

2. EXISTING ENVIRONMENT

2.1 OVERVIEW

This section outlines the key characteristics of the Project Site for the BOGP and the surrounding BOGP Area. It provides details of:

- > Existing relevant authorisations and approvals;
- > Current land ownership and the statutory planning framework;
- > Cultural values;
- > Geology and mineral resources;
- > Geotechnical and geochemistry conditions;
- > Hydrology and hydrogeology characteristics;
- > Freshwater quality, aquatic ecology and terrestrial ecology values;
- > Landscape and natural character values;
- > Archaeological and historic heritage features;
- > Contaminated land;
- > Existing noise levels;
- > Air quality and meteorology;
- > The transportation network;
- > The socio-economic context; and
- > Recreation values.

Together, these factors provide a thorough analysis of the existing environment and establish a baseline for assessing the effects of the BOGP and guide decision-making.

As previously noted, MGL has engaged a number of independent experts to prepare technical reports for the BOGP to provide an understanding of the existing environment of the Project Site. The following sections therefore provide a concise summary of the existing physical and environmental values described in these technical reports. For a more detailed description of the existing environment, refer to the corresponding technical report(s) provided as **Part B** to these application documents.



2.2 EXISTING AUTHORISATIONS AND APPROVALS

MGL currently holds several approvals for mining and related activities in and around the Project Site.

These approvals generally relate to mineral exploration activities undertaken within MGL's permitted mining tenure area which is comprised of the Mineral Exploration Permit 60311 ("**MEP60311**") and Minerals Prospecting Permit MPP60882 ("**MPP60882**") granted under the Crown Minerals Act. The proposed BOGP sits within this mining tenure area.

MEP60311 was granted for an initial term of five years commencing in April 2018 and extended for an additional five years in April 2023. This provides MGL, as the permit operator, the exclusive right to explore for a range of minerals (including gold) within approximately 25,162 hectares of land that includes the Project Site. Copies of this permit and the subsequent extension are provided in **Part E** of these application documents.

MPP60882 covers the area immediately northeast of MEP60311. The permit was granted for a two-year period commencing in December 2023 to enable exploration works to test northeast extensions of identified resources within approximately 4,020 hectares of land.

As discussed in Section 1 of this report, MGL has also submitted Minerals Mining Permit Application 61326 ("**MMPA61326**") to NZPAM on 19 March 2025, which is currently under review through a separate process under the Crown Minerals Act. For clarity, this application is not included in this fast-track application and will continue to progress separately. This application relates to an area of 3,272.5 hectares within MEP60311.

The land area to which MEP60311 and MPP60882 relates to (within which the Project Site is located) is illustrated in Figure 2-1 below.



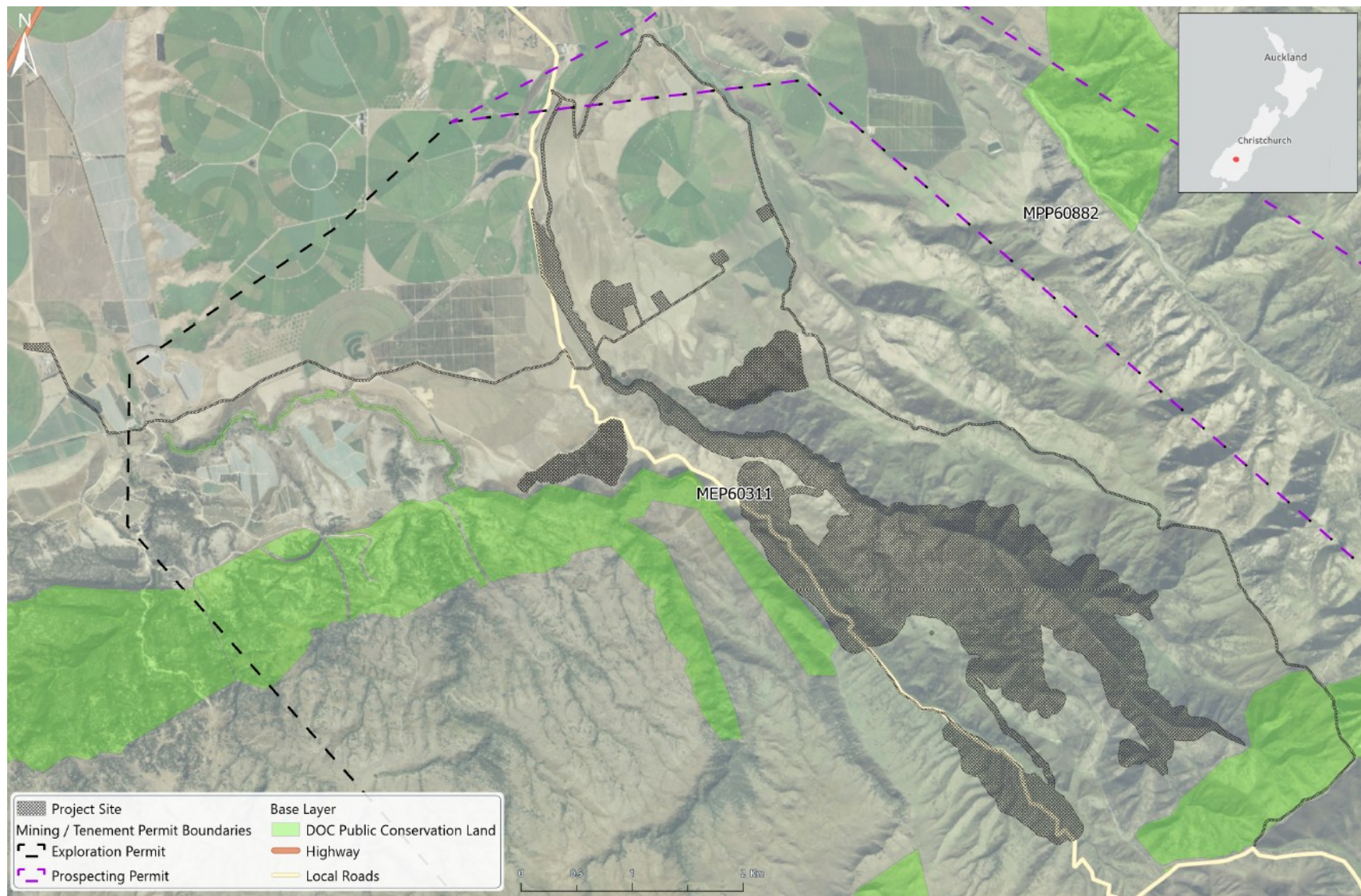


Figure 2-1: Northern Extent of Mineral Exploration Permit 60311 and Minerals Prospecting Permit 60882



In addition, MGL has obtained the following approvals relating to mineral exploration activities within the vicinity of the Project Site:

- > Approvals from the Department of Conservation for works undertaken in the Bendigo Conservation Covenant area (within Bendigo Station) and the Bendigo Historic Reserve related to mineral exploration activities;
- > Land use consents under the RMA from the Central Otago District Council (“**CODC**”) to construct access tracks, drill holes and groundwater bores; and
- > Archaeological authorities under the HNZPT Act from HNZPT to modify recorded archaeological sites and various other archaeological approvals and authorisations.

MGL has also obtained approvals from the Otago Regional Council (“**ORC**”) for various activities that will support the development of the BOGP, including the establishment of groundwater bores at Bendigo Aquifer, the installation of culverts in the bed of Shepherds Creek and the disposal of wastewater to land on Bendigo / Ardgour terraces.

The full list of existing approvals and authorisations held by MGL and that apply to the Project Site are summarised in Table 2-1 below, with copies also provided in **Part E** of the application documents.

Table 2-1: Summary of Existing Approvals and Authorisations held by MGL

Approval or Authorisation	Date Granted	Expiry Date	Summary
Department of Conservation Approval Letter – 6 March 2018	6 March 2018	N/A	Letter of Authority – Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act. Approval to undertake drilling of 60 m deep drill holes at 50 sites within Bendigo and / or Ardgour Stations.
MEP 60311 Permit Certificate and Extension	13 April 2018 and 12 April 2023	12 April 2028	Described in section above.
Department of Conservation Approval Letter – 7 February 2019	7 February 2019	N/A	Letter of Authority – Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act.



Approval or Authorisation	Date Granted	Expiry Date	Summary
			Approval to undertake drilling of 50 m deep drill holes at 40 to 50 sites and construct temporary access tracks within Bendigo and / or Ardgour Stations.
Central Otago District Council Land Use Consent RC190034	7 March 2019	N/A	Land use consent for new tracks in an ONL, minor earthworks and potential disturbance of indigenous vegetation across road reserve (Thomson Gorge Road and the paper road) and Bendigo, Ardgour and Matakanui Stations.
Department of Conservation Approval Letter – 22 September 2021	22 September 2021	N/A	Letter of Authority - Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act. Approval to undertake drilling of 350 m deep drill holes at 50 sites and construct temporary access tracks in the Ardgour and Bendigo Stations.
Central Otago District Council Land Use Consent RC210308	18 November 2021	N/A	Land use consent to construct temporary access tracks to enable mineral exploration on a property situated at 159 Thomson Gorge Road (legally described as Lot 11 DP 525588) i.e. Ardgour Station.
Central Otago District Council Land Use Consent RC210507	21 February 2022	N/A	Land use consent to construct temporary access tracks to enable mineral exploration on a property situated at 159 Thomson Gorge Road (legally described as Lot 2 DP 505064).
Central Otago District Council Section 127 Variation (RC190034V1)	29 April 2022	N/A	Variation of resource consent RC190034 lodged pursuant to section 127 of the RMA (see above). RC190034 included a condition that certain new tracks authorised by the consent are rehabilitated within three



Approval or Authorisation	Date Granted	Expiry Date	Summary
			years of construction and this variation sought to extend the rehabilitation timeframes.
Archaeological Authority 203/107: G41/638	1 September 2022	1 September 2027	Application for an Archaeological Authority pursuant to Section 48 of the HNZPT Act. Authority to modify a recorded archaeological site (a historic fence line) at Matakanui Station, Thomson Gorge Road, in order to construct a gate and track.
Central Otago District Council Land Use Consent RC220300	27 September 2022	N/A	Land use consent to construct temporary access tracks to enable mineral exploration activity within Matakanui Station (legally described as Run 238N) involving the upgrade of existing tracks, the construction of new tracks and drill pads.
Department of Conservation Approval Letter – 25 October 2022	25 October 2022	N/A	Letter of Authority - Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act. Approval to undertake drilling at 50 sites, construct temporary drill pads and construct several temporary access tracks in Ardour and Bendigo Stations.
Department of Conservation Approval Letter – 17 February 2023	17 February 2023	N/A	Letter of Authority - Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act. Approval to undertake drilling at a further 50 sites and construct associated temporary drill pads within the Rise and Shine deposit area.

Approval or Authorisation	Date Granted	Expiry Date	Summary
Department of Conservation Letter of Agreement to Amend Bendigo Conservation Covenant	16 November 2023	N/A	Letter of Agreement – Minister of Conservation’s agreement to the landholders of Bendigo Station to amend the Bendigo Conservation Covenant (Condition 9(D)) to allow the construction of further temporary tracks within the station, subject to a restoration and enhancement programme.
Department of Conservation Wildlife Act Authority (108620-FAU)	23 January 2024	31 March 2030	Authorises the taking or killing of wildlife for certain purposes under Section 53 of the Wildlife Act to undertake various bat, avifauna, vegetation, moth, lizard, and mammalian pest surveys on public conservation land and the Ardgour and Bendigo Stations.
Otago Regional Council Land Use Consent RM24.272.01	17 May 2024	N/A	Land use consent to construct a bore for the purpose of accessing groundwater at 305 Bendigo Loop Road, Bendigo (legally described as Lot 2 DP 316124).
Central Otago District Council Section 127 Variation (RC210308V2)	15 October 2024	N/A	Variation of resource consent RC210308 at 159 Thomsons Gorge Road pursuant to section 127 of the RMA (see above). RC210308V1 was issued on 11 July 2022 to approve an expansion of the same consented works under RC210308 to include land on the northern side of Shepherds Creek. RC210308V2 sought to expand previously consented works to construct a new access track for an additional drill hole to investigate potential underground gold reserves.



Approval or Authorisation	Date Granted	Expiry Date	Summary
Department of Conservation Approval Letter – 11 December 2024	11 December 2024	N/A	Letter of Authority – Approval for further mineral exploration within Bendigo Conservation Covenant under Section 77 of the Reserves Act. Approval to construct 18 drill pads within the Come in Time and Rise and Shine areas, up to 500 m of temporary tracks and one new track approximately 240 m long.
Archaeological Authority 2025-574	21 July 2025	21 July 2030	Authority granted pursuant to Section 48 of the HNZPT Act with respect to several archaeological sites (G41/264, G41/266, G41/267, G41/269, G41/584, G41/658 and possible subsurface sites) for the proposal to undertake earthworks associated with an intensive drilling program at SRX deposit to test the quality and nature of subsurface gold-bearing deposits at Section 11-12 Survey Office Plan 24641, Cromwell.
Otago Regional Council Discharge Permit RM25.259	13 August 2025	19 August 2040	A discharge permit to authorise the disposal of treated wastewater to land on the Bendigo / Ardgour terraces, approximately 2.6 km south of the intersection of Thomson Gorge Road and Ardgour Road.
Otago Regional Council Land Use Consent RM25.279.01	4 September 2025	3 September 2040	A land use consent for the placement, reconstruction, associated bed disturbance and bed remobilisation and ongoing use of three culverts in Shepherds Creek for the purpose of allowing for crossings.



As discussed in Section 1.2 of this report, MGL has also submitted two resource consent applications ¹¹ to the CODC concurrently with this substantive fast-track application which applies for land use consents for several ‘early works’ components of the BOGP. These applications seek to enable the early construction of Ardgour Rise and support facilities to facilitate the timely initiation of the wider project following the granting of all necessary approvals and authorisations under the Act through this substantive application. For clarity, the activities of the BOGP which are covered by the early works application are also sought to be authorised through this substantive application. The early works application will be withdrawn within five working days of the EPA confirmation that the substantive application is complete and within scope.¹² The two resource consent applications for the early works are provided in **Part J** of these application documents.

2.3 SITE LOCATION AND GENERAL CHARACTERISTICS

The Project Site is located in the Bendigo area of Central Otago in the Dunstan Mountains and within the regulatory boundaries of the ORC and the CODC. The Bendigo area is situated in the Upper Clutha Valley, between the urban areas of Wānaka and Cromwell, with the Project Site located approximately 20 km northeast of Cromwell. The Bendigo area is known for pastoral farming and viticulture, along with the Bendigo scenic and historic reserves and associated public conservation areas (which are discussed further below).

