

Before an Independent Hearings Panel  
Appointed by Waimakariri District Council

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*under:* the Resource Management Act 1991

*in the matter of:* Submissions and further submissions on the Proposed  
Waimakariri District Plan and Variation 1

*and:* Hearing Stream 12: Rezoning requests (larger scale)

*and:* **Crichton Developments Limited**  
(Submitter 299)

Statement of evidence of Victor Mthamo (Soils) on behalf of  
Crichton Developments Limited in relation to Gladstone Road  
rezoning request

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Dated: 5 March 2024

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## **STATEMENT OF EVIDENCE OF VICTOR MTHAMO ON BEHALF OF CRICHTON DEVELOPMENTS LIMITED**

### **INTRODUCTION**

- 1 My full name is Victor Mkurutsi Mthamo and I am a Principal Consultant for the environmental science, engineering and project management consultancy Reeftide Environmental and Projects Limited (Reeftide). I have been in this role for almost 12 years. Prior to this I was a Senior Associate with the surveying, environmental science and engineering, and resource management consulting firm CPG New Zealand Limited (now rebranded to Calibre Consulting Limited), where I was also the South Island Environmental Sciences Manager. I have worked in the area of environmental science and engineering for over 29 years.
- 2 I have the following qualifications:
  - 2.1 Bachelor of Agricultural Engineering (Honours) with a major in Soil Science and Water Resources (University of Zimbabwe).
  - 2.2 Master of Engineering Science in Water Resources (University of Melbourne in Victoria, Australia).
  - 2.3 Master of Business Administration (University of Zimbabwe).
  - 2.4 Advanced Certificate in Overseer Nutrient Management modelling qualification.
  - 2.5 I am a member of Engineering New Zealand (MEngNZ) and am a Chartered Professional Engineer (CPEng) and an International Professional Engineer (IntPE).
  - 2.6 I am a past National Technical Committee Member of:
    - (a) Water New Zealand; and
    - (b) New Zealand Land Treatment Collective (NZLTC).
- 3 My specific experience relevant to this evidence includes:
  - 3.1 Stormwater planning, catchment hydraulic and hydrological modelling and design.
  - 3.2 Presenting evidence at a regional council hearing on catchment wide modelling that I carried out to assess the effects of flooding in the lower reaches of the Waitaki catchment in South Canterbury.
  - 3.3 Regular engagement by Christchurch City Council (CCC) as a Three Waters Planning Engineer. In this role as a stormwater

planning engineer, I review stormwater designs and modelling by various engineers from consulting firms and I peer review their reports (concepts, calculations and detailed designs) and provide them with the required guidance for solutions that are acceptable to the CCC. As a result, I am conversant with various hydrological modelling tools, flooding assessments and flood mitigation.

- 3.4 Designing and implementing numerous on-farm irrigation schemes, soil investigations and land use assessments. Examples of projects include Hunter Downs Irrigation Scheme, North Bank Hydro Project, Mararoa-Waiiau Rivers Irrigation Feasibility Study and the North Canterbury Lower Waiiau Irrigation Feasibility Assessment.
- 3.5 Assessing large subdivisions in relation to stormwater management, earthworks and the associated actual and potential impacts on soils, groundwater and surface waterways and how to effectively use erosion and management control plans to mitigate the potential impacts that may occur during the construction works.
- 3.6 Assessing effects on soils and groundwater associated with onsite and community wastewater discharge systems such as the Wainui Community wastewater discharge consent.
- 3.7 Assessing actual and potential effects on groundwater and surface water associated with groundwater and surface water takes.
- 3.8 Providing quarry soils and rehabilitation expert evidence for the extension of the Road Metals Quarry on West Coast Road in Templeton in 2018.
- 3.9 Acting as a soils and rehabilitation expert witness for the proposed Roydon Quarry in Templeton in 2019 and 2020. I provided an assessment of the soils' versatility and the effect of the requested changes to the land use on the land's productivity potential.
- 3.10 Acting as an expert witness at the proposed Fulton Hogan Miners Quarry extension in 2020 and 2021. I provided an assessment of the soils, their versatility and productivity potential with and without mitigation post quarrying.
- 3.11 More recently, I have been involved with a number of Plan Changes across the Selwyn District. These include:
  - (a) Plan Change 66 (PC66) in Rolleston.
  - (b) Plan Change 67 (PC67) in West Melton.

- (c) Plan Change 68 (PC68) in Prebbleton.
- (d) Plan Change 69 (PC69) in Lincoln.
- (e) Plan Change 71 (PC71) in Rolleston.
- (f) Plan Change 74 (PC74) in Rolleston.
- (g) Plan Change 75 (PC75) in Rolleston.
- (h) Plan Change 79 (PC79) in Prebbleton.
- (i) Plan Change 80 (PC80) in Rolleston.
- (j) Plan Change 81 (PC81) in Rolleston.
- (k) Plan Change 82 (PC82) in Rolleston.
- (l) Plan Change 31 (PC31) in Ohoka.

- 4 I am familiar with the submitter's request to rezone land which is approximately 22.7 ha of land at 145 & 167 Gladstone Road (the *Site*) (the *Proposal*).
- 5 I have been involved with this Proposal since October 2023 when I was engaged by Crichton Development Group Limited (*CDGL*) to carry out a desktop assessment of the actual and potential effects of the Proposal on the productive potential of land and soils.

