6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 OVERVIEW

In accordance with Schedule 5 (clause 5 (4), clause 6 and clause 7), Schedule 6 (clause 3 (1)(g)(i)), Schedule 7 (clause 2 (1)(j)), Schedule 8 (clause 2 (1)(g)) and Schedule 9 (clause 2) of the Act, this section provides an assessment of the actual and potential environmental effects associated with the proposed BOGP.

This section of the report addresses the actual and potential effects associated with the proposed construction, operation, maintenance, rehabilitation and closure of the BOGP.

MGL has commissioned a number of independent experts to provide specialist reports on the actual and potential effects on the environment. Copies of those reports are included in **Part B** of these application documents.

It is noted that the following sub-sections provide a summary of the actual and potential environmental effects of the BOGP - and the key recommendations to manage effects - primarily through the reproduction of the executive summaries from these reports to provide a concise and digestible summary for each technical discipline. Refer to the full reports for a more detailed assessment.

The relevant actual and potential environmental effects, as summarised in the following sub-sections of this report, are considered to be:

- Positive effects;
- Cultural effects;
- Effects on surface water and groundwater;
- Environmental geochemistry / water quality effects;
- Effects on terrestrial ecology, wetlands and aquatic ecology;
- Landscape, visual amenity and natural character effects;
- Geotechnical effects;
- Noise, vibration and blasting effects;
- Transportation effects;
- Lighting effects;
- Contaminated land management;

- Effects relating to the storage and handling of hazardous substances;
- Dust and air quality effects;
- Historic heritage and archaeological effects;
- Public access and recreation effects; and
- Closure and aftercare.

MGL proposes to implement the effects management and mitigation measures referenced in the sub-sections below by way of the proposed conditions provided in **Part D** of these application documents. A proposed set of conditions has been drafted for all activities for which MGL is seeking approval under the Act within the jurisdiction of each administering agency. Specifically this includes:

- A single Land Use Consent and associated conditions for all the activities within the jurisdiction of CODC;
- Various resource consents and associated conditions for the activities within the jurisdiction of ORC;
- Separate concessions and associated conditions for the activities proposed on land administered by the Department of Conservation;
- A Wildlife Permit and associated conditions (administered by the Department of Conservation); and
- An Archaeological Authority and associated conditions for the activities proposed within the jurisdiction of HNZPT.

To avoid repetition (as much as reasonably possible) and to advance an integrated approach to the management environmental effects associated with the BOGP, the proposed consent conditions include a set of "common conditions" which apply to the land use consent within the jurisdiction of CODC and the various resource consents within the jurisdiction of ORC. The various resource consents within the jurisdiction of ORC are also subject to a set of "general conditions" along with conditions specific to each consent (where necessary in addition to the common and general conditions).

The proposed conditions for the BOGP have been drafted to address the environmental effects associated with the project in a robust way. As set out below, the conditions have been drafted according to best practice principles such that they are enforceable and avoid any subsequent delegation of decision-making functions.

Where management plans are relied on to give effect to conditions, the relevant conditions include a clear statement of the objectives that are required to be met by those plans and the key environmental outcomes that must be achieved. All management plans submitted as part of this substantive application are considered final versions. For these management plans it is intended that the decision-making panel that is charged with delivering a decision on this application will have sufficient information to accept and certify those plans and impose conditions that require the Consent Holder to implement and adhere to their requirements without the need for subsequent certification. For any management plans that are required to be certified post issuance of consent (e.g. Site-specific Erosion and Sediment Control Plans), there is clear guidance set out in the conditions about the process that must be followed to facilitate the certification process.

It is acknowledged that throughout the panel's consideration of the application and as part of its deliberations there will likely be a need to revisit these conditions to address new matters that arise or to deal with new perspectives that might be brought to bear on a particular issue. MGL is committed to a collaborative process whereby further amendments and refinements can be made to the conditions if and when the need arises at the panel's request.

6.2 POSITIVE EFFECTS

As noted in Sections 1 and 3 of this report, the BOGP will deliver significant benefits to both Inland Otago (Queenstown Lakes and Central Otago) and New Zealand more broadly. In that regard, the BOGP will:

- Generate a significant contribution to the GDP of Inland Otago and New Zealand;
- Generate substantial revenue for the New Zealand Government;
- Generate substantial foreign investment, making it one of the largest funded projects in New Zealand's infrastructure pipeline;
- Support a wide range of highly paid jobs, bringing with them job security, sustained livelihoods, reduced local unemployment, increased business activity, and indirect employment opportunities; and
- Deliver significant contributions to the regional economy.

Further to the substantial economic benefits offered by the project, as part of the proposed approach to managing the actual and potential effects of the BOGP, the project will generate demonstrable ecological benefits to terrestrial and wetland biodiversity within the Dunstan Ecological District as a result of extensive weed and pest control, pest exclusion, habitat enhancement and plantings and browsing pressure management.

These measures will ensure a net gain in ecological values is achieved for many species (refer to Section 6.7 of this report for further details).

Furthermore, in addition to the measures necessary to mitigate, offset or compensate for the environmental effects associated with the BOGP's proposed mining activities, MGL is proposing to establish the BOGP Biodiversity Fund.

At a global scale, the gold produced by MGL contributes to powering the global economy and is essential to the renewable energy and transport sectors, life-saving medical devices, and technology (including computers and cell phones) that connects communities around the world.

6.2.1 Economic Benefits of the Bendigo-Ophir Gold Project

The economic benefits of the BOGP have been assessed and quantified further in an economics assessment by Benje Patterson (2025), provided in **Part B** to these application documents, and summarised in the sub-sections below.

6.2.1.1 Direct Economic Impacts

The BOGP will directly contribute an average of $360 million of GDP per year to the New Zealand economy in the initial mine life of 13.8 years, peaking at over $535 million of GDP in year 5 when open pit and underground mining are commenced in parallel and peak gold production is reached. The BOGP will generate an estimated cumulative GDP total of approximately $5.8 billion.[62] The average annual GDP contribution of the BOGP will equate to 5.4% of the Inland Otago economy. This is a significant increase on the $33,400 of GDP per year the Project Site would generate if retained for the current agricultural purposes.

6.2.1.2 Government Revenue

Benje Patterson (2025) has estimated that with the BOGP generating approximately $5.8 billion of revenue, the New Zealand Government will receive approximately $1.8 billion of revenue which will benefit the social, economic and cultural wellbeing of New Zealand. This revenue is in the form of:

- Approximately $1.1 billion of corporate taxes paid by MGL;
- Approximately $448 million for mining royalties;
- Approximately $216 million of PAYE and ACC payments; and

[62] The Economics Assessment (Benje Patterson (2025)) estimates that the BOGP will generate a cumulative total of $5.8 billion dollars of GDP over the course of the mine life based on gold prices at June 2025.

> An additional approximately $82 million of corporate taxes paid to the New Zealand Government due to profits made by other associated parties.

6.2.1.3 Employment Opportunities

The BOGP will support an average of 351 FTE staff per year who will be located within the Queenstown, Wānaka, Cromwell and Alexandra areas. This equates to approximately 0.7% of the current size of the Inland Otago job market. Furthermore, Benje Patterson (2025) has identified that for every direct job, there will be an additional 1.3 jobs created through multiplier channels through indirect employment (suppliers for the mining operations) and induced employment (providing goods and services such as supermarkets, health and education) to support workers at the BOGP. This is anticipated to generate an additional 437 jobs, comprised of approximately 257 indirect jobs and 180 induced jobs.

In addition to the increase in employment opportunities across the Inland Otago Region, the jobs directly provided by BOGP will be highly productive and highly paid. The average wage for workers employed by the project will be $140,300 per year which is 104% higher than the average wage in Inland Otago of $68,904 (as of 2024). As the staff will be located within the Inland Otago Region, it is anticipated this will flow through to the local economy and businesses and have positive effects on a number of industries within the region.

6.2.1.4 Indirect Economic Impacts and Local Economy

Benje Patterson (2025) estimate the BOGP will generate a further $25 million of indirect GDP per year from the procurement of goods and services across the Otago Region, subject to the local supplier's capacity to service the mining operations. There is also potential for another $58 million of indirect GDP to be generated annually across the rest of New Zealand.

In terms of the local economy, the average direct GDP contribution of the BOGP will be $360 million a year, which as noted above, equates to 5.4% of the current size of the Inland Otago economy. During its peak production year, the BOGP is expected to generate the equivalent of 8.1% of Inland Otago's current GDP.

In addition to the economic benefits presented above, MGL is committed to investing within the local community through partnerships, sponsorships and supporting students with scholarships and learning opportunities. This currently includes sponsoring the Central Otago Football League, the Light Up Cromwell community event and providing two local scholarships for 2025 study, one for tertiary study and one trade scholarship.

Furthermore, as detailed in Section 3.17 of this report, high voltage power will be brought to the Project Site by Aurora Energy. This will be through the installation of a new 66 kV

overhead powerline from the Upper Clutha Network via the existing Lindis Crossing Substation location approximately 10 km north of the Project Site that follows Maori Point and Thompson Gorge Roads to site. MGL understands this work will be the catalyst for wider upgrades to the Upper Clutha electricity network which will have benefits for the security of supply (and result in less outages and growth capacity) for the Central Otago Region.

6.2.1.5 Existing Economic Benefits

In addition to the significant economic benefits that will be generated through the life of BOGP, it is noted that the project is already generating substantial positive economic benefits through its authorised exploration activities. In summary:

- MGL has spent approximately $23.6 million over the last 12 months in the New Zealand economy;
- MGL currently employs 28 full-time staff who working locally out of Cromwell and / or in site offices and field activities; and
- MGL also supports a range of external jobs through its contractors, with up to 30 direct FTE jobs associated with existing drilling activities.

6.2.2 Ecological Improvements Associated with the Bendigo-Ophir Gold Project

As part of the proposed approach to managing the actual and potential effects of the BOGP, MGL seeks to undertake and implement ecological improvements within the DDF and surrounding landscape. A range of technical experts have been engaged to assist with formulating the proposed ecological improvements which are brought together in Alliance Ecology (2025) and Boffa Miskell (2025a) and detailed further in Sections 6.7 and 6.8 of this report.

The ecological experts have recommended, and MGL proposes to, offset / compensate for the loss of terrestrial (vegetation and fauna) and wetland ecology values through ecological restoration and habitat enhancement across approximately 2,219 hectares of land surrounding the DDF, including:

- The 889 hectare MRZ surrounding the DDF via native enrichment planting, livestock management, mammalian pest control and ecological weed control;
- The 1,237 hectare Ardgour Restoration Area (located on Ardgour Station land to the northeast of the DDF that is currently used for grazing) via livestock management, track establishment and management, restoration planting, mammalian pest control, pest plant control, habitat enhancement (for lizards and some species of invertebrates and

Threatened plants) and fire management. Lizards and invertebrates salvaged prior to clearance activities within the DDF will also be relocated to this area; and

> The establishment, operation and maintenance of two predator-proof sanctuaries within the DDF - being the 38 hectare Ardgour Sanctuary Area and the 29 hectare Bendigo Sanctuary Area – which will include the eradication of mammalian predators, management of browsers, ecological weed control, lizard habitat enhancement, native revegetation and enrichment planting and translocation of locally extirpated (extinct) Threatened or At-Risk flora and fauna species.

Some of these measures will result in a net gain in ecological values for most very high or high value ecosystems affected by the BOGP, including native-dominated scrubland, native tussockland, native taramea herbfield and shrubland and swamp / marsh wetlands and a range of Threatened or otherwise ecologically important species associated with these ecosystems. This includes rare, under-represented or locally extinct species that are proposed to be reinstated within the DDF and surrounding landscape, including several Threatened or At-Risk lizard species.

In addition, whilst part of rehabilitation activities to remedy effects, MGL is proposing to establish over 7.5 hectares of indigenous swamp / marsh wetland communities within the DDF to offset the loss of 3.1 hectares natural inland wetlands within the DDF. While there is potential for drawdown effects on wetlands surrounding the mine features and outside of the DDF, MGL proposes augmenting the Rise and Shine Creek and associated wetlands with groundwater sourced from the Bendigo Aquifer to mitigate potential drawdown impacts to the Rise and Shine swamp and marsh wetlands. MGL also proposes to undertake groundwater and surface performance monitoring to confirm the hydrological function of the swamp and mash wetlands are maintained.

With respect to aquatic ecological values, and to address the unavoidable reclamation of approximately 7,139 m of stream length in Shepherds Creek catchment and approximately 1,483 m of stream length in the Rise and Shine Creek catchment, MGL proposes to create some 9,558 m of rehabilitated stream diversions for Shepherds Creek and approximately 1,600 m of rehabilitated stream diversion for Rise and Shine Creek. To address time lags in functional restoration of diversions, MGL is also proposing to undertake willow management and riparian vegetation enhancement activities along approximately 6,700 m of the Bendigo and Clearwater Creeks (located within the Bendigo Historic Reserve downstream of Rise and Shine Creek). These measures will result in no net loss and an enhanced benefit for aquatic ecology values.

6.3 CULTURAL EFFECTS

Cultural effects have been identified via direct engagement with iwi as MGL acknowledges and recognises that only iwi have the ability to determine how the project affects them.

MGL commenced engagement with iwi in 2017 at the outset of the BOGP and has endeavoured to build and maintain relationships as the project has been developed. Consultation with iwi is summarised in Section 5 of this report.

MGL engaged Aukaha to prepare a Cultural Impact Assessment that:

- Provides mana whenua with an overview of the project and environmental context;
- Enables Aukaha to assess the key information from the application and the proposed restoration or remediation plans and to provide technical advice to inform assessment of the project by mana whenua;
- Identifies mana whenua associations, history, and values associated with the area;
- Identifies key issues and cultural impacts of the project; and
- Provides recommendations to address the effects and cultural impacts of the project, where that is possible. The recommendations will support mana whenua engagement with Matakanui on the project.

The unendorsed draft CIA was not to be seen as Kā Rūnaka approval of this project, but as a basis for ongoing engagement and discussion between Matakanui and Kā Rūnaka in the context of this Project.

Constructive discussions between MGL and Kā Rūnaka remain ongoing to progress opportunities for cultural participation, acknowledgement and consultation.

Kā Rūnaka has made the following statements of their position on the proposed BOGP in the unendorsed draft CIA, based on the four core values of mana, mauri, tapu and whakapapa, and captured during the various wānaka with whānau.

Mana

Kāi Tahu continue to practice mahika kai, despite the history of loss. We have seen a resurgence in our people re-establishing their connections to our whenua and waterways, and breathing life into long held cultural practices. It is our aspiration to re-establish habitat for taoka species and to improve water quality to support mahika kai practices. For reconnection to be successful, social and economic sustainability for whānau is also necessary as well as a healthy environment.

Mauri

The word mauri refers to the life essence found in all things, relating to its nature, appearance, and vitality. For mana whenua, the mauri of the environment is a direct reflection of the health and wellbeing of whānau and communities.

Protection of the mauri of wai māori is a significant priority for Kā Rūnaka, due to its life-giving properties and as a vital component of the living world of te taiao. The presence and health of indigenous flora and fauna is an expression of the mauri of the natural environment in an area.

Mana whenua apply the principle of utu, giving back more than is taken, as a means of protecting mauri. The right to take kai and extract resources from te taiao is balanced with the kaitiaki duty to care for, and nurture, the environment in return.

Tapu

The principle of tapu provides a guide for Kā Rūnaka to gauge the appropriateness of actions and behaviours in the context of the existing environment.

It is the position of Kāi Tahu that the Project is significantly tapu in this location, due to the location of the proposed pit lakes, waste rock storage and tailings storage in the tributaries of the Mata-au, including the diversion of Shepherds Creek to construct tailings storage.

Whakapapa

After generations of loss and disconnection from the whenua, creating opportunities to reconnect with the whenua is now more important than ever. The potential long-term risks associated with the Project to wāhi tīpuna, taoka species and wai māori risks undermining the efforts of whānau to restore the whenua and rekindle connections and mahika kai practices.

MGL has actively engaged with Kā Rūnaka from the inception of the project and discussions remain ongoing on a number of cultural participation, acknowledgement, consultation and commercial requests from Kā Rūnaka which are prescribed in quantum. There is high-level agreement in principle around matters of partnership to Deliver On a Vision of Abundance and to address in terms of the views of Kā Rūnaka, mitigation of the environmental, cultural and socio-economic effects, and compensation for any residual cultural effects.

MGL will continue work with Kā Rūnaka in good faith to ensure that the BOGP is developed and managed in a manner that is sensitive to the cultural requirements of the mana whenua.

As part of the proposed conditions on **Part D**, MGL proposes that site inductions for staff will include iwi cultural awareness programme elements that have been prepared within input from iwi.

6.4 SURFACE WATER EFFECTS

The effects of the BOGP on surface water hydrology within the Project Site have been assessed in Kōmanawa (2025c), a copy of which is included in the **Part B** of these application documents. The executive summary in Kōmanawa (2025c) is reproduced in part below.

This is an assessment of the effects on the flow or volume of surface water and provides key inputs to other experts work including aquatic ecology, wetlands and environmental geochemistry modelling undertaken by others. This assessment concludes the abstraction, diversion, use and return of surface water with the proposed mitigations will result in an acceptable outcome.

The surface water hydrological setting adjoining the proposed Bendigo – Ophir Gold Mine Project (BOGMP) comprises creeks draining the Dunstan Mountains westward into the Lindis River (a tributary of the Clutha) but also the Clutha River / Mata Au main stem via Bendigo Creek. The hydrology of Shepherds and Rise and Shine Creeks were previously ungauged but have more recently been characterised by a combination of gaugings and continuous measurement since late 2022. These two years of flow measurement have allowed correlation with surrounding gauged creek catchments draining the Dunstan Mountains. Rainfall measurement has also been instituted at three sites across the BOGMP site.

The mining activities to re-position overburden and extract ore would occur across the Shepherds and Rise and Shine creek catchments. As the mining surface activities extend across the three deposit areas, Rise and Shine (RAS), Come In Time (CIT), and Srex (SRX, plus Srex East pit, SRE), a set of water management perimeters would be established in order to intercept or retain stormwater, other mine-impacted water and shallow groundwater seepage from entering downstream natural water during the operational phase of the mine site. These expanding water management cut-offs would reduce the natural flow rates of Shepherds Creek and, for a briefer period, Rise and Shine Creek (Bendigo catchment), during the operational phase of active mining. Shepherds Creek catchment contains the Tarras Farm Limited Partnership irrigation intake, which diverts up approximately 50% of creek volume out of the creek water course and out of catchment (consent number RM17.301.15).

The operational phase dewatering of the Rise and Shine, Come In Time, and Srex pits at their deepest extent would lead to groundwater depletion of the respective adjoining creeks (Dumont et al., 2025). The Shepherds Creek hard-rock depletion is estimated from MODFLOW modelling to be up to 0.5 to 3.5 litres per second. The Come In Time pit dewatering is estimated from MODFLOW modelling to induce groundwater depletion from Shepherds Creek up to 1.7 litres per second but may also be effectively negligible. Due to higher permeability shallow schist in the Rise and Shine Creek area, Srex pit dewatering is estimated from MODFLOW modelling to induce groundwater depletion from the creek of up to 17 litres per second, extending over a 1¼ year period of operations. But this estimate is likely to be a substantial over-estimate. Surface water would be diverted around the SRX pit and ELF to minimise loss of creek flow during this phase

As RAS pit extends through a short reach of Rise and Shine Creek during the later stages of pit development, it is proposed to construct an extended straddle culvert that crosses the pit wall and redirect creek water back to the creek course downstream of the pit intrusion. The culvert diversion would be sized so as to carry normal flow and lower and maintain continuity to the Bendigo Catchment. However, flood flows from the upstream creek catchment would instead overtop the intake

structure and be side-cast into the RAS pit. The loss of high and flood flows from the existing Bendigo catchment into the RAS pit sump would be the sole effect of the diversion besides the short loss of creek course.

Artificial drainage paths would be left in the wake of mining operations into the post-closure period. These altered drainage paths would include:

- *Residual pit lakes or backfilled pits that are partially flooded, namely RAS, CIT, and SRX,*
- *Underground channels, including the RAS pit, flooded underground crown pillar stope and the former access drift that would form the new long-term drainage pathway for the RAS former mining area,*
- *Drainage of the SRX pit to Rise and Shine Creek by simple overflow at the pour-over point on the pit's edge,*
- *The already-mentioned creek transfer straddle culvert for Rise and Shine Creek around the southwestern edge of the RAS pit,*
- *The Shepherds ELF that would sit across the Jean and middle Shepherds Creek catchments and the Western ELF as internally draining masses, and*
- *CIT backfill and West ELF that would in modest seepage discharges to their respect creek catchments.*

The main RAS and SRX surface pits would become partially flooded in the post-closure period. Post closure, RAS pit would maintain drainage through the crown pillar stope void and the former access drift to the surface for water treatment as required and eventual drainage to Shepherds Creek. The pit lake would stabilise at an elevation halfway up the pit wall and an elevation of approximately 490 metres AMSL as a result.

Post-closure alterations to land surfaces of former mining areas following rehabilitation would result in changes to the hydrological function of the affected areas and the mode of surface water runoff. The addition of more permeable and porous materials in affected areas of waste rock and backfilled overburden is projected to lead to a higher proportion of creek flow being made up of base flow at the expense of high creek flows. The former mining area's water balance would also change in terms of the balance of evaporation, evapotranspiration, and infiltration into the substrata. Overall, surface water flows in both arms of the Shepherds and Bendigo catchments would increase. The addition of the RAS pit to the creek network in the post closure phase would include the flow buffering effects of a pit lake and outflow through a cavernous route in former underground workings, which would also result in flow buffering and a higher proportion of creek flow forming base flow. The pit and underground workings outflows would be a mixture of runoff entering the pit lake from the sides and residual seepage inflow from the hard rock groundwater system.

