

Dairy Green Ltd

Practical Engineering Solutions

Consents, Effluent, Stock water, Irrigation

Design through to Installation

Irrigation NZ Accredited Designer

Woldwide Runoff

Farm Environmental Management Plan – Appendix N

Version 1.0

1 June 2019 – 31 May 2020

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1 Property Details

Entity Name:	Woldwide Runooff Limited
Physical Address	20 Gill Road – Merrivale block 1711 Otautau Tuatapere Road – Merriburn block
Description of landholding ownership	Woldwide Runooff Limited
Landholding owner's details	A and JJ de Wolde 104 Shaws Trees Road, Heddon Bush, RD3 Winton, 9783
Contact Person:	Abe de Wolde 021 227 2537 abe@woldwide.nz
Legal Description:	Merrivale Block: Part Section 7 Block XII Waiau SD Part Section 7 Block XII Waiau SD Part Section 7 Block XII Waiau SD Lot 1 DP 3537 Merriburn Lease Block: Lot 1 DP 302409 Sec 26 Merrivale Settlement No. 1 Sec 27 Merrivale Settlement No. 1
Land Area:	507 ha total, 321 ha effective – Merrivale 385ha total, 338 ha effective – Merriburn
Location	NZTM 1201022, 4893762 – Merrivale NZTM 1200812, 4890495 – Merriburn
Resource Consents:	None currently

2 Maps

2.1 Accompanying notes to maps

- Woldwide Runoff (WRO) is located 20 km to the west of Otautau, on the western side of the Longwood Ranges.
- WRO is comprised of two separate blocks:
 - The Merrivale Block is owned by Woldwide Runoff Limited and the Merriburn block is leased.
 - The Merriburn lease block is under a 5-year lease agreement, with Woldwide Runoff Limited having first right of renewal.
- Activities at WRO area:
 - Grazing of R1 and R2 heifers, grazing of carry over cows and grazing of mating bulls all year round (includes intensive winter grazing)
 - Production of baleage
 - 100 hectares of commercial pine plantation
 - 60 hectares of beech forest under sustainable management.
- Topography is easy, rolling to steep. Steeper slopes are elevated and under forestry.
- Critical source areas (CSAs) are found at the bottom of slopes and close to waterways.
- Waterways are fully fenced off and well-vegetated.
- All crossings are culverted; stock do not have access to surface waterways. Locations where lanes cross drains are managed as critical source areas to minimise runoff from tracks and lanes into surface waterways.
- Infrastructure includes cattle yards, lanes and silage pads.

2.2 Boundaries



Figure 1. Boundary of WRO's Merriburn (left) and Merrivale (right) blocks.

