BEFORE THE HEARING COMMISSIONER

FOR SELWYN DISTRICT COUNCIL

UNDER	the Resource Management Act 1991
IN THE MATTER	of Private Plan Change 79 by Birchs Village Ltd

STATEMENT OF EVIDENCE OF THOMAS JOH FRASER

23rd March 2023

In preparing this evidence, I have reviewed:

(a) All PC79 documentation on the Selwyn District Council Web site, and the supporting technical assessments;

(c) The evidence of Mr Victor Mthamo and Mr Mark Everest.

(d) The NPS-HPL;

(e) The Council Officer's section 42A report and appendices on PC79;

(f) Relevant submissions on PC79

While this evidence is for a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses contained in Section 9 of the Environment Court Practice Note 2023 and that I agree to comply with it. While I am also a submitter on the proposed plan change, I am aware of my duty to the decision-maker to impartially assist them on matters that are within my expertise.[1]

I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

My Qualifications and Experience

Diploma in Agriculture, Lincoln University 1965

50 years working for Grasslands Division Department of Scientific Research and AgResearch Crown Research Institute as a Research Scientist.

For the last 10 years with AgResearch I was Senior Scientist in the Farm Systems Team based at Lincoln

Author on over 50 scientific papers

Presented at over 800 conferences, Seminars and Workshops to Science, Farmers, and the agriculture communities.

I have worked in other countries supporting Research Science programmes

Australia. Great Britain, United States, Chile, Argentina, Inner Mongolia and Canada.

I was a Judge for the Ahuwhenua Trophy Māori Farming Award for sheep and beef farmers from 2006 to 2014

Since leaving AgResearch in 2016 I have been contracted to Beef+Lamb NZ. DairyNZ Ministry of Primary Industries and various Regional Councils to work with sheep and beef, dairy, and arable farmers throughout New Zealand.

I have also worked with Māori Farming Incorporations in East Coast North Island for the past 20 years advising them on matters related to Farm Systems.

Past President New Zealand Grassland Association. (NZGA)

Life member NZGA

Ray Brougham Award for excellence in Grassland Research: 2013.The Ray Brougham Trophy is awarded annually to a person who has made an outstanding national contribution to the New Zealand grassland industry.

Sir Arthur Ward Award 2021, This Award recognises the successful application of research to an aspect of animal production in New Zealand.

Role of a Farm Systems Scientist.

People training to be an Agriculture Scientist will go to university and complete a Batchelor of Agriculture Science. This is a general course that covers most aspects of agriculture but nothing in depth. They may then go on and complete a Masters degree. This will be more focused but still in general terms (Plant science for example) Then they may continue to complete a PhD. This will be very focused on a narrow topic. On the completion of their studies, they will have a very good knowledge in a very narrow topic, (e.g., moisture uptake of a lucerne plant growing in Templeton soils) Basically gaining more and more knowledge in less and less topics as a person moves through their academic journey. “an expert in a very narrow field”

In my employment at AgResearch there were around 400 research scientists all with a great knowledge in very narrow topics. Most of the scientist had little or no understanding of what happens on farm or how their research would fit into a farm system.

Farmers manage a very complex system that involves incorporating many different information into their system if they are going to be successful. All farms throughout New Zealand are different in some aspect. Different soil types, aspect. Climate, soil fertility, stock classes, production targets, personal circumstances etc. The list goes on and on. Then on top of all the scientific information they are also the target of all the commercial promotions. Farmers are bombarded with a mass of information and in most cases have difficulty sorting out what is applicable for them. What works on one farm may not be applicable to their next-door neighbour.

The role of the System Scientist is to take the research and identify where it may fit into an individual farmers system. The first task is to have a very good understanding of the individual farmer’s needs. This means being able to listen to the farmer. There are many very experienced farmers who will have a lot of knowledge around the location and environment that they have farmed in over a long period of time. These farmers have “local knowledge” of the limitations and strengths of their area.

Mr John Smith has farmed much of the land within the PC 79 site for the past 60 years and still farms on the adjacent site to the west. I have spoken extensively to him about his experiences while farming on this land and his knowledge around the production that he has been able to achieve has been important in arriving at the conclusions I have made regarding the versatility and productivity of farming on these soils and irrigation requirements of this area. Perhaps if Mr Mthamo and Mr Everest had spoken with Mr Smith, they would not have arrived at the conclusions that they have.