Since European settlement, land uses in the Bendigo area have included pastoralism (cattle grazing), viticulture, exploration, mining and conservation. Gold mining activities commenced within and around the Project Site from the mid-1860s and continued intermittently, as gold prices allowed, until the mid-1960s. Mining operations ceased in the 1940s within the Project Site itself, however, modern exploration commenced in the mid-1980s which intermittently competed with the predominant pastoral land uses. Evidence of this historic mining activity remains at the Project Site, which includes structure such as stamper batteries and mining shafts and elevated arsenic concentrations in soils at historic mining locations (refer to Section 2.10 for further details).

The Project Site is broadly located within two incised valley systems of Otago schist rock - the Shepherds Valley and Rise and Shine Valley - on the north-western flank of the Dunstan Mountains. These valleys presently support sheep and cattle pastoral farming and contain several small streams that run and converge throughout the Project Site including Rise and Shine Creek, Shepherds Creek, Jean Creek, Bendigo Creek and Clearwater Creek.

¹¹ Resource Consent Number RC250126.

¹² In accordance with Section 94(3) of the Act.



These watercourses have sub-surface, north-west flows through the Cromwell-Tarras Valley gravels and into the Clutha River / Mata-Au and Lake Dunstan (refer to Section 2.12 below for further details on groundwater flows).

The Project Site also includes supporting infrastructure and facilities that are proposed to be located on the adjoining Bendigo / Ardgour terraces. The terraces are located at the base of the Dunstan Mountains and bounded by the Clutha River / Mata-Au to the west and the Lindis River to the north. The terraces are largely comprised of agricultural and horticultural activities in the form of improved pasture, vineyards, orchards and residences. The underlying Bendigo Aquifer is the proposed source of water supply to the project (refer to Section 2.11 for further details).

Within the Shepherds and Rise and Shine Valleys, the Project Site sits on semi-arid grazing land with moderate topography. The topography of the area rises from the Ardgour terrace at 370 metres above sea level (“mRL”) to the head of the Rise and Shine Valley at 970 mRL, known as Thomsons Saddle, which is a watershed divide into the Thomson Creek that sheds into the Manuherikia Valley to the east (which is not affected by the BOGP). The RAS, CIT, SRX and SRE mining areas are located within the middle and upper reaches of the Shepherds and Rise and Shine Valleys.

Shepherds Creek and Rise and Shine Creek (the latter a tributary of Bendigo Creek) are the two primary stream catchments in the Project Site. While both creeks have perennial main stems, they each have ephemeral reaches downstream of existing irrigation water abstraction sites, where their surface flows cease but they continue as subterranean flows across the alluvial terraces and into the Clutha River / Mata-Au and Lindis River.

As noted, the Project Site is primarily located within Bendigo Station and Ardgour Station. Bendigo Station generally covers the western and southern portions of the site while Ardgour Station broadly covers the eastern and northern portions of the site. Land use within these areas is primarily extensive pastoral grazing of beef and cattle and merino sheep. Except for some infrastructure associated with pastoral activity and historic mining activities, the Project Site is largely undeveloped. Refer to Section 2.4 below for further land ownership details.

Land cover within the Project Site is dominated by low producing grassland, with areas of depleted grassland and mixed exotic shrubland and matagouri / grey scrub primarily in gullies. Higher elevations are dominated by areas of gravel or rock and tall tussock grassland.



Thomson Gorge Road is located in the Rise and Shine Valley within Bendigo Station. It is an existing four-wheel drive track that is not suitable for general vehicles and traverses across the Project Site. It provides access from the Matakanui locality in the Manuherikia Valley in the east to the Lower Lindis in the west.

As noted above, the Project Site is surrounded by several areas of public conservation land administered by the Department of Conservation which straddle the ridgeline of the Dunstan Mountains on either side of Thomsons Saddle. These areas include the Bendigo Historic Reserve, the Bendigo Conservation Area and the Ardgour Conservation Area (refer to Figure 2-4 below), with further detail provided as follows:

- > The Bendigo Historic Reserve is located immediately west of the Project Site. It is accessed off State Highway 8 (“**SH8**”) via Bendigo Loop Road, with alternative four-wheel drive access available from Thomson Gorge Road. The reserve contains a range of historic sites and features from hard rock quartz-mining operations undertaken in the 1800s, including stamper battery sites and mining shafts, as well as kānuka stands and views of the Upper Clutha basin.

While native vegetation has shown regrowth since early burn off activities undertaken by pastoralists, transient iwi and miners, large areas of the reserve are overgrown and dominated by brier. As discussed further in Section 3 of this report, MGL proposes to undertake willow management activities within Bendigo and Clearwater Creeks within this reserve and provide a replacement walking route to the Come-in-Time Battery site.

- > The Bendigo Conservation Area is located to the south of the Project Site and covers approximately 1,980 hectares. It spans the crest of the Dunstan Mountains and contains all the natural features of Otago’s alpine tussock land, whilst also providing a range of recreational opportunities. The Bendigo Conservation Area is leased and grazed by Bendigo Station as part of their high-country farming operation.
- > The Ardgour Conservation Area is located to the southeast of the Project Site and covers 303 hectares. It straddles the ridgeline of the Dunstan Mountains in the Thomsons Saddle area and provides for hiking and mountain biking opportunities. As discussed in Section 3 of this report, part of the proposed realignment of Thomson Gorge Road (i.e. Ardgour Rise) will traverse through the same area of land currently used as a road pursuant to an existing easement in this conservation area. As discussed further in Section 4 of this report, a concession is included in this application for this amended purpose.

No mining activities will take place on this adjacent conservation land.



With respect to surrounding land uses, the locality of Bendigo is a few kilometres to the west of the Project Site. Bendigo village precinct is accessed from SH8 in the vicinity of the north-eastern extent of Lake Dunstan. Further north-west at the junction of Lindis Crossing, which features a bridge across the Lindis River, the Project Site is proposed to be accessed at the intersection of SH8 and Ardgour Road. Access will then be gained via Ardgour Road and Thomson Gorge Road.

The settlement of Tarras lies a further 10 km to the north of the Project Site, and includes several retail outlets, a cluster of houses and a primary school. The Tarras Hall and Tarras Golf Club lie further north along SH8.

There are several residential dwellings and commercial properties, including vineyards, located on the Bendigo terraces to the north and west of the Project Site. The closest residential dwelling to the Project Site is located at 218 Thomson Gorge Road, approximately 1.5 km away from the general / administration area and 3.2 km from the processing plant area within the lower Shepherds Valley.

2.4 LAND OWNERSHIP AND UTILISATION

2.4.1 Land Ownership

As noted above, land ownership within the Project Site is predominantly freehold private land - with Bendigo Station covering the southwestern part and Ardgour Station covering the northeastern part of the Project Site. The sites and locations that are not owned by these stations comprise:

- > Thomson Gorge Road and the undeveloped paper road which runs through the lower Shepherds Valley – administered by CODC;
- > Part of the Matilda Rise and Bendigo Loop Road which contains the proposed borefield pipeline – administered by CODC; and
- > A small part of Matakanui Station to the south of the Project Site which contains a section of Ardgour Rise - which is leasehold land administered by Land Information New Zealand (“**LINZ**”).

Several activities will be undertaken on adjoining public conservation land to maintain and / or improve public access, amenity or ecological values within the surrounding environment. It is pertinent to note these are not mining activities and will be undertaken at the following locations:

- > Areas of road reserve associated with the proposed upgrade of the SH8 and Ardgour Road intersection and associated construction laydown areas – administered by CODC



and the New Zealand Transport Agency Waka Kotahi (“**NZTA**”) and underlain by land administered by the Department of Conservation for the adjacent Lindis River;

- > Areas of the Ardgour Conservation Area for the proposed realignment of Thomson Gorge Road (Ardgour Rise) – administered by the Department of Conservation; and
- > Areas of the Bendigo Historic Reserve and Bendigo Creek marginal strip to establish a replacement walking route to provide access to the historic Come-in-Time Battery and undertake willow management activities – administered by the Department of Conservation.

The current landowners of the properties within the Project Site are shown in Figure 2-4 below. **Part C** of these application documents provides more detailed land ownership maps (including for the proposed water pipeline along Matilda Rise), while **Part I** provides more details on the land ownership for the Project Site, including the relevant Records of Title.

2.4.1.1 Land Use Agreements and Approvals

As set out in Section 1 of this report, MGL has signed access agreements with the landowners of both Bendigo and Ardgour Stations which, subject to all necessary regulatory approvals, enable the BOGP mining operations within the Project Site. These agreements are also registered on the relevant Records of Title. MGL has also obtained signed Affected Party Approvals (“**APAs**”) from the landowners of both Bendigo and Ardgour Stations. These APAs provide explicit support for this substantive application and any necessary approvals required under the Act. Redacted versions of both access agreements and APAs are provided in **Part F** to these application documents.

MGL has also entered into a binding agreement to acquire land within the Ardgour Station that falls within the Project Site extents.¹³ This staged acquisition is subject to normal Overseas Investment Office approval, covers four Records of Title covering approximately 2,880 hectares of land and is subject to obtaining all necessary approvals for the BOGP under the Act.

MGL also has obtained landowner agreement from the owners of Matakanui Station and is seeking landowner agreement from LINZ to construct a short section of Ardgour Rise within Matakanui Station (a redacted versions of the Matakanui Station APA is also provided in **Part F**).

¹³ Announced to the New Zealand and Australian Securities Exchange on 2 July 2025.



The written approval of CODC as landowner has been obtained to undertake mining operations on various parcels of land (paper roads) owned by CODC (provided in **Part F**).

2.4.1.2 Current Land Utilisation

The Bendigo Station in the vicinity of the BOGP is comprised of approximately 700 hectares of extensive dryland pastoral grazing consisting of moderate rolling dryland hill country sited between 400 and 1,222 mRL. As discussed in Sections 2.11 and 2.21 of this report, the Bendigo and Tarras districts are among the driest in Otago with dry spells of more than two weeks occurring frequently. The station has a predominantly north-easterly aspect although a proportion faces southwest above the Rise and Shine Creek. Mount Moka is located towards the southwestern extent of the station and is the highest point at 1,222 mRL. The land within the vicinity of the Project Site is in pasture and covered by extensive areas of matagouri, brier and other scrub, and can support 900 stock units. Deer, pigs and rabbits are known pests in this area. Current improvements include a set of steel cattle yards, stock water from creeks and dams, fences, tracks and a part of the Thomson Gorge Road.

This area forms part of the larger farming enterprise across the wider approximately 12,000 hectare station used extensively for sheep and beef grazing.



Figure 2-2: Views Across Rise and Shine and Shepherds Creek Areas of Bendigo Station

The northeastern part of the Project Site is located within Ardgour Station which covers an overall area of 3,067 hectares - consisting of approximately 2,173 hectares of extensive hill country, approximately 642 hectares of arable dryland and approximately 260 hectares of irrigated land. The main access and infrastructure areas of the BOGP will be located on part of the arable dryland that is planted in a combination of lucerne or clover and cocksfoot pasture. Several other key components of the BOGP (i.e. the processing plant, RAS Open Pit, Shepherds ELF and TSF) are located within the Shepherds Creek catchment in the wider



hill country area. Pests include deer, pigs and rabbits, while improvements include rabbit proof fences, stock water, tracks and an airstrip.

The wider Ardgour Station has an average of approximately 8,000 stock units, with the hill country area carrying up to 3,540 beef and sheep stock units.



Figure 2-3: Views Across Shepherds Creek Area of Ardgour Station

2.4.2 Adjacent Landowners

There are several residential dwellings and commercial properties, including vineyards, located on the Bendigo / Ardgour terraces to the north and west of the Project Site, and immediately adjacent to the proposed borefield and pipeline which predominantly runs within the existing road reserve of Matilda Rise.

As noted, the closest residential dwelling to the Project Site is located at 218 Thomson Gorge Road, approximately 1.5 km away from the general and administration area on Ardgour terrace and 3.2 km from the processing plant area within the lower Shepherds Valley.

Except for the Bendigo / Ardgour terraces, the remaining adjoining land to the west, east and south of the Project Site is privately owned high-country station land or Crown land administered by the Department of Conservation, including the Bendigo Historic Reserve to the west, the Bendigo Conservation Area to the south and the Ardgour Conservation Area to the east (with several non-mining activities located within parts of these reserves).

The adjacent landowners to the Project Site are shown in Figure 2-5 below and the relevant landowners adjacent to the SH8 and Ardgour Road intersection upgrade are shown in Figure 2-6 below. More detailed plans are provided in **Part C** of these application documents.

Part I of these application documents provides further details of the land ownership for the adjoining landowners, including the relevant Records of Title.