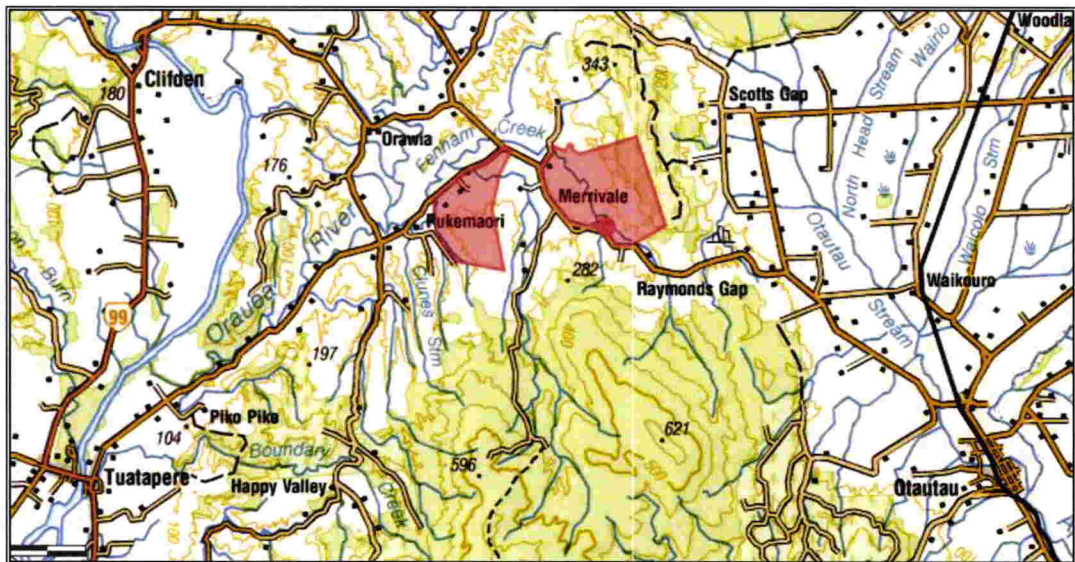


Figure 2. General location of WRO

2.3 Farm maps

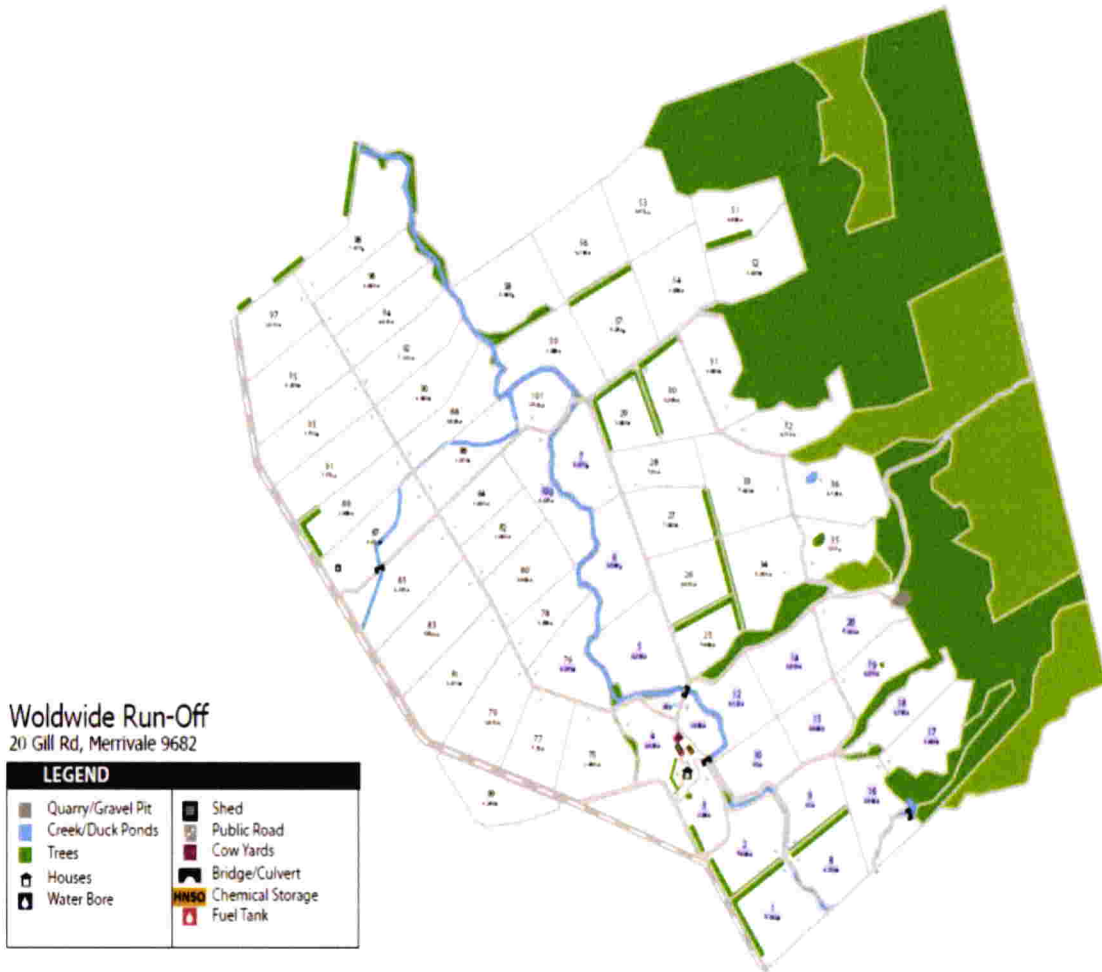


Figure 3. Farm map of Merrivale Block showing features.

