

Planning Memorandum – Substantive Groundwater and Surface Water Issues Arising from Responses to RFI 11

Introduction

1. The purpose of this memorandum is to address substantive issues relating to groundwater and surface water that have arisen through the responses of Matakanui Gold Limited (**MGL, the applicant**) to RFI 11.
2. This memorandum is separated into three discrete parts:
 - (a) Part 1 – Seepage from mine waste storage facilities in the Shepherds Valley
 - (b) Part 2 – Groundwater take from the Bendigo Bore
 - (c) Part 3 – Other matters
3. This memorandum summarises and frequently refers to the following two memoranda prepared by experts advising Otago Regional Council (**ORC**) in relation to groundwater and surface water:
 - (a) *Bendigo-Ophir Gold Project Fast-track Approval: Review of applicant's response to the Expert Panel's 11th request for further information*, prepared by Dr Michael Greer, dated 4 September 2026; and
 - (b) *Technical Review*, prepared by Alexandra Badenhop, dated 7 September 2026.
4. This memorandum should be read alongside the two memoranda listed above.
5. This memorandum also provides recommendations for changes to the consent conditions provided to the Panel by the applicant on 28 August 2026.

Part 1 – Seepage from mine waste storage facilities

Untreated seepage is likely to bypass primary seepage collection systems in the Shepherds Valley

6. The groundwater seepage modelling report¹ suggests that 3-10% of seepage generated by discrete mine waste storage facilities in the Shepherds Valley may bypass primary seepage collection infrastructure. Specifically:
 - (a) Losses from the tailings storage facility (**TSF**) are estimated as 4-8%
 - (b) Losses from the Shepherds Engineered Landform (**SELF**) are estimated as <9%
 - (c) Losses from the Shepherds Valley Infill are estimated as <10%.
7. The assumptions and limitations of the groundwater seepage modelling, and of the other investigations and reporting provided by the applicant in its response to RFI 11 are discussed below.

Assumptions and limitations of site investigations, modelling, and RFI 11 reporting

8. The memoranda of Ms Badenhop and Dr Greer collectively summarise the modelling, site investigations, and reporting provided by the applicant in its responses to RFI 11 questions relating to water. Their memoranda also identify the key assumptions, limitations, and gaps in the various assessments provided by the applicant and explain the implications of these in respect of the environmental outcomes for groundwater and surface water.
9. I do not repeat the assessments of Ms Badenhop or Dr Greer in this memorandum but highlight for the Panel those points that I consider to be of greatest importance, and which have informed the recommended changes to consent conditions that are set out later in this memo.
10. In respect of the recent site investigations undertaken by Hydro Geochem Group:²
 - (a) The new data improves the understanding of the three hydrostratigraphic units within the Shepherds Valley, being the

¹ *Updated Groundwater Modelling for Bendigo Ophir Gold Deposit*, prepared by Kōmanawa Solutions Ltd for Matakanui Gold Ltd.

² *BOGP Groundwater Site Investigation Memorandum*, Hydro Geochem Group, 17 August 2026

shallow alluvial, weathered bedrock, and fresh bedrock aquifers, and changes the conceptual understanding of the Shepherds Valley hydrogeology.

- (b) While the data indicate an upward hydraulic gradient along much of the Shepherds Valley and a downward gradient in the valley sides, which is generally consistent with the original conceptual model,³ the data do indicate a downward hydraulic gradient at GW02 i.e. groundwater moves downward into the deeper schist at this location.
- (c) This is important, because it does not support the assumption, discussed later in this memorandum, that seepage which bypasses primary seepage collection infrastructure would report to, and therefore be detectable at, surface water compliance location SC01 in Shepherds Creek. It also has implications for the physical ability to capture bypassed seepage at that location in the Shepherds Valley.
- (d) The data gathered in the Shepherds Valley do provide some information about the likely magnitude of contaminant transport times, although this was not the primary purpose of this report. These data suggest that the hydraulic conductivity of the alluvium and in the weathered schist may be an order of magnitude higher than was assumed in the original seepage assessment.⁴ The implications of this are most significant for uncaptured seepage from the Shepherds Valley Infill. Previous indications as to the time it would take contaminants to migrate in groundwater from the Shepherds Valley Infill to SC01 was approximately eight years.⁵ Based on updated site data, Ms Badenhop considers that this timeframe would be reduced to less than one year. This is important, because it significantly reduces the time available to identify and react to any increasing trend of contaminants in groundwater.
- (e) Only one groundwater quality sampling event was completed within the Shepherds Valley alluvium. This provides only a snapshot of the groundwater quality at a point in time, and there is still no

