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CONCERN WITH TSF LOCATED ON THE PERRY GULLY.

- This presentation relates to MFG Community Fingerboards EES submission, Document 813. Chapter 4. This document was prepared pre-centrifuge.

EES Requirements in the nutshell.

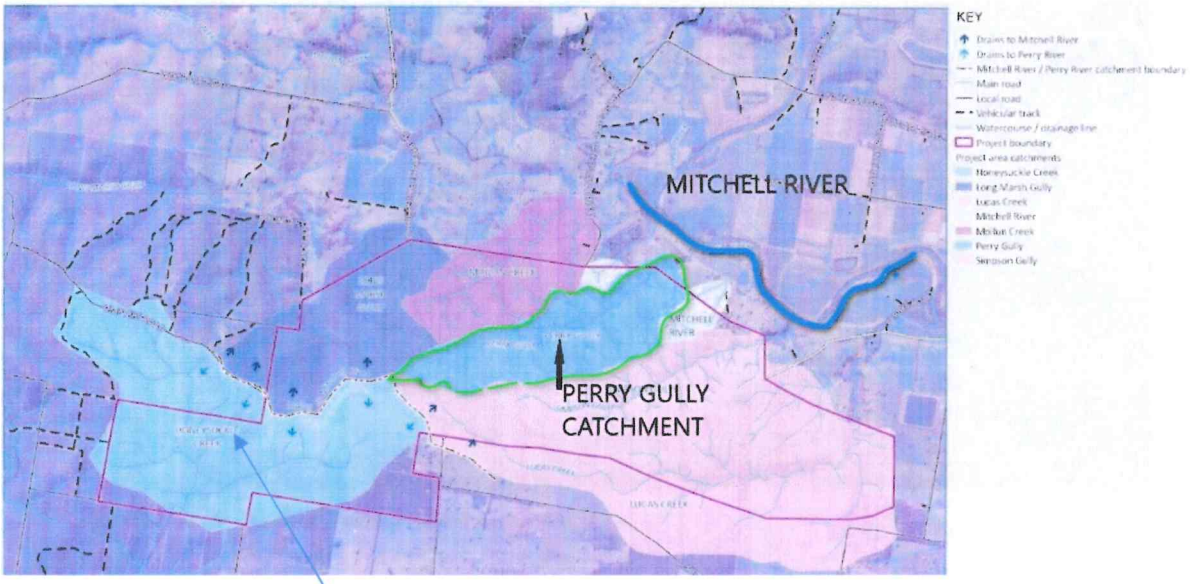
In general, the miners are required to minimise, (not eliminate) effect on the fragile local resources of water, vegetation, wildlife to protect the health and wellbeing of residents and communities.

The proponent is expected to describe physical, chemical characteristics relevant to air quality and radiation levels with environmentally acceptable exposure levels.

The proponent is expected to identify loss of habitat quality through modelling and other means resulting from loss of water quality, contaminants and pollutants, potential for adverse effects through leaching in the Mitchell and Perry Rivers, King & Lake Wellington, as well as Gippsland Lakes the Ramsar Wetlands. The proponent is expected to be on top of all the current and upcoming provisions that require a mine of this type to adhere to the EES Requirements.

Remarkably, under cross examination from the EPA Serena Armstrong, Kalbar conceded they had not included new EPA provisions in their design.

I ENCLOSE TWO MAPS SHOWING EXTENSIVE CATCHMENTS AND WATER COURSES IN THE PROJECT AREA.



PERRY RIVER CATCHMENT.

