



BEFORE

Independent Commissioners appointed by Tasman District Council

IN THE MATTER

of the Resource Management Act 1991

AND

IN THE MATTER

of an application by CJ Industries Ltd for land use consent RM200488 for gravel extraction and associated site rehabilitation and amenity planting and for land use consent RM200489 to establish and use vehicle access on an unformed legal road and erect associated signage

**EVIDENCE OF MICHAEL ADRIAN NELSON ON BEHALF OF CJ INDUSTRIES LIMITED
(LAND PRODUCTIVITY - HORTICULTURE)**

15 July 2022

1. INTRODUCTION

- 1.1 My full name is Michael Adrian Nelson. I am a Horticultural Consultant employed by Fruition Horticulture (SI) Ltd.
- 1.2 The applicant has applied for resource consents authorising the extraction of gravel, stockpiling of topsoil, and reinstatement of quarried land, with associated amenity planting, signage and access formation at 134 Peach Island Road, Motueka:
 - (a) RM200488 land use consent for gravel extraction and associated site rehabilitation and amenity planting and
 - (b) RM200489 land use consent to establish and use vehicle access on an unformed legal road and erect associated signage
- 1.3 My evidence addresses the productivity of the site in terms of its capability of producing crops at a high rate or across a wide range.

Qualifications and Experience

- 1.4 I have 35 years' experience in the horticulture industry. I have worked for Fruition Horticulture (SI) Ltd in my current role as a Horticultural Consultant for 7 years. Prior to this I was employed as a Field Consultant for a fertiliser farm co-operative (Ballance) giving nutrient and soil management advice on a wide range of crops. More than 20 years of my career focused on field research projects on a wide range of crops working as a senior technical officer for Agriculture Canada and the precursor of Plant and Food Research.
- 1.5 I hold the following qualifications:
- (a) NCH in Vegetable Production (1995) RNZIH
 - (b) Diploma in Field Technology – Horticulture (1986) Lincoln University
 - (c) Cert. Advanced Sustainable Nutrient Management (2012) Massey University
 - (d) Certified Nutrient Management Advisor.
- 1.6 My technical skills and experience directly relevant to my assessment include:
- (a) I tutor a range of subjects including soil science and plant science for Horticultural Diploma students from Lincoln University's Regional Diploma Programme in Nelson/Tasman and for industry trainees NZ Certificate in Horticulture.
 - (b) Annual re-certification as an advisor in nutrient management requires ongoing professional development and passing modules related to soil and nutrient management.
 - (c) I am involved in various research and consulting projects related to practical soil and nutrient management. I am currently writing a best practice nitrogen and phosphorus factsheet for apple growers, and I am involved in a World Bank project in Northern India to provide advice and resources on apple nutrient management..

1.7 I undertook a site visit on 5 July 2022.

Purpose and scope of evidence

1.8 The purpose of my evidence is to assess:

- (a) The site's current state in terms of horticultural opportunities.
- (b) The site's capability of producing crops at a high rate or across a wide range.
- (c) The horticultural opportunities for the site post-extraction.

1.9 As my evidence is limited to those specific issues, I have not reviewed the Application, submissions or the s 42A report. I have however considered the evidence of Reece Hill in relation to soil management, and the draft Soil Management Plan.

Code of Conduct

1.10 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014 and I agree to comply with it. My evidence is within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

2. EXECUTIVE SUMMARY

2.1 My evidence is based on my existing knowledge of how crops respond to soils in the Tasman Region, my review of Mr Hill's evidence and draft Soil Management Plan, and a site visit.

2.2 My evidence assesses the site's current horticultural opportunities, and the horticultural opportunities for the site post extraction. The site in its current state would be considered acceptable to only a limited range of horticultural crops or ventures such as grapes, and possibly apples although the lack of even soil depth would pose a concern for apples.

2.3 The site is not capable of producing crops at a high rate or across a wide range.

- 2.4 It is likely after reinstatement, if correctly undertaken, that the high soil variation across the block would be reduced, making for more accurate soil water and nutrient management. This would enable crops such as apples or grapes to be grown. Both these crops have relatively low nutrient demand, particularly nitrogen, and would be easier to manage for reduced environmental impact.

3. EVIDENCE

Current state

- 3.1 As outlined in the report by LandVision who classified 9.98 ha of the site into six different soil types, the site is highly variable in soil depth, soil development, and drainage characteristics. LUC classification ranged from 3 to 6. (lllw1 to Vls1 Figure 1). LUC 3 is considered at the lower end of the scale for arable cropping and is considered to have moderate physical limitations. For horticultural use this site would have significant limitations that would be difficult or virtually unrealistic to overcome. Some areas show excessive drainage while others show mottling or gleying indicating a high water table. While there is 1.45 ha of LUC llis1, that area also has limitations with a very weak topsoil.

Figure 1: Land Use capability map from LandVision1 with proposal areas (Stages 1-3)



3.2 I understand that a previous owner of the property (Mr Allred) had significant challenges growing blackcurrants on this site. He was contacted by the Applicant to ask about his experience, and replied as follows:

“I farmed 134 peach island for almost 20 years.
Planted blackcurrants from year 2000 to eventually have 10 hectare in area.
Soil conditions where [sic] challenging with siltyloam being the main but large areas where very sandy and the gravel layer was close to surface.
Plants took 3 times longer to become established and replanting was ongoing.”