#### **CODE OF CONDUCT**

- 2 Although this is not an Environment Court hearing, I note that in preparing my evidence I have reviewed the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

#### **SCOPE OF EVIDENCE**

- 3 I have been asked to comment on the relief sought by CDGL (*Submitter 299*) in relation to the Proposal by way of submission on the proposed Waimakariri District Plan (*PDP*).
- 4 My evidence will address:
- 4.1 my assessment of the productivity of the existing soils within the Site;

- 4.2 the long-term constraints associated with the highly productive soils within the surrounding area; and
  - 4.3 the effects of those constraints on the soils' productive potential.
- 5 In assessing the above, I have also been asked to consider rezoning of different highly productive land within the Waimakariri district that has a relatively lower productive capacity.
- 6 In preparing my evidence I have reviewed:
- 6.1 Sections of the PDP and reports that are relevant to my area of expertise;
  - 6.2 The National Policy Statement on Highly Productive Land 2022 (*NPS-HPL*); and
  - 6.3 Submissions relevant to my expertise relating to the rezoning of the Site.

### **SUMMARY OF EVIDENCE**

- 7 The Site is located at 145 & 167 Gladstone Road, Woodend. CDGL's submissions on the notified PDP seeks to rezone the Site from Rural Lifestyle (*RLZ*) to Large Lot Residential (*LLRZ*).
- 8 "Highly productive land" (*HPL*) or versatile soils are regarded as the best possible land or soils for agricultural production because of their properties. These soils are in Land Use Capability Classes (*LUC*) Classes 1, 2 and 3.
- 9 Under the *NPS-HPL*, *HPL* is land which is zoned general rural or rural production and is predominantly classified as *LUC* Classes 1, 2 and 3.
- 10 The Site is comprised of 9.48 ha of *LUC* Class 2 land and 13.2 ha of *LUC* Class 4. Therefore, 9.48 ha is considered *HPL* under the *NPS-HPL*, and the other 13.2 ha is not.
- 11 However, the 9.48 ha that is considered *HPL* is excluded from the direction contained in the *NPS-HPL*.<sup>1</sup> This is because the transitional definition in the *NPS-HPL* excludes *HPL* that it is subject to a Council-initiated plan change, being the PDP, which proposes to zone the Site to *RLZ*. This is based on a memorandum prepared by Mr Mark Buckley (the s42A reporting officer) on behalf of the Waimakariri District Council (*WDC*) which reached the same conclusion, determining that the *NPS-HPL* does not apply to the *RLZ*, which is the proposed zone for the Site.

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<sup>1</sup> National Policy Statement for Highly Productive Land, clause 3.5(7).

- 12 The Canterbury Regional Policy Statement 2016 (*CRPS*) defines “versatile soils” as land classified as LUC 1 or 2. That definition is not bound to any zoning and, as such, the Site comprises versatile soils under the CRPS. The directions of the CRPS as they relate to versatile soils focus on avoiding, remedying or mitigating the adverse effects of development on the productivity or productive capacity of soils and their ability to support primary production now and into the future.<sup>2</sup>
- 13 In that context there are, in my opinion, some ‘constraints’ which will (in some cases significantly) affect the productive capacity of the Site. These include the soils, nutrient limits and available productive land. The impacts of these factors are as follows:
- 13.1 *Soils*. While the soils on the Site are predominantly classified as LUC 2 and 4, there are some variabilities in the nature and extent of those soils across the Site. Some spatial variability even over short distances affects the management of the land for productive purposes.
- 13.2 *Nutrient limits*. The Site’s soils are such that application of nutrients to the Site would be essential to support land-based primary production activities. However, strict nutrient limits are currently in place through the Canterbury Land and Water Regional Plan (*CLWRP*) which would significantly constrain the use of nutrients at the Site. Those limits are unlikely to ease in the short or medium term.
- 13.3 *Available productive land*. The Site represents a reduction in the total regional and district productive or versatile soils of only:
- (a) 0.003% and 0.022% respectively under the CRPS definition of HPL.
- 14 I therefore conclude that the Proposal will not result in any more than a negligible loss of LUC Class 1 and 2 soils within both the Waimakariri district and the Canterbury region. In my opinion, the adverse effects of that loss are also negligible given the Site is subject to a number of constraints which significantly limit its productive capacity over the long term.

## **DESCRIPTION OF THE SITE, LAND USE, CURRENT AND PROPOSED ZONING**

### **Location**

- 15 The Site is located at 145 & 167 Gladstone Road in Woodend. 145 Gladstone Road (Lot 1 DP 29099) is 2.49 ha in extent and 167

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<sup>2</sup> CRPS, policy 5.3.2, supporting principal reasons and explanation; Chapter 15 – Soils, Introduction. Objective 15.3.1.

Gladstone Road (Lot 2 DP 29099) has an area of 20.23 ha. **Attachment 1** shows the location of the Site.

### **Land Use**

- 16 The topography of the Site generally comprises flat land.
- 17 The Site is comprised of grassed paddocks with sheep grazing being one of the main activities. It includes some buildings - residential dwellings and garages, farm buildings and ancillary sheds at 145 Gladstone Road.

### **Groundwater and Surface Water**

- 18 Waihora Creek, is a spring-fed waterway, defined as an unscheduled waterway in the PDP, that runs from north to south through the Site bisecting it into almost two equal halves. This is shown in **Attachment 1**. The waterway is approximately 2-3 m wide (as measured from GIS maps) along most of its length.
- 19 The Canterbury Maps GIS system shows that the Site is over the Coastal Confined Gravel Aquifer System. The bore logs in and around the Site provide data on the groundwater levels within the area. These show that:
- 19.1 The highest groundwater level is 1.3-2.81 mbgl (metres below ground level) based on Wells M36/0545 and M36/3319, respectively, both of which are located within the Site.
- 19.2 The bore logs indicate the presence of:
- (a) Silts and sands in the top 1 m.
  - (b) Blue/grey silty/sands/clayey gravels from below the topsoil to 2-3 m below the ground level.