As part of the unique intermontane physiography of the Bendigo area, Shepherds Creek does not extend as a perennial water course to its main stem at the Lindis River. Instead Shepherds Creek is lost to soakage through its bed a full three (3) kilometres short of the Lindis confluence, thereby replenishing the Ardgour Alluvial Aquifer, which

in turn seeps into the Lindis River Alluvial Ribbon Aquifer and ultimately the Lindis River. Without treatment this may result in the solutes, including sulphate, becoming elevated by post-closure leaching from ELFs followed by downstream accumulation within the alluvial groundwater system receiving creek infiltration. Conceptual modelling suggests that little in situ attenuation in solute concentrations could be expected within the proximal parts of the aquifers. Operational releases of solutes would also occur during storm-punctuated accumulations of rainfall runoff amounting to between 3% and 10% of annual creek flow. These releases of mine-impacted water would carry mass loads of solutes, including sulphate and nitrogen (Mine Waste Management, 2025a). Active water treatment is understood to be proposed to maintain solute concentrations to below proposed compliance limits.

Rise and Shine Creek is a small tributary of Bendigo Creek such that the tributary Mean Annual Low Flow (MALF) is estimated at 1.3 – 5 litres second whereas the Bendigo Creek main stem has an MALF estimated at 33 litres per second. Therefore, the low flow yield of Rise and Shine Creek is in the order of a seventh (7th) of the comparative yield of the larger catchment. Appreciable liberation of operational or post closure solute loads into Rise and Shine Creek are not anticipated from the SRX pit or ELF. Substantial dilution of solute loads in Rise and Shine Creek by larger creeks that do not carry appreciable solute concentrations (Clearwater, Bendigo Left and Right Branches, Perrys, and Aurora) would also be anticipated before creek water entered the Bendigo Aquifer. Mine-impacted water solute concentrations would thus be reduced by factors as much as 7-fold between the Srex mining area and their entry to the Bendigo Aquifer.

In a nutshell, during operations Shepherds Creek would lose perhaps 20% to 30% of previous upper catchment flow contribution and be affected by RAS pit dewatering related groundwater depletion. The proposed diversion of north bank clean water around these impact zones and removal of irrigation abstraction from Shepherds Creek currently below the operations area would remedy or offset these temporary operational catchment losses. SRX pit dewatering would briefly draw off a significant portion of creek flow passing the immediate vicinity of the pit's northwest corner in the latter operational stages of mine life, although upstream diversions above the SRX pit would preserve the bulk of upper Rise and Shine Creek flows. This creek is in any case a small tributary among much larger Bendigo catchment tributaries. The loss of Rise and Shine flood flows, which could not pass the straddle culvert to the RAS pit sump, would be of low impact. The active closure and post-closure creek network would be significantly restored to their former hydrological function, with the exception of the RAS pit lake and drainage to lower Shepherds Creek through flooded underground workings, altered former ELF and TSF substrates, and the former SRX pit lake. Post-closure catchment hydrology for both Shepherds and Rise and Shine Creeks would be affected by the change in substrates and retention of soil moisture, resulting in higher catchment flow yields and more stable creek flow. Long-term this would be a beneficial outcome for creek hydrology in a water-short part of Otago. Project water supply groundwater pumping would affect the flows of the Clutha River / Mata Au and Lake Dunstan, but in comparison to large available flows and surface

water allocation in the main stem, the groundwater depletion effect would be inconsequential.

Overall, the proposal for mining activities in the current location is assessed to have environmental effects in terms of catchment flows, surface water depletion and groundwater resource allocation that are less than minor.
[...]

In summary, during the operation of the BOGP, a series of clean water diversion channels will be established within all operational mining areas to divert clean water around working areas and minimise loss of creek flows / maintain the hydrological function of the wider upstream creek catchment (refer to Section 3 of this report for further details). All mine-impacted water will be captured and reused within the operations for a range of uses including processing and dust suppression. This will result in the partial loss of creek flows within the Shepherds Creek and Rise and Shine Creek catchments (and the downstream Bendigo Creek catchment). Augmentation of surface water flows is proposed to mitigate downstream effects (see further detail in Section 6.4.1). Only minor discharges of mine-impacted water are predicted to occur to Shepherds Creek (in the event the Shepherds Silt Pond reaches full capacity) while runoff from the SRX ELF to the Rise and Shine Creek may only occur following detention and settlement of sediment.

To avoid and minimise borefield pumping effects on the Bendigo Aquifer - which ultimately impacts surface water - Kōmanawa (2025c) recommends water conservation efforts including using mine-impacted water where possible, the monitoring of water levels and flows and the monitoring of natural environmental processes that influence surface water such as rainfall gauge monitoring.

During the post-closure phase of the BOGP, creek flows are expected to be restored to pre-mining (or greater) levels due to enhanced catchment flow recruitment and the presence of porous flow reservoirs (the TSF, ELFs and RAS pit lake) that result from the proposed rehabilitation of the landscape within the Project Site. Mine-impacted water will occur as seepage from the TSF, ELFs, the backfilled CIT pit, the RAS pit lake and the RAS underground workings. Kōmanawa (2025c) recommends this seepage is captured and treated to achieve the recommended water quality limits which are discussed further in Section 6.6 of this report.

Kōmanawa (2025c) recommends that monitoring of creek flows, rainfall, and solutes (particularly sulphate) in the Shepherds and Rise and Shine Creek catchments is maintained throughout the life of the mine and into the active closure period. The full suite of proposed surface water monitoring within the Project Site is detailed in the Water Management Plan prepared by MWM, provided in **Part G** of these application documents.

Overall, MGL has accepted the mitigation and management measures recommended by Kōmanawa (2025c). These are summarised in Section 7 of this report and incorporated into the proposed conditions, included in **Part D** of these application documents.

6.4.1 Proposed Augmentation of Surface Water Flows

In the absence of any augmentation of flows, Kōmanawa (2025c) identifies that the BOGP will likely result in the following reduced flows during mine operations:

- An average reduced flow of 3.3 l/s and a peak reduced flow of 5.2 l/s within Shepherds Creek; and
- An average reduced flow of 1.9 l/s and a peak reduced flow of 17.3 l/s within Rise and Shine Creek.

Kōmanawa (2025c) has identified several existing water permits located downstream of the Project Site that are used for various pastoral, viticultural, horticultural and agricultural activities.

However, modelling indicates that without augmentation of flows in Shepherds Creek and Rise and Shine Creek downstream of the Project Site, the BOGP may result in potential effects on the following downstream water permits:

- An abstraction from Shepherds Creek for irrigation and storage purposes held by Tarras Farm Partnerships Limited; and
- An abstraction from Rise and Shine Creek for irrigation, stock water supply and domestic supply purposes held by Bendigo Station Limited.

MGL therefore proposes to maintain flows within both Shepherds and Rise and Shine Creek through the augmentation of flows within these watercourses at locations upstream of the Project Site. This will be achieved through the taking of water from the Bendigo Aquifer (which is not fully allocated) as described in Section 3.16 of this Report, with the water then conveyed from the proposed borefield via pipelines and discharged into the Shepherds and Rise and Shine Creeks at locations downstream of the Project Site (refer to Figure 3-21).

The augmentation is proposed prior to any abstraction and the strategy for flow augmentation is set out in HGG (2025b) in **Part B** of these application documents. In addition to augmentation, MGL proposes monitoring and adaptive management detailed in HGG (2025b) which will ensure no derogation of creek flows as a result of the BOGP.This augmentation of flows will ensure that existing permit holders are able to access their full consented surface water allocations throughout the life of the BOGP and the approvals sought by MGL can be exercised alongside those existing permits. This augmentation is reflected in the proposed conditions included as **Part D** of these application documents.

As further discussed in Sections 8.3 and 8.7 of this Report, the ORC has also provided the written notice required under section 30 of the Act that confirms that no existing surface water take permits will be affected by the BOGP. This response from the ORC is provided in **Part F** of these application documents.

6.5 GROUNDWATER EFFECTS

Kōmanawa has assessed the effects of the BOGP on groundwater within the Project Site and the surrounding environment in two reports. Kōmanawa (2025a) relates to the effects of the proposed groundwater take from the borefield at the Bendigo Aquifer, while Kōmanawa (2025b) relates to effects of the BOGP on groundwater within the Project Site and Kōmanawa (2025d) details groundwater modelling undertaken to support the effects assessment, with copies of these reports included in the **Part B** of these application documents.

Despite the above, Kōmanawa (2025b) addresses both groundwater effects within the Project Site and potential effects of the proposed groundwater take from the Bendigo Aquifer, and as such, the executive summary of Kōmanawa (2025b) is reproduced verbatim below.

> ***This is an assessment of the effects on groundwater, plus providing key inputs to other experts work including environmental geochemistry modelling undertaken separately by Mine Waste Management (MWM) to determine solute concentrations and mitigation. This assessment concludes the abstraction, diversion, use and return of groundwater with the proposed mitigations will result in an acceptable outcome.***
>
> *Two creek catchments, being Rise and Shine and Shepherds Creeks cross the proposed Bendigo – Ophir Gold Mine Project site. These creek catchment are within the wider Clutha River / Mata Au main catchment. In the hydrogeological context, these creek catchments in their upper parts are a variably saturated fractured-rock groundwater system. While the basement rock is metamorphosed schist and any superficial drift or landslide deposits are largely unsaturated, the area's schist rock nonetheless contains a somewhat stratified and compartmentalised groundwater system with hydrologically variable connection to the surface that would mediate and ameliorate the above listed impacts.*
>
> *In the existing environment, cold-water groundwater in hard rocks of the Dunstan Mountains is relatively dilute, although of long residence at depth resulting in enhanced solution of metals, metalloids, carbonates or silica by rock – water interactions. Slightly elevated sulphate and arsenic concentrations in groundwater have been noted. The host rock without disturbance has inherently low permeability (<1 x 10-7 metres per second, m/s) and low water-filled porosity (generally less than 1%) meaning that the schist rock has generally poor groundwater transmission properties. Further to the west where water supply would be drawn for mining complex*

water supply, post-glacial outwash gravels of the Bendigo Aquifer provide more permeable and porous reservoirs of groundwater, plus subsurface hydraulic connection to the major Clutha River / Mata Au.

As part of the unique intermontane physiography of the Bendigo area, Shepherds Creek does not extend as a perennial water course to its main stem, the Lindis River. Instead, Shepherds Creek in normal flow is lost to soakage through its bed a full three (3) kilometres short of the Lindis confluence, thereby replenishing the Ardgour Alluvial Aquifer, which in turn seeps into the Lindis River. Similarly, Bendigo Creek which includes Rise and Shine Creek as a tributary, soaks into the Bendigo Aquifer and is subsequently drawn at water bores or seeps into the Clutha River / Mata Au.

The groundwater related impact areas of the proposed Bendigo – Ophir Gold Project include –

- *The mining project bore water supply from the Bendigo Aquifer to the west of the main mine zone, and the potential drawdown, surface water depletion and aquifer depletion effects that new groundwater abstraction could potentially induce,*
- *Penetration of the fractured rock groundwater system by open cut pits (Rise and Shine, Come In Time, Srex East and Srex), plus the Rise and Shine underground workings,*
- *The necessary dewatering / depressurisation of schist rock groundwater penetrated by mine workings causing localised lowering of the saturation surface, followed by depletion in hydrologically connected creeks,*
- *Drainage of ELF waste rock pore waters and eventual, post closure release from the ELFs and TSF into downstream creek network,*
- *Mobilisation of groundwater into the surface realm by dewatering, eventually producing a solutecontaining surplus that would require release into the surface water system or infiltration back into groundwater, and*
- *Percolation and release of fluid in the ELFs and to a lesser extent the TSF, would result in post-closure solutes, including sulphate, to accumulate within the alluvial groundwater system(s).*

Following the installation and testing of a production sized bore into the Bendigo Aquifer we consider that the make-up water demand for plant, dust suppression and other water uses can be supplied in the required quantities by the single water bore provided a back-up bore was also available. The characteristics of the Bendigo Aquifer in terms of its hydraulic properties, water balance and connection to large surface water bodies indicates that the proposed taking of up to 110 litres per second from the aquifer would be sustainable with less than minor effects. In terms of drawdown (water level lowering) effects on surrounding bores, the projections of short-term and long-term drawdown indicates the ability to operate with less than minor effect on other groundwater users. The Clutha River / Mata Au and Lake Dunstan are the main water bodies to be affected by calculated depletion during bore field pumping. These water bodies are relatively invulnerable to the effect of pumping on their flow rate or water level. The proposed bore field operation to supply the mining complex would

also be consistent with regional policy, rules and conventions set by Otago Regional Council.

Assessment of surface mining in the final pit shell in the Rise and Shine (RAS) Pit indicates to us that modelled peak groundwater inflow of 5 litres per second is reporting to the basal sump. Similarly, the indicated peak groundwater make of the underground at full tunnel development would approach 30 litres per second. The Rise and Shine (RAS) pit was modelled to have a depleting effect on Shepherds Creek at its closest approach of 0.5 to 3 litres per second in terms of the hard rock groundwater transmission, which is likely to have a discernible effect during periods in which the creek is in base flow condition.

Summary of Dewatering Duration, Hard-Rock Inflow Rate plus consequent Depletion

	Duration	Hard Rock Inflow Rate (L/s)	Surface Water Depletion Rate (L/s)	Peak Total Depletion (L/s) (Hard Rock)	
Pit				Shepherds Ck	Rise & Shine Ck
RAS Pit	11.3* years	**5** *(Year 11 peak)*	**0.5 – 3.5** *(Shepherds)*	**5.2**	
CIT Pit	1 years	**3.5** *(Year 9 peak)*	**1.7** *(Shepherds)*		
SRX Pit	1¼ years	**23** *(Year 12 peak)*	**15.3** *(SRX)* **2** (RAS)		**17.3**

The satellite pits of Come In Time (CIT) are expected to have a light dewatering requirement, up to 3.5 litres per second, while Srex pit coincides with a set of schist formations of higher permeability that would allow the inflow of up to 23 litres per second to the pit during its operational phase according to model results. MWM concluded that with the proposed mitigation of ELF construction to achieve 20% net percolation, reuse of the low volumes of seepage in the process water, ongoing performance monitoring, and at closure if needed the application of active and passive treatment, will result in the water discharge below the compliance limits. Effects on the Ardgour aquifer will be less than minor.

The waste rock on the Engineered Land Forms (ELFs) were assessed in the MWM source load assessment document to produce toe drain seepage with elevated concentrations of sulphate. These levels of loading are projected to result in increases in the concentrations of the solute in the downstream Ardgour alluvial aquifer within the Lindis Valley, albeit at concentrations less than the appropriate water quality standard.

During the operations phase of the Bendigo – Ophir Gold Project the effect of the Rise and Shine mines (surface and underground) in terms of produced dewatering groundwater would allow water conservation and avoidance of using bore water supplies, by diversion of dewatering waters (i.e., mine-impacted water) into processing plant make-up water, dust suppression or evaporative loss in the Tailings Storage Facility water column. Fewer opportunities for diverting dewatering water are available for the shallower Srex East and Srex pits, excess mine-impacted water would instead be transferred to the Tailing Storage Facility (TSF).

During the active closure and post-closure phases of mine life, the inflowing groundwater to residual mine voids would be progressively returned to the creek system. In the case of the paired RAS pit and underground workings, the voids would form a combined drainage system and release net water to surface water after passage through the base of the pit and upper compartments of the underground to the former mine portal.

The portion of the restored (i.e., post-closure) catchment hydrograph would include a greater degree of baseflow due to the hydrological buffering within the flooded RAS pit lake and underground workings. MWM assessments propose that active and passive water treatment for amelioration of residual contaminants from groundwater would be utilised in the immediate closure and also the post-closure period of mine life.

Mentions of mitigation and monitoring are herein made in terms of options for these in the operational or closure phases of the mine life to strengthen environmental controls on potential effects and are summarised as follow:

- *Monitoring of groundwater related activities would be beneficial in ensuring that assessments of groundwater activities are in line with or less than projected as the project operations or post-closure controls are applied.*
- *Level and water chemistry monitoring of the Bendigo Aquifer supply bore field and the areas of the Ardgour Alluvial Aquifer that could be affected by elevated solute concentrations.*
- *Also included are measures to reduce the solute loads of sulphate and nitrogen transiting Shepherds Creek to enter especially the Ardgour Aquifer, particularly during the active closure and post closure phases of mine life.*
- *Water quality and flow monitoring would be applied to the Shepherds and Rise and Shine creek catchments at SC-01 and RS-03 monitoring sites, plus groundwater quality monitoring at MW-101 within the Ardgour Aquifer in the post-closure context.*

...

MGL accepts the management and monitoring measures recommended above by Kōmanawa (2025b). These are summarised in Section 7 of this report and incorporated into the proposed conditions which are included in **Part D** of these application documents.

6.6 ENVIRONMENTAL GEOCHEMISTRY / WATER QUALITY EFFECTS

6.6.1 Mine-Impacted Water

MWM has prepared a suite of technical reports to understand the potential environmental geochemistry effects of mine impacted waters from the BOGP. This has included extensive modelling to identify potential effects and propose measures to minimise and manage these effects.

These reports have been summarised into an overarching Mine Impacted Water Overview Report provided in MWM (2025), a copy of which is included in **Part B** of these application documents. The executive summary in MWM (2025) is reproduced in part below.[63]

> *Mine Waste Management Limited (MWM) has developed this report summarising the environmental geochemistry and water related studies that have been undertaken for Matakanui Gold Limited (MGL) for the proposed Bendigo-Ophir Gold Project (BOGP) to understand potential effects of the project.*
>
> *Specifically, the assessment of effects covered by this report include:*
>
> - *The assessment of geoenvironmental hazards.*
> - *The effects of these geoenvironmental hazards on water quality.*
>
> ***Report Objectives***
>
> *The assessment of effects has been used to support the development of the Water Management Plan (WMP) and the Engineered Landform Management Plan (ELFMP), which was developed by MGL for the BOGP, and are provided as separate documents, to ensure the effects of mine impacted water (MIW) on the receiving environment are minimised.*
>
> *The objectives of this overview report are to:*
>
> - *Summarise and facilitate understanding of the geoenvironmental hazards for the BOGP as part of the assessment of effects.*
> - *Explain how these geoenvironmental hazards can generate mine impacted waters (MIW).*
> - *Identify potential effects of MIW on the downstream receiving environment.*
> - *Develop engineering controls for the BOGP to mitigate potential effects of MIW.*
> - *Support the development of management plans to ensure the recommendations identified by the various studies, presented in this overview report, are undertaken.*
>
> ***Findings***
>
> *Studies indicate that the environmental risks associated with MIW at the proposed BOGP can be successfully managed if the correct management processes are utilised, appropriate engineering controls are implemented, and performance monitoring is undertaken to support adaptive management principles if there is variation from the expected case.*
>
> *The key issues relating to water that need to be managed are:*

[63] Note minor amendments have been made to the executive summary to expand / clarify abbreviations, terms and references.

- *Elevated total suspended solids (TSS) in surface waters.*
- *Neutral metalliferous drainage (NMD) that may have elevated potential constituents of concern (PCOC) such as arsenic (As), sulfate, (SO4), and trace metals.*
- *Nitrate-rich drainage due to the use of ammonium nitrate fuel oil (ANFO) explosives and cyanide (due to gold recovery) that may also include ammoniacal nitrogen.*

Collectively these waters are referred to as MIW to acknowledge the different potential contributions to poor water quality within the project area.

The key PCOC that are likely to be associated with MIW include: TSS, aluminium (Al), antinomy (Sb), As, cobalt (Co), copper (Cu), chromium (Cr), iron (Fe), molybdenum (Mo), nickel (Ni), lead (Pb), SO4, strontium (Sr), zinc, (Zn), cyanide (CN), ammoniacal nitrogen (Amm-N) and nitrate nitrogen (NO3-N).

Water quality monitoring also includes pH, cadmium (Cd), manganese (Mn), selenium (Se), and uranium (U) as a more comprehensive dataset to ensure all potential risk are monitored (Ryder, 2025).

Management Approach

To mitigate the risks associated with MIW, the BOGP has developed a hierarchy of controls (Management Steps), which is in alignment with international guidance documents (e.g., INAP, 2014; DFAT, 2016), of how to manage the potential effects of NMD as follows:

1. Determine the closure objectives for the mine.

2. Understand the source hazards.

3. Prevent oxidation of sulfide minerals.

4. Minimise the mobilisation of stored oxidation products.

5. Control and treatment of mine-impacted waters.

6. Complete an assessment of the potential effects.

7. Monitor performance.

Studies have been completed to address these management requirements and provide recommendations for performance monitoring. These studies are summarised in this report (as shown in Table E1).

Potential Effects on Water and Management Outcomes

The potential effects of the BOGP are summarised in this section. Management of these potential effects is explained in the prescribed management plans.

Two surface water quality monitoring locations are proposed for compliance monitoring of potential effects including SC01 in Shepherds Creek and RS03 in Rise and Shine Creek (Table E1), which cover the main catchments affected by mining

activities. A third compliance monitoring location is also proposed in Clearwater Creek as a control site that will be unaffected by mining-related activities.

Table E1 provides a summary of the streams that will be affected by mining:

- *Baseline characteristics of each stream (pre mining).*
- *Potential effects to the downstream environment (below these compliance monitoring locations) with no management or engineering controls.*
- *Proposed water quality operating limits (operational phase and closure phase).*
- *Proposed engineering controls and management mechanisms.*
- *Overall effects of the BOGP on Shepherds Creek and Rise and Shine Creek.*

Table E1: Potential Effects and Management Options

Baseline Water Quality	Shepherds Creek (SC01) is elevated in Cu. Rise and Shine Creek (RS03) is elevated in As, Co, Cu, and Fe.
Potential MIW Effects on Water Quality	TSS effects during project start-up (break-in).
	Operational Phase effects including: TSS, NMD, and nitrate.
	Closure Phase effects including NMD and nitrate.
Proposed Water Quality Limits	Operational and closure phase water quality objectives defined by Ryder (2025).
Engineering Controls and Management Mechanisms	Geochemical classification of materials.
	Appropriate management and placement of materials.
	Engineered landforms to control net percolation and oxygen ingress.
	Control of MIW and internal management of MIW during the operational phase.
	Control and treatment of MIW (active and then passive treatment) during the closure phases.
	Sediment and Erosion Control Management Plan.
	ELF Management Plan.
	Water Management Plan.
	Soil Management Plan.
	Performance monitoring and adaptive management.
	Ongoing studies to minimise effects and improve management outcomes.
Expected Overall Effects	Increases to stream base flow at closure.
	Possible slight elevation in PCOC during operations – to be managed by adaptive management processes.
	Minor increase in some PCOC but below proposed operating and closure water quality limits.
	In Rise and Shine Creek (RS03) only - Potential betterment where historic mining legacy effects on water are improved through management/treatment.

