Before the Hearing Commissioners
appointed by the Grey District Council and
West Coast Regional Council

Under	the Resource Management Act 1991
In the matter of	Resource consent applications by TiGa Minerals and Metals Ltd to establish and operate a mineral sands mine on State Highway 6, Barrytown (RC-2023-0046; LUN3154/23)

Summary Statement of evidence of Cameron Andrew Wylie

2 February 2024

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Summary of evidence

1 I prepared a statement of evidence dated 19 January 2024. My qualifications and experience are set out in that statement of evidence. I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court.

2 I have carried out a geotechnical assessment of the proposed mining plan including stability of the wall, and consider any potential effects are confined within the 20m setback from waterbodies and property boundaries.

3 My role has been to assess the geotechnical stability of the proposed pit under normal operating conditions and considering matters raised by submitters and the Officers report. Matters raised include:

(a) The effect of the M8 Earthquake generated by the Alpine Fault; and

(b) The effect of the proposed mine on the exposure of the coast to extreme inundation.

(c) the effect of groundwater injection on the stability of the pit wall; and

(d) Potential for uncontrolled wall collapse due to unforeseen ground conditions.

4 The geotechnical aspects of the project are relatively simple with top soil and barren overburden overlying mineralised sands, overlying basement comprising dense sand and gravel. Groundwater is 0.5m to 4m below ground level.

5 The mine plan is to extract in Panels numbered 1 to 10 by open pit to ~9m below current ground level, undertaken with excavators, mine trucks and dozers. It is anticipated that mining will be complete within 5-7 years, with each Panel taking 4 to 6 months to complete.

6 The mining sequence in general (Figure 2) is to strip top soil and barren overburden, excavate mineral sands by excavator and backfill the mining void with tailings and overburden concurrent with the advance of the mining face.

7 Backfilling will be continuous with tailings placed using hydraulic methods; followed by overburden placed by earthworks machine and topsoil; and finished with topsoil grading to the closure condition (farm use).

8 For stability, backfilling the pit with tailings and overburden will effectively buttress the excavation.

9 In terms of geotechnical effect, the starter cuts for Panels 5 to 10 adjacent to Canoe Creek Lagoon, Rusty Pond and the Northern Boundary present the critical geotechnical condition.

10 For the seismic cases where FoS < 1 FEM derived ground displacement indicate displacement < 0.05m at a distance ~20m behind the crest of the cut suggesting a very Low likelihood to breach the waterbodies outside of the 20m setback.

11 When buttressed with tailings (i.e. not including overburden) the FoS improves to 1.4 and 1.1 respectively, with no deformation in the wall expected.

12 The risk of extreme earthquake (a M8 event) and coastal inundation are both considered Low with moderate consequential damage with no specific mitigation required.

13 Groundwater injection if required is not expected to adversely influence wall stability. The current stability modelling already assumes groundwater levels at 1m below surface which is unlikely to be significantly raised by gravity infiltration.

14 The risk of uncontrolled pit wall collapse is Very Low with remedial measures immediately available to rectify any situation should it occur, and ground monitoring and additional ground investigation recommended to confirm the geotechnical model.

15 The mining method with a very short time of exposure followed by backfill with tailings and overburden, facilitates a very fast response to any adverse condition should it occur. The means to rectify any adverse deformations are immediately at hand.

16 Confidence in the wall stability can also be developed ahead of mining in the critical wetland areas. Mining Panels 1 to 5 are clear of the Coastal Lagoon, Rusty Pond, Northern Drain and Collins Creek and are well placed to confirm the stability case with Very Low potential for any adverse effects on water bodies and adjacent land.

17 Monitoring ground response to the panels and additional investigation to confirm conditions ahead of mining in Panels 6 – 10 is recommended as a normal part of mine processes.

18 Proposed consent conditions include an annual geotechnical review, monitoring of pit wall performance with a focus on Panel 1 to 5 to confirm the geometry, setback and results of stability analyses; and ground investigation to confirm geotechnical conditions for Panel 6 to 10.

Cameron Andrew Wylie

Dated this 2 February 2024