BEFORE INDEPENDENT HEARING COMMISSIONERS

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the hearing of submissions on Proposed Variation 2 (Hinds Plain) to the Proposed Canterbury Land and Water Regional Plan

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BRIEF OF EVIDENCE OF GRANT JOSEPH EARLY

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Introduction

1 I am a director of Ruapuna Farms Limited (RFL) with my wife Jan. RFL farms approximately 950ha of farmland within the Lower Hinds catchment at 901 Moorhouse Road, RD8 Ashburton. A map of the farm is included below.

2 The farm currently comprises 400ha of irrigated Dairy Platform, with an effective area of 375ha, and 550ha of non irrigated dairy support farmland, with an effective area of 520ha.

The dairy support farmland consists of 253 ha owned by us and a leased area of 297 ha. We are currently in our seventh dairy season.

3 The farm was converted to its current use in 2008 from dryland farm. Prior to the conversion the area which is now Dairy Platform was owned by my wife's parents, who have owned and farmed the land for four generations. My wife and I bought the 253 hectares of support block in 1993. I am the third generation of my family to farm in the Ruapuna district.

4 Irrigation water for the farm is sourced from two local schemes, Barrhill Chertsey and Mayfield Hinds Irrigation Scheme. Stock water is sourced from ground water and council water races and dairy shed water is sourced from groundwater.

Dairy Platform

5 The Dairy Platform contains 375 effective hectares and is fully irrigated with water from the Mayfield-Hinds and Barrhill Chertsey irrigation schemes. Mayfield-Hinds supplies 42 litres per second and Barrhill Chertsey supplies 124 l/s. This water is applied on the Dairy Platform between 1st October and 30th March each year.

6 1465 cows are currently milked on the Dairy Platform this season through an 80 bail rotary shed that has in-shed feeding, Protrac, automatic cup removers and walk-over scales. A heat detection camera was installed in the shed in 2014 to enable a more efficient mating period and enabled us to artificially mate for 10 weeks, using short gestation semen for the last 4 weeks.

7 We bring supplements onto the Dairy Platform, sourced from our dairy support unit and occasionally some grain, purchased through local feed merchants. Typically these comprise of approximately 1000-1100 tonnes of barley/wheat, kale for wintering cows, fodder beet for wintering calves, straw, silage grass and molasses.

8 At a stocking rate of 3.9 cows/ha, which we are currently running, the support farms have enough scope to supply all supplementation on the Dairy Platform as well as grazing for young replacement stock and winter feed requirements. We use barley or wheat as our main supplement as it fits in with the grass/winterfeed/cereal cropping rotation. Crop rotation predominantly cycles from grass to kale or fodder beet, then spring wheat followed by autumn wheat followed by autumn barley then back into grass for three to four years. This rotation results in approximately 150 ha winterfeed, 150 ha cereals and 200 ha grass.

9 Our aim is to utilise all grass grown on the Dairy Platform with grain and/or grass silage used when grass available is not sufficient to maintain the cow's diet. This is typically in the shoulders of the growing season (early spring and autumn), although some grain is kept in the system over the spring and summer in order to maintain good grass residuals, aid in helping improve in calf rates and cow body condition.

10 Any cropping rotation must be practical in terms of the weight of feed/seed grown on an annualised basis, ability of the plant variety to grow during the time within the rotation, cultivation required, soil moisture and temperature conditions throughout the year and profitability. There is an awareness now to also consider the environmental issues associated with any crop rotation. The FRNL project we are involved with (discussed below) is looking at ways to reduce nitrates entering the ground water through research into not only alternative pasture species on the dairy platforms, but also crop rotations on dairy support, arable and sheep and beef farms

11 This season we have employed seven full-time staff through a contract milker. Up until two years ago we employed all staff directly and we still maintain farm traditions with a pre-season, post calving and post season 'get together' with staff. Children of the staff attend the local Mayfield Primary School or Geraldine High School.

12 We like to support the local area when we can and undertake a number of fund raising activities from our Dairy Platform. We raise calves for the IHC, Mayfield School and the Church and graze cattle for the Southern Rugby Club and local golf club.

Dairy Support

13 Our dairy Support Unit is located adjacent to the Dairy Platform. It is a self-contained, dryland Support Unit growing cereals, wintering cows and grazing young stock on 520ha effective.