I have also been on our property, 198 Birchs road for over 50 years so have a very good knowledge of what these soils are capable of growing.

The main role of a Farm System Scientist is to understand that they do not have all the knowledge and to learn to identify and ask those who do have the expertise required. Then bring all the information together and then to transfer this information in a manner that is understandable to the client.

Scope of Evidence

Soils

Irrigation and Nutrients

Economic

Reverse Sensitivity

Alternative Options Assessment

Soils:

The following are my comments on Expert Evidence submitted by Mr Victor Mthamo.

I refer to the text within Mr Mthamo's evidence

Para 11 The Site's productive capacity is constrained by the following factors:

(a) Soils. While the soils are predominantly classified as Land Use Capability (LUC) 1 – 2, wetness is a factor that constrains the productive use of parts of the Site.

I agree that all the soils within PC 79 are classified as Land Use Capability (LUC) as class 1or 2.

Mr Mthamo states that "wetness" is a factor that constrains the productive use of parts of the Site. Wetness is not normally used to describe soil properties. Ability for soils to drain is the more Appropriate term.

Apart from two small areas within the Site, one at the south east corner (the area where the applicant intends to site the stormwater retention area) and the second a very small area (less than 100 sqr m) near the north east corner that retain surface water for longer than 24 hours after a significant rainfall event. The area to the south east corner is lower lying and collects runoff from higher land to the north west in moderate and high rainfall events. This will be a potential problem if this site is developed to residential as this area that is designated for stormwater retention may already be full with natural runoff water from a rainfall event. The small area in the north east corner of the Site appears to be an area where some previous management of this area has resulted in soil compaction. This would be easily corrected with "deep ripping" or some similar management practice.

Para 35 to 41

Mr Mthamo states that the soils have a significant physical restraint which is "wetness.

This is completely incorrect. Mr Mthamo has stated in appendix 2 that 90% of the area is well or moderately well drained. The remaining 10% of soil are imperfectly drained. The imperfectly drained definition is the mid-range in soil drainage properties so cannot be considered as poorly drained. With reasonable farm management practices these moderately drained soils are capable of high productivity. I give examples of production on these soils later in my evidence.

Para 38 The examples stated in this paragraph are almost entirely to do with irrigation and soil nutrients and have almost nothing to do with drainage.

Para 39 I agree that the listed species do not tolerate waterlogged soils but as none of the soils within the Site are waterlogged. This statement does not apply in this instance.

Para 40 and 41 The soils are not poorly drained so again this does not apply.

The following puts into perspective the value of the highly productive land within PC79

Average yields of crops on class 2 soils around Prebbleton.

Taking 30 ha of the total area of PC79 available to crop

Crop	Yield/ha	Total yield
Potatoes	50 tonne	1500 tonne
Cabbages	50 000 plants	1.5 million cabbages
Wheat	12 tonne	360 tonne
Fresh peas	8 tonne	240 tonne

It is possible to grow 2 crops in a 12-month period, for example process peas and barley

It should be also noted that the PC 79 site is in very close proximity to the Wattie's processing factory and Christchurch city.

In Mr Geddes's evidence in Para 15 he states'

LUC 1 soils are also contained within the most southern block of the original ODP Area3 . A decision was made to amend the ODP and remove this block of land from PC79 due to the potential for flooding. At the time, the draft NPS-HPL was available and I also supported this decision on the basis that his Property was the only property in the ODP area which wholly contained LUC 1 soils.

It is good to see that Mr Geddes supports retaining class 1 soils for agriculture production. As I have stated above the class 2 soils in this location are more versatile than the class 1 soils. So, by inference Mr Geddes's statement would support retaining all the land within the site for future agriculture production.

Irrigation:

Soil Moisture:

I agree with Mr Mthamo that without irrigation that there will be soil moisture deficits however I disagree with some of the conclusions.

Para 44 *States that to maximise agriculture production irrigation is required.*

This statement is applicable for maximising pasture production (dairy farms) then irrigation is required throughout the growing season. However, for most arable crops and horticulture crops irrigation is only required for some periods of the year. For example, most arable crops do not require irrigation over the summer months as dry conditions are required during this period to harvest.

