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Featherston WWTP Resource Consent Applications - Further Points of Clarification Response to Request for Further Information (s92)

20 October 2017

Dear Nicola,

Further to the resource consent applications submitted for the proposed Featherston Wastewater Treatment Plant (WWTP) discharges to land, water and air on 1 March 2017, Greater Wellington Regional Council (GWRC) issued a Section 92 (s92) request for further information on 19 April 2017. Mott MacDonald, on behalf of South Wairarapa District Council (SWDC), subsequently submitted a response to this s92 request on 2 June 2017. Further points of clarification have since been requested by GWRC by e-mail on 28 June 2017 to address matters considered to be outstanding from the original s92 response, with further queries relating specifically to the land application issued by e-mail on 26 September 2017.

Outstanding matters relating to clarity under Section 107(1)(d) of the Resource Management Act 1991 were provided to GWRC in a response letter dated 11 October 2017.

This letter and appendices has been prepared on behalf of SWDC as a response to the further points of clarification request, to specifically address the outstanding matters relating to the land application scheme. The enclosed responses are presented in a tabular form to capture GWRC's comment, SWDC's response and proposed solutions.

1 Overseer Modelling

Further to our response presented in Section 2 of the letter dated 2 June 2017, our response on OVERSEER© modelling is provided below and in the relevant appendices.

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Ref.	GWRC comment	SWDC response	Proposed Solution
1.1	There appears to be a discrepancy between the overseer modelling and the report in Appendix 7. Appendix 7 has a total nitrogen loading rate of 301 kgN/ha/year (Table 4.9) for grazed pasture which indicates fertiliser is added (given what we know about nitrogen loading rates of wastewater irrigation). However, in the Section 92 response it is indicated that no fertiliser is added to the irrigated blocks. Can you please provide an explanation for this discrepancy?	The Assessment of Environmental Effects (AEE) assesses the "worst case scenario" application of nitrogen (e.g. grazing system with application of fertilisers up to 300 kgN/ha/yr) that could be applied to the area. Although it is unlikely that this scenario would arise (as it is not considered good practice), to ensure a conservative effects assessment, our recommendation is for an annual application rate of 300 kgN/ha/yr. The Overseer scenarios are based on good practice i.e. a more realistic farming regime where sufficient nitrogen is applied to grow enough feed for the animals grazed. It is likely that in practice where grazing land use is adopted an annual load of 300 kg N/ha would not be applied as shown in the attached Nitrogen summary (see **Appendix A1**, final column "Added N"). However, if a cut and carry system was adopted then 300 kg N/ha would be considered a reasonable rate of application providing a net nitrogen reduction. We note that despite the higher nitrogen load associated with the cut and carry system the OVERSEER© estimated leaching is lower estimated 21 kg N/ha/yr compared to grazed system of 43 kg N/ha/yr and compared to the current permitted dairy farm baseline nitrogen loss of 63 kg N/ha/yr. The method to avoid excess nitrogen being applied (as additional fertiliser) is through the implementation of management plans which are required to be complied with as a condition of consent, and the inclusion of recording requirements and nitrogen limits in the conditions.	No changes are proposed.
1.2	Also, we need some more information regarding the overseer inputs. Given the number of blocks we understand that providing all the inputs may not be practical or necessary, we would however consider the following inputs for each model (on a farm basis rather than block basis) useful for assessing the overseer model – stocking rates/herd numbers, milk solids yield, fodder crop product, overall farm scenario – pasture production.	Full parameter reports for the three scenarios modelled are provided in **Appendix A2**. Please note: the basis for the inputs is actual farm data for the baseline. For changes to farming practice for the two potential "future" scenarios is based on our understanding of farming systems and was "truthed" against the Environment Canterbury reference files.	No changes are proposed.

We believe the above and associated appendices address the matters raised in GWRC's comments.

2 Soil Type

Further to our response provided in Section 3 of the letter dated 2 June 2017, our response on soil type is provided below.

Ref.	GWRC comment	SWDC response	Proposed Solution
2.1	It is our understanding that there are some areas within Site B which have similar soil types to that found in Site A. Can you please provide reasoning for why the irrigation rates on Site B (which includes the similar Site A pockets) will be higher to that at site A?	It is correct that soil types within Site A and Site B are similar or the same. As shown in the Assessment of Environmental Effects, Appendix 7, Table 3.3, the measured soil unsaturated hydraulic conductivity across the two sites was approximately the same. The reason that a different design irrigation rate is adopted for each site was to account for the different land management styles proposed. To re-iterate, the discharge regime for Site A allows for the entire irrigable area of the site (8 ha) to be irrigated in any irrigation event and on any day that sufficient soil moisture deficit exists (i.e. could potentially be irrigated on consecutive days). This regime was adopted to: (1) Maximise the amount of wastewater to be removed from Donald Creek during the early stages of the upgrade programme; (2) Avoid rapid drainage and protect soil health; and (3) Operate as a deficit regime for conservatism due to the proximity to the WWTP infrastructure and accessway. To achieve this the application rate is set at 10 % of the daily unsaturated hydraulic conductivity per the Crites and Tchobanoglous (1998) method described in the Site Investigation reports. It is possible to adopt the same application criteria for Site A as proposed for Site B. For Site B, the application rate is 30 % of the daily unsaturated hydraulic conductivity per the Crites and Tchobanoglous (1998) method described in the Site Investigation reports and was adopted since the amount of land available enables an eight day return for any 55 mm of discharge. The effects due to the higher maximum discharge rate are mitigated by the long return period. Note, even at 55 mm/d, the rate of application does not cause rapid drainage in the soil. To summarise, the different design irrigation rates adopted for the similar soils are to reflect the Site management after the soils hydraulic conductivity has been taken into account.	No changes are proposed.

We believe the above addresses the matters raised in GWRC's comments.

3 Groundwater Mounding

Further to our response presented in Section 1 of the letter dated 2 June 2017, our response on groundwater mounding is provided below and in the relevant appendices.

Ref.	GWRC comment	SWDC response	Proposed Solution
3.1	The groundwater mounding assessment outlines what is likely to occur – but it appears that the impact of the groundwater mounding on the proposed irrigation regime has not been considered? If it has then what are the outcomes/changes, and if not, why?	The s92 response letter (dated 2 June 2017) included an assessment of potential mounding within the site which conservatively concludes that the groundwater may rise by a maximum of 1.00 m to 1.35 m across the site. During summer, this will not be an issue for the site. During winter (when seasonal groundwater levels increase) it is likely that groundwater break-out could occur in low lying areas of the site. Minimal irrigation is proposed to occur at this time of the year (equivalent to <2 mm/month on average for June, July, August), and sufficient land is available across the site to avoid areas prone to ponding. High groundwater levels or potential for high groundwater levels were noted in the early stages of irrigation regime development. As a result, a number of measures have been included in the irrigation regime design to avoid exacerbation of mounding beneath the site. These measures include: (1) Minimal irrigation occurs when winter breakout is predicted to occur due to use of deferred (Site B) and deficit (Site A) irrigation, both of which avoid discharge if soil moisture is high. (2) Elevated areas of the site (e.g. the NE block) can be targeted if winter irrigation occurs. (3) Suitable buffers from areas prone to winter break out can be maintained. Irrigable land available (116 ha at Stage 2B) exceeds the amount land needed to discharge the maximum event volume (4,400 m^3). This enables areas at risk of ponding to be avoided and provides for a smaller depth to be applied over a larger area if necessary. For additional information on the rotation refer to the AEE Section 4.1.1-4.1.2, or Appendix 7 of the AEE Section 4.7 – 4.10.	Follow recommendations in the GWS (2017) assessment including monitoring (as also set out in Part 1C of the AEE - Proposed Conditions of Consent), during the preceding Stages of the project to develop a detailed understanding of the mounding risk. No additional changes are proposed.

Ref.	GWRC comment	SWDC response	Proposed Solution
3.2	Provide model/assessment outputs that display the location, extent and magnitude of the predicted groundwater mounding effects. For example, a plan view and selection of 'cross-section' views through the predictive MODFLOW model would be most useful. It is PDPs understanding that existing figures provided in the GWS Limited report show the current groundwater conditions, not the effect of the assessed groundwater mounding.	Model outputs and further details of the assessment are provided in **Appendix A3** (Section 2 and 3) as an attachment to GWS Limited's response letter.	No changes are proposed.
3.3	Provide an updated irrigation regime and storage assessment which incorporates any impacts and/or limitations due to the predicted groundwater mounding effects.	See response to Ref. 3.1 above.	No changes are proposed.
3.4	If groundwater mounding effects are present offsite - provide an appropriately detailed assessment of these effects. This assessment should also include an allowance for potential uncertainty in the assumed hydrogeological system and modelled parameters. Response information should include at least; the location, extent, magnitude, and timing of areas where saturated ground has spatially or temporally increased.	Off site mounding effects are assessed in **Appendix A3** (Section 3) as an attachment to GWS Limited's response letter.	No changes are proposed.

Ref.	GWRC comment	SWDC response	Proposed Solution
3.5	Provide a robust assessment of the potential effects of pathogen discharge to all groundwater and surface water users. This should include information on the potential risk to existing and potential future water users, and how any identified risks will be mitigated/ managed.	Pathogen effects on groundwater users are assessed in **Appendix A3** (Section 4 and 5) as an attachment to GWS Limited's response letter. All treated effluent discharged to land and surface water under normal operating conditions (excluding an emergency situation such as site flooding, UV plant failure, etc) will be UV disinfected. Therefore the pathogen risk to surface water users is generally low during Stage 2B as discussed in the AEE.	Water quality monitoring will be undertaken to verify surface and groundwater effects of the proposed WWTP scheme. No changes are proposed.

We believe the above and associated appendices address the matters raised in GWRC's comments.

4 Conclusion

In summary, this letter and its attachments forms our response to the Section 92 request for further clarification of outstanding matters relating to the land application scheme, specifically relating to the Overseer modelling, soil type and groundwater mounding.

Should you have any further queries, please do not hesitate to contact the undersigned.

Yours sincerely,

On behalf of Mott MacDonald New Zealand Limited

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A1. Nitrogen Balance

A summary of the nitrogen balances generated for (i) wastewater irrigated and grazed (ii) wastewater irrigated cut and carry provided by Lowe Environmental Impact (LEI).

Wastewater irrigated and grazed: Nitrogen balance

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Buf_Rang_18b.1	358	45	7.4	97	28
Irr_Mid_Bram_8a.1	65	14	1.8	60	84
Irr_Mid_Tait_42a.1	260	12	1.6	65	84
Buf_Selw_25a.1	41	22	4.5	87	28
Irr_E_Selw_25a.1	244	41	3.8	84	136
Irr_NE_Darn_17a.1	1106	58	5.2	99	136
Irr_Mid_Darn_17a.1 ##	663	57	5.0	94	136
QE2	11	3	N/A		
Maize	1163	120	**17.1**	22	0
Irr_Darn_9a.1	206	48	5.7	116	84
Irr_Rang_18b.1	1761	58	6.6	118	84
Irr_E_Darn_17a.1	733	57	6.6	123	84
Buf_Darn_17a.1 ##	1044	43	7.3	103	28
Irr_A_Bram_8a.1	41	5	0.7	-8	72
Buf_Bram_8a.1	82	14	3.2	88	28
Buf_Tait_42a.1	47	12	2.6	97	28
Buf_Darn_9a.1	48	32	5.9	92	28
Other farm sources	36				
Whole farm	7909	43			
Less N removed in wetlands	0				
Farm output	7909	43			

Wastewater irrigated cut and carry: Nitrogen balance

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Buf_Rang_18b.1	289	36	5.9	84	83
Irr_Mid_Bram_8a.1	46	10	1.3	59	305
Irr_Mid_Tait_42a.1	181	8	1.1	58	305
Buf_Selw_25a.1	20	11	2.2	74	83
Irr_E_Selw_25a.1	101	17	1.6	48	274
Irr_NE_Darn_17a.1	455	24	2.1	49	274
Irr_Mid_Darn_17a.1 ##	279	24	2.1	49	274
QE2	11	3	N/A		
Maize	1141	118	**16.8**	19	0
Irr_Darn_9a.1	58	13	1.6	61	305
Irr_Rang_18b.1	386	13	1.4	66	305
Irr_E_Darn_17a.1	189	15	1.7	62	305
Buf_Darn_17a.1 ##	568	23	4.0	85	83
Irr_A_Bram_8a.1	115	14	2.1	72	265
Buf_Bram_8a.1	47	8	1.8	75	83
Buf_Tait_42a.1	29	7	1.6	83	83
Buf_Darn_9a.1	25	17	3.1	75	83
Other farm sources	10				
Whole farm	3949	21			
Less N removed in wetlands	0				
Farm output	3949	21			

A2. OVERSEER© Farm Parameters

Outputs from OVERSEER© providing the parameters used to model (i) current dairying (ii) proposed grazing (iii) proposed cut and carry scenarios, provided by LEI.

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Farm details

Type	Farm type	Full range
Assessment	Assessment year	Not entered
Region	Region	Wellington

Farm blocks

Rang_18b.1 Dry	Pastoral	25.9
Bram_8a.1 Irrigated	Pastoral	2.5
Tait_42a.1 Irrigated	Pastoral	25.2
Selw_42a.1 Dry	Pastoral	7.3
Selw_25a.1 Dry	Pastoral	4.8
Selw_25a.1 irrigated	Pastoral	5.6
Darn_17a.1 Irrigated	Pastoral	11.9
Darn_17a.1 Dry	Pastoral	30.8
Kaia_19a.1 Irrigated	Pastoral	4.3
Darn_9a.1 Dry	Pastoral	4.3
Rang_18b.1 Irrigated	Pastoral	16.5
Darn_17a.1 Silage Irrigated	Pastoral	10.4
Darn_17a.1 Silage Dry	Pastoral	19.6
QE2	Trees and Scrub	4.8
Maize	Fodder Crop	
Total farm area declared in blocks	ha	173.9
Total farm area	ha	180.8
Non-productive area	ha	6.90000000000001

Farm animals

Stock numbers

Stock numbers entered via RSU - Dairy

Peak number of cows milked		285
Breed		Friesian
Replacements grazed off farm from		Off farm at birth
Replacement grazing	%	Not entered
Production		
Milk solids	kg/yr	128000
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered
Calving times		
Default calving times used		

Stock management

Animal excreta distribution

Relative productivity assessment method	Relative yield (from soil, fertiliser inputs)
Relative productivity calculated for each Pastoral block	
Rang_18b.1 Dry	0.843843589901339
Bram_8a.1 Irrigated	0.844972611405511
Tait_42a.1 Irrigated	0.892615414363345
Selw_42a.1 Dry	0.86624922646562
Selw_25a.1 Dry	0.86624922646562
Selw_25a.1 irrigated	0.909677767052455
Darn_17a.1 Irrigated	0.90602637782886
Darn_17a.1 Dry	0.866249233881455
Kaia_19a.1 Irrigated	0.892615419335456
Darn_9a.1 Dry	0.843844007182234
Rang_18b.1 Irrigated	0.959582494488118
Darn_17a.1 Silage Irrigated	0.958431675452551
Darn_17a.1 Silage Dry	0.927181771522285
Ratio of stock types on pastoral blocks is the same as the farm stock ratios	

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Farm dairy effluent management system
Effluent management method: Spray from sump

Animal health supplements

Animal - Dairy
No animal supplementation has been entered

Animal - Dairy replacements
No animal supplementation has been entered

Left over feeding
No left over feeding specified

Stored supplements
No supplements from storage added to this farm

Imported supplements
No supplements imported onto this farm

Greenhouse gas emission factors

Enteric methane - g methane/kg DMI intake

Dairy		21.6
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915
Goats	0.691
Other	0.691

Nitrous oxide
Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions

Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271

Energy emissions

Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4
Electricity	MJ / kWh	8.21

GWP
Use NZ national inventory

Allocation
Allocation method: Enter actual allocation figures

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Report settings

Greenhouse gas emission report units: Use default
Target N application rate as effluent: kg N/ha/yr

Block Information

Block - Rang_18b.1 Dry

Block name		Rang_18b.1 Dry
Block type		Pastoral
Area	ha	25.9
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 04 16:57
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19
	> 60	19
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

FarmParameters

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S		6
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Bram_8a.1 Irrigated