### **Road Designation**

- 20 The proposed Woodend Motorway Bypass runs through part of the Site. Its extent within the Site is shown in **Attachment 2**.

### **Description of the Soils**

- 21 Canterbury Maps and S-Maps<sup>3</sup> provide details of the soils under the Site. The main soil types and their properties are presented in **Attachment 3**. The soil types are mainly Kaiapoi, Waimakariri, Sockburn, Flaxton and Waikuku soils.
- 22 The soils drainage classes range from well drained ( $\approx 26\%$ ), imperfectly drained ( $\approx 70\%$ ) with the remained being poorly drained as shown in **Attachment 3**.

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<sup>3</sup> <https://smap.landcareresearch.co.nz/1>

### **Current and Proposed Zoning**

- 23 Under the Operative District Plan the Site is bounded to the north by Gladstone Road and Rural Land, to the west by Rural Land and Residential Land zoned Res4a and Res2, to the south by Rural Land and to the east by Rural land. **Attachment 2** shows the existing zoning of the Site under the Operative District Plan.
- 24 The Site and 129 Gladstone Road are proposed to be zoned RLZ in the PDP. The land to the west of the Site and south of 129 Gladstone Road is proposed LLRZ except for 129 Gladstone Road. **Attachment 2** shows the proposed zoning.
- 25 The zones are defined as follows:
- 25.1 RLZ - Rural Lifestyle Zone. This is to provide for primary productive activities, those activities that support rural activities and those that rely on the natural resources that exist in the zone, while recognising that the predominant character is derived from smaller sites.
- 25.2 LLRZ - Large Lot Residential Zone. The purpose of the zone is to provide residential living opportunities for predominantly detached residential units on lots larger than other Residential Zones.

### **LAND USE CAPABILITY CLASSIFICATION AND THE SITE SOILS**

#### **LUC Classification**

- 26 LUC Classification is a land categorisation system in use in New Zealand which seeks to achieve sustainable land development and management on farms. The LUC Survey Handbook (Lynn et al. (2009)<sup>4,5</sup>) provides a qualitative evaluation system which has been widely applied in New Zealand for land use planning, especially for management and conservation.
- 27 The LUC classification system defines eight LUC classes (Figure 1). Classes 1–4 are classified as arable land, while LUC Classes 5–8 are non-arable. The best soils for arable/crop farming are those soils in Class 1, 2, or 3 soils as delineated by the New Zealand Land Resource Inventory (New Zealand Soil Bureau amended 1986).

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<sup>4</sup>Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, and Newsome PJF, 2009. *Land Use Capability survey handbook: a New Zealand handbook for the classification of land*, 3rd ed. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, GNS Science. 163 p.

<sup>5</sup> Lynn et al., (2009), *Land Use Capability Survey Handbook*, 3<sup>rd</sup> Edition, <https://www.tupu.nz/media/izbjrpy4/land-use-capability-luc-survey-handbook-3rd-edition.pdf>.



Increasing Limitations to Use	LUC class	Arable Cropping Suitability†	Pastoral Suitability	Production Forestry Suitability *	General Suitability	Decreasing Versatility of Use			
	1	High ↓	High	High	Multiple Use Land				
	2		↓	↓		↓			
	3								
	4								
	5	Unsuitable			Low		Low	Pastoral or Forestry Land	
	6		↓	↓	↓				
	7								
	8								
		Unsuitable				Unsuitable	Catchment Protection		

**Figure 1 – Relationship between the Versatility and LUC Classes (Lynn et al, 2009<sup>6</sup>)**

### LUC Classes of the Soils Within the Site

- 28 The LUC Classes of the soils within the site are mapped on Canterbury Maps<sup>7</sup>, and Land Resource Information System (LRIS) Portal.<sup>8</sup> **Attachment 4** shows the locations and areas of the LUC Classes in and around the Site. Based on the LRIS, the Site is comprised of LUC 2 and LUC 4 Class soils. The proportions of LUC 2 and 4 soils are presented in Table 1 below.

**Table 1 – Gross Default LUC Classes within the Site**

LUC Class	Area (ha)	%age
LUC 2	9.48	41.72%
LUC 4	13.244	58.28%
<b>Total</b>	<b>22.724</b>	<b>100%</b>

## NATIONAL POLICY STATEMENT FOR HIGHLY PRODUCTIVE LAND

### Introduction

- 29 The NPS-HPL came into effect on Monday 17 October 2022. The NPS-HPL seeks to protect highly productive land for use in land-based primary production, both now and for future generations. “*Land-based primary production*” encompasses production from agricultural, pastoral, horticultural, or forestry activities that are reliant on the soil resource of the land.<sup>9</sup> To achieve this, the NPS-HPL requires the identification of HPL at a regional level, and imposes varying levels of constraint on the rezoning, subdivision, land use and development of that land.

### Highly Productive Land – Clause 3.5(7)(a)

- 30 Until that regional identification (through mapping) occurs, the NPS-HPL (including its various constraining provisions) will only apply to

<sup>6</sup><https://www.tupu.nz/media/jzbrjpy4/land-use-capability-luc-survey-handbook-3rd-edition.pdf>

<sup>7</sup> <https://mapviewer.canterburymaps.govt.nz>

<sup>8</sup> <https://soils.landcareresearch.co.nz/soil-data/the-lris-portal/>

<sup>9</sup> National Policy Statement for Highly Productive Land 2022, clause 2.1.

land that, at the commencement date of the NPS-HPL, meets the transitional definition of “highly productive land”.<sup>10</sup> The two inclusionary criteria for that definition are that the Site is:

- (i) zoned general rural or rural production; and
- (ii) LUC 1, 2 or 3 land.

31 “LUC 1, 2 and 3 land” is defined in the NPS-HPL as land identified as LUC Class 1, 2 or 3, as mapped by the NZLRI or by any more detailed mapping that uses the LUC classification.