³ Dumont et al., (2025). *Groundwater Modelling Analysis for Mining Bendigo Ophir Gold Deposit*, prepared by Kōmanawa Solutions Ltd for Matakanui Gold Ltd, and in Statement of Evidence of Ryan Burgess, Appendix A, dated 17 April 2026

⁴ BOGP MWSF Seepage Risk Assessment, prepared by Hydro Geochem Group, 5 March 2026

⁵ Ibid.

comprehensive baseline data set for groundwater in the Shepherds Valley, either for flow or quality.

- (f) No new information has been provided about the Ardgour Aquifer, and little is known about groundwater quality of flow in this aquifer.⁶

11. In respect of the groundwater seepage modelling:

- (a) The groundwater seepage modelling reinforces the critical importance of seepage collection infrastructure and underdrainage within and under all mine waste storage facilities. Without this infrastructure, seepage would likely be very poorly contained.
- (b) Not all critical assumptions in the modelling are reflected in the consent conditions. In particular, the current version of the conditions does not require underdrainage beneath the Shepherds Valley Infill, or require removal of weathered bedrock beneath the Shepherds Seepage Collection Sump, but these are identified in the modelling as being critical to reduce seepage loss. This means that implementation of the activities in accordance with the current version of the consent conditions would not necessarily result in the realisation of the modelled outcomes.
- (c) The groundwater seepage modelling does not assess the effects of increased seepage bypass as a consequence of the anticipated future underdrain failure.⁷ This means that seepage bypass rates may increase over time, and this has not been modelled or assessed.
- (d) The groundwater seepage modelling assumes that all uncaptured seepage would ultimately migrate via Shepherds Creek or the shallow groundwater system (alluvium / colluvium and weathered bedrock) into the Ardgour Aquifer. Based on the updated site investigation data, Ms Badenhop considers that all uncaptured seepage would migrate through groundwater, not surface water, and therefore not report to SC01. Given the extent of the valley fill, she

⁶ The Ardgour Aquifer is made up of the Ardgour Valley Aquifer and the Lindis Alluvial Ribbon Aquifer. These are demarcated only for the management of abstraction. Bores within the area demarcated as the Lindis Alluvial Ribbon Aquifer are stream-depleting and are subject to the surface water allocation limits; bores within the area designated as the Ardgour Valley Aquifer are subject to groundwater allocation limits. Unless otherwise specified, the applicant's reports, and this memorandum, refer to these aquifers collectively as the Ardgour Aquifer.

⁷ *Shepherds Tailings Storage Facility Technical Report*, Appendix B, prepared by Engineering Geology Ltd, dated 08 August 2025, and in Statement of Evidence of Ryan Burgess, Appendix A, dated 17 April 2026

does not expect groundwater to be in connection with Shepherds Creek at any point along the valley.

- (e) The model broadly rejects the hypothesis that substantial seepage may be lost to the deep schist system without being detected by the proposed monitoring network. However, Ms Badenhop has highlighted two key limitations that call into question this conclusion:
 - (i) The groundwater seepage model was run in steady state conditions and therefore does not make predictions about contaminant migration timeframes, nor the concentrations of potential contaminants of concern at any downstream location at any point in time.
 - (ii) Importantly, the groundwater seepage model does not appear to have included the recently gathered hydrogeological data. It is assumed that the modelling and the site investigations were undertaken concurrently and that timeframes did not enable incorporation of the site investigation data into the model. This reduces confidence in the conclusions reached by the applicant's experts because the modelling did not incorporate the best available information which, as noted above, changes the conceptual understanding of the Shepherds Valley hydrogeology.

12. In respect of the updated operational phase Water and Load Balance Model (WLBM):⁸

- (a) The updated WLBM for the operational phase (approximately years 2 – 13 of the life of mine) does not incorporate the range of seepage bypass predicted by the groundwater seepage model, instead using a fixed value of 5%. As a result, the WLBM does not accurately predict the potential range of contaminant loads lost as uncaptured seepage for the operational phase.
- (b) The updated WLBM assumes that the 5% uncaptured seepage (from mine waste features in the Shepherds Valley) would report to SC01. As noted above, site investigation data does not support this assumption.

