

# APPLICANT: KJ, DK, & SR ANDERSON

## REPORT OF KERI JOHNSTON

Consent ID	Description	Table 3 Location	Table 5 Location
CRC012019	To divert, take and use up to 9,504 cubic metres of water per day at a maximum rate of 110 litres per second from the Otamatapaio River for the spray and border dyke irrigation of pasture and winter crop on Bog Roy Station.	All other streams – Otamatapaio River	Upstream of Waitaki Dam but not upstream of the outlets of the glacial lakes
<b>Activity Status</b>			
<p><u>Rule 2, Table 3 WCWARP:</u> No allocation limit is specified for “all other stream”, and the minimum flow has been determined as the 1 in 5 year, 7 day low flow required in the WCWARP.</p> <p><u>Rule 6, Table 5 WCWARP:</u> The proposed annual volume is within the allocation limit for “Upstream of Waitaki Dam, but not upstream of the outlets of the glacial lakes.</p> <p><b>Overall status:</b> Any activity that complies with Rules 2 and 6 is a discretionary activity under Rule 15</p>			
Consent ID	Description		
CRC012033	To discharge up to 9,504 cubic metres of by-wash water and excess stockwater per day from an irrigation race, at a maximum rate of 110 litres per second into Lake Benmore.		
<b>Activity Status</b>			
<p><u>TRP:</u> As this application was lodged prior to the notification of Chapters four and five of the Proposed Natural Resources Regional Plan (PNRRP), it is the TRP which controls the activity status of this application pursuant to s88A of the RMA. The TRP has no provisions which authorise the discharge of water into water, therefore s77C(1)(a) of the RMA applies, and the activity is discretionary.</p>			

## 1 PROPOSAL

1. KJ, DK and SR Anderson (heron in referred to as “the applicant”) farm Bog Roy Station, adjacent to SH83, between Omarama and Otematata. Part of the property borders Lake Benmore.
2. The applicant is seeking the renewal of existing use rights WTK691232 and WTK691233, which authorise the taking of water from an unnamed tributary of the Otamatapaio River at a rate of 110L/s and a discharge of this amount into Lake Benmore.
3. The method of irrigation is currently border dyke irrigation; however, the applicant realises that with a greater emphasis on irrigation efficiency, the current irrigation system will need to be up-graded to a spray system and proposes to do this over a 5 year period. This includes the intake structure, which

currently consists of a concrete opening into a race, with flow controlled by opening and closing a gate.

## 1.1 Timeline and Summary of Significant Amendments made to the Applications

Timeline	CRC012019 and CRC012033
Date of Lodging	28 March 2001
First Notifiable Date	20 June 2003
WCWARP Notifiable Date	15 December 2006
Public Notification	4 August 2007

4. The applications were lodged in March 2001, seeking the renewal of existing use rights as described above. As the applications were lodged six months prior to the expiry of the above consents, the applicant is current operating under s124 continuation.
5. In December 2006, an annual volume of 2,146,176 cubic metres per year was proposed for irrigation and stock water purposes.
6. As a result of discussions with Meridian Energy Ltd regarding derogation approval, the annual volume was amended to 1,820,016 cubic metres per year.
7. It was also advised that work was being undertaken to determine appropriate minimum flows.
8. The Canterbury Regional Council was advised in April 2009 that the proposed minimum flow for this application was 200L/s to be measured at the footbridge on the Otamatapaio River, with flow-sharing to occur between 450L/s and 200L/s with Otamatapaio Station, who are also part of this hearing.
9. In July 2009, it was proposed to reduce the annual volume to 1,188,806 cubic metres per year on the fifth anniversary of the commencement of the consent. This volume was proposed to reflect the upgrade of the irrigation system from border dyke to spray irrigation, which requires less volume.
10. No other changes have been made to the applications.