Report Structure and Contents

This overview report summarises all the documents relating to geoenvironmental hazards and the potential effects on water quality. These documents are summarised in Table E2 and are provided as appendices to this report. Recommendations provided in these reports, and this overview report are addressed in the WMP.

...

In addition, the potential effects of the BOGP on water quality during both the operational and post-closure phases of the project are assessed in the Water and Load Balance Model ("**WLBM**") Report, which is provided as Appendix N to MWM (2025). MWM (2025) provides a summary of the key findings and recommendations from the WLBM Report which are reproduced below.

Findings - Operational Phase

The Operational Phase calculations suggest the following:

- *Water balance calculations suggest that the site will be in a water deficit condition up to Year 8. After this point, dewatering from satellite pits (i.e., SRX and to a lesser extent CIT) may push the site to a water surplus condition for the last few years of mine life without additional controls. Engineering controls (e.g., construct the water treatment plant prior to closure) are available to manage potential water surpluses, and can be evaluated during detailed design phases. Ongoing site water balance reconciliation for the BOGP will be required to confirm water balance conditions remain in a water deficit condition.*
- *Based on mine features that will retain water on site and not be discharged to the receiving environment during operations, mean flows at SC01 and RS03 are estimated to be reduced by approximately 17% and 13% respectively, at the full life of mine project footprint. Low flow conditions will also increase, showing the seven day mean annual low flow decreasing by approximately 27% and 15%, for SC01 and RS03 respectively.*
- *Interpretation of the mixing model results suggests surface water quality at SC01 and RS03 will remain below the proposed compliance limits for both surface and groundwater if groundwater is used for dust suppression.*

Findings - Post-Closure Phase

The Post-Closure WLBM results suggest the following:

- *Pit voids will fill with water and discharge mine-impacted water (MIW) at average rates of approximately 6 L/s, 8 L/s and 1.5 L/s, from the RAS Pit (via the RAS underground workings), SRX Pit, and CIT Pit, respectively. RAS Pit Lake will reach a stable condition at ~25 years, and SRX and CIT pits will do so in <5 years.*

- *Of the mine waste storage facilities (MWSFs),[64] using a net percolation rate of 20%, Shepherds engineered landform (ELF) will have the highest average seepage rate of MIW of approximately 4 L/s, followed by the TSF seepage rate of approximately 2 L/s on average. SRX ELF, WELF, and SCK Fill all had seepage rates of approximately 1 L/s or less.*
- *In the post closure phase, creek flows will increase, with average flows increasing by approximately 60% at Shepherds Creek (at SC01) and 50% at Rise and Shine Creek (at RS03). Low flow conditions will also increase, with the seven day mean annual low flow increasing by approximately 530% and 280%, for SC01 and RS03 respectively.*
- *Model results suggest that active water treatment within the Shepherds Creek catchment will be needed for 50 years, when concentrations of SO4, Mo, and Sb after passive treatment are below the surface water and groundwater limits, for the base case model scenario.*
- *Water quality findings for the base case model at RS03 indicate:*
  - *No limits are exceeded after partial passive treatment of the average flow (8 L/s) from SRX Pit.*
  - *Active treatment of MIW from SRX Pit and SRX ELF is not required.*

Operational Management Recommendations

- *Back-to-back wet years and changes of water balance assumptions (e.g., dust suppression water sources) may move the site into a water surplus condition. As such, detailed water balance modelling by mine stage and that includes rainfall variability is recommended to support detailed mine design and improve confidence in a water deficit being maintained. Development of an adaptive management process related to the site water balance would also support proactive management of identified risks.*
- *A site water balance reconciliation should be completed regularly (e.g., annually or more frequent) to confirm water balance model results are appropriate, and/or make model updates to improve confidence in model results projected into the future.*
- *Clean water sources (i.e., bore water) should be used for dust suppression.*
- *Pit sump water could potentially be used for dust suppression early on in mine life. Adaptive management processes should be developed to proactively manage and respond if performance and/or compliance monitoring data suggests use of pit sump water may begin to provide a risk of non-compliance (i.e., potential to cause exceedance of water quality limits at SC01 and RS03).*

[64] The Shepherds ELF, Western ELF, SRX ELF and CIT Backfill.

- *Other water management options include the early construction, during operations, of the water treatment plant if prolonged water surplus conditions eventuate.*

Closure Management Recommendations

The following management recommendations are proposed for the active- and post-closure phases:

- *Active water treatment in the Shepherds Creek catchment through a water treatment plant (WTP) is required until passive treatment systems can achieve the proposed water quality compliance limits.*
- *Passive treatment of the SRX Pit Lake is required to achieve water quality limits at RS03. Noting that passive treatment is modelled at 8 L/s (average SRX Pit flow rate) with higher flows being untreated.*
- *Active and passive water treatment systems need to be developed to a detailed design level:*
  - *For the WTP, these studies need to be completed within the first few years of the mine commencing so that the technology is ready for operations and closure. Early design of the WTP would mean it is ready as part of any adaptive management process for water management.*
  - *Passive water treatment systems should be designed once the project is operational using actual water quality from the project mine domains to confirm the proposed approach is appropriate.*
- *The majority of PCOC loads originate from Shepherds ELF and the TSF; therefore, performance monitoring of both flow rates and water quality is recommended at these locations.*
- *Model results suggest that active water treatment within the Shepherds Creek catchment will be needed for 50 years, when concentrations of SO4, Mo, and Sb after passive treatment are below the surface water and groundwater limits, for the base case model scenario.*
- *Diverting Shepherds ELF and TSF seepage to the RAS Pit Lake for dilution was also assessed as a management option. Results indicate that at closure of the BOGP, the proposed water quality limits can be achieved without active treatment. The exception to this is molybdenum. Active treatment is required until Mo decreases to a concentration that can be managed by passive treatment technologies.*
- *Performance monitoring is necessary to assess whether treatment is required using these management mechanisms.*

The recommended ELF design concepts to minimise oxidation of sulfide minerals and mobilisation of oxidation products are provided in MWM (2025) and summarised in Table 6-1 below.

Table 6-1: Recommended ELF Design Concepts to Manage Oxygen Ingress

Design Feature	Attribute
Foundation Earthworks	> Clean water diversion to minimise water/rock interaction. > Inert – low S basal materials (3 m thick) to minimise PCOC mobilisation due to basal seepage from natural springs etc. Note: Low S materials (<0.02 wt% S) have been identified in drill holes near the surface of the RAS deposit to approximately 10-15 m depth and these materials should be used for this basal layer where practicable (MWM, 2025). > Basal underdrainage network to minimise water/rock interaction using the low S (< 0.02 wt% S) materials where practicable. > ELF toe bund (or similar) to prevent advective oxygen ingress.
Clean Water Management	> Clean water diversion to minimise water/rock interaction. > ELF design to shed water as quickly as practicable. > Compaction to shed water.
Materials Management	> Development of a material classification management process. > Development of a material management process. > Minimise time between blasting and placement. > Maximise blasting opportunities to maximise grainsize of waste rock – e.g., reduce reactive surface area of higher risk materials (e.g., TZ4 / RSSZ).
Lift Height	> Commence construction using a 4-6 m lift height. > Confirm grainsize segregation does not occur for lift heights of 4-6 m via test pitting or tip head inspections. > Maximise paddock dumping where possible. > Undertake studies to confirm whether higher lifts can be used (e.g., >4-6 m) yet advective oxygen ingress is prevented and diffusion of oxygen is limited to ~20 m horizontal depth into the ELF. > Limit long term diffusive oxygen ingress to < 20 m horizontally and 15 m vertically. > Confirm by performance monitoring. Avoid advective oxygen ingress (high airflow). > Validate oxygen flux rates (e.g., cover system trials) to confirm long term sulfide oxidation processes and geochemical model reliability.

Design Feature	Attribute
Encapsulation	> Placement of RSSZ, TZ4, and High As TZ3 waste rock in the core of the ELF surrounded by lower risk TZ3 materials. > Development of perimeter bund (advective oxygen barrier) and lower permeability running surfaces constructed from TZ3 materials. > Construction of a drainage layer between the bulk waste rock and the soil to enable lateral seepage (along running surfaces) to drain to the ELF toe without compromising rehabilitation surface water quality objectives. This will be the brown rock layer.
Nitrogenous compounds	> General health, safety, and environmental hazards associated with ANFO will be managed by health and safety processes. > This will include management processes for housekeeping (e.g., spill management) and optimising blast efficacy (to maximise volatilisation of nitrogenous compounds)to minimise nitrogen loads within the BPCP ELFs.
Cover System	> Topsoil/subsoil > Moderately weathered mine rock (commonly referred to as 'Brown Rock') > Develop a cover system to limit net percolation to <20% of annual rainfall and limit oxygen flux such that closure objectives can be achieved. Further work is required.
Progressive Rehabilitation	> Up-valley construction of ELFs where practicable to provide immediate surfaces for rehabilitation (cover system installation). > Placement of compacted brown rock, soils, and vegetation to reduce net percolation of rainfall.
Performance Monitoring	> Geochemical characterisation and quality assurance / quality control (QA/QC); > Grainsize segregation and lift height > Oxygen ingress depth > Net percolation rates > Seepage water quality and quantity

MGL has adopted these recommendations into the design and construction methodology for the Shepherds ELF, Western ELF, SRX ELF and CIT Backfill to minimise oxygen ingress, seepage and associated water quality effects.

As noted above, modelling by MWM (2025) indicates that treatment of mine-impacted water is required post closure due to some potential constituents of concern ("**PCOC**") being elevated. Active water treatment will be required for 50 years post closure and passive water treatment thereafter. The PCOC which will likely require treatment to achieve the proposed water quality limits for the BOGP as set out in Ryder (2025) are sulfate, molybdenum and antimony.

The modelling undertaken by MWM (2025) indicates that diverting Shepherds ELF and TSF seepage to the RAS pit lake for dilution would achieve PCOC concentrations below the proposed water quality limits set out in Ryder (2025) without active treatment, except for molybdenum. MWM (2025) recommends further studies and performance monitoring is undertaken within the first few years of operations to confirm active treatment requirements and efficiencies.

In addition to the above, MGL also proposes to implement the following measures to manage potential water quality effects:

- The adoption of a range of water quality compliance limits for the BOGP, as recommended by Ryder (2025), which are incorporated into the proposed conditions in **Part D** of these application documents;
- The design of the water management system to capture and reuse mine-impacted waters within the operations wherever possible; and
- The implementation of several relevant management plans including:
  - Water Management Plan, which sets out water quality and flow monitoring within surface waters and groundwater within and surrounding the Project Site to demonstrate compliance with compliance limits; and
  - Engineered Landform Management Plan, which sets out the methods, practices and procedures to manage and monitor the construction, operation and closure of the ELFs to achieve the recommended design concepts and ensure water quality discharges are within compliance limits.

These management plans are provided in **Part G** of these application documents, with the key management measures summarised in Section 7 of this report.

6.6.2 Erosion and Sedimentation Effects

As discussed in Section 3.8 of this report, erosion and sediment control measures will be required for bulk earthworks associated with the establishment of key mine components throughout the Project Site – including the various open pits, the establishment of the Shepherds Service Corridor and the network of haul roads throughout the Project Site.

The proposed approach to erosion and sediment control for the BOGP is set out in EGL (2025g), a copy of which is provided in **Part B** to these application documents. The executive summary in EGL (2025g) is reproduced verbatim below:

> *Erosion and sediment effects of the Bendigo-Ophir Gold Project (BOGP) on watercourses can be managed using the controls detailed in relevant guidance documents summarised in this report such that the effects on the watercourses will be less than minor. This report outlines the proposed works, the types of erosion and sediment controls required and suitable design criteria for sizing sediment control structures.*
>
> *An Erosion and Sediment Control Management Plan (ESCMP) for the BOGP is required, outlining the site management, procedures and practices for the site. Site specific Erosion and Sediment Control Plans (ESCP) will be developed for key earthworks or mining areas including detailed design of erosion and sediment controls for all stages of the BOGP.*
>
> *Initially for establishment of the site, the key areas which will require ESCPs are:*
>
> - *Administration and work camp area, including the access road;*
> - *Process plant and infrastructure area;*
> - *Rise and Shine pit, haul road, Shepherds Engineered Landform (ELF), Shepherds Silt Pond, and Shepherds Tailings Storage Facility (TSF); and*
> - *Western ELF.*
>
> *As the site is further developed, ESCPs will also be required for:*
>
> - *Come in Time pit and backfill; and*
> - *Srex pit, Srex East pit, and Srex ELF.*
>
> *The BOGP ESCMP will include regular monitoring of the erosion and sediment controls and discharge water quality to confirm the controls are effective.*
>
> *It is recommended the consent conditions require the following general items:*
>
> 1. *The approved ESCMP is in place and is complied with.*
> 2. *Substantive changes to the ESCMP require approval by the Regional Authority.*
> 3. *Site specific ESCPs are prepared for each key area of the site.*

4. *A Suitably Qualified Experienced Professional (SQEP) is approved for the BOGP by the Regional Authority. The SQEP role is to review and approve the site specific ESCPs for the BOGP.*
5. *Site specific ESCPs meet the site-specific design criteria and referenced guidance in the ESCMP.*
6. *Site specific ESCPs prepared are approved by the SQEP and submitted to the Regional Authority at least two weeks prior to earthworks proceeding.*
7. *Any substantive changes to the site specific ESCPs are approved by the SQEP and submitted to the Regional Authority within two weeks of the approval of the change by the SQEP. Substantive changes include changes to the catchment area reporting to a control by more than twenty percent, removal or addition of controls, or changes in sizing of controls by more than twenty percent. Minor adjustment of the position or alignment of controls are not substantive. ESCPs shall be kept up to date whether substantive or minor and reflect the controls in place onsite.*
8. *Site specific ESCPs are held onsite for the Regional Authority to inspect and review that the specified controls in the ESCPs are in place and effective.*
9. *Erosion and sediment control measures are effective, or are reviewed and revised, to meet the site water quality compliance limits.*

In addition, while EGL (2025g) notes the site-specific ESCPs will include specific erosion and sediment control measures required for each work area, they will generally include:

- Clean water diversion channels and bunds to divert clean water from disturbed areas;
- Dirty water diversion channels and bunds to manage water from disturbed areas;
- Sediment retention ponds and decanting earth bunds to allow time for settlement of suspended solids associated with dirty water runoff from disturbed areas. Sediment retention ponds and bunds will be sized for site-specific design criteria in accordance with the proposed duration of land disturbance activities (as outlined below) and will be routinely pumped out to maintain design capacities;
- Staged stripping of ELF and TSF footprints to minimise disturbed areas, and stripping of soils in dry weather conditions;
- Placement of stockpiles at the top of catchments or with appropriate diversions and progressive stabilisation;
- Management of water on the working surface of the ELFs to specific diversion channels and bunds to shed runoff to sediment retention ponds or pits;
- Dust suppression using water on un-stabilised surfaces;

- Progressive rehabilitation of the ELF and TSF embankments with final ELF slopes to minimise erosion of the rehabilitation layer;
- Monitoring of water quality and turbidity of inflows and outflows from sediment retention ponds to confirm effectiveness at dropping sediments out of suspension; and
- Regular inspections of measures above to check condition and undertake maintenance if required.

Where controls are required for less than 12 months, clean and dirty water diversions and sediment retention ponds or bunds will be sized for a 1 in 2 year rainfall event (with retention ponds and bunds having an emergency spillway sized for a 10 year average reoccurrence interval ("**ARI**") event as a minimum) . Where controls are only required for 12 to 24 months, the clean and dirty water diversions and sediment retention ponds or bunds will be sized for a 1 in 5 year rainfall event (with retention ponds and bunds having an emergency spillway sized for a 50 year ARI event as a minimum).

For the mining operation stage where controls are semi-permanent and will be in place until mine closure (i.e. required for greater than 24 months), the clean and dirty water diversions and sediment retention ponds or bunds will be sized for a 1 in 10 year rainfall event (retention ponds and bunds having an emergency spillway sized for a 100 year ARI event as a minimum).

Overall, erosion and sediment controls work together in a treatment train to minimise erosion and sediment and minimise effects on the receiving environment.

In light of the recommendations above, EGL has also prepared an Erosion and Sediment Control Management Plan, a copy of which is provided in **Part G** of these application documents, which outlines the site management procedures and practices for the Project Site. The purpose of this management plan is to limit erosion and sediment control effects to an acceptable level beyond the Project Site.

Overall, MGL has accepted the management measures recommended by EGL above. These are summarised in Section 7 of this report and incorporated into the proposed conditions which are included in **Part D** of these application documents.

6.6.3 Summary

MGL has commissioned a large number of technical reports to identify the BOGP's potential risks to water quality. Effects may occur as a result of mining activities and the existing geochemical properties of materials within the project area.

The majority of water quality effects during operations can be managed through the proposed water management system that will capture and reuse mine impacted water and implementation of erosion and sediment controls. The appropriate design and construction of waste rock emplacement areas will minimise the potential for NMD to occur that would result in elevated concentrations of PCOC's present in seepage. During closure, active treatment of mine-impacted water is required for a small number of PCOC's until passive treatment can achieve concentrations below water quality limits. MGL has commissioned a number of management plans that will ensure that these management measures are implemented during the BOGP.

6.7 TERRESTRIAL ECOLOGY AND WETLAND EFFECTS

Alliance Ecology Consulting ("**Alliance Ecology**") has assessed the effects of the BOGP on terrestrial ecology values within the DDF and surrounding landscape in detail within Alliance Ecology (2025). This assessment includes effects on:

> Mammalian pest management, native bats and invertebrates, with baseline ecological values provided in Habitat NZ (2025a, 2025b and 2025c) respectively; and

> Wetlands, vegetation, avifauna and lizards, with baseline ecological values provided in RMA Ecology (2025a, 2025b, 2025c and 2025), respectively.

Copies of these various reports are provided in **Part B** of these application documents. The executive summary in Alliance Ecology (2025) is reproduced as follows:

> *Matakanui Gold Limited ("**MGL**") is proposing to establish the Bendigo-Ophir Gold Project ("**BOGP**") in Central Otago. Alliance Ecology has been engaged to provide an assessment of ecological effects to inform the application under the Fast Track Approvals Act 2024 ("**FTAA**").*
>
> *The BOGP comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. The project site is located approximately 20km north of Cromwell and will have a maximum disturbance footprint of approximately 610 hectares.*
>
> *This report provides an ecological effects assessment on terrestrial and wetland values to support applications for approvals (including resource consent applications) under the FTAA. This assessment of ecological effects includes:*
>
> > *A description of ecological characteristics and values of the current environment, comprising the Direct Disturbance Footprint ("**DDF**"), Potential Dewatering Drawdown Zone ("DDZ") and the Surrounding Landscape ("**SL**"), collectively the 5,386 ha 'Ecological Study Area' ("**ESA**"), based on desktop review and field surveys.*
>
> > *An assessment of ecological significance against the Otago Regional Policy Statement (Operative and Proposed).*

- *An assessment of potential ecological effects on those ecological values affected by the proposed mining activities after effects avoidance, minimisation/mitigation and remediation have been taken into account.*
- *Proposed measures to manage residual adverse effects through offsetting or compensation.*
- *An assessment of the adequacy of proposed residual effects management measures against the offsetting and compensation principles of the National Policy Statement for Indigenous Biodiversity ("**NPSIB**") and the National Policy Statement for Freshwater Management ("**NPSFM**"), for subsequent use in the application of the FTAA statutory weighting exercise.*

*The assessment of effects has been undertaken in accordance with the Environment Institute of Australia and New Zealand's Ecological Impact Assessment Guidelines ("**EcIAG**"). It is based on desktop review and comprehensive field investigations of the ecological values within the ESA undertaken over a 20-month period between October 2023 and May 2025. These investigations are detailed in technical reports by RMA Ecology (vegetation, wetlands, birds, and herpetofauna) and Habitat NZ (terrestrial invertebrates, bats, and pest management).*

Ecological values

The ESA has been heavily altered by the clearance of almost all original woody vegetation, historic mining, stock browsing, oversowing with non-native pasture grasses, topdressing with fertilisers, repeated burning, and the impacts of invasive plants and animals.

Seven broad terrestrial vegetation communities have been identified—ranging in ecological value from low to very high—along with natural inland wetlands. These communities form an intergrading mosaic shaped by environmental conditions and management practices. Although the landscape is predominantly in exotic vegetation cover, native grey scrub, kānuka, tussock, taramea, and Raoulia (cushionfield) species are characteristic features. The vegetation communities include:

- *Exotic pasture or herbfield: (low value)*
- *Mixed depleted herbfield (cushionfield) and grassland: (very high value)*
- *Mixed tussock shrubland and exotic grassland: (moderate value)*
- *Mixed scrubland: (moderate value)*
- *Native dominant tussockland: (high value)*
- *Native taramea herbfield and shrubland: (high value)*
- *Native dominant scrubland: (very high value)*
- *Wetlands (including moderate value seepages and fens and high value swamps/marshes).*

Overall, these terrestrial and wetland habitats support a diverse assemblage of native flora and fauna species. Many of these species are nationally or regionally 'Threatened' or 'At Risk', including:

- *At least 58 vascular plant species, of which at least 48 occur within the DDF.*
- *At least 10 bird species, including the nationally Threatened New Zealand falcon (eastern), the At Risk New Zealand pipit, various At Risk braided river bird species that may occasionally use cultivated fields or artificial ponds within the DDF, and regionally At Risk species. The nationally At Risk fernbird is also potentially present within the ESA[4] but was not detected.*
- *Two nationally At Risk lizard species: Kawarau gecko and tussock skink, both present in the DDF.*
- *18 notable species of invertebrate, including 14 nationally Threatened, At Risk or data deficient species. These include 4 nationally Threatened moth species, and an additional 4 newly identified species also detected.*

Distinctive vegetation features also occur within these communities and contribute to ecological value, including relict kōwhai, and rock tors that support distinct vegetation communities and provide high quality habitat for a diversity of indigenous flora and fauna.