Block name	Bram_8a.1 Irrigated
Block type	Pastoral

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Area	ha		2.5
Relative productivity			0
Pasture block type			No
Topography			Flat
Distance from coast	km		37
Cultivated in last 5 years			False
Fodder rotates through			No
Climate			
Annual average rainfall	mm/yr		1153
Mean annual temperature			12.8
Seasonal variation in rainfall			731-1450 mm, Moderate
Annual potential evapotranspiration	mm		866
Seasonal variation in PET			Moderate
Soil description			
Soil order (default)			Recent
Soil group (default)			Recent/YGE/BGE
SMaps			
Sibling			Bram_8a.1
Date downloaded			2017 May 04 16:59
Wilting point	0 - 30cm		17
	30 - 60cm		17
	> 60		17
Field capacity	0 - 30cm		45
	30 - 60cm		39
	> 60		39
Saturation	0 - 30cm		59
	30 - 60cm		49
	> 60		48
Natural drainage class			Imperfect
Depth to impeded layer	cm		Not entered
Maximum rooting depth	cm		Not entered
Top soil horizon chemical and physical parameters			
ASC/PR	%		33
Bulk density	kg/m³		1090
Clay	%		19
Sand	%		5
Sub soil			
Sub soil clay	%		18
Soil profile			
Profile drainage class			Use default
Top soil texture			Unknown
Maximum rooting depth	m		0
Depth to impeded drainage layer			0
Soil drainage			
Drainage method			
Method			None
Hydrophobic condition			Use default
Occurence of pugging damage			Rare
Compacted top soil			False
Soil settings			
K leaching potential not set			
N immobilisation status			

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type	Spraylines
Month: October	
Application depth (mm)	30
Month: November	
Application depth (mm)	55
Month: December	
Application depth (mm)	70
Month: January	
Application depth (mm)	70
Month: February	
Application depth (mm)	65
Month: March	
Application depth (mm)	55
Month: April	
Application depth (mm)	30
Month: September	
Application depth (mm)	20

Irrigation concentrations

Source: Overseer default (fixed)

N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up
Animals grazing

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Tait_42a.1 Irrigated

Block name		Tait_42a.1 Irrigated
Block type		Pastoral
Area	ha	25.2
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Gley
Soil group (default)		Sedimentary
SMaps		
Sibling		Tait_42a.1
Date downloaded		2017 May 04 17:07
Wilting point	0 - 30cm	15
	30 - 60cm	15
	> 60	11
Field capacity	0 - 30cm	44
	30 - 60cm	39
	> 60	38
Saturation	0 - 30cm	56
	30 - 60cm	49
	> 60	47
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	35
Bulk density	kg/m³	940
Clay	%	24
Sand	%	10
Sub soil		
Sub soil clay	%	24

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Winter
Compacted top soil		False

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Soil settings
K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed
No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type		Spraylines
Month: September		
Application depth (mm)	20	
Month: October		
Application depth (mm)	30	
Month: November		
Application depth (mm)	55	
Month: December		
Application depth (mm)	70	
Month: January		
Application depth (mm)	70	
Month: February		
Application depth (mm)	65	
Month: March		

FarmParameters

Application depth (mm)	55
Month: April	
Application depth (mm)	30

Irrigation concentrations

Source						Overseer default (fixed)	
N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Selw_42a.1 Dry

Block name		Selw_42a.1 Dry
Block type		Pastoral
Area	ha	7.3
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_42a.1
Date downloaded		2017 May 04 17:08
Wilting point	0 - 30cm	12
	30 - 60cm	11
	> 60	11
Field capacity	0 - 30cm	38
	30 - 60cm	31
	> 60	32
Saturation	0 - 30cm	56
	30 - 60cm	48
	> 60	47
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	17
Sand	%	17
Sub soil		
Sub soil clay	%	16

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up
Animals grazing

Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Selw_25a.1 Dry

Block name		Selw_25a.1 Dry
Block type		Pastoral
Area	ha	4.8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_25a.1
Date downloaded		2017 May 05 10:31
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2
Field capacity	0 - 30cm	33
	30 - 60cm	20
	> 60	8
Saturation	0 - 30cm	53
	30 - 60cm	49
	> 60	25
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	88
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	11
Sand	%	37
Sub soil		
Sub soil clay	%	9

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0

Soil drainage
Drainage method

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Method					None
Hydrophobic condition					Use default
Occurence of pugging damage					Rare
Compacted top soil					False

Soil settings
K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed
No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Effluent application
Receives no liquid or solid effluents

Block - Selw_25a.1 irrigated

Block name		Selw_25a.1 irrigated
Block type		Pastoral
Area	ha	5.6
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_25a.1
Date downloaded		2017 May 04 17:08
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2
Field capacity	0 - 30cm	33
	30 - 60cm	20
	> 60	8
Saturation	0 - 30cm	53
	30 - 60cm	49
	> 60	25
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	88
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	11
Sand	%	37
Sub soil		
Sub soil clay	%	9

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings
K leaching potential not set
N immobilisation status

Soil tests

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type		Spraylines
Month: September		
Application depth (mm)	20	
Month: October		
Application depth (mm)	30	
Month: November		
Application depth (mm)	55	
Month: December		
Application depth (mm)	70	
Month: January		
Application depth (mm)	70	
Month: February		
Application depth (mm)	65	
Month: March		
Application depth (mm)	55	
Month: April		
Application depth (mm)	30	

Irrigation concentrations

Source	Overseer default (fixed)

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up
Animals grazing
Dairy % 0
Water connectivity
Direct access to streams False
Animal grazing
Dairy graze block all year round

Effluent application
Receives no liquid or solid effluents

Block - Darn_17a.1 Irrigated

Block name		Darn_17a.1 Irrigated
Block type		Pastoral
Area	ha	11.9
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type	Spraylines
Month: September	
Application depth (mm)	20
Month: October	
Application depth (mm)	30
Month: November	
Application depth (mm)	55

FarmParameters

Month: December	
Application depth (mm)	70
Month: January	
Application depth (mm)	70
Month: February	
Application depth (mm)	65
Month: March	
Application depth (mm)	55
Month: April	
Application depth (mm)	30

Irrigation concentrations

Source						Overseer default (fixed)	
N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Darn_17a.1 Dry

Block name		Darn_17a.1 Dry
Block type		Pastoral
Area	ha	30.8
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Kaia_19a.1 Irrigated

Block name		Kaia_19a.1 Irrigated
Block type		Pastoral
Area	ha	4.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Kaia_19a.1
Date downloaded		2017 May 05 10:32
Wilting point	0 - 30cm	16
	30 - 60cm	14
	> 60	7
Field capacity	0 - 30cm	42
	30 - 60cm	35
	> 60	27
Saturation	0 - 30cm	58
	30 - 60cm	50
	> 60	53
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	20
Sand	%	12
Sub soil		
Sub soil clay	%	19

Soil profile

Profile drainage class	Use default

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Rare
Compacted top soil		False

Soil settings

K leaching (%s)		Medium
N immobilisation status		

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type		Spraylines
Month: September		
Application depth (mm)	20	
Month: October		

FarmParameters

Application depth (mm)	30
Month: November	
Application depth (mm)	55
Month: December	
Application depth (mm)	70
Month: January	
Application depth (mm)	70
Month: February	
Application depth (mm)	65
Month: March	
Application depth (mm)	55
Month: April	
Application depth (mm)	30

Irrigation concentrations

Source						Overseer default (fixed)	
N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Darn_9a.1 Dry

Block name		Darn_9a.1 Dry
Block type		Pastoral
Area	ha	4.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_9a.1
Date downloaded		2017 May 05 10:33
Wilting point	0 - 30cm	11
	30 - 60cm	7
	> 60	6
Field capacity	0 - 30cm	23
	30 - 60cm	12
	> 60	9
Saturation	0 - 30cm	36
	30 - 60cm	17
	> 60	15
Natural drainage class		Moderately well

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Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	80
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	20
Sand	%	15
Sub soil		
Sub soil clay	%	28

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.8
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other

FarmParameters

Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Rang_18b.1 Irrigated

Block name		Rang_18b.1 Irrigated
Block type		Pastoral
Area	ha	16.5
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 05 10:34
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19
	> 60	19
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type	Travelling irrigator
Month: September	

FarmParameters

Application depth (mm)	20
Month: October	
Application depth (mm)	30
Month: November	
Application depth (mm)	55
Month: December	
Application depth (mm)	70
Month: January	
Application depth (mm)	70
Month: February	
Application depth (mm)	65
Month: March	
Application depth (mm)	55
Month: April	
Application depth (mm)	30

Irrigation concentrations

Source						Overseer default (fixed)	
N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Liquid effluents		
Receives farm dairy effluent		
Effluent application depth		12-24 mm
Percentage of block effluent applied to	%	100

Block - Darn_17a.1 Silage Irrigated

Block name		Darn_17a.1 Silage Irrigated
Block type		Pastoral
Area	ha	10.4
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

		> 60	5
	Saturation	0 - 30cm	26
		30 - 60cm	18
		> 60	15
	Natural drainage class		Moderately well
	Depth to impeded layer	cm	Not entered
	Maximum rooting depth	cm	Not entered
	Top soil horizon chemical and physical parameters		
	ASC/PR	%	19
	Bulk density	kg/m³	1220
	Clay	%	25
	Sand	%	20
	Sub soil		
	Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	500
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

Irrigation system type		Spraylines
Month: September		
Application depth (mm)	20	
Month: October		
Application depth (mm)	30	
Month: November		
Application depth (mm)	55	
Month: December		
Application depth (mm)	70	
Month: January		
Application depth (mm)	70	
Month: February		
Application depth (mm)	65	
Month: March		
Application depth (mm)	55	
Month: April		
Application depth (mm)	30	

Irrigation concentrations

Source						Overseer default (fixed)	
N	P	K	S	Ca	Mg	Na	H
2.5	0.1	1.6	2.5	9.3	2.2	9.5	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Darn_17a.1 Silage Dry

Block name		Darn_17a.1 Silage Dry
Block type		Pastoral
Area	ha	19.6
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	500
Fertiliser products - September		
Category		Ravensdown other

FarmParameters

Product		Urea
Amount	kg/ha	60
Fertiliser products - October		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - December		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - February		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - QE2

Block name		QE2
Block type		Trees and Scrub
Area	ha	4.8
Rainfall	mm/yr	950
Distance from coast	km	37
Bush type		Native

Block - Maize

Block name		Maize
Block type		Fodder Crop
Rotation area	ha	9.7
Low N mineralisation		False
Final grid month		April
Irrigation system type		No Irrigation

Crop information

Current assessment year

May - Grazed pasture		
June - Grazed pasture		
July - Grazed pasture		
August - Grazed pasture		
September - Maize silage		
Crop management	See details below	Crop sown
October - Maize silage		
November - Maize silage		

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm

FarmParameters

December - Maize silage
January - Maize silage
February - Maize silage
March - Mature - Maize silage
April - Grazed

Crop management	See details below	Crop sown

Crop sowing information - September of the Current assessment year

Crop category		Forages
Crop type		Maize silage
Yield at final defoliation	T/ha dry matter	19
Cultivation practice at sowing		Minimum till

Crop sowing information - April of the Current assessment year

Crop category		Permanent pasture
Crop type		Grazed
Source of animals		Not entered

No fertiliser application applied on block

Effluent application
Receives no liquid or solid effluents

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Farm details

Type	Farm type	Full range
Assessment	Assessment year	Not entered
Region	Region	Wellington

Farm blocks

Buf_Rang_18b.1	Pastoral	8
Irr_Mid_Bram_8a.1	Pastoral	4.6
Irr_Mid_Tait_42a.1	Pastoral	21.3
Buf_Selw_25a.1	Pastoral	1.9
Irr_E_Selw_25a.1	Pastoral	6
Irr_NE_Darn_17a.1	Pastoral	19
Irr_Mid_Darn_17a.1	Pastoral	14.9
Irr_Darn_9a.1	Pastoral	4.3
Irr_Rang_18b.1	Pastoral	30.4
Irr_E_Darn_17a.1	Pastoral	12.8
Buf_Darn_17a.1	Pastoral	30.9
Irr_A_Bram_8a.1	Pastoral	8
Buf_Bram_8a.1	Pastoral	5.7
Buf_Tait_42a.1	Pastoral	4
Buf_Darn_9a.1	Pastoral	1.5
QE2	Trees and Scrub	3.6
Maize	Fodder Crop	
Total farm area declared in blocks	ha	176.9
Total farm area	ha	186
Non-productive area	ha	9.09999999999999

Farm animals

Stock numbers

Stock reconciliation - Beef / dairy grazing

Stock production

Calving percentage	%	83
Percent replacements	%	15
Mean calving date		Not entered
Mean weaning date		Not entered
Weaning weight	kg	80

Stock numbers

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
CowsMixedAgeBreeding	Friesian	120	120	120	120	120	120	120	120	120	120	120	120
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
0	0	0	0	0			Female	No mating					
HeifersBreeding	Friesian	0	0	0	0	0	0	0	0	0	18	18	18
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
300	80	97	0	7	Weaned		Female	No mating					
HeifersBreeding	Friesian	18	18	18	18	18	18	18	18	18	18	18	18
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
300	97	201	0	10	On-farm		Female	No mating					
HeifersBreeding	Friesian	18	18	18	18	18	18	18	18	18	0	0	0
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
300	201	276	0	22	On-farm		Female	No mating					
Weaners	Friesian	0	0	0	0	0	0	0	0	0	82	82	82
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
325	80	98	0	7	Weaned	Remain on-farm	MixedSex						
Weaners	Friesian	82	82	82	82	82	82	82	82	82	82	82	82
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
325	98	214	0	10	On-farm	Remain on-farm	MixedSex						
Steers	Friesian	50	50	50	50	50	50	50	50	50	50	50	50
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
341	231	333	0	22	On-farm	Remain on-farm	Castrated						
Steers	Friesian	50	50	0	0	0	0	0	0	0	0	0	0
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated					
341	333	486	0	34	On-farm	Sold to works	Castrated						

FarmParameters

HeifersAndCows	Friesian	32	32	32	32	32	32	32	32	32	32	32
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate	Sex	Mated			
300	201	292	0	22		On-farm	Remain on-farm	Female				
HeifersAndCows	Friesian	32	32	0	0	0	0	0	0	0	0	0
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate	Sex	Mated			
300	292	430	0	34		On-farm	Sold to works	Female				
BullsBreeding	Friesian	2	2	2	2	2	2	2	2	2	2	2
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate	Sex	Mated			
427	0	0	0	0				Male				

Stock management

Animal excreta distribution

Relative productivity assessment method: Relative yield (from soil, fertiliser inputs)

Relative productivity calculated for each Pastoral block

Buf_Rang_18b.1	0.843843589901339
Irr_Mid_Bram_8a.1	0.732938896662893
Irr_Mid_Tait_42a.1	0.779207671477187
Buf_Selw_25a.1	0.86624922646562
Irr_E_Selw_25a.1	0.798661677444725
Irr_NE_Darn_17a.1	0.848541096147982
Irr_Mid_Darn_17a.1	0.798661684281953
Irr_Darn_9a.1	0.807210333695446
Irr_Rang_18b.1	0.807209934529905
Irr_E_Darn_17a.1	0.846900652029663
Buf_Darn_17a.1	0.927181771522285
Irr_A_Bram_8a.1	0.732191710751621
Buf_Bram_8a.1	0.832404538817526
Buf_Tait_42a.1	0.88538269396957
Buf_Darn_9a.1	0.843844007182234

Ratio of stock types on pastoral blocks is the same as the farm stock ratios

Animal health supplements

Animal - Beef / dairy grazing

No animal supplementation has been entered

Left over feeding

No left over feeding specified

Stored supplements

No supplements from storage added to this farm

Imported supplements

No supplements imported onto this farm

Greenhouse gas emission factors

Enteric methane - g methane/kg DMI intake

Dairy		21.6
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915

FarmParameters

Goats		0.691
Other		0.691

Nitrous oxide
Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions

Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271

Energy emissions

Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4
Electricity	MJ / kWh	8.21

GWP
Use NZ national inventory

Allocation
Allocation method: Enter actual allocation figures

Report settings

Greenhouse gas emission report units: Use default
Target N application rate as effluent: kg N/ha/yr

Block Information

Block - Buf_Rang_18b.1

Block name		Buf_Rang_18b.1
Block type		Pastoral
Area	ha	8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 04 16:57
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

	> 60	19
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		

FarmParameters

Beef / dairy grazing graze block all year round

Effluent application
Receives no liquid or solid effluents

Block - Irr_Mid_Bram_8a.1

Block name		Irr_Mid_Bram_8a.1
Block type		Pastoral
Area	ha	4.6
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings
K leaching potential not set
N immobilisation status

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information

Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	1

Supplements are distributed evenly across all pastoral blocks
No timing of feeding has been specified

Fertiliser application

Fertiliser products - September

Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Irrigation

Irrigation system type		Spraylines
Month: January		
Application depth (mm)	18	
Month: February		
Application depth (mm)	14	
Month: March		
Application depth (mm)	24	
Month: April		

FarmParameters

Application depth (mm)	32
Month: May	
Application depth (mm)	50
Month: July	
Application depth (mm)	2
Month: September	
Application depth (mm)	98
Month: October	
Application depth (mm)	83
Month: November	
Application depth (mm)	58
Month: December	
Application depth (mm)	36

Irrigation concentrations

Source						Block specific	
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Irr_Mid_Tait_42a.1

Block name		Irr_Mid_Tait_42a.1
Block type		Pastoral
Area	ha	21.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Gley
Soil group (default)		Sedimentary
SMaps		
Sibling		Tait_42a.1
Date downloaded		2017 May 04 17:07
Wilting point	0 - 30cm	15
	30 - 60cm	15
	> 60	11
Field capacity	0 - 30cm	44
	30 - 60cm	39
	> 60	38
Saturation	0 - 30cm	56
	30 - 60cm	49