## 1.2 Derogation Approval

11. Derogation approval was obtained from Meridian Energy Limited on 8 December 2008.

## 2 BACKGROUND INFORMATION

### 2.1 Property Details

12. The property currently runs beef cattle and sheep.
13. The property is 3,000 ha in total and consists of flatter country (closest to Lake Benmore) and gently rolling country.
14. 105ha is currently irrigated under resource consents WTK691232 and WTK691233 with water taken from the Otamatapaio River, using border dyke irrigation.
15. The irrigated land is vital to the economics of the operation allowing the applicant to grow winter feed and finish all the properties young stock.
16. Irrigation on Bog Roy has occurred since the 1960's, and prior to this, the race system now used to convey irrigation water around the property was used to supply stockwater. The applicant's grandfather constructed the race system and it is thought to have been put in place in the early 1950's. Therefore, it has been in existence for some time.

## 2.2 Water Source

17. The Otamatapaio River drains the Hawkdun and St Cuthbert Range, directly into the southern side of the Ahuriri Arm of Lake Benmore at Sailors Cutting. The Otamatapaio River has a catchment area above SH83 of 185km<sup>2</sup>. Corbies Creek also contributes to the Otamatapaio catchment.
18. The catchment altitude ranges from 360m up to 1850m, and the upper catchment has snow on the shady faces for much of the winter months and therefore low flows in the catchment are usually experienced in winter.
19. There are significant flow losses down the system below the Foot Bridge; however the losses are the greatest approximately 200 metres downstream of the Corbies Creek confluence where often in the summer months the river bed is completely dry.
20. The Otamatapaio supports fisheries common to high country rivers. These include common and upland bullies, common river galaxias, rainbow and more predominantly brown trout.

## 3 SUBMISSIONS

21. These applications were notified in 2003, as part of the “ministerial call-in”. A total of 314 submissions were received.
22. A summary of the 2007 submissions is as follows:

Resource Consent	Submissions in support	Submission in opposition	Neutral
CRC012019	2	12	2
CRC012033	2	11	2

23. Details of the submissions made in response to all applications that were publically notified at the same time in 2003 and 2007 are contained in CRC Report 1, Appendix 5. I have reviewed this report and adopt it as a true and accurate summary of the submissions received.
24. Details of the submissions received made individually on these applications are as follows:

Submitter	Issues	Support/ neutral/ oppose
Otamatapaio Station Ltd	Need to have a flow sharing arrangement.	Oppose
Meridian Energy Ltd	The rate and volume does not reflect actual and reasonable use, effects on water quality, flow metering requirements.	Oppose
Central South Island Fish and Game Council	Request a minimum flow of the 1 in 5 year, 7 day low flow (thought to be 300L/s at the time of the submission).	Oppose

Submitter	Issues	Support/ neutral/ oppose
The Department of Conservation	Potential effects on in stream values given high cumulative rate of take from the catchment.	Oppose

25. The applicant and Otamatapaio Station have agreed to a minimum flow and are committed to flow sharing, having signed a Memorandum of Understanding on 23 September 2009.
26. Derogation approval has been obtained from Meridian Energy Ltd. The applicant will install a flow meter, and has provided mitigation to ensure that effects on water quality are minor.
27. Fish and Game and the Department of Conservation support the proposed minimum flow of 200L/s, which has been calculated as the 1 in 5 year, 7 day low flow.

## 4 CRC012019 - TAKE AND USE CONSENT - ASSESSMENT OF ENVIRONMENTAL EFFECTS

### 4.1 Effects on other water users

Effects on other water users	
<b>Comments</b>	<p>This is the renewal of an existing water right. No increase in rate or weekly volume (as currently authorised) is being sought, and the applicant has proposed a minimum flow in accordance with Table 3 of the WCWARP. A Memorandum of Understanding, including a flow sharing regime has been signed by all water users in the catchment.</p> <p>The CRC reporting officer for these applications agrees that effects on other water users are minor</p>