32 The Site contains 9.48 ha of LUC Class 2 soils and the Operative District Plan zoning is rural. Consequently the Site meets the definition of HPL under clause 3.5(7)(a). However, as explained below, the Site is subject to an exclusion in clause 3.5(7)(b) whereby the NPS-HPL does not apply.

**Assessment of the Site and Proposal Against Clause 3.5(7)(b) of the HPL**

33 Clause 3.5(7)(b) of the NPS-HPL provides the basis for excluding land identified for future urban development or Council initiated urban or rural lifestyle plan change even if it is defined as HPL under Clause 3.5(7)(a). LUC Class 1-3 land is only captured by the NPS-HPL under Clause 3.5(7)(b) if the land:

*(b) is not:*

*(i) identified for future urban development; or*

*(ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle.*

34 The intent of Clause 3.5(7)(b) is to ensure future urban development areas are only excluded from the NPS-HPL in circumstances where there is a high level of certainty that the land will be developed for urban use in the next 10 years (Section 1.3 of the NPS-HPL).

35 The Site has been notified in the PDP as RLZ. In the WDC memorandum<sup>11</sup> that was prepared by Mr Mark Buckley to help with the interpretation and the relevance of the NPS-HPL on the PDP rural zones Mr Buckley concluded that:

35.1 *“Under clause 3.5.7 the NPS-HPL provisions on highly productive land would not apply to the RLZ zone. My position is that based on the plain and ordinary wording of Clause 3.5.7, a district plan review is a plan change (or collection of changes) and that the notified Rural Lifestyle Zone is excluded from the NPS-HPL. Although it should be noted that in notifying this change, the Rural Lifestyle Zone in the PDP was made in advance of the NPS-HPL and therefore it was not decision*

<sup>10</sup> National Policy Statement for Highly Productive Land 2022, Clause 3.5(7).

<sup>11</sup> Buckley M, July 2023. S42A Reporting Officer for Rural Zones. Amended National Policy Statement on Highly Productive Land.

*cognisant of the final NPS-HPL. Despite this, I note that the RLZ in the PDP was prepared under the rural lifestyle zone descriptor in the National Planning Standards".*

- 36 Therefore, the NPS-HPL does not apply to the Site because clause 3.5(7)(b)(ii) excludes land that is subject to a Council initiated notified plan change to rezone land to RLZ.

#### **ASSESSMENT OF THE SITE AGAINST OTHER RELEVANT NPS-HPL CLAUSES**

- 37 While I have concluded that the NPS-HPL does not apply to the Site, for completeness I provide an assessment of the Site against other relevant provisions in the NPS-HPL.

#### **Assessment of the Site and Proposal Against Clause 3.9(1) of the HPL**

- 38 Clause 3.9(1) of the NPS-HPL provides that territorial authorities must avoid the inappropriate use or development of HPL that is not land-based primary production. However, clause 3.9(2) provides various exceptions for certain activities on HPL that do not constitute inappropriate use or development.

- 39 Clause 3.9(2)(h) of the NPS-HPL provides an exception where the use or development of HPL is for an activity by a requiring authority in relation to a designation.

- 40 There is approximately 0.4 ha (**Attachment 5**) of the LUC 2 Class soils located within the motorway designation (Paragraph 20). This area is not captured by the NPS-HPL under Clause 3.9(2).

- 41 When I exclude this area from the LUC Class 2 area in Table 1, the remaining area of LUC Class 2 land is 9.08 ha.

#### **Assessment of the Site and Proposal Against Clause 3.4 of the NPS-HPL Specifically to the Site**

- 42 In this section I apply Clause 3.4 of NPS-HPL specifically to the Site.

- 43 Clause 3.4 relates to the mapping of HPL and provides guidance on what can and need not be included as HPL. Of particular relevance to the site are:

43.1 Clause 3.4(5)(b) which states that "*where possible, the boundaries of large and geographically cohesive areas must be identified by reference to natural boundaries (such as the margins of waterbodies), or legal or non-natural boundaries (such as roads, property boundaries, and fence-lines)*";

43.2 Clause 3.4(5)(d) which states that "*small, discrete areas of LUC 1, 2, or 3 land need not be included if they are separated from any large and geographically cohesive area of LUC 1, 2, or 3 land*".

- 44 Therefore, when I apply the criteria in Clause 3.4(5)(b) I conclude

that the 0.28 ha LUC Class 2 soils between Waihora Creek and the motorway designation (**Attachment 5**) is "a small discrete block of land that must not be included in the mapping of HPL because it is separated from any large and geographically cohesive area of" LUC 2 land. It is isolated and cannot be meaningfully made productive especially when the riparian margins are excluded from productive uses.

- 45 When I exclude this area from the remaining 9.08 ha LUC Class 2 land the remaining area of HPL is 8.8 ha.

#### **Assessment of the Site and Proposal Against Clause 3.4 of the NPS-HPL To the Wider Area**

- 46 I also considered the relevance of Clause 3.4 to the wider area which is the area bound by Gladstone Road, Woodend Beach Road, the NZTA designation which form natural boundaries.

- 47 Under the PDP zoning the land to the west of the Site and south of 129 Gladstone Road i.e. 83 Petries Road will be LLRZ. This land is therefore not covered by the NPS-HPL based on WDC's memorandum.<sup>12</sup> Therefore, the proposed LLRZ is also forms a natural boundary.

- 48 This leaves the Site, 129 Gladstone Road and 196 Woodend Beach Road within the natural boundaries (defined above) proposed to be zoned RLZ.