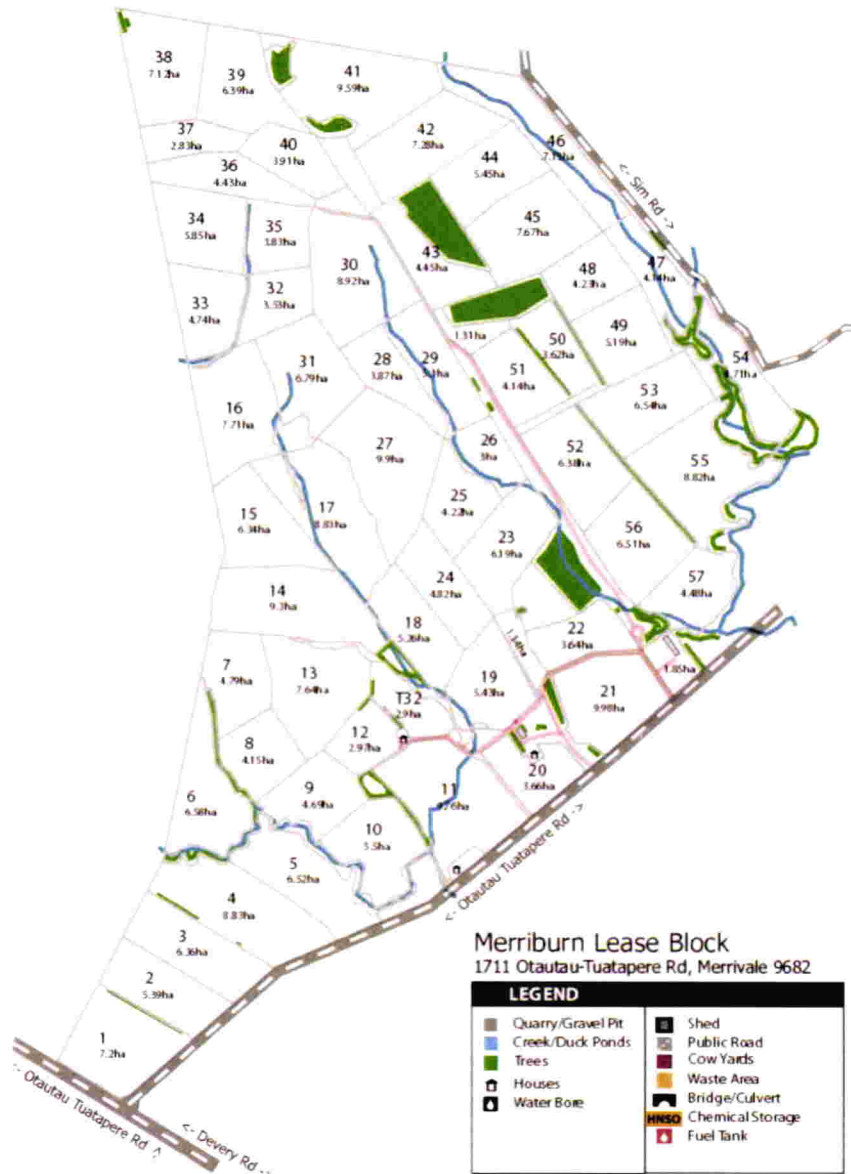


Figure 4. Farm map of Merriburn block showing features

2.4 Physiographic zones

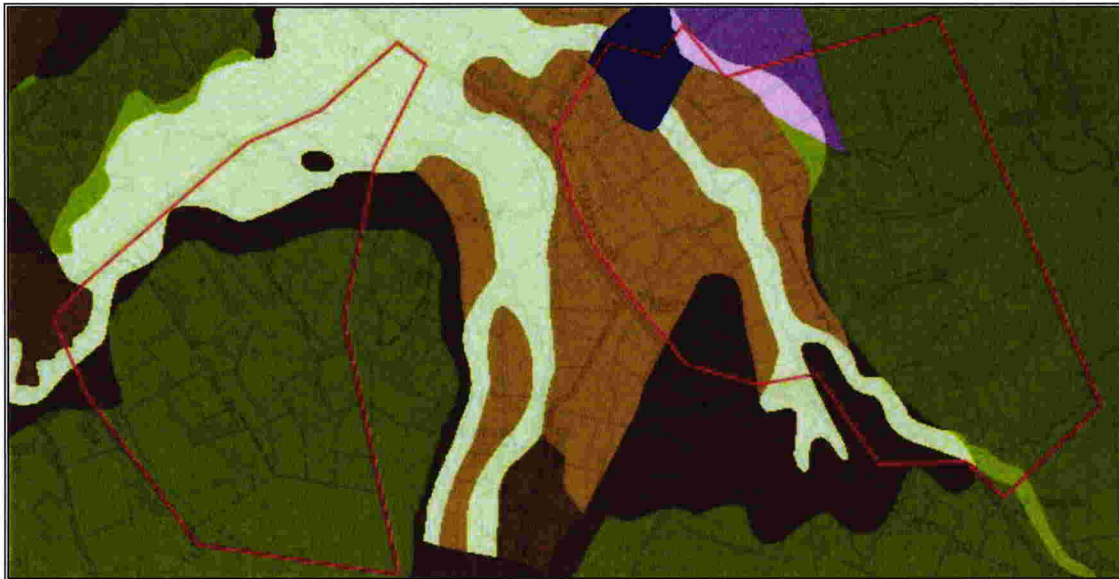


Figure 5. Physiographic zones at Merriburn block (left) and Merrivale block (right)