⁸ Operational Phase Site Wide Water and Load Balance Model, Mine Waste Management Limited, 17 August 2026

- (c) The WLBM has not been updated for the closure and post-closure (active and passive closure) phases, when the mine waste storage facilities have been constructed to their full extent, seepage rates are highest,⁹ and when underdrain failure may occur.
13. In respect of the assessment of adverse effects of the BOGP on the Ardour and Bendigo Aquifers:¹⁰
- (a) This report does not present a comprehensive assessment of effects of uncaptured seepage on the Ardour Aquifer or on the Lindis River, which is hydrologically connected to this aquifer.
 - (b) In relying on the other reports and modelling discussed above, this report appears to assume that any uncaptured seepage would be readily detected by the monitoring network (presumably prompting rapid action to install secondary seepage collection infrastructure, although this is not explicitly discussed) and hence doesn't appear to consider the potential for any seepage to migrate via groundwater into the Ardour Aquifer.
 - (c) This report does not specify how seepage would be detected by the monitoring network, or what actions would be taken in response to any seepage detection. For example, this report does not prescribe or refer to any numerical triggers in groundwater or surface water that would be indicative of seepage bypass, nor does it specify any remedial or corrective actions that should be implemented in response.
 - (d) The report does not specify any secondary seepage collection infrastructure that should or could be installed to capture the seepage that it acknowledges may bypass the primary collection system.
 - (e) The report does not appear to acknowledge that the greatest risk of seepage bypass is in the closure (active and passive) phase and that the WLBM has not been updated to account for uncaptured seepage.
14. In summary, as advised by Ms Badenhop and Dr Greer, there are significant consequential limitations to the site investigations, modelling, and reporting

⁹ Statement of Evidence of Dr Paul Weber, Attachment A to Appendix D, dated 17 April 2026

¹⁰ Response to RFI 11 – Fast Track Approvals Application FTA-2507-1089 – Item 5, Hydro Geochem Group Limited, Boffa Miskell Limited, Komanawa Solutions Limited, and Geocontam Risk Management, 17 August 2026

that have been provided as part of the applicant's response to RFI 11, and these reduce the confidence in the predictions and conclusions of these reports.

15. The absence of a report that assesses the impacts of uncaptured seepage reaching the Ardgour Aquifer and thereafter the Lindis River is, in my opinion, an important gap in the information available to the Panel.
16. To the extent that has been possible to do so based on the information provided and the available timeframes, ORC's experts have endeavoured to provide the Panel with an assessment as to the potential magnitude of risk to downgradient aquifers and the Lindis River. This is provided in the memoranda of Ms Badenhop and Dr Greer and summarised below.

Risk to the Ardgour Valley Aquifer and the Lindis Alluvial Ribbon Aquifer

17. The groundwater seepage report states that the impacts of lost seepage to the Ardgour Aquifer were not modelled, because the authors conservatively assume that all lost seepage will ultimately enter the Ardgour Aquifer, and because their previous modelling could not discount mine-sourced contamination moving through the aquifer without significant dilution. Without additional data, which was not collected during the recent site investigations, the authors state that the modelling cannot be improved.
18. The limited information available does not allow for water quality impacts on the Ardgour Aquifer to be quantified. However, any uncaptured untreated seepage that enters the aquifer will evidently not improve the quality of water within the aquifer.
19. Further compounding this, as discussed at Section 3.7 of Ms Badenhop's memorandum, groundwater within the Shepherds Valley alluvial system may already be of poorer quality than the water within the Ardgour Aquifer, based on the recent groundwater sampling within the Shepherds Valley alluvium. Ms Badenhop goes on to identify the possibility that water quality within the Ardgour Aquifer is reliant on the diluting influence of higher quality Shepherds Creek water. The potential implication of this is that because water quality within Shepherds Creek will degrade as a result of the BOGP activities (even while remaining compliant with conditioned surface water limits) this may reduce the quality of the water within the Ardgour Aquifer, even without the addition of uncaptured seepage.

