BEFORE THE COMMISSIONERS ON BEHALF OF THE OTAGO REGIONAL COUNCIL

Consent No. RM16.093.01

BETWEEN	**CRIFFEL WATER LIMITED**
	Applicant
AND	**OTAGO REGIONAL COUNCIL**
	Consent Authority

BRIEF OF EVIDENCE OF GEORGE RICHARD COLLIER

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BRIEF OF EVIDENCE OF GEORGE RICHARD COLLIER

Background

1. My full name is George Richard Collier.

2. Qualifications & Experience

3. My name is George Richard Collier and I am a Chartered Accountant and hold a Batchelor of Agricultural Commerce Degree and a Post-Graduate Diploma in Agricultural Science.

4. I am a Registered Farm Management Consultant residing in Alexandra and a Director and Partner of ICL Limited, Chartered Accountants. I am a member of the Rural Advisory Committee for Chartered Accountants New Zealand and Australia. I have 25 years' experience of working with farming businesses in Central Otago.

5. I confirm that I have read and am familiar with the Code of Conduct for expert witnesses in the Environment Court. I agree to comply with that Code. Other than where I state I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

6. ICL Limited Chartered Accountants have many farming clients throughout Central Otago.

7. Our services include accountancy and business advice to a wide range of commercial clients, including farming businesses. Part of that service involves examining the likely rates of return on proposed farm capital expenditure for the purposes of obtaining bank funding. We have 30 staff, including five Directors/Partners and have staff located in Alexandra, Ranfurly, North Canterbury and Southland.

8. I have been engaged by Criffel Water Limited to determine the economics of irrigating further land with varying lengths of an irrigation consent and the impact on the existing farming systems that are in place with a varying lengths of an irrigation consent

Methodology

9. I have researched the pasture yields for both dryland and irrigated pasture yields under the existing farming systems.

10. I have then factored in the amount of pasture utilised (eaten and consumed) by livestock. This is measured in Kilograms of drymatter.

11. I have obtained information on the cost of the irrigation schemes from Roger Simpson, Irritech Otago Limited. The information provided included the capital cost of developing K-Line and Centre Pivot irrigation and the delivery system required for the existing and proposed new irrigation so that water would be delivered to the existing and proposed new irrigation areas in an efficient manner.

12. I have calculated the cost of the existing irrigation schemes per kilogram of dry matter consumed for Centre Pivot and K-Line Irrigation and this has been worked out on the basis of three different lengths of for an Irrigation consent being 10 years, 25 years and 35 years.

13. I have calculated the returns for the current classes of livestock being run on land presently irrigated by Luggate Creek.

14. I have then calculated the difference between the current status quo livestock returns and growing feed under irrigation with different irrigation consent periods of 10, 25 and 35 years.

15. I have then made some economic observations about the implications of having a 10, 25 and a 35 year consent.

Feed Grown Dryland and Irrigated

Table 1: Kilograms Dry matter Per Hectare

	Dryland	Irrigated K-line	Irrigated Centre Pivot
Kg Dry Matter/Hectare /Annum	3,255	11,000	13,000
Feed Utilised	80%	80%	80%
Feed Eaten by Livestock(Kg DM)	2,600	8,800	10,400

Dryland Pasture Yields

16. Two drylands sites have been measured for pasture production at Luggate with Lucerne as the base pasture.

    These sites were measured over a five-year period and the average yield across both sites over the five years was 3,255 kg dry matter/hectare.[1]

Irrigated Pasture Yields

17. Central Otago has the driest climate (with rainfall at Luggate being measured at 520 mm) in New Zealand and therefore has the greatest response to irrigation of anywhere in New Zealand

18. The most common irrigation systems for pastural farmers is K-line and Centre Pivot.

K-Lines Irrigation:

19. K-Line irrigation is an irrigation system that is a towable pipe with a number of pods attached to it and is manually shifted on a daily basis.

20. The placement of these pods can influence the amount of grass grown.

21. The amount of water applied tends to be a larger amount than a Centre Pivot, e.g. 40 to 70 mm per application within a 24 hour period with a return period of up to 10 days.

22. Pasture Yields have been calculated for Criffel Station by Allan Agricultural Consulting limited for both K-Line and Centre Pivot by calculating livestock performance and using a feed utilisation of 80%. This was calculated 3 years ago.