Physiographic Zones

	Alpine - No Variant		Lignite - Marine Terraces - Overland Flow
	Bedrock/Hill Country - Artificial Drainage		Old Mataura - No Variant
	Bedrock/Hill Country - No Variant		Oxidising - Artificial Drainage
	Bedrock/Hill Country - Overland Flow		Oxidising - No Variant
	Central Plains - No Variant		Oxidising - Overland Flow
	Gleyed - No Variant		Peat Wetlands - No Variant
	Gleyed - Overland Flow		Riverine - No Variant
	Lignite - Marine Terraces - Artificial Drainage		Riverine - Overland Flow
	Lignite - Marine Terraces - No Variant		Urban Area

2.5 Soils

The Merrivale block contains Malakoff, Waimatuku and Makarewa soils and the Merriburn lease block contains Aparima, Orawia and Makarewa soils. These soils are a mixture of heavier wetter soils and free draining soils.



Figure 6. Soils at Merriburn Block (left) and Merrivale block (right)

2.6 Riparian Vegetation and Fencing

All streams and drains are fenced off to ensure stock cannot enter the waterways. Riparian buffer are wide and have good grass cover/mature vegetation.

2.7 Heritage

There are no known or recorded heritage sites on the property.

2.8 Significant Indigenous Biodiversity

60 hectares of beech forest is under a sustainable management plan.

3 Nutrient Management

3.1 Environmental Management Actions Recommended

To mitigate the potential loss of nutrients the following actions will be adopted as far as practical:

- i. Soil and herbage testing to monitor soil chemistry and inform on decisions regarding fertiliser and lime application to maintain optimum soil fertility levels. Testing should initially be annually until an understanding and trends have been established;
- ii. Fertiliser and lime management plan prepared annually with guidance from Overseer output reports;
- iii. Exclude stock from streams;
- iv. Tracks and lanes sited away from streams where possible. Lanes constructed to divert run off away from potential waterway ingress. Water tables will be designed to shed water to pasture for riparian treatment where practical.

3.2 Fertiliser Application Best Management Practices

The following practices are recognised as being most desirable and will be followed as much as is practical.

- i. The spreaders used to apply fertiliser are 'Spread Mark' accredited and ideally have Tracmap or a similar recording system to show proof of placement;
- ii. Buffer distances are maintained such that there is no direct contamination of waterways from the application of fertiliser;
- iii. Best practice is to have a 20 m buffer between fertiliser placement and waterways;
- iv. Fertiliser is not applied to saturated soils;
- v. Nitrogen-containing fertilisers are only applied to actively growing pastures;
- vi. Fertiliser is not applied when or where air drift can occur beyond the farm boundaries; and
- vii. The need for large fertiliser dressings should be achieved through split dressings rather than a single application.

Note: The application of fertilisers is deemed a permitted activity by Environment Southland provided:

- Application must not occur within 30 m of a neighbouring residential unit without approval. Spray drift must also be minimised.
- There must be no direct discharge to water and no discharge when soil moisture exceeds field capacity. For permanently flowing waterbodies (including artificial drains), fertiliser in riparian plantings where stock is excluded can only be applied to establish the planting. If there is no riparian planting, a setback of 10 m is required.

3.3 Potential Nutrient Loss

A nutrient budget was prepared for the 2017/18 year in Overseer® Version 6.3.0 by Mr. Cain Duncan, Certified Nutrient Advisor, in accordance with the latest version of the OVERSEER Best Practice Data Input Standards (March 2018).

A nutrient budget analysis report has been prepared by Mr. Duncan and is available for review. Please refer to the report for an analysis of nutrient losses, including inputs and outputs.

A summary of the nutrient loss from Overseer calculations is provided in Table 1.

Table 1: Nutrient loss summary for WW1&2 dairy platform.