20. As discussed at Section 3.6 of Ms Badenhop's memorandum, contaminant migration timeframes from source to receiving environment are not known with any certainty due to insufficient information being available. However, based on the recent site investigations, hydraulic conductivity of the alluvium and the weathered schist are likely to be an order of magnitude higher than previously assumed. As an example of the potential implications of this, Ms Badenhop identifies that this would reduce the travel time of contaminants within groundwater from the Shepherds Valley Fill to (the vicinity of) SC01 from the eight years assumed by the applicant's expert Mr Burgess to less than one year.¹¹
21. From section 3.9 of Ms Badenhop's memorandum, I understand that in the vicinity of at SC01 / GW02 uncaptured seepage would be lost to deeper groundwater. It would therefore be challenging to reliably capture seepage at this location, and it should be assumed that after this location, any seepage that has not been captured will enter the Ardgour Aquifer.
22. There are few, if any, options available to remediate a contaminated aquifer. Therefore, in my opinion, it is of critical importance that all practicable measures to capture seepage that bypass primary collection systems be taken. Secondary seepage collection infrastructure should be installed at the location of key seepage sources, and all practical seepage collection should be upgradient of SC01 / GW02. My recommendations for changes to consent conditions to address these matters are detailed later in this memorandum.

Risk to the Lindis River

23. The applicant has not provided an assessment that considers the effects of uncaptured untreated seepage entering the Lindis River.
24. To address this gap, and to assist the Panel, Dr Greer has prepared a memorandum which discusses two key issues:
- (a) The potential effects on the Lindis River from uncaptured seepage; and
 - (b) The inadequacy of the currently proposed monitoring regime.

¹¹ BOGP MWSF Seepage Risk Assessment, prepared by Hydro Geochem Group, 5 March 2026

25. Dr Greer has undertaken an analysis of the potential effects of contaminant loads leaving the BOGP site on water quality in the Lindis River for varying percentages of uncaptured seepage. The methodology utilised by Dr Greer repeats and expands on analysis previously undertaken by Dr Ryder on behalf of the applicant, but includes untreated seepage within the analysis, whereas Dr Ryder previously only included *treated* seepage.
26. Based on his analysis, and in the absence of a comprehensive assessment to the contrary, Dr Greer concludes that there is potential for marked increases in nitrate and metal / metalloid concentrations in the Lindis River at low flows which could generate significantly adverse periphyton and ecotoxicological effects. Based on the information available, protection against these effects would require >99% of all seepage to be captured.
27. Dr Greer's analysis is conservative because it assumes that 100% of the contaminant load leaving the site would reach the Lindis River.
28. Dr Greer considers that the currently proposed seepage bypass detection and response regime as set out in consent conditions is inadequate and does not provide sufficient protection for the Lindis River. He recommends that:
 - (a) Numerical groundwater and surface water triggers be set at a level that detects the smallest possible level of seepage bypass, and these triggers would ideally be secured in consent conditions;
 - (b) Groundwater triggers are of primary importance, because any uncaptured seepage is not expected to report to surface water at SC01;
 - (c) Consideration should be given to applying the surface water compliance limits to the Lindis River at Ardgour Road (currently a performance monitoring site); and
 - (d) Breach of triggers must generate a management response sufficient to prevent or minimise adverse effects to the fullest extent possible.
29. The applicant has not proposed numerical triggers for detection of seepage in groundwater or surface water, nor has it specified any management actions that would be implemented in the event that seepage bypass was detected.

30. Ms Badenhop has advised that she does not have enough information to develop these numerical triggers for groundwater with any confidence. Accordingly, Dr Greer recommends that the consent conditions should specify how appropriate triggers are to be developed through the Water Management Plan, including the process and criteria to be used to ensure that any deterioration in groundwater or surface water quality is identified and addressed before untreated seepage can reach the Lindis River.
31. I agree with Dr Greer that if triggers cannot be specified in consent conditions due to lack of information then, if the Panel is minded to grant the approvals sought, another option would be for the conditions to specify qualitative outcomes required to be achieved by the consent holder, with appropriate triggers to be developed and included within the Water Management Plan prior to commencement of mining. However, if it is at all possible to do so, I consider that triggers should be specified directly within the consent conditions as this provides a greater level of certainty. Triggers that are only specified in the management plan could potentially be altered without a need for a s127 variation, although certification of any changes would still be required by ORC.
32. To the extent possible, given the gaps in information, I make recommendations for changes to consent conditions to reflect the recommendations of Dr Greer later in this memorandum.

