

Silver Fern Farms Ltd Waitotara
Monitoring Programme
Annual Report
2019-2020

Technical Report 2020-96

Taranaki Regional Council
Private Bag 713
Stratford

ISSN: 1178-1467 (Online)
Document: 2595514 (Word)
Document: 2662683 (Pdf)

March 2021

Executive summary

Silver Fern Farms Ltd (Silver Fern Farms) operates a meat processing plant located on Wai-inu Beach Road, Waitotara in the Waitotara catchment. This report, for the period 1 October 2019 to 30 September 2020 coincides with the killing season. It describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Silver Fern Farms' environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of Silver Fern Farms' activities.

Silver Fern Farms holds a total of five resource consents, which include a total of 51 conditions setting out the requirements that Silver Fern Farms must satisfy. Silver Fern Farms holds resource consents to allow it to take and use groundwater and spring water, to discharge wastes by spray irrigation to land, to discharge stormwater and cooling water to an unnamed tributary of the Waitotara River, and to discharge emissions into the air.

During the monitoring period, Silver Fern Farms Ltd demonstrated an overall good level of environmental performance.

The Council's monitoring programme for the year under review included four inspections, and the collection of four wastewater and 29 groundwater samples for physicochemical analysis. This includes monitoring of a bore which was installed on 5 November 2019. Silver Fern Farms supplied records of their own monitoring, as well as records of the volume of water abstracted and the volume of wastewater discharged.

The groundwater abstraction data showed that the instantaneous volume limit was exceeded frequently by small amounts, although the daily limit was being met. These exceedances continued occasionally throughout the current monitoring period. However the exceedance was greater than the margin of error of the flowmeter on only two occasions during the period under review. No action was taken due to problems with the telemetry system which caused a delay in receipt of the data by both Silver Fern Farms and the Council.

Nitrogen loadings exceeded the operational target of 300 kg/ha/y in one sector during the period under review. Monitoring of a site of significance to Ngaa Rauru Kiiitahi, a spring at the coast, was continued in relation to the extended irrigation area.

Stormwater and cooling water discharges were not found to have significant environmental effect.

During this reporting period no odour complaints were received by Silver Fern Farms from residents at the Wai-inu Beach Settlement. Mitigation measures following the complaints in the 2016-2017 year have been undertaken, and operational changes have been made to the irrigation system to minimise the risk of further complaints.

During the year, Silver Fern Farms demonstrated a good level of environmental and high level of administrative performance with the resource consents.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.

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

This report includes recommendations for the 2020-2021 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	1
1.1.4	Evaluation of environmental and administrative performance	2
1.2	Process description	3
1.2.1	Water abstraction	6
1.2.2	Discharges to land	6
1.2.3	Discharges to air	6
1.3	Resource consents	7
1.4	Monitoring programme	7
1.4.1	Introduction	7
1.4.2	Monitoring by Silver Fern Farms	8
1.4.3	Monitoring by the Council	8
2	Results	10
2.1	Water	10
2.1.1	Inspections	10
2.1.2	Results of water abstraction monitoring	10
2.1.3	Results of discharge monitoring	13
2.2	Air	20
2.2.1	Inspections	20
2.3	Investigations, interventions, and incidents	20
3	Discussion	23
3.1	Discussion of site performance	23
3.2	Environmental effects of exercise of consents	24
3.3	Evaluation of performance	25
3.4	Recommendations from the 2018-2019 Annual Report	30
3.5	Alterations to monitoring programmes for 2020-2021	31
4	Recommendations	32
	Glossary of common terms and abbreviations	33
	Bibliography and references	35

Appendix I Resource consents held by Silver Fern Farms Ltd (Waitotara)

List of tables

Table 1	Consents held by Silver Fern Farms in relation to their Waitotara site	7
Table 2	Monthly average and maximum instantaneous groundwater abstraction rates 2019-2020	11
Table 3	Monthly average and maximum instantaneous spring water abstraction rates 2019-2020	12
Table 4	Chemical monitoring results for the irrigation pond 2019-2020	13
Table 5	Groundwater monitoring sites	14
Table 6	Water quality results for monitoring bores at Silver Fern Farms Waitotara October 2019 to September 2020	15
Table 7	Water quality results for monitoring bores on the Longview Irrigation area October 2019 to September 2020	16
Table 8	Chemical composition of Te Kiri o Rauru spring	20
Table 9	Incidents, investigations and interventions summary table	21
Table 10	Summary of performance for consent 2260-3.1	25
Table 11	Summary of performance for consent 2261-3.1	26
Table 12	Summary of performance for consent 4629-3.1	27
Table 13	Summary of performance for consent 5027-2	28
Table 14	Summary of performance for consent 10256-1.0	28
Table 15	Evaluation of environmental performance over time	29

List of figures

Figure 1	Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points	4
Figure 2	Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points	5
Figure 3	Daily abstraction volume m ³ , October 2019 to September 2020	11
Figure 4	Conductivity at groundwater monitoring points, 1994-2020	17
Figure 5	Ammonia at groundwater monitoring points, 1994-2020	17
Figure 6	Nitrate at groundwater monitoring points, 1994-2020	17
Figure 7	Nitrate at groundwater monitoring points in the 2019-2020 monitoring year	18

List of photos

Photo 1	Ponding of wastewater at the Longview irrigation area on 10 September 2020	22
---------	--	----

1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period October 2019 to September 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Silver Fern Farms Ltd (Silver Fern Farms). Silver Fern Farms operates a meat processing plant situated on Wai-inu Beach Road at Waitotara, in the Waitotara catchment. The monitoring period coincides with the killing season.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Silver Fern Farms that relate to abstraction of water, discharge of wastes by spray irrigation to land, discharge of stormwater and cooling water in the Waitotara catchment, and the air discharge permit held by Silver Fern Farms to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of Silver Fern Farm's use of water, land and air, and is the twenty-seventh combined annual report by the Council for this meat processing plant.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by silver fern farms in the Waitotara catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Silver Fern Farms' site.

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

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

Section 4 presents recommendations to be implemented in the 2019-2020 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

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

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

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

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.¹

1.2 Process description

The meat processing plant was constructed in 1987 within pastoral lands beside Wai-inu Beach Road, approximately 3.5 km south of Waitotara and 3 km north of Wai-inu Beach. The location of the plant site is shown in Figure 1 and the layout of the irrigation system in Figure 2. The nearest dwellings are farmhouses, situated about 900 m to the north and 1.2 km to the south-east. The Waitotara River is located approximately 450 m to the north of the plant.

The plant primarily slaughters and processes sheep and lambs, but is also capable of handling bobby calves and goats. The site processes sheep and bobby calves, and during March 2019 operations were reduced from 7 days to 5 days a week. The majority of the processed output is exported. There are no fellmongery or rendering facilities, with all blood and renderable material taken off-site for processing.

¹ The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018



Figure 1 Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points

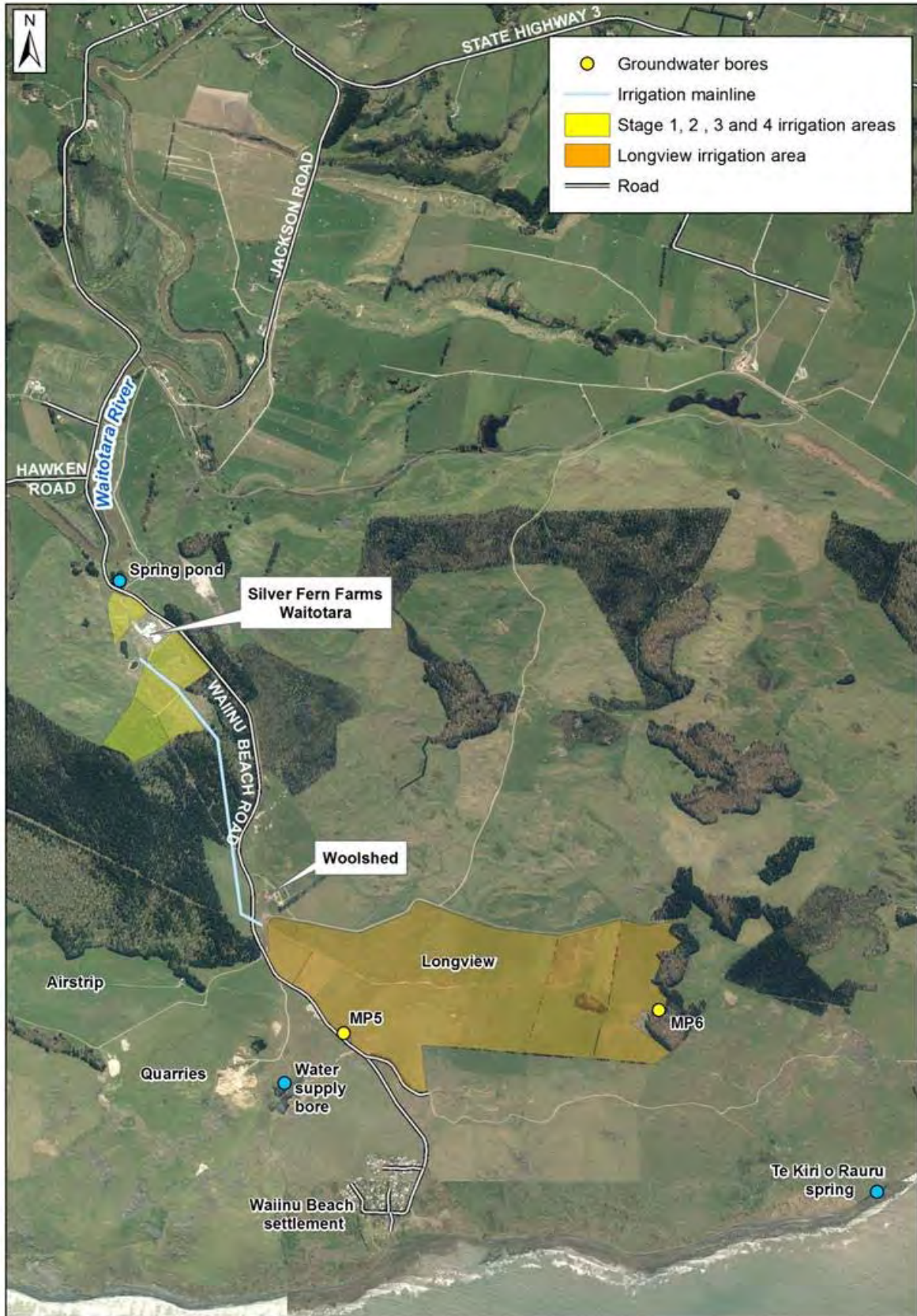


Figure 2 Location of SFF Waitotara meat processing plant showing irrigation areas and groundwater monitoring points

Ownership of the plant has changed twice. The original owner, Waitotara Meat Company, merged with Richmond Ltd in October 1999, which in turn amalgamated with PPCS Ltd in December 2004. PPCS Ltd was rebranded Silver Fern Farms Ltd in June 2008.