28. Other users in the catchment include Otamatapaio Station, Bog Roy Station, Otematata Station and Rostriever Station who seek to renew water resource consent to take and use 110L/s from Corbies Creek, a tributary of the Otamatapaio River (CRC012017), for irrigation and stockwater (which whilst the same applicant as this report relates too, is a separate application).
29. Otematata Station also seeks consent to take water from the Glen Bouie Stream which is a tributary of Corbies Creek.
30. Boraman Consulting Ltd installed a flow recorder on the Otamatapaio River in 2004. This information has been used to determine the required minimum flow on the Otamatapaio River and will also be used to develop a flow sharing arrangement between the water users.
31. The applicant and Otamatapaio Station have a long history with the Otamatapaio River main stem and how the resource has been used, and each submitted on the opposing applications.
32. Considerable work has gone into improving relations between the two properties and all water users have agreed to work together to manage the Otamatapaio River flows in the range of 450L/s to 200L/s (the range when reductions would need to be implemented to maintain flows above the minimum flow for as long as possible). This has been formalised with a Memorandum of Understanding (MOU) to which has been signed off by all Otamatapaio River catchment. Furthermore the opposing submissions between the applicant and Otamatapaio Station have been removed.
33. A telemetered water level recorder will be installed at the minimum flow site.
34. Mitigation is proposed restricting the rate of take and volume per week, and commitment to the establishment of a flow sharing committee.

35. Given this, effects on other users are considered to be minor.

## 4.2 Effects on ecosystems

Minimum flow requirements	
Proposed Environmental Flow Regime	All other rivers and streams
<b>Comments</b>	<p>The applicant has proposed a minimum flow in accordance with Table 3 of the WCWARP.</p> <p>The applicant is proposing to upgrade the existing irrigation system within a 5 year time frame, at which point, a fish screen will be installed in accordance with recommended guidelines. This is supported by Fish and Game and the Department of Conservation.</p> <p>The CRC reporting officer for these applications agrees that effects on ecosystems are minor provided fish screen is suitable.</p>

36. The applicant has proposed a minimum flow required under the WCWARP for the Otamatapaio River which for “all other rivers and streams” is the 1 in 5 year, 7 day low flow. This minimum flow was specified in the WCWARP to ensure that the aquatic values of the stream are protected.
37. Boraman Consulting Ltd installed a flow recorder on the Otamatapaio River in 2004 and this information has been used to determine the minimum flow. Hydrology evidence has been given by Mr Dave Boraman of Boraman Consulting Ltd.
38. The minimum flow determined is 200 L/s at the Foot Bridge on the Otamatapaio River. The Foot Bridge is located upstream of all abstractions.
39. The minimum flow has been agreed with the Canterbury Regional Council and Fish and Game. From verbal communications with the Department of Conservation, it is understood that they also accept this minimum flow.
40. At present, the applicant uses a surface intake structure to take water and the current intake would not allow an easy “retro-fit” of a fish screen. A separate structure would need to be installed in the race immediately downstream of the intake, at a cost of between \$3000 and \$5000. The new intake will be designed to incorporate a fish screen that meets the requirements of the NIWA Report.<sup>1</sup>
41. This has been proposed as a condition of consent (refer Appendix B) and has been agreed to by Fish and Game and the Department of Conservation (by e-mail dated 24 August 2009).
42. Policy 28 of the WCWARP provides for recognition of the value of investment when an application for replacement is considered, and also whether all reasonable attempts have been made to meet the efficiency expectation of the plan.
43. It is because of the efficiency expectations that the applicant has made a commitment to up-grade their intake and irrigation system, but financially, this cannot happen straight away. However, the applicant has proposed a five year time frame, which is considered to be reasonable, to allow the up-grade to occur, with full support from Fish and Game and the Department of Conservation
44. It is also noted that this is an existing activity, and the continuation of abstraction in its current form will not cause any change in existing effects, and that the proposed over five years will enable the best system to be installed, and have positive results.
45. Given this, effects on in-stream values are considered to be minor.

<sup>1</sup> Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007”.