Indices	WRO 2017/18
N/loss to water (kg/ha/yr)	22
P loss to water (kg/ha/yr)	0.6
Pasture production (kg DM/ha/yr)	10,928

4 Good Management Practices

4.1 Land

Key strategies to achieve this objective:

- i. Fence off all waterways;
- ii. Maintain riparian vegetation;
- iii. Maintain good pasture coverage;
- iv. Soil test regularly and operate a fertiliser management plan;
- v. Exclude stock from high risk critical collection source areas and swales when the soil is near or at field capacity;
- vi. Ensure adequate buffer zones from waterways during tillage;
- vii. Maintain sustainable stocking rate; and
- viii. Stock managed to avoid excessive pugging.

4.2 Review

General good management practices and those specific to the transport pathways to be implemented in the current year are contained in section 4. These good management practices will be reviewed annually as part of the overall review of the Farm Environmental Management Plan.

4.3 General Good Management Practices

Contaminant Pathways – Overland Flow and Artificial drainage

Loss of nutrients via overland flow and artificial drainage presents the highest risk to the environment on the wetter, poorly drained soils on this property primarily in the Gleyed physiographic zone. These areas have high vulnerability to waterlogging, and in some areas require subsurface artificial drainage, which can become a mechanism for the rapid transfer of contaminants to the water bodies they drain to. GMPs adopted are:

- Ensuring critical source areas are left as buffer zones for cropping and fenced off to exclude stock;
- Re-sowing bare soils as soon as possible;
- Avoid grazing very wet soils by opening the breaks up to reduce tramping damage;
- Using good management practice for intensive winter grazing on either grass or forage crop – back fencing, CSA management, last bite grazing, portable troughs etc.; (See FEMP)
- Ensure water ways are fenced off to exclude stock and existing riparian vegetation is maintained;
- Time fertilizer application to meet pasture demand and apply in a little and often manner;
- Protecting steeper, erosion prone land with trees.

Contaminant Pathways – Deep drainage

Loss of nutrients via deep drainage presents the highest risk to the environment on the free draining soils mainly within the Oxidizing physiographic zone. These areas have high vulnerability for nutrients, particularly N, leaching through the soil profile which has the potential to reach groundwater and surface water receiving environments. The operator will avoid and mitigate the risk of contaminant loss via deep drainage using the same measures as above, with the primary goal to avoid the accumulation of excess N in the soil profile prior to high drainage periods.

- Maintaining stocking rates at sustainable levels;
- Avoiding the over-application of fertilizer by matching application to pasture demand and undertaking in a little and often manner;
- Utilizing pasture species which result in less N loss;
- Utilizing soil testing to guide fertilizer usage;
- Time fertilizer application to meet pasture demand and apply in a little and often manner.

5 Riparian Management

5.1 Streams, Creeks and Drains

- i. All waterways are riparian fenced on both sides;
- ii. Regular riparian fencing checks are to be completed and any damaged sections or breakages/breaches are to be repaired immediately;
- iii. Calves or other stock that are found in the riparian areas are to be removed immediately;
- iv. Check all crossings are contoured to channel run-off onto pasture;
- v. Carry out weed control as required following best practice methods;
- vi. Remove drain cleanings and spread over paddocks to utilize the nutrients and to prevent material returning to the water way; and
- vii. Make sure fish have passage through all culverts and underneath bridges.

5.2 Weeds and Pests

Weeds (e.g. gorse, broom, blackberry, ragwort, thistles etc.) are controlled by manually removing them or by using sprays:

- i. When sprays are used to control weeds, care is taken to ensure all sprays are certified to be aquatic safe and that appropriate staff training is given to ensure good health and safety practices are fully implemented;
- ii. Spraying is best carried out when there is active growth (e.g. mid/late spring). The aim is to spray plants when they are small as less chemical is required;

6 Cultivation

6.1 Area of Cultivation

For winter 2019, approximately 50 hectares have been sown in kale to be IWG by stock from May to August.

Re-grassing

An extensive re-grassing policy is underway, with a portion of the property having been re-grassed at the time of writing. Where grass to grass re-grassing occurs, paddocks are sprayed off and direct drilled with grass seed or undergo full cultivation if necessary.

Forage brassica crop

- Paddocks are sprayed off in October/November;
- Paddocks are direct drilled or fully cultivated into fodder crop from mid-October to mid-November;
- Fodder crop is IWG in over winter by dry stock, mainly R1s and R2s;
- Paddocks are subsequently re-grassed in October/November;

Surplus grass is harvested as baleage and silage. Specialist machinery is used to avoid the risk of soil compaction when harvesting grass if required.

