

**BEFORE HEARINGS COMMISSIONERS, TAUPŌ**

**IN THE MATTER** of the Resource Management Act 1991 (**RMA**)

**AND**

**IN THE MATTER** Proposed Plan Change 42 Rural Chapter - General Rural Environment and Rural Lifestyle Environment

**AND**

**IN THE MATTER OF** a submission seeking the rezoning of the site at 287 Whakaroa Road to Rural Lifestyle Environment and associated relief

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**STATEMENT OF EVIDENCE OF ALAN MITCHEL BLYDE**

**CIVIL ENGINEERING ISSUES**

**10 AUGUST 2023**

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## INTRODUCTION

1. My full name is Alan Mitchel Blyde.

### *Qualifications and experience*

2. I am a Director of Envelope Engineering Ltd (Envelope), an engineering consultancy practice, with offices in Wellington and Auckland. Prior to becoming a director at Envelope, I was the Technical Director, and Wellington Manager for Harrison Grierson Consultants Limited. I have the following academic qualifications:
  - (a) I hold a Bachelor of Engineering (Environmental) Hons Degree and a NZ Certificate in Engineering (Civil).
  - (b) I am a Professional Member of Engineering New Zealand.
3. I have worked for 30 years in the Land Development field of civil engineering. I have worked on numerous large residential land subdivision projects providing clients with technical design and construction expertise on all aspects of residential subdivision development. This particularly includes the design of earthworks and sediment and erosion control on steep sites. I have prepared numerous Environmental and Construction Management Plans for large development sites and have overseen construction works to completion for those sites.
4. I have been involved in reviewing and overseeing all civil engineering design aspects for the proposed development of 287 Whakaroa Road, including infrastructure services, water supply, wastewater, roading, earthworks and sediment and erosion control, and stormwater and flood hazard management.

### *Code of Conduct*

5. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and confirm that I have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are within my area of expertise, except where I have indicated that I am relying on others' opinions. I have not omitted material facts known to me that might alter or detract from my evidence.
6. This statement of evidence also attaches an Infrastructure Report (Envelope Engineering, dated 10<sup>th</sup> August 2023), prepared by Envelope Engineering Ltd which I have reviewed and approved. It should be considered part of my evidence.

### **Earthworks**

7. Earthworks are required to enable access over the site and to enable future land use. These include measures to:
  - Provide site access with roads that have appropriate widths and achieve design standards for gradient and geometry.
  - Provide lot platforms that will reduce the need for future earthworks during house building stage.
8. Environmental drivers for Earthworks:
  - To be in accordance with overarching regional earthworks provisions and those encompassed within the proposed PC42.
  - Minimising visual effects of earthworks on the landscape attributes.
9. Other key considerations for earthworks are:
  - Achieving a cut and fill balance as far as practicable (i.e., limiting the need for excess material leaving the site and the requirement for additional material to be imported to site)
  - Providing gradients in accordance with geotechnical recommendations outlined by the project Geotechnical engineer, Core50.
  - Earthworks fills in accordance with NZS: 4431: 1989 Code of Practice for Earth Fill and Residential Development.

### **Erosion and Sediment Control**

10. Primary responsibility for significant earthworks and sediment and erosion control lies with Waikato Regional Council (WRC). The guiding document is "Erosion and sediment control: Guidelines for soil disturbing activities TR 2009/02".

11. Erosion and sediment control design requirements will be included in any future Resource Consent applications to Taupō District Council (TDC) and WRC and then imposed as conditions of consent.

### **Environmental Engineering**

12. The previous owner and current manager of the site have both stated that the site has not been used to store fuel or pesticides. The size of the site is large, and the intensity of previous farming operations is low. There is nothing to suggest that contamination will be an impediment to the development of the site as anticipated.
13. Notwithstanding the above, we propose that a Preliminary Site Investigation (PSI) be prepared by a suitably qualified practitioner to support any future resource consent applications associated with the proposed development. This is common practice and allows any contamination that might be present to be identified and appropriately dealt with.

### **Wastewater**

14. There is no existing wastewater infrastructure on the site, and no public wastewater infrastructure available within the vicinity of the site.
15. Accordingly, on-site wastewater treatment and discharge systems are required to service the proposed development.
16. Lots 1 and 2 are slightly remote from the remainder of the proposed development. Accordingly, for these lots, we propose individual 'advanced wastewater systems' meeting Regional Council requirements.
17. Lots 1 and 2 are both larger than the 5000m<sup>2</sup> referred to in WRC guidance for meeting the permitted criteria for on-site wastewater discharge.
18. For the remaining residential lots, we have considered individual on-site systems and also a combined/ centralised community treatment device. We believe that both would be viable solutions but have elected for a community device for reasons of economies of scale, control of the location, quality of discharge, and the ability to ensure required ongoing maintenance is carried out.
19. Due to the sensitive downstream environment, a high quality of treatment is proposed. Other than for Lots 1 and 2, we are proposing a communal treatment system with a recirculating packed bed reactor. Key advantages of this system are flexibility to accommodate varying inflows, high quality effluent, and simple maintenance

requirements.