Downstream risks are avoided if all seepage is collected

33. Evidently, if all seepage is collected and adequately treated prior to discharge from site then the risk of contamination of downstream aquifers and rivers is eliminated.
34. Based on the advice of Ms Badenhop and Dr Greer, and with consideration to the residual uncertainty that remains after reviewing the applicant's responses to RFI 11, I consider that the appropriate management measure for seepage bypass is avoidance, as opposed to minimisation, given the potential downstream effects of even 1% seepage bypass. Remediation (of effects) is not practicable; once an aquifer is contaminated there are few, if any, remedial options available to address that contamination.
35. I do not consider that avoidance of effects necessarily requires avoidance of the proposed mining activities. Rather, suitably stringent consent conditions could be imposed to ensure that seepage does not enter the downstream

receiving environment. However, this task is made substantially more difficult by the information gaps that remain, and which have been detailed above and in the memoranda of Ms Badenhop and Dr Greer.

Recommended changes to consent conditions

36. It is understood from the recent conditions workshops that it is not the intention of the applicant to allow untreated seepage to discharge from the site, and this is reflected in the commitment to install secondary seepage collection infrastructure at the Shepherds Seepage Collection Sump.¹² I support the intent of this condition, but do not consider that it addresses all of the issues discussed in the memoranda of Ms Badenhop and Dr Greer.
37. For ease of reference, I describe below my recommended changes to consent conditions alongside their current condition number as set out in the 28 August (clean version) suite of conditions supplied by the applicant. Detail about recommended wording (where I have been able to suggest wording) can be found in the relevant condition document.

Note for reader: I have referenced the existing condition numbering as set out in the 28 August 2026 version of conditions supplied by the applicant. Where I have recommended new conditions be added, I have named them NEW #, but have not renumbered subsequent conditions.

38. In condition document D.04 – *Schedule Two – General Conditions for ORC Consents* (28 August 2026):
 - (a) Condition 19(e) – change to require the Water Management Plan to include triggers and actions in relation to seepage.
 - (b) Condition 19(g) – change to extend the ‘no release of mine-impacted water’ to include the closure phases.
 - (c) New conditions NEW 20 – NEW 23:
 - (i) NEW 20 – include overarching water quality outcome of no discharge of untreated mine-impacted water from the site;

¹² Condition 70 on D.04 – *Schedule Two – General Conditions for ORC Consents* (28 August 2026)

- (ii) NEW 21 – process to develop triggers and responses for seepage management;
 - (iii) NEW 22 – requirement to maintain triggers and responses in water plan;
 - (iv) NEW 23 – measures that must be implemented to prevent irreversible environmental effects when other contingency measures have been exhausted and seepage bypass persists.
- (d) Conditions 20 and 22 – change to make the surface water monitoring site ‘Lindis River at Ardgour Road’ a compliance monitoring site rather than a performance monitoring site.
- (e) New condition NEW 58 – requirement to install underdrainage beneath the Shepherds Valley Infill;
- (f) New condition NEW 59 – requirement to capture and direct seepage from Shepherds Valley Infill underdrains to the mine water circuit for reuse, or to the active or passive water treatment plant.
- (g) Condition 59 – change to require underdrains to be extended into the upper reaches of the TSF.
- (h) Condition 67 – change to require the removal of all weathered bedrock beneath the Shepherds Seepage Collection Sump to achieve a conductivity of no more than 10^{-6} m/s (geometric mean), but ideally less than 10^{-7} .
- (i) Condition 70 – change wording from “at the Shepherds Seepage Collection Sump” to “immediately downstream of the Shepherds Seepage Collection Sump and upstream of the Shepherds Silt Pond”.
39. I consider that the above changes to consent conditions provide a more robust framework for the management of effects relating to untreated seepage. However, based on the advice of Ms Badenhop and Dr Greer, I do not have sufficient information to be able to recommend final wording for all of these conditions.
40. For the avoidance of doubt, my recommendation is that focus should be on identifying all practicable primary and secondary seepage collection

infrastructure necessary to provide maximum certainty that the maximum amount of seepage is captured and requiring, through consent conditions, installation of these systems prior to first tailings discharge i.e. as part of the construction of the mine waste facilities. This will reduce the burden on performance monitoring and reactive measures.

