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:

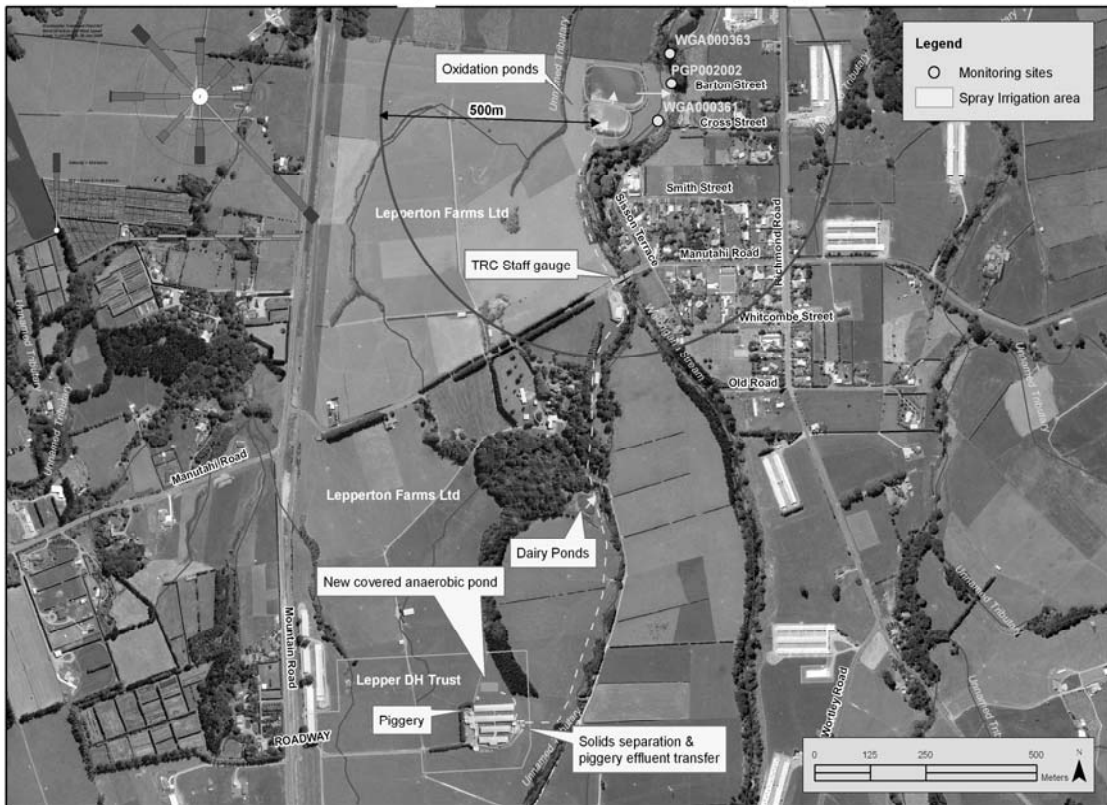
- Where the odour is detected from.
- Note type of area (for example, agricultural, residential, or industrial).

Odours emanating from the aerobic pond are generally acceptable, but odours from the anaerobic pond, as to be expected, are stronger and it's these odours which give rise to complaints from neighbours. Weather conditions, especially wind direction (Figure 2), have been the main trigger for residents to register an odour complaint with the Council. In all odour cases investigated, the wind has been from a northerly quarter in relation to the oxidation ponds.

The complainants are all local residents living within close proximity (200 metres), directly south-west of the ponds system. The locations from where the complaints have been received, and the Council subsequently investigated, are Sisson Terrace, Smith Street and an industrial area on the eastern side of Manutahi Road bridge. The consent holder has not received any odour complaints directly, but is aware of

recent developments and disquiet within the Lepperton Township and is working with other pork producers and consultants to minimise and rectify this situation.

For the majority of the monitoring period the consent holder has maintained and operated the ponds system effectively, demonstrating good odour control apart from the localised neighbouring issue which needs to be resolved.



**Figure 2** Aerial map showing wind direction in relation to ponds and township

### 3.4 Evaluation of performance

A tabular summary of DH Lepper Trust's compliance record for the year under review is provided in Tables 5, 6 & 7.

**Table 5** 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	Yes
2. Location and position of the discharge point	Monitoring inspections	Yes
3. Minimum dilution rate in receiving waters	Consent holders discharge records and monitoring	No – on one occasion dilution was insufficient
4. Discharge only when the river conditions allow	Consent holders discharge records and monitoring	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Maximum concentrations in receiving water after mixing	Sampling	Yes
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 from 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	Consent up for review during 2008	N/A

N/A = not applicable

**Table 6** Summary of performance for Consent 5206-1 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	N/A
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 (excluding ponds)	Monitoring inspections	Yes
6. Objectionable dust levels at 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 system and associated activities	Monitoring inspections	Yes
10. Advise neighbours prior to irrigating effluent to land	Consent holder to inform neighbours and Council prior to irrigating to land	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
11. Particular regard to wind direction to minimise effects upon neighbours when discharging effluent	Monitoring inspections	Yes
12. Review of consent conditions	Consent expired 1 June 2008 – application received to renew	N/A

N/A = not applicable

**Table 7** 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. Review of consent conditions	Optional permit review – June 2008	N/A

N/A = not applicable

DH Lepper Trust has subsequently demonstrated an overall good level of environmental performance and compliance with resource consents.