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

	> 60	47
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	35
Bulk density	kg/m³	940
Clay	%	24
Sand	%	10
Sub soil		
Sub soil clay	%	24

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Winter
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

FarmParameters

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: July	
Application depth (mm)	2
Month: September	
Application depth (mm)	98
Month: October	
Application depth (mm)	83
Month: November	
Application depth (mm)	58
Month: December	
Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Buf_Selw_25a.1

Block name		Buf_Selw_25a.1
Block type		Pastoral
Area	ha	1.9
Relative productivity		0

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_25a.1
Date downloaded		2017 May 05 10:31
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2
Field capacity	0 - 30cm	33
	30 - 60cm	20
	> 60	8
Saturation	0 - 30cm	53
	30 - 60cm	49
	> 60	25
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	88
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	11
Sand	%	37
Sub soil		
Sub soil clay	%	9
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Rare
Compacted top soil		False
Soil settings		
K leaching potential not set		
N immobilisation status		

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

FarmParameters

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed
No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Irr_E_Selw_25a.1

Block name		Irr_E_Selw_25a.1
Block type		Pastoral
Area	ha	6
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_25a.1
Date downloaded		2017 May 04 17:08
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2
Field capacity	0 - 30cm	33
	30 - 60cm	20
	> 60	8
Saturation	0 - 30cm	53
	30 - 60cm	49
	> 60	25

FarmParameters

Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	88
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	11
Sand	%	37
Sub soil		
Sub soil clay	%	9

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Area cut taken from		6
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

FarmParameters

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: September	
Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12
Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

FarmParameters

Effluent application
Receives no liquid or solid effluents

Block - Irr_NE_Darn_17a.1

Block name		Irr_NE_Darn_17a.1
Block type		Pastoral
Area	ha	19
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

FarmParameters

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	1
Area cut taken from	19
Supplement is exported from the farm	

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Irrigation

Irrigation system type		Spraylines
Month: August		
Application depth (mm)	4	
Month: September		

FarmParameters

Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12
Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source						Block specific	
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Irr_Mid_Darn_17a.1

Block name		Irr_Mid_Darn_17a.1
Block type		Pastoral
Area	ha	14.9
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

		> 60	3
	Field capacity	0 - 30cm	17
		30 - 60cm	11
		> 60	5
	Saturation	0 - 30cm	26
		30 - 60cm	18
		> 60	15
	Natural drainage class		Moderately well
	Depth to impeded layer	cm	Not entered
	Maximum rooting depth	cm	Not entered
	Top soil horizon chemical and physical parameters		
	ASC/PR	%	19
	Bulk density	kg/m³	1220
	Clay	%	25
	Sand	%	20
	Sub soil		
	Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Area cut taken from		14.9
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

FarmParameters

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: September	
Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12
Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing

Beef / dairy grazing	%	0

FarmParameters

Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Irr_Darn_9a.1

Block name		Irr_Darn_9a.1
Block type		Pastoral
Area	ha	4.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_9a.1
Date downloaded		2017 May 05 10:33
Wilting point	0 - 30cm	11
	30 - 60cm	7
	> 60	6
Field capacity	0 - 30cm	23
	30 - 60cm	12
	> 60	9
Saturation	0 - 30cm	36
	30 - 60cm	17
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	80
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	20
Sand	%	15
Sub soil		
Sub soil clay	%	28

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.8
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Compacted top soil: False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September

Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: July	
Application depth (mm)	2
Month: September	
Application depth (mm)	98
Month: October	
Application depth (mm)	83
Month: November	
Application depth (mm)	58
Month: December	

FarmParameters

Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source						Block specific	
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Irr_Rang_18b.1

Block name		Irr_Rang_18b.1
Block type		Pastoral
Area	ha	30.4
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 05 10:34
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19
	> 60	19
Natural drainage class		Well

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September

Category		Ballance super
Product		Superten
Amount	kg/ha	200

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

FarmParameters

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: November	
Application depth (mm)	58
Month: October	
Application depth (mm)	83
Month: September	
Application depth (mm)	98
Month: December	
Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Irr_E_Darn_17a.1

Block name		Irr_E_Darn_17a.1
Block type		Pastoral
Area	ha	12.8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Rare
Compacted top soil		False
Soil settings		
K leaching (%s)		Medium
N immobilisation status		

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September

Category	Ballance super

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Product						Superten
Amount				kg/ha		200
Soluble fertiliser inputs (kg/ha/month) - January						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - February						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - March						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - April						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - May						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - September						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - October						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - November						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - December						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Irrigation

Irrigation system type		Spraylines
Month: July		
Application depth (mm)	2	
Month: September		
Application depth (mm)	98	
Month: October		
Application depth (mm)	86	
Month: November		
Application depth (mm)	58	
Month: December		
Application depth (mm)	36	
Month: January		
Application depth (mm)	18	
Month: February		
Application depth (mm)	14	
Month: March		
Application depth (mm)	24	
Month: April		
Application depth (mm)	32	
Month: May		
Application depth (mm)	50	

Irrigation concentrations

Source							Block specific
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		

FarmParameters

Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application
Receives no liquid or solid effluents

Block - Buf_Darn_17a.1

Block name		Buf_Darn_17a.1
Block type		Pastoral
Area	ha	30.9
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

FarmParameters

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	500
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		

Beef / dairy grazing graze block all year round

Effluent application

Receives no liquid or solid effluents

Block - Irr_A_Bram_8a.1

Block name		Irr_A_Bram_8a.1
Block type		Pastoral
Area	ha	8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)	Recent
Soil group (default)	Recent/YGE/BGE

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	3

Supplement is exported from the farm

Fertiliser application

Fertiliser products - September	
Category	Ballance super
Product	Superten

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Amount				kg/ha		200
Soluble fertiliser inputs (kg/ha/month) - January						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
14	4	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - February						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
13	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - March						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
8	2	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - April						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - May						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - September						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - October						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - November						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - December						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
13	3	0	0	0	0	0

Irrigation

Irrigation system type	Spraylines
Month: January	
Application depth (mm)	72
Month: February	
Application depth (mm)	64
Month: March	
Application depth (mm)	40
Month: April	
Application depth (mm)	12
Month: September	
Application depth (mm)	14
Month: October	
Application depth (mm)	28
Month: November	
Application depth (mm)	59
Month: December	
Application depth (mm)	65

Irrigation concentrations

Source						Block specific	
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

FarmParameters

Effluent application
Receives no liquid or solid effluents

Block - Buf_Bram_8a.1

Block name		Buf_Bram_8a.1
Block type		Pastoral
Area	ha	5.7
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings
K leaching potential not set
N immobilisation status

Soil tests

FarmParameters

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

Effluent application

Receives no liquid or solid effluents

Block - Buf_Tait_42a.1

Block name		Buf_Tait_42a.1
Block type		Pastoral
Area	ha	4
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Gley
Soil group (default)		Sedimentary
SMaps		
Sibling		Tait_42a.1
Date downloaded		2017 May 04 17:07
Wilting point	0 - 30cm	15

FarmParameters

		30 - 60cm	15
		> 60	11
	Field capacity	0 - 30cm	44
		30 - 60cm	39
		> 60	38
	Saturation	0 - 30cm	56
		30 - 60cm	49
		> 60	47
	Natural drainage class		Poor
	Depth to impeded layer	cm	Not entered
	Maximum rooting depth	cm	Not entered
	Top soil horizon chemical and physical parameters		
	ASC/PR	%	35
	Bulk density	kg/m³	940
	Clay	%	24
	Sand	%	10
	Sub soil		
	Sub soil clay	%	24

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Winter
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

FarmParameters

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		
Effluent application		
Receives no liquid or solid effluents		

Block - Buf_Darn_9a.1

Block name		Buf_Darn_9a.1
Block type		Pastoral
Area	ha	1.5
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_9a.1
Date downloaded		2017 May 05 10:33
Wilting point	0 - 30cm	11
	30 - 60cm	7
	> 60	6
Field capacity	0 - 30cm	23
	30 - 60cm	12
	> 60	9
Saturation	0 - 30cm	36
	30 - 60cm	17
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	80
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	20
Sand	%	15
Sub soil		
Sub soil clay	%	28
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.8
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None

FarmParameters

Hydrophobic condition					Use default
Occurence of pugging damage					Rare
Compacted top soil					False
Soil settings					
K leaching (%s)					Medium
N immobilisation status					
Soil tests					
Olsen P	QT K	QT Ca	QT Mg	QT Na	
32	4	15	20	5	
Organic S					6
Anion storage capacity or phosphate retention					Not entered
TBK reserve K test					Not entered
K reserve status					Use default
Pasture					
Pasture type					Ryegrass/white clover
Clover levels					Use default
Supplements removed					
No supplements removed from this block					
Fertiliser application					
Fertiliser products - September					
Category					Ballance super
Product					Superten
Amount				kg/ha	300
Fertiliser products - September					
Category					Ravensdown other
Product					Urea
Amount				kg/ha	60
Irrigation					
No irrigation entered					
Animals on block					
Ratio and type of stock based on whole farm values due to this option being selected on block set up					
Animals grazing					
Beef / dairy grazing				%	0
Block intensity					
Finishing beef					False
Water connectivity					
Direct access to streams					False
Animal grazing					
Beef / dairy grazing graze block all year round					
Effluent application					
Receives no liquid or solid effluents					

Block - QE2

Block name		QE2
Block type		Trees and Scrub
Area	ha	3.6
Rainfall	mm/yr	950
Distance from coast	km	37
Bush type		Native

Block - Maize

Block name		Maize
Block type		Fodder Crop
Rotation area	ha	9.7
Low N mineralisation		False
Final grid month		April
Irrigation system type		No Irrigation

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-grazed - copy 1 - copy 1

FarmParameters

Crop information

Current assessment year

May - Grazed pasture		
June - Grazed pasture		
July - Grazed pasture		
August - Grazed pasture		
September - Maize silage		
Crop management	See details below	Crop sown
October - Maize silage		
November - Maize silage		
December - Maize silage		
January - Maize silage		
February - Maize silage		
March - Mature - Maize silage		
April - Grazed		
Crop management	See details below	Crop sown

Crop sowing information - September of the Current assessment year

Crop category		Forages
Crop type		Maize silage
Yield at final defoliation	T/ha dry matter	19
Cultivation practice at sowing		Minimum till

Crop sowing information - April of the Current assessment year

Crop category		Permanent pasture
Crop type		Grazed
Source of animals		Not entered

No fertiliser application applied on block

Effluent application

Receives no liquid or solid effluents

South Waiarapa District Council

Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Farm details

Type	Farm type	Full range
Assessment	Assessment year	Not entered
Region	Region	Wellington

Farm blocks

Buf_Rang_18b.1	Pastoral	8
Irr_Mid_Bram_8a.1	Pastoral	4.6
Irr_Mid_Tait_42a.1	Pastoral	21.3
Buf_Selw_25a.1	Pastoral	1.9
Irr_E_Selw_25a.1	Pastoral	6
Irr_NE_Darn_17a.1	Pastoral	19
Irr_Mid_Darn_17a.1	Pastoral	14.9
Irr_Darn_9a.1	Pastoral	4.3
Irr_Rang_18b.1	Pastoral	30.4
Irr_E_Darn_17a.1	Pastoral	12.8
Buf_Darn_17a.1	Pastoral	30.9
Irr_A_Bram_8a.1	Pastoral	8
Buf_Bram_8a.1	Pastoral	5.7
Buf_Tait_42a.1	Pastoral	4
Buf_Darn_9a.1	Pastoral	1.5
QE2	Trees and Scrub	3.6
Maize	Fodder Crop	
Total farm area declared in blocks	ha	176.9
Total farm area	ha	186
Non-productive area	ha	9.09999999999999

Farm animals

Stock numbers

Stock reconciliation - Beef / dairy grazing

Stock production

Calving percentage	%	83
Percent replacements	%	15
Mean calving date		Not entered
Mean weaning date		Not entered
Weaning weight	kg	80

Stock numbers

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
CowsMixedAgeBreeding	Friesian	80	80	30	30	30	10	10	10	10	10	10	80
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
0	0	0	0	0					Female	No mating			
HeifersBreeding	Friesian	0	0	0	0	0	0	0	0	0	12	12	12
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
427	80	106	0	7		Weaned			Female	No mating			
HeifersBreeding	Friesian	12	12	12	12	12	12	12	12	12	12	12	12
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
427	106	270	0	10		On-farm			Female	No mating			
HeifersBreeding	Friesian	12	12	12	12	12	12	12	12	12	0	0	0
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
427	270	389	0	22		On-farm			Female	No mating			
Weaners	Friesian	0	0	0	0	0	0	0	0	0	54	54	54
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
461	80	109	0	7		Weaned	Remain on-farm		MixedSex				
Weaners	Friesian	54	54	54	54	54	54	54	54	54	0	0	0
Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)		Source	Fate		Sex	Mated			
461	109	257	0	10		On-farm	Sold to works		MixedSex				

Stock management

Animal excreta distribution

Relative productivity assessment method	Relative yield (from soil, fertiliser inputs)
Relative productivity calculated for each Pastoral block	
Buf_Rang_18b.1	0.843843589901339

FarmParameters

Irr_Mid_Bram_8a.1	0.836697729890761
Irr_Mid_Tait_42a.1	0.887771936158874
Buf_Selw_25a.1	0.86624922646562
Irr_E_Selw_25a.1	0.910253711118774
Irr_NE_Darn_17a.1	0.943874118709781
Irr_Mid_Darn_17a.1	0.910253718911325
Irr_Darn_9a.1	0.866133852197388
Irr_Rang_18b.1	0.866133423894164
Irr_E_Darn_17a.1	0.942342634029144
Buf_Darn_17a.1	0.927181771522285
Irr_A_Bram_8a.1	0.835983005989411
Buf_Bram_8a.1	0.832404538817526
Buf_Tait_42a.1	0.88538269396957
Buf_Darn_9a.1	0.843844007182234

Ratio of stock types on pastoral blocks is the same as the farm stock ratios

Animal health supplements

Animal - Beef / dairy grazing
No animal supplementation has been entered

Left over feeding
No left over feeding specified

Stored supplements
No supplements from storage added to this farm

Imported supplements
No supplements imported onto this farm

Greenhouse gas emission factors

Enteric methane - g methane/kg DMI intake

Dairy		21.6
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915
Goats	0.691
Other	0.691

Nitrous oxide
Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions

Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Energy emissions

Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4
Electricity	MJ / kWh	8.21

GWP

Use NZ national inventory

Allocation

Allocation method	Enter actual allocation figures

Report settings

Greenhouse gas emission report units: Use default
Target N application rate as effluent: kg N/ha/yr

Block Information

Block - Buf_Rang_18b.1

Block name		Buf_Rang_18b.1
Block type		Pastoral
Area	ha	8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 04 16:57
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19
	> 60	19
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2

Soil profile

Profile drainage class	Use default
Top soil texture	Unknown

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
Beef / dairy grazing graze block all year round		

FarmParameters

Effluent application
Receives no liquid or solid effluents

Block - Irr_Mid_Bram_8a.1

Block name		Irr_Mid_Bram_8a.1
Block type		Pastoral
Area	ha	4.6
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings
K leaching potential not set
N immobilisation status

Soil tests

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	4
Supplement is exported from the farm	

Fertiliser application

Fertiliser products - September

Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Fertiliser products - October

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - December

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - March

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - September

FarmParameters

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - November		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - February		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50
Month: July	
Application depth (mm)	2
Month: September	
Application depth (mm)	98
Month: October	
Application depth (mm)	83
Month: November	
Application depth (mm)	58
Month: December	
Application depth (mm)	36

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Irr_Mid_Tait_42a.1

Block name		Irr_Mid_Tait_42a.1
Block type		Pastoral
Area	ha	21.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Gley
Soil group (default)		Sedimentary
SMaps		
Sibling		Tait_42a.1
Date downloaded		2017 May 04 17:07
Wilting point	0 - 30cm	15
	30 - 60cm	15
	> 60	11
Field capacity	0 - 30cm	44
	30 - 60cm	39
	> 60	38
Saturation	0 - 30cm	56
	30 - 60cm	49
	> 60	47
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	35
Bulk density	kg/m³	940
Clay	%	24
Sand	%	10
Sub soil		
Sub soil clay	%	24
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Winter
Compacted top soil		False
Soil settings		
K leaching potential not set		
N immobilisation status		

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover
Clover levels	Use default
Supplements removed	
Supplement information	

FarmParameters

Conservation type						Baleage
Name						
Wrapping						Wrapped in plastic
Supplement amount						
Number of cuts						4
Supplement is exported from the farm						