All vegetation communities within the ESA and the wider landscape satisfy criteria for recognition as significant indigenous vegetation or significant habitats of indigenous fauna under the NPSIB and the operative and proposed Otago Regional Policy Statements. This is due in part to their provision of habitat for multiple Threatened or At Risk flora and fauna species across most of the site, with several of these species also present in low value habitat such as exotic pasture.

Nevertheless, with the exception of woody vegetation cover, indigenous biodiversity within the landscape is generally in decline due to ongoing habitat loss and degradation through stock browsing, topdressing and aerial oversowing with non-native pasture species, spread of competing non-native plants (including weeds), invasive browsers and grazers (especially rabbits and deer), and predation by introduced mammals. Without intervention, most native species will continue to decline, and several Threatened or At Risk species are likely to become locally extinct over time. A notable exception is the cushionfield ecosystem (which contains threatened plants and invertebrates) and is likely being maintained in areas of the DDF where browsing pressure and the absence of pasture improvement actions have enabled some cushionfield-associated species to persist at relatively high abundances. In addition, the spread of woody mixed exotic-native shrubland across the site and surrounds is evident from aerial photographic analysis and shows that some native plant species are increasing in distribution and abundance (probably to the detriment of others).

Potential effects on ecological values

Potential direct effects of the BOGP include the direct loss of habitat and the associated loss of flora and fauna due to mine construction. Potential indirect effects

include fragmentation of habitat and reduced ecological connectivity, loss of altitudinal sequences; and wetland dewatering and degradation resulting from surface water diversion, groundwater drawdown within the DDZ, and reduced water quality.

Measures to avoid or minimise/mitigate effects

Key measures proposed to avoid, minimise or mitigate adverse effects include:

- *Realigning Thomson Gorge Road to bypass the Ardgour airstrip, avoiding identified habitat for the Threatened (Nationally Critical) moth Sporophyla oenospora.*
- *Delaying mining of the 23.26 ha CIT Open Pit to markedly reduce effects on Ceratocephala pungens (Nationally Critical) and to a lesser degree Myosotis brevis (Nationally Vulnerable) which are found at high densities in this location. Except for a 2.7 ha early disturbance area required for enabling works, mining within the CIT Open Pit is proposed to proceed only if populations of these Threatened spring annuals within the CIT Open Pit footprint are less than 1% of the known populations within the Dunstan Ecological District ("ED"), demonstrated via either:*
  - *propagation and species recovery at offset/compensation sites, as informed by the Applied Research Plan for Conservation Management, Rehabilitation and Expansion of Cushionfield ("**ARP**"); or*
  - *The discovery of further spring annual populations within the wider Dunstan ED.*
- *Positioning spoil sites and certain infrastructure away from 'mixed depleted herbfield (cushionfield) and grassland' and other high-value habitats where possible.*
- *Refining stockpile and infrastructure locations to reduce impacts on key ecological features, including kōwhai trees, taramea, and rock outcrops, and to avoid adverse effects on Rise and Shine creek wetlands to the extent possible.*
- *Design of slopes to minimise infrastructure footprints, including the use of retaining (rather than side-casting) for the approximately 8 km access road; narrowing haul road design to reduce cut faces, and refining pit walls to minimise footprints, e.g. the Rise and Shine (RAS) Open Pit eastern wall.*
- *Avoiding habitat clearance near nesting birds until chicks have fledged.*
- *Salvaging and relocating notable plants, invertebrates, lizards, and habitat features (e.g. wood, weathered rock) where possible, with many habitat features stored in stockpiles for later use in rehabilitation. Additionally, a research and captive breeding study for the moth Sporophyla oenospora, if detected in pre-salvage surveys, is a requirement of the Terrestrial Invertebrate Management Plan.*

Ecological management plans—including the Habitat Impact Management Plan coupled with the Avifauna, Lizard and Invertebrate Management Plans, the Landscape and Ecological Rehabilitation Plan and ARP —will guide the implementation of these measures.

Measures to remedy adverse effects that cannot be avoided or minimised/mitigated

After measures to avoid or minimise adverse effects, the BOGP is expected to result in the direct loss and associated effects on 607 ha of terrestrial habitat that includes:

- *79.3 ha of low value exotic pasture and herbfield*
- *103.8 ha of very high value mixed depleted herbfield (cushionfield) and grassland*
- *187.4 ha of moderate value mixed tussock shrubland and exotic grassland*
- *124.1 ha of moderate value mixed scrubland*
- *25.3 ha of high value native dominant tussockland*
- *1.86 ha of high value native taramea herbfield and shrubland*
- *85.6 ha of very high value native dominated scrubland.*
- *Loss of individuals of various Threatened plant species, some of which have Very High ecological value.*

Additionally, direct impacts on wetlands within the DDF, and indirect drawdown effects on wetlands within the DDZ, will result in the loss of:

- *2.42 ha of high value swamp/marsh wetlands*
- *0.19 ha of moderate value seepage wetlands*
- *0.84 ha of moderate value gully fen wetlands*

Ecological rehabilitation will be implemented across all available areas within the DDF (approximately 480 ha), excluding the majority of the two permanent pit lakes the pit walls, permanent infrastructure (roads and water treatment facilities), and the Ardgour Terraces which will be subject to agricultural (pasture) rehabilitation. Ecological rehabilitation will include:

- *Re-establishing four indigenous terrestrial vegetation communities, including native scrubland (230 ha); native tussockland (222 ha); taramea herbfield and shrubland (2 ha); and up to 19 ha of cushionfields though outcomes are uncertain for this habitat type.*
- *Re-establishing indigenous wetland communities totalling 7.5 ha, comprising at least 2 ha of swamp wetlands (including 0.5 ha of open water) and 4 ha of marshlands on the TSF, along with three smaller areas of marsh/swamp wetland (of at least 0.4 ha each: Ardgour Terrace, Lower Shepherds and Processing Plant.*
- *Deploying rocky outcrop/scattered rock complexes (at least 1 per ha, totalling ≥1 ha), recreating rock rubble pits (at least 1 per 5 ha, totalling ≥0.5 ha) and including at least 5% rock cover in ecological rehabilitation areas across the DDF Collectively these rock features will provide high-value habitat for lizards and select Threatened or At Risk invertebrates, and a favourable environment for establishing plants.*
- *Establishment of Threatened or At Risk plant species*

> *Establishment of reproductively viable kōwhai clusters*

*In addition to the ecological rehabilitation within the DDF, ecological enhancement of habitats within 889 ha of Mine Regeneration Zones (“**MRZs**”) adjacent to the DDF will facilitate ecological rehabilitation of the DDF by providing source populations of fauna and a species-diverse, continuous native seed/propagule source[9] including for nationally Threatened or At Risk plant species.*

The Landscape and Ecological Rehabilitation Management Plan for the DDF and surrounding MRZs will guide the implementation of these measures.

Residual adverse effects

Residual effects on terrestrial and wetland ecological values within the BOGP range from no residual effects to Very High residual effects, following implementation of avoidance, minimisation/mitigation, and remediation measures.

Where residual adverse effects are assessed as moderate or greater, efforts to offset or compensate for these effects have been undertaken to the extent practicable (Table 1.1). These measures are also expected to provide benefits to many values in the wider ESA that are not impacted, as well as to those within the DDF where residual adverse effects are assessed as ‘low’ or lower.

Proposed biodiversity offsets/compensation

The overarching objective and intended biodiversity outcome for addressing residual effects is to achieve, where possible, demonstrable benefits to indigenous terrestrial and wetland biodiversity that outweigh impacts within 35 years of granting of approvals.

These benefits are assessed from a starting point of, and relative to, the current pre-BOGP mining condition.

Biodiversity offsetting is proposed to address residual adverse effects on ecological values where Net Gain outcomes can be demonstrated through offset modelling. For ecological values where no contemporary like-for-like replacement or enhancement is available, biodiversity compensation is proposed.

Proposed offset and compensation measures include ecological restoration and habitat enhancement across 2,219 ha of habitat within the ESA, in the landscape surrounding the mine footprint. These measures aim to reverse the ongoing decline of native habitat in the surrounding landscape, supporting a large-scale transition from exotic-dominated to native-dominated ecosystems. In doing so, they will deliver additional benefits beyond directly addressing residual adverse effects of the BOGP.

Restoration efforts will prioritise the reinstatement of species that are rare, under-represented, or locally extirpated, as well as resilient native species capable of persisting under harsh and variable conditions. Long-term biodiversity outcomes will be supported by a combination of extensive weed and animal pest control, animal pest exclusion, habitat enhancement, and browsing pressure management, tailored to the specific requirements of each area. This proposed restoration and enhancement programme surrounding the DDF includes:

- *The 889 ha MRZ adjacent to the DDF, through native enrichment planting, livestock management, mammalian pest control, and ecological weed control (the MRZ also serves to facilitate ecological rehabilitation within the DDF).*
- *The 1263 ha proposed Ardgour Restoration Area **("ARA")** adjacent to the DDF. Ecological uplift will occur via native enrichment planting, livestock management, mammalian pest control, weed control and habitat enhancement within select Ecological Management Units ("EMUs") at Ardgour Station currently used for grazing.*
- *Approximately 67 ha of proposed predator-exclusion fenced areas: the 38 ha Ardgour Sanctuary and the 29 ha Bendigo Sanctuary. Within these areas, measures include construction of predator-exclusion fences, eradication of mammalian predators, browser management, ecological weed control, deployment of salvaged rock habitat, native revegetation and enrichment planting, and translocation of locally extirpated (extinct) Threatened or At Risk species.*

Ecological management plans—including the Landscape and Ecology Rehabilitation Management Plan (in relation to the MRZs), the ARA Management Plan, and the Matakanui Sanctuary Management Plan—will guide the implementation of these measures. These management plans will be accompanied by clear, enforceable and measurable conditions of approvals.

Additionally, a $5 million biodiversity fund is proposed to support the protection and enhancement of cushionfield habitat or other threatened species and ecosystems within the Dunstan ED. While this is expected to provide biodiversity benefits, the type, quantum, location and timing of benefits is not certain and on this basis this fund is not considered to be part of the residual effects management package. Providing such a biodiversity fund does, however, demonstrate the commitment of the Applicant to providing positive outcomes that extend beyond like-for-like offsetting and similar ecological compensation in the hope that a decision maker may consider these beneficial in a weighing exercise of overall losses and overall gains to the ecological values subject to the project.

Assessment against offsetting and compensation principles

The proposed residual effects management package has been designed in accordance with good practice and, where possible, to align with the biodiversity offsetting and compensation principles in the NPSIB and NPSFM.

As relevant to the subsequent weighting exercise under the FTAA, proposed offsetting and compensation as described above is generally consistent with the suite of offsetting and compensation principles set out in the NPSIB[11] and NPSFM. However, certain principles —notably the 'limits to offset/compensation' and 'leakage' principles—are unlikely to be satisfied for a relatively small number of species and habitat types, based on current information.

Specifically, the limits to offsetting/compensation principles contained in National Policy Statements are unlikely to be met for a limited number of ecological values due to:

a) their irreplaceability or vulnerability

b) the significance of adverse effects

c) the technical infeasibility of demonstrating that adequate ecological gains will be achieved.

The affected ecological values include:

> *Cushionfield habitat*

> *The nationally Threatened (nationally vulnerable) spring annual Myosotis brevis*

> *The newly identified ground beetle Harpalus sp.*

Additionally, the principle is potentially not met based on current information for the newly identified weevil Inophloeus sp and the nationally Threatened (nationally critical) spring annual Ceratocephala pungens.

The deferral of mining the CIT Open Pit will allow further research to address technical feasibility and may provide sufficient certainty that ecological gains can be achieved for cushionfields and M. brevis, in which case the limits to offsetting/compensation principles may be met for these ecological values.

However, for C. pungens, this cannot be established. The enabling works within the 2.7 ha early-disturbance area of the CIT Open Pit are proposed to proceed irrespective of this deferral. While current understanding suggests that C. pungens populations within this 2.7 ha area are relatively low compared to elsewhere in the CIT, there remains insufficient information at present to provide confidence in this assessment.

While the ARP is proposed in the hope of addressing some of the above impacts on cushionfields and spring annuals in the future – and for providing the justification to impact more of these areas in the CIT Open Pit footprint – the uncertainty over finding solutions from this research means that sought-after benefits cannot be relied upon for avoiding, minimising, rehabilitating, offsetting or compensating impacts that are proposed.

The unavoided loss of irreplaceable and vulnerable species or communities will be permanent and either cannot be replaced or balanced by the suite of beneficial actions. Under good ecological practice, such values should not be impacted. For those ecology values, the project will result in significant residual adverse effects that cannot be addressed.

The leakage principle is not met for certain habitats and species (for instance native tussockland and Carex talboti), since restoration and enhancement will inevitably benefit some higher priority ecological values at the expense of others. Additionally, while the scale of proposed compensation is considered appropriate such that biodiversity benefits are expected to outweigh effects overall, Net Loss is expected or conservatively assigned for certain ecological values, as described further below.

Biodiversity outcomes

The broader objective of restoring woody native vegetation cover will inevitably prioritise certain species over others, with emphasis on reinstating those that are rare, under-represented, locally extirpated, or resilient to harsh and variable conditions. Biodiversity outcomes should also be considered in the context of wider benefits associated with the restoration and enhancement of:

- *Ecological connectivity across a broad area of the northern faces of the Dunstan Mountains. This is achieved by linking existing public conservation land at Bendigo Scenic Reserve and Bendigo Historic Reserve to the west, with Bendigo Conservation Area and Ardgour Conservation Area to the south, and Neinei i kura Conservation Area and Dry Creek Conservation Areas to the north-east.*
- *Altitudinal sequences across a large scale, which build both climate resilience and cater for life stages of species that shift on the landscape.*
- *Rare or locally extirpated species.*

As set out in the Biodiversity Outcome Monitoring Plan, comprehensive biodiversity outcome monitoring is proposed to verify that stated outcomes are achieved and to inform adaptive management or contingency actions as needed.

Following the implementation of proposed offset/compensation measures, biodiversity outcomes for values impacted by the BOGP are expected to range from Net Loss to Net Gain within 35 years from the granting of approvals, depending on the specific ecological value.

In broad terms, the proposed biodiversity offset/compensation package is expected to kick-start a large-scale transition from exotic-dominated to native-dominated ecosystems, reversing the ongoing decline of key native habitats and many associated species outside the DDF, while maintaining cushionfield ecosystems beyond the mine footprint.

As a result, Net Gain or Net Positive outcomes are anticipated for all 'very high' or 'high' value ecosystems except cushionfields; specifically:

- *Native-dominated scrubland*
- *Native tussockland*
- *Native taramea herbfield and shrubland*
- *Swamp and marsh wetlands.*

Net gain or net positive outcomes are also expected for a range of threatened or otherwise ecologically important species that are associated with these habitat types. These include species targeted for reinstatement that are rare, under-represented, or locally extirpated (locally extinct). Examples include:

- *Plants such as Carmichaelia crassicaulis crassicaulis, Coprosma virescens, Olearia lineata, and O. odorata.*

> *Threatened or At Risk lizards not impacted by mining activity such as the nationally and regionally Threatened-endangered Otago skink and grand skink, and the At Risk jewelled gecko (subject to translocation approvals).*

Although significant restoration efforts are proposed for cushionfield habitat and associated species, these outcomes have conservatively been assigned as Net Loss, as their success depends on research that has yet to be completed. In practice, the ARP is expected to strengthen and inform biodiversity outcomes for the proposed offset and compensation measures; however, effectiveness will not be known until after some impacts have commenced.

a) The biodiversity outcomes expected within 35 years of the granting of approvals are set out in Table 1 below, including outcomes for: Threatened, At Risk or otherwise notable biodiversity values impacted by the BOGP, with species grouped according to whether residual adverse effects are assessed as moderate or higher, or low, very low or 'positive'.

b) Biodiversity values not directly impacted by the project but expected to benefit from the proposed offset/compensation package (select examples).

Expected outcomes are assigned as follows:

> *Net Gain: biodiversity offsetting can be demonstrated.*

> *Net Positive: biodiversity compensation is expected to deliver a positive outcome for the ecological value.*

> *Uncertain: the success of an action cannot be predicted with sufficient confidence to assign as Net Positive or Net loss.*

> *Net Loss: where, based on current information, a negative outcome is assumed. In such cases—despite proposed restoration or enhancement measures—the benefits cannot be demonstrated (without further research) to adequately address the residual adverse effects. This applies particularly to cushionfield habitat and some associated species.*

Table 1-1: Expected Biodiversity Outcomes within 35 years for vegetation/habitats and Threatened, At Risk or otherwise notable species

Ecological value	***Level of residual effect***	***Expected outcome following offset/ compensation actions***
Vegetation/habitat type		
Exotic pasture or herbfield	*Low*	*Net gain for native elements*

Ecological value	Level of residual effect	Expected outcome following offset/ compensation actions
Mixed depleted herbfield (cushionfield) and grassland	*Very high*	*Net loss*
Mixed tussock shrubland and exotic grassland	*Moderate*	*Net gain for native elements*
Mixed scrubland	*Moderate*	*Net gain for native elements*
Native-dominant tussockland	*High*	*Net loss in extent and net gain in condition*
Native taramea herbfield and shrubland	*Moderate*	*Net gain in extent and condition*
Native-dominant scrubland	*Very High*	*Net gain in extent and condition*
Seepage wetlands within DDF and DDZ	*Moderate*	*Net loss*
Gully fens within DDF and DDZ	*Moderate*	*Net loss*
Swamp/marsh wetlands in DDF	*Positive*	*Net gain in extent and condition*
Alluvial podocarp forest	*Not impacted*	*Net gain in extent and condition*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Species for which level of residual effect is assessed as Moderate or higher				
Plant species				

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Tiny forget-me-not - Myosotis brevis	*Threatened – Nationally Vulnerable*	*Threatened - Regionally Endangered*	*Very high*	*Net loss*
Carex talboti	*At Risk – Declining*	*Threatened - Vulnerable*	*Very high*	*Net loss*
Colobanthus brevisepalus	*At Risk – Declining*	*Threatened - Vulnerable*	*Very high*	*Net loss*
Raoulia beauverdii	*At Risk – Declining*	*Threatened - Vulnerable*	*Very high*	*Net loss*
Hypericum involutum	*At Risk – Declining*	*Data deficient*	*Very high*	*Net loss*
Desert poa - Poa maniototo	*At Risk – Declining*	*At Risk - declining*	*Very high*	*Net loss*
Ceratocephala pungens	*Threatened – Nationally Critical*	*Threatened – Regionally Critical*	*Potentially Very High*[20]	*Net loss*
Lagenophora barkeri	*At Risk – Declining*	*Threatened - Regionally Endangered*	*High*	*Net loss*
NZ Mousetail - Myosurus minimus n-z	*At Risk – Declining*	*Threatened - Endangered*	*High*	*Net loss*
Celadon mat daisy - Raoulia parkii	*At Risk – Declining*	*Threatened - Vulnerable*	*High*	*Net loss*
Rytidosperma maculatum	*At Risk – Declining*	*Threatened - Vulnerable*	*High*	*Net loss*
Common scabweed - Raoulia australis	*At Risk – Declining*	*At Risk - declining*	*High*	*Net loss*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Rytidosperma buchananii	*At Risk – Declining*	*At Risk - declining*	*High*	*Net loss*
Colobanthus strictus	*Not Threatened*	*At Risk - declining*	*High*	*Net loss*
Pincushion grass - Agrostis muscosa	*Not Threatened*	*At Risk - declining*	*High*	*Net loss*
Poa lindsayi	*Not Threatened*	*At Risk - declining*	*High*	*Net loss*
Bladder Fern - Cystopteris tasmanica	*Not Threatened*	*At Risk - Naturally Uncommon*	*Moderate*	*Net loss*
Luzula leptophylla	*At Risk – Naturally Uncommon*	*At Risk - Naturally Uncommon*	*Moderate*	*Net loss*
Myosotis antarctica subsp. antarctica	*At Risk – Naturally Uncommon*	*At Risk - Naturally Uncommon*	*Moderate*	*Net loss*
Hot rock fern - Pellaea calidirupium	*At Risk – Naturally Uncommon*	*At Risk - Naturally Uncommon*	*Moderate*	*Net loss*
Myriophyllum pedunculatum ss novae-zelandiae	*Not Threatened*	*At Risk - Naturally Uncommon*	*Moderate*	*Net loss*
Rock fern - Cheilanthes sieberi sieberi	*Not Threatened*	*At Risk - Naturally Uncommon*	*Moderate*	*Uncertain*
Bird species				

