

**BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY CANTERBURY
REGIONAL COUNCIL AND WAIMAKARIRI DISTRICT COUNCIL**

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

AND

IN THE MATTER of the Waimakariri River Regional Plan (**WRRP**); the Canterbury Land and Water Regional Plan (**LWRP**); the Proposed Plan Change 7 to the LWRP (**pPC7**) and Proposed Plan Change 2 to the WRRP (**pPC2**); the Canterbury Air Regional Plan (**CARP**) and the Waimakariri District Plan (**WDC**)

AND

IN THE MATTER of applications to the Canterbury Regional Council by **Woodstock Quarries Limited** for various resource consents to establish and operate a hard rock quarry and a landfill (**CRC214073-CRC214077**)

AND

IN THE MATTER of an application to the Waimakariri District Council by **Woodstock Quarries Limited** for resource consents to establish a landfill and associated earthworks at 513 Trig Road within an area currently being used as a quarry (**RC215276 / 221101189245**).

EVIDENCE IN REPLY OF ALAN PATTLE FOR THE APPLICANT

29 April 2024

Presented for filing by:

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- 1 My name is Alan David Pattle. A full description of my qualifications and experience can be found in my Statement of Primary Evidence.
- 2 I have read the Environment Court's Code of Conduct and agree to comply with it. 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.
- 3 I provide this further statement of evidence in reply to matters that have arisen since the hearing of the applications.
- 4 Specifically, I have reviewed the Supplementary Section 42A Officer's Report of Timothy Johnston and the Joint Witness Statement – Drawings dated 15 March 2024. I wish to comment on the key outstanding issue raised in each of these documents; that of "underlying complexity of landfill design and constructability".
- 5 However, firstly I would like to explain my absence from the discussions leading to the JWS as was instructed in clause 4 of the 19th Minute to the Parties, dated 22nd December 2023. Unfortunately, this related to no other reason than timing of the discussions. I was on leave for much of January and February 2024 when the discussions were held, to the extent that it was not feasible to arrange the meetings to fit with my availability. I apologise to the Panel for this. However, I was able to have discussions with Mr Stayton at intervals during the process to provide my views to him on issues being covered. To this end, I would have been happy to append my signature to the final JWS document.

COMPLEXITY OF DESIGN AND CONSTRUCTABILITY

- 6 These two matters were raised in 2nd para of clause 15 of the JWS and repeated in clause 10 of the Supplementary s42a report. I address these below.
- 7 As I understand it, the comment relates primarily to the design and construction of the landfill liner as a double composite base liner and a single high angle composite wall liner, which is, as yet, an uncommon design used in New Zealand. The current WasteMINZ Landfill Guidelines do not refer to such a design, primarily because double lined systems are not considered necessary to contain municipal or lower grade wastes in landfills. It is considered that double lined composite landfills are

in the realm of containment of hazardous waste where the effects of leachate escape are potentially more severe.

8 The applicant has chosen to provide for a higher level of containment for Woodstock than that provided by liners recommended for Class 1 landfills, the highest level of containment for non-hazardous waste landfills in NZ. While the proposed design theoretically offers more protection for the environment, it involves a more complex design and construction. That objective of better protection can only be reached if the design can be constructed properly in place.

9 That is the nub of the issue, as I understand it, behind the comment in the JWS
"... the underlying complexity of the landfill design and constructability remains a concern to CRC and OOCB technical experts."

Further the JWS goes on to say

"CRC and OOCB are not aware of a double base liner and a steep wall liner system in a rock quarry being designed and implemented in New Zealand."

10 Double composite lined landfills are not uncommon overseas. For example, MSW and C&D landfills in New York State are required by regulation to be constructed with double composite liners of the type proposed for Woodstock. Currently, there are 25 active MSW landfills and 11 active C&D landfills there¹. Experience with double liners at solid waste landfills in eastern states of the U.S.A. dates back to the late 1970s. The construction methodologies used to construct these lining systems has improved over the years with the main challenges identified² to be the same as those related to the construction of single composite lined landfills of the type specified in the NZ WasteMINZ Guidelines. New Zealand lining contractors have experience with such liners dating back to the early 2000s and are well aware of the methods required to ensure in-place liner integrity whether it be in the construction of a single or double liner configuration.