1.2.1 Water abstraction

The plant's water usage is proportional to the number of stock being processed through any particular period and the maximum daily water usage follows the same pattern as daily stock kill rate.

Water for operation of the plant is taken from two sources. Water of high quality is drawn from a deep aquifer via bores at the plant site. Water of lesser quality (high hardness) is piped from springs near the Waitotara River.

Three bores, each with the capacity to pump 770 m³/d, pump from a depth of 122 to 140 m. Two bores are pumped at any one time, with the other being a reserve supply. The aquifer is recharged by rainfall/riverbed infiltration in the hill country north of Waitotara. Aquifer analysis undertaken by Silver Fern Farms, and checked by the Council, shows that the maximum sustainable yield is 3,000 m³/d.

A secondary supply, for stock and yard washing purposes, is drawn at a rate of up to 350 m³/d from springs which arise beside the Waitotara River. This is piped approximately 400 m to the plant across Wai-inu Beach Road.

1.2.2 Discharges to land

Wastewater derives primarily from two sources: the plant and the stockyards. Plant wastewater consists of wash-water from the washing of carcasses, pelts and offal, and from cleansing of process areas. Wastewater is produced from the external yards as a result of washing incoming stock, stockyard washings and of discharge from the truck-wash facility.

After primary treatment by screening, the wastewater is stored in two holding ponds before discharge onto land by spray irrigation. Screenings are spread mechanically on the irrigation areas.

The irrigation area was increased to a total area of 110.5 ha in January 2013. An area of 19.3 ha adjacent to the plant that was owned by Silver Fern Farms was irrigated by 15 independently controlled fixed sprinkler networks. An area of 91.2 ha on the farm of Longview Ltd, at a location about 2 km away towards the coast along Wai-inu Beach Road, was irrigated by one of three rotary boom travelling irrigators. Reticulation is by a ring main, around which a travelling irrigator is rotated manually according to weather conditions and wastewater availability. Irrigator run lengths are about 400 m, with a wetted width of 45 m, giving an area of about 1.8 ha per application. An independent automated control system is in place for control of spray drift towards Wai-inu Beach.

The land that is irrigated is largely undulating stabilised sand dunes, with an overlay of free draining yellow brown soils of very low natural fertility, that frequently have periods of soil moisture deficit. Properly managed, the irrigation system is expected to increase nutrient and moisture levels and moisture retention ability of the land while minimising the effect on groundwater quality.

The discharge of stormwater and wastewater is primarily managed by SFF Waitotara via the Wastewater Management Plan, which defines operational, monitoring and reporting procedures. The plan is essentially 'response driven' in that changes in operation of the treatment system are made in response to regular performance evaluations based on monitoring results.

1.2.3 Discharges to air

The sources of aerial emission from the plant are a boiler for hot water production, the stockyards, the wastewater ponds, the wastewater irrigation system, and miscellaneous plant processes.

1.3 Resource consents

Silver Fern Farms currently holds five resource consents, the details of which are summarised in Table 1 below. Copies of all permits held by Silver Fern Farms during the period under review are included in Appendix I.

Table 1 Consents held by Silver Fern Farms in relation to their Waitotara site

Consent number	Purpose	Granted	Review	Expires
<i>Water abstraction permits</i>				
2261-3.1	To take groundwater from three bores in the vicinity of the Waitotara River for meat processing purposes	2016	2022	2034
10256-1.0	To take and use water from a spring for non-potable plant processes	2016	2022	2040
<i>Water discharge permits</i>				
5027-2	To discharge stormwater, defrost water and evaporative cooling water from a meat processing plant site into an unnamed tributary of the Waitotara River	2010	2022	2028
<i>Air discharge permit</i>				
4629-3.1	To discharge emissions into the air from various activities associated with meat processing operations	2017	2022	2034
<i>Discharges of waste to land</i>				
2260-3.1	To discharge to land wastewater by spray irrigation, stockyard solid wastes and stabilised sludges by spreading, from meat processing operations in the vicinity of the Waitotara River, including associated discharges to air	2017	2022	2034

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

Monitoring at Silver Fern Farms' meat processing plant is carried out by both Silver Fern Farms and the Council. The purposes of monitoring are:

- to determine compliance with conditions on resource consents;
- to determine the effects on surface waters and groundwater, and air quality from the exercise of the resource consents; and
- to provide information for management of the wastewater disposal system.

The monitoring programme has developed with experience in operation of the plant. A comprehensive wastewater management plan has been prepared which specifically addresses monitoring of discharges to land.

1.4.2 Monitoring by Silver Fern Farms

Monitoring undertaken by Silver Fern Farms covers two main areas as described below.

Water abstraction

Silver Fern Farms monitors the volume of water abstracted and reports the results to the Council annually. Telemetry of abstraction rate and of bore water level was commissioned on 24 September 2014. Groundwater level monitoring was instituted as a requirement of consent 9608, held by DR Wilson for abstraction of groundwater at a location across the Waitotara River for irrigation of pasture land.

Irrigation system management

The irrigation system is managed through monitoring and control of volumes of wastewater applied to 23 sectors at the plant site and 65 runs across 19 paddocks at Longview Farm. Results of irrigation monitoring are reported to the Council annually.

In October 2009, Silver Fern Farms commenced monitoring the chemical composition of wastewater irrigated, on a monthly basis. This information is used mainly for more accurate measurement of nitrogen loadings on irrigation areas.

Soil of the irrigated areas is tested biennially to determine top-dressing requirements for pasture nutrients and maintenance of soil structure.

1.4.3 Monitoring by the Council

The consent monitoring programme for Silver Fern Farms' site undertaken by the Council consists of four primary components as described below.

Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans and;
- consultation on associated matters.

Review of Silver Fern Farms monitoring data

Monitoring data gathered by Silver Fern Farms are reviewed to determine compliance with resource consent conditions and to assess trends in water usage, and in wastewater volumes and land application.

Site inspections

An officer of the Council visits the Waitotara plant site at quarterly intervals. Inspections are made of the water abstraction system, stockyards, truck wash, processing facilities, boiler, blood and offal holding areas, and wastewater treatment and waste disposal systems. An off-site odour assessment is conducted in the vicinity of the plant and irrigation areas. Monitoring results, irrigation records and activities which may influence plant wastewater quality are discussed. The site neighbourhood is surveyed for environmental effects.

Chemical sampling

The composition of wastewater irrigated and groundwater around irrigation areas is monitored quarterly. The wastewater is analysed to determine its organic and mineral strength, particularly for calculation of nitrogen loading on irrigation areas. Groundwater at six locations, comprising five monitoring bores and a spring, is analysed to determine the effects of irrigation on water quality, particularly on nitrate concentration.

2 Results

2.1 Water

2.1.1 Inspections

An officer of the Council carried out four routine inspections of Silver Fern Farms site during the 2019-2020 monitoring period. These took place on 17 December 2019, and 22 May, 18 June and 10 September 2020. Each inspection by an officer of the Council is usually conducted in conjunction with a Silver Fern Farms employee.

Particular attention is given to the following items:

- water supply (bores and spring)
- wastewater treatment system
- land irrigation system
- by-product load-out and truck-wash areas
- chemical and fuel/oil storage areas
- stormwater/road drains
- domestic sewage disposal

Site management was generally found to be good and no significant environmental issues were noted, with the exception of the inspection on 10 September 2020 which found ponding of wastewater on the Longview irrigation block, approximately five hours after irrigation had finished.

2.1.2 Results of water abstraction monitoring

Process water for the site is drawn from three groundwater bores and a spring via separate pumps. Consent 2261-3.1 covers the abstraction from the groundwater bores. The daily volume limit is 1,300 m³ (15.0 L/s), at a maximum rate of 20 L/s. Consent 10256-1.0 covers the abstraction from the spring, with a daily volume limit of 350 m³ at a maximum rate of 4.4 L/s.

Under the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*, Silver Fern Farms was required by 10 November 2014 to take continuous measurements and keep daily record of volume taken, and thereafter supply by 31 July each year the record for the preceding 1 July to 30 June period.

Silver Fern Farms installed new meters for each of the water abstraction pumps, with telemetry to Council from 24 September 2014. Previously, weekly records had been kept. The meters were calibrated by a suitably qualified independent person.

Total daily abstraction volumes for the 2019-2020 monitoring period are shown in Figure 3. The daily abstraction rate from the groundwater bores was within the limit of 1,300 m³/d set on consent 2261-3.1 throughout the monitoring period.

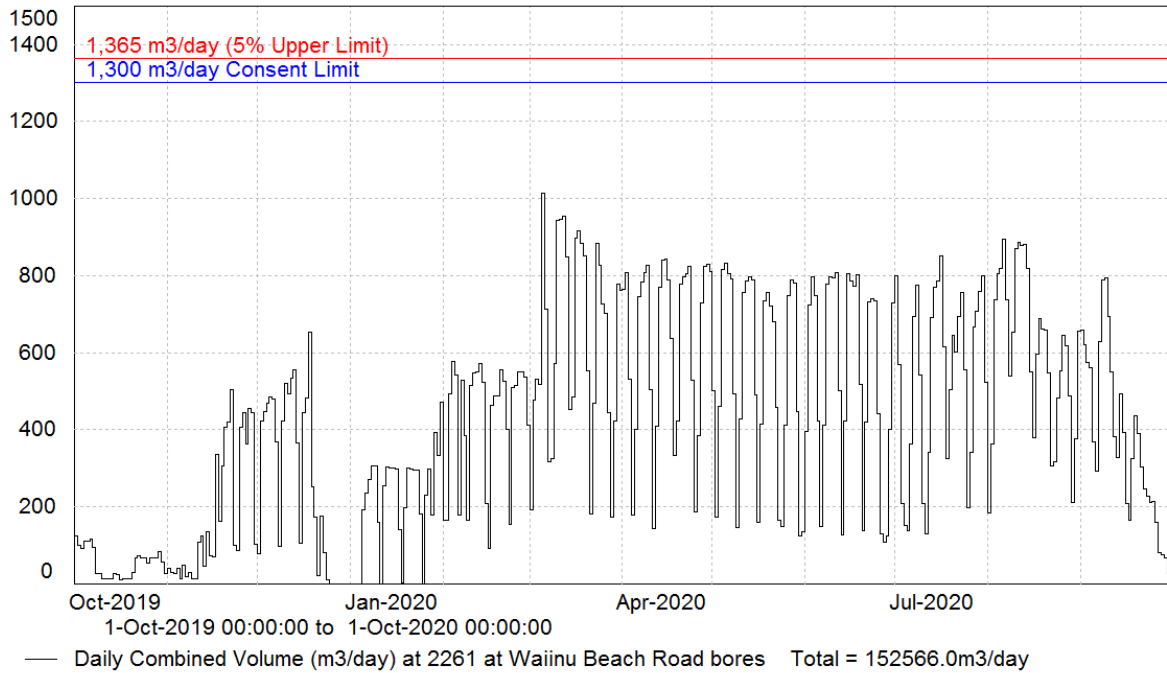


Figure 3 Daily abstraction volume m³, October 2019 to September 2020

The total volume abstracted over the 12-month period ending 30 September 2020 was approximately 194,903 m³, of which 152,566 m³ was taken from the deep aquifers and 42,337 m³ from the spring beside the Waitotara River.