14 Our Support Unit grows all dairy grain and straw requirements for the Dairy Platform. Currently, 150ha grows cereals, 150ha is planted in winterfeed and the balance of the support unit is planted in pasture. We use arable and winter feed advisors to ensure the crops planted are appropriate for the results we wish to achieve, in order to provide for Dairy Platform supplementation and winter feed requirements.

15 We directly employ two full time permanent staff on the Support Unit, one of whom has been with us for 29 years, the other for 10. We also employ 4 part-time calf rearers between August and December. We live on Moorhouse Road, one of the blocks within the Support Unit.

Irrigation

16 We enjoy approximately 950mm of rain a year on average, based on data dating back to 1966. The cost benefit of irrigation in the Ruapuna area is not as great as an area with shallower soils and lower rainfall; however it is the variability within the years and between months which we manage with irrigation. It allows us to dairy farm confidently regardless of the season. This may become increasingly important as our data shows the annual average rainfall has decreased.

17 We are part of a reliable scheme, and use efficient overhead spray irrigation. Water is applied only when required. In other words, there is no over watering in case we are running into a dry period with possible water restrictions.

18 In December 2010 we installed four half pivots on the farm and in spring 2014 two three-quarter corner pivots were installed along with some K Line and long line irrigation over the remaining area. Because we converted directly from dryland we have only ever used spray irrigation on the farm with annual costs of $500/ha plus interest costs on shares and on farm infrastructure of approximately $600/ha.

19 We have a 5ha storage pond with a capacity of approximately 100,000 cumecs that holds both Mayfield Hinds and Barrhill-Chertsey water. Barrhill Chertsey pressurise the water from the pond. We attempt to keep the pond full through management of our scheme takes, as this covers us for any times of water restriction. Water is applied to the farm at 3.5mm.

20 Although it is discussed as being 'best practice', with our soil type (Ruapuna Stony Silt Loam) being the same over the whole property, variable rate irrigation has not been installed. Variable Rate irrigation benefits irrigated land with different soil types and water holding capacities and would achieve little benefit on our properties.

21 As part of our pursuit for on farm efficiencies, we have installed four Aquaflex monitors. Two of these are installed under two of the larger pivots, one is under one of the smaller corner pivots and one is under one set of K line. This records soil moisture levels and temperature in real time.

22 Results of the Aquaflex system are web based and can be viewed on a PC or smart phone. When looking at results a graph is produced showing the current moisture level in relation to field capacity and plant refill points. As long as the soil moisture level at any given time is between these two lines the plant has sufficient moisture to grow optimally with no surplus water leaching to the sub soil.

23 Soil temperature reading is important at the start and end of the season to ensure irrigation is not applied when soil is too cold (less than 8 degrees) It also gives an indication of grass growth rates during the season. Daily checking of Aquaflex monitors along with weather watch predictions ensures irrigation is used efficiently and not wasted through leaching to ground water.

Nutrient management

24 Both areas of our farm lie on Ruapuna stony silt loam, which on a scale of 1 to 10 with 1 being extremely well drained, I would say is about a 4 or 5. Located close to the foothills, (330 metres above sea level) the dairy farm receives a higher annual rainfall compared to farms lower on the plains.

25 The stony soil type is well suited to the grazing of cattle as soil damage through pugging during wet periods is minimal, an advantage for animal health and wellbeing. The first two years after conversion the dairy farm was unirrigated. At this time river irrigation water in our area was not available. Despite being located in a higher rainfall area, pasture production was unpredictable due to large variations in rainfall throughout the growing season. With access to river water since 2010 the property can now grow grass throughout the season ensuring consistent, predictable production.

26 While the free draining nature of the soil suits dairying, it does present the challenge of minimising moisture and nutrient loss through the soil profile. We have minimised this through the installation of soil moisture meters and using nutrient budgets to calculate fertiliser applications.

27 We have used OVERSEER since the 2012/2013 season and prior to that used a nutrient budget with the assistance of Ravensdown to calculate fertiliser requirements. For the 2012/2013 season, we milked 1445 cows and Ravensdown calculated our outputs at 45kgN/ha.

28 For the 2013/2014 season we peak milked 1510. The Mayfield Hinds Company OVERSEER figure for the Dairy Platform that season was 68kgN/ha. The Ravensdown figure for the same season was 55 kgN/ha. So there has been some inconsistency with OVERSEER calculation results.