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
*New Zealand falcon – eastern form**	*Threatened, nationally vulnerable*	*Threatened, vulnerable*	*Moderate*	*Net positive*
*New Zealand pipit**	*At Risk, declining*	*Not threatened*	*Moderate*	*Net positive*
*Silvereye**	*Not threatened*	*At Risk, declining*	*Moderate*	*Net positive*
Lizard species				
Tussock skink	*N/A†*	*At Risk - declining*	*High*	*Net loss*
Kawarau gecko	*At Risk - declining*	*At Risk - declining*	*High*	*Net loss*
Invertebrate species				
Pseudocoremia cineracia (moth)	*Threatened: Nationally Vulnerable*	*N/A*	*Very high*	*Uncertain*
Harpalus new sp. (ground beetle)	*Potentially Threatened*	*N/A*	*Very high*	*Uncertain*
Inophloeus new sp. (weevil)	*Potentially Threatened*	*N/A*	*Very high*	*Uncertain*
Phaulacridium otagoense (grasshopper)	*At Risk, declining*	*N/A*	*Very high*	*Uncertain*
Elachista helonoma (moth)	*At Risk, declining*	*N/A*	*Very high*	*Uncertain*
Ichneutica toroneura (moth)	*At Risk, declining*	*N/A*	*Very high*	*Uncertain*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Megadromus new sp. 1 (ground beetle)	*Potentially Threatened*	*N/A*	*High*	*Uncertain*
Megadromus new sp. 2 (ground beetle)	*Potentially Threatened*	*N/A*	*High*	*Uncertain*
Scythris sp. 1 (moth)	*Not assessed, of importance*	*N/A*	*High*	*Uncertain*
Sporophyla oenospora (moth)	*Threatened – nationally critical*	*N/A*	*Moderate*	*Uncertain*
Homodotis sp. A (NZAC (CO)) (moth)	*Threatened – nationally endangered*	*N/A*	*Moderate*	*Uncertain*
Pasiphila sp. 'Olearia' pug moth	*Threatened: Nationally Vulnerable*	*N/A*	*Moderate*	*Uncertain*
Species for which level of residual effects is assessed as low, very low or positive				
Plant species				
Coastal woodrush - Luzula banksiana var. rhadina	*Data Deficient*	*At Risk - Naturally Uncommon*	*Low*	*Net loss*
Feldmark grass - Rytidosperma pumilum	*Not Threatened*	*At Risk - declining*	*Low*	*Net loss*
Vittadinia australis	*Not Threatened*	*At Risk - Naturally Uncommon*	*Positive*	*Uncertain*
Kōwhai Sophora microphylla	*Not threatened*	*Not threatened*	*Low*	*Net positive*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Chaerophyllum ramosum	*Data Deficient*	*Not Threatened*	*Low*	*Uncertain*
Juncus distegus	*Not Threatened*	*At Risk - declining*	*Positive*	*Net positive*
Mikimiki - Coprosma virescens	*At Risk – Declining*	*Threatened - Vulnerable*	*Positive*	*Net positive*
Blue Wheat Grass - Anthosachne aprica	*At Risk – Naturally Uncommon*	*Threatened - Vulnerable*	*Positive*	*Net positive*
Olearia lineata	*At Risk – Declining*	*At Risk - declining*	*Positive*	*Net positive*
Scented tree daisy Olearia odorata	*At Risk – Declining*	*At Risk - declining*	*Positive*	*Net positive*
Epilobium hectorii	*At Risk – Declining*	*At Risk - declining*	*Positive*	*Net positive*
Styphelia nana	*At Risk – Declining*	*N / A*	*Positive*	*Net positive*
Pimelea aridula aridula	*At Risk – Declining*	*Threatened - Vulnerable*	*Positive*	*Net positive*
Rytidosperma corinum	*Data Deficient*	*Not Threatened*	*Low*	*Net positive*
Carex diandra	*Not Threatened*	*At Risk - Naturally Uncommon*	*Positive*	*Net positive*
Festuca mathewsii subsp. mathewsii	*Not Threatened*	*Data deficient*	*Positive*	*Net positive*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Buchanan's Sedge - Carex buchananii	*At Risk – Declining*	*Threatened - Vulnerable*	*Positive*	*Net positive*
Geranium potentilloides	*Not Threatened*	*Data deficient*	*Positive*	*Net positive*
Rumex flexuosus	*Not Threatened*	*At Risk - Naturally Uncommon*	*Positive*	*Net positive*
Bidibid / piripiri - Acaena buchananii	*At Risk – Declining*	*Threatened - Vulnerable*	*Positive*	*Net positive*
Spineless Acaena - Acaena inermis	*Not Threatened*	*At Risk - declining*	*Positive*	*Net positive*
Carex kaloides	*At Risk – Declining*	*Threatened – Regionally Endangered*	*Positive*	*Net positive*
Carmichaelia petrei	*At Risk – Declining*	*At Risk - declining*	*Positive*	*Net positive*
Geranium aff. microphyllum	*At Risk – Naturally Uncommon*	*Not Threatened*	*Positive*	*Net positive*
Olearia bullata	*Not Threatened*	*At Risk - Naturally Uncommon*	*Positive*	*Net positive*
Pimelea notia	*Not Threatened*	*At Risk - Naturally Uncommon*	*Positive*	*Net positive*
Bird species				

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Black-fronted tern	*Threatened, nationally endangered*	*Threatened, regionally endangered*	*Low*	*Uncertain*
Black-billed gull	*At Risk, declining*	*Threatened, regionally vulnerable*	*Low*	*Uncertain*
*South Island pied oystercatcher**	*At Risk, declining*	*Threatened, regionally vulnerable*	*Very low*	*Uncertain*
Tomtit	*Not threatened*	*Not threatened (but locally uncommon)*	*Low*	*Net positive*
Bellbird	*Not threatened*	*Not threatened (but locally uncommon)*	*Very Low*	*Net positive*
Black shag	*At Risk, relict*	*Threatened, regionally endangered*	*Very low*	*Uncertain*
Little shag	*At Risk, relict*	*At Risk, relict*	*Very low*	*Uncertain*
Lizard species				
McCanns skink	*Not threatened*	*Not threatened*	*Low*	*Net loss*
Invertebrate species				
Agrotis admirationis (moth)	*At Risk, declining*	*N/A*	*Low*	*Uncertain*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Asaphodes recta (moth)	*At Risk, declining*	*N/A*	*Low*	*Uncertain*
Nyctemera annulata (moth)	*At Risk, declining*	*N/A*	*Low*	*Uncertain*
Ichneutica sistens (moth)	*Uncommon*	*N/A*	*Low*	*Uncertain*
Meterana exquisite (moth)	*Uncommon*	*N/A*	*Low*	*Uncertain*
Paranotoreas fulva (moth)	*At Risk, declining*	*N/A*	*Very low*	*Uncertain*
Examples of species which are not impacted by the project but are expected to benefit				
Plant species				
Stout dwarf broom Carmichaelia monroi	*At Risk – Declining*	*Threatened – Regionally Critical*	*No effect*	*Net Gain*
Coprosma brunnea	*At Risk – Declining*	*Threatened - Regionally Endangered*	*No effect*	*Net Gain*
Coral broom Carmichaelia crassicaulis crassicaulis	*Threatened – Nationally Vulnerable*	*Threatened – Regionally vulnerable*	*No effect*	*Net Gain*
Olearia cymbifolia	*Not Threatened*	*At Risk - Naturally Uncommon*	*No effect*	*Net Gain*
Veronica rakaiensis	*Not Threatened*	*At Risk - Naturally Uncommon*	*No effect*	*Net Gain*

Species	National threat status	Regional threat status	Level of residual effect	Expected outcome following offset/ compensation actions
Carmichaelia nana	*Threatened – Nationally vulnerable*	*Threatened – Regionally vulnerable*	*No effect*	*Net gain*
Tussock bindweed (Convolvulus verecundus subsp. Verecundus)	*At Risk - declining*	*At Risk - declining*	*No effect*	*Net gain*
Lizard species (subject to granting of translocation permits)				
Otago skink	*Nationally Threatened – endangered*	*Threatened – regionally endangered*	*No effect*	*Net gain*
Grand skink *Oligosoma grande*	*Nationally Threatened – endangered*	*Threatened – regionally endangered*	*No effect*	*Net gain*
Jewelled gecko *Naultinus gemmeus*	*At Risk declining*	*At risk declining*	*No effect*	*Net gain*

** Bird species detected in avifauna surveys*

† Described after the NZTCS assessment for reptiles (Hitchmough et al. 2021; Jewell 2022c)

‡The threat classification for New Zealand Lepidoptera (moths and butterflies) is currently under review, with publication pending. Data is based on this pending classification update.

Conclusion

Substantial measures are proposed to address the ecological effects of the BOGP. Within the DDF, efforts focus on directly minimising effects on the highest value habitats and species. Additionally, rehabilitation of all 480 ha of the post-mining landform is proposed, to reinstate key terrestrial vegetation communities and habitat features.

For those effects that cannot feasibly be minimised or remedied, extensive biodiversity offsetting and compensation is proposed across 2,219 ha surrounding the mine footprint. Proposed measures aim to reverse the ongoing decline of native habitat, fostering a large-scale transition from exotic-dominated to native-dominated ecosystems. Careful design ensures the measures, including extensive weed and pest

control, pest exclusion, habitat enhancement, and browsing pressure management, are tailored to the specific requirements of each area.

Expected biodiversity outcomes for impacted ecological values, assessed individually, range from Net Loss to Net Gain. Notably, for certain values—including cushionfield habitat, one threatened plant species, and one terrestrial invertebrate species—residual effects are unlikely to be effectively addressed in accordance with the limits to offsetting/compensation principles as set out in the NPSIB [22]. This reflects their irreplaceability or vulnerability, the magnitude of impact, and inherent uncertainty regarding demonstrable offsetting or compensation outcomes. For a further two species (one threatened plant and one invertebrate) these principles are potentially not addressed.

The unavoided loss of these irreplaceable and vulnerable species or communities will be permanent and cannot be replaced, outweighed or balanced by different, alternative, or larger actions elsewhere and remain as an effect of the project, irrespective of the considerable scope, scale, robustness and beneficial nature of the other ecology actions combined that the project will deliver.

The net result is therefore a comprehensive package of actions that will provide broad, long-lasting benefits that balance most ecological impacts.

In summary, after implementation of avoidance, minimisation / mitigation and remediation measures, Alliance Ecology (2025) concludes there will be residual effects on a range of terrestrial and wetland ecological values as a result of the BOGP. Where residual effects are assessed as moderate or greater, offsetting and compensation measures comprising extensive ecological restoration and habitat enhancement in the landscape surrounding the DDF will be applied. Overall, Alliance Ecology (2025) consider these measures will result in demonstrable benefits to indigenous biodiversity values that outweigh impacts within 35 years of granting approvals.

A range of ecological management plans have been prepared as part of this substantive application to guide the measures outlined above. These include:

- The Habitat Impact Management Plan coupled with the Avifauna, Lizard and Invertebrate Management Plans and the LERMP to guide the measures to avoid or minimise / mitigate adverse effects on terrestrial ecology and wetlands;
- The LERMP, Ardgour Restoration Management Plan and the Matakanui Sanctuary Management Plan to guide the proposed restoration and enhancement programme; and
- The Biodiversity Outcome Monitoring Plan ("BOMP") which outlines comprehensive biodiversity outcome monitoring to verify that stated outcomes are achieved and to inform adaptive management.

These management plans are provided in **Part G** of these application document. MGL have adopted the measures recommended by Alliance Ecology (2025) – including the preparation of these management plans - which are summarised in Section 7 of this report and incorporated into the proposed conditions included in **Part D** of this application.

However, Alliance Ecology (2025) also concludes that despite significant efforts, there will be residual effects which cannot be demonstrably offset or compensated for cushionfield habitat and two associated species.[65] In response, MGL is proposing several further measures that will assist in addressing potential adverse effects on cushionfield habitat and these associated species.

The Cushionfield ARP, discussed further in Section 6.7.1 below, will inform how conservation management, rehabilitation and expansion activities for cushionfield and taramea herbfield within the DDF will be undertaken. This will help determine if the ecological integrity of cushionfields and herbfields can be enhanced and rehabilitated in the DDF post-mining operations. In addition, the majority of the CIT Open Pit – which contains high densities of the 'Nationally Critical' *Ceratocephala pungens* and 'Nationally Vulnerable' *Myosotis brevis* species – will not be mined until a net increase in these species relative to loss can be demonstrated as informed by the Cushionfield ARP.

MGL will also provide the BOGP Biodiversity Fund which will make regular instalments to the Department of Conservation to contribute to the protection and enhancement of cushionfield habitat or other Threatened or At-Risk species within the Dunstan Ecological District.

6.7.1 Applied Research Plan for Cushionfields

As noted in Alliance Ecology (2025), the works associated with the BOGP could result in the disturbance of up to 92 hectares of herbfields that may result in significant ecological effects. Cushionfields are a high-value subset of herbfields which have or support high regional and / or national ecological values and often contain the presence of indigenous spring annual herbs.

Further to the measures outlined above with respect to delaying mining a portion of the CIT Open to minimise adverse effects of high densities of cushionfields and spring annuals, MGL propose to implement, and adhere to, the Cushionfield ARP.

[65] Due to their irreplaceability or vulnerability, the magnitude of adverse effects or the technical infeasibility of demonstrating that adequate ecological gains will be achieved.

MGL acknowledge that as there is little existing research, knowledge or experience of management actions that have achieved cushionfield rehabilitation, applied research is required to reduce the uncertainty and define and refine management interventions. In response, Landcare Research has developed the Cushionfield ARP for conservation management, rehabilitation and expansion of cushionfield and taramea herbfield within the DDF. The objective of the Cushionfield ARP is to deliver a framework of the activities, timing and resulting methods and actions for applied research, monitoring and mitigation that identifies management actions to enhance the area and condition (i.e. ecological integrity) of cushionfields in the managed landscape, including establishing new cushionfields and patches of kōwhai in the DDF in mined areas.

Landcare Research (2025) recommends a suite of management actions to determine if the area and condition of cushionfields and herbfields can be enhanced and rehabilitated. These actions include:

- Mapping cushionfields across the managed landscape to define distribution and confirm success criteria for condition of key cushionfield species;
- Identifying current pressures on cushionfields and best current management outcomes for cushionfield vegetation;
- Identifying areas where cushionfields could be most likely enhanced and develop a range of practical extensive and intensive interventions;
- Developing methods for *raoulia* propagation and re-establishment;
- Protecting and replanting genetically diverse kōwhai treeland and shrubland areas within cushionfield mosaic; and
- Mapping, propagating and establishing taramea herbfield at mined areas.

MGL has adopted the Cushionfield ARP measures recommended above and incorporated them into the proposed conditions which are included as **Part D** of these application documents.

6.8 AQUATIC ECOLOGY EFFECTS

Boffa Miskell (2025a) has assessed the effects of the BOGP on freshwater quality and aquatic ecology within the various watercourses associated with the project. A copy of this assessment is provided in **Part B** of these application documents, with the executive summary provided verbatim below.

EXECUTIVE SUMMARY

Matakanui Gold Ltd (MGL, a subsidiary of Santana Minerals) proposes to develop an open cut pit and underground mining complex linked to an ore processing plant located in close proximity. Any overburden will be redeposited in Engineered Landforms (ELFs), while pulverised ore will be run through the processing plant with tailings deposited as a slurry behind a zoned-earth dam and ELF buttress in the Tailings Storage Facility (TSF). The proposed mine activity is located in the Bendigo area in the Upper Clutha Valley between the urban areas of Wānaka and Cromwell of New Zealand's South Island.

Shepherds Creek is representative of a low gradient Dunstan Mountains perennial small stream. The upper reaches of Shepherd Creek have moderate to high ecological value while downstream of the gorge section ecological values are moderate. Habitat modification increases with various impacts including water abstraction, channel modifications (e.g., the dam), crack willow, and stock impacts are evident. The Rise and Shine Creek catchment has a range of ephemeral, intermittent and perennial streams that support a fauna of high to low ecological value.

Four potential adverse effects on stream habitat resulting from the development and operation of the proposed mine are considered: complete loss of habitat; permanent diversion of streams; long term changes to stream flow; and potential water quality changes.

The functional need of the proposed activities means that the loss of watercourses is unavoidable. Although loss will be minimised as much as possible, the proposed mine activities will result in the loss of 7,139 m of permanent stream length whilst 1,631 m of intermittent stream length will be modified in Shepherd Creek.

Effects management provides remedy of 9,558 m (9,558 m2 of stream area) of created permanent watercourse through rehabilitation of the proposed diversion of Shepherd Creek, including the reinstated stream across the surface of the TSF at closure. A further 1,196 m length (~957 m2 of stream area) of Shepherds Creek will be enhanced to improve aquatic ecological values. This amounts to a total enhancement of 10,754 m of stream length (~10,515 m2 of stream area) of stream values.

Some 1,483 m length of stream (~741.5 m2) will be lost in the Rise and Shine Creek and approximately 1,600 m of stream length (800 m2 of stream area) will be created within the catchment, and the equivalent will apply for enhancement of aquatic ecological values.

The rehabilitation aims to provide habitat within the diversion as similar in form and structure to the stream to be reclaimed (and like neighbouring tributaries). The stream profile will allow the planting of riparian vegetation close to and extending over and into the water surface at the margins to enhance habitat for the aquatic ecosystem.

Additional enhancement of some 6,700 m of Bendigo and Clearwater Creeks, located in the Bendigo Historic Reserve near the Come-in-Time Stamper Battery immediately west of the project site is proposed. Proposed enhancement includes the management of crack willow trees and enhancement of the riparian margins of the

creeks which will provide substantial benefit to the aquatic ecological values of these watercourses.

The overall effects management for the BOGP addresses the direct and indirect effects of the BOGP through intensive rehabilitation of stream diversions and additional stream enhancements. The outcome maintains the connectivity up and downstream in the catchment.

Overall, the effects of the BOGP on watercourse extent and aquatic ecological values are avoided, minimised, remedied or mitigated, and with additional compensation, the outcome of BOGP delivers a no net loss and enhanced benefit for aquatic ecological values.

A functional need for the permanent stream diversions at Shepherds Creek and temporary diversion at Rise and Shine Creek is demonstrated in Boffa Miskell (2025a). Although loss has been minimised as far as possible by MGL via the proposed capture of water and transfer back into the creeks, the loss of 7,139 m of Shepherds Creek, 1,483 m of Rise and Shine Creek, and temporary diversion of 880 m (Mt Mocha Creek) of perennial stream is unavoidable.

MGL propose to remedy the stream reclamation through stream creation and rehabilitation which will result in the enhancement of a total of 10,754 m in Shepherds Creek, 1,600 m in the Rise and Shine Creek catchment, and approximately 6,700 m of Bendigo and Clearwater Creeks. MGL proposes to manage crack willow trees out of the Bendigo and Clearwater Creeks as part of this enhancement and transfer this to native riparian vegetation. The manner in which these measures will be undertaken is addressed in the Freshwater Ecology Management and Monitoring Plan in **Part G** of these application documents.

The proposed mitigation and offsetting is also summarised in Section 7 of this report and incorporated into the proposed conditions, included in **Part D** of these application documents.

6.9 LANDSCAPE, NATURAL CHARACTER AND VISUAL AMENITY EFFECTS

The potential effects of the BOGP on the landscape, visual amenity, and natural character values of the Project Site and surrounding environment have been assessed in detail in Boffa Miskell (2025). A copy of this assessment is provided in **Part B** of these application documents. At the outset, and as discussed below, while the Project Site is located within the Dunstan Mountains ONL, the landscape of the underlying Bendigo and Ardgour Stations has been modified to accommodate extensive pastoral activity over the last 100 years.

The executive summary of Boffa Miskell (2025) is reproduced verbatim below:

Matakanui Gold Limited (MGL) is proposing to develop and establish a [568] ha gold mine operation on the western slopes of the Dunstan Mountains within the Shepherds

Creek and Rise and Shine Creek valleys. The Site is located within the Dunstan Mountains Outstanding Natural Landscape (ONL) and contains several tributaries and springs within the upper reaches of the creek catchments.

The proposal will include start-up, mining activity, and closure phases which will occur over a 30-year period. Beyond this, passive closure will include continued pest management, monitoring of water quality, and support ongoing rehabilitation with native vegetation.

This Landscape Assessment concludes the proposed mining activity will inevitably result in some significant adverse landscape effects during operation, albeit which remain relatively well contained within the broader Dunstan Mountains ONL. The location of the proposed open cast mines and consequent modified landforms have been developed in response to the underlying landscape context and its identified values and reduces the potential for any broader scale significant adverse landscape or natural character effects. In particular, mined extents have been located to reduce perceived impacts on the mountain's broader coherent back drop and skyline and includes rehabilitation of completed engineered landforms, stockpiles, haul roads, and process areas and tailings as well as backfilling the proposed Come-in Time Pit.

In combination with mining activity, extensive rehabilitation of native vegetation will occur within the catchments of Shepherds Creek and Rise and Shine Creek to enhance associated biophysical landscape values. This will occur in tandem with mining activity during operation and endure beyond closure. Once completed, the proposed development will remain embedded within a larger mosaic of rehabilitated habitats that contributes to enhancing the landscape's broader conservation values, including maintaining enduring recreation access through Thomson Saddle and continued opportunities to observe evidence of successive gold mining activity. Despite the scale of the project, potential external views of mining activity will remain relatively limited including avoiding potential significant adverse visual effects beyond the Site.

Landscape Effects

The landscape character of the Site is largely contained within the broader Dunstan Mountains ONL. In this context it forms a legible transition between the broad flat character of the peneplain to the south and the more defined angular ridgeline to the north. The valleys are highly expressive of their tectonic and fluvial formative processes, although the Rise and Shine Creek valley has remnant gold sluicing from the historic Bendigo goldfield. Vegetation within the valley has been modified to accommodate stock grazing, with remnant kowhai, and matagouri found within the sheltered valleys, and tussockland and herbfield present at higher altitudes. At the centre of the Site, is Battery Hill (trig station number B10D) a local and legible feature visible along the broader Dunstan Mountains skyline. The Rise and Shine Creek valley within the Site was also once an alternative travel route for mana whenua between Moeraki and Makarora.

Key elements of the proposed mine which give rise to potential adverse landscape effects include the Rise and Shine Pit, Come in Time Pit, and Srex Pit which, with the

exception of backfilling the Come-in-Time Pit, will endure. The proposed mining activity will also involve the construction of permanent landscape features such as the Tailings Storage Facility (TSF), Shepherds Engineered Landform (ELF), Western ELF and Srex ELF with associated diversion channels which will be progressively rehabilitated. Additional effects throughout the project include the construction and use of the haul roads, construction of the plant, site workers camp and geology compound, the Thomson Gorge Road realignment as well as the subsequent rehabilitation of Come and Time Pit. Many of these effects will be most prominent during the mining activity phase of the project and will gradually reduce as mining activity is completed and progressively rehabilitated.