### 4.3 Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	
<b>Land Use</b>	Mixed (cropping, and pasture for fattening sheep and beef cattle)
<b>Area to be irrigated (hectares)</b>	105
<b>Method of application</b>	Currently border dyke, with conversion to spray within 5 years
<b>Daily application depth</b>	6.5mm
<b>Return period</b>	8 days in 10
<b>Application depth per return period</b>	52mm
<b>Soil profile available water</b>	Eweburn 45mm Grampians 90mm (Soils information supplied by Mr T Webb, Landcare Research).
<b>Effective Irrigation Season Rainfall</b>	180mm
<b>Irrigation Seasonal volume (m<sup>3</sup>/year)</b>	1,339,200 m <sup>3</sup> /year reducing to  765,373 m <sup>3</sup> /year after 5 years
<b>Stock water Seasonal volume (m<sup>3</sup>/year)</b>	315,360 m <sup>3</sup> /year
<b>Race losses (10%) (m<sup>3</sup>/year)</b>	165,456 m <sup>3</sup> /year reducing to  150,417 m <sup>3</sup> /year after 5 years
<b>Comments</b>	<p>The proposed irrigation annual volume for the current system is based on its design system capacity of 1500mm/ha/year, for a 155 day irrigation season. The irrigation season length is that determined by Mr Rob Potts as the average number of days in the Upper Waitaki Catchment for a border dyke irrigation system.</p> <p>The proposed irrigation annual volume for the spray system (5 year upgrade) is based on Irricalc. More detail is given on this method below.</p> <p>The proposed stock water volume is based on 10L/s continuous flow. This is because of the required head for conveyance along the race network. Water that is not taken for stock water is discharged into Lake Benmore.</p> <p>The CRC reporting officer for this application does not agree with the proposed irrigation annual volume for the spray system.</p>

46. Policy 16 of WCWARP requires all applications for irrigation to meet a reasonable use test in relation to the instantaneous rate of take and the annual volume, including consideration of irrigation system

operation and management (Policy 16(a)), and an irrigation application efficiency of at least 80% (Policy 16(b)).

47. Generally, border dyke irrigation has the perception of being an inefficient method of irrigation. In *"Selection of Irrigation Methods for Agriculture (1999)"*, AJ Clemmens published a schedule of attainable irrigation efficiencies for a range of irrigation system types.
48. Clemmens proposes that border dyke irrigation is capable of achieving between 50% and 90% efficiency. Centre pivots, for comparison, should be capable of achieving between 70% and 90% efficiency.
49. The applicant's border dyke system has been in place for many years, and utilises available fall to gravity feed the system. However, there are efficiency gains to be made, and the applicant acknowledges this.
50. There are two areas where irrigation efficiency can be improved. The first is "how evenly water is being distributed" and the second is "how well the system is managed" (are the taps turned on and off at the right time).
51. With the border dyke system in the mean time, it is not easy to change how evenly the water is distributed, but irrigation management techniques can be implemented straight away. The applicant also proposes to install a soil moisture measurement system within all irrigated areas to ensure that irrigation only occurs when it is needed.
52. Furthermore, the applicant has made a commitment to ensuring efficient irrigation practices and proposes to phase out border dyke irrigation on areas where a spray system can easily be installed (on the flat land adjacent to the lake). This is where the largest efficiency gains can be made.
53. The proposed condition acknowledges that the applicant already has an irrigation system, and policy 28 of the WCWARP recognises the value of investment of the existing consent holder, and this has to be given consideration, however, policy 28 also requires a consent holder to take all reasonable attempts to meet the efficiency expectations of the plan, and the applicant is doing this by committing to a 5 year plan to upgrade the system, therefore, reducing the volume of water needed.
54. The irrigation volume needed once the upgrade is complete has been determined using Irricalc.
55. Policy 16 (c) of the WCWARP defines two alternative approaches for determining appropriate annual volumes for irrigation. These are as follows:
56. soil-moisture measurements, local rainfall and evapotranspiration modeling for the 1-in-5 year dry season (the year for which seasonal demand is exceeded in 20 percent of years);
57. or
  - i) the difference between peak total seasonal demand as shown in Table A1, Environment Canterbury Report U05/15 and the effective summer rainfall exceeded 80 percent of the time from an approved rainfall site.
58. The first method described is a soil water balance approach, and the second is more commonly referred to as Schedule WQN9v2.
59. Irricalc is a soil water balance approach developed by Aqualinc Research Ltd, and who carried out the modeling for this application. This method is a daily accounting system of the water entering and exiting the soil within the root zone of a particular crop.
60. Furthermore, Irricalc models the effect of all of the factors mentioned in Policy 16(a), namely land use, soil water-holding capacity and spatial variability, spatial and temporal rainfall and potential evapotranspiration variability, as well as irrigation system operation and management.
61. The model inputs are attached to this report as Appendix B.
62. Policy 19 of the WCWARP encourages the piping or otherwise sealing of water distribution systems to minimise water losses. The applicant considers that 10% conveyance loss is very small and this is partly due to the fact that the race system has been in existence since the early 1950's and has sealed over time, but it is a long network, and losses are still experienced.
63. Policy 21 of the WCWARP requires all water takes to be metered. To ensure that this application is consistent with this policy, the applicant proposes to meter their take.