29 We also use OVERSEER to monitor outputs on the Support Unit. The OVERSEER forecast calculated by Ravensdown for the 2014/2015 year for the dairy support block is 26kgN/ha/annum.

30 When the Dairy Platform was first converted in 2008, we installed a two pond effluent system using a travelling series 15 Briggs irrigator to spread effluent. Irrigation was installed three years later, at which point a separate underslung effluent pipe was attached to one irrigator.

31 Last year the first stage pond was extended and run off from the underpass pumped back to the first stage effluent pond. Last year we also extended the effluent consent to include all of the Dairy Platform and when finances allow will install pipe and pump effluent to two other irrigators. To date we have spent approximately $155 000 on capital effluent infrastructure over and above the initial system install in 2008.

32 We do not apply any additional N in our effluent application area. However, on the remainder of our farm we apply small amounts of additional N after each grazing between September and April providing the Aquaflex monitors indicates adequate soil temperature.

33 Our aim is to spread effluent only when soil conditions are able to absorb the green water and plants are able to utilise that resource. As mentioned previously, when finances allow, our aim is to spread effluent over a wider area by installing further effluent main line to other pivots.

34 Our Dairy Platform and Support Unit together is one of the monitor farms for the Dairy NZ led 'Forage For Reducing Nitrate Leaching' (*FRNL*) programme. FRNL is a Dairy NZ led collaborative research programme across the primary sector delivering science for better farming and environment.

35 The aim of FRNL is to reduce leaching through research into diverse pasture species and crops for dairy, arable and sheep/beef farms. The main funder is the Ministry of Business, Innovation and Employment with co- funding from research partners Dairy NZ, AgResearch, Plant & Food Research, Lincoln University, Foundation for Arable Research and Landcare Research. It is a six year project with a vision to "reduce nitrate leaching losses from dairy, arable, beef/sheep and mixed farm businesses by 20% from current levels by 2020 through delivering proven, adoptable pasture and forage crop options for end users in all these industries.

36 We are one of the monitor farms where it is hoped that research and modelling work can be extended into commercial full scale farming businesses. The monitor farm network will be used as a vehicle to provide practical extension to the local farming area. There are nine monitor farms in the wider Canterbury area (South Canterbury through to North Canterbury) made up of 4 dairy, 2 arable, 2 sheep and beef and 1 mixed .We were asked to participate (I think) through our involvement in local discussion groups and general interest in the nitrate environmental issue in the Hinds area.

37 We agreed to be a part of the project because it is science based, we liked to think we could help in some way to find practical, profitable solutions and it enabled us to keep abreast of what might lie ahead in our business. Our participation involves keeping a daily datasheet of farm matters including (for example) effluent management, production, rainfall, animal health, stock reconciliation, animal movements and supplements fed.

38 We annually test the soil on both the RFL farm blocks to monitor soil nutrient levels and trends. Once the results of the soil testing are received a nutrient budget is prepared by Ravensdown. This helps in formulating an appropriate fertiliser plan/programme and gives an estimate of possible surplus nutrient losses through leaching. My understanding is that after two years of gathering base data we will begin implementing additional on-farm reduction strategies suggested by the FRNL project.

Variation 2

39 We try to improve efficiencies where we can on farm and adopt new technology once it is established and providing real gains – We would like to be on the 'leading edge, not the bleeding edge'. In order for any business to reinvest it must be profitable and this is no different for a farming operation. Our ability to invest in mitigation for nutrient losses from our Dairy Platform and Support Unit is directly influenced by the dairy payout and farm profitability.

40 I have participated in the Variation 2 process since the first zone committee meetings and am concerned about:

40.1 Mitigation reductions based on the description of what the farm does, rather than the outputs it produces. For example, the Support Unit has outputs of 26kgN/ha, which is low, however, the way Variation 2 is currently written, we would still be required to make reductions, which is difficult with already low outputs.

40.2 The technology or science required to make the suggested plan reductions is not currently available. The FRNL project that we are involved in has an aim of reducing nitrate leaching by 20% by 2020. Whether this aspiration can be achieved and within this time frame is an unknown. Dairy NZ analysis for our farm has shown that further reductions beyond this, given todays technology, will be economically unsustainable. I believe that giving farmers more time to achieve reductions would help by:

(a) providing time to reduce farm debt. This allows farm businesses to be more resilient in times of commodity down turns and still handle mitigation costs; and

(b) giving science and technology time to find economically viable answers to nitrate leaching.