Part 2 – Groundwater take from the Bendigo Bore

Drawdown assessment

41. The aquifer test report¹³ describes the aquifer tests that were undertaken to address Question 6 of RFI 11. Resource consents for the aquifer tests were sought separately from ORC.¹⁴ Additionally, this report describes the data gathered, analyses those data to derive updated aquifer parameters, and presents an estimate as to the radius of influence of the pumped bore i.e. the radius beyond which little discernible drawdown would persist in equilibrium conditions.¹⁵
42. The report may provide the information required to address RFI 11 Question 6 in that it is compliant with ORC's Aquifer Test Guidelines;¹⁶ however, in my view, it does not undertake the drawdown analysis required to address the overarching purpose of the question, which was to understand the potential effects of the proposed groundwater abstraction on other users of the Bendigo Aquifer.¹⁷
43. This drawdown assessment is necessary to understand the potential effects on nearby bores, and the extent to which the proposed groundwater abstraction may prevent bore owners accessing their consented or permitted allocation of groundwater.
44. The applicant has all the relevant and necessary information to hand from the recent aquifer test to enable it to undertake this assessment; in my view, it would assist the Panel if the applicant could provide this now.

¹³ *Report on Compliant Aquifer Test at BOGP Water Supply Bore Field*, prepared by Kōmanawa Solutions Ltd for Matakanui Gold Ltd.

¹⁴ Water Permit RM26.356.01 authorised the aquifer tests; Land Use Consent RM26.361.01 authorised the drilling of additional observation bores.

¹⁵ The radius of influence is estimated to be 1,060 metres from the pumped bore.

¹⁶ <https://www.orc.govt.nz/media/14441/aquifer-test-guidelines.pdf>

¹⁷ RFI 11 Q6: *In order to understand the potential effects on other users of the aquifers, please provide the results of a compliant bore pump test for the Bendigo aquifer.* The applicant has complied with the direction and provided the results of the compliant bore pump test, but provision of results is not the same as interpretation of results, and in not interpreting the results the applicant has not addressed the overarching purpose of the question.

Changes to proposal as a result of the aquifer testing

45. The proposal has been revised to reduce the maximum rate of abstraction of groundwater from the Bendigo Aquifer from 110 L/s to 97 L/s. This change was made to reflect the maximum achievable pumping rate of the 400 mm diameter production bore¹⁸ in combination with an adjacent 150 mm bore,¹⁹ as demonstrated by the aquifer test.

Provision of alternate water supply to affected bore owners in Bendigo Aquifer

46. Condition 10 of Section 14 Water Permit to take and use groundwater from the Bendigo Aquifer on the D.02 – *Proposed Consents and Conditions for Resource Consents within the Jurisdiction of Otago Regional Council* (28 August 2026) requires MGL to take a series of actions to address drawdown effects on nearby bores, if those effects are sufficiently significant as to prevent the bore owner accessing their full consented or permitted volume of water.
47. At the recent conditions workshops, participants discussed the feedback from nearby bore owners that the original proposal to remediate effects by, for example, arranging for repairs to damaged pumps, deepening bores, or drilling new bores was not acceptable. While these are likely appropriate long-term solutions, the concern from other bore owners was that the time taken to implement these actions would have unacceptable effects on their personal or business activities that require a consistent supply of water.
48. Consequently, the applicant agreed to include a requirement, in conditions, to provide an alternate water supply to any bore owner whose bore is sited within a one kilometre radius of the applicant's bore and who cannot access their full consented or permitted volume of water where this is demonstrably caused by the applicant's own water take in the Bendigo Aquifer.
49. I agree with the intent of this condition, and I also agree that demonstrating causation is appropriate, because there are many reasons that a bore owner may not be able to access their water that would not be related to the applicant's take and for which the applicant should not be responsible.

¹⁸ ORC bore tag reference CB13/0215

¹⁹ ORC bore tag reference CB13/0216

50. However, currently, the condition requires that causation is demonstrated via a hydrogeological assessment, and the applicant advises that 40 working days is necessary to undertake this assessment. Assuming that the findings of this assessment are that the applicant's take is the causative factor, further delays to the provision of an alternate supply are likely while the necessary infrastructure is procured, supplied, and installed. These delays may result in long-term reduced access to drinking or stock water supplies, or irreparable damage to businesses, and are therefore unlikely to be acceptable.
51. I consider that the drawdown assessment, if completed, will substantially reduce the uncertainty about effects on nearby bores and the potential management of those effects. With this information, the Panel will be able to better understand the likelihood and magnitude of drawdown effects at nearby bores and would be in a better position to develop more specific and effective consent conditions to manage these effects, if necessary. This would also be of benefit to the applicant, because it would then have certainty as to its likely future obligations, and would be able to maintain the necessary infrastructure on site and plan for implementation, rather than reacting to an unexpected notice from a nearby bore owner.