Fertiliser application

Fertiliser products - September						
Category						Ballance super
Product						Superten
Amount				kg/ha		400
Soluble fertiliser inputs (kg/ha/month) - January						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - February						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - March						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - April						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - May						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - September						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - October						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - November						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0
Soluble fertiliser inputs (kg/ha/month) - December						
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0
Fertiliser products - October						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80
Fertiliser products - December						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80
Fertiliser products - March						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80
Fertiliser products - September						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80
Fertiliser products - November						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80
Fertiliser products - February						
Category						Ballance other
Product						N-rich urea
Amount				kg/ha		80

Irrigation

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Irrigation system type		Spraylines
Month: July		
Application depth (mm)	2	
Month: September		
Application depth (mm)	98	
Month: October		
Application depth (mm)	83	
Month: November		
Application depth (mm)	58	
Month: December		
Application depth (mm)	36	
Month: January		
Application depth (mm)	18	
Month: February		
Application depth (mm)	14	
Month: March		
Application depth (mm)	24	
Month: April		
Application depth (mm)	32	
Month: May		
Application depth (mm)	50	

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Buf_Selw_25a.1

Block name		Buf_Selw_25a.1
Block type		Pastoral
Area	ha	1.9
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)	Recent
Soil group (default)	Recent/YGE/BGE
SMaps	

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Sibling		Selw_25a.1
Date downloaded		2017 May 05 10:31
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2
Field capacity	0 - 30cm	33
	30 - 60cm	20
	> 60	8
Saturation	0 - 30cm	53
	30 - 60cm	49
	> 60	25
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	88
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1090
Clay	%	11
Sand	%	37
Sub soil		
Sub soil clay	%	9

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	1
Supplement is exported from the farm	

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300

FarmParameters

Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
September		True
October		True
November		True
December		True

Effluent application
Receives no liquid or solid effluents

Block - Irr_E_Selw_25a.1

Block name		Irr_E_Selw_25a.1
Block type		Pastoral
Area	ha	6
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Selw_25a.1
Date downloaded		2017 May 04 17:08
Wilting point	0 - 30cm	10
	30 - 60cm	5
	> 60	2

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Field capacity	0 - 30cm		33
	30 - 60cm		20
	> 60		8
Saturation	0 - 30cm		53
	30 - 60cm		49
	> 60		25
Natural drainage class			Well
Depth to impeded layer	cm		Not entered
Maximum rooting depth	cm		88
Top soil horizon chemical and physical parameters			
ASC/PR	%		19
Bulk density	kg/m³		1090
Clay	%		11
Sand	%		37
Sub soil			
Sub soil clay	%		9

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.88
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		4
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Fertiliser products - October			
Category			Ballance other
Product			N-rich urea
Amount		kg/ha	60
Fertiliser products - November			
Category			Ballance other
Product			N-rich urea
Amount		kg/ha	80
Fertiliser products - January			
Category			Ballance other
Product			N-rich urea
Amount		kg/ha	80
Fertiliser products - March			
Category			Ballance other
Product			N-rich urea
Amount		kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: September	
Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12

FarmParameters

Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Irr_NE_Darn_17a.1

Block name		Irr_NE_Darn_17a.1
Block type		Pastoral
Area	ha	19
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered

Top soil horizon chemical and physical parameters

FarmParameters

ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		4
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Fertiliser products - October		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	60

Fertiliser products - November		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - January		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - March		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: September	
Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12
Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up
Animals grazing

Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application
Receives no liquid or solid effluents

Block - Irr_Mid_Darn_17a.1

Block name		Irr_Mid_Darn_17a.1
Block type		Pastoral
Area	ha	14.9
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Depth to impeded drainage layer	0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	4
Supplement is exported from the farm	

Fertiliser application

Fertiliser products - September	
Category	Ballance super
Product	Superten
Amount	400 kg/ha

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - June

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - August

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
47	12	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
37	9	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
11	3	0	0	0	0	0

Fertiliser products - October		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - January		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - March		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: September	
Application depth (mm)	233
Month: October	
Application depth (mm)	186
Month: November	
Application depth (mm)	101
Month: December	
Application depth (mm)	54
Month: January	
Application depth (mm)	13
Month: February	
Application depth (mm)	5
Month: March	
Application depth (mm)	12
Month: April	
Application depth (mm)	22
Month: May	
Application depth (mm)	47
Month: June	
Application depth (mm)	4

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True

FarmParameters

July		True
August		True

Effluent application
Receives no liquid or solid effluents

Block - Irr_Darn_9a.1

Block name		Irr_Darn_9a.1
Block type		Pastoral
Area	ha	4.3
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_9a.1
Date downloaded		2017 May 05 10:33
Wilting point	0 - 30cm	11
	30 - 60cm	7
	> 60	6
Field capacity	0 - 30cm	23
	30 - 60cm	12
	> 60	9
Saturation	0 - 30cm	36
	30 - 60cm	17
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	80
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	20
Sand	%	15
Sub soil		
Sub soil clay	%	28

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.8
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		4
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Fertiliser products - October		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - December		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - March		
Category		Ballance other

FarmParameters

Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - September		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - November		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - February		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: July	
Application depth (mm)	2
Month: September	
Application depth (mm)	98
Month: October	
Application depth (mm)	83
Month: November	
Application depth (mm)	58
Month: December	
Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Irr_Rang_18b.1

Block name		Irr_Rang_18b.1
Block type		Pastoral
Area	ha	30.4
Relative productivity		0
Pasture block type		No

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Rang_18b.1
Date downloaded		2017 May 05 10:34
Wilting point	0 - 30cm	2
	30 - 60cm	1
	> 60	1
Field capacity	0 - 30cm	8
	30 - 60cm	5
	> 60	5
Saturation	0 - 30cm	23
	30 - 60cm	19
	> 60	19
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	65
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1180
Clay	%	5
Sand	%	72
Sub soil		
Sub soil clay	%	2
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0.65
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Rare
Compacted top soil		False
Soil settings		
K leaching potential not set		
N immobilisation status		

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Clover levels: Use default

Supplements removed

Supplement information
- Conservation type: Baleage
- Name:
- Wrapping: Wrapped in plastic
- Supplement amount
  - Number of cuts: 4

Supplement is exported from the farm

Fertiliser application

Fertiliser products - September
- Category: Ballance super
- Product: Superten
- Amount: 400 kg/ha

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Fertiliser products - October
- Category: Ballance other
- Product: N-rich urea
- Amount: 80 kg/ha

Fertiliser products - December
- Category: Ballance other
- Product: N-rich urea
- Amount: 80 kg/ha

Fertiliser products - March
- Category: Ballance other
- Product: N-rich urea
- Amount: 80 kg/ha

Fertiliser products - September
- Category: Ballance other
- Product: N-rich urea
- Amount: 80 kg/ha

Fertiliser products - November
- Category: Ballance other
- Product: N-rich urea
- Amount: 80 kg/ha

Fertiliser products - February
- Category: Ballance other

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type	Spraylines
Month: August	
Application depth (mm)	4
Month: November	
Application depth (mm)	58
Month: October	
Application depth (mm)	83
Month: September	
Application depth (mm)	98
Month: December	
Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Irr_E_Darn_17a.1

Block name		Irr_E_Darn_17a.1
Block type		Pastoral
Area	ha	12.8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11
	> 60	5
Saturation	0 - 30cm	26
	30 - 60cm	18
	> 60	15
Natural drainage class		Moderately well
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	19
Bulk density	kg/m³	1220
Clay	%	25
Sand	%	20
Sub soil		
Sub soil clay	%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching (%s)	Medium
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	9	13	38	8

Organic S	4
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	4
Supplement is exported from the farm	

Fertiliser application

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Fertiliser products - September

Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
4	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
5	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
10	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
20	5	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
17	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
7	2	0	0	0	0	0

Fertiliser products - October

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - December

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - March

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - September

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - November

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Fertiliser products - February

Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80

Irrigation

Irrigation system type		Spraylines
Month: July		
Application depth (mm)	2	
Month: September		
Application depth (mm)	98	
Month: October		
Application depth (mm)	86	

FarmParameters

Month: November	
Application depth (mm)	58
Month: December	
Application depth (mm)	36
Month: January	
Application depth (mm)	18
Month: February	
Application depth (mm)	14
Month: March	
Application depth (mm)	24
Month: April	
Application depth (mm)	32
Month: May	
Application depth (mm)	50

Irrigation concentrations

Source						Block specific	
N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Buf_Darn_17a.1

Block name		Buf_Darn_17a.1
Block type		Pastoral
Area	ha	30.9
Relative productivity		0
Pasture block type		Yes
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Darn_17a.1
Date downloaded		2017 May 05 08:07
Wilting point	0 - 30cm	9
	30 - 60cm	7
	> 60	3
Field capacity	0 - 30cm	17
	30 - 60cm	11

FarmParameters

		> 60	5
Saturation		0 - 30cm	26
		30 - 60cm	18
		> 60	15
Natural drainage class			Moderately well
Depth to impeded layer		cm	Not entered
Maximum rooting depth		cm	Not entered
Top soil horizon chemical and physical parameters			
ASC/PR		%	19
Bulk density		kg/m³	1220
Clay		%	25
Sand		%	20
Sub soil			
Sub soil clay		%	27

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set	
N immobilisation status	

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
24	6	8	26	5

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	500
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea

FarmParameters

Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation
No irrigation entered

Animals on block
Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
November		True
December		True

Effluent application
Receives no liquid or solid effluents

Block - Irr_A_Bram_8a.1

Block name		Irr_A_Bram_8a.1
Block type		Pastoral
Area	ha	8
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare
Compacted top soil	False

Soil settings

K leaching potential not set
N immobilisation status

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
20	4	10	20	4

Organic S	3
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	
Number of cuts	3
Area cut taken from	8

Supplement is exported from the farm

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400

Soluble fertiliser inputs (kg/ha/month) - January

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
14	4	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - February

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
13	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - March

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
8	2	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - April

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
2	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - May

FarmParameters

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
1	0	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - September

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
3	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - October

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
6	1	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - November

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
12	3	0	0	0	0	0

Soluble fertiliser inputs (kg/ha/month) - December

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
13	3	0	0	0	0	0

Fertiliser products - September		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - October		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - January		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - March		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	80
Fertiliser products - February		
Category		Ballance other
Product		N-rich urea
Amount	kg/ha	100

Irrigation

Irrigation system type		Spraylines
Month: January		
Application depth (mm)	72	
Month: February		
Application depth (mm)	64	
Month: March		
Application depth (mm)	40	
Month: April		
Application depth (mm)	12	
Month: September		
Application depth (mm)	14	
Month: October		
Application depth (mm)	28	
Month: November		
Application depth (mm)	59	
Month: December		
Application depth (mm)	65	

Irrigation concentrations

Source: Block specific

N	P	K	S	Ca	Mg	Na	H
0	0.1	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False

FarmParameters

Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application
Receives no liquid or solid effluents

Block - Buf_Bram_8a.1

Block name		Buf_Bram_8a.1
Block type		Pastoral
Area	ha	5.7
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Recent
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Bram_8a.1
Date downloaded		2017 May 04 16:59
Wilting point	0 - 30cm	17
	30 - 60cm	17
	> 60	17
Field capacity	0 - 30cm	45
	30 - 60cm	39
	> 60	39
Saturation	0 - 30cm	59
	30 - 60cm	49
	> 60	48
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	33
Bulk density	kg/m³	1090
Clay	%	19
Sand	%	5
Sub soil		
Sub soil clay	%	18

Soil profile

Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method	
Method	None
Hydrophobic condition	Use default
Occurence of pugging damage	Rare

FarmParameters

Compacted top soil					False
Soil settings					
K leaching potential not set					
N immobilisation status					
Soil tests					
Olsen P	QT K	QT Ca	QT Mg	QT Na	
20	4	10	20	4	
Organic S					3
Anion storage capacity or phosphate retention					Not entered
TBK reserve K test					Not entered
K reserve status					Use default
Pasture					
Pasture type					Ryegrass/white clover
Clover levels					Use default
Supplements removed					
Supplement information					
Conservation type					Baleage
Name					
Wrapping					Wrapped in plastic
Supplement amount					
Number of cuts					1
Supplement is exported from the farm					
Fertiliser application					
Fertiliser products - September					
Category					Ballance super
Product					Superten
Amount				kg/ha	400
Fertiliser products - September					
Category					Ravensdown other
Product					Urea
Amount				kg/ha	60
Fertiliser products - November					
Category					Ravensdown other
Product					Urea
Amount				kg/ha	60
Fertiliser products - April					
Category					Ravensdown other
Product					Urea
Amount				kg/ha	60
Irrigation					
No irrigation entered					
Animals on block					
Ratio and type of stock based on whole farm values due to this option being selected on block set up					
Animals grazing					
Beef / dairy grazing				%	0
Block intensity					
Finishing beef					False
Water connectivity					
Direct access to streams					False
Animal grazing					
January					True
February					True
March					True
April					True
May					True
September					True
October					True
November					True

FarmParameters

December		True
Effluent application		
Receives no liquid or solid effluents		
Block - Buf_Tait_42a.1		
Block name		Buf_Tait_42a.1
Block type		Pastoral
Area	ha	4
Relative productivity		0
Pasture block type		No
Topography		Flat
Distance from coast	km	37
Cultivated in last 5 years		False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1153
Mean annual temperature		12.8
Seasonal variation in rainfall		731-1450 mm, Moderate
Annual potential evapotranspiration	mm	866
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Gley
Soil group (default)		Sedimentary
SMaps		
Sibling		Tait_42a.1
Date downloaded		2017 May 04 17:07
Wilting point	0 - 30cm	15
	30 - 60cm	15
	> 60	11
Field capacity	0 - 30cm	44
	30 - 60cm	39
	> 60	38
Saturation	0 - 30cm	56
	30 - 60cm	49
	> 60	47
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Maximum rooting depth	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	35
Bulk density	kg/m³	940
Clay	%	24
Sand	%	10
Sub soil		
Sub soil clay	%	24
Soil profile		
Profile drainage class		Use default
Top soil texture		Unknown
Maximum rooting depth	m	0
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Winter
Compacted top soil		False
Soil settings		
K leaching potential not set		
N immobilisation status		

FarmParameters

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	5	10	33	6

Organic S		3
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default

Pasture

Pasture type		Ryegrass/white clover
Clover levels		Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Supplement is exported from the farm		

Fertiliser application

Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	400
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60

Irrigation

No irrigation entered

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
September		True
October		True
November		True
December		True

Effluent application

Receives no liquid or solid effluents

Block - Buf_Darn_9a.1

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Block name			Buf_Darn_9a.1
Block type			Pastoral
Area	ha		1.5
Relative productivity			0
Pasture block type			No
Topography			Flat
Distance from coast	km		37
Cultivated in last 5 years			False
Fodder rotates through			No
Climate			
Annual average rainfall	mm/yr		1153
Mean annual temperature			12.8
Seasonal variation in rainfall			731-1450 mm, Moderate
Annual potential evapotranspiration	mm		866
Seasonal variation in PET			Moderate
Soil description			
Soil order (default)			Pallic
Soil group (default)			Recent/YGE/BGE
SMaps			
Sibling			Darn_9a.1
Date downloaded			2017 May 05 10:33
Wilting point	0 - 30cm		11
	30 - 60cm		7
	> 60		6
Field capacity	0 - 30cm		23
	30 - 60cm		12
	> 60		9
Saturation	0 - 30cm		36
	30 - 60cm		17
	> 60		15
Natural drainage class			Moderately well
Depth to impeded layer	cm		Not entered
Maximum rooting depth	cm		80
Top soil horizon chemical and physical parameters			
ASC/PR	%		19
Bulk density	kg/m³		1220
Clay	%		20
Sand	%		15
Sub soil			
Sub soil clay	%		28
Soil profile			
Profile drainage class			Use default
Top soil texture			Unknown
Maximum rooting depth	m		0.8
Depth to impeded drainage layer			0
Soil drainage			
Drainage method			
Method			None
Hydrophobic condition			Use default
Occurence of pugging damage			Rare
Compacted top soil			False
Soil settings			
K leaching (%s)			Medium
N immobilisation status			

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
32	4	15	20	5

Organic S	6
Anion storage capacity or phosphate retention	Not entered

FarmParameters

TBK reserve K test		Not entered
K reserve status		Use default
Pasture		
Pasture type		Ryegrass/white clover
Clover levels		Use default
Supplements removed		
Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Number of cuts		1
Supplement is exported from the farm		
Fertiliser application		
Fertiliser products - September		
Category		Ballance super
Product		Superten
Amount	kg/ha	300
Fertiliser products - September		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - November		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Fertiliser products - April		
Category		Ravensdown other
Product		Urea
Amount	kg/ha	60
Irrigation		
No irrigation entered		
Animals on block		
Ratio and type of stock based on whole farm values due to this option being selected on block set up		
Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
September		True
October		True
November		True
December		True
Effluent application		
Receives no liquid or solid effluents		

Block - QE2

Block name		QE2
Block type		Trees and Scrub
Area	ha	3.6
Rainfall	mm/yr	950
Distance from coast	km	37

South Waiarapa District Council | Lowe Environmental Impact

Client reference:
Farm name: Otawira Dairy Farm - WWirr-cutandcarry

FarmParameters

Bush type		Native

Block - Maize

Block name		Maize
Block type		Fodder Crop
Rotation area	ha	9.7
Low N mineralisation		False
Final grid month		April
Irrigation system type		No Irrigation

Crop information

Current assessment year

May - Grazed pasture		
June - Grazed pasture		
July - Grazed pasture		
August - Grazed pasture		
September - Maize silage		
Crop management	See details below	Crop sown
October - Maize silage		
November - Maize silage		
December - Maize silage		
January - Maize silage		
February - Maize silage		
March - Mature - Maize silage		
April - Grazed		
Crop management	See details below	Crop sown

Crop sowing information - September of the Current assessment year

Crop category		Forages
Crop type		Maize silage
Yield at final defoliation	T/ha dry matter	19
Cultivation practice at sowing		Minimum till

Crop sowing information - April of the Current assessment year

Crop category		Permanent pasture
Crop type		Grazed
Source of animals		Not entered

No fertiliser application applied on block

Effluent application

Receives no liquid or solid effluents

A3. Groundwater Effects

A letter addressing the further points of clarification related to groundwater effects of the proposed WWTP, produced by GWS Limited.