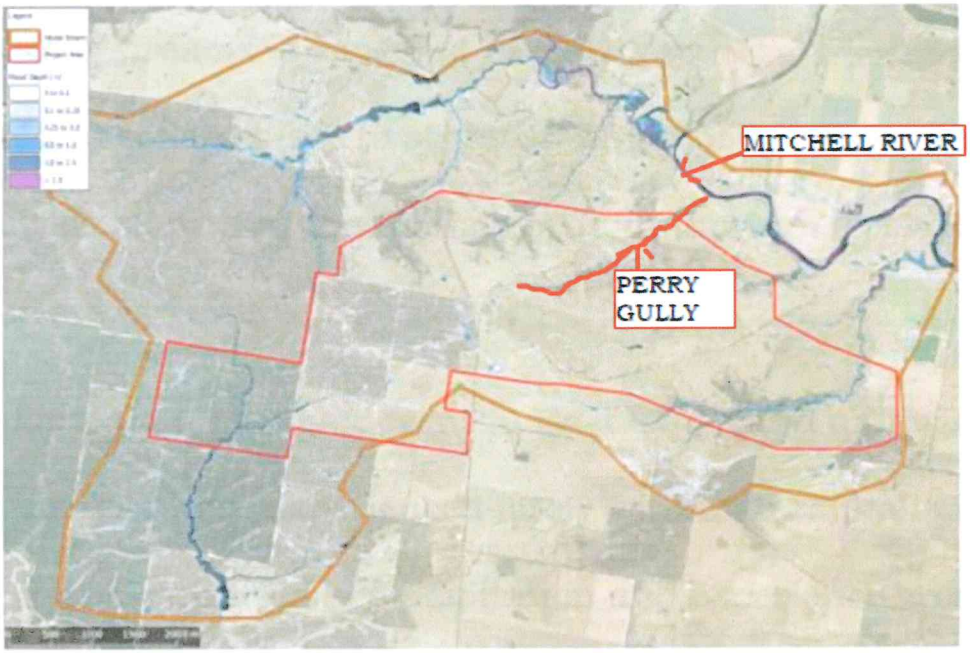


Figure 7-7: Mine area flood depth - existing conditions (Water Technology 2020b)

EXISTING CONDITIONS:

The Fingerboards area acts as a 'gravel aquifer' that seeps into the Mitchell River. Any rainfall event changes the complex series of gullies to the north and east into the river systems of the Mitchell then onto Lake King and the Gippsland Lakes. Then onto an opposite direction being the west and south to flow into Lake Wellington via the Perry River system including the Chain of Ponds.

The Tailings, whether through dam or centrifuge may contain quantities of toxic heavy metals and other contaminants including flocculants which are ecotoxic to aquatic life that would impact on the Chain of Ponds. (See attached letter provided by Dr Juliet F Bird in Appendix)

Where the tailings are planned to be dumped, is an area known by locals for its propensity for erosion. Seepage and leaching of water towards water table and streams is expected to cause tunnel erosion which can lead to localised collapse due to structural instability. Remarkably, limited analysis show that the tailings contain thorium levels higher in the than the ore.

East coast lows are a common event in East Gippsland and will cause saturation. As may have experienced lately with high rainfalls in Gippsland, locals record daily precipitation and experience greater rainfall 3km North and South of the project area.

GOVERNANCE:

The root causes of failures in mines have been a failure in governance due to capital constraints, change in management and construction supervision. The soils available either out of the site nearby or from the site in particular, do not seem to address the GHD issues identified in their earlier studies. The local soils and clays are not up to the task for building structures.

There is only one material for structural elements, and that is clay. Clay is prohibitively expensive. Locals will tell you that the impact of disturbing topsoil is to exacerbate tunnelling and other erosive actions on Glenaladale soil.

One of my major concerns with the proposal to build a mine in this inappropriate location gives the perception so far that the proponents are either not up to the task to overcome the complexities that this project represents or deliberately downplaying the ramifications of mining this location.

The withholding of the full knowledge of the risks is against the public interest. Queensland University Paper titled 'Catastrophic Tailings Dam Failures and Disaster Risk Disclosure' noted that the mining industry has given little attention to defining what a community facing disaster risk "has a right to know"'.

INFORMATION EX AUSTRALIAN GOVERNMENT PUBLICATION: 'TAILINGS MANAGEMENT'.

Paragraph 5.5.1 Tailings Containment. (Precis for this document)

Tailings containment structures must be designed in accordance with sound geotechnical engineering principles such as those provided by ANCOLD. The principal considerations for the design of a tailings containment structure are:

- Suitable foundation conditions.