Recommended changes to consent conditions

52. The following changes are recommended to be made to consent document Section 14 Water Permit to take and use groundwater from the Bendigo Aquifer located on D.02 – *Proposed Consents and Conditions for Resource Consents within the Jurisdiction of Otago Regional Council* (28 August 2026):
- (a) Condition 3 – change to include the ORC bore tag numbers for the two bores that are required to be pumped to achieve the 97 L/s applied for.
 - (b) Condition 10 – until the drawdown assessment has been undertaken, I am not in a position to recommend specific changes to this condition. However, if this assessment is provided by the applicant in its response on 14 September, further consideration could be given to the wording of this condition, if it would assist the Panel.

Part 3 – Other matters

53. During the review of the applicant's response to RFI 11 ORC has identified a small number of other matters that it considers sufficiently important to bring to the attention of the Panel.
54. Where it is possible to do so with the information available and in the time available, I have recommended changes to consent conditions to assist the Panel. These changes are informed by the expert opinions of Ms Badenhop and Dr Greer, where relevant.
55. These matters are discussed in turn below.

Rise and Shine Catchment

56. The seepage issues discussed at length in the memoranda of Ms Badenhop and Dr Greer, and summarised in Part 1 of this memorandum, are also relevant to the Rise and Shine Creek catchment, albeit to a lesser extent as there are fewer (and smaller) seepage sources in this catchment.
57. The applicant has not provided any new information about the risk of seepage bypass in this catchment, nor has it proposed any consent conditions that specifically relate to secondary capture of seepage that bypasses the primary collection infrastructure for the mine waste features in this catchment.
58. I recommend the following changes to condition document D.04 – Schedule Two – General Conditions for ORC Consents (28 August 2026) as follows:
- (a) The changes to Condition 19(e) and 19(g) and the new conditions NW 20 – NEW 23 described in paragraph 39 of this memorandum are also applicable to the Rise and Shine catchment.

Triggers for construction of active water treatment plant

59. At the recent conditions workshops, the specific events or scenarios that should prompt the construction and commissioning of the active water treatment plant were discussed. These are currently set out in Condition 10 of Section 15 Discharge Permit to discharge water and associated contaminants to water from the active water treatment plant or passive water treatment system, located on D.02 – *Proposed Consents and Conditions for Resource Consents within the Jurisdiction of Otago Regional Council* (28 August 2026).

60. This condition states:

The Consent Holder must instigate the construction and subsequent commissioning of the Active Water Treatment Plant upon the earliest occurrence of any of the following triggers:

- (a) *Measured sulfate concentrations at groundwater performance monitoring sites GW02A, GW02B and GW02C (shown on Attachment 3 – Groundwater Monitoring Locations and listed in Attachment 4 – Groundwater Monitoring Location Details in the General Conditions in Schedule Two (that apply to all of the resource consents within the jurisdiction of ORC) which exceed 50% of the applicable compliance limit on three occasions within 12 months, including at least one exceedance of the limit, that is attributable to activities on the Project Site and cannot be remedied through adaptive management processes; or*
- (b) *Development of a water surplus condition that is not being adequately managed by engineering controls, as predicted by water load balance modelling where mine circuit water requires discharge (as set out in Conditions 29-33 of the of the Schedule 2 General Conditions (which apply to all of the resource consents within the jurisdiction of the Otago Regional Council); or*
- (c) *Permanent cessation of mining where ongoing water management is required.*

61. In the time since the workshops, I have reflected on this condition and now consider that part (a) of this condition may not be a relevant trigger for the construction of the active water treatment plant.

62. If increasing sulphate concentrations are detected in performance bores in the Shepherds Valley then this is an indication of seepage bypass, and the appropriate management response is to install additional seepage collection infrastructure, not to construct the active water treatment plant (in the absence of the situations described in clauses (b) and (c) of the condition).