Water Availability/Irrigation

Para 47 Table 3. This table estimates the total water required to maintain available soil moisture at 100% so is overestimating the amount of irrigation a farmer would apply. Plant growth is not limited till available soil moisture levels reach 50% of saturation

Under good management practice on irrigated farms irrigation to 100% is very inefficient and expensive because any rainfall when soil is at saturation point will go to drainage with associated loss of nutrients, applying nutrients is expensive and farmers do not want to have these nutrients leached to the groundwater.

Plant available soil moisture will depend on the depth of the soil and the root zone of the plants being grown. Deep soils, such as Templeton silt loam are considered to be deep soils so are able to store a lot of moisture when it is available. In spring in all years, the soils are at moisture capacity

Most pasture plants such as ryegrass and white clover are shallow rooted (top 100mm of soil profile) and are not able to capture the moisture from further down the soil profile so require to be irrigated more frequently to keep the rooting zone with adequate moisture. This is the main reason Dairy farmers use centre pivot irrigators and are able to irrigate every 3 or 4 days with small quantities of water, 5 to 10 mm per application.

Some pasture plants (lucerne, red clover chicory) and most arable and horticulture crops have deeper root systems meaning that they can harvest moisture from deeper in the soil profile.

Class 1 and 2 soils such as the soils on the Site, have a deeper top soil profile than other classes of soils which means that the total moisture holding capacity of these soils is much greater than the shallow class 3 and 4 soils. For Farm management practice this is important as autumn and spring sown crops will require little or no top up from irrigation to reach maturity by early summer harvest. Some examples of this are as follows for crops grown on the soils within the Site.

Up until 10 years ago (before it was sold) the land on the site had successfully grown high yielding crops of broad beans, process peas, green beans, broccoli, potatoes, cauliflowers, wheat, barley, and herbage seed crops. In some years the broad beans and process peas have been followed by barley. In many cases the autumn and early spring sown crops have been grown without any irrigation. Land adjacent to the site is still growing some of the above crops and the area (50 ha. of class 1and 2 soils) immediately to the south has recently been converted from arable cropping to market gardening.

In spring these crops may require as little as 75mm of irrigation to reach full potential.

This spring the broad bean crop grown on the land immediately west of the PC 79 site (class 2 soil) was the second highest yielding crop in Canterbury and received only 50mm of irrigation. An adjacent area on class 2 soils harvested 4 cuts of lucerne this season without any irrigation.

In the Prebbleton location class 2 soils more versatile than class 1 soils due to their better draining qualities however there are instances of market garden farming on class 1 soils in close proximity of the PC 79 site.

Irrigation developments:

Over the past 60 years there have been massive advances in irrigation efficiencies. We have gone from wild flood irrigation to border dyke then to big gun spray irrigation. These changes resulted in around a 50% saving in water use while achieving an increase in production. Over the past 20 years there has been a further change to centre pivot application resulting in further efficiencies. More recently the shift has been to differential water application with the use of soil moisture tools to better apply the irrigation to where and when it is required

Water harvesting and irrigation efficiencies:

The Central Canterbury irrigation scheme, that is coming to full implementation is an example of using all the modern technologies to make sure available water is used to maximise production while limiting the amount of irrigation being applied. One other big advantage of this scheme is that it is harvesting water that would normally flow out to sea from the main Canterbury rivers and make it available for irrigation. Another benefit from this scheme is that the farmers in Central Canterbury are now using the harvested water instead of taking it from the ground water table. The result of this is that the ground water in Central Canterbury will be recharged and the quality will improve.

Advance in irrigation efficiencies will continue and in another 30 years there may be systems in place then will look entirely different to what we are currently used to.

Alongside advances in irrigation efficiencies there is also considerable research being undertaken in Plant Breeding. One of the aims of this research is to breed plants that are more efficient in water use. i.e., produce more harvestable dry matter per litre of water. Another aim of the plant breeding is to breed plants with deeper root systems making them able to harvest moisture from deeper in the soil profile. A further benefit from having plants with deeper root systems is that they harvest nutrients from deeper in the soil profile thus reducing the amount of nutrients that are lost through leaching.