64. Given this, effects of inefficient water use will be minor.

#### 4.4 Effects of the use of water on water quality

<b>Effects on Water Quality</b>	
<b>Comments</b>	<p>The CRC reporting officer for these applications is not currently satisfied that effects of water quality are minor.</p> <p>Cumulative effects on water quality have been addressed by Mackenzie Water Resources Limited (MWRL) and are summarized below.</p> <p>Local effects have also been addressed below</p>

65. The calculated nutrient mitigation requirement of the receiving environments determined in the MWRL Study has identified an N and P threshold for each property.

66. "OVERSEER® has been RUN by a QUALIFIED person to model the N and P outputs from the proposed farming system. The results of the model have been incorporated in to the table below. The following table shows that the applicant can meet the property thresholds proposed by the MWRL study.

	<b>Nitrogen Threshold (kg/farm)</b>	<b>Phosphorous Threshold (kg/farm)</b>
MWRL Water Quality Study Property Thresholds	8,834	237
OVERSEER® outputs	8,511	96

67.

68. The applicant is committed to implementing the "Mandatory Good Agricultural Practices" set out within the FEMP (see Appendix E). Implementing these practices ensure that the OVERSEER® results are validated. This along with ensuring that the property thresholds of the WQS (set out in the table above) are not exceeded will ensure that the cumulative effects of the use of water for irrigation on water quality are no more than minor.

69. Whilst the applicant is within their property thresholds, the MWRL Study identified that the applicant still has to consider specific on farm effects and the impacts these activities could have on the local receiving environment. This requires a specifically developed Farm Environmental Management Plan (FEMP) to identify and implement appropriate mitigation measures set out in the draft attached (see Appendix E).

70. At a workshop held in Twizel in August 2009, the applicants met with Ms Melissa Robson of GHD Limited. A "desk top" on farm risk assessment was undertaken. This is considered to be the "starting point" of the FEMP.

71. The workshop identified potential on farm risks specific to each farm along with possible mitigation measures. The on farm risks identified during the desktop risk assessment need to be verified by an appropriately qualified person who has carried out a site visit. It is anticipated that this will occur should the applications be granted. For this property, the following potential risks were identified:

- Evidence of erosion
- Runoff from winter feed crops
- Laybacks from waterways from fertiliser application
- Timing of P fertiliser on border dykes
- Track runoff - check
- The Otamatapaio River
- Tailgate water from border-dykes until conversion to spray is completed

- Fencing off water races
72. The applicant has committed to carrying out a full on farm risk assessment, proposing mitigation, monitoring and auditing will occur within 12 months of the commencement of the consents (as these applications seek renewal of existing activities), and this has been proposed as conditions of consent. All risks will be addressed in a Farm Environmental Management Plan (FEMP).
73. Given that the N and P thresholds from the MWRL Study can be met, and the applicant's commitment to addressing on farm risks with the implementation of the FEMP, the effects of the use of water on water quality for both the local receiving environment and cumulative effects are considered to be minor.