- The zoning of the containment wall and geotechnical parameters of the construction materials.
- Geotechnical scope stability including consideration of the potential for liquefaction and/or loss of strength (particularly of tailings) during and/or after seismic loading.
- Seepage and the need for filters, internal drainage or clay cores and cut-offs in the foundation beneath the containment wall.

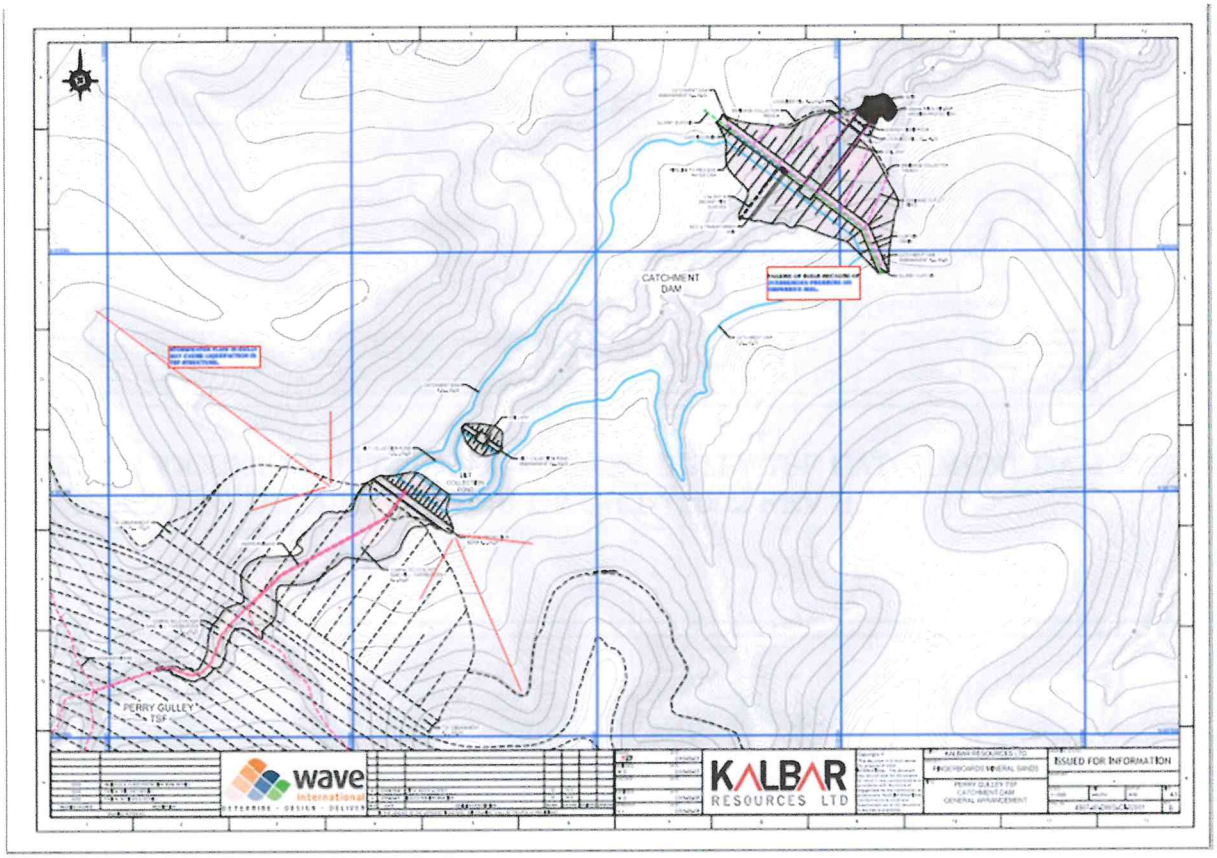
ACCORDING TO **'GROUND WORKS SOLUTIONS',** the licensee of URETEK, the deep Injection process for settled structures. *One of the biggest causes of foundation issues or soil degredation is MOVING WATER.*

High water tables or poor design of water runoff can cause soil to move away from the areas where soil weight is compressing the soil.