- 49 Parts of the above properties are within LUC Class 4 and are therefore not HPL. The land within the boundaries that is LUC Class 2 is 15.4 ha gross area distributed as follows:

49.1 The Site = 8.8 ha.

49.2 129 Gladstone Road = 3.85 ha.

49.3 196 Woodend Beach Road = 2.71 ha.

- 50 The net area is estimated at approximately 14.7 ha when the riparian margins, dwellings and other buildings and yards are factored out. This 14.7 ha is shown (white dotted outline) in **Attachment 6**.

- 51 As I noted Paragraph 43.1 Clause 3.4(5)(d) states that "small, discrete areas of LUC 1, 2, or 3 land need not be included if they are separated from any large and geographically cohesive area of LUC 1, 2, or 3 land". The 14.7 ha is separated from the rest of the LUC 2 Class land to the north and south of the natural boundaries defined above and does not form a cohesive area of LUC 2 land (**Attachment 6**)

#### **Relevance of the RLZ Development Yields to Clause 3.4**

- 52 As a result of my assessment above, the net site area LUC 2 soils is approximately 8.8 ha. As the zone permits one residential unit per

<sup>12</sup> Buckley M, July 2023. S42A Reporting Officer for Rural Zones. Amended National Policy Statement on Highly Productive Land

minimum site area of 4 ha (or a minor residential unit in conjunction with a standard residential unit) the Site will only yield just 2 lots.

- 53 If the area bound by the boundaries shown in **Attachment 6** is all considered, the approximate 14.7 ha area will yield 3.6 lots.
- 54 It is my view that, because of the way the Site or the wider block has been isolated by the boundaries, it does not lend itself to retaining as the Site RLZ for the purposes of achieving the intent of the zone as defined in the PDP.

### **CANTERBURY REGIONAL POLICY STATEMENT 2016**

- 55 In the previous paragraphs I have assessed the Proposal against the NPS-HPL. The CRPS is also relevant as it considers the importance of productive soils.
- 56 The CRPS defines “versatile soils” as land classified as LUC 1 or 2. That definition is not bound to any zoning and, as such, the Site comprises versatile soils under the CRPS. The directions of the CRPS as they relate to versatile soils focus on avoiding, remedying or mitigating the adverse effects of development on the productivity or productive capacity of soils and their ability to support primary production now and into the future.<sup>13</sup>
- 57 In that context (and noting that those directions should, as I understand it, be read in the context of the NPS-HPL), I address the productive capacity of the Site soils below and the extent to which they would be compromised by the Proposal.

### **PRODUCTIVE CAPACITY OF THE SITE SOILS**

#### **Introduction**

- 58 “Productive capacity” can generally be defined as the ability of the land to support land-based primary production over the long term, based on an assessment of:
- 58.1 physical characteristics (such as soil type, properties, and versatility); and,
  - 58.2 legal constraints (such as consent notices, local authority covenants, and easements); and
  - 58.3 the size and shape of existing and proposed land parcels.
- 59 Similar guidance has previously been given by the Environment Court<sup>14</sup> on factors which indicate productive capacity (illustrated in Table 2 below).

<sup>13</sup> CRPS, policy 5.3.2, supporting principal reasons and explanation; Chapter 15 – Soils, Introduction. Objective 15.3.1.

<sup>14</sup>*Canterbury Regional Council v Selwyn District Council* [1997] NZRMA 25 at Appendix II.

**Table 2 – List of Factors Determining Versatility (Treadwell, 1997<sup>15</sup>)**

Soil texture	Soil structure	Soil water holding capacity
Soil organic matter stability	Site's slope	Site's drainage
Temperature of the site	Aspect of the site	Stormwater movements
Floodplain matters	Wind exposure	Shelter planted
Availability of irrigation water	Transport, both ease and distance	Effect of the use on neighbours
Access from the road	Proximity to airport	Proximity to port
Supply of labour	Previous cropping history	Soil contamination
Sunlight hours	Electricity supply	District scheme
Economic and resale factors		

- 60 Based on my desktop analysis, a number of the factors in Table 2 affect or are relevant to the Site which I consider constrain land-based primary production at the Site.
- 61 I now discuss the relevant factors and the extent to which the limitations may or may not be able to be managed.

### **Soils**

- 62 The soils are LUC Classes 2 and 4 with LUC Class 2 soils making up 38.7% (based on net areas) of the Site. This theoretically indicates their suitability for arable cropping.<sup>16</sup> **Attachment 3** shows that soil properties such as depth and permeability vary within each soil type and between soil types. For example:
- 62.1 The soils have various textures and these have different management requirements if their capacity is to be maximised. However, for convenience they are generally treated the same with the restrictions imposed by the worst soil type often determining the management requirements at the expense of the other soil types.
- 62.2 The variability in soil properties has implications on the management of the soils and crops if the soil's productivity potential is to be achieved. This places additional management burden as the different soil units can lead to differences in germination times, irrigation needs during the growth of crops, and differences in optimal harvest dates. It can also lead to variability in overall yields, which could impact the economic

<sup>15</sup> *Canterbury Regional Council v Selwyn District Council*, above n12.

<sup>16</sup> Lynn et al., (2009), [Land Use Capability \(LUC\) Survey Handbook, 3rd edition \(tupu.nz\)](http://tupu.nz).

viability of primary production on what is already a small area of land.

### **Effects of the Regional Statutory Consideration on Land Productivity**

#### Canterbury Land and Water Regional Plan and Plan Change 7

63 CLWRP and Plan Change 7 to the CLWRP seek to manage and require reductions in diffuse discharges of nitrogen, phosphorus, sediment and microbial pathogens from land use activities including commercial vegetable production through rules. For example:

63.1 Policies 4.34-4.36 which relate to management of nutrient loss from farming among other activities. For example:

(a) Policy 4.36A relates to vegetable production requirements to achieve certain nutrient requirements.

