

**BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY THE
WAIMAKARIRI DISTRICT COUNCIL**

IN THE MATTER OF

The Resource Management Act 1991 (**RMA** or
the Act)

AND

IN THE MATTER OF

Hearing of Submissions and Further
Submissions on the Proposed Waimakariri
District Plan (**PWDP** or **the Proposed Plan**)

AND

IN THE MATTER OF

Hearing of Submissions and Further
Submissions on Variations 1 and 2 to the
Proposed Waimakariri District Plan

AND

IN THE MATTER OF

Submissions and Further Submissions on the
Proposed Waimakariri District Plan by
Bellgrove Rangiora Limited

**EVIDENCE OF JAN KUPEC
ON BEHALF OF BELLGROVE RANGIORA LIMITED
REGARDING HEARING STREAM 12E**

Dated: 30 April 2024

Presented for filing by:
Chris Fowler
PO Box 18, Christchurch
T 021 311 784 / 027 227 2026
chris.fowler@saunders.co.nz

INTRODUCTION

- 1 My name is Dr Jan Kupec.
- 2 I hold the qualifications of a Doctorate and Masters in Civil Engineering,
- 3 I am a Ground and Underground Engineering Principal for Aurecon in Christchurch, a position I have held for 12 years. I have contributed to a number of land development projects across New Zealand and many in Rangiora. I have 19 years of geotechnical engineering experience and have assisted with the preparation, review and technical guidance of many geotechnical assessments for Resource Management Act (**RMA**) matters for public and private sector clients.
- 4 My role in relation to the Waimakariri Proposed District Plan (**pWDP**) and Variation 1 is as an independent expert witness to Bellgrove Rangiora Limited (**Bellgrove**) on geotechnical matters.
- 5 Although these are not an Environment Court proceeding, I have read the Environment Court's Code of Conduct and agree to comply with it. My qualifications as an expert are set out above. The matters addressed in my evidence are 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.

SCOPE OF EVIDENCE

- 6 In my evidence I address the following issues:
 - (a) The Proposal to rezone the Site to Medium Density Residential Zone (**MRZ**);
 - (b) Amend the South East Rangiora Development Area (**SER-DA**) and South East Rangiora Outline Development Plan (**SER-ODP**) to include an additional 3.3 ha (being the full extent of Lot 2 DP 452196) – the **Additional Land**);
 - (c) Amendment sought to the notified SER-ODP (the **revised SER-ODP**);
 - (d) The relevant statutory planning provisions;

- (e) The Preliminary Geotechnical Investigation Report for the site, completed by Aurecon in 2019 and other readily available geotechnical information; and
 - (f) My assessment of the geotechnical suitability of Bellgrove's rezoning proposal under the proposed Waimakariri District Plan (**pWDP**).
- 7 In preparing my evidence I have reviewed the following documents and evidence:
- (a) Inch Property, Kippenberger Avenue, Rangiora: Preliminary Geotechnical Investigation Report, 506685, Revision 1 dated 30 July 2019 prepared for Westpark Rangiora Limited;
 - (b) Additional readily available public geotechnical information; and
 - (c) The revised SER-ODP with amendments sought by Bellgrove (Drawing Reference 509177-W00001-GIS-UU-0004, dated 22 April 2024).

SUMMARY OF MY EVIDENCE

- 8 Bellgrove are seeking the rezoning of approximately 31.2ha block of land in the South East of Rangiora as part of the Waimakariri District Plan review.
- 9 The site has been zoned Rural Lifestyle Zone (**RLZ**) in the pWDP. Bellgrove seek to have it rezoned Medium Density Residential Zone (**MRZ**).
- 10 Given this is a rezoning request, my evidence has focused on whether there are any significant or insurmountable geotechnical reasons that would impede the site from being rezoned to MRZ.
- 11 Based on the evidence before me, I conclude that from a geotechnical perspective the site is suitable for residential rezoning and subsequent subdivision following appropriately designed engineering measures.

CONTEXT

- 12 Bellgrove seek to rezone approximately 31.2 ha of land situated to the immediate south-east of Rangiora from RLZ to MRZ as part of the Waimakariri District Plan review.

THE SITE

13 Bellgrove South comprises Lot 2 DP 12090, Lot 2 DP 394668, Lot 2 DP 452196 and Lot 4 DP 25508, all of which is currently used for grazing purposes (Figure 1).

