

**BEFORE A COMMISSIONER APPOINTED BY THE OTAGO REGIONAL
COUNCIL AND THE CENTRAL OTAGO DISTRICT COUNCIL**

IN THE MATTER OF

the Resource Management Act 1991

AND

IN THE MATTER OF

applications by Cromwell Certified
Concrete Limited for resource
consents to expand Amisfield Quarry

**SUPPLEMENTARY EVIDENCE OF DR MIKE FREEMAN
(GROUNDWATER)
IN RESPONSE TO FOURTH MINUTE OF THE COMMISSIONER**

Dated: 28 March 2022

GREENWOOD ROCHE
LAWYERS
CHRISTCHURCH
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1 **SAMPLING OF MONITORING BORES AND ASSOCIATED CONDITIONS**

- 1.1 As the Commissioner has observed, I anticipate that groundwater samples from monitoring bores may at times (after periods of heavy rain) give results that exceed the New Zealand Drinking Water Standards (NZDWS) guideline values for aesthetic determinands because the bores in the area are relatively shallow and the groundwater is unconfined (no barrier to downwards movement of water and contaminants). This may persist for some days or potentially weeks after periods of heavy rain.
- 1.2 However because the groundwater sampling proposed would involve sampling of up to six bores (G41/0321, G41/0220, G41/0319, G41/0456, G41/0111 plus the new down-gradient bore), I am confident that the sampling results are likely to provide a reasonable indication of the wider groundwater quality, recognising that bore G41/0111 at 14.8 m depth is shallower than all the upgradient bores, so is likely to respond more acutely and quickly to rainfall events.
- 1.3 I am also confident that a suitably qualified water quality expert will be able to identify any situations where it is likely that a breach of a NZDWS was caused by a natural event and when it is likely that a breach was not caused by a natural event. However I have discussed the potential inefficiencies in investigating minor increases in turbidity caused by natural events with Ms Badenhop, and we agree that it would be prudent to replace the NZDWS turbidity guideline value of 2.5 NTU with an alternative threshold of 4.0 NTU that is recognised by the World Health Organisation¹ as the threshold where water becomes “visibly cloudy”. I have recommended to Mr Curran that condition 13 of RM 20.360.02 be amended (and an advice note included) to reflect the potential for increases in results following heavy rainfall.

Mike Freeman
28 March 2022

¹ WHO (2017) Water quality and health - review of turbidity: Information for regulators and water suppliers, WHO/FWC/WSH/17.01