

**Before the Expert Panel appointed  
under the Fast-track Approvals Act 2024**

**Under** the Fast-track Approvals Act 2024  
**(Act)**

**And**

**In the Matter of** an application for approvals by  
Matakanui Gold Limited to establish,  
operate, rehabilitate and ultimately  
close an open pit and underground  
gold mining operation known as the  
Bendigo-Ophir Gold Project

**Statement of Evidence of  
Julie Palich on behalf of Matakanui  
Gold Limited in response to Section 53  
Feedback**  
Environmental Geoscience

Dated: 17 April 2026

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## INTRODUCTION

1. My name is Julie Palich.
2. I hold a B.Sc. in Geophysics from the Colorado School of Mines and an M.Sc. in Geology (Environmental Hydrogeochemistry) from Monash University. I am a EIANZ Certified Environmental Practitioner with over 25 years' experience in the assessment of contaminated sites in countries including Australia, New Zealand, and Canada. I am the Principal Environmental Scientist and Director of Geocontam Risk Management Pty Ltd (GRM). GRM is part of the Green Road group of companies (~45 employees) that provides practical, innovative, and sustainable solutions to the international resources industry. Prior to this role I worked for SLR Consulting and 360 Environmental (acquired by SLR Consulting) where I held roles including Technical Director – Contaminated Sites Services and Asia Pacific Technical Discipline Manager – Land Quality and Remediation team. Prior to these roles I worked as a contaminated sites practitioner for URS Canada and Parsons Brinckerhoff Australia. My professional work experience has specialised in the assessment and management of mine site contamination and waste management.
3. This statement is given as part of Matakanui Gold Limited's (**MGL**) response to comments on the Bendigo-Ophir Gold Project (**BOGP**) made under Section 53 of the FTA. This statement responds to specific comments raised by the following parties in their written comments on the application:
  - (a) Ross Hanan: Comments from Owners and Occupiers of the Adjacent Land.
  - (b) Environmental Defence Society: Comments from Environmental Groups.
  - (c) Central Otago Winegrowers Association (**COWA**): Comments from Others.
4. My original findings are provided in full in:
  - (a) Geocontam Risk Management. 2025. Preliminary Site Investigation – Bendigo-Ophir Gold Project.
  - (b) MGL. 2025. Soil Management Plan.

5. In the process of considering my responses, I also present pertinent additional information not previously addressed in the application that draws upon information contained in the following reports:
- (a) Process Flow. 2025. BOGP Post Closure Active Water Treatment Plant (WTP) – Order of Magnitude (**OoM**) Study.
  - (b) Mine Waste Management (**MWM**). 2025. Report on Water Treatment Requirements (MWM Report Number: J-NZ0464-002-R-Rev2).
  - (c) Geocontam Risk Management (**GRM**). 2025. Preliminary Site Investigation – Bendigo-Ophir Gold Project. (GRM Report Number: J-AU0005-001-R-Rev3).
  - (d) B.33 Pattle Delamore Partners - Assessment of Environmental Effects from the Discharge of Contaminants into Air (PDP 2025)
  - (e) G.23 Air Quality Management Plan
  - (f) The reports in (a) to (c) above are provided in:
    - (i) B.06C Mine Waste Management Limited - Mine Impacted Water Overview Report – Appendix I to O.
6. Although this is not an Environment Court proceeding my confirmation of compliance with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 is included in Substantive Application Document A0.2B.

## SPECIFIC RESPONSE TO REQUEST FOR INFORMATION

### Ross Hanan: Comments from Owners and Occupiers of the Adjacent Land and Environmental Defence Society: Comments from Environmental Groups.