Monthly maximum total instantaneous abstraction rates (L/s) for 2019-2020 are presented in Table 2, with the monthly average values for comparison. During the year under review the maximum instantaneous abstraction limit of 20 L/s was exceeded on a number of occasions. However the flow meters have an accuracy of +/- 5%. Because three flowmeters are grouped together, error propagation methods are used to give a combined accuracy of +/- 9% for the total take rate of the three flowmeters. This was exceeded on only two occasions through the 2019-2020 year. Due to problems with the telemetry of the data, which caused a delay in the receipt of the data by both Silver Fern Farms and the Council, no further action was taken on these occasions.

Table 2 Monthly average and maximum instantaneous groundwater abstraction rates 2019-2020

Month	Average daily abstraction (L/s)	Maximum total instantaneous abstraction (L/s)	Number of days per month total instantaneous abstraction limit exceeded	
			Over limit (20.0 L/s)	Over limit+9% (22.0 L/s)
October 2019	0.7	20.7	11	-
November 2019	2.1	22.7	3	2
December 2019	3.0	10.3	-	-
January 2020	2.4	13.4	-	-
February 2020	4.9	10.2	-	-
March 2020	7.5	20.1	1	-
April 2020	7.3	19.1	-	-
May 2020	6.3	20.3	3	-

Month	Average daily abstraction (L/s)	Maximum total instantaneous abstraction (L/s)	Number of days per month total instantaneous abstraction limit exceeded	
			Over limit (20.0 L/s)	Over limit+9% (22.0 L/s)
June 2020	6.1	21.0	5	-
July 2020	6.3	20.3	7	-
August 2020	6.9	21.9	5	-
September 2020	4.4	20.4	8	-

Spring

The maximum abstraction from the spring was no more than 253 m³/day, within the consented limit of 350 m³/day. Like the production bores, the pump has been configured to only pump at the maximum consented rate. The rate of take did not exceed the consented limit of 4.4 L/s during the year under review (Table 3).

Table 3 Monthly average and maximum instantaneous spring water abstraction rates 2019-2020

Month	Average daily abstraction (L/s)	Maximum total instantaneous abstraction (L/s)	Number of days per month total instantaneous abstraction limit exceeded	
			Over limit (4.4 L/s)	Over limit+5% (4.6 L/s)
October 2019	0.2	3.3	-	-
November 2019	1.1	4.4	-	-
December 2019	1.8	4.4	-	-
January 2020	2.0	4.4	-	-
February 2020	2.0	3.3	-	-
March 2020	1.7	3.3	-	-
April 2020	1.8	3.3	-	-
May 2020	1.5	3.3	-	-
June 2020	1.3	4.4	-	-
July 2020	1.1	3.3	-	-
August 2020	0.9	3.3	-	-
September 2020	0.5	3.3	-	-

2.1.3 Results of discharge monitoring

2.1.3.1 Wastewater monitoring

Irrigation volumes

Records of the volume of wastewater irrigated at Silver Fern Farms' site have been supplied by Silver Fern Farms in accordance with the Wastewater Management Plan. The reported total volume irrigated for the 12 month period ending 30 September 2020 was approximately 140,523 m³, a decrease of 2% from 2018-2019. This value represents 72% of the reported water abstraction volume.

Some of the reasons put forward by Silver Fern Farms for the difference in the volumes abstracted and discharged are;

- Not all waste streams are directed to wastewater for disposal, for example domestic sewage;
- Loss of boiler-generated steam to atmosphere;
- Discharged as defrost or cooling water;
- Held within storage tanks.

Wastewater composition

The results from chemical monitoring of wastewater irrigated are given in Table 4. Samples were taken from a tap that was installed on the irrigation line in the pump shed beside Pond 2 (site code IND003001). The results of monitoring of Pond 2 are used below, as this is the regular wastewater holding pond, with Pond 1 only used in the event of an emergency (i.e. a problem with the irrigators or plant which results in the need to hold wastewater for a period of time).

Table 4 Chemical monitoring results for the irrigation pond 2019-2020

Parameter		17 Dec 2019	22 May 2020	18 Jun 2020	10 Sep 2020
Time	NZST	11:19	13:50	11:28	10:38
Temperature	°C	27.4	16.5	16.2	14.5
Conductivity, 25°C	µS/cm	1549	1498	1527	1026
pH		7	7.7	7.1	7.2
Suspended solids	g/m ³	106	179	470	350
COD	g/m ³	380	330	780	340
Total nitrogen	g/m ³ N	104	113	91	61
Ammonia nitrogen	g/m ³ N	91	77	84	52
Nitrate+Nitrite	g/m ³ N	0.101	0.019	0.03	< 0.10
Total phosphorus	g/m ³ P	18	16.7	16.8	6.2
Sodium	g/m ³	112	104	103	96
Potassium	g/m ³	118	137	140	22
Calcium	g/m ³	28	30	27	27
Magnesium	g/m ³	6.1	6.2	6	3.8
SAR		3	4	4	0.6
KAR		5	4.5	4.6	4.6

In general, the strength of the irrigated wastewater, in terms of mineral and nitrogen content (conductivity and total nitrogen), was similar to that of the previous several killing seasons. The organic strength,

represented by chemical oxygen demand (COD), showed some variation, which may be related to the amount of blood present at the time of sampling.

Nitrogen loading

Nitrogen loading on the irrigation areas is expressed as kilograms of nitrogen per hectare per year (kgN/ha/y). On the basis of the reported irrigation volumes and wastewater total nitrogen concentrations, as provided by Silver Fern Farms, the nitrogen loading for the sectors on Longview Farm in 2019-2020 ranged from 54 to 308 kg/ha/y, with one sector that was not irrigated during the year under review. Adjacent to the plant nitrogen loading ranged from 17 to 71 kg/ha/y with no irrigation or solids disposal occurring on eight sectors. The loadings exceeded the operational target of 300 kg/ha/y on one sector at Longview Farm.

2.1.3.2 Groundwater monitoring

The locations of the eight groundwater monitoring points (MPs) are depicted in Figure 1 and Figure 2 and described in Table 5. The four points near the plant are positioned approximately in a straight line running upslope (southward) from the Waitotara River towards the wetland which used to receive overflow from the wastewater holding ponds (pre 1999). The remaining points are downslope of the Longview Farm irrigation area.

MP1 is the spring from which water is drawn for stock and yard washing. The spring is located approximately 120 m from the Stage I irrigation area at the nearest point. The other five monitoring points are piezometer bores which are located at the periphery of irrigation areas. MP2 is underneath (section 5 of) Stage II irrigation area. MP3 is about 35 m downslope of the old wastewater overflow trench and of the new Stage IV area. MP4 is in the lower part of the Stage IV area, about 200 m downslope of the Stage III area and about 35 m upslope of the wastewater overflow trench. The wastewater overflow trench runs between MP3 and MP4 to the wetland.

MP5 is beside Wai-inu Beach Road. It lies between Longview Farm irrigation area and the old quarry where the water supply bore for Wai-inu Beach is situated. MP6 is near the boundary of Longview Farm closest to the sea and to the coastal spring Te Kiri o Rauru.

MP7 and MP8 were installed in November 2019 to comply with an abatement notice requiring compliance with consent 2260-3.1. These bores were installed downslope of the Longview irrigation area specifically to assess the risk to the Wai-inu water supply.

Table 5 Groundwater monitoring sites

Name	Site Code	Location	Grid reference, NZTM	
MP1	GND1124	Spring N (downgradient) of Stage 1 irrigation area, adjacent to Waitotara River	1747905	55892552
MP2	GND000097	Piezometer, N (downgradient) corner of Stage 2 irrigation area	1748176	5588876
MP3	GND000098	Piezometer, S (upgradient) corner of Stage 2 irrigation area	1748231	5588618
MP4	GND000099	Piezometer, NE (downgradient) of Stage 3/4 irrigation area, adjacent to wetland	1748351	5588498
MP5	GND0686	Piezometer, W (downgradient) of Longview irrigation area	1749098	5586785
MP6	GND2510	Piezometer, SE (downgradient) of Longview irrigation area	1750792	5586905
MP7	GND3070	Piezometer, W (downgradient) of Longview irrigation area	1748863	5587001
MP8	GND3071	Piezometer, W (downgradient) of Longview irrigation area and MP5	1748921	5586644

The summary of chemical analysis results for the quarterly samples taken from the eight groundwater monitoring points is given in Table 6 and Table 7. During the period under review, an additional sample was collected from MP8 in response to *E. coli* levels in December 2019. On one occasion, MP8 was not able to be sampled due to low recharge rates, however a sample was obtained the following day using low flow sampling equipment. No samples were obtained from MP7 during the period under review due to the bore being dry on all sampling occasions.

Table 6 Water quality results for monitoring bores at Silver Fern Farms Waitotara October 2019 to September 2020

Date	Site	Water level	Temperature	Conductivity 25°C	pH	COD	Ammonia	Nitrate + Nitrite	Chloride	Calcium	Magnesium	Potassium	Sodium
		m	°C	µS/cm		g/m ₃	g/m ³ N	g/m ³ N	g/m ₃	g/m ₃	g/m ₃	g/m ₃	g/m ₃
17 Dec 2019	MP1	-	15.3	561	7.6	14	4.1	3.2	43	58	7.8	22	31
	MP2	2.79	16.2	608	7.6	12	< 0.010	7.9	19.2	80	6.5	36	18.5
	MP3	2.76	15.3	618	7.6	9	0.108	7.1	45	91	5.6	17.6	18
	MP4	5.75	16.3	548	7.6	11	0.057	5.3	34	74	4.9	10.1	31
22 May 2020	MP1	-	14.8	610	7.5	10	5.2	3.2	46	62	8	22	32
	MP2	3.33	16	636	8.4	12	< 0.010	7.4	21	85	7.5	41	21
	MP3	3.35	16.1	621	7.7	8	0.166	1.01	45	87	6	20	29
	MP4	6.06	14.9	505	7.8	10	< 0.010	2.1	23	73	5	7.6	25
18 Jun 2020	MP1	-	15.5	612	7.5	12	5.4	3.0	47	64	8.1	25	32
	MP2	3.38	15.2	627	7.6	11	< 0.010	7.7	22	85	7.6	41	20
	MP3	3.43	15.3	671	7.5	10	0.39	0.67	52	87	6.3	21	37
	MP4	5.11	14.7	593	7.6	9	0.086	1.2	41	86	6.2	9.4	31
10 Sep 2020	MP1	-	15.1	642	7.7	10	6.1	3.8	49	62	8	23	34
	MP2	3.03	14.6	621	7.6	< 6	< 0.010	9.1	24	74	6.7	39	18.5
	MP3	3.03	14.5	632	7.8	11	0.189	2.9	45	75	5.5	18.9	36
	MP4	6.01	14.9	594	7.7	10	0.061	2.4	39	76	5.5	10.1	30

