

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF Private Plan Change 95 Pencarrow Estate
Pongakawa to the Western Bay of Plenty
District Plan

**REPLY EVIDENCE OF KIRSTIN BROWN (WASTEWATER)
ON BEHALF OF KEVIN AND ANDREA MARSH**

Introduction

1. My full name is Kirstin Brown. I confirm my qualifications and experience as set out in my statement of evidence dated 24 October 2024.
2. I also confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses, as contained in the Environment Court's Practice Note 2023. I confirm that this evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.
3. My reply evidence addresses some of the statements made in the evidence of Mike Maassen. Mr Maassen has made comments on matters which are not within my area of expertise (regional hydrogeological flows and groundwater contamination effects on orchards) and I do not comment on those further in this evidence.

Response

4. The rounds of groundwater level readings at the location of the proposed wastewater disposal field were indeed undertaken in January 2022 (summer) and 22nd August 2024 (winter). I draw reference to a Bay of Plenty Regional Council (BOPRC) rainfall gauge located nearby and at a similar elevation (FO490726 – Kaituna at Marshalls Farm), which although not referenced, it appears to be the rainfall data used in Mike Maassen’s response statement. Although the January 2022 period was considered a ‘drier than usual’ summer, the BOPRC rainfall data indicates this period followed a month (December 2021) of near average rainfall. Furthermore, this BOPRC rainfall gauge also indicates a period of consistent rainfall between the 18th and 19th of August 2024 where approximately 40mm of rainfall was recorded which is likely to have impacted the regional groundwater level. The results of the test pit undertaken on the 22nd August 2024 encountered water levels consistent with those encountered during the dry summer conditions (January 2022), indicating limited groundwater level response to the heavy winter rainfall.
5. Sea level rise and the impact of this on groundwater and flood levels is not my area of expertise. However, I note that the proposed wastewater disposal area is largely above the 100-year flood level as discussed in the evidence of Mr Hight and is approximately 5km from the coastline to the north, so would anticipate the reported ‘Intermediate Emissions’ sea level rise of 0.44m to 0.76m not to have a significant impact on the permanent groundwater level. Therefore, the minimum 0.6m vertical offset from the wastewater system to the permanent water level is likely to be maintained over the design life, subject to the recommended groundwater monitoring regime outlined in my original evidence statement to observe groundwater level fluctuations.
6. I cannot comment on the anecdotal evidence regarding the surface groundwater fluctuations observed after heavy rainfall events, including overtopping of the drains and inundation of the proposed wastewater disposal

area. The groundwater level data used to form the basis of my evidence statement was collected at two discrete intervals (January 2022 and August 2024). I recommended a groundwater monitoring regime for a minimum period of one year prior to earthworks commencement as discussed in my original evidence statement to observe groundwater level fluctuations.

7. As stated in my original evidence response, the following investigation data points from CMW 2022 investigations were collected within the proposed wastewater disposal area: Test pits (TPs) 1, 2, 3, 13, 14 and Cone Penetrometer Tests (CPTs) 1 to 4, as shown in **Figure 1** below. These investigations encountered groundwater between 1.2m and 2.0m and should not be discounted when assessing the suitability of the proposed disposal area.

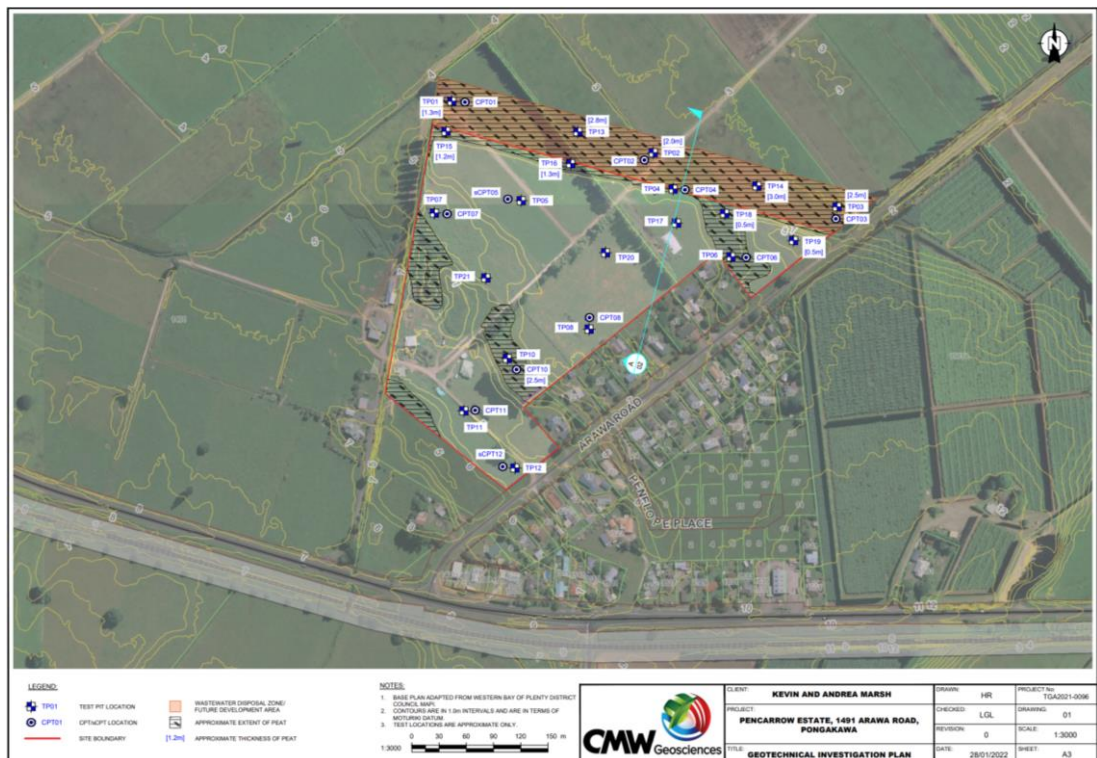


Figure 1: CMW Geotechnical Investigation Plan depicting the January 2022 investigation location with respect to the proposed wastewater disposal area.

8. The existing ground conditions below the wastewater disposal field, according to the investigation results, comprise an approximately 200mm to 300mm layer of sand, overlying fibrous peat. Sandy soils are known to have high permeability and this is not disputed. A paper titled 'Engineering Properties of Fibrous Peats' by Mesri and Ajlouni (July 2007) suggests the permeability of

fibrous peat soils are typically 1,000 times higher than typical soft clays and silts. The soils encountered are therefore considered suitable for the wastewater disposal regime proposed.

9. As noted above, I cannot comment on groundwater contamination as raised as a concern by Mike Maassen in regard to the Birley Kiwifruit orchard. However, I can confirm my opinion that the proposed wastewater disposal field has considered appropriate design irrigation rates for the soils likely to be encountered, and based on available groundwater level data, appears to maintain OSET compliant separation distances to water bodies and standing groundwater tables.

Kirstin Brown

12 November 2024