7. This response addresses a portion of paragraph 7 in the comments submitted by Ross Hannan specifically pertaining to concerns raised around sludge disposal, namely that *“no plan for sludge disposal has been presented”*. This response also a similar comment from Environmental Defence Society – paragraph 10(o) regarding *“uncertainty about the ultimate fate of contaminated sludge and sediment from the active and passive water treatment systems”*.
- (a) Sludge, a by-product of active and passive water treatment will be created. During operations any sludge generated by water treatment will be disposed within the tailings storage facility (**TSF**). This is a standard operating practice for many gold mines. Because the volume of sludge is considerably smaller than the volume of tailings disposed within the TSF the environmental risks are low.
  - (b) Once mining ceases and the TSF is closed, an alternative disposal option will need to be identified. Given the long timeframes of mining operations, it is standard practice for post closure disposal options to be evaluated closer to closure. Dependent upon the sludge quality, a number of feasible disposal options may be available to choose from. One typical and potentially viable disposal option would be disposal to landfill, however, given the proposed closure timeframe (>30 years), it is not currently possible to define the specific landfill at which disposal would occur.
  - (c) A preliminary evaluation of the volume and composition of sludge that may be generated post-closure has been undertaken based on the predicted water quality and load from the engineered landforms (**ELFs**) at Year 27, when peak seepage from the ELFs is predicted to occur. This is considered to be a conservative estimate as it assumes peak metals concentrations and higher flow rates than would generally be expected at closure.

- (d) The evaluation of potential sludge quality (**Attachment A**) was undertaken to understand potential offsite waste disposal options post closure of the TSF. This evaluation was based on a proportional flow rate from each of the seeps at Year 27, using the water quality forecast for each water input. The results forecast that only arsenic and nickel have the potential to be present at concentrations that could exceed Class 3 or Class 4 landfill acceptance criteria (WasteMINZ, 2023 – Technical Guidelines for the Disposal to Land - Project Team Draft - Revised B, MfE comments). The predicted concentrations are conservative because they assume 100% precipitation of metals in the water feed into the sludge, whereas in practice only the proportion of metals required to achieve compliance limits for discharge will be removed.
- (e) Peak sludge dry volumes have been estimated at ~0.2 – 1.3 t/yr (dry weight solids) or 1.05 – 6.57 t/yr (spadable solids). Under the current flow process design, two types of sludge will be generated:
- (i) Calcium hydroxide treated, metal-enriched sludge, which, based on predicted water quality is estimated to represent about one-third of the sludge production by mass (i.e. ~0.06 – 0.43 t/yr dry solids or ~0.35 – 2.2 t/yr spadable solids). This volume may be slightly greater if gypsum precipitation is incorporated into the metal-enriched sludge stream. This waste stream will likely require disposal to landfill post-closure however predicted volumes are small and manageable.
  - (ii) Sulfate-enriched sludge generated through ettringite precipitation which is estimated to represent about two-thirds of the sludge production by mass (i.e. 0.13 – 0.86 t/yr dry solids or 0.7 – 4.4 t/yr spadable solids). There are no waste classification criteria for sulfate, therefore onsite disposal of this waste stream may be possible if it is determined to be inert (e.g., neutral pH with low leachability potential). If landfill disposal is required, the material will likely be accepted at any Class 4 landfill. Recycling or formation of a new product for export offsite may also be a viable option for this sludge stream.

8. Detailed testing of the sludge during water treatment plant design, water treatability trials, and operations will confirm the sludge composition and facilitate the final determination of waste management options for the sludge streams. Given the long lag time for offsite disposal to be required (>30 years), it is not viable to provide a specific offsite disposal option for sludge post closure, however it is noted that estimated sludge volumes are readily manageable for both offsite and onsite disposal options. The final disposal location will be determined through the mine closure planning process.