63.2 Policies 4.37 to 4.38H which apply to individual farming activities, nutrient user groups and farming enterprises. More specific to the Site:

(a) Policy 4.38 which applies to areas that are within the Orange Nutrient Allocation Zone. The Site is within the Ashley-Waimakariri Nutrient Allocation Zone which is Orange. Policy 4.38 seeks improved water quality outcomes by "avoiding the granting of any resource consent that will allow nitrogen losses from a farming activity to exceed the Baseline Good Management Practice (GMP) Loss Rate, except where Policy 4.38C applies";

(i) including on any resource consent granted for the use of land for a farming activity, conditions that;

(ii) limit the nitrogen loss calculation for the farming activity to a rate not exceeding the Baseline GMP Loss Rate;

(iii) require farming activities to operate at or below the GMP Loss Rate, in any circumstance where that GMP Loss Rate has not been influenced by severe extraordinary events (including but not limited to droughts or floods) and is less than the Baseline GMP Loss Rate; and

(iv) requiring a Farm Environment Plan as part of any application for resource consent to use land for a farming activity and requiring that Farm Environment Plan to be prepared in accordance with Schedule 7 of this Plan.

- 63.3 Rules 5.42CA to 5.42CD which set out the rules for vegetable production on a regional basis.
- 63.4 Sub-regional Rules 8.5.21 to 8.5.26 which relate to the use of land >5 ha for farming activities and set out conditions for permitted to non-complying activities depending on the nitrate loss rates for the farming activity.
- 64 The nutrient requirements set out in the various rules seek to address excessive groundwater nutrient concentrations in the catchment over which the Site lies.
- 65 The CLWRP requires that baseline nutrient budgets be established based on the farming activities during the period of 2009-2013. For the land parcels which make up the Site, productivity has always been historically low. Therefore, the baseline nitrogen leaching rates are also very low.

*Permanency of the Nutrient Limit Constraints*

- 66 Future nitrogen leaching rates are required to not exceed the baseline rates and, where they do, these must be reduced. I consider the nutrient limits to be a long-term constraint on the following basis:
- 66.1 The groundwater nutrient concentrations being observed now within the groundwater catchment are primarily from activities of the 1970s, 80s, 90s and early 2000s. The effects of the more recent (1980s to the present day) intensification in dairying and other farming activities will manifest over the next several decades (approximately 20 to 40 years). The effects will be considerably worse than what the catchment is experiencing now because of this intensification.
- 66.2 Mitigation measures being implemented in compliance with the CLWRP will unlikely restore the nutrient levels to the pre-intensification levels. For these reasons, I consider that limits on nutrient use and applications as a permanent constraint.
- 66.3 It is also not unreasonable to expect further policies and regional rules to be tightened to reduce the use of nutrients.
- 67 Therefore, nutrient limiting policies and rules are a permanent long-term constraint for the Site.

**Impacts of Nutrient Limits on Productivity and Farm Economics**

- 68 Any reductions in nitrogen fertilisers or limited use is accompanied by a decrease in yields, revenues and profitability. There is literature that supports this. A few examples of such literature are:
- 68.1 A Landcare Research study called "*Modelling Economic Impacts of Nutrient Allocation Policies in Canterbury: Hinds Catchment*"



in 2013 prepared for the Ministry for the Environment.<sup>17</sup> That research concluded that loss in productivity could result in revenue reductions of up to 41% with an average of 14% across the farming systems studied.

68.2 Reports prepared by the Agribusiness Group (2014)<sup>18, 19</sup> (together the *Agribusiness Reports*) found significant reductions in yield and profitability resulting from nutrient reductions.

68.3 I have extracted Figure 2 below from the Agribusiness Reports. It shows the corresponding yield reductions associated with reductions in nitrogen.

<b>Appendix One: Average Estimated Reduction in yield with reduction in applied N.</b>					
<b>Reduction in N</b>	<b>Potato (Summer), Onions, Carrots,</b>	<b>Squash, Broccoli, Lettuce,</b>	<b>Cabbage, Spinach, Cauliflower</b>	<b>Potato (Winter)</b>	<b>Barley</b>
10%	10%	15%	15%	25%	25%
20%	20%	25%	30%	35%	35%
30%	30%	40%	40%	50%	45%

**Figure 2 – Yield Reductions Due to Reductions in N Applications**

- 69 Agribusiness Reports also include budgets showing losses for some crops with the conclusion that *“At the 10% reduction in the amount of N applied the Gross Margin result is reduced to approximately one third to a half of that under the Status Quo situation and from there it dips towards a close to breakeven scenario which means that it would not be economic to grow the crop. This reflects the relatively tight margins which these crops are grown under.”*
- 70 Therefore, any natural capital from the remaining 8.8 ha of LUC Classes 2 land on the Site is negated by the statutory constraints relating to nutrient application limits imposed by the statutory planning rules.

<sup>17</sup>Landcare Research (2013). *Modelling Economic Impacts of Nutrient Allocation Policies in Canterbury: Hinds Catchment*. Prepared for the Ministry for the Environment. <https://environment.govt.nz/assets/Publications/Files/modelling-economic-impacts-of-nutrient-allocation-policies-canterbury.pdf>

<sup>18</sup>The Agribusiness Group (2014). *Nutrient Performance and Financial Analysis of Lower Waikato Horticulture Growers*. Prepared for Ministry for Primary Industries and Horticulture NZ. <https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Section-32/Part-E3/AgriBusiness-Group-2014.-Nutrient-performance-and-financial-analysis-of-lower-Waikato-horticulture-growers.-Document-8727329.pdf>

<sup>19</sup>The Agribusiness Group (June 2014). *Nutrient Performance and Financial Analysis of Horticultural Systems in the Horizons Region*. Prepared for Horticulture NZ. <https://www.horizons.govt.nz/HRC/media/Media/One%20Plan%20Documents/Nutrient-Performance-and-Financial-Analysis-of-Horticultural-Systems-in-Horizons-Region-2014.pdf?ext=.pdf>.