### 3.5 Recommendations from the 2006-2007 Annual Report

In the 2006-2007 Annual Report, it was recommended:

1. That monitoring of air emissions and discharges to natural water from the DH Lepper Trust Piggery and farm dairy in the 2007-2008 year, continues at the same level as in the 2006-2007 period.

The monitoring programme was undertaken as scheduled.

### 3.6 Alterations to monitoring programme for 2008-2009

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 there be no alteration to the programme for the 2008-2009 period. A recommendation to this effect is attached to this report.

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

Resource consents **0715-3** (wastewater discharge) and **0188-3** (water take) both provide for an optional review of consent in June 2008.

Condition 11 on consent **0715-3** allows the Council to review the consent, to ensure that conditions are adequate to deal with any significant adverse effects on the environment in relation to dilution rate, maximum discharge rate, and concentrations of constituents of both the discharge and receiving water. Similarly, condition 3 on consent **0188-3** allows the Council to review the consent to deal with effects on the environment which either were 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 in respect of either consent.

The air discharge Consent **5206-1** expired on 1 June 2008 and an application for renewal has been received by Council.

## 4. Recommendations

1. THAT monitoring of air emissions and discharges to natural water from the DH Lepper Trust piggery and dairy farm in the 2008-2009 year continue at the same level as in the 2007-2008 period.
2. THAT the consent holder continues to advise the Council of all treated effluent wastewater discharges to the Waiongana Stream and onto land.
3. THAT the consent holder monitors and maintains discharge records and forwards these records to the Council at six month intervals
4. THAT the consent holder monitors and maintains anaerobic biogas abstraction rates (flaring or energy usage) and supplies to Council as required.
5. THAT the consent holder operates and maintains pond levels with a minimum of 300mm freeboard.
6. THAT the provisions in the monitoring programme to sample the discharge and receiving waters on three separate occasions remain unchanged.
7. THAT the Consent holder be required to provide to Council an odour management plan for the avoidance of any offensive or objectionable odour from the effluent ponds on neighbouring properties, as part of the process for replacement of resource consent **5206**.
8. THAT the option for a review of resource consents **0715-3** (wastewater discharge) and **0188-3** (water abstraction) in June 2008, as set out in condition 11 of consent **0715-3**, and condition 3 of consent **0188-3**, not be exercised.

## 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
DO	dissolved oxygen
DRP	dissolved reactive phosphorus
FIDOL	factors (frequency, intensity, duration, offensiveness and location) and scales to rate odour observations
fresh	elevated flow in a stream, such as after heavy rainfall
g/m <sup>3</sup>	grammes per cubic metre, and equivalent to milligrammes 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 <sub>4</sub>	ammoniacal nitrogen, normally expressed in terms of the mass of nitrogen (N)
NH <sub>3</sub>	unionised ammonia nitrogen, 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
pH	a numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.

physicochemical	measurement of both physical properties(e.g. temperature, clarity, density) and chemical determinants ( e.g. metals and nutrients) to characterise the state of an environment
resource consent	refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
SS	suspended solids,
Temp	temperature, measured in °C
Turb	turbidity, expressed in NTU
UIR	Unauthorised Incident Register entry- an event recorded by the Council on the basis that it had potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan

\*an abbreviation for a metal or other analyte may be followed by the letter '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 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

## **Appendix I**

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



## **Appendix II**

### **Flow Rating for the Waiongana Stream (at Manutahi Road)**



## Waiongana Stream at Manutahi Road Bridge Height vs Flow Values

Prepared for DH Lepper Trust

(reviewed March 2007)

A staff gauge has been installed on the Waiongana Stream at Manutahi Road Bridge for monitoring of the stream level (or height).

The table shows stream levels at this bridge and the corresponding flow for each level.

River Level	Flow (m <sup>3</sup> /sec)
0.20	0.572
0.21	0.604
0.22	0.640
0.23	0.683
0.24	0.733
.25	0.790
0.26	0.857
0.27	0.932
0.28	1.020
0.29	1.110
0.30	1.220
0.31	1.340
0.32	1.470
0.33	1.620
0.34	1.770
0.35	1.940
0.36	2.109
0.37	2.292
0.38	2.486
0.39	2.691
0.40	2.906
0.41	3.133
0.42	3.372
0.43	3.622
0.44	3.885
0.45	4.160
0.46	4.448
0.47	4.749
0.48	5.063
0.49	5.391
0.50	5.733
0.51	6.089
0.52	6.460
0.53	6.846
0.54	7.247
0.55	7.663
0.56	8.096
0.57	8.544
0.58	9.008
0.59	9.490
0.60	9.988