Table 7 Water quality results for monitoring bores on the Longview Irrigation area October 2019 to September 2020

Date	Site	Water level	Temperature	Conductivity 25°C	pH	COD	Ammonia	Nitrate + Nitrite	Chloride	Calcium	Magnesium	Potassium	Sodium
		m	°C	µS/cm		g/m ₃	g/m ³ N	g/m ³ N	g/m ₃	g/m ₃	g/m ₃	g/m ₃	g/m ₃
17 Dec 2019	MP5	5.58	15.4	555	7.6	6	< 0.010	5.7	33	86	9.7	1.72	23
	MP6	5.92	15.2	902	7.3	< 6	< 0.010	4.5	95	136	12.7	3.2	44
	MP8	4.7	15.1	758	7.5	6	< 0.010	9.9	49	108	14.1	2.6	42
10 Jan 2020	MP8	4.80	16.2	735	7.6	< 6	< 0.010	9.5	45	105	12.5	2.3	39
22 May 2020	MP5	5.15	15.2	629	7.7	< 6	< 0.010	9.6	33	90	10.1	1.73	24
	MP6	5.42	15	921	7.5	< 6	< 0.010	3.5	105	138	12.1	3.2	49
	MP8	5.15	15.2	742	7.5	< 6	< 0.010	9.6	42	111	13	2.4	41
18 Jun 2020	MP5	5.02	14.9	625	7.6	< 6	< 0.010	8.5	32	92	10.6	1.88	26
	MP6	6.52	14.5	946	7.4	8	< 0.010	3.3	117	141	12	3.5	50
17 Jun 2020	MP8	5.21	15.4	739	7.4	< 6	< 0.010	10	41	108	13.6	2.3	41
10 Sep 2020	MP5	5.03	14.9	624	7.8	10	< 0.010	8.7	33	88	10.1	1.87	24
	MP6	6.07	14.8	1025	7.6	< 6	< 0.010	3.2	144	147	12.7	3.6	51
	MP8	N/R	14.6	756	7.6	8	< 0.010	9.2	45	103	12.6	2.4	41

The parameters of most interest with regard to the operation of the wastewater disposal system and the monitoring of its effects on the surrounding environment are the nitrogen species (nitrate and ammonia), the organic strength (COD), and the conductivity. Figures 4, 5 and 6 show how the levels of conductivity, ammonia and nitrate, respectively, have varied through time for groundwater at the six monitoring points.

The spring water at MP1 is likely to be subject to the effects of activities at the surface, such as local farming, and particularly the irrigation of wastewater by Silver Fern Farms. Since monitoring began in 1992, conductivity has risen and fallen twice over a range of up to two-fold, with peaks in the winters of 2001 and 2007. In 2019-2020, the nitrate concentration did not show significant seasonal variation, with low levels of between 3.0 and 3.8 g/m³N (Figure 7).

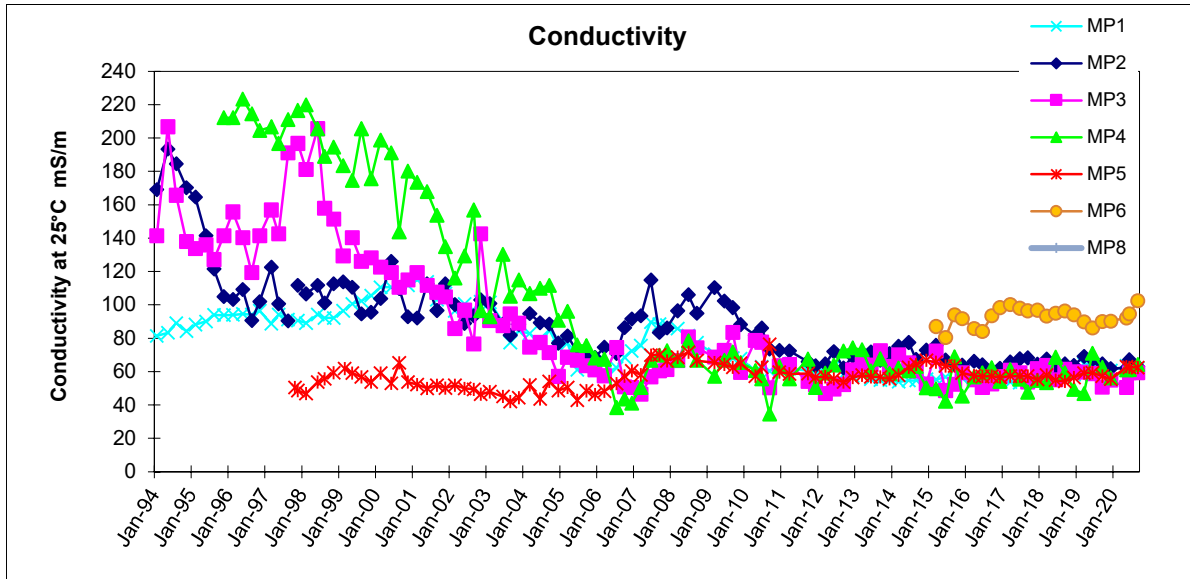


Figure 4 Conductivity at groundwater monitoring points, 1994-2020

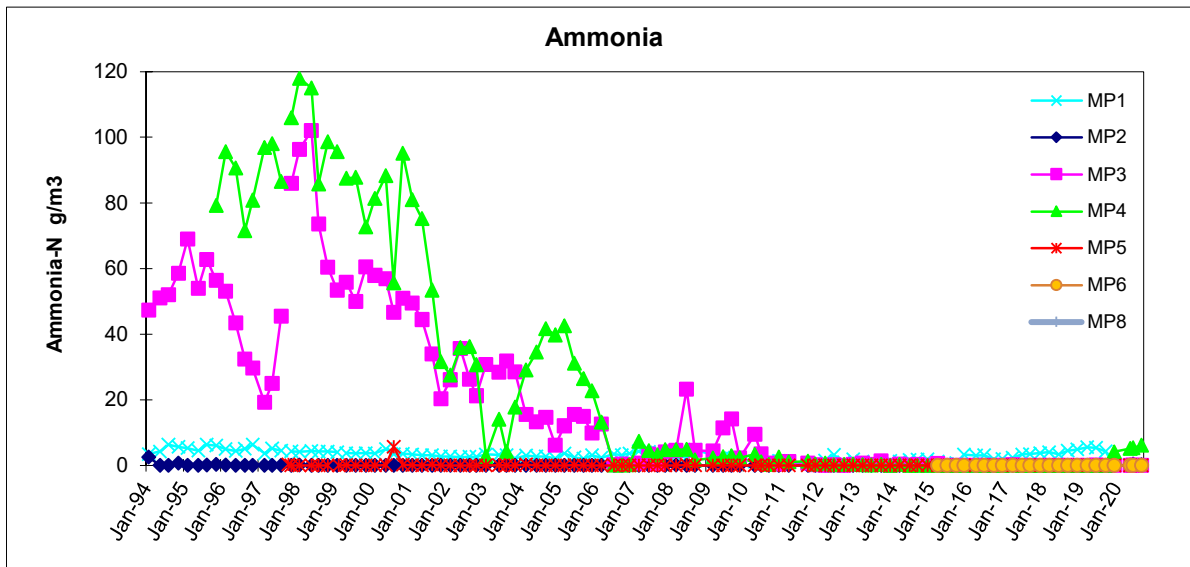


Figure 5 Ammonia at groundwater monitoring points, 1994-2020

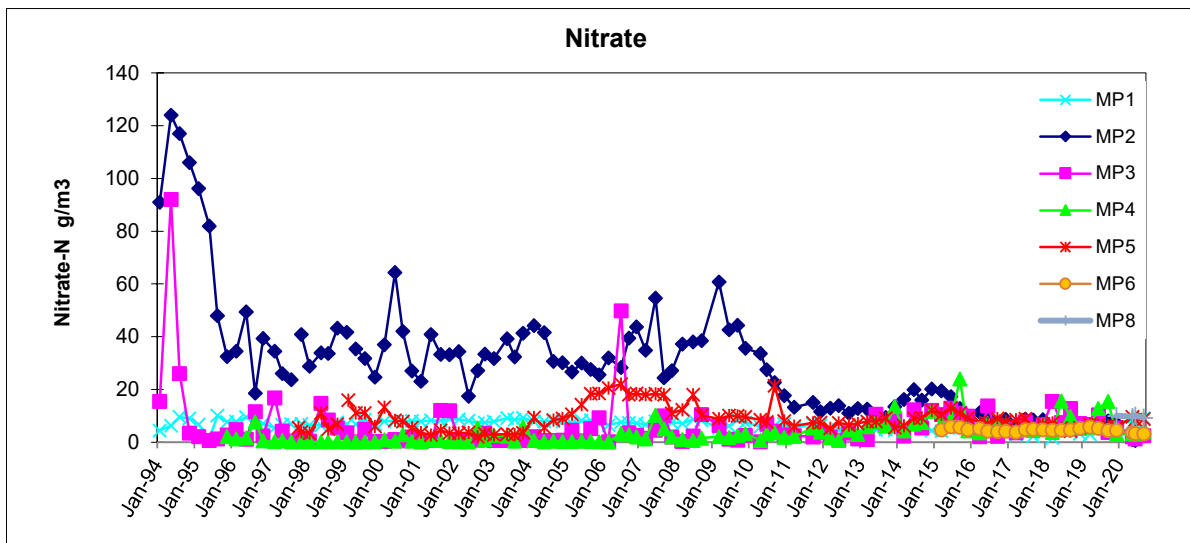


Figure 6 Nitrate at groundwater monitoring points, 1994-2020

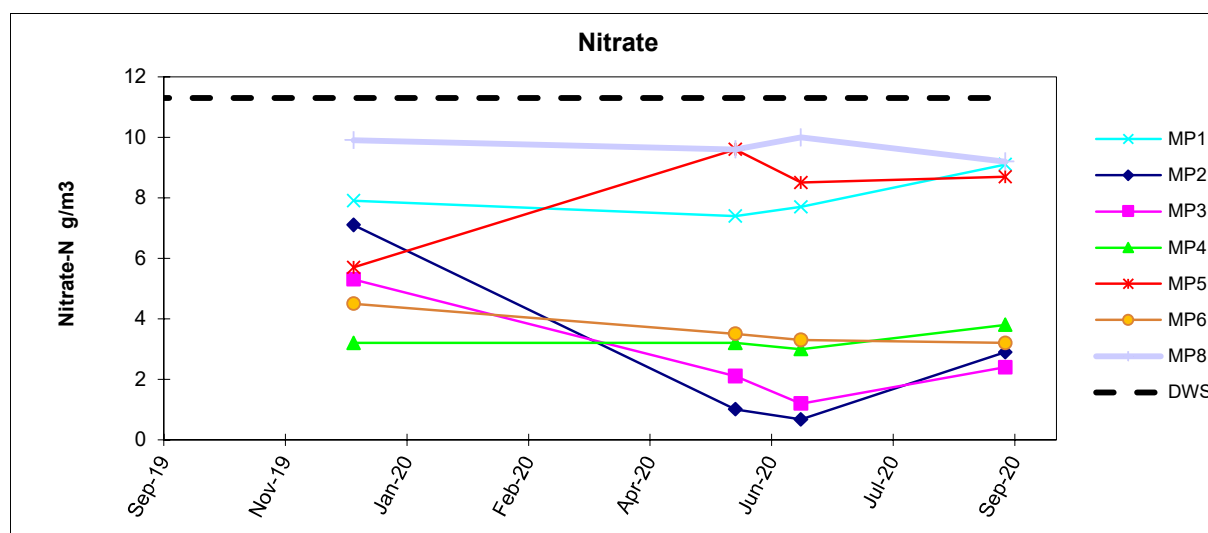


Figure 7 Nitrate at groundwater monitoring points in the 2019-2020 monitoring year. The black line represents the drinking water standard for nitrate.