Grass production, soil structure and fertility are the primary factors in paddock selection, with poorly performing pastures targeted for renewal. Soil moisture content is also a factor in the choice of paddock selection and timing of cultivation.

6.2 Cultivation Good Management Practices

- i. Where drainage depressions in crop paddocks are likely to channel sediments and nutrients to drainage, these will be left uncultivated to act as sediment traps;
- ii. Direct drill paddocks where possible;
- iii. Choose paddocks away from waterways to plant winter feed crops; and
- iv. Plough lines will be kept 5 metres back from the top of drain banks. This ensures at least a 5 m buffer along waterways. A buffer of at least 10 metres is implemented where the topography is sloping down toward a waterway.

7 Intensive Winter Grazing

7.1 Stock Grazing Management

The Environment Southland Intensive Winter Grazing Rule covers the period from 1 May until 30 September.

7.2 Pasture

Paddock selection

Judicious paddock selection based on the soil moisture content is a key tool. This is important not only to avoid overland flow, pugging etc. but to ensure that the pasture and soils are not damaged to any extent that would inhibit spring pasture growth. The range in soil types gives some flexibility of being able to move away from waterways to better draining soils during wet weather. The proposed stand-offs will reduce pugging damage through less time on pasture and more settled stock.

Back fencing

The eating of the excess feed will not (for spring growth reasons) result in the paddocks being eaten down hard, or pugged.

- If break fencing is to be used, the breaks, once eaten off, will be back fenced;
- Breaks should be sequenced to insure grazing is towards the watercourse; and
- If baleage is used, place baleage in the paddock before soil becomes too wet thereby preventing heavy vehicles from damaging the ground.

Water

Where breaks do not encompass a trough, a portable trough will be used to avoid pug lanes between the water troughs and the feed breaks.

Buffer zones

There will be fenced buffer zones along all water ways, and higher risk areas over tiles, drainage depressions (swales) or cracked soils will be temporarily fenced off and not grazed in the critical source areas.

Wet weather

In wet weather, where there is risk of pasture and soil damage, care must be taking to minimise grazing and avoid supplement feeding and pugging within 10 metres of a waterway or drain.

8 Other Environmental Issues

8.1 Lanes and Races

Run-off from races can in some situations constitute an illegal discharge to land. These can be mitigated by:

- i. Ensuring that lanes and races are not used as feed pads, yards, or herd holding areas;
- ii. Ensuring that riparian vegetation is adequate to treat storm water;
- iii. Checking after heavy rain the lane/track edge cut-outs, to ensure they are not blocked and there is no risk of large single point discharges;
- iv. Gateways – to avoid compaction around the gateways and reduce lane edge wear, where possible bring stock out of the paddock at a different gate to which they were let in; and
- v. Ensure that swales away from culverts are kept clear, and discharge is directed away from the waterway.

Annual maintenance to races can often result in the “run back” shaping over culverts and lane edge discharge divot/cutouts not being restored. All lane edges and culverts should be checked after lane maintenance.

8.2 Silage pad

Silage pads are constructed on dry sites. Rain landing on silage covers does not mix with leachate and is diverted to the farm drainage. No leachate flows off pads at any time.

Only wilted silage is used to minimise the risk of creating leachate

8.3 Cut and Carry

Grass harvesting is carried out according to best practice management. Harvesting is not carried out if the risk of soil compaction cannot be avoided.

Health and safety protocols are adhered to when operating machinery.

8.4 Animal Pests

- i. Rabbits, hares, possums – regular culls using night shooting, poisoning etc.
- ii. Magpies – trap, shoot etc.

9 Emergency Response

9.1 Emergency Contacts

Abe de Wolde - 021 227 2537

Environment Southland – 0800 768 845 or 03 2115115

Dairy Green Limited – 03 215 4381

10 Review

Review whole farm management plan and update by 1 June each year – and complete the version control below.

- i. Development targets for coming season/plan.
- ii. Nutrient Management
 - Overseer Inputs
 - New Overseer report if applicable
- iii. Good Management Practices
- iv. Cultivation Areas
- v. Intensive Winter Grazing
- vi. Emergency Contacts

Version	Date	Reviewed	Distribution List
1.0	28 March 2019	Nessa Legg, Dairy Green Ltd	A & JJ de Wolde
1.2			
1.3			
2.			
3.			