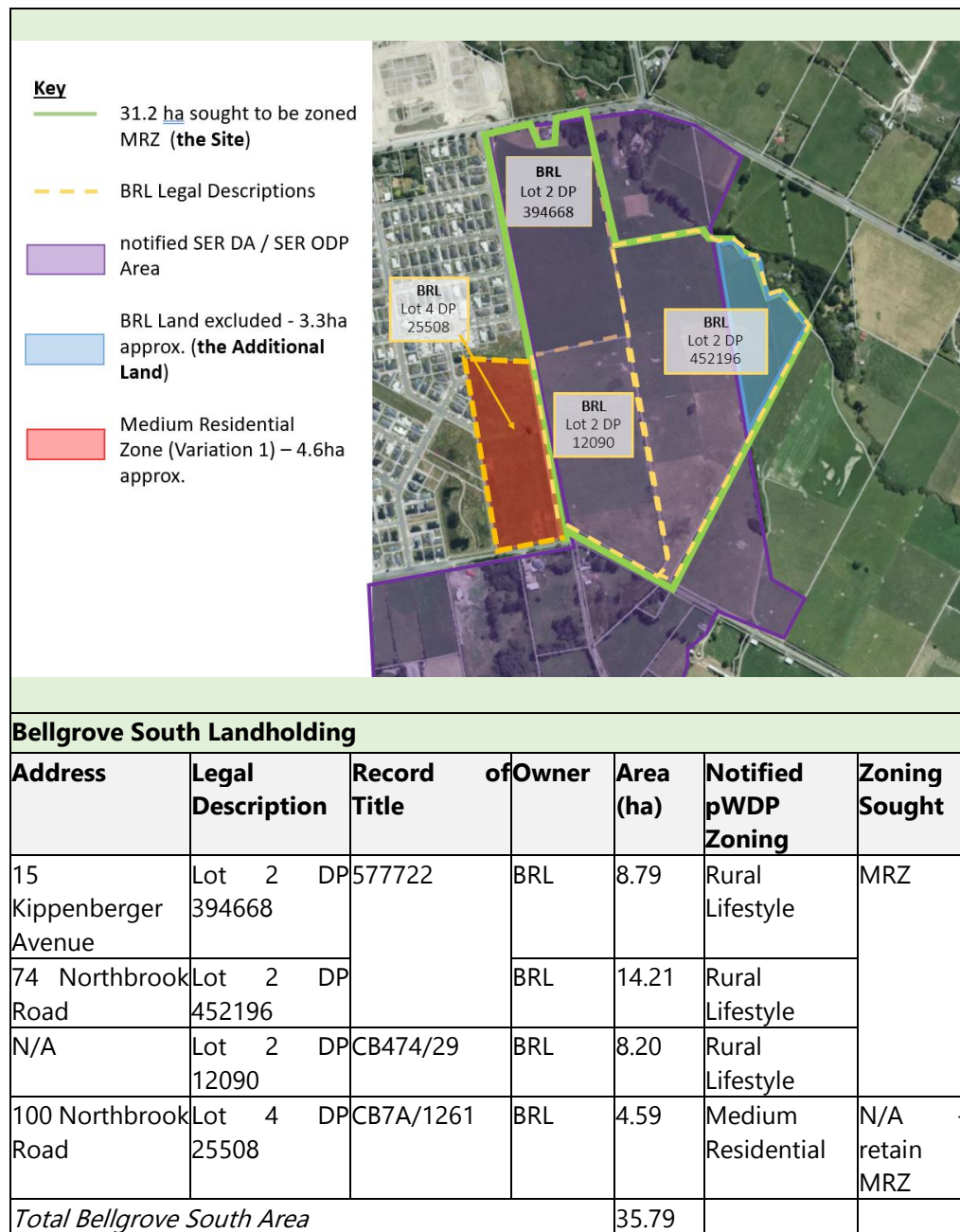


Figure 1. Bellgrove South Landholding Information

14 Bellgrove South is abutted by residential land to the west (Devlin Avenue), land earmarked for future residential development to the south (also located within the SER DA) and rural land use to the east.

15 To the immediate north of the site, on the other side of Kippenberger Avenue Bellgrove North (Stage 1) is currently under development in accordance with

the consent approved under the COVID-19 Recovery (Fast-track Consenting) Act 2020 for 198 residential lots.