Mr Everest's evidence:

Para 23, *My cost estimate also includes a provision for consenting and establishment of a well and pump system referred to in paragraph 57 of Mr Mthamos' evidence*

17 ha of the Site was previously irrigated from consent number CRC 131234. All the infrastructure (underground pipes, hydrants etc.) are still in place. The pump capacity is also still in place and is still being used for irrigation purposes. So, there would be no infrastructure costs to irrigate another 17ha of the Site. This together with the 4 ha that already has a consent takes the total area available to irrigate without any additional infrastructure costs to 21ha. Some of the infostructure is in near proximity to a further 11 ha so with very limited capital costs 32ha could be irrigated.

Irrigation water is available to purchase and with the infrastructure that is already in place the cost of acquiring this would be the only costs to irrigate nearly 90% of the area to reach a high production.

Nutrients

Mr Everest's evidence:

Para 26 The Selwyn-Te Waihora catchment, Rule 11.4.13 in the Canterbury Land and Water Regional Plan (CLWRP), requires that farms greater than 10 hectares must reduce their nitrogen loss to water from the baseline

Para 27 if the total 36.58 hectares is run as one management unit (farm)

Para 35 While productive farm systems could be implemented which are compliant with the nutrient loss constraints of the PC79 Site, the increasing effects of reverse sensitivity will likely result in a lower level of harvested produce relative to the level of nutrient input:

Para 36 Due to nutrient and irrigation water availability constraints, the properties within PC79 should therefore only consider farm systems which include trading livestock, horticulture, viticulture or grain, seed and vegetable crop production.

The statement in Para 26 (*requires that farms greater than 10 hectares must reduce their nitrogen loss to water from the baseline*) is the key to any discussion around nutrients. Farms that are 10 ha or less

do not have to do nutrient budgets. All the properties in PC 79 are under 10ha except for the Geddes property and Mr Geddes has stated that this has now been subdivided into 4 ha blocks.

Para 35 is not applicable as the properties are not one management unit.

The farm systems mentioned in Para 36 give plenty of options for future development. I do not consider irrigation availability to be a restriction.

Conclusion: Loss of nutrients are not a restriction to future development.

Reverse Sensitivity Considerations

From Mr Mthamo evidence.

Para 65 The proposed rezoning Site is next to the new SDC sports facility, Kahaka Park. The facilities will be used by young people.

Para 66 In my opinion, it is highly likely that the establishment and operation of any primary production would have adverse effects. It would however be difficult to manage those adverse effects without compromising the productive capacity of the Site.

Para 67 The other major reverse sensitivity issue will arise from complaints by people using the park. I expect use of the park to increase when its fully developed. With hundreds or thousands of people coming to the park it is possible that some will start to complain about the farming activities (e.g. noise. dust, spray drift) on land adjacent to park if this stays rural. Such complaints will necessitate a scaling back of the farming activities or changes to the farming practices both of which could have adverse effects on the land's productive capacity regardless of its LUC classes.

From Mr Everest evidence

Para 44 PC79 Site is bounded with residential subdivision to the North and services, adjacent to a residential subdivision to the North East (PC72), and with Kakaha Park to the East, and shares a boundary with rural lifestyle with residential houses and sections to the West. Any farm operator of the PC79 Site would likely expect to have to operate a more conservative farm programme to comply with residential expectations. A more conservative farm programme, such as the dryland livestock system described below, results in poorer profitability and often makes properties economically unviable.

Para 46 While properties neighbouring the PC79 Site have increased vegetable production in recent years, the properties in the Plan Change 79 are in much closer proximity to residential dwellings and would be significantly more impacted by reverse sensitivity effects.

The Kakaha park on the eastern side boundaries onto the site for approximately 700m. When the Selwyn District Council applied for consent to develop the Park, they were concerned about the noise from the park impacting on the houses on the western side of Birchs road and designed the Changing shed building so that most of the noise level would be towards the east and away from the rural dwellings along Birchs Road. The car park was sited in between the changing sheds and Birchs Road to reduce as much as possible the noise from impacting on the rural dwellings on the west side of Birchs road.

At present the closest LLRZ housing is at least 200 metres and the nearest GRZ zone housing is some 500 metres from the PC 79 site. With the new subdivision consented (PC 72) there will potentially be housing across Birchs road, however this is at the very pointy end of the land within PC 79 and the

owners of this land have stated that they are not selling. Also, the owners of the land at the north west corner of PC 72 have indicated that they do not want to be part of the subdivision.