#### 4.5 Effects on people, communities and recreational value, including landscape

Effects on People, Community and Recreational Values, including Landscape	
<b>Comments</b>	<p>Landscape effects have been addressed by UWAG's Landscape Architect, Mr Andrew Craig, who considers that this proposal will have a minor effect on landscape values.</p> <p>An appropriate minimum flow is proposed and the applications are within allocation limits set by the WCWARP, therefore effects on people, communities and recreational values are minor.</p> <p>The CRC reporting officer for these applications is satisfied effects are minor subject to conditions.</p>

##### 4.5.1 Landscape

74. This is an application to renew existing water rights.
75. Bog Roy has a "visible" irrigation area between SH83 and Lake Benmore, but irrigation has been occurring on this property since the 1960's. The property is part of an already substantially modified rural environment, whereby cultivation and fencing occur regularly, and where power lines and many buildings exist and are highly visible also.
76. The applicant has a defined area to be irrigated.
77. Mr Andrew Craig is a landscape architect who is providing general and specific recommendations on behalf of UWAG clients to this hearing. His conclusions reflect that the general effects on the MacKenzie landscape of these applications within the basin will be significantly less than minor. I adopt his recommendations to the committee.

##### 4.5.2 People, communities and recreational values

78. The applicant has proposed an appropriate minimum flow condition in accordance with the WCWARP for the water body from which they have applied to take and use water. A minimum flow is considered to adequately protect people, community and amenity values within the rivers specific to each applicant.
79. The activities all occur in a rural setting, where the dominant land use is pastoral farming. Given that the proposed activities all occur on private farmland; as such the use of water is unlikely to adversely affect amenity values.
80. The WCWARP sets an annual allocation "cap" for agricultural and horticultural activities within defined areas (Table 5). The applicant has proposed an annual allocation limit for their own resource consents for the use of water, as well as implementing Farm Management Plans, which require existing irrigation systems to be audited and improved where possible, and new systems to be designed and installed by accredited personnel, and implementing initiatives to ensure that water is used wisely.
81. The primary objective of an annual allocation is to ensure that the water is used efficiently and effectively for the land use, soil type and climatic conditions. The applicant has proposed an annual

volume that is considered to reflect reasonable and actual use and this is within the allocation limit defined by Table 5.

- 82. It is also noted that take is within the bounds set in Table 3 of the WCWARP. Table 3 is set to protect in-stream values and effects on other users. It has an “environmental” focus.
- 83. Therefore, given the applicant’s commitment to ensuring efficient use of water on their properties, and that the take is within allocation limits set to protect in-stream values and other users, it is considered that effects on people and communities will be minor.

#### 4.6 Effects on Tangata Whenua Values

Effects on Tangata Whenua	
<b>Comments</b>	The CRC reporting officer for these applications considers the effects on Tangata Whenua are uncertain and may therefore be more than minor

- 84. Te Runanga O Ngai Tahu submitted on all applications in the catchment, seeking that all applications be declined.
- 85. The primary reasons for this were that the applications were considered to be inconsistent with the policies and objectives of the WCWARP, and also at odds with the cultural objectives of the RMA.
- 86. This application is entirely within the limits defined by the WCWARP. Te Runanga O Ngai Tahu had considerable input into the creation of the WCWARP.
- 87. However, it is acknowledged that Te Runanga O Ngai Tahu have a significant relationship with the Waitaki Catchment, and as such, appropriate minimum flow conditions, and management of water quality effects, is proposed by the applicant to ensure that the potential effects on the environment, including tangata whenua values are minor.