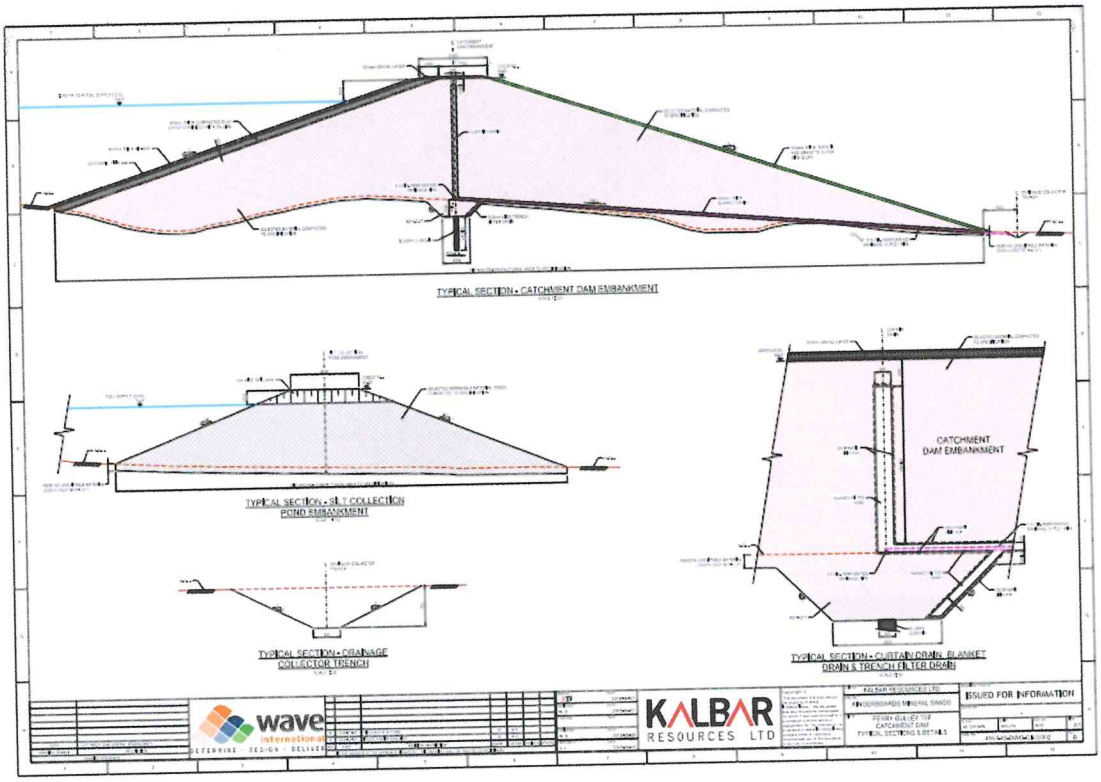
OVERBURDEN PRESSURE

It is the stress that will include the pressure coming from the soil, water in pores and from the external load. When the load is applied to the soil, it transfers the load to water in the pores and soil grains. The load will cause the increase of pressure inside the pore water and soil particles. This is otherwise termed as vertical stress or confining pressure. Looking at the drawings, (Tabled Documents 116, 117, 118 and 119 above), there