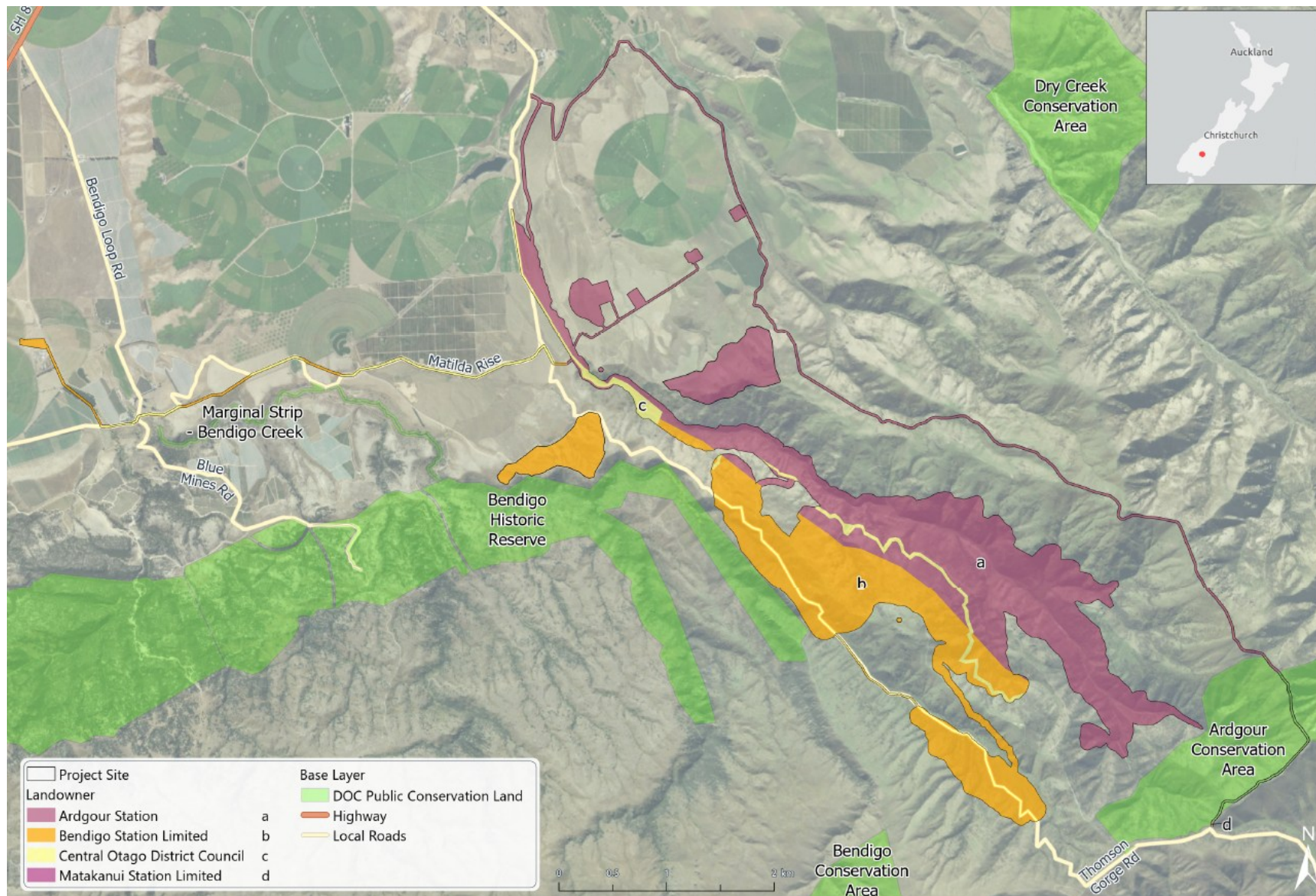


Figure 2-4: Current Land Ownership within the Bendigo-Ophir Gold Project Site



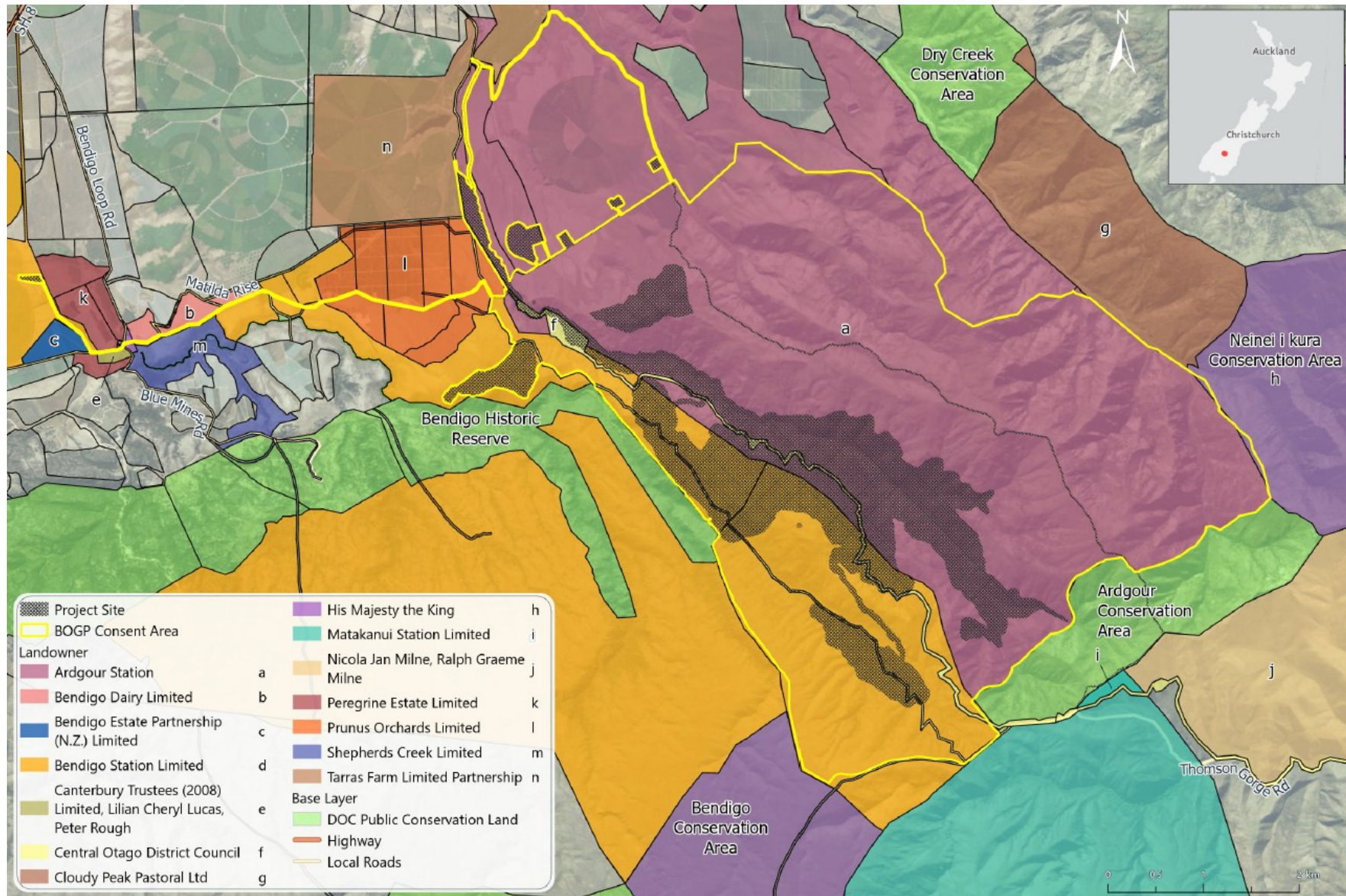


Figure 2-5: Adjacent Landowners of the Bendigo-Ophir Gold Project Site



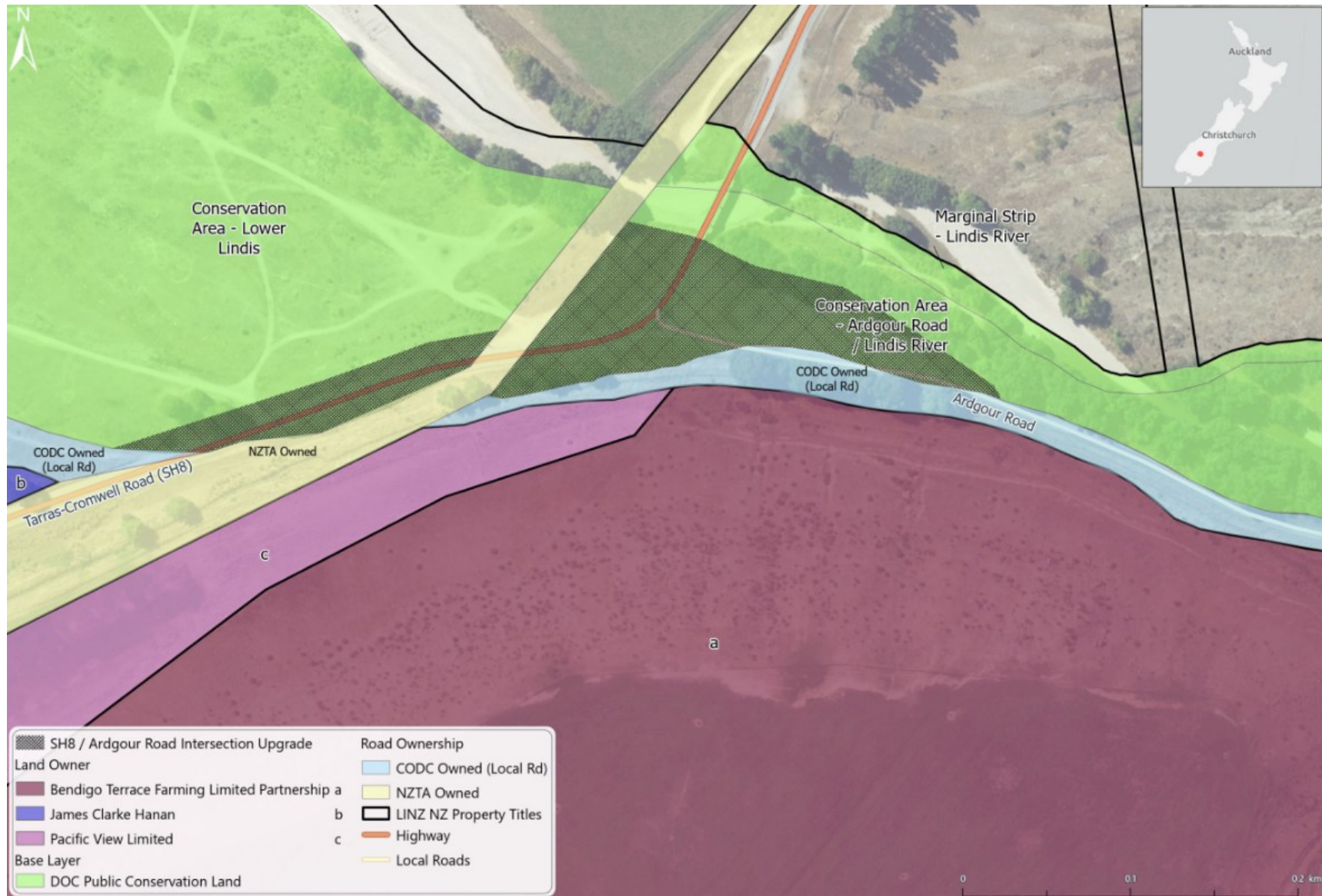


Figure 2-6: Adjacent Landowners of the SH8 and Ardgour Road Intersection Upgrades



2.5 BENDIGO CONSERVATION COVENANT

As previously noted, the part of the Project Site located on Bendigo Station is also subject to the Bendigo Conservation Covenant, which is a conservation covenant administered by the Department of Conservation under Section 77 of the Reserves Act. The covenant applies to a large area of land which extends significantly beyond the Project Site, as shown in Figure 2-7 below.

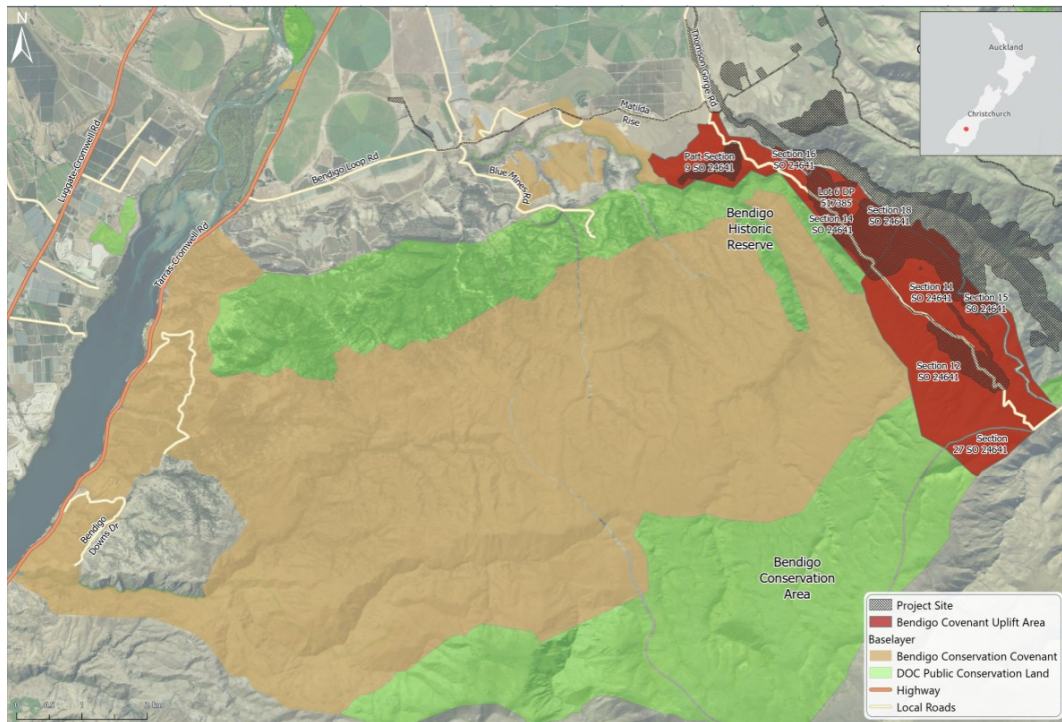


Figure 2-7: Bendigo Conservation Covenant Area within the vicinity of the Bendigo-Ophir Gold Project

Section 77 of the Reserves Act provides that the Minister of Conservation may agree with the owner of land that the land should be managed to preserve the natural environment or landscape amenity or wildlife or freshwater life or marine life habitat or historic value of the land. The term of that agreement is then recorded as a covenant on the relevant Records of Title.

In relation to the full area covered by the Covenant, the Minister of Conservation and landowners agreed that the land should be managed in accordance with the following conservation objectives:

- > Protecting and enhancing the natural character of the land, with particular regard to the natural functioning of ecosystems and to the native flora and fauna in their diverse



communities and dynamic inter-relationships with their earth substate and water courses and the atmosphere;

- > Protecting the land as an area representative of a significant part of the ecological character of the Dunstan Ecological District;
- > Maintaining the landscape values of the land; and
- > Maintaining the historic values of the land.

The covenant allows for grazing and requires that the land is kept free from gorse, rabbits and rubbish or unsightly materials. It also requires the landowners to permit public access to parts of the land. In relation to mining, the covenant expressly provides that the landowners will not carry out or allow “*any prospecting or mining for minerals, coal, or other deposit on or under the land*” without the approval of the Minister of Conservation.

To facilitate the delivery of the BOGP, an amendment is required to remove reference to the legal descriptions applying to the Project Site and effectively revoking the application of the Bendigo Conservation Covenant from the Project Site. This amendment is sought through this substantive application. It is noted the covenant would continue to apply to the surrounding land on the same terms as currently apply. Section 8 of this report provides an assessment of this proposed amendment to the conservation covenant against the relevant information requirements set out in Schedule 6 of the Act.

A copy of the Bendigo Conservation Covenant is provided as **Part E** to these application documents.

2.6 STATUTORY PLANNING FRAMEWORK

The Project Site is located within the regulatory boundaries of the ORC and the CODC. A summary of the relevant zonings, overlays and notations under the various regional plans administered by the ORC and the Central Otago District Plan (“**District Plan**”) is provided in the sub-sections below. A full assessment of the BOGP against the provisions of the statutory planning documents is provided in Section 8 of this report.