The groundwater quality at MP2 appears to respond relatively quickly to changes in wastewater loading on the Stage 2 irrigation area. This is consistent with rapid wastewater infiltration through approximately 2 m of sandy soil to the underlying water table. The levels of ammonia present are very low, indicating almost complete nitrification in aerobic soil. The most significant impact on groundwater was observed in MP2 and MP3, where nitrate levels in 1994 were well in excess of the drinking water standard of 11.3 g/m³N at 124 and 90 g/m³N respectively. Levels then dropped to below the drinking water standard in MP3 and fluctuated between about 20 and 50 g/m³N between 1995 and 2009 in MP2. In the 2010-2011 monitoring period nitrate concentration in MP2 fell in response to reduced irrigation volumes, and since has ranged between about 10 and 20 g/m³N, lifting when volumes increased in 2014-2015 and falling when volumes decreased in 2015-2016. During the current monitoring period levels in MP2 remained below 10 g/m³N (Figure 7).

At MP3, up-gradient of stage 2 area, the effects of wastewater disposal via the old soakage trench and wetland have been apparent. Both conductivity and organic (COD) component concentrations were elevated, but have fallen since peaking in the 1997-1998 year. The amount of ammonia present has continued to reduce significantly since 1998, which is attributed to no longer using the soakage trench and wetland for discharge. The reduction is also consistent with the movement of wastewater through saturated soil, such as would occur below a soakage trench or wetland. Nitrate concentrations have been relatively low, generally less than 4 g/m³N, from the period immediately after installation of the piezometer, as the lack of oxygen in the saturated soil has prevented nitrification. Since 2005, there have been occasional spikes in the nitrate level of up to about 12 g/m³N, with one value of 50 g/m³N recorded in July 2006. After development of stage IV irrigation area in January 2013, nitrate concentration has lifted, with seasonal variation from 2 to 15 g/m³N, and generally peaking in winter. A rapid increase in nitrate concentrations observed in June 2019 to 10.3 g/m³N (Figure 7). This is just below the drinking water standards. The nitrate concentrations in December 2019 was 7.1 g/m³N, and decreased substantially for the remainder of the period under review.

In the past, the effects of wastewater disposal have been recorded at MP4, the site closest to the wetland. The concentrations of several groundwater parameters (sodium, potassium, alkalinity and chloride) were similar to those in the wastewater itself, until after disposal of wastewater to the area ceased in 1999. Subsequently, nitrate concentrations were generally low, with occasional spikes, until winter 2006, since when levels have increased, to about 5 g/m³N in 2012, and further to about 8 g/m³ after the development of stage 4 irrigation area in January 2013, with spikes, of up to 24 g/m³N in September 2015, coincident with

increases in groundwater level. Nitrate levels during the period under review were lower than the previous period, ranging from 1.2. to 5.3 g/m³N.

At sites MP3 and MP4, nitrate levels have been increasing over a shorter period, since approximately 2006. but have decreased substantially during the period under review. Although the nitrate concentrations have decreased substantially in MP3 since the early 1990s, this more recent increase is a cause for concern and represents an adverse impact on the groundwater quality in the vicinity of the plant. In the 2017-2018 and 2018-2019 monitoring years, there were breaches of the drinking water standard in both MP3 and MP4. The nitrate concentrations in these bores have decreased substantially during the period under review.

Groundwater quality at MP5, downslope of the western side of Longview Farm irrigation area, was monitored for two years before irrigation commenced there in January 1999, and showed considerable variation in nitrate concentration (4 to 16 g/m³N) during that period. Post-irrigation, nitrate concentration increased from 2 g/m³N in 2002 to 22 g/m³N in 2006 then fell again from 2008. During the period under review concentrations showed an increase, and ranged between 5.7 and 9.2 g/m³N.

MP6 was established on 1 February 2015 in the new irrigation area on the south-eastern side of Longview Farm, where irrigation commenced in September 2012. Conductivity was higher than at the other groundwater monitoring sites, reflecting closer proximity to the sea. Nitrate concentration has remained moderately low and steady at between 3.0 to 6.0 g/m³N.

Following renewal of consent 2261-3.1 consent conditions required that the consent holder undertake a monitoring programme that monitors groundwater in the vicinity of the Wai-inu town water supply bore (GND0853), which has the potential to be impacted by the contaminants irrigated to land, resulting from the exercise of the consent. The required monitoring programme was submitted to the Chief Executive, Taranaki Regional Council for certification in December 2017.

A requirement of the monitoring programme was that it include as a minimum, the drilling and monitoring of bores down gradient of monitoring bore MP5 (GND0686) at locations and depths determined after consultation with the Chief Executive, Taranaki Regional Council. A review of the monitoring programme found that it only partially met the requirements of the consent conditions and the subsequent queries regarding the monitoring programme were not addressed in a timely manner. This resulted in an abatement notice being issued, requiring that the monitoring programme be amended to fulfil these requirements.

Amendments to the monitoring programme were received on 28 June 2019, and a final report on the monitoring programme results was supplied on 11 September 2019. Subsequent discussions finalised the locations of two new monitoring bores. Drilling of the bores MP7 and MP8 was completed on 5 November 2019.

Bore MP7 did not intercept water and has remained dry or with insufficient water to collect a sample during the period under review. Monitoring in this bore will continue to determine whether seasonal fluctuations in water level occur. Bore MP8 is downslope of the Longview irrigation area and MP5, and is approximately 180m upslope of the Wai-inu water supply bore. Nitrate concentrations in this bore to date have been relatively stable at high concentrations. Results recorded by the Council range between 9.2 and 10.0 g/m³N. This bore is also sampled monthly by Silver Fern Farms, whom recorded nitrate concentrations of up to 11.4 g/m³N, in exceedance of the drinking water standard of 11.3 g/m³N.

2.1.3.3 Te Kiri o Rauru spring

When consent was sought from STDC in the 2011-2012 monitoring year to provide for extension to the irrigation area on Longview Farm, consultation with tangata whenua, Ngaa Rauru Kiihahi, raised a concern

about potential effect of the irrigation on a sacred spring, Te Kiri o Rauru, that is situated at the coast approximately 1,350 m from the nearest part of the wastewater application area.

In response, Silver Fern Farms undertook to monitor the quality of water from the spring. Three monthly sampling, for turbidity, total coliforms and total nitrogen analysis, was initiated at the site identified by Te Kaahui o Rauru representative Dallas McLeod (Site Code GND2531). The spring constitutes seeps at the base of an 8-10 m high shellrock face over a distance of about 100 m at the shore.

To provide comprehensive background information, a sample of the spring taken by Silver Fern Farms on 24 September 2012 was analysed by the Council for a wide range of physicochemical parameters. Another sample, taken on 16 December 2012 about 30 m west of the first sampling site, which had been covered by sand, was analysed by Council for microbiological quality. During the period under review Silver Fern Farms collected samples approximately quarterly. A summary of results is given in Table 8 below.

Table 8 Chemical composition of Te Kiri o Rauru spring

Parameter		Range 2019-2020	Range 2018-2019
Total nitrogen	g/m ³	<5	<5
Total coliforms	Cfu/100ml	<1-9 (6)	<1-7 (2)
Turbidity	NTU	0.25-1.8 (0.9)	0.15-0.55 (0.33)

Average of all samples is shown in brackets.

Sample results showed no indication that the spring had been influenced by the wastewater irrigation, with low total coliform and total nitrogen values in all samples. Water quality was similar to 2018-2019 and well within the national drinking water standard for nitrates of 11.3 mg/L (equivalent to g/m³). On several occasions, conditions prevented sampling from the spring directly and instead samples were collected from pooled water below the spring. This appears to have had minimal influence on the sample results.

2.2 Air

2.2.1 Inspections

The sources of aerial emission from the plant are a boiler for hot water production, the stockyards, the wastewater ponds, the wastewater irrigation system, and miscellaneous plant processes. Routine inspections of the site were conducted on four occasions, as described in section 2.1.1: 17 December 2019 and 22 May, 18 June and 10 September 2020.

In general the site was found to be well managed with regard to odours. Odours were not noticeable beyond the site boundary during any of the inspections.

2.3 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with Silver Fern Farms. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

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

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

Table 9 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to Silver Fern Farms activities during the 2019-2020 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 9 Incidents, investigations and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
24/12/2019	Upon receipt of laboratory results from samples collected on 17 December 2019, <i>E. coli</i> of 387 MPN/100mL was detected in MP8.	Y	None	Resampling was undertaken to determine whether the <i>E.coli</i> was detected from the groundwater or was an artefact of bore installation or a result of contamination during sampling.
17/07/2020	Nitrate concentrations in MP5 and MP8 were found to be approaching the drinking water standard. Investigation found that in addition to the wastewater irrigation, synthetic nitrogen fertiliser was being applied on Longview Farm	Y	None	Condition 6 of consent 2260-3.1 was invoked, requiring Silver Fern Farms to review the Integrated Management Plan to ensure that total nitrogen loadings are considered
10/09/2020	Excessive ponding was found on the Longview irrigation area during a routine inspection	N	14 day letter; abatement notice	Actions to prevent and mitigate ponding were incorporated into the review of the Integrated Management Plan

Following the installation of the monitoring bores on 5 November 2019, sampling on 17 December 2019 detected high levels of *E. coli* in the new bore MP8. A resample on 10 January 2020 recorded substantially lower *E. coli* levels in the same bore. Subsequent monitoring by both the Council and Silver Fern Farms has continued to detect low levels of *E. coli* in this bore and bore MP5.