THE PROPOSAL

- 16 Bellgrove seek to rezone the full extent of Bellgrove South from RLZ to MRZ in the pWDP. Excluding Lot 4 DP 25508 (100 Northbrook Road) which is already proposed to be zoned MRZ as part of Variation 1, this is an area of approximately 31.2 ha (the Site).
- 17 Included within this rezoning request is a 3.3 ha area of 'Additional Land' currently located to the east of (outside) the notified SER-DA.
- 18 The rezoning will allow for a potential yield of approximately to 440 lots¹.
- 19 No actual land use change, subdivision or soil disturbance is proposed as part of the rezoning. Bellgrove also seek changes to the notified SER-ODP as shown on the revised SER-ODP with those of relevance to this evidence being:
- (a) Changes to the indicative road layout to comprise a single north/south primary road and extend the two secondary east/west roads east into the area of Additional Land;
 - (b) Changes to the open space network to include the provision of a stormwater facility within the southern portion and south-eastern corner of the Site (approximately 6.5 ha in size);
 - (c) Identification of all the residential land as Medium Density Residential; and
 - (d) Inclusion of the area of Additional Land within the revised SER-ODP.

GEOTECHNICAL ASSESSMENT REVIEW

- 20 Aurecon has previously completed a Preliminary Geotechnical Investigation Report for the entire Bellgrove Rangiora site² (the **Geotechnical Investigation Report**) which is attached at Attachment 1. This report summarises the Bellgrove site both north and south of Kippenberger Avenue, however for the

¹ An indicative concept layout produced for Bellgrove South dated 3 April 2024 estimates an indicative yield of approximately 437 residential lots (including approximately 74 located within Lot 4 DP 25508 which is already residential zoned).

² Inch property, Kippenberger Avenue, Rangiora – Preliminary Geotechnical Investigation Report, ref 506685 dated 30 July 2019

purposes of this evidence only the southern half of the site is considered. The Geotechnical Investigation Report is summarised below:

- (a) Aurecon have reviewed readily available geotechnical information, including the New Zealand Geotechnical Database, ECAN's Canterbury Maps and the Institution of Geological and Nuclear Sciences (**GNS**) Active Fault Database. The geology is described as *"Grey to brownish-grey river alluvium beneath plains or low-level terraces."*
- (b) Aurecon undertook a site walkover followed by two geotechnical boreholes and eleven cone Penetrometer Tests (**CPT**). The investigations were undertaken across the site to provide reasonable coverage. The ground model built from the investigations shows the proposed site is underlain by a thick (4-6m) sequence of interbedded silts, sands and peat layers overlying medium dense to dense gravels. The peat layers were predominantly located in the southern half of the site.
- (c) Groundwater was encountered from artesian (above ground level) to 0.6m below ground level, within BH4 and BH3 respectively. The measurements of groundwater within the investigations in the southern block, and from observations during Aurecon's site walkover, showed near surface and at surface levels with artesian pressures in the underlying gravel units. The artesian groundwater levels rise towards the southern portion of the site where the existing ground level drops correspondingly. The flow of groundwater is inferred to be recharged predominantly by the Ashley River.
- (d) The predominant geotechnical engineering hazards identified in the Geotechnical Investigation Report are:
 - (i) The potential for 'Mild to Moderate' seismically induced liquefaction, in accordance with the definitions given in Table 5.1 of the 'MBIE/NZGS Module 3. Identification, assessment and mitigation of liquefaction hazards'.
 - (ii) The presence of variable thicknesses of organic/peaty soils in the southern portion of the site, as evidenced in the sketch 509177-0002-SKT-GG-0001[0] at Attachment 2. These soils are susceptible to long term consolidation settlement as a result of imparted loads,

including the placement of engineered fill or foundations of proposed structures.

(iii) The presence of artesian (i.e. above existing ground surface) groundwater pressures identified in the southern portion of the site. Artesian groundwater levels are shown in 506685-0001-GG-0001-DRG-02[A] in the attached Geotechnical Investigation Report. The artesian pressures are localised to the underlying gravel layers and are currently suppressed by the overlying finer soil layers. Artesian pressures have not been measured to date.

- 21 In addition, I note the site is not at risk from the following natural hazards:
- (a) Seismically induced slope stability due to a lack of significant existing slopes. Any future slopes associated with subdivision development should be assessed to ensure suitable stability;
 - (b) Rockfall, including seismically induced rockfall, due to the lack of a rockfall source;
 - (c) Shallow or deep-seated land sliding; and
 - (d) Tsunami inundation.
- 22 The stormwater and flooding evidence of Mr Delagarza includes an assessment regarding flood hazard risk for the Site.
- 23 In addition to the information specifically given in Aurecon's Geotechnical Investigation Report, I have reviewed the following sources of information.
- (a) The New Zealand Geotechnical Database (**NZGD**) has a number of additional geotechnical investigations predominantly located to the west of the site associated with other subdivision developments. Four additional boreholes were drilled in the southwestern section of the proposed site in 2021 by Aurecon. Each of these boreholes also identified varying thicknesses of organic/peaty soils.
 - (b) Groundwater monitoring recordings surrounding the site from the Environment Canterbury Database indicates two wells in the vicinity with historical groundwater monitoring data.
 - (i) M35/0366 located approximately 300m northeast of the Site, is screened at 14m to 14.8m below ground level. Groundwater has

historically been measured between 1978 and the current day, with variation predominantly between 2.4m and 5m below ground level.