3.3 Modern production systems are placing more importance on low variability between plants within a block. Reduced soil variability is an important factor in terms of consistent product size, production level and even maturation. Consistent soil type, texture and depth allow for more precise irrigation and nutrient management for optimal plant performance, production costs and reduced environment impact. For example, highly variable sites may require managing irrigation frequency and duration to match the areas with the lighter soil textures. And consequently, will be over irrigating the areas with a heavier texture. If irrigating to a middle zone it is likely that the lighter soil areas are over-irrigated with subsequent nutrient leaching.

3.4 While there is evidence of apple and kiwifruit production on adjacent properties (older plantings), their performance is likely to be less than optimum on these soil types. Conceivably, adjacent sites further back down the road may have deeper topsoils than this site.

3.5 This site would likely be unsuitable for a new kiwifruit development due to the high soil variability. Establishing a hectare of kiwifruit is an extremely expensive undertaking with the land component being just one aspect of this. Given the high cost of establishment, deeper and more consistent soil types/sites would be favoured.

3.6 For modern high-density apples on dwarf rootstocks, the rooting depth is considered to be 50 – 60cm. Nearby recent modern plantings (where there are soil moisture probes installed) would indicate top soil depth to be between 40 – 90cm. This proposed site ranges from 15 – 45cm. While apples could be grown in this site the yield and quality is likely to be inferior to other preferred locations.

3.7 Due to the shallowness of the soil, weakly developed nature, and underlying gravels it is likely that the site would be unsuitable for any agricultural/horticultural enterprise that required soil cultivation, or crops that required higher levels of nutrient/fertiliser use such as market gardening, hops or kiwifruit.

- 3.8 Also, of consideration would be potential limitations placed on the site or areas within the site that may be imposed by the TDC implementing the National Policy Statement for Freshwater Management 2020. Given the shallowness of the soils, with the potential for nutrient leaching and the close proximity to the Motueka river and aquafer, this site would have to be considered at high risk for limitations being imposed on nutrient use.
- 3.9 Grapes tend to have a low nutrient requirement and have shown to do well on some gravel soils e.g. Gimblett Gravels in Hawke's Bay. While the site may be somewhat acceptable for viticulture, similar comments apply regarding soil variability which would likely have a significant impact on variable berry maturation.

High productive value

- 3.10 The Tasman Resource Management Plan includes a definition of "high productive value":

High productive value – in relation to land, means land which has a combination of at least two of the following features, one of which must be (a):

- (a) a climate with sufficient sunshine that supports sufficient soil temperature;
 - (b) a slope of up to 15 degrees;
 - (c) imperfectly-drained to well-drained soils;
 - (d) soil with a potential rooting depth of more than 0.8 metres and adequate available moisture;
 - (e) soil with no major fertility requirements that could not be practicably remedied;
 - (f) water available for irrigation;
- where that combination is to such a degree that it makes the land capable of producing crops at a high rate or across a wide range.

- 3.11 My evidence relates specifically to the last part of the definition:

where that combination is to such a degree that it makes the land capable of producing crops at a high rate or across a wide range.

- 3.12 In my opinion, the site could not produce crops at a high rate, or across a wide range:

- (a) Rate is dependent on the crop. Overall production per hectare would be very unlikely to be in the medium to higher rates of production of the common horticultural crops in the area such as apples, hops and kiwifruit. This is due to the areas within the site with poor physical soil properties as previously mentioned. This is supported by Mr Allred's experience.
- (b) In terms of the range of crops, I consider that the site is currently suitable for grapes and possibly apples. I do not consider this to be a wide range. I have considered this definition from the perspective of a commercial

horticultural operation, rather than a hobby venture. It may be possible to grow a wider range of crops at a hobby scale. However most commercial growers would likely not consider the site suitable for growing a range of crops, or a high rate of crops, due to the site's soil physical properties, on the grounds that in places the soil is very shallow and in places has poor drainage.

Potential (post-extraction) state after reinstatement

- 3.13 Reinstatement of the soil profile site, subject to a consistent depth, is likely to address the concerns around soil variability.
- 3.14 A consistent soil depth would allow for more accurate soil moisture management. This would:
- (a) significantly reduce the risk of over watering, or under watering areas of a planted crop; and
 - (b) reduce the risk of nutrient leaching within the growing season.
- 3.15 This would require consistency of reinstatement across the site. Any fill should be of a consistent texture and depth and should not impede drainage. The reinstated topsoil should also be of a consistent depth.
- 3.16 Given that the depth of reinstated topsoil may still be relatively shallow across the whole site, being a consistent depth means that it could be more accurately managed. In this case apples or grapes may be suitable. Both these crops have relatively low nutrient demand particularly nitrogen and would be easier to manage for reduced environmental impact.
- 3.17 Even after reinstatement, due to the likely shallowness of the soil, weakly developed nature, and underlying gravels it is likely that the site would be unsuitable for crops such as hops, kiwifruit or market gardening.

Michael Nelson

15 July 2022