2.6.1 Otago Regional Policy Statements

The Otago Regional Policy Statement (“**RPS**”) generally notes that gold mining provides an integral source of revenue that supports economic development in the wider Otago Region. Furthermore, the Proposed Otago Regional Policy Statement (“**Proposed RPS**”) states that mining activities more broadly contribute approximately 4.5% of the total GDP for the Otago Region (\$13.2 billion).



The Proposed RPS also describes the landscape in the Otago Region as modified by both farmland and remnants of the region's early gold mining activity creating a rich sense of heritage and regional identity.

The Project Site is not subject to any statutory acknowledgements within either the RPS or Proposed RPS, with the closest statutory acknowledgements to the site being the Mata-Au (Clutha River) and Te Wairere (Lake Dunstan). The statutory acknowledgements record that the mauri of Mata-au represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi (Kāi) Tahu Whānui with the river.

2.6.2 Otago Regional Plans

There are no relevant notations or overlays that apply to the Project Site under the following regional plans administered by the ORC:

- > The Regional Plan: Water for Otago ("**Regional Water Plan**");
- > The Regional Plan: Air for Otago ("**Regional Air Plan**"); and
- > The Regional Plan: Waste for Otago ("**Regional Waste Plan**").

The following points are relevant to note for the BOGP in respect of these regional plans:

- > Regional Water Plan does not provide any details on the water quality of the creeks within the Project Site and immediate surrounds;
- > The Project Site is not located within any airsheds identified in Air Zone 1 and 2, and is therefore located in Air Zone 3 under the Regional Air Plan, which covers the remainder of the Otago Region is subject to less stringent air quality standards; and
- > The Regional Waste Plan outlines that concerns for the region include contaminated sites (which are often associated with mining activities) and disposal of hazardous waste such as mine waste and tailings.

A full assessment of the resource consents sought under these regional plans for the establishment, operation, rehabilitation and closure of the BOGP is provided in **Part H** of these application documents and summarised in Section 4 of this report.

2.6.3 Central Otago District Plan

The Project Site and much of the surrounding area is located within the Rural Resource Area of the District Plan.



The Rural Resource Area comprises the rural environment of the district. The District Plan notes the amenity values of the rural environment are dominated by Central Otago's unique, semi-arid landscape of broad basins separated by low mountain ranges with sparse vegetation that is covered in tussock grassland and exotic pasture and broken by schist rock outcrops. The District Plan considers that this landscape retains a high natural character.

The Rural Resource Area chapter states that activities locate within the rural environment for several reasons, including the need to locate directly adjacent to the resource – and specifically notes that mineral extraction and related activities cannot locate anywhere other than directly adjacent to where the deposit occurs.

The BOGP is located within the Dunstan Mountains Outstanding Natural Landscape (“**ONL**”), which is described as “*the mountain range between Manuherikia and Upper Clutha Valley that extends northeast from Cromwell Gorge*”. The values and attributes of the ONL are listed in Schedule 19 of the District Plan as follows:

- > The mountain range forms part of the backdrop to the Manuherikia Valley to the east and the Upper Clutha Valley to the west and is a memorable feature of the Central Otago landscape; and
- > The crest of the range is an extensive summit plateau extending from Haehaeata / Leaning Rock northwards with distinctive rock tors visible on the skyline.

In addition, the Bendigo Historic Reserve and Ardgour and Bendigo Conservation Areas are notated as Ecological Areas of Significant Natural Value (“**SNV**”). As previously noted, while no mining activities will occur within any of these conservation areas, several associated activities are proposed within the Bendigo Historic Reserve and the Ardgour Conservation Area – including the proposed realignment of Thomson Gorge Road, willow management activities and the relocation of the walking route to the historic Come-in-Time Battery.

Additional overlays and notations of relevance to the BOGP are as follows:

- > A small part of the Ardgour Terrace Site (which contains many of the general and administration activities for the BOGP) is located within a Significant Amenity Landscape, with this landscape including “*the terrace between the Dunstan Mountains and the Waikerikeri Valley*”;
- > The intersection of SH8 and Ardgour Road, which is proposed to be upgraded to enable access to the Project Site, is notated as a flood prone area; and
- > High voltage lines are mapped and intersect Thomson Gorge Road in an east-west direction immediately north of the Ardgour Site.

Figure 2-8 below illustrates the site zoning and spatial extents of the relevant District Plan overlays and notations for the BOGP.

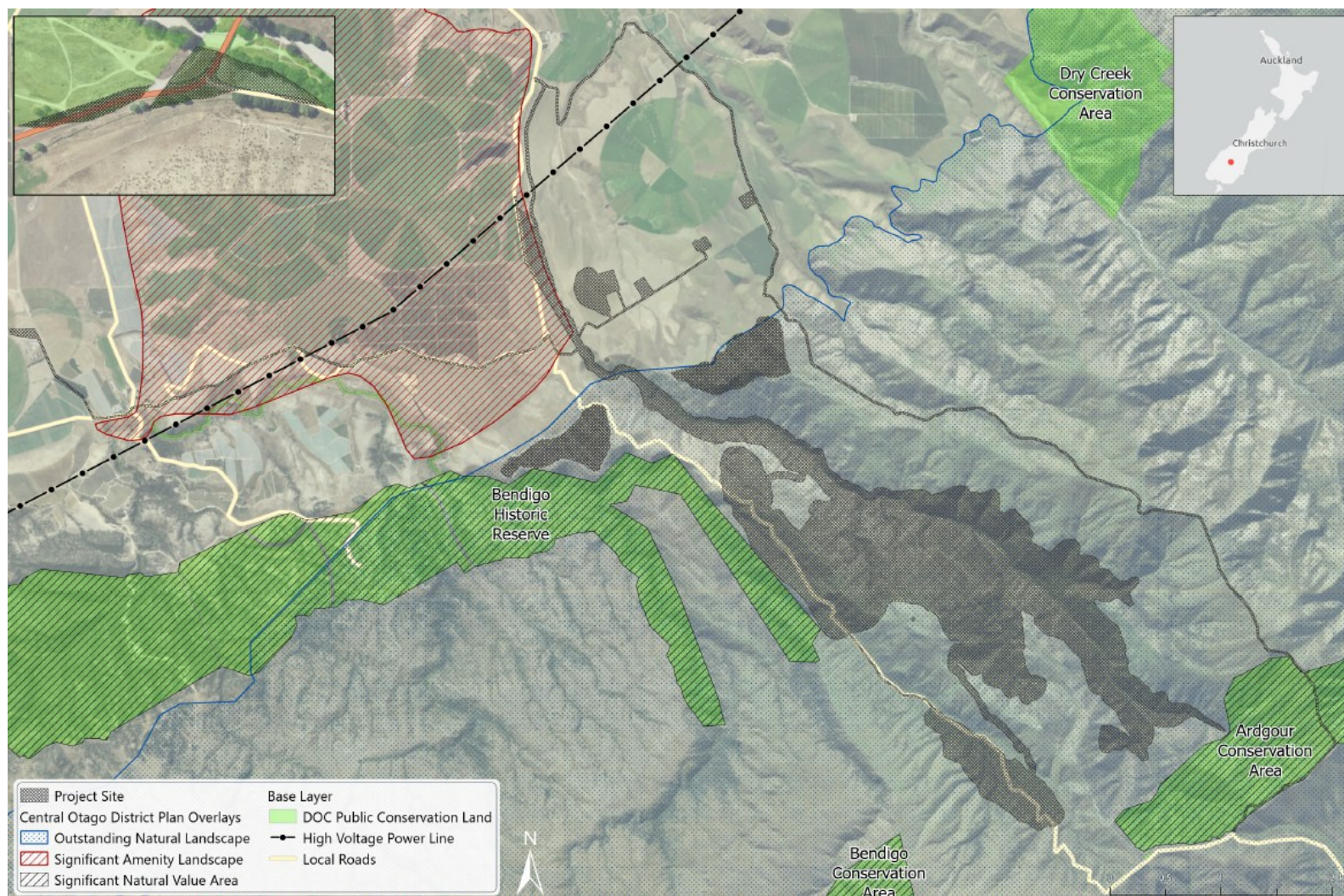


Figure 2-8: Zoning and Overlays for Project Site under the Central Otago District Plan



2.6.4 Highly Productive Land

The National Policy Statement for Highly Productive Land 2022 (“**NPSHPL**”) came into effect on 17 October 2022. It provides direction to protect highly productive land from inappropriate use and development.

The BOGP includes the establishment of general and administration infrastructure on the Bendigo / Ardgour terraces, with large parts of these terraces identified as land use capability (“**LUC**”) 3 in the New Zealand Land Resource Inventory (“**NZLRI**”).¹⁴ These areas are therefore identified as highly productive land in accordance with Clause 3.5(7) of the NPSHPL.¹⁵ Figure 2-9 below illustrates the parts of the Project Site which are located within land that is deemed highly productive under the NPSHPL. This is discussed further in Section 8 of this report.



Figure 2-9: Highly Productive Land within the Project Site

¹⁴ Refer to https://ourenvironment.scinfo.org.nz/maps-and-tools/app/Land%20Capability/lri_luc_main.

¹⁵ Noting that the New Zealand Government proposes to remove LUC Class 3 land from the protections of the NPSHPL as part of its upcoming reforms to the RMA.



2.7 CULTURAL VALUES

The Bendigo area holds cultural importance to local iwi, particularly those affiliated with Kāi Tahu. The Māori history of the region is characterised by extensive seasonal use and resource gathering, long predating European settlement.

MGL has consulted with Aukaha (previously known as Kāi Tahu ki Otago), which is a mana whenua-owned organisation that provides resource management services across the takiwā of the four Papatipu Rūnaka and associated whānau and rōpū of the Otago Region. The four Papatipu Rūnaka are:

- > Te Rūnanga o Moeraki;
- > Kāti Huirapa Rūnaka ki Puketeraki;
- > Te Runanga o Ōtākou; and
- > Hokonui Rūnanga.

These Papatipu Rūnaka are collectively referred to as “Kā Rūnaka” for the project, which represent the relevant Otago Kāi Tahu hapū that hold mana whenua and exercise rakatirataka and kaitiakitaka within their respective takiwā. MGL has consulted with the Kā Rūnaka in good faith to ascertain the nature of their interest and / or concerns in relation to the BOGP, which has included the preparation of an unendorsed draft Cultural Impact Assessment (“**CIA**”). This consultation is summarised in Section 5 of this report, and identified cultural effects are assessed in Section 6.3 of this report.

In addition, the Kā Rūnaka have prepared a Cultural Values Statement (“**CVS**”) in 2018 which informed the development of the project. While this CVS related to exploration activities within the wider MEP60311, the conclusions regarding identified features are considered to equally apply to the Project Site for the BOGP.

The CVS identified the cultural values within the Central Otago District, the Dunstan Mountains and more specific areas relating to the BOGP (e.g. Thomsons Saddle, several archaeological sites and vegetation areas). In summary, whilst the Bendigo area has a rich cultural history, the CVS identified that there are no parcels of Māori land, marae, or identified wāhi tapu within the Project Site.

Further details on the cultural sites of value associated with the BOGP identified in the CVS include:

- > A number of wāhi tapu and wāhi taonga sites are present within the Central Otago District, including along the Mata-au (Clutha River) and around Lake Dunstan.



These sites are identified as holding memories and traditions of the tupuna who moved through the area associated with the gathering of mahika kai and occupation activities;

- > The Central Otago District is identified as a wāhi tūpuna area that includes cultural and natural resources associated with an historic event, activity, tradition or tupuna. Sites of significance include:
 - > Tuhituhi Nehera (rock art);
 - > Wahi Kohatu (rocky outcrops that provided shelter);
 - > Kaika Nohoaka (networks of seasonal settlements);
 - > Umu-tī (earth ovens for cooking);
 - > Wahi Ingoa (Place Names); and
 - > Ara Tawhito (Travel routes).
- > The Dunstan Mountains (also referred to as Matakinui) is a significant physical and cultural marker that provides value through mauka, archaeological sites, wāhi ikoa and mahika kai. Access to and from the area was also facilitated through access from the Thomsons Saddle; and
- > The taramea plant, which is located throughout the Project Site, was historically used by Māori for scent and Chief's clothing.

MGL engaged Aukaha to prepare a CIA 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 MGL 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 MGL and Kā Rūnaka in the context of this Project.



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 tipuna, taoka species and wai māori risks undermining the efforts of whānau to restore the whenua and rekindle connections and mahika kai practices.



MGL continues to engage with Kā Rūnaka on recommendations to address the effects and cultural impacts of the project, where that is possible and discussions remain ongoing.

It is noted that, in accordance with section 53 (2)(b) and (c) of the Act, relevant iwi authorities and Treaty settlement entities have the opportunity to provide written comments on the substantive application, once it has been received by the Panel.

2.8 GEOLOGY AND MINERAL RESOURCES

The Otago Schist is formed from sedimentary (sandstone and siltstone) and minor volumes of volcanic derived rocks of the Caples and Torlesse tectono-stratigraphic terranes. Collision of the terranes during the Mesozoic resulted in regional metamorphism up to greenschist facies.

Greenschist facies rocks of the Otago schist are sub-divided into four textural zones based on mineralogy and mineral textures. Rocks of the Otago schist are sub-divided into four textural zones (TZ1 to TZ4) based on mineralogy and mineral textures resulting from regional metamorphism, with TZ4 generally associated with the highest degree of temperature and pressure, and greatest amount of deformation. Gold mineralisation developed within deformation zones and / or fractures during the uplift of the Otago Schist, which was completed by the late Cretaceous (approximately 90 million years ago). Uplift and exhumation of the Otago Schist belt was achieved in parts by significant offset across normal faults.

Figure 2-10 shows a map of regional geology illustrating extent of Otago Schist (blue / green), location of known gold deposits (including RAS) and low angle normal faults associated with uplift and exhumation of the Otago Schist belt (late Cretaceous normal faults).