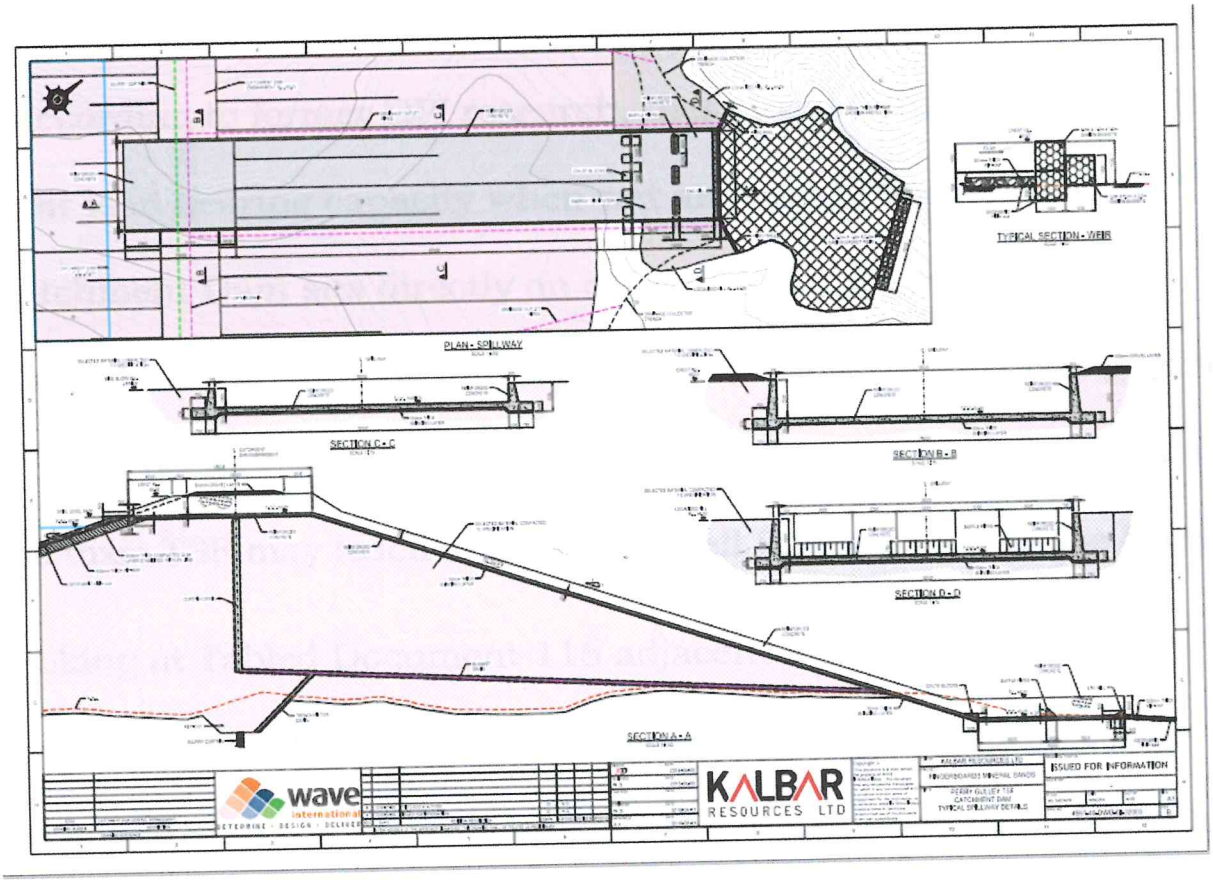
seems to be no allowance for preventing Overburden Pressure from impacting onto the dispersive soil.