## **5 CRC012033 – DISCHARGE CONSENT - ASSESSMENT OF ENVIRONMENTAL EFFECTS**

### **5.1 Effects on flood carrying capacity and erosion**

88. When water is discharged into a waterway, the flow, and potentially the velocity, of the receiving water body is increased, thereby increasing the volume of water in the water body and potentially scouring the banks where the discharge occurs.
89. Lake Benmore is a large, well established waterbody also, meaning they are less subject to erosion. It is also noted that the discharge has been occurring since the early 1950's and there is no evidence of any erosion having occurred.
90. Given this, effects on flood carrying capacity and erosion will continue to be minor.

### **5.2 Effects on water quality and ecosystems**

91. The water that is discharged into Lake Benmore is excess water that is diverted as well as irrigation by-wash water from the border dyke system.
92. The discharge may contain some contaminants, but Lake Benmore is a large body of water relative to the discharge.
93. The discharge will also be addressed through the FEMP process, and has been identified already as a farm specific risk.
94. Given this, effects on water quality and ecosystems will continue to be minor.

### **5.3 Effects on other water users and amenity values**


95. When water is discharged there is the potential to cause adverse effects on other users of the water body due to the contamination of the water, or create an unsightly plume that may affect amenity.
96. In this case, the receiving water body is Lake Benmore. The volume discharged is a very small volume of water in proportion to the volume of water in the lake.
97. Therefore, effects on other users and amenity values will be minor.


### **5.4 CONCLUSIONS**


98. The potential effects associated with the divert, take and use of water, and the discharge of water have been assessed and are considered to be minor.

# APPENDIX A – LOCATION PLAN SHOWING AREA TO BE IRRIGATED

**Bog Roy**  
Location Plan showing  
areas to be irrigated and  
Points of take and  
discharge

 CRC012019 area to  
be irrigated current  
(Anderson)

 CRC012019 divert

 CRC012033 discharge



99.

1  
2

KJ, DK & SR Anderson – CRC012019 and CRC012033



- Irrigation application efficiency of at least 80 %.
- Within NRRP system capacity limits (a maximum of 0.8  $\ell$ /s/ha (or 6.9 mm/day)).

A summary of the important Irricalc input parameters are provided in Attachment A and a summary of the important output parameters are provided in Attachment B.

# Attachment A

Property	Resource Consent	Irrigation Method	Soil PAW mid (mm)	Proportion Area of Irrigation Area (ha)	Application Depth (mm)	Return Interval (days)	Christiansen Uniformity (%)	Trigger for Starting Irrigation	Rooting Depth (mm)	Landuse
K.J., D.K. and S.R. Anderson	CRC012017	Spray	45	27	20.7	3	85	50% of PAW	500	Pasture
			50	23	20.7	3	85	50% of PAW	500	Pasture
			80	108	34.5	5	85	50% of PAW	500	Pasture
			90	48	41.6	6	85	50% of PAW	500	Pasture
			100	4	48.3	7	85	50% of PAW	500	Pasture
	CRC012019	Border-dyke	45	26	85	14	70	50% of PAW	500	Pasture
			90	79	85	14	70	50% of PAW	500	Pasture

# Attachment B

Property	Resource Consent	Soil PAW mid (mm)	Proportion Area of Irrigation Area (ha)	Application Efficiency (%)	Irrigation Water Use (mm/yr)	Annual Volume (m <sup>3</sup> /yr)
K.J., D.K. and S.R. Anderson	CRC012017	45	27	80	744	200,994
		50	23	80	728	167,325
		80	108	80	678	731,786
		90	48	80	699	335,581
		100	4	80	687	27,463
	CRC012019	45	26	70	668	173,801
		90	79	70	749	591,572

# APPENDIX C – PROPOSED CONDITIONS

Have used CRC proposed resource consent conditions and tracked changes.