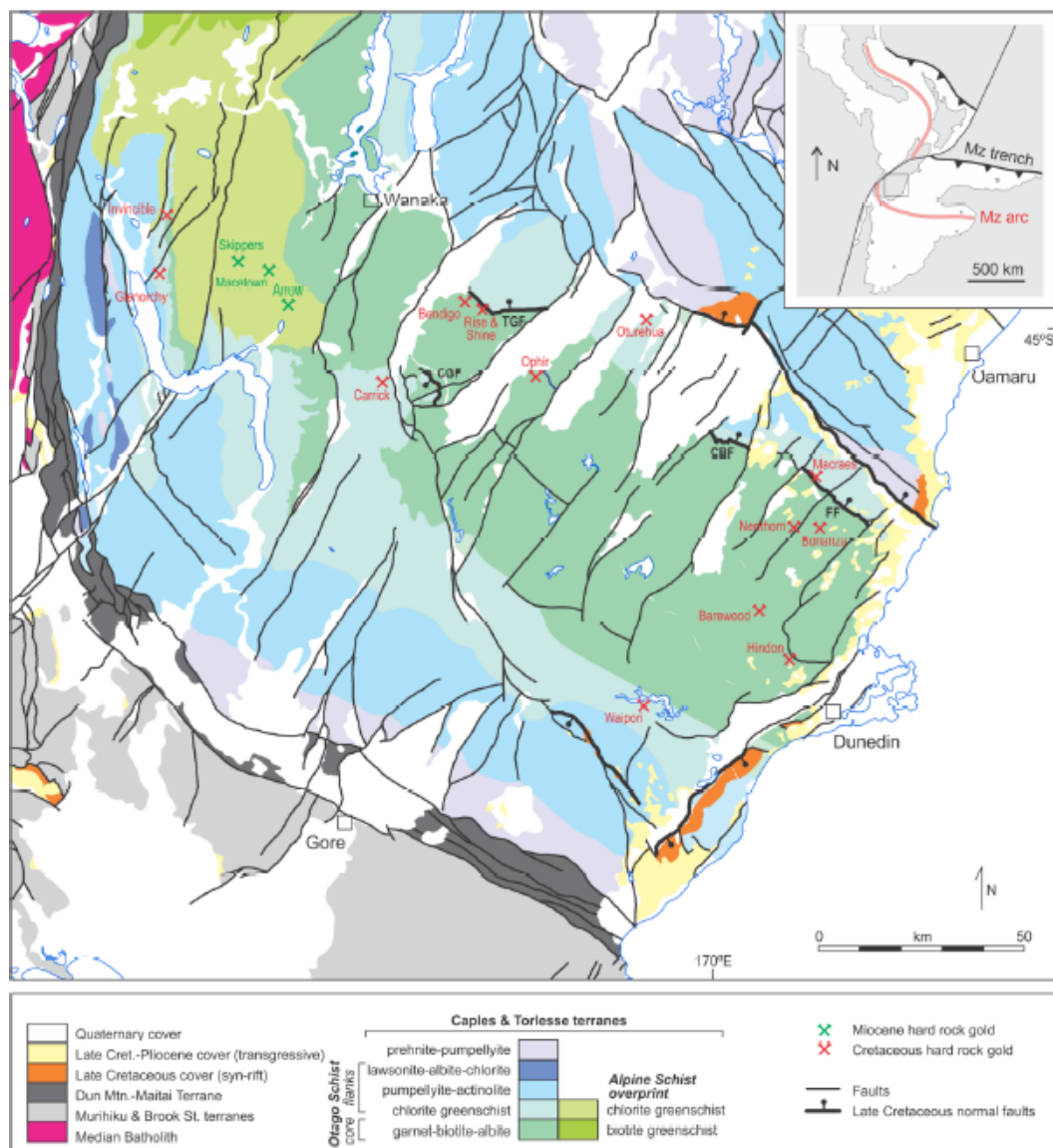


Figure 2-10: Overview of Regional Geology and Known Gold Deposits¹⁶

Two primary geological units and two regional geological structures are recognised at the Project Site.

¹⁶ Mortimer N., Craw D., MacKenzie D., Mortensen J., Ring U. & Pitcairn I. 2016. Cretaceous Tectonics and Gold Mineralisation in the Otago Schist p 133 – 140. In: Christie A.B. (ed). Mineral deposits of New Zealand; exploration and research. Carlton, Vic.: Australasian Institute of Mining & Metallurgy, AUSIMM Monograph 31.



The two primary geological units are:

- > Lower greenschist facies (chlorite zone) Textural Zone 3 rocks of the Otago schist (“TZ3”); and
- > Upper greenschist facies (garnet – biotite – albite zone) Textural Zone 4 rocks of the Otago schist (“TZ4”).

The two regional geological structures are:

- > Rise and Shine Shear Zone (“RSSZ”); and
- > Thomsons Gorge Fault.

Figure 2-11 shows a schematic cross-section of the BOGP Project Site that illustrates the relationship between the primary geological units and regional geological structures

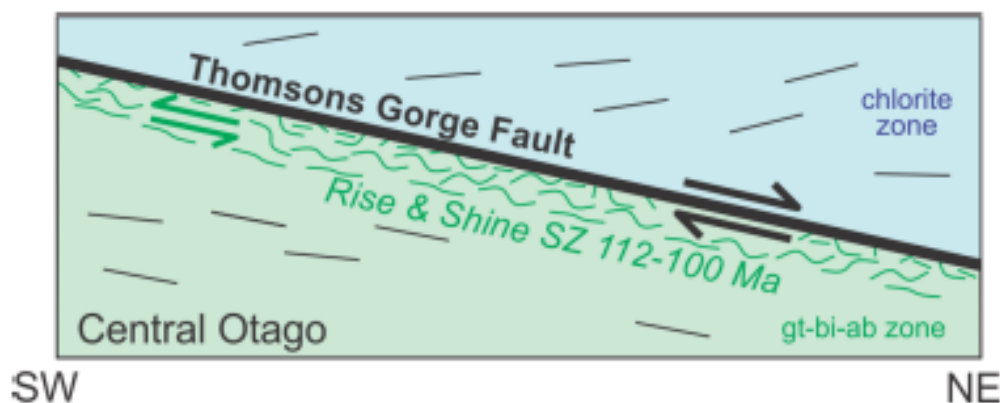


Figure 2-11: Schematic Cross-Section illustrating Relationship of Primary Geological Units and Regional Geological Structures (view looking northwest).¹⁷

The RSSZ is a late metamorphic deformation zone developed within TZ4 Schist.¹⁸ The shear zone has been hydrothermally altered, with the addition of gold associated with replacement of schist minerals by pyrite, arsenopyrite and trace amounts of base metal sulphides (such as galena and sphalerite). Gold occurs as both free particles, typically up to 400 microns in size, and as smaller particles associated with sulphide minerals, especially arsenopyrite. Hydrothermal alteration also involved recrystallization of metamorphic

¹⁷ Mortimer N., Craw D., MacKenzie D., Mortensen J., Ring U. & Pitcairn I. 2016. Cretaceous Tectonics and Gold Mineralisation in the Otago Schist p 133 – 140. In: Christie A.B. (ed). Mineral deposits of New Zealand; exploration and research. Carlton, Vic.: Australasian Institute of Mining & Metallurgy, AUSIMM Monograph 31.

¹⁸ Cox L., MacKenzie D.J., Craw D., Norris R.J. & Frew R. 2006. Structure and geochemistry of the Rise & shine SHERA Zone mesothermal gold system, Otago Schist, New Zealand. New Zealand Journal of Geology & Geophysics, Vol. 49: p 429 - 442.



quartz, muscovite and chlorite, and the addition of ankerite (calcium, iron, magnesium and manganese carbonate mineral). Deformation within the RSSZ involved both shearing and silicification / vein fill within extensional structures.

The upper part of the RSSZ is truncated by a shallow northeast dipping normal fault, the Thomsons Gorge Fault, which juxtaposes RSSZ rocks against unmineralised TZ3 Schist (refer to Figure 2-11 above). The Thomsons Gorge Fault can be traced for more 10 km across the Dunstan Range, with rocks from this fault within the Project Site dominated by clay-rich gouge up to 1 m in thickness. The Thomsons Gorge Fault developed after metamorphism, RSSZ formation and mineralisation, and is one of several identified structural features responsible for Late Cretaceous exhumation of the central core of the Otago Schist belt.¹⁹

Gold mineralisation is developed within the RSSZ and below the Thomsons Gorge Fault at several locations within the Project Site, the most significant and most intensely drilled to date being the RAS deposit. At RAS, an approximately 500 m wide zone of gold mineralisation dips shallowly towards the north- northeast and has been traced down dip for over 1.5 km (refer to Figure 2-12 below). Within the 500 m wide zone, a narrower high-grade zone (approximately 150 – 200 m wide) contains the majority of gold.

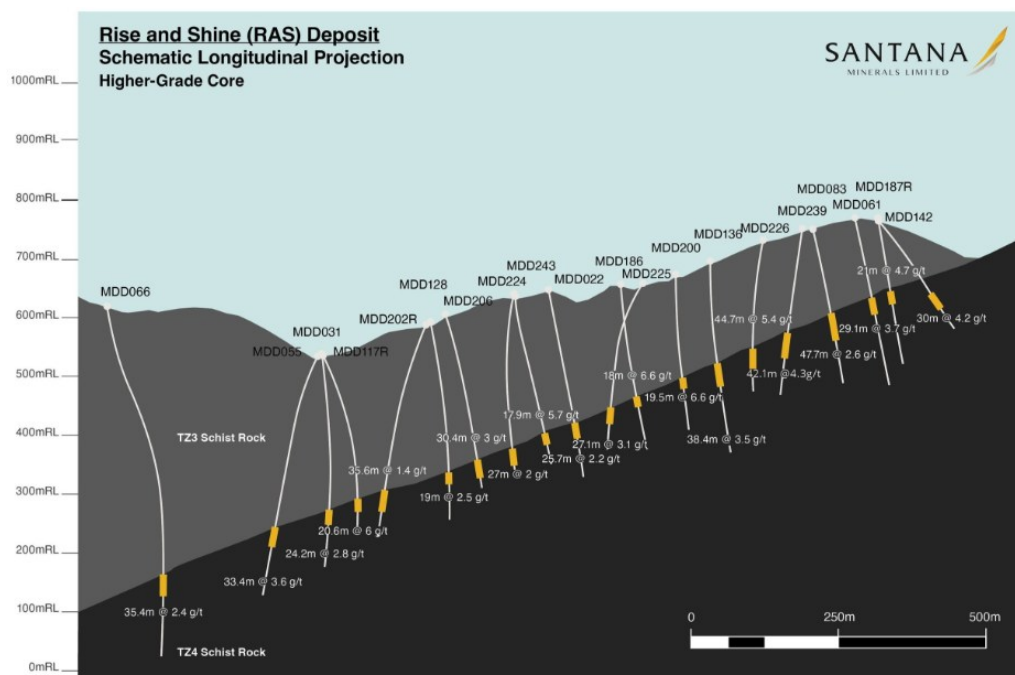


Figure 2-12: Rise and Shine Deposit Schematic Longitudinal Projection

¹⁹ Mortimer N., Craw D., MacKenzie D., Mortensen J., Ring U. & Pitcairn I. 2016. Cretaceous Tectonics and Gold Mineralisation in the Otago Schist p 133 – 140. In: Christie A.B. (ed). Mineral deposits of New Zealand; exploration and research. Carlton, Vic.: Australasian Institute of Mining & Metallurgy, AUSIMM Monograph 31.



As noted, three other smaller gold deposits are present within the Project Site – being CIT, SRX and SRE. All of these deposits (including RAS) were the location of alluvial, eluvial and / or limited underground mining activity in the past.

These identified mineral resources lies within MEP60311 (which covers 251 km²) in the Central Otago goldfields and has a resource estimate of 2.3 million ounces of gold at 2.1 g/t, calculated at a cutoff grade of 0.5 g/t as announced in March 2025.

The approximate mineral resources within each deposit are shown in Table 2-2 below.

Table 2-2: Summary of Mineral Resource Estimates for Identified Deposits within the Project Site

Deposit	Resource Classification	Tonnes (Mt)	Gold Grade (g/t)	Contained Gold (koz)
RAS	Indicated	18.9	2.5	1,538
	Inferred	7.6	2.2	542
	Total	26.5	2.4	2,080
CIT	Inferred	1.2	1.5	59
SRX	Indicated	2.2	0.8	54.7
	Inferred	2.9	1.0	90.5
	Total	5	0.9	145
SRE	Indicated	0.4	0.8	10.3
	Inferred	1.1	1.2	42
	Total	1.5	1.1	52
BOGP Total	Indicated	21.5	2.3	1,603
	Inferred	12.8	1.8	734
	Total	34.3	4.1	2,337



Following uplift and exhumation of the Otago Shist during the late Cretaceous, the wider Otago Region experienced a prolonged period of slow subsidence (100 to 25 million years ago) with deposition of a terrestrial and marine sedimentary sequence. From approximately 25 million years ago, development of the current tectonic plate boundary was initiated, which resulted in renewed uplift of the Otago Region. Further reorganisation of the plate boundary 5 million years ago produced a component of compression at the Alpine Fault, in addition to the dominant sideways motion, and resulted in the formation of the Southern Alps and mountain building across the Otago Region. The result of this ongoing phase of compression is a characteristic basin and range landscape, with northeast trending ranges of Central Otago uplifted on their southern sides along steeply dipping reverse faults. Sedimentary sequences deposited since the late Cretaceous have been removed by erosion on the ranges but are preserved within the basins (refer to Figure 2-13 below).

The Dunstan Ranges are an uplifted block of Otago Shist within this basin and range province. Figure 2-13 illustrates how compression associated with the current configuration of the plate tectonic boundary (Alpine Fault) results in uplift of distinct fault bounded blocks to produce a characteristic basin and range topography.



Figure 2-13: Schematic Cross-Section across the Otago Region to illustrate formation of Characteristic Basin and Range Topography.²⁰

Glacial till, fluvio-glacial terraces, outwash plains and moraine deposits are recognised from six periods of glacial advances over the last 660,000 years within the Upper Clutha basin.²¹ Though glaciation is not thought to have affected the Dunstan Ranges, glacial till, fluvio-glacial terraces (e.g. Ardgour terrace) and outwash gravels are located immediately downstream of the lower Shepherds Valley Gorge. Isolated pockets of loess (wind deposited sediment) associated with glacial periods are present on some slopes within both the Shepherds and Rise and Shine Creek catchments.

²⁰ Balance P. 2009. New Zealand geology: an illustrated guide. Geoscience Society of New Zealand GSNZ Miscellaneous Publication 148, 397 pp, version 2.

²¹ Turnbull. I. M. (compiler) 2000, Geology of the Wakatipu area. Institute of Geological & Nuclear Sciences 1:250 000 geological map 18. Lower Hutt, New Zealand. Institute of Geological & Nuclear Sciences Limited.



2.9 GEOTECHNICAL CONDITIONS

Engineering Geology Limited (“**EGL**”) has prepared a suite of technical reports for the BOGP, copies of which are provided in **Part B** to these application documents, with EGL (2025a) and EGL (2025g) providing an understanding of the existing geotechnical conditions at the Project Site. The key findings are summarised below.