### **Central Otago Winegrowers Association (COWA): Comments from Other**

9. This response addresses a portion of Items 7, 19, and 21 in the RFI received from COWA pertaining to arsenic concentrations in dust and soil.
10. Concerns have been raised regarding the risks associated with biota uptake within the vineyard to via several exposure mechanisms – direct deposition of dust onto and absorption by grapes and leaves, long-term accumulation of arsenic in vineyard soils that disrupt soil biota, or uptake up arsenic impacted water through the root system. With respect to the dust and soil pathways:
  - (a) Soil studies undertaken for the project have screened soil results against published criteria for arsenic for the protection of human health risks as well as the Eco-SGV (95% protection) for arsenic (20 mg/kg) (Landcare Research New Zealand Ltd and Hawke's Bay Regional Council (2023)), which is comparable to the human health exposure guideline for Residential land use with produce production (MfE, 2012). The Eco-SGV (95% protection) are presented in the Soil Management Plan (Table 3) however the Eco-SGV have not been adopted with regards to the arsenic concentrations both within the previous mining footprint and in areas unlikely to have been impacted by historic mining, and we know that the soils will exceed the Eco-SGV due to the mineral-enriched environment.
  - (b) With respect to potential soil impacts at the vineyard, the key potential migration route for arsenic in soil will be via airborne dust. The dust monitoring program and management will establish background levels of arsenic and monitor operational concentrations in dust with management strategies implemented to ensure adverse effects on the receiving environment do not extend beyond the boundary of the site. Further details are provided in the G.23 Air Quality Management Plan.

- (c) International studies on arsenic undertaken at vineyards suggest that uptake of arsenic via leaves is a relatively limited bioaccumulation pathway (Jimenez-Ballesta et. al., 2023) and instead the primary pathway for arsenic uptake into plants is via water uptake in the root system (Bergqvist, C., and M. Greger, 2012). Groundwater quality monitoring at the site indicates that arsenic is predominantly below the 0.01 mg/L drinking water guideline (**DWG**) at most locations. The groundwater performance monitoring program defined in the BOGP Water Management Plan have been designed to protect the beneficial use of this water resource for offsite users.
11. A baseline soil assessment is proposed to determine pre-mining arsenic levels at the vineyard and be incorporated into the Soil Management Plan.