20. The proposed InnoFlow system is modular and can be installed in stages. The tertiary (ultraviolet) unit is not always required and the requirement for this can be confirmed at detailed design stage.
21. The expected nitrogen discharge associated with the development is approximately 483kgN/yr.
22. Offsetting this, a significant proportion of the site is proposed to be retired from active pastoral use as a part of the development. This land will be landscaped and protected with covenants. Retirement of these areas results in a reduction of nitrogen of 10kgN/yr/ha (13KgN for pastoral less 3kgN for planted).
23. Some 268.7 hectares are proposed to be retired from pastoral use, this represents a reduction of 2,687kgN/yr.
24. The net result of the development, based on the calculations above, is expected to be a reduction of 2,204kgN/year. This is a significant reduction, which should be expected to result in long-term reductions to downstream nitrogen levels.

### **Water Supply**

25. There is an existing public rural supply main on the site that extends through to Whakaroa Rd. We understand that the site has an existing allowance of 66,800 litres per day (0.77l/s). There is also a private bore supply on the property that has been tested at 14,000 litres per hour (3.89l/s) over a period of 12 hours without significant change in groundwater level.
26. TDC have advised that the existing public supply is sufficient to provide a trickle supply (at 1600 litres/day) to 39 properties. We propose that this supply be allocated to Lot 1, Lot 2, and Lots 5 to 41.
27. As noted above the existing private bore has been tested and can supply enough water for the remaining 73 houses and lodge complex. This would require 143,700 litres per day or 1.66l/s against a tested flow rate of 3.89l/s.
28. We propose to utilise this supply on a trickle feed basis, similar to the public supply.
29. Some treatment of the bore water is required, and this would be provided at the point of extraction.
30. As another option for water supply, stormwater runoff from roofs can be collected and stored for use as either potable water or for non-potable uses such as landscaping. The lots are of ample size to accommodate a larger tank if required and therefore these lots

could rely only on roof-collected rainwater.

31. To minimise water storage requirements, we propose that all residential dwellings be constructed with a complying sprinkler system, these dwellings would therefore require 7,000l of firefighting water storage to comply with the requirements of SNZ PAS 4509:2008.
32. Similarly for the lodge, subject to detailed design and assessment, with a sprinkler system this is likely to require 45,000l storage to comply with the requirements of SNZ PAS 4509:2008.
33. Based on the above I conclude that there are a variety of feasible options available to provide a supply of potable water to the proposed development. If necessary, the site could be solely self-sufficient through use of rainwater harvesting via roof collection either on its own or in combination with the existing bore. However, as there is an existing public supply and private bore our design preference is to utilise these resources to meet the supply requirements of the development.

## **Stormwater Management**

### *Road Stormwater*

34. Future roads across the site are expected to remain as private roads. Stormwater assets within the road lot would also remain private. On the steeper parts of the site there is a greater need to control the runoff velocity of road-based stormwater and therefore more kerb and channel will be used. These channels would drain into roadside sumps which are likely to be connected to short, piped networks within the road. These piped networks would discharge to existing gullies. On the lower, flatter parts of the site, stormwater runoff from roads is expected to be controlled by roadside swales.

### *Stormwater Quality*

35. We have applied best practice water sensitive design principles to inform our stormwater design. Our general design principles for stormwater are to:
  - Minimise changes to the hydrology of the site.
  - Avoid concentration of stormwater and to discharge any collected stormwater as close to the point where it is generated as possible.
36. The final form of the treatment measures proposed will be detailed within a development specific SMP provided at the time of future consent applications and is proposed to be in compliance with the Waikato Regional Council guidelines to address stormwater management: Waikato stormwater management guideline (TR2020/07).

### *Stormwater Attenuation*

37. The proposed retirement of large areas currently in pasture will result in a net reduction in stormwater runoff as a result of the development.

### *Stormwater Discharge*

38. Discharge from stormwater pipes collecting runoff from roadways will be into existing gullies with suitable erosion control. As noted above the discharge will include or be preceded by treatment.

### *On-Lot Stormwater*

39. Stormwater generated from development on individual lots will be managed on each site. Roof water may be collected within rain tanks adjacent to each house. Where tanks are utilised, there will be overflow connections from the rain tank passing to the downstream disposal point. The discharge point will vary depending on the location of the house site within the lot, the terrain of the lot, and whether there is a suitable gully to discharge to. The ground conditions are generally suitable for discharge via soakage where required.

## **Utility Services**

### *Power*

40. There is existing power infrastructure within the site. Unison Networks Ltd have previously advised that they are able to service the proposed development.

### *Telecommunications*

41. Chorus have confirmed the development can be serviced by their network.

## **Conclusion**

42. In my opinion, there is no civil servicing or engineering reason that presents an impediment to the rezoning and other preferred relief sought. All matters are capable of being addressed at the resource consent and detailed design stage. I have a high degree of confidence in this, as the Infrastructure Report (Envelope Engineering, dated 10<sup>th</sup> August 2023) has been prepared to a level appropriate to support lodgement of a resource consent application.



**Alan Blyde**

**10 August 2023**