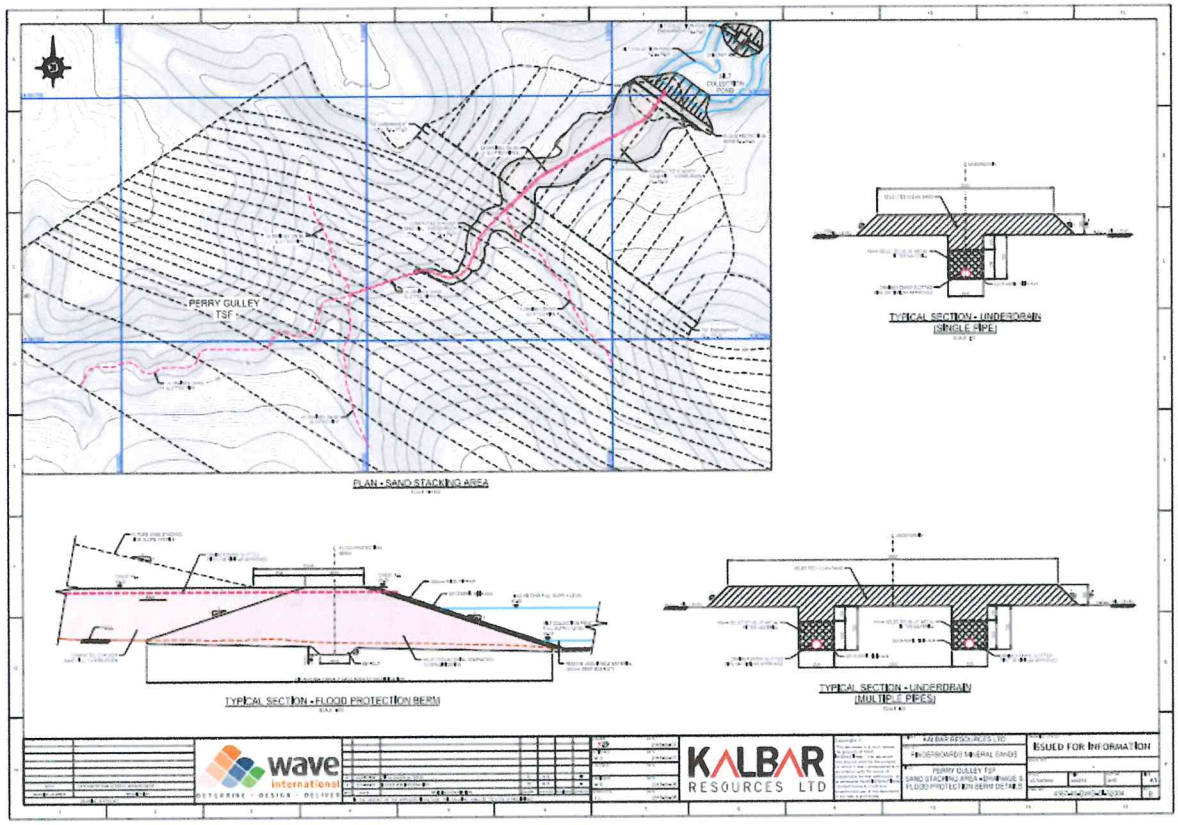
TABLED DOCUMENT-116- TN 006 – PERRY GULLY TSF CATCHMENT DAM GENERAL ARRANGEMENT (4567-40-DWG-CI-32001 REV B.



TABLED DOCUMENT-117- TN 006 – PERRY GULLY TSF CATCHMENT DAM TYPICAL SECTIONS AND DETAILS (4567-40-DWG-CI-32002 REV B.



TABLED DOCUMENT-118- TN 006 – PERRY GULLY TSF CATCHMENT DAM TYPICAL SPILLWAY DETAILS (4567-40-DWG-CI-32003 REV B.



TABLED DOCUMENT-119- TN 006 – PERRY GULLY TSF SAND STAKING AREA – DRAINAGE AND FLOOD PROTECTION BERM DETAILS. (4567-40-DWG-CI-32004 REV B.

According to former DPI research, these local Glenaladale soils lose their load bearing capacity when wet and create tunnel erosion. The Catchment Dam sits directly on original soil it would seem. The Underdrains sit directly into the dispersive soils. The existing gullies are so deep because stormwater causes erosion. This situation tells me that the toxic TSF may leach into the Mitchell River as well as the Perry River.

Looking at Tabled Document 116 adjacent to the Flood Protection Berm and the TSF. Little protection is seemingly evident to protect the documented structure from erosion and liquefaction as noted with the added arrows. It would also seem that the dumped TSF and the drainage

located beneath the TSF drain into the Perry River Catchment. (See attached letter provided by Dr Juliet F Bird in Appendix)

CONCLUSION.

The tragic storms and consequent flooding that occurred early in June 21 were modelled by BOM to occur in our region of East Gippsland. By some quirk of fate, the actual storm occurred a 100km West of here in the Latrobe Valley and we dodged a bullet. People just west of here have been without power for weeks.