18th October 2017

South Wairarapa District Council
PO Box 6
Martinborough 5741
New Zealand

Attention: Bill Sloan

Subject: Response to Request for Further Points of Clarification Related to Proposed Land Discharge Area for the South Featherston WWTP - DRAFT

Dear Bill,

1. Background

We understand that an application for a land discharge consent associated with the operation of the Featherston WWTP was lodged with the GWRC and that this is currently being processed. A S92 request for further information has since been issued requesting the following information

1. Provide model/assessment outputs that display the location, extent and magnitude of the predicted groundwater mounding effects.

2. Provide an updated irrigation regime and storage assessment which incorporates any impacts and/or limitations due to the predicted groundwater mounding effects.

3. If groundwater mounding effects are present offsite - provide an appropriately detailed assessment of these effects. This assessment should also include an allowance for potential uncertainty in the assumed hydrogeological system and modelled parameters. Response information should include at least; the location, extent, magnitude, and timing of areas where saturated ground has spatially or temporally increased.

4. Provide a robust assessment of the potential effects of pathogen discharge to all groundwater and surface water users. This should include information on the potential risk to existing and potential future water users, and how any identified risks will be mitigated/managed.

This letter is intended to address items 1, 3 and 4 of the request for further information.

2. Model Outputs

A selection of MODFLOW model outputs are included in Attachment A.

3. Off Site Mounding Effects

As can be seen from the model outputs provided, the main change to the piezometric surface associated with mounding effects due to irrigation are largely constrained to the south eastern corner of the irrigation block nearest observation point A. This block is susceptible to saturation conditions due to the thinning vadose zone that naturally reduces as the water table and the land surface converge. Near-saturated conditions are noted to occur in this area in any case and stream gauging has shown the lower reaches of the Mangatarere Stream and Donald's creek are

gaining due to groundwater inputs. The network of channels at this location have, therefore, been constructed to drain the land due to its high water table throughout the area.

Figure 1 below provides a schematic derived from the model outputs provided and shows the depth to the water table under existing conditions and under condition of peak irrigation loading.

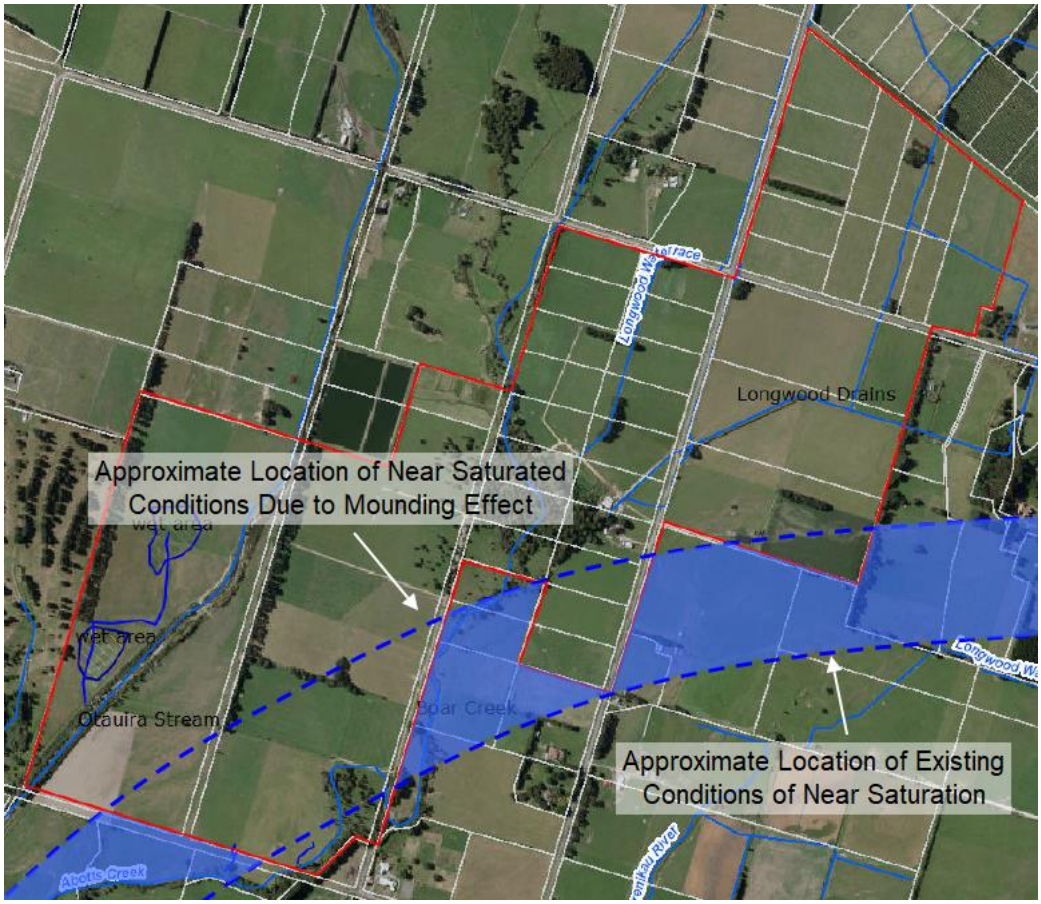


Figure 1 Off Site Areas of Near Saturation

Model results indicate an increase in off-site groundwater levels of up to 0.7 m at the site boundary, reducing to 0.5 m off site which is expected to result in a higher groundwater levels down gradient of the irrigation areas as depicted in Figure 1. This effect is expected to be temporary and will exist under peak loading conditions only, after which dissipation of the mounding effects is expected.

It should be noted that the Modflow model does not include the effects of the drainage network or ephemeral discharge to streams and creeks. In reality, the drainage channels and natural surface waters is expected to continue to drain the land such that fully saturated conditions at the surface are not expected to occur.

Further, it is noted that the model results provided are indicative only as no detailed surface elevation model has been included in the analysis and a planar land surface is assumed. In

addition, the model results are considered representative of conservative hydrogeologic conditions where fully saturated conditions can exist within the irrigation areas. In reality we understand that the application of wastewater will be controlled such that irrigation will not take place under fully saturated conditions.

4. Pathogen Discharge

The fate and survival of pathogens during the wastewater treatment and land disposal process will be governed by three principal factors:

- Reduction of pathogens due to the level of treatment prior to disposal.
- Reduction of pathogens in the vadose zone during percolation.
- Reduction of pathogens in the aquifer.

Each of these processes is described further below.

Tertiary Disinfection

The primary means of protecting groundwater from pathogens is the low loading due to UV treatment. The proposed wastewater discharge will be treated to a high standard prior to land application through sedimentation, oxidation and UV disinfection. The wastewater is presently UV treated to reduce pathogen concentration, and has a median E.coli concentration of 18 cfu/100 mL. The proposed conditions of consent require that the E.coli concentration will not exceed 100 cfu/100 mL for more than 3 out of 12 consecutive samples. A compliance limit of 100 cfu/100 mL (1,000 bacteria per litre) for E.coli represents a 3-4 Log reduction in bacteria from the raw effluent and this is consistent with what can be expected for a treatment process of this kind.

While no specific details have been provided in relation to the reduction in viruses, it is expected that a similar level of reduction can be achieved through UV disinfection. On average, a base population on the order of 10 viruses per litre can be expected in raw effluent. This population will likely grow to 1,000s per litre for 70% of the time and reach a maximum of 100,000 per litre once every few years during a viral outbreak (Lewis, pers. comm., 2004). For the purpose of this assessment a total viral population of 10^4-10^5 per litre in untreated wastewater has been assumed. Table 1 below provides the level of reduction in viruses as a function of the wastewater treatment process.

Table 1 Reduction in Viral Count Due to Treatment

	Raw Effluent	Primary / Secondary Treatment	Tertiary UV Disinfection Outlet *
90 Percentile Virus Count (per litre)	10^4- 10^5	10^2 -10^3	0-10^1
Median Virus Count (per litre)	10^3	10^1	1

* Obtained reduction is dependant on applying appropriate dosage

Data sourced from Leonard (2003)

For the purpose of the following assessment a bacterial population of 1,000 bacteria per litre and 10 viruses per litre has been assumed as starting populations.

Soil Filtration

Soil passage is the next method of minimising pathogen concentrations entering groundwater. The soil mechanisms that reduce microbe movement include filtration, adsorption, predation and competition (die-off). The efficiency of these processes are mostly controlled by soil texture, degree of saturation and temporal effects.

There are a number of studies which look at travel of bacteria and viruses in a wide range of NZ soils. Key conclusions from these studies have informed the proposed discharge regime. Notably this is achieved through maximising the contact with the unsaturated zone of the soil, achieved by:

- Applying wastewater at a rate less than the soil unsaturated hydraulic conductivity i.e. a thin film of water moves through the soil under tension rather than gravity drainage which occurs in saturated conditions. This also avoids bypass flow;
- Minimising the amount of wastewater applied when the groundwater table rises i.e. avoiding winter discharge. This results in a greater depth of unsaturated soil to pass through;
- Not applying wastewater if the soil moisture content is above field capacity;
- Not applying wastewater following high rainfall events;
- Avoiding discharge in conditions which favour pathogen survival. Specifically, it has been found that pathogen survival is greater in cold and wet conditions. The proposed discharge includes minimal wastewater application during the cold and often wet winter months.

Under these conditions it is possible to achieve upwards of 99% reduction in bacteria in the first few cm of soil, and 62 to 99% removal of viruses in around 0.5 m of unsaturated soil. In the context of the applied treated wastewater, this would then result in a population of 10 bacteria per litre and <5 virus per litre after travel through the vadose zone.

ESR (2010) provides guidance on the removal rate of pathogen based on soil type in New Zealand. These data indicate a 2 log/m reduction for brown soils that are present on the site, which would equate to 1 log reduction for a 0.5 m vadose thickness. Adopting this reduction would result in a population of 100 bacteria per litre and 1 virus per litre after travel through the vadose zone before entering groundwater.

Aquifer Transport

Two methods have been used to assess the likely reduction of pathogens in the aquifer during transport; pathogen die-off rate and soil removal rate. Pathogen die-off rate adopts decay factors based on published parameters for various pathogen species and simulates reduction over time due to natural die-off. This method uses calculated groundwater velocities to determine travel time. Pathogen removal rate adopts decay factors based on published parameters for various pathogen species given certain soil types over a given distance. Both methods have been used for comparative purposes.

- Pathogen Die-Off

For the purpose of this assessment E. Coli has been selected as the archetype bacteria as these bacteria can have the longest die off rates. Rotavirus has been selected as the archetype virus, again due to its long die off rates, but also due to its highly infectious nature and high counts in faecal matter. Die off rates for these pathogens have been adopted from Sinton (2001).

In order to calculate die-off rates it is necessary to calculate the groundwater velocities leaving the discharge area. Table 2 below provides the parameters and results of these calculations.

Table 2 Travel Time Calculations

Parameter	Value	Units
Permeability (K)	12	*m/d*
Hydraulic Gradient (I = 0.7 m/25 m)	0.03	
Effective Porosity (ne)	0.15	
Groundwater Velocity	2.4	*m/d*
Buffer Distance	25	*m*
Travel Time	10	*days*

These calculations indicate that under worst case conditions the travel times through the disposal field buffer zones would be 10 days.

Calculating die off in the aquifer for E.Coli (die-off rate of 0.31 Log 10 day^{-1}) with an initial concentration of 100 bacteria per litre indicates there would be complete die-off (<1 viable E.Coli) within 7 days. In other words, no viable E.Coli would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone. A conservative assessment adopting an initial concentration of 1,000 bacteria per litre indicates there would be complete die-off within 10 days. Again, no viable E.Coli would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone.

Calculating die off in the aquifer for Rotavirus (die-off rate of 0.36 Log 10 day^{-1}) with an initial concentration of 10 viruses per litre indicates there would be complete die-off (<1 viable Rotavirus) within 4 days. In other words, no viable Rotavirus would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone. A conservative assessment adopting an initial concentration of 100 viruses per litre indicates there would be complete die-off within 7 days. Again, no viable Rotavirus would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone.

- Pathogen Removal

Pathogen removal in the aquifer can be calculated by adopting removal rates for pathogens as provided by Pang et al (2008). Calculating removal in the aquifer for E.Coli (removal rate of 0.32 Log /m) with an initial concentration of 100 bacteria per litre indicates there would be complete die-off after travelling 6 m. A conservative assessment adopting an initial concentration of 1,000 bacteria per litre indicates there would be complete die-off after travelling 9.5 m. These calculations, therefore, indicate no viable E.Coli would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone.

Similarly, calculating removal in the aquifer for viruses using Salmonella Bacteriophage (removal rate of 0.12 Log /m) with an initial concentration of 10 viruses per litre indicates there would be complete die-off after travelling 8.5 m. A conservative assessment adopting an initial concentration of 100 viruses per litre indicates there would be complete die-off after travelling 16.5 m. These calculations, therefore, indicate no viable viruses would be expected to be present in the groundwater discharge beyond the 25 m irrigation site buffer zone.

In summary, these calculations indicate the potential for viable pathogens to enter the environment through groundwater discharges resulting from the application of treated wastewater is very low given the treatment standard prior to irrigation. Further, the effective processes of soil filtration, pathogen die-off and removal within the aquifer all assist to reduce pathogen loads such that viable counts beyond the site buffer zones are not expected.

5. Effects of Groundwater Discharge

The results of this assessment indicate the off-site mounding effects are localised and are expected to be largely mitigated by the existing natural drainage network.

The discharge of groundwater leaving the irrigation areas and entering surface water is not expected to have viable pathogens remaining provided a high level of treatment is achieved prior to land application and that adequate buffer distances are in place. Overall, the effects to surface waters from pathogen discharge is expected to be less than minor and will provide a nett positive benefit over the existing direct discharge to Donalds Creek.

There are a number of domestic groundwater users surrounding the irrigation areas which are used for domestic potable supply, stock use and irrigation. Many of these water bores are tapping the deeper confined aquifer system and no effects are expected from the discharge due to vertical separation assuming they are appropriately designed and constructed. There are, however, 11 groundwater users within 550 m of the irrigation sites that take water from the shallow groundwater system and therefore have the potential to be impacted by the land discharge. These takes are expected to be of limited volume and pumping duration and, therefore, the radial extent of drawdown will be limited. Applying a Theis (1935) algorithm (where T=60 m^2/d, S=0.1 and Q=20 m^3/d) indicates the drawdown effects from these bores would be indiscernible beyond approximately 25-30 m distance from the bore. There are no bores within this proximity to the irrigation areas, with the closes being 50 m distance away (ID S27/0019) that is used for irrigation. The drawdown from a domestic bore is, therefore, insufficient to affect the rate at which pathogens travel in groundwater. As there will be no pumping effects that will extend to within the buffer zones and pathogen removal has been demonstrated within the buffer zones, it is considered unlikely that shallow bores will be affected by the discharge. One bore (ID S27/0044 used for irrigation) is located within the irrigation area and this is proposed to have a 50 m radius buffer distance.

In summary, the effects to groundwater users from pathogens in the discharge are expected to be minor. Ongoing groundwater quality monitoring is proposed to verify this conclusion.

6. Assessment Limitations and Uncertainty

This assessment includes models and calculations that are based on limited information in regard to the site topography, geologic conditions, groundwater levels and aquifer parameters. As a result, the accuracy and reliability of the predictions made here are affected by these assumptions. In reality, it is expected that these parameters will vary over the irrigation areas resulting in differences from those effects predicted in this report. Preferential flow paths, for example, may exist that cannot be considered at this time.

This level of uncertainty cannot be resolved without detailed and extensive site investigations which are not proposed at this time. As an alternative to undertaking this work, a precautionary approach to development of the irrigation fields is proposed through staging of the irrigation areas. This will be undertaken in parallel with monitoring of the discharge quality, surface and groundwater quality, and groundwater levels. This information can then be used to verify the assumptions within this assessment which can be revised, if necessary, prior to developing other irrigation areas.