63. The applicant may wish to reconsider whether clause (a) condition is necessary.

Compliance monitoring bores

64. Ms Badenhop advises in her memorandum that the Bendigo Base Bore may not be suitable for use as a compliance monitoring site, because it will be pumped at a high rate and would draw in water from a wide radius in the aquifer, and because it will not necessarily be representative of water quality entering the Bendigo Aquifer from Bendigo Creek.
65. Ms Badenhop suggests that a more suitable compliance monitoring location would be in the Bendigo Aquifer close to the point at which Bendigo Creek discharges into the aquifer.
66. To the best of my knowledge, the applicant does not currently have a monitoring bore installed in the area recommended by Ms Badenhop. However, this application already seeks approval for drilling of land over the Bendigo Aquifer for the purpose of installing monitoring bores and piezometers and I do not consider that drilling of an additional monitoring bore would introduce issues of scope.²⁰
67. I recommend that the following changes are made to condition document D.04 – *Schedule Two – General Conditions for ORC Consents* (28 August 2026):
- (a) Condition 24 – change to replace compliance monitoring site ‘Base Bore’ with ‘New Bore’ to be located in the Bendigo Aquifer close to the point at which Bendigo Creek discharges into this aquifer.
 - (b) Condition 27 – change to require the groundwater compliance limits to apply at New Bore rather than the Base Bore.
 - (c) Attachment 4 – change to retain the Base Bore as a performance monitoring location and to add New Bore as the compliance monitoring location.

Review of water use

68. The applicant has applied to take groundwater at a rate of up to 97 L/s for 24 hours a day, 7 days a week, for 35 years. While this remains well within the available allocation for the Bendigo Aquifer, this is a substantial amount of water, and no justification has been provided as to the need for this much

²⁰ Drilling of a monitoring well within the Bendigo Aquifer is a controlled activity under Regional Plan: Water for Otago rule 14.2.2.1.

water for this duration. This efficiency assessment was requested by ORC in its s53 comments²¹ but has not yet been supplied by the applicant.

69. Granting more water than is necessary for the intended use is not efficient and can result in the 'locking up' of the groundwater resource. This is because ORC prescribes maximum allocation limits for groundwater within mapped aquifers (including the Bendigo Aquifer) and this allocation is calculated via the consented volume of water, rather than actual measured volume of water that is used.
70. The updated WLBM model indicates that water only needs to be introduced to the site for approximately two years, after which time site should be self-sufficient in terms of water. Further, water requirements are likely to vary seasonally; estimates of bore water usage range from 80 L/s in summer to 30 L/s in winter.
71. This is a substantially less water over a substantially shorter duration than has been applied for.
72. I recommend that a consent condition be imposed that requires the applicant, shortly after the commissioning of the active water treatment plant, to undertake a review of the rate and volume of water required for the continued operation (if relevant), closure, and rehabilitation of the mine in accordance with consent conditions. The purpose of this review would be to determine whether there is an ongoing need for water to be introduced to the site from the Bendigo Aquifer, and to quantify this requirement.
73. If the finding of the review is that less than 97 L/s of water, either permanently or seasonally, is required on an ongoing basis, then the applicant must either lodge a s127 application to reduce the rate and / or volume of the take to accord with the findings of the review, or surrender (in whole or in part) the water permit authorising the groundwater take and use.
74. In recommending the timing of this review I recognise that the WLBM, like all modelling, has inherent uncertainty, and that constraining water use too early may have unintended consequences, such as impeding necessary dust suppression activities or the flow augmentation regime in Shepherds and Rise and Shine Creeks. I consider that the link to the construction of the water

²¹ At paragraphs 291-292

treatment plant is an appropriate time for the review, as it reflects that this is the time at which a permanent water surplus condition has already developed, or mining has ceased. In both situations, there would be in a substantial reduction in the need for water.

75. I do not consider that requiring the consent holder to review their water use at an appropriate time in the mine life is unduly onerous.
76. I have made the following changes to consent conditions on consent document Section 14 Water Permit to take and use groundwater from the Bendigo Aquifer located on D.02 – *Proposed Consents and Conditions for Resource Consents within the Jurisdiction of Otago Regional Council* (28 August 2026) accordingly:
- (a) NEW 11 – new condition to give effect to the review process recommended above.

Numbering of the resource consents in D.02 – Proposed Consents and Conditions for Resource Consents within the Jurisdiction of Otago Regional Council

77. As an administrative point, each resource consent in Document D.02 needs to have a unique identifier. I have added a reference number to each of these resource consents and would request that this numbering is retained in any future iterations of the consent conditions, including in any cross-referencing between condition sets.
78. For the avoidance of doubt, the consent documents D.04 and D.03 do not need a reference number, as these would be attached as schedules to the D.02 consents (in the event that the consents are granted).



Shay McDonald
Principal Consents Planner
7 September 2026