100. Please note that conditions relating to water quality thresholds and FEMP's are to be added.

Recommended draft conditions for water permit CRC012019		
No.	Condition Code <sup>2</sup>	Details
<b>Divert &amp; Take</b>		
1	WP01 (modified)	<p><i>Name of waterbody:</i> Otamatapaio River</p> <p><i>Map reference:</i> NZMS 260 H40:7868-2126</p> <p><i>Instantaneous rate:</i> 110 litres per second</p> <p><i>Volume:</i> 9,504 cubic metres per day and 1,820,016 cubic metres between 1<sup>st</sup> July and the following 30<sup>th</sup> June for the first 5 years after commencement of consent.</p> <p><i>Volume:</i> 9,504 cubic metres per day and <del>1,062,996</del> <b>1,231,150</b> cubic metres between 1<sup>st</sup> July and the following 30<sup>th</sup> June following 5 years after commencement of consent.</p>
<b>Use</b>		
2	WP04	<p><i>Type of irrigation:</i> Border-dyke and Spray irrigation <b>and stock water</b></p> <p><i>Number of hectares:</i> 105 hectares</p> <p><i>Use:</i> crops and pasture for grazing stock excluding milking dairy cows</p> <p><i>Plan No:</i> "CRC012019" (Attachment 1)</p>
3	WP05	Efficiency of use
4	WP06	Backflow preventer
<b>Mitigation</b>		
5	WP07	<p><i>Name of waterbody:</i> Otamatapaio River</p> <p><i>Map reference:</i> NZMS 260 H40:759-168</p> <p><i>Minimum flow:</i> 200 litres per second</p> <p><del><i>Flow graph:</i> See Report 2A</del> <b>Refer to Mr Dave Boraman for proposed flow sharing condition</b></p>
6	WP09	Fish screen – or gallery with minimum depth below river of 2 metres <b>amend to reflect "by the fifth anniversary of this consent, the consent holder shall have..."</b>
7		The consent holder shall ensure water races used to convey water diverted in terms of this permit are well maintained to minimise losses.
8		The consent holder shall cease irrigation using border-dyke systems and convert the property to spray irrigation within 5 years from the date of

<sup>2</sup> See Report 1, Appendix 6 for condition code and wording.

		commencement of this consent.
<b>Measuring &amp; Metering</b>		
9	ME03	Open channel
10	ME04	
11	ME05	
12	ME06	
13	ME07	<i>Waterway:</i> Otamatapaio River
14	WP08	<i>Waterway:</i> Otamatapaio River <i>Map reference:</i> NZMS 260 H40:759-168 <b>To be used with ME03-05</b>
<b>Administrative Conditions</b>		
15	AD01	
16	AD02	<i>Number of working days:</i> 5 <i>Month 1:</i> March <i>Month 2:</i> July <i>Waterbody:</i> Otamatapaio River <i>Cross reference to Condition:</i> 5
17	AD04	Lapse date

<b>Recommended draft conditions for discharge permit CRC012033</b>		
<b>No.</b>	<b>Consent Code<sup>3</sup></b>	<b>Details</b>
<b>Scope</b>		
1	DP01	<i>Waterbody from:</i> irrigation race <i>Waterbody to:</i> Lake Benmore <i>Map reference:</i> NZMS 260 H40:801-224 <i>Discharge rate:</i> 110 litres per second <i>Plan:</i> "CRC012019" (Attachment 1) <i>Other:</i> The water shall be excess irrigation and stock water.
<b>Operation and Maintenance</b>		
2	DP02	<i>Waterbody:</i> Lake Benmore
3	LU13 modified	The discharge shall not occur in a manner likely to cause erosion of, or instability to, the banks or bed of Lake Benmore.
4	DP03	
5	DP04	<b>Not needed</b>

<sup>3</sup> See Report 1, Appendix 6 for condition code and wording.

<b>Administrative Conditions</b>		
6	AD03	Review
7	AD04	Lapse date

## APPENDIX D – PHOTO GALLERY



**Intake**

# APPENDIX E – DRAFT FARM ENVIRONMENTAL MANAGEMENT PLAN (FEMP)