23. The pasture grown for K-line was calculated as 11,000 kg dry matter/hectare.

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[1] Publication: Invermay Technical Report 21, G.G. Cossens, Published February 1990

24. Compared to pivot irrigation, K-line systems have a lower capital cost but a higher operational cost due to the labour requirement for manually operating and shifting K-line systems.

Centre Pivot Irrigation

25. Centre Pivot Irrigation applies water on a 1 to 2 daily basis and therefore applies a smaller amount per day, e.g. 4 to 6mm per day. The application of the water is more consistently accurate than K-lines.

26. The pasture grown for Centre Pivot was calculated as 13,000kg dry matter/hectare.

27. The operational cost of pivot irrigation relates to energy (electricity) where pump systems are used. Pivots are highly automated and so labour cost is minimal.

Pasture Utilisation

28. Of the total dry matter grown, only 75 to 80% is utilised or consumed by livestock of feed. The 20% that is not consumed by livestock is typically trampled by livestock. I have assumed livestock consume 80% of the irrigated pasture on offer to them.

Financial Returns of Livestock

29. The returns of livestock currently farmed on the Luggate Properties using irrigation have been calculated and are listed below.

30. The income for livestock is calculated on the basis of Total income minus direct costs to obtain the income. In effect a gross margin for each class of livestock. Direct costs could include items such as animal health, shearing expenses for sheep, freight for livestock and winter feed, The financial gross margin for each class of livestock is then divided by the amount of feed consumed by that class of livestock to obtain the financial gross margin per kilogram of feed for each class of livestock

31. The livestock returns are based on the average returns that farmers have achieved on average over the last 5 years.

Table 2: Net Returns of Livestock (Cents Per Kg of feed eaten)

Farming System	R2 Year Bulls	Finishing 18Month Bulls	Weaner Stag Finishing	Breeding Hinds Selling Fawns	Velveting Stags	Half-bred Ewes, Finishing Lambs
Nett return per Kg Dry Matter consumed	17.0	19.0	19.6	13.1	22.2	20.1

32. The average return across all livestock classes is 18 cents per kg Dry matter consumed.

33. If we excluded breeding hinds which only spend a limited amount of time on irrigation, the average return is 19.6 cents per kg Dry matter consumed. This has some relevance as the breeding Hinds are run on the irrigated area for only a short period every year.

Cost of Growing Feed Under Irrigation

34. The cost of feed grown under irrigation is dependent on several variables which include:

    (a) The increase in grass grown over dryland (refer Table 1)

    (b) The extra capital costs including:

        (i) Delivery system for irrigation

        (ii) The Irrigation system installed, e.g. Pivot or K-line

        (iii) The cost of repasturing, fencing, stock water, soil fertility.

The additional running costs over and above dry farming including:

Table 3 :Cost of Extra Capital Per Hectare For Irrigation Development

	K-Line $/Hectare	Centre Pivot $/Hectare
Delivery Pipes as Costed Reference :Irritech	$1,808	$1,808
Physical Irrigation Infrastructure including Mainline :	$3,120	$6,000

Reference Irritech		
Re sowing pasture, fencing, fertiliser, stock water	$1,800	$1,800
Development Cost per Hectare	**$6,728**	**$9,608**

Table 4 : Summary of Running Costs for Irrigation Per Hectare

	K-Line $/Ha	Central Pivot $/Ha
Insurance costs @ 1.5% of above ground pivot cost	_	$ 50
Annual maintenance	$ 50	$ 50
Extra fertiliser over and above dry land	$130	$155
Annual water supply cost	$ 25	$ 25
Shifting costs (People, Vehicle, pivot power)	$216	$ 50
Interest on cost of extra capital @ 5%	$300	$444
Depreciation of Irrigation Asset		
10 Year Consent	$493	$781
25 Year Consent	$197	$312
35 Year Consent	$140	$223
Total Costs		
10 Year Consent	$1,300	$1,566
25 Year Consent	$ 1,005	$1,098
35 Year Consent	$ 948	$ 1,008

Table 5: Costs, cents Per Kg Dry Matter Grown and utilised Depending on Length of Consent