**Julie Palich**

**17 April 2026**

**ATTACHMENT A - SLUDGE EVALUATION FOR LANDFILL  
DISPOSAL**

Parameter	Units	Stream 1 TSF Seepage	Stream 2 Shepherds ELF Seepage	Stream 3 WELF Seepage	Stream 4 RAS Portal	Stream 5 CIT Pit Backfill	Stream 6 SCK Fill Seepage	Stream 7 MIW combined	Combined Feed Solids % (Dry) mg/sec	Combined Feed Solids (Dry) g/hr	Combine Feed Solids Dry kg/day	Combine Feed Solids Dry mg/day	Combine Feed Solids Dry mg/kg	NZ Class 3 Landfill (mg/kg)	NZ Class 4 Landfill (mg/kg)
Flow Rate	l/sec	13.4	4	1	6	1.5	1	26.9					NA		
Acidity	mg/L	0.01	0	0	0.44	0	0	0.03					NA		
Al	mg/L	0.011	0.003	0.003	0.1	0.005	0.003	0.013	0.0004	0.0014	3.37E-05	33.7	5.96		
Alkalinity	mg/L	73	189	183	182	190	158	160					NA		
As	mg/L	2.06	0.2	0.2	0.09	0.08	0.2	0.61	0.018	0.066	0.0016	1581	280	140	17
B	mg/L	0.83	0.87	0.1	0.05	0.09	0.01	0.59	0.018	0.064	0.0015	1529	270		
Ca	mg/L	297	51	51	59	39	36	107	3.21	11.56	0.28	277344	49054		
Cd	mg/L	0.0002	0	0	0.0001	0.0001	0	0.0001	3.0E-6	1.08E-05	2.59E-07	0.26	0.046	10	0.8
Cl	mg/L	806	63	37	14	12	8	223	6.69	24.084	0.58	578016	102233		
Co	mg/L	0.053	0.109	0.023	0	0.004	0.003	0.061	0.002	0.0066	0.00016	158	28.0		
Cr	mg/L	0.00636	0.0002	0.00019	0.00058	0.0004	0.00007	0.0017	5.1E-05	0.00018	4.41E-06	4.40	0.78	150	150
Cu	mg/L	0.001	0	0	0.00302	0.00021	0	0.00049	1.5E-05	5.29E-05	1.27E-06	1.27	0.22	280	220
DOC	mg/L	0	0	0	0.09	0.206	0	0.038					NA		
F	mg/L	1.94	6.3	6.12	0.23	1.39	2.37	3.9	0.117	0.42	0.010	10109	1788		
Fe	mg/L	15.3	7.6	7.6	7.9	2.4	7.6	8.7	0.261	0.94	0.023	22550	3988		
Hg	mg/L	0	0	0	0.00006	0.00014	0	0.00003	1.0E-06	3.24E-06	7.78E-08	0.078	0.014	3	0.7
K	mg/L	51	683	672	34	84	159	372	11.16	40.18	0.96	964224	170541		
Mg	mg/L	100	38	37	37	20	24	49	1.47	5.30	0.13	127008	22464		
Mn	mg/L	0.594	0.819	0.774	0.014	0.103	0.182	0.567	0.017	0.062	0.0015	1470	260		
Mo	mg/L	0.14	1.005	0.672	0.02	0.119	0.157	0.535	0.016	0.058	0.0014	1387	245		
NO3-N	mg/L	2.01	49.64	9.54	4.35	0.73	1.33	22.89					NA		
Na	mg/L	848	922	734	42	127	170	673	20.19	72.68	1.74	1744416	308533		
Ni	mg/L	0.6784	0.0121	0.001	0.0009	0.0013	0.0001	0.1652	0.005	0.018	0.00043	428	75.73	320	35
Pb	mg/L	0.0276	0.0001	0.0001	0.0035	0.0002	0	0.0068	0.0002	0.00073	1.76E-05	17.6	3.12	460	160
Sb	mg/L	0.1802	2.9986	3.2208	0.0234	0.3622	0.7601	1.6317	0.049	0.18	0.0042	4229	748		
Se	mg/L	0.003	0.1544	0.1649	0.0008	0.0196	0.0388	0.0826	0.002	0.0089	0.00021	214	37.87		
SO4	mg/L	954	957	888	141	110	208	730	21.9	78.84	1.89	1892160	334664		
Sr	mg/L	4.4	16.15	15.91	0.79	3.77	10.89	10.12	0.304	1.093	0.026	26231.04	4639.46		

Parameter	Units	Stream 1 TSF Seepage	Stream 2 Shepherds ELF Seepage	Stream 3 WELF Seepage	Stream 4 RAS Portal	Stream 5 CIT Pit Backfill	Stream 6 SCK Fill Seepage	Stream 7 MIW combined	Combined Feed Solids % (Dry) mg/sec	Combined Feed Solids (Dry) g/hr	Combine Feed Solids Dry kg/day	Combine Feed Solids Dry mg/day	Combine Feed Solids Dry mg/kg	NZ Class 3 Landfill (mg/kg)	NZ Class 4 Landfill (mg/kg)
<b>TI</b>	mg/L	0	0	0	0.00031	0.00021	0	0.00005	2.0E-06	5.4E-06	1.3E-07	0.1296	0.022922		
<b>CN</b>	mg/L	0.35	0	0	0	0	0	0.082	0.002	0.0089	0.00021	212.544	37.59246		
<b>U</b>	mg/L	0.028	0.2751	0.2225	0.0094	0.0299	0.0515	0.1468	0.004	0.016	0.00038	380.5056	67.29967		
<b>V</b>	mg/L	0.004	0.12	0.1155	0.0006	0.0135	0.0269	0.0633	0.002	0.0068	0.00016	164.0736	29.01955		
<b>Zn</b>	mg/L	0.0296	0.0098	0.0021	0.0022	0.0014	0.0003	0.0117	0.0004	0.0012	3.03E-05	30.3264	5.363802	1200	190
<b>pH</b>	mg/L	6.41	7.93	7.92	5.91	8.03	7.92	6.72					NA		
<b>Hardness</b>	mg/L	1151	285	280	299	179	190	469					NA		