### Positive Benefits of the Proposal

- 71 The Proposal seeks to convert rural land to residential land. This means that any nutrient leaching into groundwater and flows into surface waterways from the farming activities which may be occurring as a result of the existing/historical uses of the Site would cease. The resultant adverse impacts on groundwater and surface water quality would also cease.

### SCALE OF THE PROPOSAL AND REDUCTION IN VERSATILE SOILS

- 72 The estimated quantities of LUC Class 2 based on information from various sources is summarised below:
- 72.1 The Canterbury Region has 293,700<sup>20</sup> ha of Class 1 and 2 soils.
- 72.2 There are approximately 39,478 ha<sup>21</sup> of LUC Class 1 and 2 within Waimakariri District.
- 73 In Table 3 below I give a sense of the proportional reduction in HPL within the district and the region as a result of the Proposal for the Site under the CRPS definition of HPL.

**Table 2 – Proportion of the Site’s HPL Under the CRPs**

LU Class	Canterbury (ha)	Waimakariri (ha)	Plan Change Area (ha)	Potential Reduction in HPL Under the RPS	
				Canterbury	Waimakariri
LUC1	23,200	39,478.00	0	<b>0.003%</b>	<b>0.022%</b>
LUC2	270,500		8.8		
<b>Area</b>	<b>293,700</b>	<b>39,478.00</b>	<b>8.8</b>		

- 74 Using the CRPS definition of HPL, the reduction in HPL would be 0.003% and 0.022% in Canterbury and in Waimakariri District, respectively. Therefore, the reduction in HPL as a result of the Proposal would be insignificant.

<sup>20</sup>LR Lilburne, IH Lynn & TH Webb (2016) Issues in using Land Use Capability class to set nitrogen leaching limits in moisture-deficient areas—a South Island case study, New Zealand Journal of Agricultural, Research, <https://www.tandfonline.com/doi/full/10.1080/00288233.2015.1092996>

<sup>21</sup>Waimakariri District Council, In the matter of the Proposed National Policy Statement on Highly Productive Land, 1 October 2019, [https://www.mpi.govt.nz/assets/dmstemp/HPL\\_submissions/2-3-21/E6.-Waimakariri-DC-Attachment-Redacted.pdf](https://www.mpi.govt.nz/assets/dmstemp/HPL_submissions/2-3-21/E6.-Waimakariri-DC-Attachment-Redacted.pdf)

## **SUMMARY AND CONCLUSION**

- 75 In summary, I consider that there are a number of significant constraints on the productive capacity of the Site to be used for primary production. In that context (and noting the very minor contribution that the Site makes to versatile soils in Canterbury generally), I do not consider that the productive capacity potential of the Site should preclude it from being rezoned for residential development.
- 76 To that end, I support CDGL's submission to rezone the Site for residential development on the basis that:
- 76.1 The Site is excluded from the NPS-HPL definition of HPL under Clause 3.5.
  - 76.2 There are multiple long-term constraints on the capacity of the Site to support primary production activities. In light of these constraints, the overall benefits of retaining this land for primary production are, in my opinion, negligible.
  - 76.3 The proportional reductions in HPL/versatile soils in the Waimakariri district and the Canterbury region as a result of the Proposal are insignificant.
  - 76.4 The Proposal has significant positive benefits which include reducing nutrient applications to land. This will reduce the adverse effects on the waterway and groundwater.

Dated: 5 March 2024

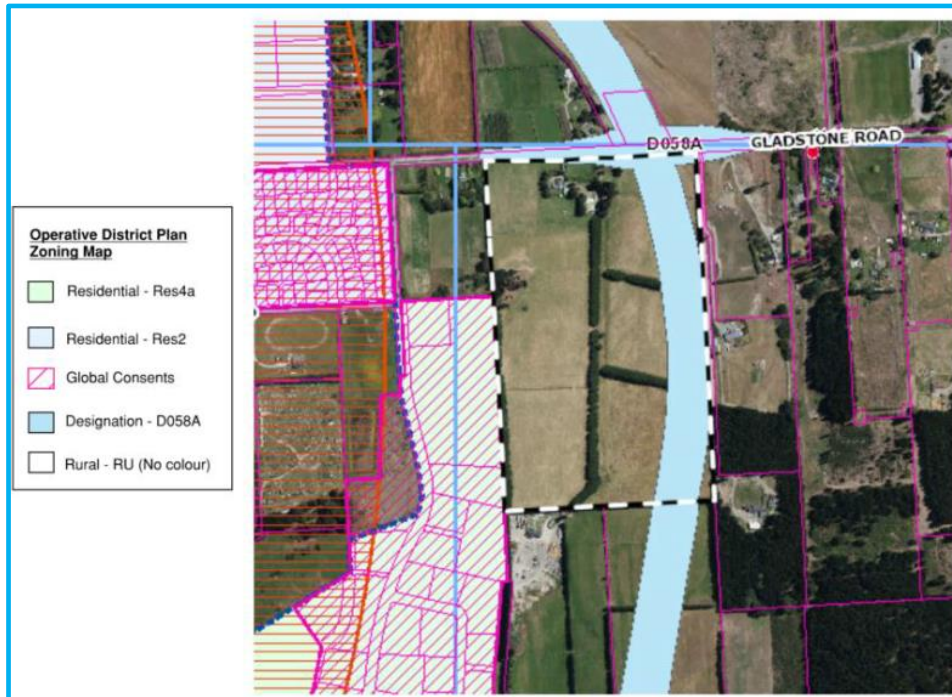
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Victor Mthamo