7. References

Environmental Science and Research Limited (ESR). 2010. Guidance for Separation Distances Based on Virus Transport Between On-Site Domestic Wastewater Systems and Wells. Client Report No CSC1001.

Leonard, M. 2003. Removal of Microbial Pathogens in Christchurch City Councils Bromley Wastewater Treatment Plant. December 2003.

Lewis, G. Professor of Microbiology ant the University of Auckland.

Sinton, L. W. 2001. Microbiological Contamination of New Zealand Aquifers. In Groundwaters of New Zealand. P 221-251.

Pang L, McLeod M, Aislabie J, Simunek J, Close M, Hector R. 2008. Modelling Transport od Microbes in Ten Undisturbed Soils Under Effluent Irrigation. Vadose Zone Journal. P97-111.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

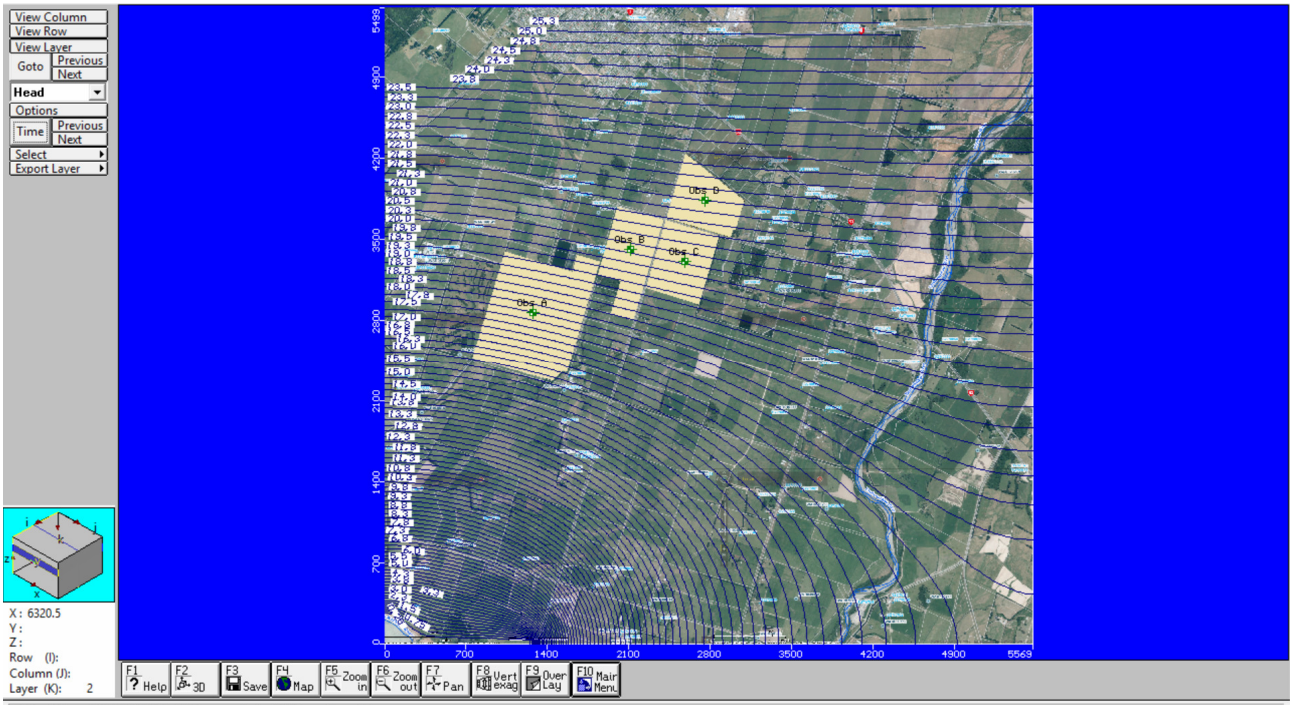
8. Closure

Should you have any further questions please contact the undersigned.

Chris RJ Simpson
B.Sc, M.Sc, CEnvP

Director - Hydrogeologist

For and on behalf of GWS Limited



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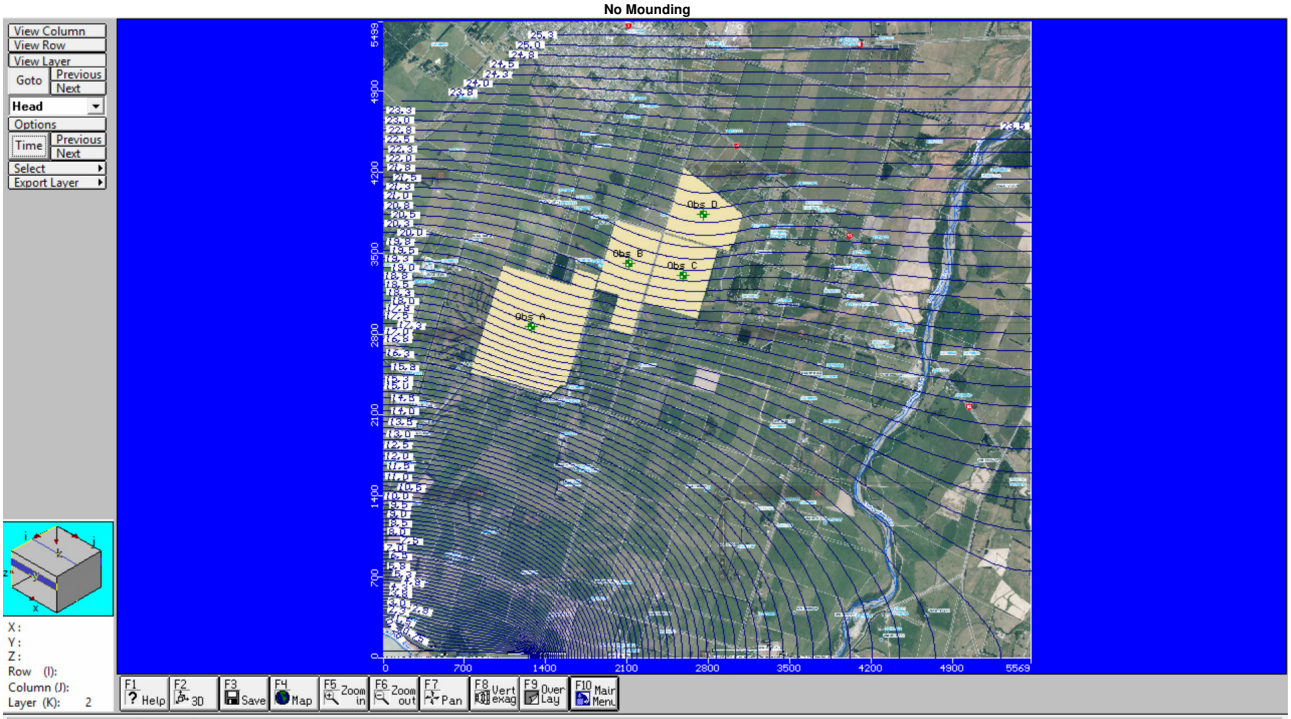

Peak Mounding

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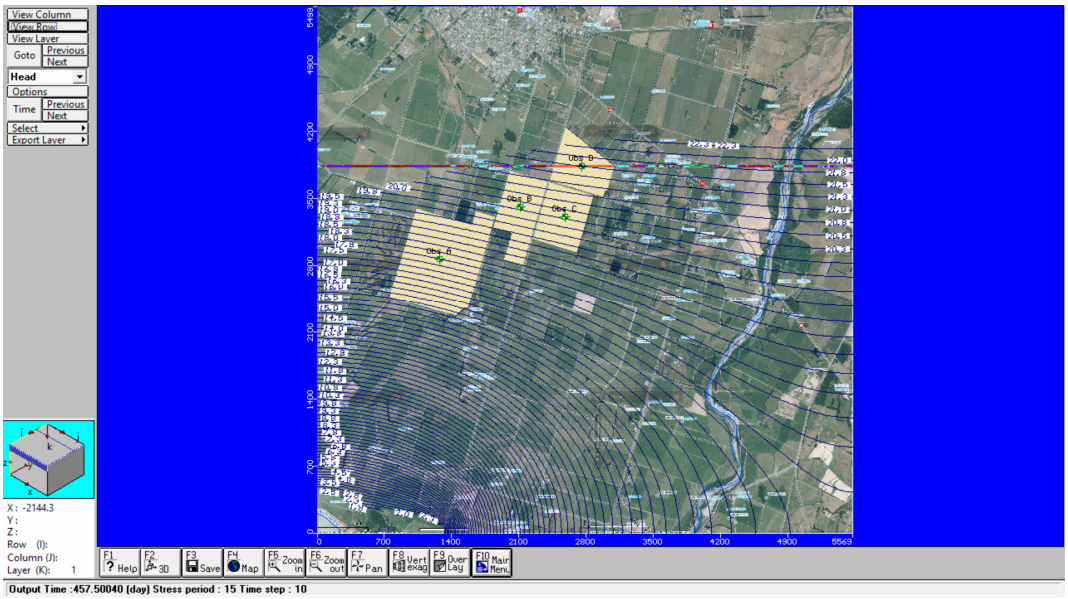

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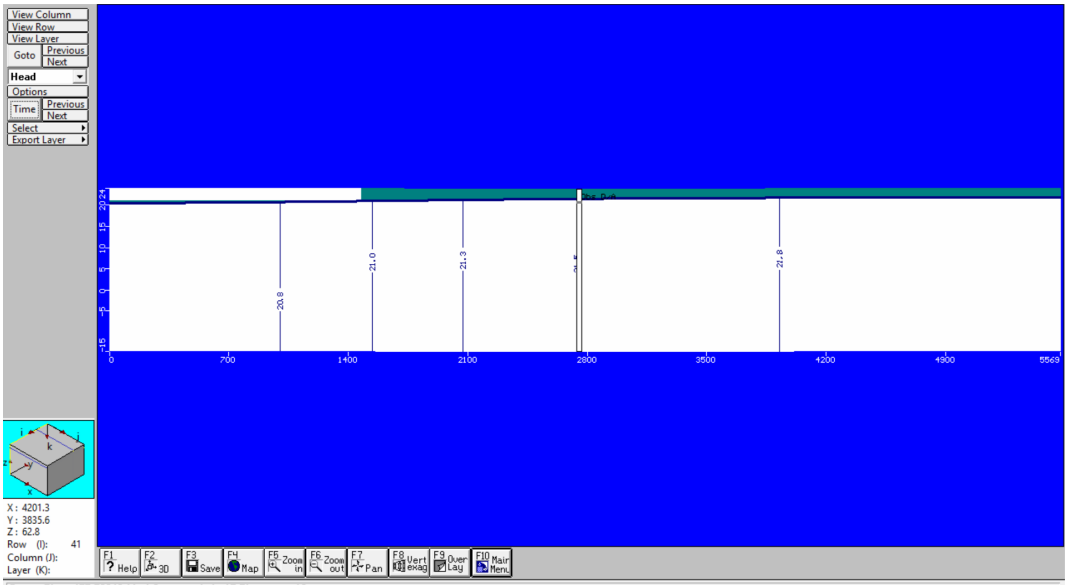

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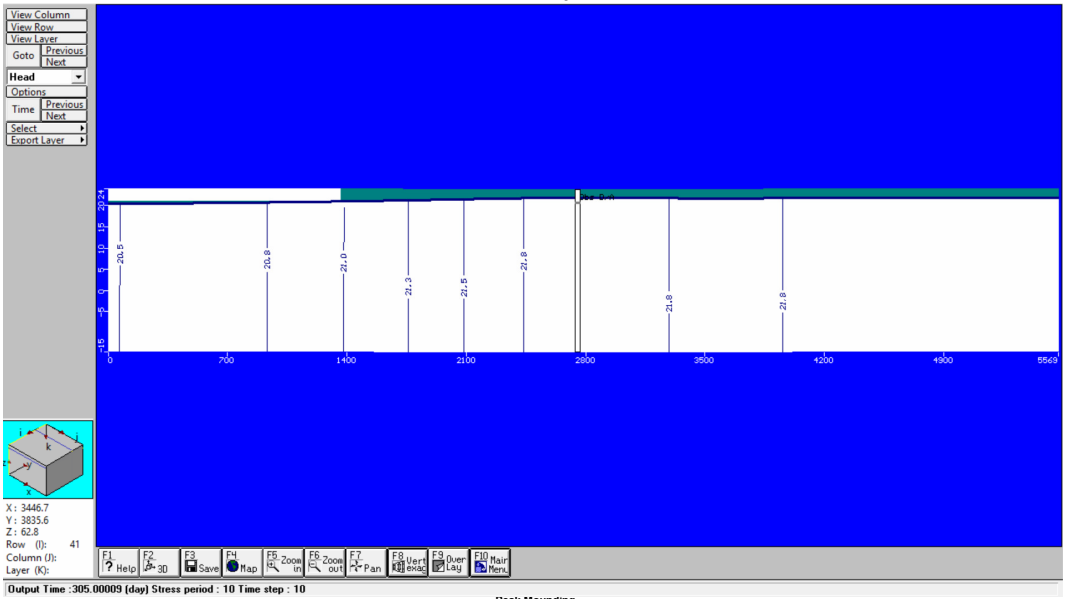

Peak Mounding

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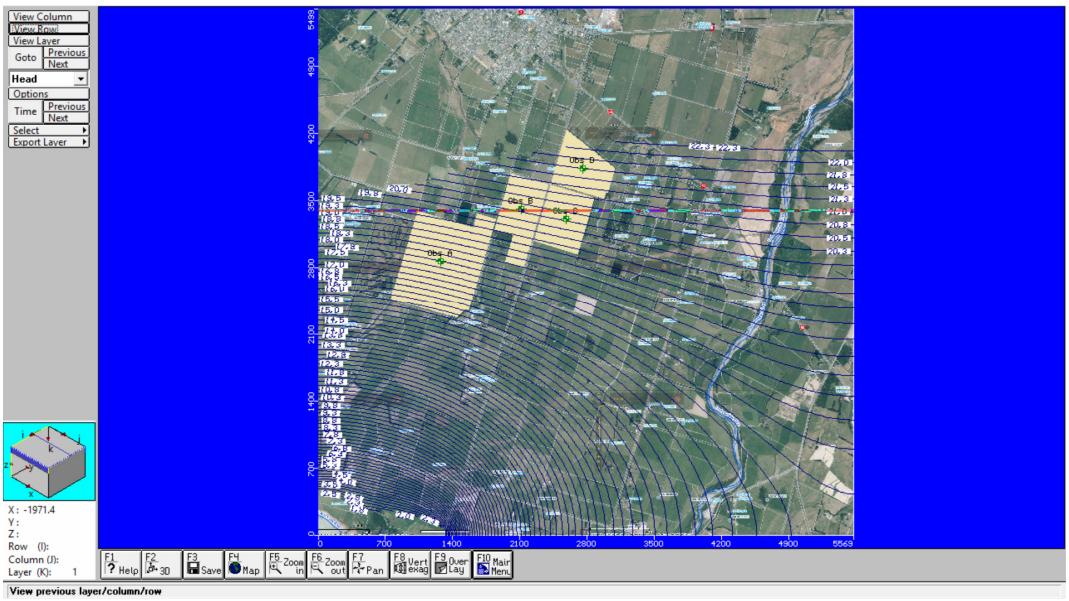