Overall effects of the proposed mine in the context of the broader Dunstan Mountains Outstanding Natural Landscape are considered ***moderate adverse****. The coherent interface between the northern and southern Dunstan Mountains will remain albeit with more substantial but relatively localised disruption within the Rise and Shine Creek and Shepherds Creek valleys. While evident from beyond the Site, these effects will not significantly detract from the values of the overall outstanding natural landscape. At a local scale, the level of adverse effects ranges from* ***low*** *to* ***high*** *during mining activity, with the greatest effects resulting from permanent changes to create the Rise and Shine Pit. At the local scale, cumulative effects of the proposed mine will further modify the Shepherds Creek valley, and sections of the Rise and Shine Creek valley while remaining integrated within the western backdrop of the Dunstan Mountains which includes the relatively intact form of Battery Hill along the skyline.*

Visual Effects

Views of the Site are contained to the Upper Clutha valley to the north of Lake Dunstan. In this context, views are available from several private and public viewpoints throughout the valley in proximity of Bendigo, Tarras, Lindis Crossing, Queensbury, and Mount Pisa Settlement, including State Highways 8, 8a, and 6. This also includes public conservation areas within the Pisa Range, and Dunstan Mountains.

Visual effects from private viewpoints and residential dwellings range from ***very low adverse*** *to* ***moderate - high*** *adverse during the height of mining activity. The greatest effects are experienced from Ardgour Road, and Bendigo Terrace where the elevated topography and proximity to the Site provides for views into the Shepherds Creek and Rise and Shine Creek valleys. Views from Tarras, Queensberry, and Mount Pisa settlement are long distance views which include views of the Shepherds Creek valley, Rise and Shine Pit, Come in Time Pit, haul roads, Pest Exclusion Areas, TSF and ELF. Views in proximity of the Site from lower elevations are largely truncated by the foothills to the west of the Site, and intervening topography.*

Visual effects from local roads and the State Highway range from ***low adverse*** *to* ***moderate adverse*** *with the greatest effect experienced during the mining phase observed from Thomson Gorge Road as this is relocated to Ardgour Rise. Views from Thomson Gorge Road will be primarily associated with the construction of the site workers camp. These effects will reduce to* ***neutral*** *at closure. Within the broader context, visual effects are no greater than* ***moderate adverse*** *during the height of mining activity and are largely oblique.*

*Visual effects from conservation areas range from **very low adverse** to **low moderate adverse**. From these areas, views are largely concealed by intervening landform and otherwise seen over substantial viewing distances, including Ardgour Conservation Area to the southeast of the Site, and Pisa Conservation Area approximately 15km west. Views from the Ardgour Conservation Area are primarily associated with the TSF, Thomson Gorge Road realignment (Ardgour Rise), and the ELF, while views from the Pisa Conservation Area primarily include Rise and Shine Pit, ELF, Ardgour Rise, and open views of the Come in Time pit and Site Workers Camp /Geology Compound.*

Natural Character Effects

*The Site includes two creek catchments, namely Shepherds Creek and Rise and Shine Creek. The Shepherds Creek catchment is characterised by several ephemeral, perennial, and intermittent streams in the upper catchment. The upper and lower reaches contain sand and gravels and are gentle in gradient. These reaches are separated by a narrow, rocky, gorge containing waterfalls, boulders, and pools. The active bed largely follows its original course, albeit within a modified pastoral context. The Rise and Shine Creek catchment is part of the Clearwater Creek catchment and is characterised by its steep headwaters on the upper slopes of Mount Moka, its modified valley floor from historic gold mining in the valley, and the gorge downstream. The existing level of natural character of Shepherds Creek is considered **moderate**, while the existing level of natural character within Rise and Shine Creek is considered **low moderate**.*

Key elements of the proposed mine which give rise to natural character effects include the TSF, ELF, and plant infrastructure within the Shepherds Creek catchment, and the SRX pit, SRE pit, SRX ELF, Rise and Shine pit, and haul roads within the Rise and Shine Creek catchment.

*Natural character effects of the proposal on Shepherds Creek are no greater than **moderate-high adverse** and will reduce the overall level of natural character from **moderate**, to **low**. Natural character effects on Rise and Shine Creek are considered no greater than **moderate adverse** and will reduce the overall level of natural character from **low moderate** to **low**.*

The landscape, visual and natural character effects outlined above will be mitigated and managed through rehabilitation throughout the duration of the BOGP and after project completion. Boffa Miskell (2025) recommend the following rehabilitation and mitigation measures to manage adverse landscape, visual and natural character effects:

Rehabilitation and mitigation of effects will occur throughout the duration of the project, with topsoil stockpiles located throughout the Site each being used as part of the rehabilitation of each of the mine elements. During operation, the construction of the Shepherds ELF will be tiered with several benches, one of which will include mine infrastructure, buildings, and laydown areas. At completion of extraction, the Shepherds ELF will be recontoured to resemble the topography of the surrounding landscape, and to allow for the establishment of native shrubland. A similar rehabilitation method will be used for the SRX ELF, in that benching will be removed,

and slopes will be recontoured to allow for the establishment of native vegetation. The Western ELF will be rehabilitated in earlier years of the project and will be contoured to resemble the permanent landform using overburden from the RAS pit. No benching is proposed, with the landform being rehabilitated to support the recolonisation of cushionfield on north and western facing slopes [...]

At closure, the TSF will be capped to enable the establishment of native tussockland, at least 2ha of wetland, and 4ha of marsh [...]

The CIT pit will be backfilled with brown rock and covered with topsoil to resemble the topography of the surrounding context. SRE pit will also be backfilled on completion of extraction and amalgamated into the final landform of the SRX ELF [...]

To address potential adverse effects, this assessment has adopted an integrated effects management strategy that means in most cases the ecological mitigation and the landscape mitigation planting take a similar form and in the same key locations, or locations which link to one another. Ecology is integrated with landscape to provide a more continuous connection of vegetation and freshwater environments, which will benefit biodiversity throughout the proposed project footprint whilst also providing benefit from a landscape and visual perspective.

In summary, mitigation measures for this project have been developed in two ways:

- *Measures that intrinsically comprise part of the development design through an iterative process;*
- *Specific Mine Rehabilitation Actions designed to reduce adverse effects of the final development proposals including rehabilitation of mine elements and substantial areas of ecological mitigation set out within a separate **Landscape and Ecological Rehabilitation Plan**.*

The Landscape and Ecological Rehabilitation Plan also encompasses anticipated ecological mitigation planting as set out in the separate assessments of ecological effects. To ensure the certainty of these measures, it is recommended that landscape rehabilitation including ongoing management actions form conditions of consent.

MGL has accepted the rehabilitation and mitigation measures recommended by Boffa Miskell (2025) above, which are primarily achieved through the implementation of the recommended Landscape and Ecological Rehabilitation Management Plan (“**LERMP**”). The LERMP has been prepared and is provided in **Part G** of these application documents.

The key measures set out in the LERMP to manage actual and potential landscape and visual effects associated with the BOGP are summarised in Section 7 of this report and incorporated into the proposed conditions included in **Part D** of this application.

6.10 GEOTECHNICAL EFFECTS

Site-specific seismic hazards for the BOGP have been assessed in EGL (2025a). A copy of this assessment is also provided in **Part B** of this application, and the executive summary is reproduced verbatim below:

> *This report provides a site-specific seismic hazard assessment (SSSHA) for the Bendigo-Ophir Gold Project (BOGP). The results are required for the safe design of the Tailings Storage Facility (TSF) in accordance with the New Zealand Dam Safety Guidelines (NZDSG) published in 2024. The results are suitable for other structures, with due consideration for the specific basis of design being applied and compliance with the Building Act, Regulations and Codes.*
>
> *Peak ground acceleration (PGA) and spectral acceleration values are provided along with mean magnitudes for design.*
>
> *For the site, the seismic hazard contribution from shallow crustal earthquakes is the most notable. This includes known and undefined faults in the wider local region, with notable contribution from the Alpine Fault at the 1 in 150 year level. The Alpine Fault (closest distance of approximately 115km, potential magnitude up to Mw 8.6) is considered as a shallow crustal fault. At 1 in 10,000 year levels of shaking, at shorter spectral periods, including those typical of the TSF embankment, it is the local faults, known and undefined, that contribute most to the seismic hazard at this intensity level, and less so the Alpine Fault. The Puysegur Margin Subduction Zone (closest distance approximately 90 km) has a contribution. It contributes at all spectral periods for the Operating Basis Earthquake (OBE) (33 to 48 %) and long spectral periods for the Safety Evaluation Earthquake (SEE) (26 to 40 %). The TSF will be designed to be robust and safe from all potential earthquake sources contributing to the seismic hazard.*
>
> *There are two nearby active fault sources contributing to the seismic hazard, the Dunstan (closest distance of 9 km) and Pisa (closest distance of 13 km) fault systems, with maximum magnitude estimates between Mw 7.1 and 8.3. The Pisa fault system aligns with the branches of the Cluden (15 km), and Grandview Faults (15 km) which can act together. Table 1 in the report provides a further summary of the characteristics of these fault sources which are shown in Figure 1. There are no known active faults expressed at the surface through the BOGP site.*

As previously noted, EGL has also prepared a suite of technical reports that consider geotechnical matters for the BOGP. Several of these are technical and / or factual reports that provide guidance for the design of key mine components, including:

- The Shepherds TSF - EGL (2025b);
- The Shepherds Silt Pond - EGL (2025d);
- The diversion of Rise and Shine Creek around the RAS Open Pit - EGL (2025e);
- The processing plant and supporting infrastructure - EGL (2025f);

> The Shepherds ELF, Western ELF, SRX ELF and the CIT Open Pit Backfill - EGL (2025h); and

> RAS Open Cut Pit and RAS Underground – Peter O'Bryan (2025).

The geotechnical investigations undertaken within the Project Site that inform the design of these components are detailed in the Site Geotechnical Factual Report in EGL (2025c). Copies of these reports are provided in **Part B** of these application documents. The key relevant findings of these reports are summarised below.

EGL (2025b) assesses the TSF design against the New Zealand Dam Safety Guidelines ("**NZDSG**") prepared by the New Zealand Society on Large Dams 2024). The key findings of this assessment are detailed in the executive summary which is reproduced in part below.

> *This technical report presents the proposed design, construction, operation, maintenance and surveillance of the proposed Shepherds TSF. Shepherds TSF will be formed by a 108 m high downstream constructed earth and rockfill embankment dam with a proposed crest at 690 mRL. The design analyses undertaken confirm that the design meets the design and performance criteria in the NZDSG. As the embankment is developed it will be buttressed downstream by the Shepherd ELF. This ELF provides a large buttress to the TSF embankment such that there is no credible long-term failure mode that could result in breach and release of tailings.*

EGL (2025d) assesses the Shepherds Silt Pond against the NZDSG. The key findings of this assessment are detailed in the executive summary which is reproduced in part below.

> *A dam breach assessment has been undertaken, and Shepherds Silt Pond is assessed as a Low Potential Impact Classification dam. The design, construction, operation, maintenance, surveillance and closure will be undertaken in accordance with the NZDSG, the Building Act, and the Building (Dam Safety) Regulations. Further foundation investigation and detailed design is required as part of the Building Consent, which is required from Environment Canterbury (the relevant Building Consent Authority for dams) prior to construction.*

EGL (2025f) provides a geotechnical stability assessment of the processing plant, infrastructure and administration areas for the BOGP, which concludes the following:

> *On the basis of our investigations, site observations and geotechnical analyses that has been completed to date, EGL generally considers the proposed Process Plant, Infrastructure, and Administration areas (as shown on the appended drawings) are geotechnically suitable for the proposed development and are not exposed to any natural hazards that cannot be mitigated through normal design and construction solutions.*

EGL (2025h) assesses the geotechnical stability of the ELFs for the BOGP through preliminary static and seismic stability analyses. These analyses concluded that the design of these ELF's will be stable in closure and in a 1 in 2,500 year seismic event.

Peter O'Bryan (2025) undertook a geotechnical assessment of proposed mining at the RAS deposit based on discussions with MGL geological and mining personnel, inspection of the general topographic setting, surface exposures and cores from geotechnical and selected exploration/ resource definition boreholes, and information/ data gathered for and results from prior geotechnical investigation. The report concludes:

> *... that, with the recommended program of ongoing analysis and application of appropriate, practicable methods in mining and ground performance monitoring; open pit and underground stability of planned excavations at RAS can be managed safely and adequately.*

Construction management and ongoing performance monitoring of key project components and infrastructure is provided for in the Engineered Landform, Pond and Reservoir and Tailings Management Plans prepared by EGL. The implementation of these management plans is reflected in the proposed conditions in **Part D,** with copies of these management plans provided in **Part G** of these application documents.

6.11 NOISE AND VIBRATION EFFECTS

The potential noise and vibration effects of the BOGP have been assessed in Marshall Day (2025). A copy of this assessment is provided in **Part B** of these application documents, and the executive summary reproduced verbatim below:

> ***This assessment of operational noise from the proposed Bendigo-Ophir Gold Project [project] in Central Otago finds that noise effects from onsite activities will be minimal in the context of the existing rural residential noise environment and what can be reasonably anticipated by the District Plan permitted activity noise limits.***
>
> *Marshall Day Acoustics has assessed noise and vibration effects for the proposed project. This report evaluates potential impacts during the construction and operational phases, providing recommendations to ensure compliance with regulatory standards and to minimise disturbance to nearby sensitive receivers.*
>
> *The large distances between primary noise sources and sensitive receivers, combined with the natural screening effects provided by the terrain, means that activity noise levels will comply with the Central Otago District Plan (CODP) permitted activity noise limits of 55 dB L_{A10} (daytime) and 40 dB L_{A10} (night-time) at the closest residential receivers. On site construction noise and blasting activities are also expected to comply with the CODP permitted activity standards.*
>
> *While vehicle noise from public roads is exempt from compliance with the District Plan permitted activity noise limits, we note the dwelling at 213 Ardgour Road will experience a temporary (2 to 3 months) adverse noise effect from increased construction phase truck movements along Ardgour Road - noise levels will be in the order of 60 dB L_{Aeq} at this dwelling. Other dwellings are sufficiently set back from Ardgour and Thomson Gorge Roads such that truck noise levels will be less than 54 dB*

L_{Aeq} which is below World Health Organisation and NZS 6802:2008 guideline values. Given the relatively short duration of the construction phase and peak truck movements, we consider that truck noise effects will be reasonable.

In Section 11.0 we have proposed several consent conditions for the project including:

1. *Noise limits that reflect the CODP numerical values but with updated metrics and Standards to reflect current best practice;*
2. *Blasting noise (overpressure) and vibration limits to reflect current best practice;*
3. *The requirement of a Noise and Vibration Management Plan to manage the day-to-day noise and vibration emissions at the mine, including a procedure for handling complaints; and*
4. *A requirement that the best practicable option is adopted on site to minimise noise at all times.*

Marshall Day (2025) recommends a range of measures to appropriately manage any adverse noise and vibration effects throughout the duration of the project. These include:

- A suite of conditions which contain noise and vibration limits that are broadly equivalent to the District Plan noise standards, which adopt the latest industry best practice standards;[66]
- Different daytime and night-time noise limits for mining activities to minimise any adverse noise effects within the notional boundary of any surrounding dwellings;
- Conditions which require mining operations to utilise the best practicable option to minimise noise at all times, including requirements for site vehicles to not be fitted with tonal or beeper reversing alarms, regular replacement of worn parts, maintenance of mufflers, and lubrication of moving parts for plant and equipment; and
- The preparation of a Noise and Vibration Management Plan ("**NVMP**") to control day-to-day emissions from the Project Site during construction, operational and blasting activities. As a minimum, the NVMP shall include:
  - The person(s) responsible for implementing the NVMP;
  - Applicable noise conditions relating to noise and vibration;
  - Specific procedures for informing neighbours of when blasting will occur;
  - Procedures for noise and vibration monitoring;

[66] The 2008 versions of New Zealand Standard NZS 6801:2008 "*Acoustics - Measurement of environmental sound*" and NZS 6802:2008 "*Acoustics - Environmental Noise"* as they require the use of the L_{Aeq} noise metric.

- Training of staff relating to how to minimise noise and vibration;
- Maintenance schedule for site access road surfaces to avoid excessive noise and vibration;
- Activity risk analysis for noise and vibration generation; and
- Procedure for handling complaints.

MGL has accepted the mitigation and management measures recommended by Marshall Day (2025) above, which has included the preparation of the recommended NVMP for the BOGP. A copy of this management plan is provided in **Part G** of these application documents.

The key measures to manage noise and vibration effects associated with the BOGP are summarised in Section 7 of this report and are incorporated into the proposed conditions included in **Part D** of these application documents.

6.12 ROADING AND TRAFFIC

The potential effects of the BOGP on the surrounding roading and traffic network have been assessed by Stantec (2025). A copy of this assessment is provided in **Part B** of these application documents, and the executive summary reproduced verbatim below:

> *This report provides an Integrated Transport Assessment for the Bendigo-Ophir Gold Project (BOGP). A primary access route is proposed from State Highway 8 (SH8) to the project site via Ardgour Road and Thomson Gorge Road. Currently these existing local roads experience a range of movements from less than 100 vehicle movements per day (vpd) to approximately 300vpd. The project is expected to generate approximately 400 vpd during construction, dropping to 250 vpd during operations. A range of transport mitigation improvements are proposed to support the project traffic, including safety improvements at the SH8 / Ardgour Road intersection, and upgrading Thomson Gorge Road. In addition, a new alternative local road route via Ardgour Station will be implemented at the time the project site results in the need to close part of Thomson Gorge Road. Together with a Project Traffic Management Plan, it is concluded that these mitigation measures will result in an acceptable outcome from a transport perspective.*
>
> *Matakanui Gold Limited is proposing to establish the BOGP which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. The Project site is located approximately 20 km north of Cromwell.*
>
> *The Project site will be accessed from the north, via State Highway 8 (SH8), Ardgour Road, and Thomson Gorge Road. Since the footprint of the mining areas will overlap part of Thomson Gorge Road, which forms part of the existing public road network connecting Bendigo and the Manuherikia Valley over the Dunstan Mountains, it is*

proposed to close part of the road. An alternative public road route will be formed via Ardgour Station to maintain public access.

The construction works associated with establishing the mine are expected to generate up to 400 vpd over a two year period with a high proportion of these being heavy vehicles early in construction.

Once the mine becomes operational, it is expected to generate approximately 250 vpd. This will primarily comprise staff travel which will be a mix of bus and private vehicles.

Substantial improvements are proposed to the road network connecting to SH8 to support the increased traffic volumes. These comprise safety improvements at the SH8 / Ardgour Road intersection and widening of Thomson Gorge Road. Although these improvements to the road network are proposed as part of the site establishment works to mitigate the effects of the additional vehicle movements on the road network, it is recommended that the improvements are required as conditions of consent.

A Project Traffic Management Plan will be required to manage the construction traffic effects as the site is established and it is recommended that the preparation and implementation of this is required as a condition of consent. It is also recommended that the Traffic Management Plan addresses the subsequent production stage to set out the framework for monitoring and managing any traffic effects that may arise.

Overall, it has been concluded that the transport related effects of the Bendigo-Ophir Gold Project can be appropriately managed subject to conditions of consent requiring:

1. *Safety improvements at the SH8 / Ardgour Road intersection that:*
    a. *provide a right turn bay from SH8 into Ardgour Road to NZTA design requirements;*
    b. *ensure that two-way movement of trucks turning in and out of Ardgour Road can be accommodated;*
    c. *provide for consequential change to roadside infrastructure including the likes of roadside barrier changes, flag lighting, and signage as determined through detailed design processes.*
2. *Safety management / maintenance measures on Ardgour Road from SH8 to Thomson Gorge Road to include:*
    a. *edgeline delineation at the curve 1.45km south of SH8,*
    b. *curve advisory signage assessment (and implementation of any signage that meets NZTA Traffic Control Devices Manual warrants).*
3. *Widening of Thomson Gorge Road between Ardgour Road and Shepherd Creek Valley to provide a minimum sealed carriageway width of 6.5 m;*
4. *Construction of an alternate vehicle route to Thomson Gorge Road for public access to the Dunstan Mountains to the east of the Project site, to ensure there is*

a satisfactory alternative public route bypassing the affected area when Thomson Gorge Road has to be closed because of mining activity;

5. *Implementation of a Project Traffic Management Plan.*

   The purpose of the Project Traffic Management Plan is to set out the methodology for managing traffic movements during the construction and production phases. The plan will include:

   - *Route restrictions;*
   - *Operating hours;*
   - *Any necessary road improvements;*
   - *Any necessary traffic management signage;*
   - *Driver code of conduct;*
   - *Complaints procedures;*
   - *Project contact details.*

MGL has accepted the mitigation measures recommended by Stantec (2025) above. In particular:

- The recommended safety improvements at the SH8 / Ardgour Road intersection, the safety management and maintenance measures on Ardgour Road, the widening of Thomson Gorge Road and the construction of an alternative route to Thomson Gorge Road for public access between the Ardgour Terrace and Thomsons Saddle (i.e. Ardgour Rise) are set out in the project description in Section 3.18 of this report; and
- The recommended Project Traffic Management Plan has also been prepared by Stantec and is provided in **Part G** of these application documents.

It is also noted that Ardgour Rise will be accessible before the closure of Thomson Gorge Road and public access across the Dunstan Mountains will therefore be maintained at all times.

These recommended measures are also summarised in Section 7 of this report and incorporated into the proposed conditions, provided as **Part D** of these application documents.

6.13 LIGHTING EFFECTS

The potential effects of exterior lighting proposed for the BOGP have been assessed in Cosgroves (2025), which provides recommendations to achieve compliance with light spill limits set out in the District Plan. A copy of this assessment is provided in **Part B** of these application documents, with the executive summary reproduced verbatim below.

Cosgroves has been engaged by Matakanui Gold Ltd. to review, provide comment and expert advice regarding the mitigation and effects of exterior lighting anticipated to be included within the proposed Bendigo Ophir Gold Project. ***This report concludes that the current mandatory requirements for compliance with the District Plan relate only to light spill limits, which will be achieved through the proposed conditions to mitigate lighting effects.***

Exterior lighting is required for the practical and safe establishment and operation of buildings and equipment associated with the project. This report identifies a number of mitigating factors that can be employed to minimise the environmental impacts of exterior lighting, with consideration of spill light towards boundaries and neighbouring properties as well as upward spill light towards the night sky.