Monitoring by both the Council and Silver Fern Farms has detected nitrates in bores MP5 and MP8 at levels approaching the drinking water standard of 11.3 g/m³N. Investigation found that in addition to the wastewater discharge at Longview Farm, synthetic nitrogen fertiliser had also been applied. A letter was sent, requiring Silver Fern Farms to review the Integrated Management Plan (IMP) within two months, as per condition 6 of consent 2260-3.1. This review specifically requested that the IMP was to consider all sources of nitrogen, whether applied by Silver Fern Farms or Longview Farm, in the calculation of nitrogen loading and to reduce the nitrogen loading. A response was received on 17 September 2020, requesting an

extension until 30 October 2020 in order to involve Longview Farm in the review of the IMP. This request was granted.

During inspection on 10 September 2020, ponding of wastewater was found on the Longview irrigation area approximately five hours following the completion of the irrigation run (Photo 1). This considered to be excessive ponding in non-compliance with consent 2260-3.1. A fourteen day letter was sent to Silver Fern Farms requesting an explanation for this non-compliance. This was followed by an abatement notice. The consent holder was also asked to review measures for the prevention and mitigation of ponding as a part of their ongoing review of the IMP. They were also asked to ensure that operators were complying with the requirements of the IMP and that in future records were to be kept to demonstrate this. A further extension to the review of the IMP was granted in conjunction with the abatement notice, in order to provide sufficient time for changes resulting from the abatement notice to be incorporated into the IMP.



Photo 1 Ponding of wastewater at the Longview irrigation area on 10 September 2020

3 Discussion

3.1 Discussion of site performance

Inspections of Silver Fern Farms' site during the 2019-2020 review period found that the site was generally well managed.

In September 2014, telemetry to the Council was installed on measurement of water abstraction rates for individual bores and the spring. This enabled compliance with the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*, which applied to Silver Fern Farms from November 2014. During the period under review, the abstraction volume limit was complied with. However, the maximum rate of water take was breached by more than 5% on a number of occasions. This was caused by a range of factors, including pump failure, corruption of data and telemetry issues. The pump was replaced in January 2018. It should be noted that although the abstraction rate was breached by more than 5%, this is a combined abstraction rate aggregated from three bores. All three bores are metered separately, with an accuracy of +/- 5% on each meter, which is then combined using error propagation methods to give an accuracy of +/- 9% on the combined data. This represents a change from previous periods where a combined accuracy of +/- 15% was permitted. Therefore, although the combined abstraction rate exceeded the consented limit by more than 5% on several occasions, there were only two occasions when the breach was greater than 9% (i.e. the majority of exceedances were within the margin of error). At the time the exceedances occurred, ongoing issues with the telemetry equipment prevented the data from being received in real time by both Silver Fern Farms and the Council. Therefore no further action was taken with respect to these exceedances. The spring take was within the consented limit for the rate of take for the duration of the period under review.

Condition 12 of consent 2261-3.1 requires an aquifer sustainability report to be produced in relation to the water takes. The first report was submitted to Council on 24 September 2020. This report showed that the water takes authorised by this consent are able to be sustained by the aquifer. However, it was highlighted that there was a significant amount of missing water level data due to technical difficulties in maintaining the monitoring equipment. The Council will work with Silver Fern Farms to minimise the amount of missing data in the future. The next aquifer sustainability report is due on 30 September 2023.

With regard to the discharge of stormwater and wastewater, the disposal systems were found to be operated and maintained in a satisfactory manner over the majority of 2019-2020 period. However, excessive ponding was found on the Longview irrigation block on 10 September 2020.

In the 2018-2019 period Silver Fern Farms had been directed to include measures to prevent further increases to groundwater nitrate levels in bores MP3 and MP4 in the annual review of the Integrated Management Plan. Sampling by both the Council and Silver Fern Farms showed that during 2019-2020, nitrate concentrations in these bores decreased substantially from 2018-2019.

Following renewal of consent 2261-3.1 consent conditions required that the consent holder undertake a monitoring programme that monitors groundwater in the vicinity of the Wai-inu town water supply bore (GND0853), which has the potential to be impacted by the contaminants irrigated to land, resulting from the exercise of the consent. A requirement of the monitoring programme was that it include as a minimum, the drilling and monitoring of bores down gradient of monitoring bore MP5 (GND0686) at locations and depths determined after consultation with the Chief Executive, Taranaki Regional Council. A review of the monitoring programme found that it did not specifically include these new bores. An abatement notice was subsequently issued, requiring that the monitoring programme be amended to fulfil these requirements. Amendments to the monitoring programme were received on 28 June 2019. The bores required were installed on 5 November 2019.

The *E. coli* and nitrate levels in bores MP5 and MP8, combined with the proximity to the Wai-inu water supply bore and the application of synthetic nitrogen fertiliser at Longview Farm, led to the Council invoking condition 6 of consent 2260-3.1. This required Silver Fern Farms to review their IMP within two months, with a view to reducing nitrogen loadings in the area. An extension was granted to allow Silver Fern Farms to consult with Longview Farm on changes to the IMP. During this time, the ponding at Longview was also noted. Silver Fern Farms were subsequently asked to review the adequacy and application of measures to prevent and mitigate ponding of wastewater in their irrigation areas as a part of the review of the IMP. A further extension of time was granted to allow this to be incorporated into the review. Silver Fern Farms were also asked to ensure that operators were complying with the requirements of the IMP and to maintain records to demonstrate compliance with the IMP.

In September 2012, Silver Fern Farms commissioned a 20.7 ha extension of the area where travelling irrigators apply wastewater to land. A further extension, of the fixed sprinkler irrigation area by 6.0 ha, became operational in January 2013. Both areas were already covered by resource consent. This voluntary action, for which Silver Fern Farms was given an Environmental Award by Council in November 2014, increased the area irrigated for wastewater disposal by 36% to 110.5 ha to provide for increased production at the meat processing plant and to lower nitrogen loadings. Irrigation of the undeveloped areas will also increase pasture production. Average nitrogen loadings reduced from 349 kg/ha/y in 2011-2012 to 223 kg/ha/y in 2013-2014, a factor of 36%, though there was also a 4% reduction in kill. Average nitrogen loadings have remained below the operational target of 300 kg/ha/y since this time, although this varies between sectors and as such particular sectors may exceed the target.

Monitoring of Te Kiri o Rauru spring, situated over a kilometre down gradient of the irrigation extension, to satisfy concerns of tangata whenua continued in 2019-2020 and indicated no impact to the spring.

3.2 Environmental effects of exercise of consents

Effects on groundwater in the vicinity of this site were varied, but have shown significant improvement with reference to historical results. This has mostly been addressed through the extension of the irrigation disposal system, which reduced the nitrogen loadings. Groundwater nitrate levels in MP3 still occasionally exceed drinking water standards, with seasonal peaks observed in winter. Despite the improvement that has occurred since the early 1990s, more recent results show increasing nitrate concentrations at sites MP3 and MP4 as shown in Figure 7. The Council is continuing to work with the consent holder to reduce these peaks. Monitoring at MP5, where previous monitoring has shown mounding and contamination of the groundwater, will be continued. An additional monitoring bore was installed down gradient of MP5 on 5 November 2019, to track the movement of contaminants and examine the potential risk to the nearby Wai-inu water supply bore. Monitoring of the new bore, MP8, found *E. coli* in the groundwater. Additionally nitrate concentrations in this bore were recorded by the Council as up to 10 g/m³N, and monitoring by Silver Fern Farms recorded concentrations as high as 11.4 g/m³N. These nitrate concentrations are higher than those recorded in the up-gradient bore MP5. The high nitrate concentrations have exceeded the drinking water standard of 11.3 g/m³N. This is a significant cause for concern given that MP8 is approximately 180m from the Wai-inu water supply bore.

No adverse effects on the surrounding environment were recorded as a result of the discharge of stormwater or the water abstraction from Silver Fern Farms Waitotara site in the 2019-2020 period.

In terms of environmental effects from the discharge of emissions to air, localised odours were noted during inspections. Odours were not objectionable nor were they detected beyond the boundary. No complaints were received from residents at the Wai-inu Beach Settlement during the period under review.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 10-14.

Table 10 Summary of performance for consent 2260-3.1

Purpose: To discharge to land wastewater by spray irrigation, stockyard solid wastes and stabilised sludge by spreading, from meat processing operations in the vicinity of the Waitotara River, including associated discharges to air		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Stockyards solid waste discharge rate not to exceed 28 m ³ /7 days, wastewater not to exceed 1,700 m ³ /day	Site inspections and data provided	Yes
2. Discharge to occur in agreed disposal areas	Site inspections and information provided	Yes
3. No offensive or objectionable odour beyond the boundary of the property	Site inspections and complaints register	Yes
4. Discharge not to result in spray drift beyond the boundary of the property	Site inspections and complaints register	Yes
5. Preparation of Integrated Management Plan (IMP)	Plan received with consent application 26/12/2015	Yes
6. IMP to be reviewed annually by 31 December; or upon two months' notice by either party	Liaison with consent holder	Review invoked, plan not yet received
7. Designated officer to manage spray irrigation system according to IMP	Liaison with consent holder	Yes
8. Consent holder to undertake a monitoring programme to monitor risk to Wai-inu water supply	Received	Yes
9. Adopt best practicable option to prevent or minimise adverse environmental effects	Site inspections and sampling	No; ponding of wastewater observed during inspection
10. Sodium adsorption ratio not to exceed 15	Sampling	Yes
11. Discharge not to result in wastewater reaching surface water	Site inspections and sampling	Yes
12. Contaminants not to be discharged within certain areas	Inspection	Yes
13. Discharge not to occur within 20 m of new roads	No new roads in area	N/A

Purpose: To discharge to land wastewater by spray irrigation, stockyard solid wastes and stabilised sludge by spreading, from meat processing operations in the vicinity of the Waitotara River, including associated discharges to air		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
14. Consent holder to keep records of rate and volume of discharge	Records provided	Yes
15. Council and STDC to be notified if an event occurs that may have adverse effect on Wai-inu drinking water supply	No events occurred	Yes
16. Review of consent	Not scheduled for consideration during year under review. Next optional review June 2022.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Improvement Required
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 11 Summary of performance for consent 2261-3.1

Purpose: To take ground water from three groundwater bores in the vicinity of the Waitotara River for meat processing purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on maximum abstraction rate	Metering by consent holder and review of records by Council	No
2. Labelling of bores	Site inspection by Council	Yes
3. Installation and operation of monitoring equipment	Site inspection and receipt of monitoring records.	Yes
4. Keeping of monitoring records	Receipt of records by Council	Yes
5. Certification of monitoring equipment	Receipt of certificate	Yes
6. Actions upon breakdown of monitoring equipment	Notification received	Yes
7. Installation of groundwater level monitoring device in dedicated bore before 31 August 2017	Inspection by Council. Extension granted until 31 October 2017	Yes
8. Installation of groundwater level monitoring devices in abstraction bores before 30 August 2017	Inspection by Council. Extension granted until 31 October 2017	Yes
9. Access to monitoring equipment	Site inspection	Yes