Geotechnical investigations for the BOGP targeted the Rise and Shine Valley and the main areas of the Shepherds Valley where the key mining components are proposed - including the processing plant area, TSF, Shepherds ELF and Shepherds Silt Pond.

Soils and rock materials expected to be encountered within the Project Site comprise topsoil, loess, colluvium, alluvium, terrace gravels (till and outwash gravels), weathered schist and unweathered schist.

The topsoil, loess, colluvium and alluvial deposits have the greatest potential for erosion and sediment generation where exposed. Topsoil has the highest component of fine-grained material, and while loess soils can also be highly erodible, they are generally found in isolated pockets onsite. In areas, loess may be mixed with weathered rock as colluvium on slopes or alluvium in the valley floor. The weathered and unweathered schist rock has less fine-grained material than the surficial soils. Weathered schist by nature has a higher portion of fines than the unweathered schist and is shallow, being no more than a few metres deep.

The Project Site is located within an area of moderate seismicity, however no active faults have been identified within the site. The nearest active faults to the Project Site are the Dunstan Fault (approximately 12 km surface distance to the southeast) and the Pisa Fault (approximately 13 km surface distance to the northwest). Both are associated with uplift of ranges illustrated in Figure 2-13 above.

The Alpine Fault is the most significant active fault in New Zealand and is located approximately 115 km northwest of the Project Site. The Alpine Fault has an annual mean slip rate of 25 mm / year and is considered capable of earthquakes of a magnitude of greater than Mw 8.

2.10 GEOCHEMISTRY CONDITIONS

Mine Waste Management (“**MWM**”) has prepared a suite of technical reports for the BOGP that characterise the existing geochemistry conditions of the site and surrounds. These reports have been summarised into an overarching Mine Impacted Water Overview Report provided in MWM (2025).



MWM has undertaken geochemical testing of the three geological units in the Project Site – being TZ3 Schist, mineralised TZ4 Schist within the RSSZ and unmineralized TZ4 Schist. In summary:

- > All rock materials are classified as non-acid forming (“**NAF**”), with circum-neutral pH drainage expected from mining areas that contain TZ3 and TZ4 schist. However, neutral metalliferous drainage (“**NMD**”) is likely to occur with elevated levels of arsenic, sulfate and trace metals;
- > The most significant source of NMD relates to both unmineralised TZ4 and mineralised TZ4 within the RSSZ, some of which will be waste rock and some will be processed to extract gold which therefore produces tailings. This is due to a higher sulfur and arsenic content. The TZ4 and RSSZ represent only 9.3% of the waste rock that will be disturbed;
- > Based on geochemical composition and supporting data, TZ3 materials are enriched in arsenic and cobalt with antimony possibly elevated. TZ4 and RSSZ materials are enriched in arsenic, sulfur and antimony possibly elevated;
- > Based on analogue data, nitrogenous compounds (nitrate, nitrile and ammoniacal nitrogen) are expected in drainage from mined rock due to the use of ammonium-nitrate based explosives and cyanide.

The project area has been degraded by pastoral and mining activities. Soil sampling within the project area has identified potentially elevated concentrations of metals (arsenic and possibly cadmium) in shallow soils, predominantly within historic mining areas. Water quality monitoring has also identified potentially elevated concentrations of metals in surface water (arsenic, cobalt, copper, and iron), and groundwater (arsenic, chromium, copper, iron, strontium, thallium, and zinc).

2.11 HYDROLOGY

The hydrology attributed to the Project Site is described in Kōmanawa (2025c), a copy of which is provided in **Part B** of these application documents. The key findings from this report are summarised below.

The Project Site is located within two main catchments, the Bendigo Creek catchment and the Shepherds Creek catchment, which are shown in Figure 2-14 below. In summary:

- > The Bendigo Creek catchment (including the Rise and Shine Creek sub-catchment) covers an area of approximately 28 km² and comprises the southern and western parts of the Project Site; and



- > The Shepherds Creek catchment covers an area of approximately 12 km², is located on the western slopes of the Dunstan Mountains and comprises the northern and eastern parts of the Project Site.

Seepage from these catchments provides inflow to the alluvial groundwater system, with Bendigo Creek providing flows to the Bendigo Aquifer and Shepherds Creek providing flows to the Ardgor Alluvial Aquifer. The wider hydrology features within proximity of the Project Site are shown in Figure 2-15 below.

These catchments are within the wider Clutha River / Mata-Au catchment.

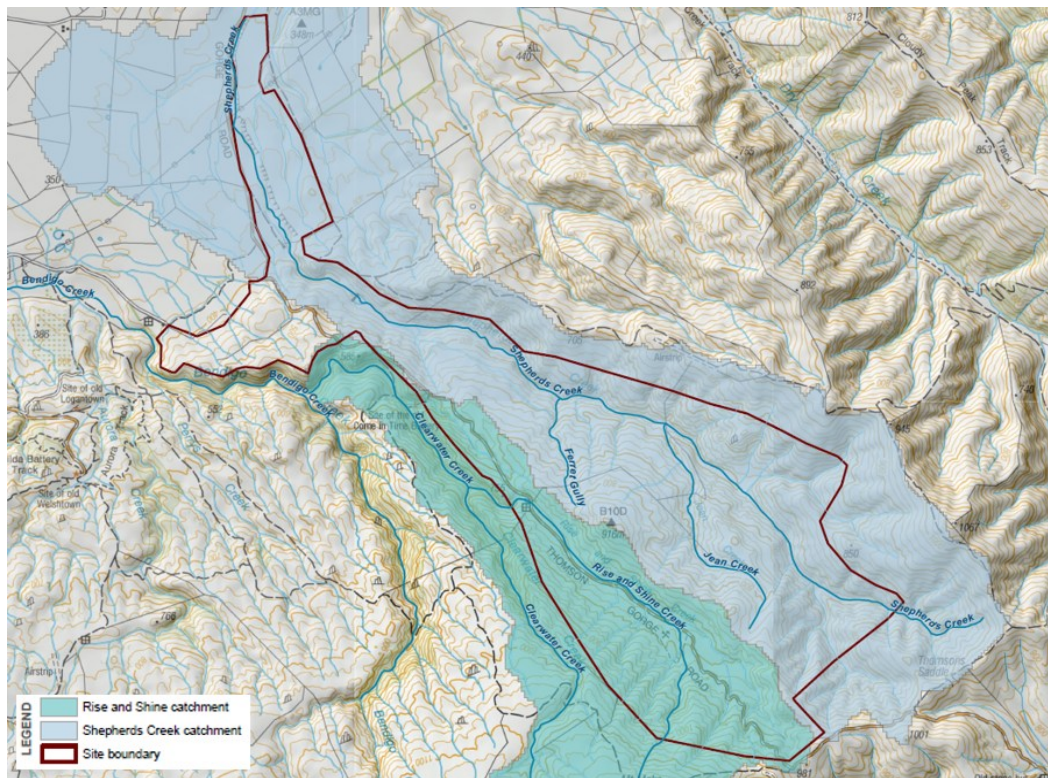


Figure 2-14: Catchments within the Project Site²²

²² Note the site boundary in this figure is high-level only for illustrative purposes.



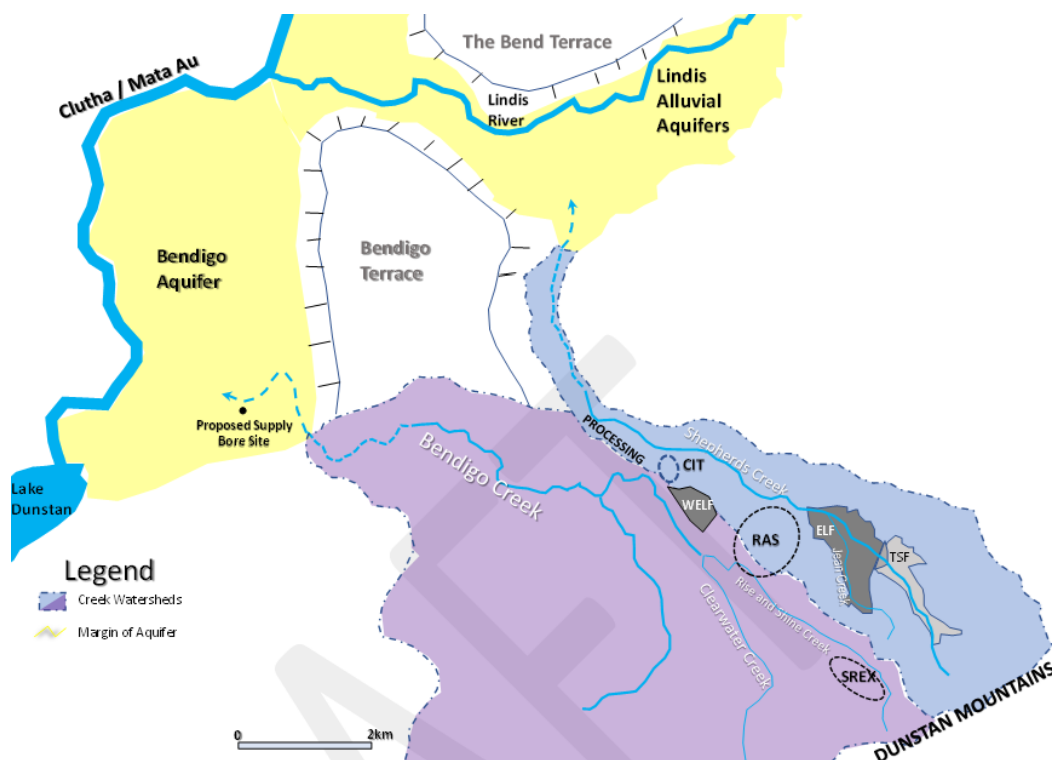


Figure 2-15: Hydrology Features within Proximity of the Bendigo-Ophir Gold Project

The Project Site itself covers several sub-catchments, including the Shepherds, Rise and Shine, Bendigo and Jean Creeks. In particular:

- > Shepherds Creek intermittently flows towards the Lindis River. An irrigation water-take within the downstream reaches diverts surface water to an irrigation reservoir, causing cessation of the stream's surficial flow. Potential groundwater movement through alluvial gravels along the bed of Shepherds Creek remain unexplored;
- > Jean Creek is an intermittent tributary to Shepherds Creek; and
- > Rise and Shine Creek flows into Clearwater Creek immediately southeast of the Come-in-Time Battery, which flows into Bendigo Creek.

The upper Clutha River is sustained by the catchment outflow of Lake Wānaka and Lake Hāwea, which are glacial lakes that provide a significant source of water for the downstream Clutha / Mata-Au river system and remaining water resources in the wider Clutha system. The lakes pass an average of 260 m³/s to the downstream river system via the Hāwea and Clutha / Mata-Au rivers, representing more than 42% of the river system's total discharge at the Pacific coast near Balclutha.

These glacial lakes contribute disproportionately to the flow and volume of freshwater coalescing into the upper Clutha River / Mata-Au, while rivers and creeks in the Bendigo area have substantially lower specific runoff rates due to the shadowing of rainfall imposed by encompassing mountain ranges.

Downstream of the lake outlets, the Cardona River, Luggate Creek, Crook Burn and Lindis River tributaries join the flow of the upper Clutha main stem, which collectively increase the main stem flows by another approximately 10 m³/s before the river reaches the Bendigo district. Combined, the upper Clutha River flowing past the Bendigo area and entering Lake Dunstan has a mean flow of approximately 270 m³/s.

In the last 30 years, pumped abstraction from the main stem of the Clutha River / Mata-Au has provided irrigation water. The dispatchable hydroelectric storage at Lake Hāwea is significant to the downstream Clutha power stations, as are the other natural flows from the rest of the upper Clutha Lakes catchments.

The artificial lake catchment of Lake Dunstan has a combined inflow of 494 m³/s based on a normalised catchment water balance. The catchment includes the Wakatipu, Shotover, Arrow, Nevis, Roaring Meg, and Long Gully sub-catchments carried by the Kawarau River that combines with the Clutha River / Mata-Au at Cromwell.

2.12 HYDROGEOLOGY

The hydrogeology attributed to the BOGP is described in Kōmanawa (2025a and 2025b). These reports are provided in **Part B** of these application documents. The key hydrogeological conditions at the Project Site and surrounding area are summarised below.

Kōmanawa (2025b) indicates that the Bendigo district has two principal domains for groundwater occurrence. These are saturated consolidated rocks (generally fractured schist basement) and alluvium or outwash sediments (generally coarse sandy gravels) consisting of either Lindis Alluvium, Bendigo Creek Alluvium or Bendigo Outwash and Bendigo Aquifer. These domains are summarised below.

2.12.1 Fractured Rocks

Kōmanawa (2025b) notes that the saturated consolidated rocks in the Bendigo district are largely the schist shield that forms the basement rock in the area. Groundwater emerges from the basement rock as diffuse seepage, spring flow and baseflow in watercourses. There is generally low permeability of the fractured rock, therefore potential groundwater recharge of excess precipitation is rejected at the soil / regolith interface and feeds surface stream flow instead. Kōmanawa (2025b) considers the schist–alluvium contact as an impermeable interface.



2.12.2 Alluvium or Outwash Sediments

With respect to Lindis Alluvium, the Lindis River has reworked alluvium and deposited an alluvial floodplain on either side of its course. In late summer low flow, surface flows in the lower Lindis River can entirely revert to subsurface flow leaving the water course dry. The Lindis River provides quantities of water infiltration that enters the top of the Bendigo Aquifer at its confluence with the Clutha River / Mata-Au.

With respect to Bendigo Creek Alluvium, sandy gravel alluvium has accumulated in the middle reaches of Bendigo Creek (upstream of the Bendigo Loop Road ford crossing) as a thin layer of gravel within a dip in the basement schist and between bedrock gorges. This Bendigo Creek alluvium has high permeability and porosity, and low flows in Bendigo Creek results in loss of surface flow when the creek water soaks into the alluvium. Higher flows and flood flows in the creek allow visible creek flow to extend further downstream, although parallel subsurface flow (interflow) continues underground.

The Bendigo Aquifer comprises river terraces and flats as a stepped sequence tiered from the east to the west and towards the Clutha River / Mata-Au, with the river known to be the principal source of replenishment for the aquifer. The Bendigo Aquifer has a measured mean depth of 33 m, and a mean depth to the water table of 12 m. The water table within the Bendigo Aquifer is relatively consistent sitting within a range of approximately 6 m, from elevations of 195 to 201 mRL. The Bendigo Aquifer has a high yield of up to 110 litres / second (“**l/s**”).