41 Dairy NZ has carried out some economic analysis on five dairy farms in the Hinds Plain area, including ours, for the 2012/2013 year. The modelling was based on a $5.80 milk price with a 32 cent dividend. Because of our soil type and rainfall, our property required a full 45% reduction to reach a 27 kg/ha N loss.

42 A 45% reduction required a drop in stocking rate from 1445 cows to 1165 (3.9 cows/ha to 3.1 cows/ha) resulting in a 37% drop in operating profit .The operating profit was enough to cover interest only , leaving nothing for wages of management ,depreciation or tax. The business under this scenario would return a net loss and would not be sustainable.

43 There has been no economic analysis done on reducing leaching on our Support Unit. Being a dryland farm, with a large proportion of cereal grown and a low stocking rate on

the grass area, the nitrate leaching figure was low at 26, although we are still facing reductions due to its description as 'Dairy Support'. It may be difficult to make significant reductions without reducing stocking rate, unless the FRNL project achieves its aspiration of 20% reductions through the use of alternate pasture mixes and improved crop rotations, although this project is only in its infancy.

44 If reductions in nutrient outputs on either the Dairy Platform or the Support Unit are required, we have some options available to us, most of which involve refining existing farm management practices. Some examples are set out below. I am unsure of the reduction rates that can be achieved from these changes in practice, although I would not expect them to be large. The FRNL project we are involved in will endeavour to answer some of these questions.

44.1 Effluent could be spread over our entire Dairy Platform.

44.2 Diversified pastures e.g. chicory, plantain and so on. However, nodding thistle control is a problem in our area and it is difficult to manage those and retain diverse pastures.

44.3 Optimising stocking rate and application of fertiliser N.

44.4 Optimise our use of irrigation water further by replacing K line with fixed sprinklers.

44.5 Use of gibberellic acid in spring and autumn.

45 I believe our farm is running at "Good Farm Management Practice" now, judged against industry recommendations. I am sure there are areas for improvement and that is one of the reasons we are involved in the FRNL project as the hope is that at the end of the six years some of those areas will be identified. The challenge is to make improvements while still remaining economically viable. Based on today's technology, to say there is "considerable scope for improvement" does not take that requirement into account.

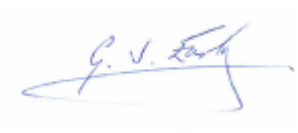
46 I have reviewed the system that the Lincoln Dairy Farm are implementing to achieve nutrient reductions this year. This involves reducing stock numbers and requires skilful management of grass. High use of mechanical topping is required in order to maintain pasture quality and high production per cow is critical in this system to retain profitability. Mower damage from mechanical topping is an issue on our soil type, which requires heavy rolling prior to mowing. To do this on a large farm adds cost in terms of money and time. It is difficult to find the required skill level to manage such a system.

47 Based on current available technology, the largest reductions in nitrate leaching would be achieved through the use of feed/winter pads/barns. I would expect this sort of system to be

expensive to install and while it may achieve the nitrate leaching objective, it would not be profitable within the volatile commodity market we supply.

48 Other options include the development of some sort of nitrification inhibitor, but this takes time. Dicyandiamide (DCD) was a successful product as a nitrate inhibitor, but has now been taken off the market as traces of the chemical were found in export milk products. Although the fertiliser industry and dairy industry believed it to be safe it did not go through the correct testing or accreditation/license process before being introduced to the market and so was withdrawn. Possibly science, (given time), could well come up with a safe appropriately accredited alternative.

49 I would like to emphasise our heightened awareness of environmental issues (especially that of ground water nitrate levels and trends in the Hinds zone) and willingness to work towards a solution. The other monitor farms in the FRNL project have all shown a willingness to participate in exploring options which would reduce nutrient leaching. The monitor farms network is designed to engage with other farmers through field days and farm publications to pass on practical, profitable and successful mitigations. I believe a plan that is science based, has robust economic analysis behind it and above all seems achievable, given a realistic time frame, would see farmers and associated industry adopt change more readily.



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