Purpose: To take ground water from three groundwater bores in the vicinity of the Waitotara River for meat processing purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
10. Adoption of best practicable option and efficient use	Site inspections and liaison with consent holder	Yes
11. Backflow protection	Records provided and site inspection	Yes
12. Provisions of triennial report on sustainability of aquifer	Received 24 September 2020	Yes
13. Optional review provision re environmental effects	Not scheduled for consideration during year under review. Next optional review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 12 Summary of performance for consent 4629-3.1

Purpose: To discharge emissions into the air from various activities associated with meat processing operations		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Emissions to be generally of the nature and scale described in the application	Site inspections	Yes
2. Best practicable option to prevent or minimise adverse effects	Site inspections	Yes
3. Discharge not to give rise to offensive or objectionable odour at or beyond the site boundary	Site inspections, complaints register	Yes
4. Discharge to be smoke free	Site inspections	Yes
5. Review of consent conditions	Not scheduled for consideration during year under review. Next optional review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 13 Summary of performance for consent 5027-2

Purpose: To discharge stormwater, defrost water and evaporative cooling water from a meat processing plant site into an unnamed tributary of the Waitotara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option	Site inspections and chemical sampling	Yes
2. Limits on catchment area of site	Site inspections	Yes
3. Containment of hazards	Site inspections	Yes
4. Limits on pH, oil and grease and suspended solids	Site inspections and chemical sampling	Yes
5. Discharge shall not give rise to effects on stream beyond mixing zone	Site inspections and chemical sampling	Yes
6. Provide and maintain a contingency plan	Council records and site inspections. Plan updated 19 December 2019	Yes
7. Provide and maintain a stormwater management plan	Council records and site inspections. Plan updated 19 December 2019	Yes
8. Notification on changes on site	Not required during monitoring period	N/A
9. Review of consent conditions	Not scheduled for consideration during year under review. Next consideration June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 14 Summary of performance for consent 10256-1.0

Purpose: To take and use water from a spring for non-potable plant purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on maximum abstraction rate	Metering by consent holder and review of records by Council	Yes
2. Installation and operation of monitoring equipment	Site inspection and receipt of monitoring records	Yes
3. Certification of monitoring equipment	Receipt of certificate	Yes
4. Actions upon breakdown of monitoring equipment	Notification received	Yes
5. Access to monitoring equipment	Site inspection	Yes
6. Keeping of monitoring records	Receipt of records by Council	Yes

Purpose: <i>To take and use water from a spring for non-potable plant purposes</i>		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Lapse of consent	Consent exercised	N/A
8. Optional review provision re environmental effects	Not scheduled for consideration during year under review. Next optional review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 15 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement required	Poor
2009-10	2260-2	1	-	-	-
	2261-2	1	-	-	-
	4629-2	1	-	-	-
	5027-1	1	-	-	-
2010-11	2260-2	1	-	-	-
	2261-2	1	-	-	-
	4629-2	1	-	-	-
	5027-2	1	-	-	-
2011-12	2260-2	1	-	-	-
	2261-2	1	-	-	-
	4629-2	1	-	-	-
	5027-2	1	-	-	-
2012-14	2260-2	1	-	-	-
	2261-2	1	-	-	-
	4629-2	1	-	-	-
	5027-2	-	1	-	-
2014-15	2260-2	-	1	-	-
	2261-2	-	-	1	-
	4629-2	1	-	-	-
	5027-2	1	-	-	-
2015-16	2260-2	-	1	-	-
	2261-2/3	-	-	1	-
	4629-2	1	-	-	-
	5027-2	1	-	-	-
2016-17	2260-3	-	1	-	-
	2261-3	1	-	-	-

Year	Consent no	High	Good	Improvement required	Poor
	4629-3	-	1	-	-
	5027-2	1	-	-	-
	10256-1	1	-	-	-
2017-18	2260-3	-	1	-	-
	2261-3	-	1	-	-
	4629-3	1	-	-	-
	5027-2	1	-	-	-
	10256-1	1	-	-	-
2018-19	2260-3	-	-	1	-
	2261-3	-	1	-	-
	4629-3	1	-	-	-
	5027-2	1	-	-	-
	10256-1	1	-	-	-
2019-2020	2260-3	-	-	1	-
	2261-3	-	1	-	-
	4629-3	1	-	-	-
	5027-2	1	-	-	-
	10256-1	1	-	-	-
Totals		28	8	3	0

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

3.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Silver Fern Farms Ltd in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the annually reviewed integrated land management plan considers how to further prevent increases to nitrate in groundwater.
4. THAT monitoring bore(s) down gradient of bore MP5 are installed in the 2019-2020 year to fulfil the requirements of condition 8, consent 2260-3.1.
5. THAT physicochemical monitoring for the same parameters tested at bore MP5 is included in the new monitoring bore(s) following their installation in the 2019-2020 year.
6. THAT continuous water level monitoring is installed in the new monitoring bore(s) following their installation in the 2019-2020 year.

These recommendations were implemented. Recommendations 5 and 6 were only partially implemented due to lack of water in the new monitoring bore MP7.

3.5 Alterations to monitoring programmes for 2020-2021

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

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

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

It is proposed that for 2020-2021 that the monitoring programme for Silver Fern Farms remains largely unchanged from that of 2019-2020. Continued surveillance of the new bore MP7 will determine whether water is present in this bore seasonally; and should water be present in this bore then monitoring will be undertaken.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to adjust this baseline programme should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Silver Fern Farms Ltd in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the annually reviewed integrated land management plan considers how to further prevent increases to nitrate in groundwater.
4. THAT the new bore MP7 should continue to be monitored to detect whether water is present in this bore seasonally and that should water be present, physicochemical monitoring should be undertaken.

Glossary of common terms and abbreviations

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

BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in $\mu\text{S}/\text{cm}$.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
KAR	Potassium adsorption ratio. A measure of the suitability of water use in agricultural irrigation, as determined by the concentrations of solids dissolved in the water.
L/s	Litres per second.
mS/m	Millisiemens per metre.
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).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SAR	Sodium adsorption ratio. A measure of the suitability of water use in agricultural irrigation, as determined by the concentrations of solids dissolved in the water.
SS	Suspended solids.

STDC	South Taranaki District Council.
Temp	Temperature, measured in °C (degrees Celsius).
UI	Unauthorised Incident.
µS/cm	Microsiemens per centimetre.

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

Bibliography and references

- Taranaki Regional Council 2020, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2018-2019, Technical Report 2019-90.
- Taranaki Regional Council 2019, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2017-2018, Technical Report 2018-66.
- Taranaki Regional Council 2018, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2016-2017, Technical Report 2017-107.
- Taranaki Regional Council 2017, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2015-2016, Technical Report 2016-54.
- Taranaki Regional Council 2015, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2014-2015, Technical Report 2015-93.
- Taranaki Regional Council 2014, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Biennial Report 2012-2014, Technical Report 2014-87.
- Taranaki Regional Council 2012, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2011-2012, Technical Report 2012-82.
- Taranaki Regional Council 2011, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2010-2011, Technical Report 2011-95.
- Taranaki Regional Council 2010, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2009-2010, Technical Report 2010-100.
- Taranaki Regional Council 2009, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2008-2009, Technical Report 2009-106.
- Taranaki Regional Council 2008, Silver Fern Farms (Waitotara) Resource Consents Monitoring Programme Annual Report 2007-2008, Technical Report 2008-69.
- Taranaki Regional Council 2007, PPCS Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2005-2007, Technical Report 2007-117.
- Taranaki Regional Council 2005, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2004-2005, Technical Report 2005-114.
- Taranaki Regional Council 2004, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2003-2004, Technical Report 2004-107.
- Taranaki Regional Council 2003, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2002-2003, Technical Report 2003-94.
- Taranaki Regional Council 2002, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2001-2002, Technical Report 2002-86.
- Taranaki Regional Council 2001, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 2000-2001, Technical Report 2001-73.
- Taranaki Regional Council 2000, Richmond Ltd (Waitotara) Resource Consents Monitoring Programme Annual Report 1999-2000, Technical Report 2000-91.
- Taranaki Regional Council 1999, Waitotara Meat Company Resource Consent Monitoring Programme 1997-99 Report, Technical Report 99-101.

- Taranaki Regional Council 1997, Waitotara Meat Company Resource Consent Monitoring Programme 1996-97 Annual Report, Technical Report 97-103.
- Taranaki Regional Council 1996, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report 1995/96, Technical Report 96-72.
- Taranaki Regional Council 1995, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report 1994/95, Technical Report 95-63.
- Taranaki Regional Council 1994, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report 1993/94, Technical Report 94-42.
- Taranaki Regional Council 1993, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report 1992-93, Technical Report 93-67.
- Taranaki Regional Council 1992, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report 1991/92, Technical Report 92-33.
- Taranaki Regional Council 1991, Waitotara Meat Company Resource Consent Monitoring Programme Annual Report for 1990/91, Technical Report 91-23.
- Taranaki Regional Council 1990, Waitotara Meat Company Monitoring Programme-Annual Report for 1989/90, Technical Report 90-44.

Appendix I

Resource consents held by Silver Fern Farms Ltd (Waitotara)

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

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

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

Name of
Consent Holder: Silver Fern Farms Limited
PO Box 941
Dunedin 9054

Decision Date: 13 September 2017

Commencement Date: 13 September 2017

Conditions of Consent

Consent Granted: To discharge to land wastewater by spray irrigation, stockyard solid wastes and stabilised sludge by spreading, from meat processing operations in the vicinity of the Waitotara River, including associated discharges to air

Expiry Date: 1 June 2034

Review Date(s): June 2022 and at 3-yearly intervals thereafter

Site Location: Waiinui Beach Road, Waitotara

Grid Reference (NZTM) 1747946E-5588813N (Pond 1)
1747993E-5588722N (Pond 2)
1748071E-5588544N (Area 1)
1749151E-5586993N (Area 2)

Catchment: Waitotara

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

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The discharge of stockyards solid waste shall occur by spreading at a rate not exceeding 28 cubic metres over any 7-day period, and the discharge of wastewater shall occur by spray irrigation at a rate not exceeding 1700 cubic metres/day.
2. The discharges authorised by this consent shall only occur on the 'disposal areas' shown in Figure 1 attached.
3. The discharge shall not result in odour that is offensive or objectionable beyond the boundary of the disposal areas shown in Figure 1 attached.
4. The discharge shall not result in spray drift beyond the boundary of the disposal areas.
5. The consent holder shall manage the site in accordance with an 'Integrated Management Plan' (IMP) prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The IMP shall detail the management of the spray irrigation and solid waste management system at the site to achieve compliance with the conditions of this consent. An objective of the IMP shall be to keep the annual nitrogen loading from wastewater, stockyards solids and solid organic waste material discharged on the 'disposal areas' to 300 kg/ha or less. The IMP shall address the following matters, as a minimum:
 - a) designated disposal areas;
 - b) selection of appropriate irrigation and spreading methods for different types of terrain;
 - c) application rate and duration;
 - d) application frequency;
 - e) farm management and operator training;
 - f) soil and herbage management;
 - g) prevention of ponding, runoff and spray drift;
 - h) minimisation and control of odour effects offsite;
 - i) operational control and maintenance of the spray irrigation system;
 - j) monitoring of the wastewater (physicochemical);
 - k) monitoring of soils and herbage (physicochemical);
 - l) monitoring of groundwater beneath the irrigated area (physicochemical);
 - m) remediation measures;
 - n) contingency events;
 - o) reporting monitoring data;
 - p) procedures for responding to complaints; and
 - q) notification to the Council of non-compliance with the conditions of this consent.