The Bendigo Aquifer is also subject to more than 30 irrigation bores and associated water take consents in the wider Bendigo district, which equates to approximately 17.4 million m³ of groundwater allocated from the aquifer per year. There are 13 bores within 2.5 km of the MGL test production bore which are potentially affected by the proposed drawdown. The aquifer is also relied upon for domestic, stock and frost-fighting at lower abstraction rates, often from smaller diameter bores under various lawful water use authorisations, including permitted activity rules.

Kōmanawa undertook constant rate and step rate tests to determine the bore drawdown and transmissivity rate. The methods and analysis for these tests are detailed in Kōmanawa (2025b). In summary, these tests indicate a transmissivity between 4,500 to 6,500 m² per day, with the accepted transmissivity value set at 4,500 m² per day. The constant rate tests analyses also indicated that the aquifer water table has enhanced effective porosity and has unconfined conditions.



With respect to groundwater quality, as further detailed in Kōmanawa (2025b), water samples taken from a test production bore in the Bendigo Aquifer do not exceed any relevant standards or guidelines for drinking water or aesthetic value.

2.13 AQUATIC ECOLOGY VALUES

Waterways Consulting Limited (“**Waterways**”) has completed an aquatic ecology assessment which identifies and characterises the various watercourses and associated aquatic fauna within the Project Site and immediate surrounds. This aquatic assessment is detailed in Waterways (2025), a copy of which is provided in **Part B** of these application documents, with a summary provided in the sections below. The existing water quality of these watercourses is discussed in Section 2.14 below.

For Shepherds Creek and Rise and Shine Creek - and their associated tributaries - which are located within the Project Site, Waterways (2025) includes a description of the creek environments, fish species and macroinvertebrates present, and provides a conclusion on the overall ecological values. For Bendigo Creek and Clearwater Creek, which are located adjacent to the Project Site, Waterways (2025) includes a description of fish and macroinvertebrates present.

The watercourses within the Project Site are classified into five stream types. These are perennial streams, intermittent streams, ephemeral streams, watersheds and springs as shown in Figure 2-16 below.

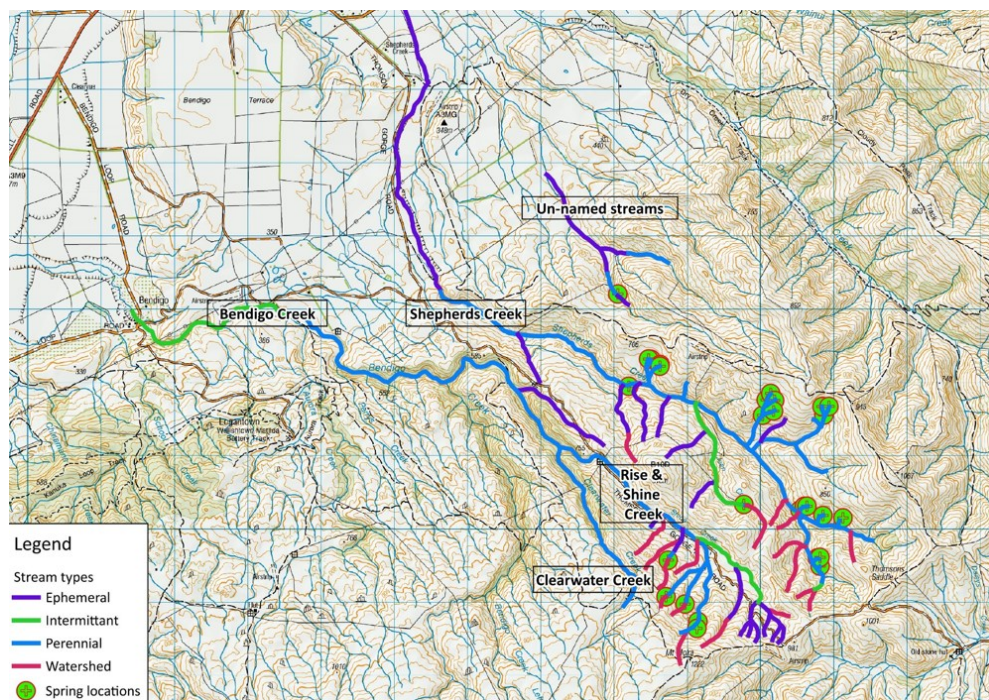


Figure 2-16: Mapped Stream Types within the Project Site



Waterways (2025) identifies three consented water abstractions within the Project Site that may influence the distribution of aquatic species, with two in Shepherds Creek and one in Bendigo Creek (refer to Figure 2-17 below). With respect to Shepherds Creek, one water abstraction is for stock water (with an estimated take of between 1-2 l/s) and the other is for irrigation purposes further downstream which is herein referred to as the “irrigation abstraction”.

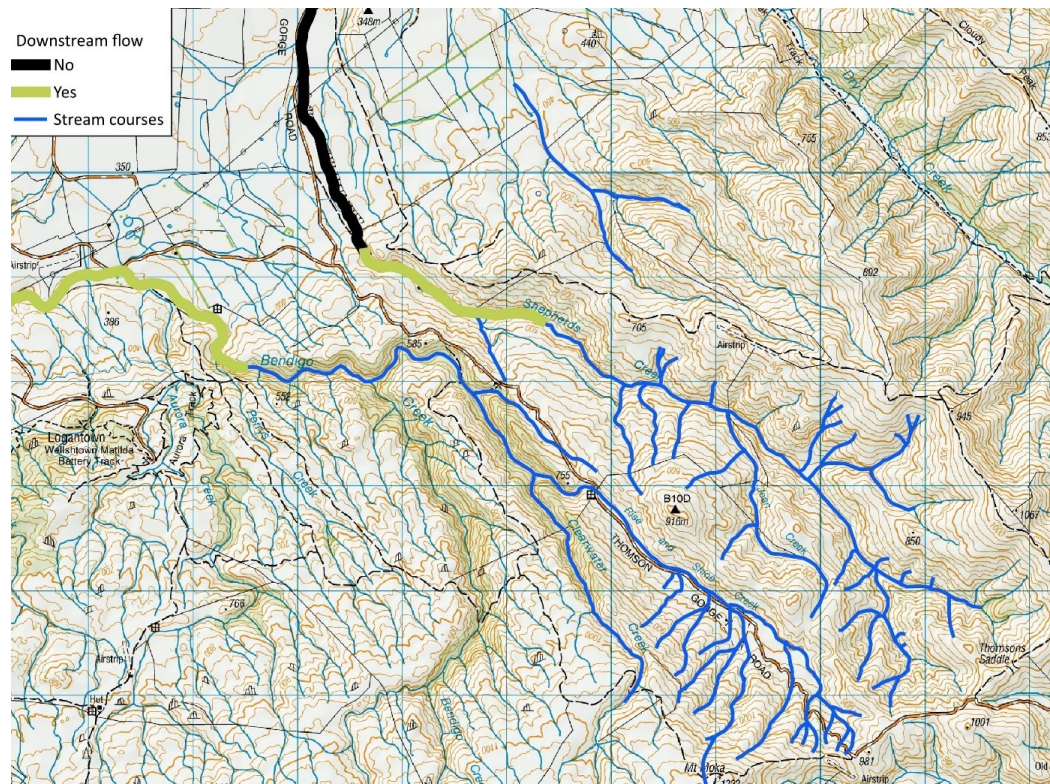


Figure 2-17: Reaches of Shepherds Creek and Bendigo Creek Affected by Existing Consented Water Abstractions

Waterways (2025) has also identified crack willow trees in both the Shepherds and Bendigo Creek catchments (refer to Figure 2-18 below). These trees can form dense stands along stream margins, creating logjams and scour holes around trunks in the riverbed. The root mats can also extend across the bed of small streams thereby burying the natural stream bed substrate. The trees are easily spread downstream, as branches that break from the trees can take root in damp ground and establish new stands of crack willow.



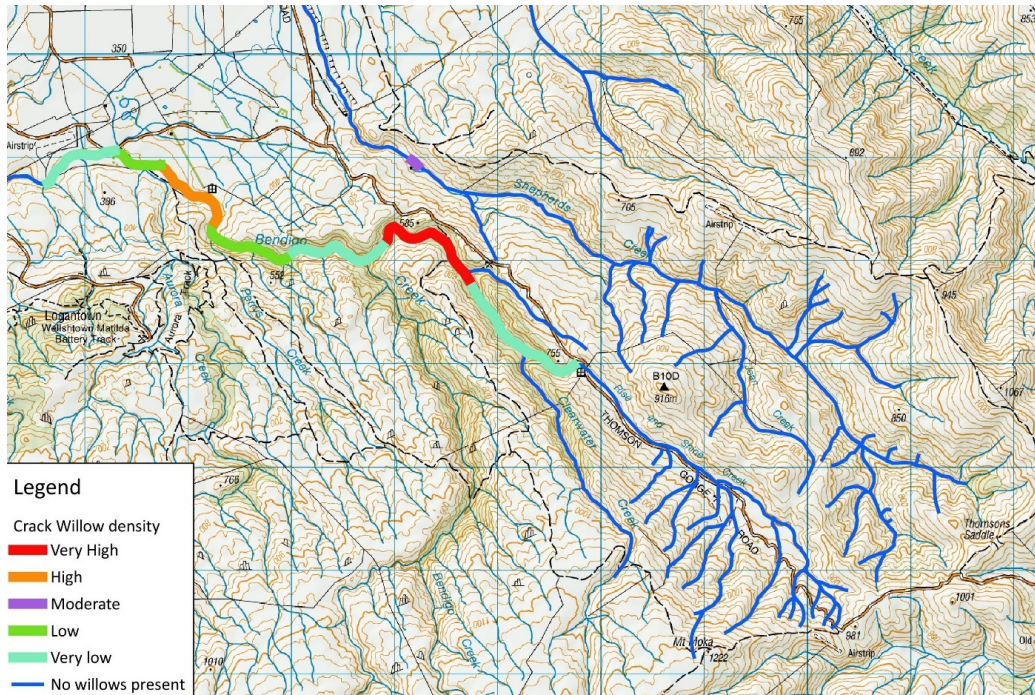


Figure 2-18: Reaches of Shepherds Creek and Bendigo Creek Affected by Crack Willow

2.13.1 Shepherds Creek

2.13.1.1 Stream Environment and Flows

The Shepherds Creek catchment includes a range of stream types as shown in Figure 2-16 above. Most of the Shepherds Creek main stem is a gentle gradient, single stream channel between 0.5 to 1 m wide, which flows within a valley floor that varies between 10 to 100 m wide. However, the stream can be divided into the following five sections:

- > Two main headwater tributaries that rise along the Dunstan Range ridgeline and are located within the Ardgour Conservation Area;
- > Gentle gradient reaches in the two main headwater tributaries and the main stem downstream from the confluence of these two tributaries;
- > A short gorge section of higher gradient stream, surrounded by bedrock bluffs and steep hillsides, where the creek is confined to a narrow valley floor and contains a bed of cobbles and boulders;
- > A long, low gradient reach which flows through a wide valley floor to the irrigation abstraction (which is now a breached reservoir); and
- > An ephemeral reach downstream of the irrigation abstraction where the stream course flows across an alluvial terrace to the Lindis River.



Waterways (2025) describes the stream bed in the gentle, low gradient reaches of Shepherds Creek to be predominately comprised of a matrix of gravels, fine gravel, sand and mud with occasional small cobbles. The gentle gradient reaches are dominated by run habitat with small gentle riffles and short pool sections. Riparian planting throughout these reaches generally consists of scrub (including matagouri, coprosmas and rosehip brier), pasture areas and grasses, and weeds. The stream banks are generally well grazed, unless shaded by riparian shrubs, in which case they are often bare, eroding soil.

Within the gorge section, Shepherds Creek has a rocky bed with boulders and several small waterfalls and plunge pools. The riparian vegetation is predominantly dense shrub vegetation and stock access is reduced by the combination of boulders, bedrock bluffs and shrubs. The stream bed has more cobble, but fine sediment deposits are still present in the plunge pools.

The second gentle gradient reach is where the creek flows across an increasingly wide alluvial outwash deposit that has been deposited on the valley floor. Downstream of the small gorge section, the Shepherds Valley is still narrow but begins to widen as it flows downstream. As the valley floor becomes wider, it is progressively developed for grazing and the surrounding land use is predominately vegetated with pasture grasses. In this reach, watercress becomes a significant instream feature and can fill the whole stream channel. The stream is modified in one short reach by the creation of a dam and upstream pond (which has since been broken).

Downstream of the irrigation abstraction, the ephemeral reach is located amongst irrigated pastoral grazing land uses, with the approximately 3 km lower ephemeral reach having very infrequent flows and representing a major fish passage barrier. There is little evidence of a stream channel due to the surrounding land use, with the channel only experiencing flows during high flow periods and when the water abstractions are not operating. Downstream of Ardour Road, the surrounding agricultural land uses have completely removed any evidence of watercourse.

The perennial tributary streams in the Shepherds Creek catchment include a series of spring fed tributaries. All but one of the springs are located on the northern side of Shepherds Creek and a single spring was found in Jean Creek. These springs flow during the summer low flow period and provide part of the base flow of Shepherds Creek.

With respect to flows, monitoring indicates that flows within Shepherds Creek range from nearly zero to high flows over 140 l/s. Summer low flows are less than 20 l/s and often below 10 l/s upstream of the irrigation abstraction.

Flows in Jean Creek range from zero to just under 30 l/s, with flows generally less than 5 l/s aside from floods and freshes.





Figure 2-19: Perennial Watercourses in Upper Shepherds Creek



Figure 2-20: Springs in the Shepherds Creek Catchment



Figure 2-21: Jean Creek Intermittent Watercourse with Downstream Drying Reach (left) and Upstream Wet Reach (Right)

2.13.1.2 Aquatic Fauna

With respect to aquatic fauna, Waterways (2025) identified that:

- > Electric fishing and eDNA sampling did not detect the presence of any fish species in Shepherds Creek. As noted above, the lower ephemeral reach of Shepherds Creek has very infrequent flows and presents a major fish passage barrier; and
- > eDNA sampling undertaken throughout the reaches of Shepherds Creek indicated that the quality of the macroinvertebrate community declines in a downstream direction, but the boulder cobble reach within the Shepherds Valley gorge supports a good quality macroinvertebrate community.

2.13.1.3 Ecological Value

Waterways (2025) concludes that the upper reaches of Shepherds Creek – extending from the downstream boundary of the Ardgour Conservation Area to the downstream end of the Shepherds Valley gorge reach – are of moderate to high ecological value.