- (ii) M35/9001 located approximately 1.7km southwest of the site, is screened between surface level and 1.65m below ground level. Groundwater has historically been measured between 2001 and the current day, with variation between surface level and 1.3m below ground level.
- (c) Well M35/066 is unlikely to represent the shallow groundwater regime located within the subject site due to the differing ground conditions in the northern area of the Bellgrove development.
- (d) Mapping from aerial and satellite photos found no evidence of liquefaction on the site following both the September 2010 and February 2011 earthquakes, based on the Environment Canterbury Database.

ENGINEERING CONSIDERATIONS REVIEW

24 Geotechnical hazards have been identified in the Geotechnical Investigation Report and summarised in Paragraph 20 above. Recommendations for the mitigation of these geotechnical hazards are also provided within the Geotechnical Investigation Report and I have summarised these below. I note that all presented solutions can be readily implemented and I consider them to be standard industry solution used on a wide range of developments in the Canterbury Region.

- (a) The southern portion of the Site is proposed to comprise a stormwater management area. This portion of the Site is also proposed to be raised by approximately 1m as part of the subdivision development process. On this basis, stormwater ponds and wetlands will be constructed 'above existing ground level' and minimise interaction with artesian groundwater pressures which exist in this portion of the site. This arrangement within the ODP is appropriate from a geotechnical perspective given it utilises the part of the site with the poorest ground conditions to construct stormwater infrastructure, rather than residential homes.
- (b) Consolidation of compressible organic/peaty soils as a result of engineered fill in the southern portion of the site will be accelerated

through the use of surcharge/preloading prior to subdivision development. Further geotechnical investigations will be undertaken at the subdivision detailed design phase to refine the degree of compressibility of the wider site and define the preload design, in addition to a regimented observational approach to fill placement and compaction.

- (c) The effects of shallow seismically induced liquefaction will be managed through the use of suitable foundation recommendations and design. The performance of all residential allotments will meet the MBIE Technical Category 2, or greater, performance requirements. In addition, the placement and certification of engineered fill will reduce the current 'minor to moderate' seismically induced liquefaction risk, by increasing the thickness of the non-liquefiable crust.
- (d) The use of MBIE Guidelines for standard foundations, such as Technical Category 2 raft and rib-raft footings will provide suitable levels of foundation performance for the expected seismically induced settlement and ground damage, as well as, cope with longer term settlement due to organic material consolidation.
- (e) Underground services will be protected from the effects of earthquake induced deformations and long-term settlement, where required, through the use of geogrid reinforced soil fills and use of appropriate materials.

RELEVANT PLANNING PROVISIONS

- 25 Section 6 'Matters of National Importance' of the Resource Management Act (RMA) outlines that the use and development of land shall recognise and provide for the management of significant risks from natural hazards.
- 26 In addition, Section 106 of the RMA enables consent authorities the right to refuse to grant a subdivision consent if it considers there is a significant risk from natural hazards.
- 27 Lastly, the Canterbury Regional Policy Statement (CRPS), Chapter 11 outlines that new subdivision, use and development is to be avoided where it increases the risk of natural hazards to people, property and infrastructure (or where avoidance is not possible, risks minimised) (Objective 11.2.1).

- 28 I consider that from a geotechnical engineering perspective, the proposed rezoning and subsequent subdivision development meet the objectives of the relevant Planning provisions.

CONCLUSION

- 29 My assessment has considered the items required by Section 106 of the RMA. In my opinion I consider the site is geotechnically suitable for rezoning to MRZ and that the changes sought to the SER-ODP including the inclusion of the Additional Land and the location and extent of the stormwater reserve area are appropriate.
- 30 I see no geotechnical objections to subsequent subdivision, provided further geotechnical investigations and analysis is completed, as detailed Geotechnical Investigation Report referenced above. Further investigations and design of geotechnical hazard mitigation will need to be carried out at the subdivision development stage.
- 31 Thank you for the opportunity to present my evidence.

Dr Jan Kupec
30 April 2024

ATTACHMENT 1: GEOTECHNICAL INVESTIGATION REPORT

ATTACHMENT 2: GEOTECH LOCATION PLANS