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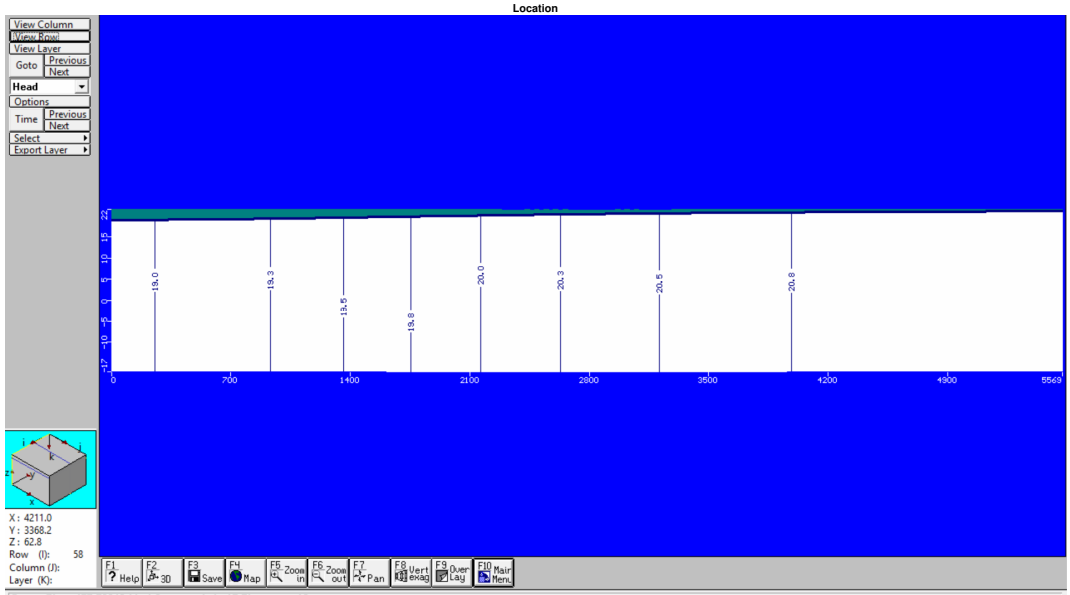
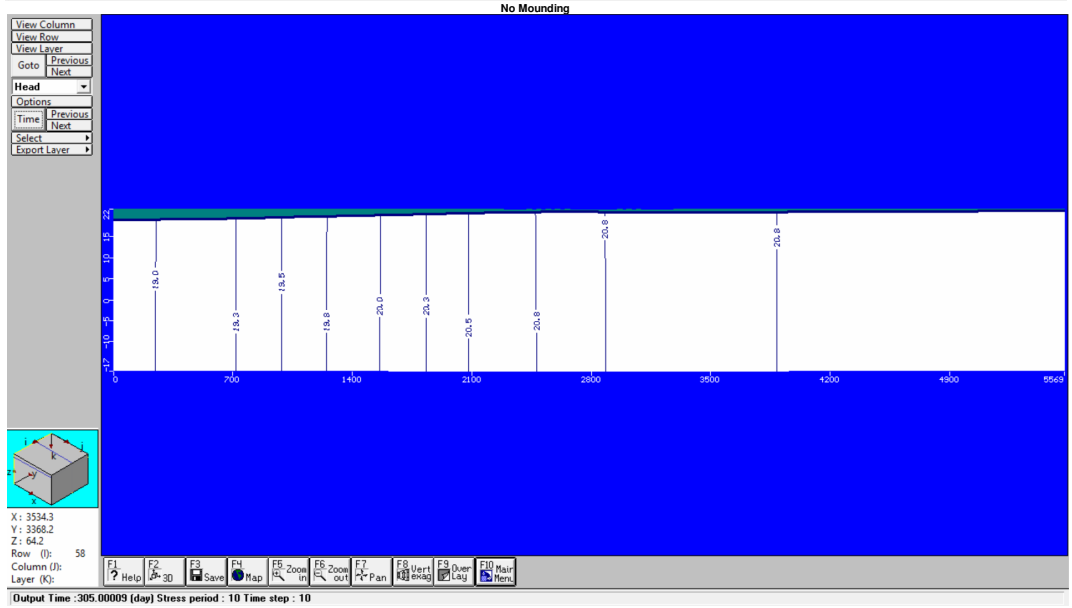
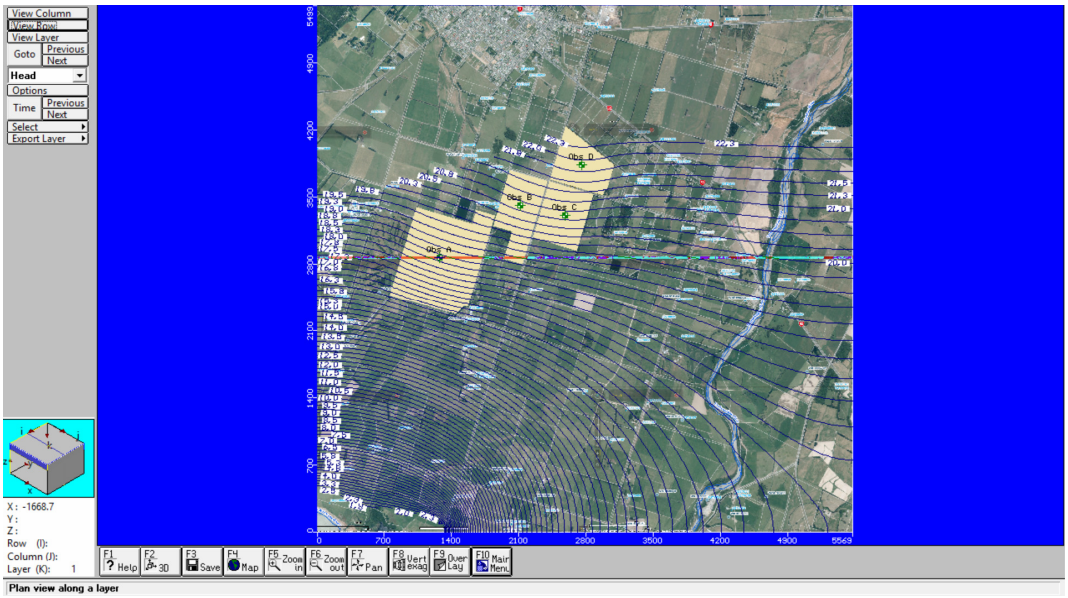


No Mounding



Peak Mounding

OBSERVATION LOCATION A



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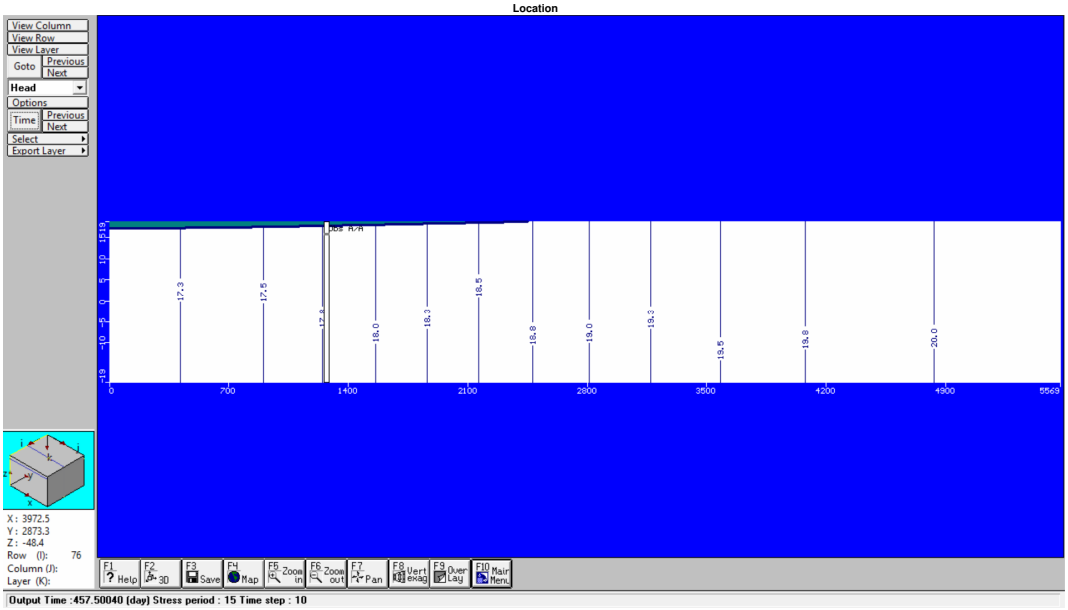

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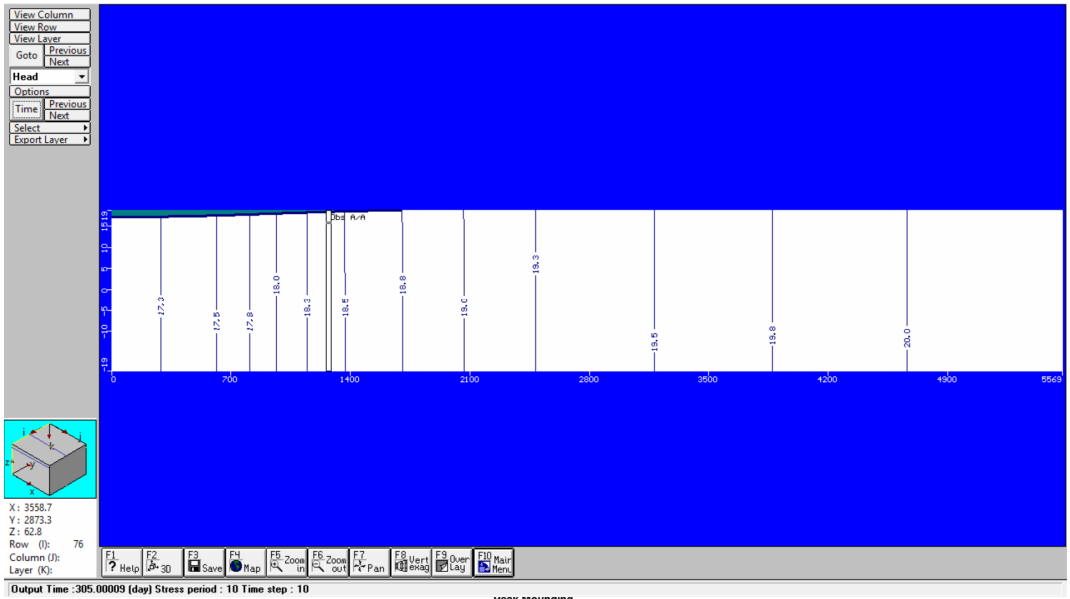

Peak Mounding

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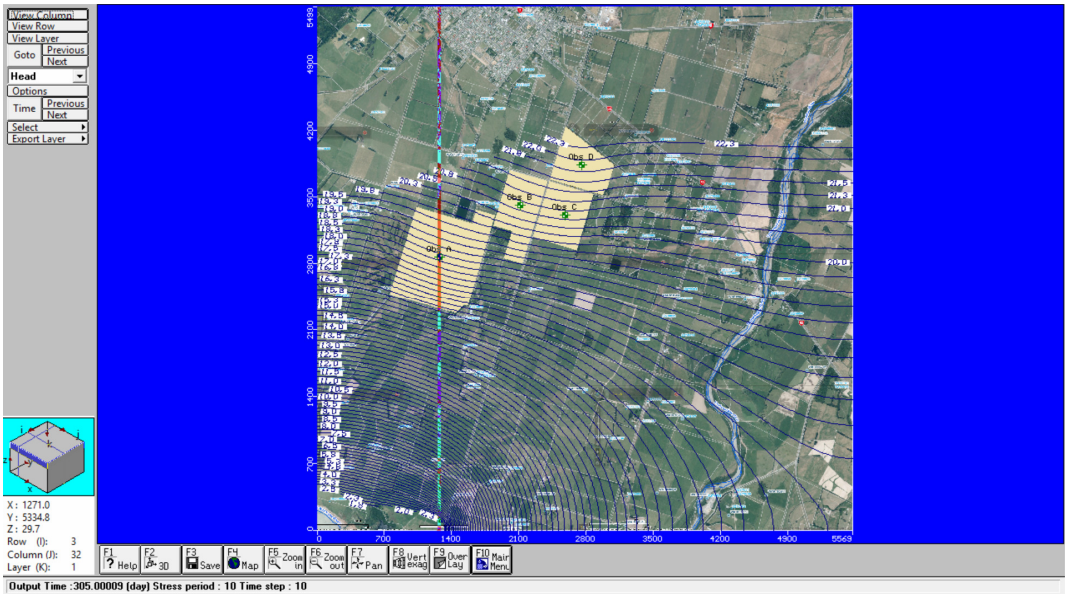

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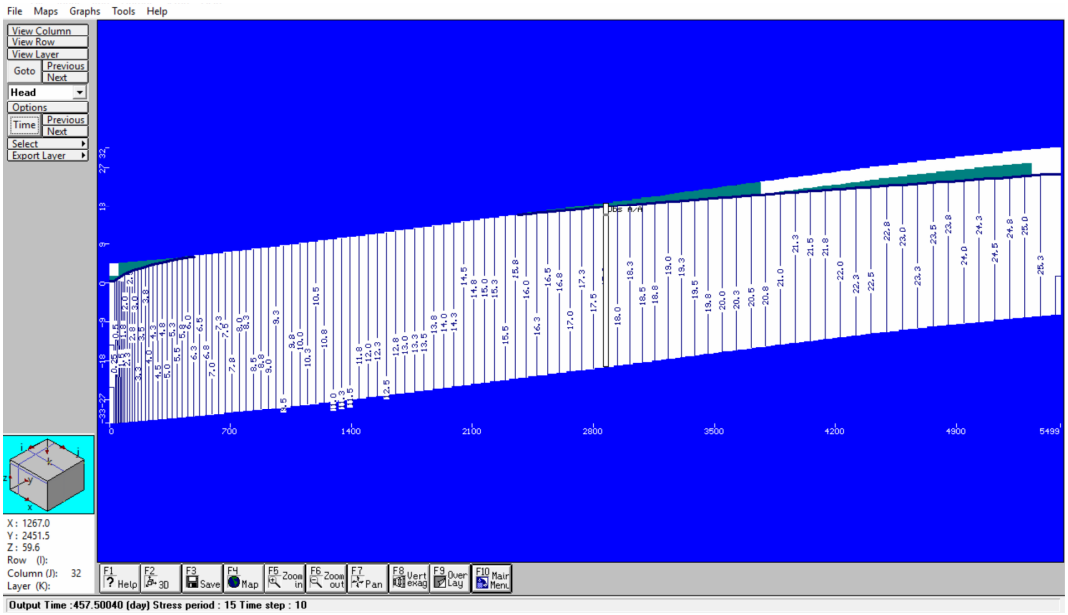

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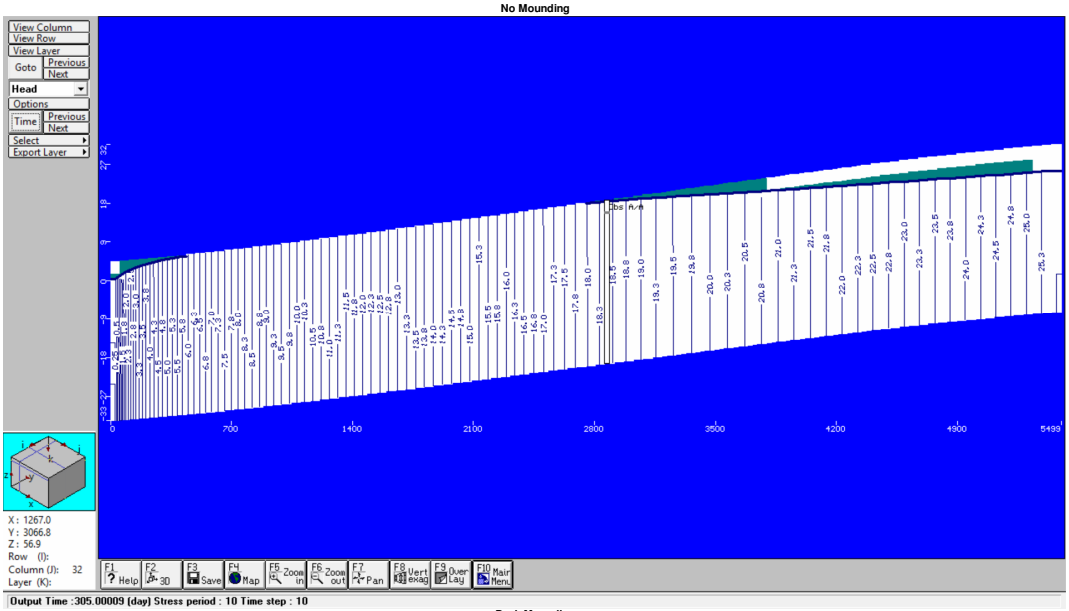
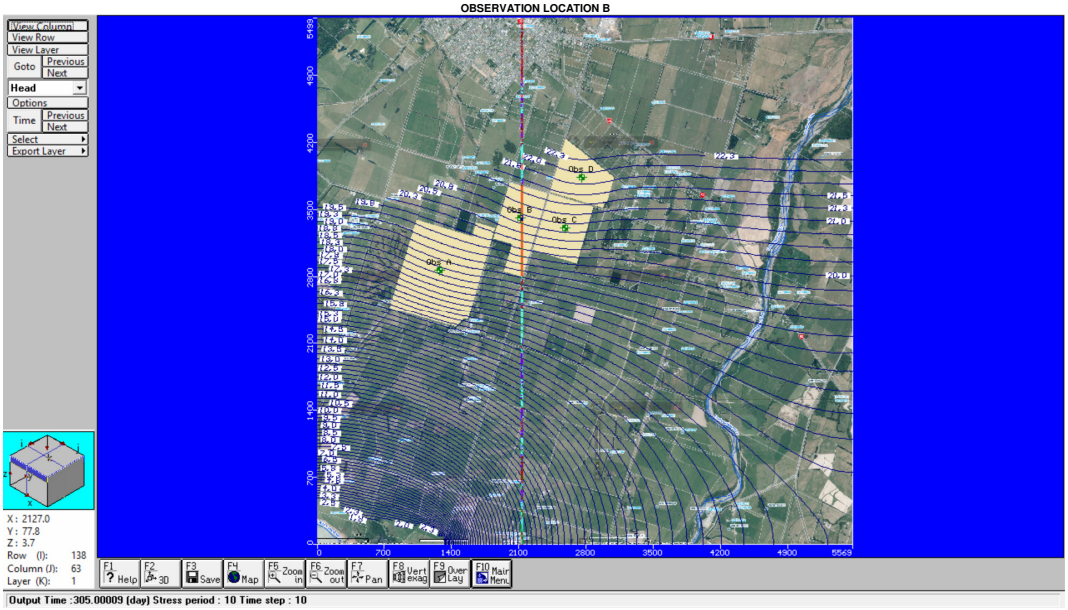