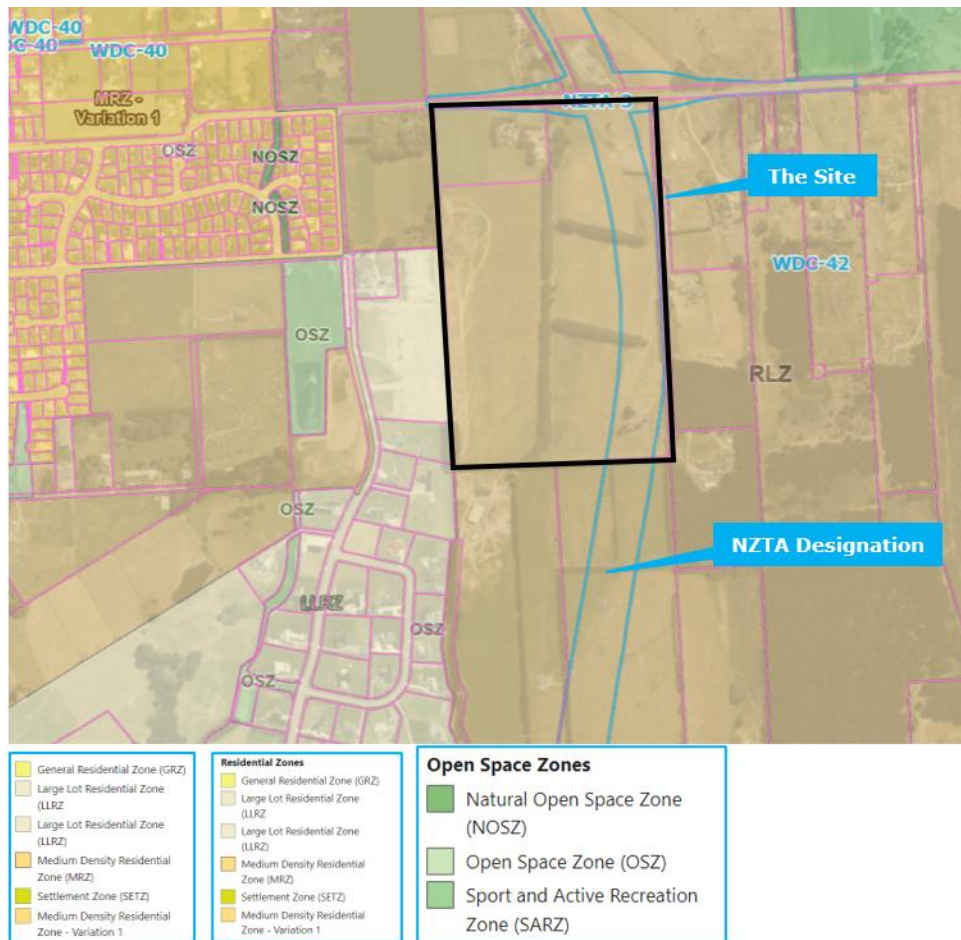
**ATTACHMENT 1 – LOCATION OF THE PLAN CHANGE AREA**



**ATTACHMENT 2 – EXISTING AND PROPOSED ROAD DESIGNATION**



**Figure 2.1 Existing Zoning**



**Figure 2.2 Proposed Zoning**



### ATTACHMENT 3 – SOIL PROPERTIES

**Table 3.1 – Soil Types and Area Under Each Soil Type**

Soil Name	Sibling	Soil Texture	Soil Depth (cm)	Permeability	Area (ha)	Proportion
Kaiapoi	Kaia_1a.1	Silt	>100	Moderate	9	38.60%
Kaiapoi	Kaia_2a.1	Silt	45-100	Moderate/Rapid	5	22.40%
Waimakariri	Waim_42a.1	Loam/ Sand	>100	Moderate/Rapid	4	17.10%
Waimakariri	Waim_40c.1	Loam/ Sand	45-100	Moderate/Rapid	1	4.90%
Sockburn	Sock_1a.1	Silt	20-45	Moderate/Rapid	1	3.70%
Rakaia	Raka_2a.1	Silt	20-45	Moderate/Rapid	1	3.70%
Kaiapoi	Kaia_4a.1	Silt	45-100	Moderate/Rapid	1	3.20%
Flaxton	Flax_1a.1	Silt	>100	Moderate/Slow	1	3.10%
Waikuku	Wiku_1a.1	Sand	>100	Rapid	< 1	1.10%
Rakaia	Raka_10a.1	Loam	<20	Moderate/Rapid	< 1	0.80%
Rakaia	Raka_1a.1	Loam	20-45	Moderate/Rapid	< 1	0.80%
Burwood	Burw_1a.1	Sand	>100	Rapid	< 1	0.30%
Waikuku	Wiku_20b.1	Sand	>100	Rapid	< 1	0.20%
<b>Total</b>					<b>≈23</b>	<b>100.00%</b>

**Table 3.2 – Drainage Properties of the Soils**

Drainage Description	Area (ha)	Percentage (%)
Poorly Drained	≈1	4.35%
Imperfectly Drained	16	69.57%
Well Drained	6	26.09%
<b>Total Area</b>	<b>≈23</b>	<b>100.00%</b>

**ATTACHMENT 4 – SITE LUC CLASSES AND THEIR LOCATIONS**



**ATTACHMENT 5 – REAKDOWN OF AREAS UNDER VARIOUS LUC CLASSES**





**ATTACHMENT 6 –LUC CLASS 2 LAND WITHIN THE NATURAL BOUNDARIES**