The northern boundary of the site (only around 120 m is adjacent to the 3ha Orion block and they have stated that they will retain this area for future development. All the remaining land within PC 79 is surrounded by productive farms including a market garden to the south and an intensive arable farm to the west.

So, at present there is no reverse sensitivity issues arising from the current farming practices or any issues that would eventuate if there was any intensification of the land use.

However, if the site was to be developed for residential there would be significant reverse sensitivity issues created.

Conclusion: Any development of the Site to residential will create a problem that doesn't exist under the present or even future agriculture land use.

Alternative Options Assessment

Mr Mthamo's evidence

Para 76 The NPS-HPS rezoning criteria requires consideration of whether there are any sites within the same locality and market which could feasibly and practicably accommodate the proposed development capacity while achieving a wellfunctioning urban environment.

Para 77 The area around Prebbleton, illustrated in Attachment 4, has been identified as the "same locality and market" for the purposes of (b) on the basis that it is:

(a) In or close to Prebbleton as a location where demand for additional capacity has been identified;

(b) Is for a market for the types of housing in demand i.e. Medium Residential Zoning.

Para 78 I undertook a desktop review of the LUC Classes of the land in this area.

(a) The nearest land that is >LUC Class 3 is northwest of the PC79 site and this extends northwest along Hamptons Road and eastwards to Tosswill Road as shown in Attachment 4

(b) Most of this land that is >LUC Class 3 is over the already approved Plan Changes 68 and 72 land.

(c) The remaining area that is not within the already developed area bound by Hamptons Road, Birchs Road and Trices Road.

(d) Therefore, most of the land around the fringe of Prebbleton that is >LUC Class 3 is either already zoned or has been developed.

Mr Mthamo has conveniently left out the most obvious parcel of land that could be developed into residential if the need was identified, which I believe it is not.

This is the block of land west of Shands road towards the Motorway and bounded by Hamptons and Blakes roads. This is a very large parcel of land and if developed would last Prebbleton for at least the next 50 years.

There are some major advantages when looking at this land compared to the proposed PC 79 site.

Soils: The soils on the site west of Shands road while still versatile are predominately class 3 (estimate 60%) with the remaining being class 2 However these soils are very “stripy and this makes intensive agriculture production difficult as crops tend to ripen at different times. Also, stripy soils are difficult to irrigate efficiently as soils within metres of each other will require different amounts of water to reach full potential.

Traffic: Development to residential of this block instead of the PC 79 site would result in all the traffic generated from the site not travelling through the already congested Prebbleton and Springs Road. There is already a roundabout on the corner of Shands and Blakes Road and I understand that a roundabout will be built on the corner of Shands and Hamptons Roads within the next 2 years. Traffic from the subdivision would go directly north on Shands road to connect with the Motorway or south on Shands to Rolleston or Lincoln.

If developed to residential the closest section would be nearer to the Prebbleton school than any section on the PC 79 site.

Developing a site west of Shands Road would also stop the spread of Prebbleton along Springs and Birchs Roads.

This site is also much closer (and at a higher altitude) to the Wastewater plant at Rolleston so would save considerable money when a new pumping station and pipe line need to be installed.

The only negative of developing this site is that there are high voltage power lines running north to south through the area. There are guidelines for set back from these lines *(Transpower refers to this corridor as the National Grid Yard, which in this instance is a corridor 12m either side of its transmission assets. And that the 26m buffer around line support structures incorporates the 12m NZECP 34 and National Grid Yard setbacks from visible tower foundation requirements.*) but this would make up a very small percentage of the total area available and could be used for reserves as is the case in many other sub divisions.

Conclusion: There are other areas around Prebbleton that are more suitable to develop to residential than the PC 79 site.

Overall conclusion:

The soils within the PC 79 site are all classified as Highly Productive and are suitable to grow a wide range of high value horticulture and arable crops.

Irrigation water can be made available with almost no cost in infrastructure costs required.

Reverse sensitivity consideration would be significantly increased if this land was to be developed to residential.

There are other areas around Prebbleton that are more suitable to develop to residential than the PC 79 site.

Tom Fraser

23/04/2023