	K-Line	Centre Pivot	Average
10 Year Consent	21.0¢	20.1¢	20.6 c
25 Year Consent	15.2¢	14.1¢	14.7 c
35 Year Consent	14.1¢	12.4¢	13.3 c

Refer to Appendix for more detail

Table 6

Returns from Irrigation Compared to Cost of Feed Under Irrigation

	10 Year Consent		25 Year Consent		35 Year Consent
Return per Kg Drymatter Consumed (excludes Breeding Hinds)	18c		18c		18c
Cost per Kg Drymatter Under Irrigation	20.6c		14.7c		13.3c
Nett Return per Kg Drymatter	-2.6c		3.3c		4.7c
Kgs Drymatter per hectare consumed					
K Line	8,800		8,800		8,800
Pivot	10,400		10,400		10,400
Return per Hectare to Contribute to Overheads					
K Line	-$229		$290		$414
Pivot	-$270		$343		$489
$$ Return for 100 hectares of irrigation					
K Line	-$22,880		$29,040		$41,360
Pivot	-$27,040		$34,320		$48,880

Scheme delivery infrastructure upgrades

35. I have attempted to derive an economic return period for scheme efficiency upgrades but have not been able to do so.

36. The reason that deriving a payback period has not been possible is that the scheme efficiency upgrades relate to areas that are already irrigated. So there is no production gain (in drymatter yield) to be achieved by improving the water use efficiency of the water delivery network. The capital expenditure is all "sunk cost" to the farming system. The gains are to the river in so far as efficiency gains enable water to be left in the river rather than taken. It is beyond my expertise to derive a value for that.

37. The period over which infrastructure efficiency upgrades might be funded is a function of the capital available to each of the scheme shareholders, and is sensitive to the ability of each shareholder to service debt. It is perhaps relevant to observe that the scheme efficiency upgrades will be likely to be funded as part of the irrigation development that I have assessed and so I would expect that the terms of any offer of bank funding would be the same.

Discussion

38. The costs of extra pasture production for a 10 year consent for irrigation if the total investment in irrigation is expensed over the lifetime of the consent (excluding the pasture development of fencing, fertilizer, stock water and pasture renewal) is in excess of 20 cents per kg of dry matter utilised.

    (a) A 10 year irrigation consent will provide no financial return for any new irrigation development to proceed.

    (b) It is also marginal to consider upgrades to irrigation delivery infrastructure with a 10 year consent as this would add a further 2.5 cents to the cost of dry matter consumed.

39. A 25 to 35 year consent provides a positive return and therefore a positive economic case to be made for the investment.

40. The reason I have expensed the irrigation development over the period of the consent is that the residual value of the irrigation scheme is expected to be very low given that the only saleable items will be the above ground moving irrigators which would have to be dismantled and relocated.

41. There is some residual value in these but there will also be a regrassing cost of transferring the irrigated pasture back into a dryland pasture such as Lucerne, which would offset any residual value in the above ground irrigators.

Other Considerations for Length of an Irrigation Consent

42. New pastoral irrigation can often take two to three years to get to full production, so the cost of growing feed is often significantly higher in the initial years of the irrigation development.

43. A shorter irrigation consent period will have an impact on property value, and with that the value of the existing investment in irrigation infrastructure and the farming systems developed in reliance on the irrigation water.

44. The length of the irrigation consent can also have a material effect on the ability to access borrowed capital to fund development.

Date: 8 October 2019.

George Collier

Appendix:

Status Quo Prices Used for Calculating Livestock Returns

(this is the average returns for the last five years)

45. These figures have been supplied by Phil Tilter, Agfirst Pastoral Limited.

46. Half Bred Ewes Finishing Lambs:

Lambs Meat Price	$6.50/kg
Wool Price	$8.00/kg
Mutton Price	$4.50/kg

47. Bull Beef:

Autumn Schedule	$4.80/kg
Spring Schedule	$5.00/kg
Purchase Price Bull Calves	$410/head
Store Price as a % of schedule	52.4% for Rising 2 year bulls

48. Deer Returns:

Venison	$8.34/kg over the whole year
Venison	$7.84/kg April average price
Weaner Stags liveweight price	57% of the April Schedule
Velvet price	$110/kg