Consent 2260-3.1

6. The *IMP* described in special condition 5 of this consent shall be subject to review upon two months notice by either the consent holder or the Taranaki Regional Council. Further, the consent holder shall review the *IMP* annually and shall provide the reviewed plan to the Chief Executive, Taranaki Regional Council, by 31 December.
7. The consent holder shall designate an officer with the necessary qualifications and/or experience to manage the spray irrigation system. The officer shall be regularly trained on the content and implementation of the *IMP* and shall be advised immediately of any revision or additions to the *IMP*.
8. The consent holder shall undertake a monitoring programme that identifies and monitors the risk to the Waiinu Water Supply provided by the bore located at approximate grid reference 1748791E-5586518 (NZTM) resulting from the exercise of this consent. The programme of monitoring shall be submitted to the Chief Executive, Taranaki Regional Council for certification before 31 December 2017 and shall include as a minimum, the drilling and monitoring of bores down gradient of the MP5 (GND0686) monitoring bore at locations and depths determined after consultation with the Chief Executive, Taranaki Regional Council.
9. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge on the environment.
10. The sodium adsorption ratio (SAR) of the wastewater shall not exceed 15.
11. The discharge shall not result in any wastewater reaching surface water, any subsurface drainage system or any adjacent property.
12. No contaminants shall be discharged within:
 - (a) 25 metres of any surface water body; or
 - (b) 25 metres of any fenced urupa (burial ground) without the written approval of the relevant Iwi; or
 - (c) subject to condition 13 below, 20 metres from any public road;
 - (d) 50 metres of any bore, well or spring used for water supply purposes; or
 - (e) 150 metres of any dwelling that is not owned by the consent holder, or any marae, unless the written approval of the owner and occupier has been obtained to allow the discharge at a closer distance.
13. Where any new public road is established that shares a boundary with a disposal area, there shall be no discharge to land within 20 metres of the road surface until the shelter vegetation on that boundary is at least two metres high. Once the shelter vegetation exceeds two metres in height, the discharge may occur no less 10 metres from the road surface.
14. The consent holder shall keep records of the rate and volume of wastewater and stockyards solid waste discharged to an accuracy of $\pm 5\%$, including, but not limited to the:
 - (a) effluent type (e.g. liquid, slurry, solid);
 - (b) source of any solid waste;
 - (c) location and area (ha) of application of wastewater and/or solid waste; and
 - (d) date each site location received the wastewater and/or solid waste application.

Consent 2260-3.1

15. If, as a consequence of the activity authorised by this consent, an event occurs that may have a significant adverse effect on water quality at the registered drinking-water supply abstraction point for Waiinu Beach [Map Ref: 1748791E-5586518 (NZTM)] the consent holder shall, as soon as reasonably practicable, telephone the Taranaki Regional Council and South Taranaki District Council and notify them of the event.
16. 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 2022 and at 3-yearly intervals thereafter, for the purposes of:
 - (a) 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; and/or
 - (b) setting limits for any contaminant if the concentration of that contaminant in groundwater at a disposal area is increasing at a rate that could make it unsuitable for any existing potential use; and/or
 - (c) requiring any data collected in accordance with the conditions of this consent to be transmitted directly to the Taranaki Regional Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Transferred at Stratford on 26 November 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Advice Note (included at the request of DITAG)

The consent holder's attention is drawn to MPI's "New Zealand Code of Practice for the Design and Operation of Farm Dairies (NZCP1) which restricts:

- The discharge of specified wastes to land used for grazing of milking animals; and
- The use of feed from land which has had specified wastes applied to it.

Should you require further information, please contact a Dairy Industry Technical Advisory Group (DITAG) representative or visit <http://www.foodsafety.govt.nz/elibrary/industry/dairy-nzcp1-design-code-of-practice/amdt-2.pdf> (specifically section 4.4 Disposal of effluent and other wastes and section 5.8 Purchased Stock Food) or contact an operation dairy processing company regarding conditions of supply.

Figure 1: Approximate locations of 'Disposal Areas for the stockyards solid waste and wastewater spray irrigation



DRAFT

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

Name of
Consent Holder: Silver Fern Farms Limited
PO Box 941
Dunedin 9054

Decision Date: 23 August 2016

Commencement Date: 23 August 2016

Conditions of Consent

Consent Granted: To take groundwater from three bores in the vicinity of the Waitotara River for meat processing purposes

Expiry Date: 1 June 2040

Review Date(s): June 2022 and every six years thereafter and in accordance with special condition 13

Site Location: Waiinui Beach Road, Waitotara

Grid Reference (NZTM) 1747961E-5588986N
1748173E-5588850N
1748280E-5588815N

Catchment: Waitotara

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

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The total rate of taking shall not exceed 20 litres per second and the total volume taken in any 24 hour period ending at midnight (New Zealand Standard Time) shall not exceed 1,300 cubic metres.
2. All bores shall be easily identifiable by permanent labels, which may be welded or engraved on the casing, or on the equivalent fixed part of the well construction or associated building. The numbering on the label shall be the bore number assigned by the Taranaki Regional Council.
3. The consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking (or a nearby site in accordance with Regulation 10 of the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010). The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

Note: Water meters must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters have a limited lifespan.

4. The records of water taken shall:
 - a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing;
 - b) specifically record the water taken as 'zero' when no water is taken; and
 - c) for each 12-month period ending on 30 June, be provided to the Chief Executive, Taranaki Regional Council within one month after end of that period.
5. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring equipment required by the conditions of this consent ('the equipment'):
 - a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.the documentation shall be provided:
 - i) within 30 days of the installation of a water meter;
 - ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
 - iii) no less frequently than once every five years.

Consent 2261-3.1

6. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
7. Before 31 August 2017 the consent holder shall ensure that a continuous record of groundwater level data is maintained by installing an automatic groundwater level recording device in to a dedicated monitoring bore. The device shall measure and record the water level at intervals not exceeding 15 minutes to an accuracy of ± 10 mm and be tamper-proof.
8. Before 30 August 2017 the consent holder shall, unless it is not practically achievable in a particular case, ensure that a continuous record of groundwater level data is maintained by installing an automatic groundwater level recording device into any operational groundwater abstracting bore. The device shall measure and record the water level at intervals not exceeding 15 minutes to an accuracy of ± 10 mm and be tamper-proof.
9. The water meters and data loggers shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
10. At all times the consent holder shall take all practicable steps to take and use water efficiently and generally prevent or minimise any adverse effects on the environment including as minimum, by ensuring that the minimum amount of water necessary for the purpose is taken.
11. The consent holder shall ensure that the bores and associated pipework are designed and configured in such a way that no water from any source can re-enter any bore.
12. Before 30 September 2020 and every three years thereafter an assessment of the sustainability of the aquifer shall be undertaken and be provided in the form of a report to the Chief Executive, Taranaki Regional Council. The report shall include as a minimum:
 - i) A borefield description;
 - ii) A description of the on site water use, water sources and discharges;
 - iii) All groundwater level data, abstraction data and groundwater quality data collected to 30 June of that year (*Monitoring data is to be presented in tables and graphical format, raw data in appendix, summary data in text*);
 - iv) A discussion on groundwater levels, observed trends and the aquifers response to abstraction;
 - v) A discussion on groundwater quality and the results of any groundwater quality analysis;
 - vi) An assessment of the impacts; including the capacity of the aquifer to sustain the demands on it.

Note: This assessment may be undertaken by the Taranaki Regional Council or a suitably qualified and experienced groundwater professional on behalf of the consent holder.

Consent 2261-3.1

13. 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:
- a. during the month of June 2022 and every six years thereafter; and/or
 - b. within 3 months of the submittal of a report required under special condition 12 above;

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.

Transferred at Stratford on 26 November 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

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

Name of
Consent Holder: Silver Fern Farms Limited
PO Box 941
Dunedin 9054

Decision Date: 13 September 2017

Commencement Date: 13 September 2017

Conditions of Consent

Consent Granted: To discharge emissions into the air from various activities associated with meat processing operations

Expiry Date: 1 June 2034

Review Date(s): June 2022, June 2028

Site Location: Waiinui Beach Road, Waitotara

Grid Reference (NZTM) 1748090E-5588905N (approximate centre of site)

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

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. This consent authorises emissions to air from activities on the site (as shown in Appendix One) generally of the nature and scale described in the application for this consent.
2. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this resource consent.
3. The discharges authorised by this consent shall not give rise to any odour at or beyond the site boundary (as shown in Appendix One) of the site that is offensive or objectionable.
4. Any discharge from the factory site shall be free of smoke.
5. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2022 and/or June 2028, for the purpose of ensuring that that conditions are adequate to deal with any adverse effects of the abstraction on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 26 November 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix One



Area of discharge bounded by the white line

DRAFT

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

Name of
Consent Holder: Silver Fern Farms Limited
PO Box 941
Dunedin 9054

Decision Date: 8 November 2010

Commencement Date: 8 November 2010

Conditions of Consent

Consent Granted: To discharge stormwater, defrost water and evaporative cooling water from a meat processing plant site into an unnamed tributary of the Waitotara River

Expiry Date: 1 June 2028

Review Date(s): June 2022

Site Location: Waiinu Beach Road, Waitotara

Grid Reference (NZTM) 1748084E-5589290N

Catchment: Waitotara

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

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharge shall be from a catchment area on the site not exceeding 2.3 hectares.
3. Any significant volumes of hazardous substances (e.g. diesel fuel, hydrochloric acid and sulphuric acid) on site shall be:
 - a) contained in a double skinned tank, or
 - b) stored in a dedicated bunded area with drainage to sumps, or to other appropriate recovery systems, and not directly to the site stormwater system.
4. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm ⁻³
oil and grease	Concentration not greater than 15 gm ⁻³

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

5. After allowing for reasonable mixing, within a mixing zone extending 30 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
 - 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.
6. The consent holder shall maintain a contingency plan. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

Consent 5027-2

7. The consent holder shall maintain a stormwater management plan. This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater. The plan shall include but not necessarily be limited to:
- a) the loading and unloading of materials;
 - b) maintenance of conveyance systems;
 - c) general housekeeping; and
 - d) management of the interceptor system.

A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site, that could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and be emailed to worknotification@trc.govt.nz.
9. 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:
- a) during the month of June 2016 and/or June 2022; and/or
 - b) within 3 months of receiving a notification under special condition 8 above;
- 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.

Transferred at Stratford on 26 November 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

DRAFT