Consent conditions for the project should ensure that compliance with the District Plan is achieved as per Rule 12.7.6 which states:

"No activities shall result in greater than 10 lux spill (horizontal and vertical) of light onto any adjoining property or road, ...The amount of light that may be spilled onto a neighbouring property may be increased by not more than 100%, in cases where the activity on that neighbouring property is not residential."

In summary, the proposed lighting layouts for the buildings, plant and processing areas within the Project Site are anticipated to comply with the light spill limits set out in the District Plan. Cosgroves (2025) has recommended conditions to ensure compliance with these limits and will undertake further calculations and modelling to demonstrate compliance.

In addition, the effects of lighting on ecology is assessed in RMA Ecology 2025c and mitigation strategies recommended in the Avifauna Management Plan and the Terrestrial Invertebrate Management Plan provided in **Part G** of these application documents.

Effects include disturbance of nesting birds and invertebrates in highly sensitive areas such as the cushionfields near the CIT Pit and the process plant area.

- The recommended mitigation measures in lighting design to limit ecological impacts of exterior lighting include:Limiting upward light spill with luminaires;
- Using a colour temperature of 3000k or lower where appropriate from a health and safety perspective;
- No exterior lighting in areas not directly involved in 24/7 operation; and
- Inwards direction of exterior lighting as far as practicable.

MGL has accepted the mitigation and management measures recommended by Cosgroves (2025) above, with key measures summarised in Section 7 of this report and incorporated into the proposed conditions provided in **Part D** of these application documents.

6.14 CONTAMINATED LAND MANAGEMENT

A Preliminary Site Investigation was undertaken by GRM to assess the current and potential adverse effects of contaminated land associated with the BOGP. This report is provided in GRM (2025), a copy of which is included in **Part B** of these application documents. The executive summary of this report is reproduced verbatim as follows:

> *Geocontam Risk Management Ltd (GRM) has undertaken a Preliminary Site Investigation (PSI) on behalf of Matakanui Gold Limited (MGL), a fully-owned subsidiary of Santana Minerals Limited, for the Bendigo-Ophir Gold Project (the Project), which is located in the Dunstan Mountains of Central Otago, New Zealand (NZ). This evaluation of the current and potential future site contamination risks associated with the development of the Project, has been undertaken to support the assessment of environmental effects (AEE) and meet regulatory obligations under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations (NESCS) that arise from the recognition that historic and future mining operations associated with the project are defined in the Hazardous Activities and Industries List (HAIL) as a potentially contaminating land use (Category E7).*
>
> ***The report concludes that determining appropriate ecological background threshold values, and inclusion in site management plans, should ensure that future mining activities within the Project area that have the potential to release contaminants to the environment are appropriately managed. This has been integrated into the soil management plan to address this environmental aspect.***
>
> *The purpose of this PSI is to identify any existing and potential future risks to receptors associated with the historic and proposed future land uses to ensure potential risks to receptors can be appropriately mitigated during the proposed mine development, operations, and closure stages. The key objectives of this PSI are therefore to:*
>
> - *Define the existing and potential sources of contamination and their associated potential constituents of concern (PCOC) associated with historic land use and future mine development activities;*
> - *Identify the pathways for PCOC migration and potential receptors that could be impacted; and*
> - *Determine future requirements for further investigation or management of contamination risks.*
>
> *The following scope of work was undertaken in accordance with the requirements of the Contaminated Land Management Guidelines (CLMG) (MfE, 2021) and included:*
>
> - *A desktop review of the site history and environmental setting from site-specific reports and publicly available maps and databases;*
> - *Completion of a site inspection and a review of the existing physical environment;*

- *Development of a conceptual site model (CSM) identifying areas of potential environmental concern (APECs), PCOC, potential migration and exposure pathways, and key receptors;*
- *Identification of data gaps in the context of future site development and land uses, and provision of recommendations for further detailed site investigation (DSI) and/or development of a site management plan (SMP); and*
- *Preparation of this PSI report.*

The results of this PSI have identified the following site conditions and potential contamination risks associated with the historic land use and proposed future mining activities:

- *The Project area is located within the Otago Schist belt, which comprises metasedimentary and metavolcanic rocks metamorphosed to greenschist facies. Gold mineralisation is widespread within the Otago Shists with the dominant mineralisation in the region generally associated with silica-siderite/ankerite alteration with minor arsenopyrite sulfides associated with the gold;*
- *There is no record of permanent Māori occupation within the Project area, however the Project area has a long history of pastoral occupation dating back to the late-1850s, and historic gold mining operations comprising alluvial sluicing and shallow mining of quartz reefs occurred in several areas across the site and surrounds between the 1860s through to the 1940s. Whilst pastoral land use has continued through to present day, only limited exploration activities have been undertaken since the 1980s;*
- *Detailed heritage mapping of the historic land use has been undertaken with numerous historic mining features, including prospecting pits, water races, mullock piles, tailings and dams, sluices areas, mine adits, turbines and batteries, alluvial workings, mapped as being present within the Project area. Several agricultural and pastoral features and one feature that may be associated with Māori activity have been identified within the broader mining lease area, however most are distal to the Project area;*
- *Baseline environmental studies have been undertaken within the Project area to assess the ecological values of the environment with respect to groundwater, surface water, and aquatic and terrestrial ecosystems. Based on these studies, few of the identified indigenous grasses and herbs are known to be rare or under any significant threat locally, regionally or nationally. Several indigenous habitats and protected wildlife species are present, but no threatened or At-Risk freshwater species have been identified;*
- *Notable evidence of the mining history is present within the Thomson Gorge along Rise and Shine Creek. Remnant impacts from the historic activities are visible within the Project area associated with the accumulation of sluicing debris and migration of tailings along creek beds, adits, mullock piles, and the former battery sites. Soil sampling and water quality monitoring around these areas has identified potentially elevated concentrations of metals in shallow soil (arsenic*

(As) and possibly cadmium (Cd)), surface water (As, cobalt (Co), copper (Cu), and iron (Fe)), and groundwater (As, Cr, Cu, Fe, strontium (Sr), thallium (Tl), and zinc (Zn)) within the project area;

- *Arsenic (As) has been identified at concentrations above industrial land use human health protection criteria and above 60% and 80% Eco-SGV in shallow soils within the Project area, predominantly within the historic mining areas. Potentially complete exposure pathways may result from the disturbance of these soils during future mining activities. Cadmium (Cd) was found extensively above 80% Eco-SGV and may also warrant management during operations to meet post-closure land use objectives; and*
- *If not appropriately managed, future mining activities within the Project area have the potential to release contaminants to the environment, potentially resulting in adverse impacts to terrestrial and aquatic ecosystems. Future mine site features including the open pit, underground workings, an engineered landform (ELF), tailings storage facility (TSF), processing plant, run-of-mine (ROM) pad, topsoil stockpiles, vehicle washdown and refuelling facilities, explosives magazine and emulsion factory, and mining fleet workshops will require appropriate facility design and management plans to minimise potential risks to human health and the environment.*

Based on the findings of this PSI, the following recommendations are made:

- *A detailed evaluation of the extensive soil dataset should be undertaken for the Rise and Shine Valley to better inform a risk assessment of the disturbance of soils with elevated As (and potentially Cd) concentrations during operations. Using the existing soil dataset, appropriate ecological background threshold values (BTV) should be derived using an appropriate industry-recognised methodology (e.g., upper tolerance limit (UTL)) for the Project area to support the assessment of environmental effects during operations and closure;*
- *A SMP should be developed in accordance with the requirements defined in the Contaminated Land Guidelines No. 1 (MfE, 2021) to define the risks, control strategies, and management responsibilities associated with shallow soil management (i.e., arsenic impacted soils) within the Project area; and*
- *Management plans and associated conditions of consent should be developed to address operational risks associated with key mine sources that have the potential to adversely impact human health or ecological receptors. These should include procedures around waste rock and processing residues (e.g., tailings) to reduce environmental risks from AMD, dust management, chemical storage, spill response, and surface and groundwater monitoring.*

As summarised above, Geocontam Risk Management (2025) recommends mitigation measures to manage potential risks to receptors during the proposed development, operations and closure stages of the BOGP. MGL has accepted these recommendations, which has included the preparation of a Soil Management Plan to define the risks, control strategies and management responsibilities associated with arsenic impacted soils within

the Project Site. A copy of the Soil Management Plan is provided in **Part G** of these application documents.

Arsenic is a main pathfinder element[67] for gold mineralisation and is therefore expected to be naturally present, or present due to the historic alluvial mining practices, in elevated concentrations within the Project Site. However, if not properly managed, mining activities have the potential to expose and release arsenic from soil and rock into the surrounding environment.

As such, the Soil Management Plan proposes to segregate arsenic-rich soils for later reuse in either the rehabilitation of areas where the soils originated, or other areas that contain naturally elevated levels of arsenic. Targeted field sampling is proposed to further delineate the locations of arsenic-rich soils. Stockpiles of arsenic-rich soils will then be managed through a range of measures including dust suppression, vegetation cover and erosion and sediment controls. Once stockpiles are removed, validation sampling of the ground surfaces will be undertaken to ensure arsenic concentrations are below the performance criteria set in the Soil Management Plan.

MGL has also commissioned various other management plans (and proffered associated conditions) to address operational risks associated with key mine components of the BOGP that have the potential to adversely impact human health or ecological receptors. These management plans include:

- The Pond and Reservoir Management Plan and Tailings Management Plan prepared by EGL, which outlines procedures on waste rock and processing residues;
- The Engineered Landform Management Plan prepared by EGL and MWM, which outlines procedures for achieving geochemically stable ELFs to ensure water quality discharges are within compliance limits;
- The Water Management Plan, which outlines the proposed water management system and water monitoring requirements;
- The Air Quality Management Plan, which provides an air quality management framework for discharges of dust generated from the operation of the BOGP; and
- The Hazardous Substances Management Plan, which includes procedures on chemical storage and spill response.

[67] A chemical element (often trace element) that is spatially or genetically associated with an economically valuable mineral deposit (i.e. gold) but is easier to detect or forms a more widespread geochemical halo around the mineral deposit.

These key measures are summarised in Section 7 of this report and incorporated into the proposed conditions provided in **Part D** of these application documents.

6.15 EFFECTS RELATING TO THE STORAGE AND HANDLING OF HAZARDOUS SUBSTANCES

A range of hazardous substances will be stored and used across the wider project site during mining operations, including diesel and petrol, LPG, maintenance chemicals (including oils and greases), transformer oil, flocculant poly aluminium chloride and sewage. Hazardous substances that are stored at the explosives magazine and emulsion mixing facilities (located outside the main mining operations area on the Ardgour Terrace) could also be deployed across the pit mining areas. Additional hazardous substances could be stored and deployed at the processing plant area.

MGL has prepared a Hazardous Substances Environmental Management Plan for the BOGP which ensures the safe, responsible and compliant management of hazardous substances throughout all operations at the site. It aims to minimise the risk of environmental contamination and ensure compliance with all relevant legislation, regulations and industry's best practices. It details the nature and approximate quantities of hazardous substances that are stored and deployed across the project area. It outlines the processes to be followed to ensure tasks or activities associated with hazardous substances are conducted in a safe manner.

A copy of the Hazardous Substances Environmental Management Plan is provided in **Part G** of these application documents. Key measures within the plan are summarised in Section 7 of this report and incorporated into the proposed conditions provided in **Part D** of these application documents.

6.16 DUST AND AIR QUALITY EFFECTS

The potential effects of the BOGP on air quality values of the surrounding environment have been assessed in PDP (2025), a copy of which is provided in **Part B** of these application documents. The executive summary of PDP (2025) is reproduced verbatim below:

> *This is an air quality assessment of effects of the Bendigo-Ophir Gold Project ("**BOGP**") for dust and gaseous emissions. **This assessment concludes that with the proposed air quality mitigation and monitoring any potential adverse effects from dust or gaseous emissions will be less than minor**.*
>
> *Matakanui Gold Limited ("**MGL**") is proposing to establish the BOGP, which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. The project*

site is located approximately 20 km north of Cromwell and will have a maximum disturbance footprint of 568 hectares (ha).

*The BOGP involves mining four identified gold deposits referred to as Rise and Shine ("**RAS**"), Come in Time ("**CIT**"), Srex ("**SRX**") and Srex East ("**SRE**"). The resources will be mined by open pit methods at each deposit within the project site, with underground mining methods also proposed to be utilised at RAS to access the deeper gold deposits. The key activities which have the potential to generate dust within the BOGP are the establishment and operation of:*

- *Haul roads;*
- *The four open pits;*
- *Engineered landforms;*
- *Tailing Storage facility;*
- *Aggregate pits;*
- *Soil stockpiles; and*
- *Ore Crushing.*

The types of particulate matter discharged from these activities include:

- *Coarse particulate - Deposited dust and total suspended particulate;*
- *Fine particulate - PMIO (IQ-micron diameter or less) which can be inhaled;*
- *Respirable crystalline silica; and,*
- *Fine particulate containing elevated levels of arsenic.*

The are five potential sources of gaseous air contaminants:

- *Processing plant - leaching and adsorption tanks;*
- *Processing plant - acid wash and elution columns;*
- *Processing plant - electro-winning cells;*
- *Processing plant - induction furnace; and,*
- *Underground mine vents and portal.*

The types of gaseous contaminants discharged from these activities include:

- *Hydrogen cyanide;*
- *Ammonia; and*
- *Combustion products discharged from machines and vehicles - including PM_{10} and nitrogen dioxide.*

The potential adverse effects of the air contaminants discharged from the BOGP are:

- *Amenity effects — dust being deposited on surfaces;*
- *Ecological effects — Flora or fauna adversely impacted; and*

- *Health effects — particulate matter and gaseous contaminants inhaled by people.*

The BOGP has a total area of 568 ha and traverses an area with two distinctly different meteorological zones and two different types of receiving environment. For these reasons, the assessment of air quality impacts has been undertaken in two parts based on the different meteorological zones.

The key dust emission mitigation measures which will be defined in the Air Quality Management Plan (AQMP) and the proposed consent conditions will include:

- *Maintain adequate buffer distance (500 m) between large-scale earthworks or point air discharge sources and sensitive receptors;*
- *Ensure adequate water supply and provide appropriate infrastructure and machines for dust suppression;*
- *Material removal, stockpiling and handing when material and/or wind conditions will not result in dust being blown across the site boundary;*
- *Engineered and maintained road surface which minimise free fine material which can generate dust;*
- *Dampen surfaces of haul roads and stockpiles. (The site has sufficient water for typical and for high demand dust suppression);*
- *Minimising material drop heights;*
- *Vegetating soil stockpiles;*
- *Road speed limits; and*
- *Water sprays at fine material transfer points in the processing plant.*

The key gaseous emission mitigation measures which will be defined in the AQMP, and the proposed consent conditions will include the processing plant:

- *Maintaining pH between 10 and 12 in wet chemistry vessels to eliminate hydrogen cyanide gas;*
- *Induction furnace exhaust capture and discharge via 15 m stacks; and*
- *Particulate filtration of induction furnace exhaust flows.*

The assessment of potential amenity effects resulting from the discharge of dust found that for both the northern and southern zones any adverse effects would likely be less than minor.

An ecological survey has identified native herbs in the vicinity of the proposed BOGP proposed activities. However, onsite observations of plant health suggest the type and scale of dust discharged from the activities is not expected to pose any toxicological risks to flora.

Based on the nature of the BOGP dust, the separation distance to the nearest location where the public may be exposed for any duration of more than one hour, and the implementation of the proposed management measures, any adverse health impacts

from the particulate matter (PMIO, respirable crystalline silica and arsenic) discharged from the proposed mine will be negligible and certainly less than minor.

The potential discharge of hydrogen cyanide and ammonia gaseous contaminant have been assessed. Based on PDPs' assessment of these discharges the potential for any adverse health effects to occur from the discharge of gaseous contaminants from the processing plant is negligible.

To ensure that any actual adverse effects are no greater than the potential adverse effects assessed in this report, PDP recommend that the air discharge consent conditions define the:

- *Type and maximum scale of activities which are permitted to discharge contaminants to air;*
- *Environmental bottom lines and/or performance measures; e.g. no deposited dust or gaseous discharges which are offensive, objectionable, noxious or dangerous effect beyond the boundary of the site;*
- *Mitigation measures which shall be implemented;*
- *Environmental monitoring programme which will identify if the:*
  - *Mitigation measures are being effective; and,*
  - *Environmental bottom line is being complied with; and,*
- *Form and content of an air quality management plan to meet the recommendations made in Good Practice Guide Dust (MfE, 2016).*

MGL has accepted the mitigation and management measures recommended by PDP (2025). To ensure the residual source dust and gas emissions from the BOGP are minimised, MGL has commissioned PDP to prepare an Air Quality Management Plan which details the measures proposed to mitigate and monitor the discharge of contaminants to air. This management plan is provided in **Part G** of this application.

The purpose of the Air Quality Management Plan is to:

- Ensure there is no noxious, dangerous, objectionable or offensive dust on private land beyond the boundary of the Project Site; and
- Ensure that best practicable options for controlling emissions are adopted.

The content and structure of the Air Quality Management Plan follows best practice recommendations of the Ministry for the Environment's *Good Practice Guide for Assessing Discharges to Air from Industry 2016*. Overall, PDP (2025) considers the Air Quality Management Plan ties the mitigation measures and environment monitoring programme together into an effective and auditable package, whilst also noting the proposed water supply system for the Project Site will provide sufficient water for typical and for high demand dust suppression.

In addition, and as described in Section 3.18 of this report, a section of unsealed Thomson Gorge Road between Ardgour Road and the proposed new site access road will be upgraded (initially widened and then resurfaced and sealed after initial construction / site establishment activities are completed). The sealing of this section of road will contribute to a reduction in dust generation that may have otherwise adversely affected the surrounding dwellings and properties on the Bendigo / Ardgour terraces.

The key measures set out in the Air Quality Management Plan to manage the effects of contaminants discharged from the BOGP are summarised in Section 7 of this report and incorporated into the proposed conditions included in **Part D** of this application.

6.17 HISTORIC HERITAGE AND ARCHAEOLOGICAL EFFECTS

The effects of the BOGP on heritage values within the Project Site have been assessed in NZHP (2025a). Further to this, the effects on heritage values for specific components of the Project Site[68] are assessed in additional memorandum reports referred to in NZHP (2025b, 2025c, 2025d, and 2025e). Copies of these reports are provided in **Part B** of these application documents.

Overall, NZHP (2025a) assesses the entirety of the Project Site with the other memorandum reports providing supplementary information. As such, the executive summary in NZHP (2025a) is presented as follows:

> *New Zealand Heritage Properties Ltd (NZHP) has been commissioned by Matakanui Gold Ltd (MGL) to undertake a heritage assessment of the Bendigo-Ophir Gold Project area. Matakanui Gold Ltd is proposing to establish an open pit and underground gold mine within the project area.* ***The areas of highest heritage values of both the Bendigo Covenant Area and the Bendigo Quartz Reef Historic Area fall outside the BOGP footprint and will not be impacted by the proposed works.***
>
> *[...]*
>
> *The research undertaken for this assessment has shown that 16 previously recorded and ten new sites recorded during the survey phase of this work will be affected by the proposed works. Nine of the previously recorded sites and eight of the sites will be destroyed by the proposed works. Two additional sites fall within the project area (G41/4 – Rabbiter's Hut, and G41/5) but these will be protected during the works, with the intention for G41/4 to be adaptively re-used in the future. Short sections of the Rise and Shine race (G41/584), Come-in-Time race (G41/586), race G41/6 and one newly recorded race (G41/790) will be destroyed but all extend outside the project area and as such most of their extents will not be impacted. A significant portion of the*

[68] The temporary construction workers accommodation, magazine and emulsion tank area, the realignment of Thomson Gorge Road (Ardgour Rise) and the relocated walk track to the Come-in-Time Battery.

Matakanui-Bendigo Road (G41/782) will be destroyed, but parts of this feature extend outside the project area. A small portion of site G41/256 will also be removed. The project area also sits on the edge of the Bendigo Quartz Reefs Historic Area (List No. 9097), and within the area covered by the Bendigo Conservation Covenant. Potential also exists for additional mining, pastoral and transport/communication features to be encountered throughout the project area, along with a low risk of encountering sites relating the mana whenua use of an ara tawhito that passed over Thomsons Saddle.

The recorded sites are considered to individually have low to medium-high heritage values, and potential unrecorded sites may hold low to medium-high heritage values. Due to the nature of the proposed works, the overall impact of the works on the heritage values of both recorded and unrecorded sites will be major, with the exception of sites G41/251, G41/256, G41/584 and G41/586 which will be impacted to a minor degree, and sites G41/4 and G41/5 which will not be impacted. Of those subject to major impacts the majority have low heritage value with 13 that have low, one had low-medium, and eight have medium heritage value. Of those subject to minor impacts, one has low, two have medium and one has medium-high heritage values. Importantly, the remaining two sites with medium-high heritage values will not be impacted. When considered as a whole, the project area is considered by NZHP to hold high heritage values. The proposed works will have a major impact on the heritage values of the project area and a moderate impact on the Bendigo Quartz Reefs Historic Area. ***However, the areas of highest heritage values of both the Bendigo Covenant area and the Bendigo Quartz Reef Historic Area fall outside the BOGP footprint and will not be impacted by the proposed works.*** *Comparable examples of all sites affected by the proposed works can be found elsewhere in the Bendigo Covenant area and the Bendigo Quartz Reef Historic Area, and are generally better maintained, more accessible and visited more regularly by the public than those proposed for removal. The recommended mitigation outlined in Section 10.1.3, would go some way to mitigate and offset the adverse effects, reducing the overall impacts of the works.*

[...]

A full summary table of the above effects on heritage and archaeology sites and values within the Project Site is presented in full in NZHP (2025a), with a summary provided in Table 6-1 below.