11 In New Zealand, Whitford landfill in Auckland is located within a previous greywacke quarry with steep walls. The side wall liner recently constructed is not dissimilar to that proposed for Woodstock with a composite liner draped over shotcrete. I believe Tirohia Landfill in the Waikato also incorporates a similar design.

¹ (<https://dec.ny.gov/environmental-protection/waste-management/solid-waste-management-facilities/landfill-types>)

² Abigail Gilson-Beck, 2019, Controlling leakage through installed geomembranes using electrical leak location, Geotextiles and Geomembranes 47 (2019) 697-710

In 1985 a double composite lined landfill to US Subtitle C standard (suitable for hosting hazardous waste) was constructed near New Plymouth at Waireka³. This is the only such double lined facility I am aware of in New Zealand.

- 12 Through recent discussion I have had with Mr Shamrock who helped prepare the JWS, I understand his main concern regarding the liner design was focussed on the wall/floor joint for the liner proposed at Woodstock. He considered this presented challenges that are not present at Whitford, where he is the designer, as that landfill does not have a double composite lined base. He acknowledged that the last sentence of clause 15 of the JWS would have been better expressed as "CRC and OOCB are not aware of the combination of a double base liner and a steep wall liner system in a rock quarry being designed and implemented in New Zealand."
- 13 There is no doubt that the current conceptual design of the wall/floor joint as shown on Figure 24734 C3, looks complicated. There are a number of separate elements that need to be positioned correctly to effect the design in place. However, it needs to be recognised that the current design is conceptual and at least two stages away from becoming "Detailed – For Construction".
- 14 The normal design process, particularly for nonstandard or irregular, components involves traversing a number of stages where the design is developed to account for such things as: site specific factors such as ground conditions, site geometry and water management; available materials and components; and contractor methods and practice. Often this process results in significant modification of the original conceptual design which was the starting point.
- 15 One of the issues raised with me by Mr Shamrock about this aspect was the constructibility of the membrane (HDPE) elements at this joint without causing them damage during placement of overlying layers. Earthworks machines will need to carry this out without damaging the HDPE. This was a common challenge found in the New York landfills where earthworks machines inadvertently damaged the HDPE membrane during gravel overlay placement. Because of the number of separate elements involved in this joint, tight scheduling and control of the earthworks and lining contractors will be needed to avoid such incidents.

³ Taranaki Regional Council, 2001, Investigation of Alleged Agrichemical Waste Disposal Sites in New Plymouth, Technical Report 2001/42

- 16 While this specific constructability issue is recognised at this stage, it is premature to judge what solutions will be developed to address it. That will require contractor involvement during the next stages of design development. As a result, it is likely that the final design will evolve from that currently shown on drawing C3.
- 17 It is important therefore, that the consent conditions do not hinder this design development by being overly prescriptive. The conditions certainly need to set objectives, required outcomes and some sense of overall methodology but also allow for designs to evolve to the best solution for the specifics of the site.
- 18 The evolution process will be overseen by the Peer Review Panel whose job it is to ensure the design meets the intent of the conditions. That is a function I'm used to for the last 24 years at Redvale landfill in Auckland.
- 19 The members of the panel that produced the JWS did make the statement (clause 23. a) that:
- "The attached set of drawings, Drawings Issue 7, are agreed by all participants to be an acceptable proof of concept to form part of the resource consents for the proposed Woodstock Landfill and Quarry development..."*
- I take it to mean that the landfill can be feasibly constructed based on the concepts presented, which concurs with my own professional view. I understand this is the question that the panel sought to answer through instructions given in Minutes 18 and 19.
- 20 That some authors of the JWS had residual concerns is interpreted by me to be a message to the designers, contractors and PRP to give the complexity and constructability matters considerable deference in progressing the design; a message that is a level below the primary statement of proof of concept.

Alan David Pattle, 29 April 2024