EnergyAustralia, the mine proponent, estimates that the average daily flow rate of water through the Morwell River diversion is more than half a gigalitre. The company said on June 11, the day after the severe storm which lashed the Latrobe Valley and wider region, the average daily flow rate swelled 34 times to 17 gigalitres.

A 200-metre crack appeared in Hazelwood open cut's southern mine wall, stretching diagonally across a burning stretch of coal batter in some places 2.5m wide and at some points 10m deep. The mine has already been flooded once. So, the Latrobe River is being diverted to take pressure off the mine wall. The EPA will allow 232 megalitres of water a day to be released from the Yallourn mine. It has also given retrospective permission for the owner of the shuttered Hazelwood mine, which closed in 2017, to release extra water from its pondage.

It comes after extensive flooding in the region almost three weeks ago, with concerns the cracks could lead to Yallourn's diversion wall collapsing.

Floodwaters enter a large open cut coal mine. And the Lakes is understood to be already under stress. Why would the fishing licences be bought out?

In 2012, floodwaters swamped the Yallourn open cut coal mine for more than two weeks. The mine was closed for more than six weeks in 2012 because of flooding, which cost millions of dollars and nearly two years to fix. The emergency declaration allows the usual planning and regulatory approvals to be waived.

Gippsland Lakes Recreational Fishing Alliance vice-president Rob Caune said allowing the two companies to release extra water, which would end up in the Gippsland Lakes, was very concerning.

He said in 2012, when more than 700 megalitres of water was pushed into the lakes system after the Yallourn mine flooded, it caused environmental damage in the Ramsar-listed wetlands.

I cannot begin to reflect on the ramifications of a mineral sands mine in Glenaladale, whether in the throes of completion or otherwise if the BOM modelling is right and the disastrous weather event occurs here. It seems to me and many others, these conditions will bring about a tragic environmental disaster that may never witness any recovery. Will the

fragility of the location require the proponents to re-route the Mitchell River if the catastrophic events we miraculously dodged occur in our district?

APPENDIX: Letter provided by Dr Juliet F Bird on behalf of the 'Chain of Ponds'.

CHAIN OF PONDS: A CONTRIBUTION BY DR JULIET F BIRD

Former lecturer in geomorphology and water resources management at Melbourne University.

The chain of ponds waterway appears to have been a widespread landform in pre-settlement Victoria and was noted by many explorers and early settlers in the mid to late nineteenth century. The best early descriptions come from Sir Thomas Mitchell, who traversed Victoria from the Murray to Portland and back in 1836. On his first crossing of what is now the Lodden Valley near Serpentine he describes what is probably now Korong Creek as a "chain of ponds watering a beautiful and extensive valley covered with a luxuriant crop of the anthisteria grass" (1). The examples noted in early records are all features of relatively small streams with broad grassy valleys and shallow gradient, within which ponds described as "deep" and "permanent" are separated by valley floors with little or no channel. This alternation of deep and shallow channels is distinct from the pools and riffles that develop in streams with coarse bed load or in association with meandering and is unrelated to ponded/infilled

sections resulting from vegetation blockage by fallen trees or by patches of thick riparian vegetation. During wet periods, overland flow may be continuous along the watercourse but in dry conditions subsurface flow may still link the ponds (2).

Most chains of ponds described in early records have disappeared, lost to urbanisation (e.g. Waurn Ponds Creek, near Geelong), channel erosion or changed farming practices, but a few persist. One of the best examples today is Providence Ponds, near Stockdale in Gippsland, where a sequence of ponds a metre or more deep is separated by segments of shallow, grassy valley floor.

Apart from their geomorphological interest as a unique landform and obvious value to early farmers and their livestock, ponds are likely to have played an important role in maintaining biodiversity, providing a permanent source of water for native fauna and a refuge for aquatic species, and reducing the risk of channel erosion. Their value is recognised today in re-creation efforts by private landholders (3) and local creek restoration projects such as that for Moonee Ponds Creek in north Melbourne (4).

Dr Juliet F Bird

Former lecturer in geomorphology and water resources management at Melbourne University.