Peak Mounding

OBSERVATION LOCATION B



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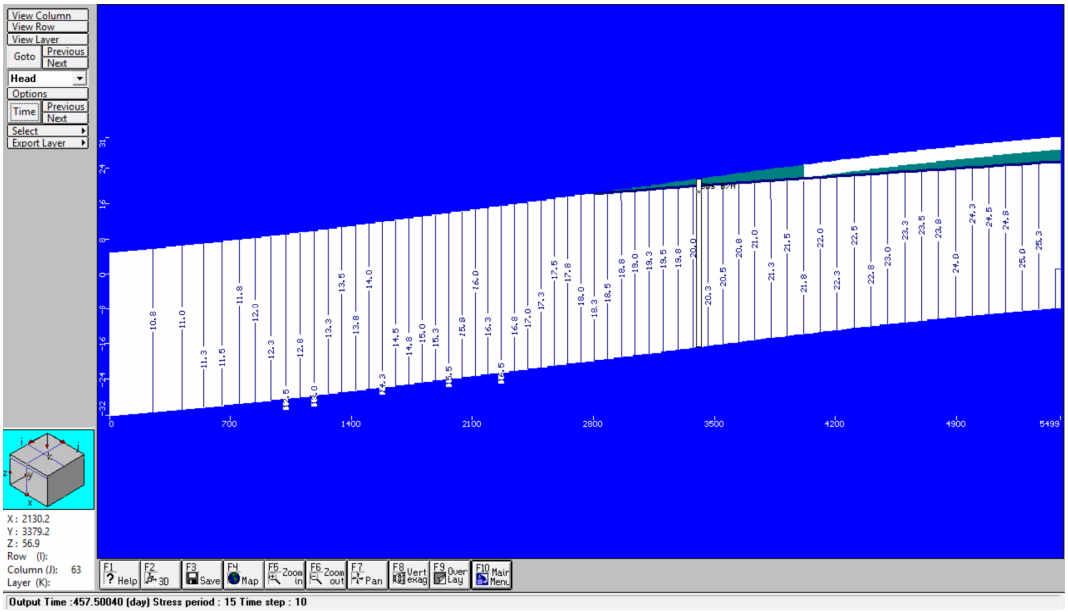

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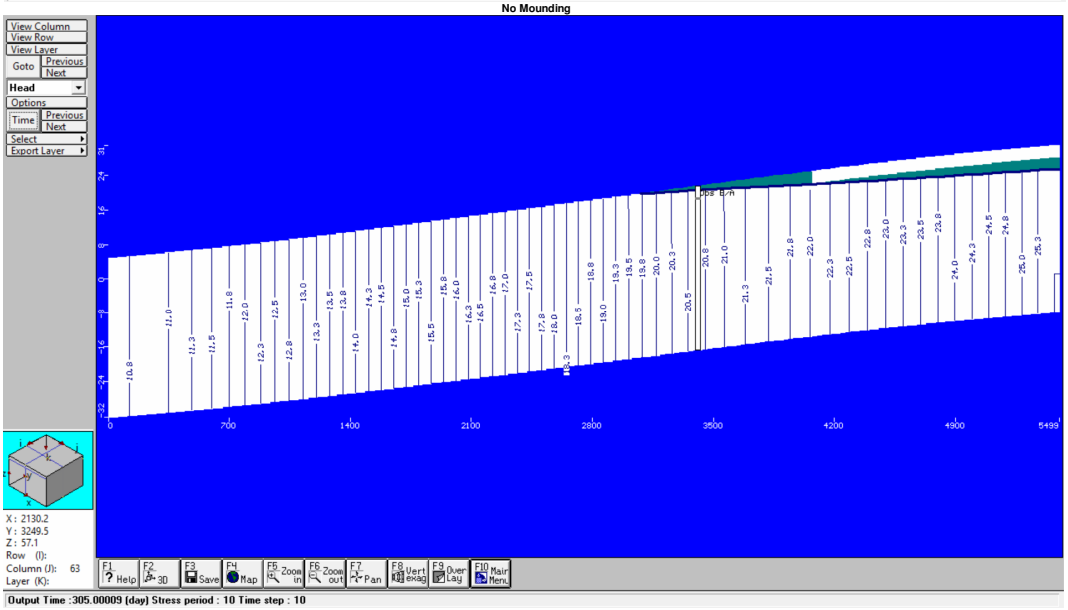
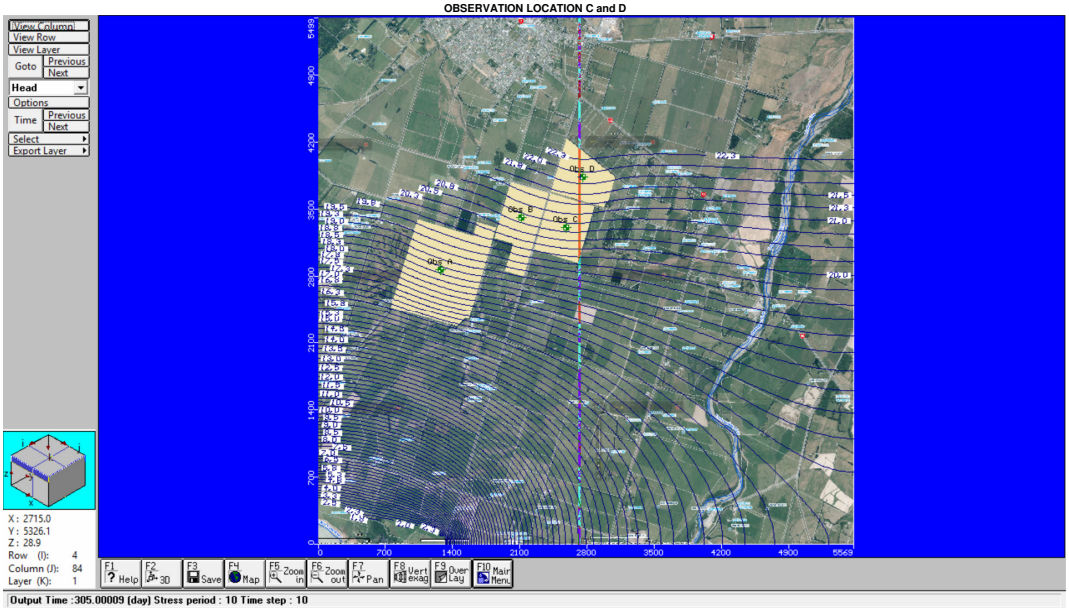


Peak Mounding

OBSERVATION LOCATION C and D



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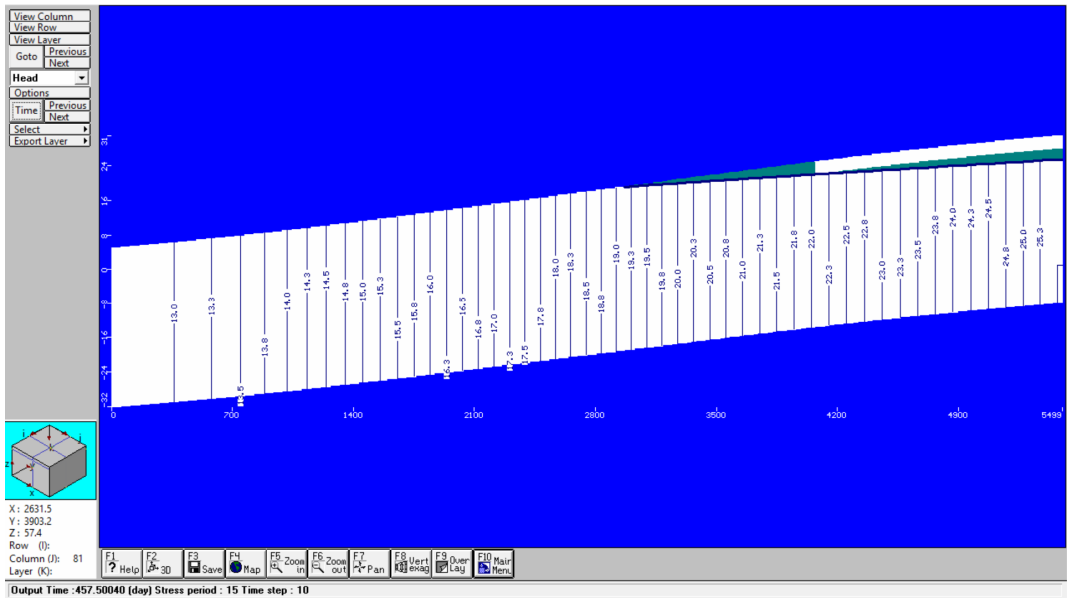

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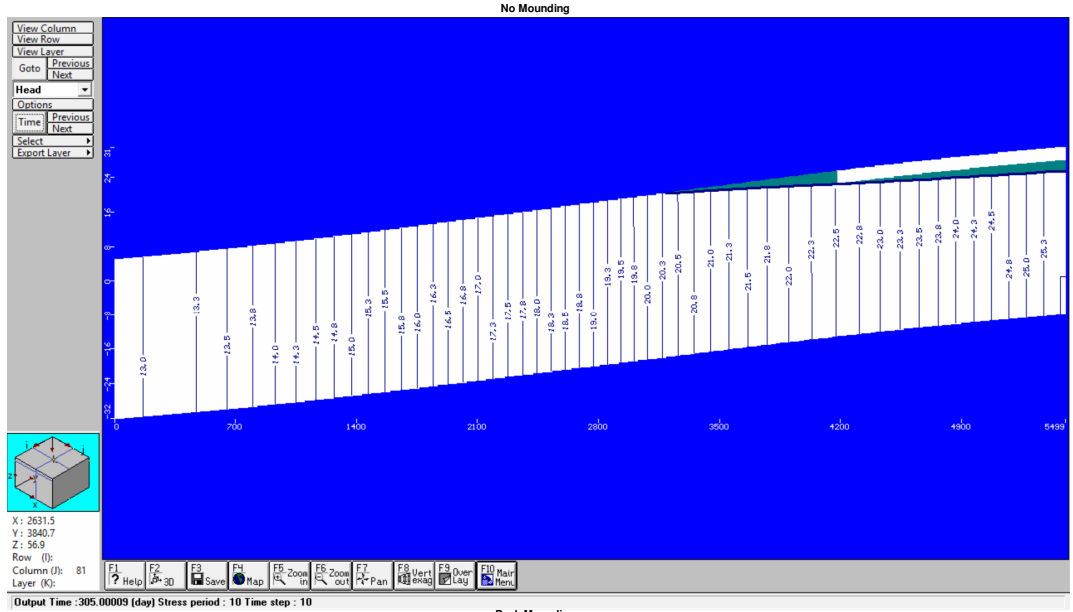
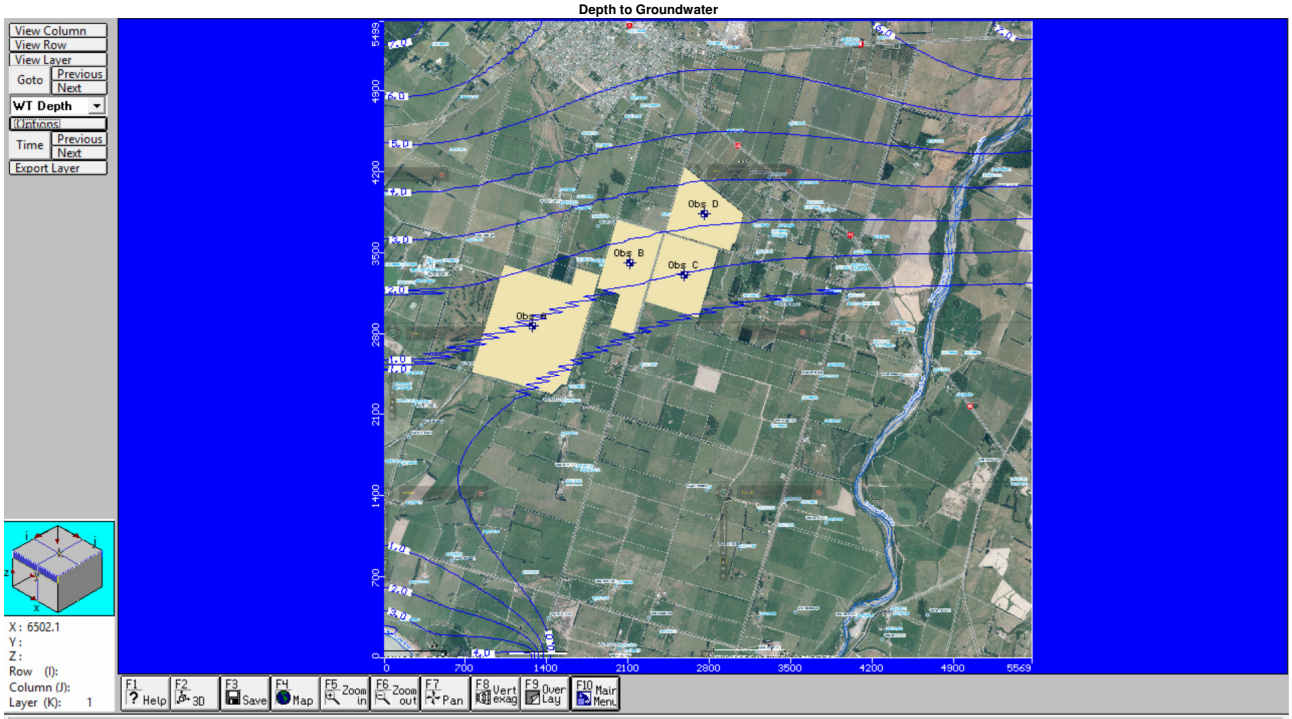


Peak Mounding

Depth to Groundwater



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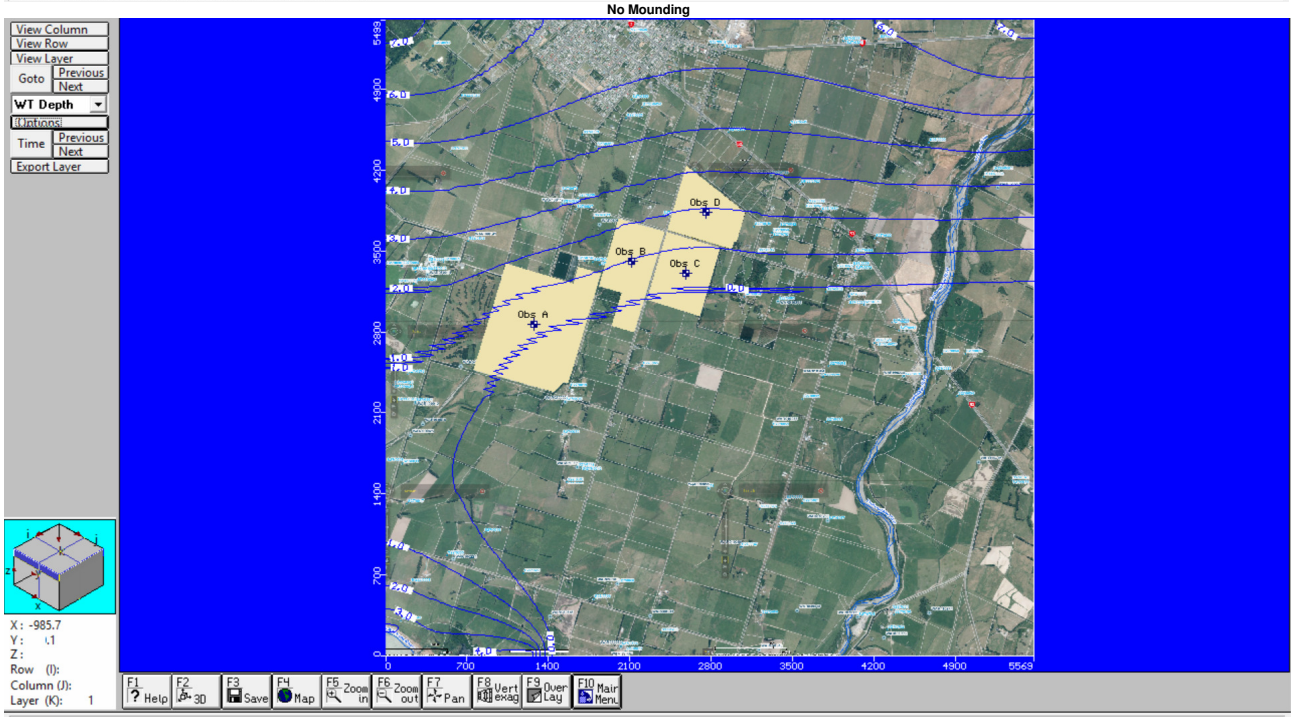

Peak Mounding