Table 6-1: Summary of Effects on Heritage Sites within the BOGP Project Site

Site Details			Assessment of Effects on Heritage Values		Assessment of Effects on Archaeology Values	
Arch Site	Site Name	Site Type	Significance	Magnitude of Impact	Effect on Structure(s)	Effect on Subsurface Archaeology
G41/4	Rabbiter's Hut	Pastoral / agricultural	Medium-High	No Impact	N/A	N/A
G41/5	-	Pastoral / agricultural	Medium-High	No Impact	N/A	N/A
G41/6	-	Mining-gold	Low	Major	Partial removal	Partial removal
G41/251	Come-in-Time Battery	Mining-gold	Medium-High	Minor	N/A	Partial removal
G41/256	-	Mining-gold	Low	Minor	N/A	Partial removal
G41/264	Rise and Shine Gold Workings	Mining-gold	Medium	Major	N/A	Full removal
G41/265	-	Historic-domestic	Medium	Major	Full removal	Full removal
G41/266	-	Historic-domestic	Medium	Major	Full removal	Full removal
G41/267	-	Historic-domestic	Medium	Major	Full removal	Full removal
G41/269	Rise and Shine Dam	Mining-gold	Medium	Major	Full removal	Full removal

Site Details			Assessment of Effects on Heritage Values		Assessment of Effects on Archaeology Values	
Arch Site	**Site Name**	**Site Type**	**Significance**	**Magnitude of Impact**	**Effect on Structure(s)**	**Effect on Subsurface Archaeology**
G41/273	-	Historic-domestic	Low	Major	Full removal	Full removal
G41/277	Rise and Shine Mine and Battery	Mining-gold	Medium	Major	N/A	Full removal
G41/584	Rise and Shine Water Race	Mining-gold	Medium	Minor	Partial removal	Partial removal
G41/586	Come-in-Time Water Race	Mining-gold	Medium	Minor	Partial removal	Partial removal
G41/589	-	Transport-communication	Low	Major	Full removal	Full removal
G41/604	-	Mining-gold	Medium	Major	N/A	Full removal
G41/605	-	Mining-gold	Medium	Major	N/A	Full removal
G41/606	-	Historic-domestic	Low	Major	Full removal	Full removal
G41/658	-	Historic-domestic	Low-Medium	Major	Full removal	Full removal
G41/782	Matakanui-Bendigo Road	Transport-communication	Low	Major	Partial removal	Full removal
G41/783	-	Transport- communication	Low	Major	N/A	Full removal

Site Details			Assessment of Effects on Heritage Values		Assessment of Effects on Archaeology Values	
Arch Site	**Site Name**	**Site Type**	**Significance**	**Magnitude of Impact**	**Effect on Structure(s)**	**Effect on Subsurface Archaeology**
G41/784	-	Historic-domestic	Low	Minor	N/A	Partial removal
G41/785	-	Historic-domestic	Low	Major	N/A	Full removal
G41/786	-	Historic-domestic	Low	Major	N/A	Full removal
G41/787	-	Mining-gold	Low	Major	N/A	Full removal
G41/788	-	Mining-gold	Low	Major	N/A	Full removal
G41/789	-	Mining-gold	Low	Major	N/A	Full removal
G41/790	-	Mining-gold	Low	Major	Partial removal	Partial removal

In light of the assessment presented above, NZHP (2025a) makes the following recommendations for an Archaeological Authority under the HNZPT Act:

1. ***Authority Application**: As the proposed works described [above] will affect the sites summarised in [Table 6.1], an archaeological authority under Section 44 of the HNZPT Act must be obtained from HNZPT prior to any modification of the sites.*
    a. *If development plans are altered from those reviewed for this assessment, then HNZPT and NZHP must be alerted, as any changes may alter the assessment of effects or invalidate the authority.*
2. ***Protection of sites/features**: As a first principle, every practical effort must be made to avoid damage to any heritage site, whether known, or discovered during any redevelopment of the site.*
    a. *Site G41/4 (Rabbiter's Hut) must be protected during works and any modifications for its future adaptive re-use may require a separate archaeological authority.*
    b. *No works will take place within the fenced boundary around site G41/5.*
    c. *No earthworks are to take place outside the project area as shown in Figure 1-1 and no topsoil or other overburden is to be stored within 10m of any previously recorded heritage site or those additional POI identified by NZHP.*
    d. *The points at which the Rise and Shine (G41/584) and Come-in-Time (G41/586) and newly recorded G41/790 water races enter the project area must be marked by semi-permanent timber survey pegs and avoided.*
3. ***Management Plan**: All works must be carried out in accordance with the archaeological management plan (AMP). Any amendments to the management plan will require prior written approval from HNZPT.*
4. ***Contractor Briefing**: All contractors working on the project must be briefed by the s45 approved person (or person nominated on their behalf) on the possibility of encountering archaeological evidence, how to identify possible archaeological sites/features during works, the archaeological work required by the conditions of the authority, and contractors' responsibilities with regard to notification of the discovery of archaeological evidence to ensure that the authority conditions are complied with.*
5. ***Recording of Water Races**: The affected portions of the Rise and Shine (G41/584) and Come-in-Time (G41/586) water races are to be recorded to a Level II standard as defined in HNZPT's guide, Investigation and Recording of Buildings and Standing Structures (HNZPT, 2018), and the full extent of each race digitally mapped. Affected portions of water race G41/790 are to be recorded to a Level III standard. Details of the recommended recording are provided in the AMP.*
6. ***Recording of Stone Huts and Dams**: The stone huts (G41/265, G41/266, G41/267, G41/273 and G41/606) and dam (G41/269) are to be recorded to a Level II standard as defined in HNZPT's guide, Investigation and Recording of Buildings*

and Standing Structures (HNZPT, 2018). Details of the recommended recording are provided in the AMP.

7. ***Recording of Stone Culverts and Revetments**: The stone culverts and revetments (G41/589 and G41/782) are to be recorded to a Level II standard as defined in HNZPT's guide, Investigation and Recording of Buildings and Standing Structures (HNZPT, 2018). Details of the recommended recording are provided in the AMP.*

8. ***Archaeological Monitoring**: All earthworks that may affect an archaeological site must be monitored by the s45 approved person (or person nominated on their behalf) in accordance with the management plan.*

    a. *An archaeologist must monitor all earthworks within recorded archaeological sites until virgin ground is encountered.*

    b. *Any archaeological features and material encountered shall be recorded, analysed, and interpreted in accordance with current archaeological practice and as outlined in the management plan.*

    c. *Works outside the extent of recorded sites can proceed under On-Call Protocols.*

9. ***Archaeology of Māori origin**: If archaeological material of Māori origin is discovered at any stage, all work must stop within 20m of the find. NZHP will assist the authority holder in contacting all relevant parties including takata whenua via Aukaha and HNZPT and in accordance with the AMP.*

    a. *Any taoka tūturu are prima facie the property of the Crown who will be notified of the find. Taoka tūturu will be registered with the Ministry for Culture and Heritage. NZHP, in collaboration with manawhenua, shall notify the Ministry of Culture and Heritage and establish the most appropriate temporary storage, management and care for taoka tūturu, until such time as traditional or actual ownership is determined, with an appropriate institution or kaitiaki.*

10. ***Kōiwi (human remains)**: Should kōiwi be encountered, all work must stop within 20m of the find. NZHP will assist the authority holder in contacting all affected parties as soon as practicable, including takata whenua via Aukaha, HNZPT, and the police. The Ngāi Tahu policy for kōiwi takata shall also be followed (Te Rūnanga o Ngāi Tahu, 2019).*

11. ***Public Outreach**: The results of the archaeological investigations, including reports, photographic records of the features and sites, and any digital 3D models should be made available to the public via the Cromwell Museum.*

12. ***Reporting**:*

    a. *Within 20 working days of the completion of on-site archaeological work, the site record forms must be updated or submitted to ArchSite.*

    b. *Within 12 months of the completion of on-site archaeological work, a final report on any archaeological material that is found must be prepared in*

accordance with ASG12 Archaeological Report Guideline (HNZPT, 2023) and submitted to HNZPT for inclusion in the digital library, to Cromwell Museum and the NZAA Central Filekeeper.

In addition, the following matters are recommended to be included in the proposed conditions as part of the substantive application for the BOGP:

1. ***Recording of Twentieth Century Heritage**: Features within sites identified in this report that postdate 1900 should be recorded following the procedures outlined for comparable archaeological sites and features described above. The results of these investigations should be included in the same report as the archaeological results.*
2. ***Reporting**: MGL must ensure the final report on the heritage investigations is made publicly available.*
3. ***Artefacts**: All archaeological and twentieth century artefacts collected during the proposed works should be retained and offered to the Cromwell Museum.*
4. ***Re-use of materials**: Stone from the stone huts, dam, culverts and revetments should be repurposed for landscaping or other purposes where it will be visible to future visitors to the project area or offered to Cromwell Museum or other local heritage organisations for re-use. Prior to their re-use, all stone should be kept in a secure storage location, with material from each site stored discretely to preserve the provenance.*
5. ***Post-Mining Interpretation**: As part of the remediation plans following the end of the mine's life, the results of the heritage site recording should be used to inform interpretive signage within publicly accessible areas of the project area:*
    a. *The paths of water races G41/584 and G41/586 should be marked on the landscape through trail posts or interactive signage at the entry and exit points of the races to the mining footprint*

The recording requirements for the 26 sites impacted by the BOGP are summarised in detail in the executive summary of NZHP (2025a). While these requirements vary according to the unique characteristics of each site, they generally involve:

> Mapping of all features using global navigation satellite system prior to modification;

> Vegetation and / or topsoil clearance by hand under supervision of an Archaeologist;

> Photographing all identified features of the site; and

> Recording of all archaeological / heritage features.

MGL has accepted the suite of mitigation measures recommended by NZHP (2025a). This includes the preparation of the Archaeological and Heritage Management Plan by NZHP which is provided in **Part G** of these application documents.

These are summarised in Section 7 of this report and incorporated into the proposed conditions which are included in **Part D** of the application.

6.18 PUBLIC ACCESS AND RECREATIONAL EFFECTS

An assessment of the potential effects of the BOGP on public access and recreation values is provided in Greenaway (2025), a copy of which is provided in **Part B** of these application documents. The executive summary of Greenaway (2025) is reproduced verbatim below:[69]

> *This report assesses the effects of the proposed Bendigo-Ophir Gold Project on the recreation values and opportunities in the Rise and Shine and Shepherds Creek catchments, and the recreation setting accessed via Thomson Gorge Road. Thomson Gorge Road is a regionally significant thoroughfare and recreation setting for cycling, four wheel driving (although it can be accessed in suitable two wheel drive vehicles also) and equestrian activities, and it provides access for, primarily, hunters in the neighbouring Bendigo and Ardgour Conservation Areas, and beyond. The historic restored Come-in-Time Battery is accessed via a short walk from the road.*
>
> *The mining proposal will result in the loss of access along Thomson Gorge Road, and access to the Come-in-Time Battery. The measures we propose to mitigate this loss of access are:*
>
> - *Developing Ardgour Rise as an alternative to Thompson Gorge Road to a standard suitable for public access, including appropriate road surfacing and width, design speed, gradient, road reserve, signage, safety features, and future maintenance requirements, and vesting in the CODC.*
> - *Providing a viewing area of the new mine activity from Ardgour Rise, with suitable interpretation about the project, in the same style as that currently provided for the Come-in-Time Battery.*
> - *Maintenance of existing recreation access to the Ardgour and Bendigo Conservation Areas.*
> - *Providing alternative walking access to the Come-in-Time Battery via the Bendigo Historic Reserve.*
> - *Consideration of cycle traffic on Ardgour Rise in the Project Traffic Management Plan.*
> - *Management of light, noise and blasting.*
>
> *Residual effects include the periodic need to close access to the Come-in-Time Battery when it falls within the blast radius of the proposed Come-in-Time Pit. Noise, light and landscape effects are otherwise considered minor for all public conservation and recreation areas, including the Bendigo Historic Reserve, which is the most-visited proximate public setting.*

[69] Note minor amendments have been made to the executive summary to clarify management plan references.

During the establishment, construction and operational phases these mitigations will ensure the Project avoids significant effects on recreation opportunities and values.

The mine rehabilitation plan (i.e. the Landscape and Ecological Rehabilitation Management Plan prepared by Boffa Miskell) aims to reinstate the recreation opportunities which are currently provided for, with provision of a cycle, walking and equestrian track as near as possible to the current Thomson Gorge Road alignment, linking Thomson Saddle with Ardgour Road, including providing a link to the Come-in-Time Battery. Ardgour Rise will be retained for vehicle access. Vehicle access to a carpark at the Come-in- Time Battery and in the upper Rise and Shine catchment will provide access to the public track through the valley. This represents a superior outcome to the current suite of recreation values with the separation of motorised and non-motorised activities in a section of the Rise and Shine catchment (3.8 km approximately).

A legal mechanism to secure enduring public access on the various roads and tracks will be required.

MGL has accepted the mitigation measures recommended by Greenaway (2025). These are summarised in Section 7 of this report and incorporated into the proposed conditions provided in **Part D** of these application documents.

The recommended Ardgour Rise alignment to provide vehicle access is detailed in Section 3.18 of this report, with the proposed measures to restore access through the Project Site upon mine closure illustrated in the LERMP provided in **Part G** of this application.

Further to the assessment of potential recreation and access effects provided in Greenaway (2025) above, it is noted that public access to the Come-in-Time Battery and a small area of the Bendigo Historic Reserve may be restricted during blasting activities at the CIT Open Pit if the area is within a 500 m radius. This access restriction is a precautionary measure required for health and safety purposes and will only be temporary and short-term in nature.

In addition, and as discussed in Sections 6.11 and 6.13 above, the management of light, noise and blasting effects are appropriately managed through various conditions and the NVMP, a copy of which is also provided in **Part G** of these application documents.

6.19 CLOSURE AND AFTERCARE

6.19.1 Mine Closure Plan

Mine Closure Management has developed a comprehensive Mine Closure Plan (MCM (2025)) for the BOGP which is provided in **Part B** of these application documents. It describes the strategies to be implemented by MGL to manage closure risks and rehabilitate the Project Site.

This is to ensure the closure outcomes for the BOGP are achieved and so that the Project Site can return to the current pre-mining land use (in addition to the proposed ecological conservation purposes set out in the LERMP) once mining operations are completed.

The executive summary in MCM (2025) is reproduced verbatim below:

> *Matakanui Gold Ltd (MGL) is proposing to establish the Bendigo-Ophir Gold Project (BOGP), which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. This report frames the current understanding of the project within the surrounding environment at closure and describes the strategies to be implemented by MGL to manage closure risks and to meet the proposed closure outcomes for the BOGP Project. This report will be updated every three years to reflect new knowledge acquired during mine operations and ensure preparedness for closure.*
>
> ***Purpose***
>
> *This Mine Closure Plan (MCP) has been developed to describe the strategies to be implemented by MGL to appropriately manage closure risks and to meet the proposed closure outcomes for the BOGP Project. These actions include activities related to mining and infrastructure associated with development and implementation of the Project.*
>
> *This MCP has been prepared to:*
>
> - *Support the assessment of the Project under the Fast-track Approvals Act 2024.*
> - *Assist MGL in the planning and management of rehabilitation and closure requirements across proposed operations by informing Life of Mine (LOM) planning, operational activities and the development of closure cost estimate provisions;*
> - *Reflect the current knowledge and requirements for closure, identify focus areas for future work and inform risk mitigation and management strategies;*
> - *To consider how to meet conditions pertaining to closure, which are in draft at the time of MCP development; and*
> - *Inform key stakeholders as to how MGL plans to meet its mine rehabilitation and closure requirements for the BOGP.*
>
> ***Scope***
>
> *The BOGP involves mining four (4) identified gold deposits worthy of economic extraction. The most significant is the Rise and Shine ("RAS") deposit. The Come in Time ("CIT"), Srex ("SRX") and Srex East ("SRE") are smaller in size. The defined orebodies are planned to be mined by open pit methods. Underground mining is planned for the deeper parts of the RAS orebody in the later years of development. The majority of the mining activities, ancillary facilities and associated infrastructure will be located in the Shepherds Valley. Access, and service and administration offices are planned to be located on the adjoining Ardgour Terrace. The BOGP also involves the*

abstraction of groundwater from the Bendigo Aquifer for use in mining-related activities and the realignment of Thomson Gorge Road via Ardgour Station.

The BOGP is estimated to have a total operational project life of 31 years, including the predevelopment, construction, operation and active closure phases.

Postmining Land Use

Post-mining land use (PMLU) options are considered in the context of relevance to the wider regional environment, post-mining land capability, acceptability to stakeholders, and predicted ecological sustainability with regard to the local and regional environment.

The proposed land use provides for the development of closure outcomes and informs completion criteria to verify such outcomes. The proposed PMLU is to return the majority of the land to pastoralism with areas of ecological uplift, in line with the current surrounding and underlying land use. Landscape changes resulting from mining, including the retention of pit voids in the post-closure landform, may result in some disturbed areas within the closure boundary being unsuitable for the proposed PMLU.

Land use options considering access requirements for stakeholders and the public will continue to be investigated throughout the life of the project in consultation with local communities, pastoralists and other stakeholders.

Closure Strategy

The following closure strategies will be implemented to manage risks associated with closure of the BOGP:

- *Engineered landforms (ELFs) will be rehabilitated with design informed by consideration of waste characterisation and ecological and hydrological factors to ensure long term stability.;*
- *To reduce the potential for Neutral Mine Drainage (NMD) generation, overburden will be carefully managed during operations. Layered ELF construction, as well as capping of final slope profiles is planned to minimise the potential for air and water ingress. The current construction methodology recommends that ELFs are constructed in low-height lifts dumping next to a tip-head and dozing over the edge to control segregation;*
- *During the project life, overburden will be used in the Tailings Storage Facility (TSF) embankment construction in the upper Shepherds valley and otherwise placed in ELFs in Jean Creek and the upper Shepherds valley. SRX and SRE over-burden will be stored in a dedicated ELF in the RAS valley. CIT pit will be backfilled to sit appropriately within the surrounding topography profile. SRE pit will be backfilled and covered by the SRX ELF;*
- *Tailings (waste fines) will be stored in the engineered tailings storage facility (TSF) in Shepherds Valley. The TSF is designed and will be constructed in accordance with the NZ Dam Safety Guidelines 2024 but will additionally be buttressed by the Shepherds Creek ELF on the downstream side. The final landform will be capped*

with overburden and topsoil. Water will run onto the surface from the surrounding catchment towards the north valley wall, then west towards the ELF into a diversion channel on the north side of the ELF to Shepherds creek;

- *Management plans implemented for relevant environmentally and culturally significant values, and protection of agreed social and cultural heritage values and sites in accordance with Cultural Values Statements and Heritage authorities;*
- *Implementation of progressive rehabilitation to promote revegetation, and monitoring of rehabilitation to inform closure planning, closure outcomes and refinement of completion criteria;*
- *Placement of safety bunding or structures around mine pit voids to manage risks associated with inadvertent public access post-closure. Designs will consider the need for ongoing public access associated with existing access agreements with pastoral stations, and stakeholder post-closure access requirements;*
- *All infrastructure will be removed, except for infrastructure buried more than 1 m below the ground surface, unless agreed with the landowner; and*
- *Environmental modelling including geochemical, geotechnical, surface water, and groundwater will be undertaken on an iterative basis during the LOM to inform operations, mine planning/design and closure planning to ensure no unacceptable impacts.*

Closure Outcomes

Closure outcomes are the overarching outcomes that are being sought in relation to mine closure and the post mining landscape. Outcomes are typically high level in nature, while the closure completion criteria that underpin each objective provide clarity and the detail on how each given objective will be measured and met. Outcomes are developed considering the context of the operation, the closure knowledge base, planned or likely impacts, identified risks, stakeholder expectations in relation to the end state and relevant industry guidance (local, national and international as applicable).

Closure outcomes will continue to be refined during the life of the mine as relevant based on new information, changes to stakeholder expectations, evolving industry standards and changes in risk profiles, while still ensuring that outcomes meet the bottom line requirements of the conditions of consent.

[...]

To achieve the closure outcomes described above, MCM (2025) has recommended management measures which are summarised in Section 7 of this report. MGL has accepted these management measures which have been incorporated into the proposed conditions included as **Part D** of these application documents.

Several closure and aftercare mitigation measures are also proposed to be implemented via the LERMP. Refer to landscape, natural character and visual amenity effects in Section 6.9 for further details.

In addition, as recommended in MCM (2025), an Archaeological and Heritage Management Plan has been prepared by NZHP and is provided as part of this substantive application. Refer to the historic heritage and archaeological effects in Section 6.17 for further details.

6.19.2 Rehabilitation Bond

Details of the rehabilitation bond proposed by MGL for the BOGP are provided in Lane Associates (2025), included in **Part B** of these application documents, with the executive summary produced verbatim below:

> *Matakanui Gold Limited (Matakanui) is seeking approvals / consents for its Bendigo-Ophir mining project (the Project) through the recently enacted fast-track process. The Project will be located approximately 20km northeast of Cromwell in Central Otago, New Zealand.*
>
> *Matakanui is anticipating consent conditions that include a requirement to post a bond sufficient to cover the cost of rehabilitation of site disturbance and a period aftercare in the unlikely event that it is unable to undertake those works. The bond would be held jointly by the Otago Regional Council, the Central Otago District Council, and perhaps the Department of Conservation.*
>
> *The imposition of a bond on mining operations is a well-established process. The initial bond quantifies rehabilitation for the planned site disturbance for the first year of project development prior to any earthworks commencing on the site. The bond quantum is then reviewed each year throughout the life of mine to cover the closure works and aftercare required for the subsequent 12 months of operation.*
>
> *This report describes the process for quantifying the cost of rehabilitation of the site for an assumed maximum area of disturbance for each year of the operation. The method of calculation described is robust, and the input data used to produce the estimated quantum for each year are based on a current mine plan. The bond estimates an amount of $3.1 million in Year 1 rising to a high of $28.1 million in Year 5.*

MGL has accepted the bond estimates, and the methodology used by Lane Associates (2025) to calculate the actual amount of the bond required each year has been incorporated into the proposed conditions included as **Part D** of these application documents.