The downstream reaches of Shepherds Creek - below the Shepherds Valley gorge – are considered to have moderate ecological value. This is due to the increasing habitat modification associated with water abstraction and channel modifications (e.g. the dam pond), the presence of crack willow (shown below) and the increasingly noticeable stock impacts.



Figure 2-22: Crack Willow Trees at the Shepherds Creek Dam Pond

Jean Creek, a tributary of Shepherds Creek, is an intermittent stream that is assessed as having very low aquatic ecological value primarily due to the level of cattle and sheep damage. Waterways (2025) notes the creek is a near-dry stream channel damaged by stock which use it as a pathway to move beneath matagouri grey scrub, as shown in Figure 2-23 below.



Figure 2-23: Stock Track along Jean Creek under Matagouri Shrubs

2.13.2 Rise and Shine Creek

2.13.2.1 Stream Environment and Flows

Rise and Shine Creek can be divided into four sections:

- > Watershed areas and tributaries that rise on the southern side of the Rise and Shine Valley;
- > The upper Rise and Shine Valley floor section;
- > The lower Rise and Shine Valley floor section; and
- > The downstream gorge reach.

Various tributaries and watersheds drain the steep hillside along the southern side of the Rise and Shine Creek catchment (and the northern side of Mt Moka). Watershed areas are shown in Figure 2-24 below. Springs are present at the head of some of the tributaries which provide permanent flow sources for the perennial Rise and Shine Creek in the valley floor.



These tributaries have steep upper reaches with reduced gradients closer to the valley floor. The stream channels are small, with a maximum width of 0.5 m and the majority less than 0.3 m wide.



Figure 2-24: Watershed Areas in the Rise and Shine Catchment

The lower elevation areas of these tributaries have riparian zones subject to pasture grazing grasses and historic alteration due to previous mining and farm track construction. The valley floors consist of modified tussock grassland and scrubland. The lower elevation areas and gentle gradient reaches have rushes and sedges present in the wetter and wider valley floors.

Upstream of the Mt Moka tributary inflow, the main Rise and Shine Creek and associated tributaries are intermittent or ephemeral streams. The tributary inflows from Mt Moka provide the permanent flow sources for the perennial reach of Rise and Shine Creek. The reach of Rise and Shine Creek between the Mt Moka tributary confluence down to the Thomson Gorge Road crossing has been modified with historic dams and water races. While the stream channel is narrow (generally less than 1 m wide) it flows through wider wetland areas.

Stock access is available along the whole reach. The lower gradient nature of the reach means creek habitat is predominately run with occasional pools, often at stock crossing points. The streambed is composed of fine grade materials, mud, sand and fine gravel and the channel has emergent macrophyte communities.

Downstream of the Thomson Gorge Road crossing, the stream flows into a gorge where the gradient increases and the riparian zone is characterised by dense woody scrub vegetation. The habitat includes more stream like structures with pools and riffles being created by boulder material in the stream bed. This reach is heavily shaded.



Flows in Rise and Shine Creek are unmodified due to no water abstractions. Flow monitoring indicates the peak flow averages around 20 l/s, however it can reach nearly 140 l/s during high flows and as little as 1 l/s during summer.

2.13.2.2 Aquatic Fauna

With respect to aquatic fauna, Waterways (2025) identified that:

- > eDNA sampling did not detect the presence of any fish species in Rise and Shine Creek, with faunal values restricted to the macroinvertebrate fauna; and
- > The macroinvertebrate community is relatively sparse across the Rise and Shine Creek. As noted, the upper reaches of Rise and Shine Creek are considered intermittent or ephemeral. The intermittent reaches will retain some macroinvertebrates that tolerate the no flow conditions, while the ephemeral reaches are not expected to retain any macroinvertebrates.

2.13.2.3 Ecological Value

The tributaries that rise on the southern side of the Rise and Shine Valley and the upper Rise and Shine Valley reach have low to moderate ecological value. The lower Rise and Shine Valley floor reach is considered to have low to moderate ecological value, while the downstream gorge reach is considered to have moderate ecological value.

2.13.3 Bendigo Creek

As noted above, Bendigo Creek is adjacent to the Project Site.

Electric fishing and eDNA surveys undertaken by Waterways (2025) detected two fish species in Bendigo Creek, being kōaro and brown trout, noting that no fish were detected in the Project Site. The locations of brown trout are identified in Figure 2-25 below, with kōaro populations only detected for a short distance upstream of brown trout populations. An upstream waterfall provides a barrier to fish passage with downstream habitat varying with flow in the downstream intermittent reach of the Bendigo Creek. It is noted the lower reaches of Bendigo Creek are typically dry and subject to historic modification associated with irrigation development (refer to Figure 2-17 above).

Kōaro is generally classified as an At-Risk - declining fish species, however landlocked populations in the Lake Wakatipu and Lake Wānaka areas are considered stable. As such, the kōaro populations in the Bendigo Creek are considered part of a stable landlocked population (or part of a new developing population in the tributaries of Lake Dunstan).

No fish species were detected in the tributaries of Bendigo Creek and no Threatened fish species were collected or detected in the Bendigo Creek catchment.

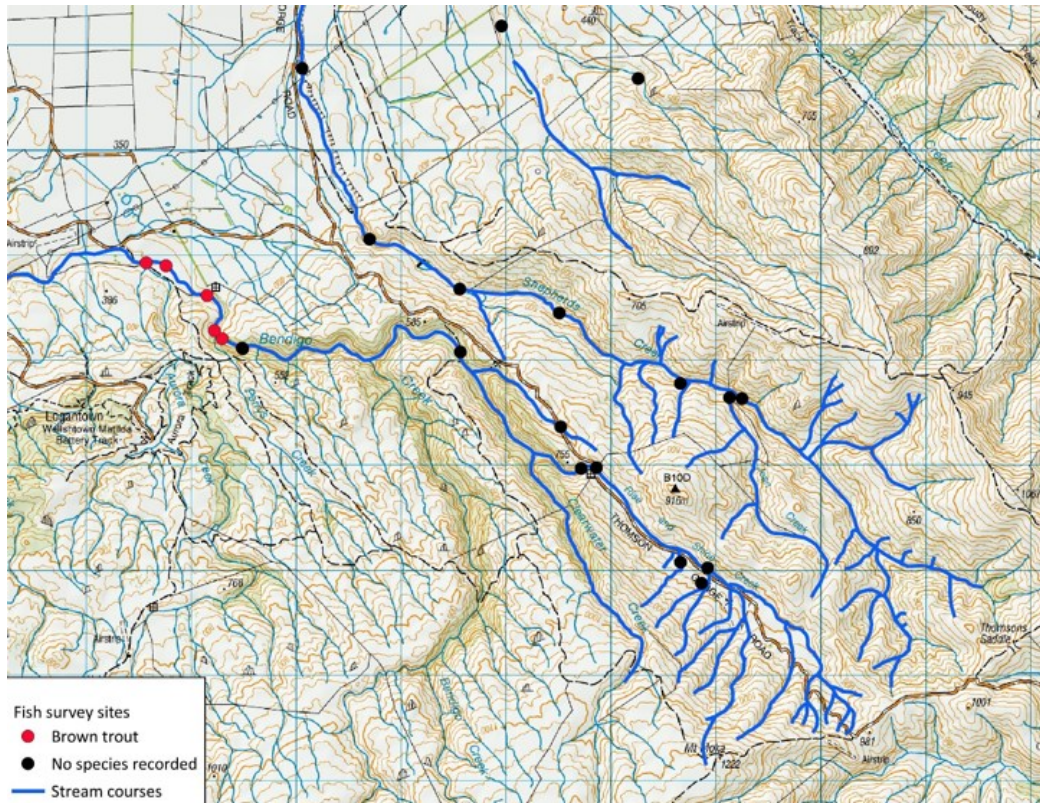


Figure 2-25: Fish Survey Locations and Fish Present

Bendigo Creek has relatively diverse macroinvertebrate communities, with good (but not high) quality communities as reflected by the presence of stonefly fauna which are often most sensitive to environmental conditions.

2.13.4 Clearwater Creek

As above, Clearwater Creek is located adjacent to the Project Site.

Electric fishing and eDNA sampling did not detect the presence of any fish in the Clearwater Creek. Clearwater Creek has two distinct macroinvertebrate communities. The upper reaches (upstream of the Rise and Shine Creek confluence) have a diverse and high-quality macroinvertebrate communities, while the mid-lower reaches of Clearwater Creek have noticeably lower quality macroinvertebrate communities.

2.14 FRESHWATER QUALITY

Baseline water quality within streams that have the potential to be impacted by the BOGP is described within MWM (2025j), a copy of which is provided in **Part B** of these application documents.



In summary, a number of these streams have elevated metals that form part of the existing environment when assessing the BOGP. These elevated metals are attributed to historical mining activities or natural baseline conditions. In particular:

- > Within the Shepherds Creek catchment, concentrations of copper and zinc are elevated or exceed the adopted default guideline values. Strontium concentrations were also elevated. Concentrations of nutrients (e.g. nitrate and ammoniacal nitrogen) are elevated in Shepherds Creek and may be attributed to the presence of livestock in the vicinity or rock weathering processes; and
- > Within the Bendigo Creek catchment, concentrations of arsenic are elevated and exceed default guideline values, though this was not detected within Clearwater Creek or the upper reaches of Rise and Shine Creek (above the Rise and Shine Creek workings). MWM (2025j) also detected elevated concentrations of cadmium, chromium, copper, and zinc, and potentially elevated concentrations of aluminium, strontium and ammoniacal nitrogen and are likely attributed to natural occurrences, historic gold mining activities or agricultural land uses which are all unrelated to the BOGP.

2.15 WETLAND VALUES

RMA Ecology has undertaken an assessment to describe the existing wetlands values within the Project Site - referred to as the Direct Disturbance Footprint (“**DDF**”) within the relevant ecological assessments - and the surrounding landscape as described below.

The DDF extends to a maximum footprint of 610 hectares,²³ while the surrounding landscape is comprised of a wider Ecological Study Area that surrounds the DDF and covers approximately 5,000 hectares of land. These areas are shown in Figure 2-26 below.

This wetland value assessment is detailed in RMA Ecology (2025a), a copy of which is provided in **Part B** of these application documents. This assessment, in conjunction with several other ecological value assessments, forms the basis of an overarching ecological effects assessment that has been prepared in Alliance Ecology (2025), also provided in **Part B** of these application documents.

²³ The DDF includes the Project Site of 568 hectares and buffers which range from 0-10 m for different project components.



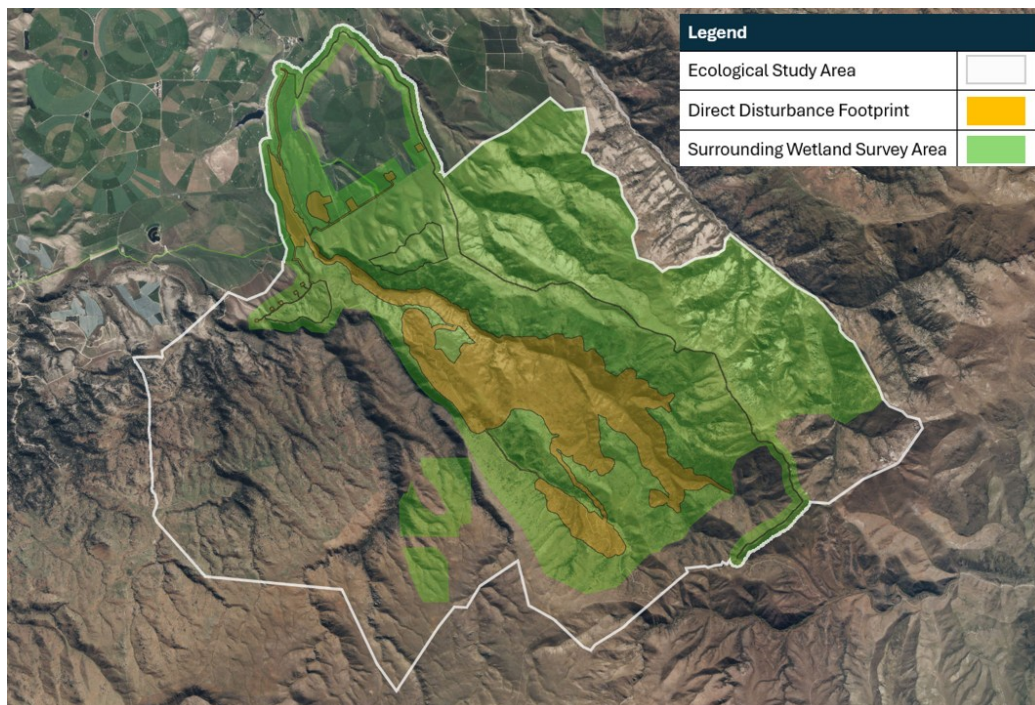


Figure 2-26: Wetland Survey Area for the Bendigo-Ophir Gold Project

2.15.1 Wetland Distribution

There are no regionally significant wetlands listed in the Regional Water Plan located in the wider Ecological Study Area or wider Dunstan Range. The nearest regionally significant wetland is Bendigo Wetland, approximately 154 hectares in size and located 6 km west of the westernmost extent of the Ecological Study Area, at the head of Lake Dunstan.

The wetland survey undertaken by RMA Ecology (2025a) identified 290 natural inland wetlands within the wetland survey area, totalling 11.3 hectares in area and distributed across the Ecological Study Area.

Approximately 94 wetlands totalling an area of approximately 3.12 hectares are located within the DDF. These wetlands are primarily comprised of swamp / marsh in valley floors and gullies (2.51 hectares), a coverage of fen largely in gullies (0.48 hectares) and hillside seepages (0.13 hectares).

The wetlands within the DDF are relatively small, except for several larger swamp / marsh complexes in the Rise and Shine Creek valley floor. Swamps / marshes are also present in valley floors and gullies in the Shepherds Creek catchments, its tributary Jean Creek, and Broad Creek to the north. Fens and marshes are present in gullies throughout the direct disturbance area and are small to moderate in size (ranging from 5 m² to 1,000 m², with the

majority less than 100 m²). Seepages are generally small (most are less than 100 m²) and particularly prevalent on the south facing slopes of Shepherds Creek catchment, and at the head of Rise and Shine Creek catchment.

RMA Ecology (2025a) also notes that wetland coverage is relative to altitude, with generally greater wetland coverage below 800 m compared to above 800 m in elevation.

Figure 2-27 below illustrates the distribution of wetlands within the surrounding wetland survey area (green area).

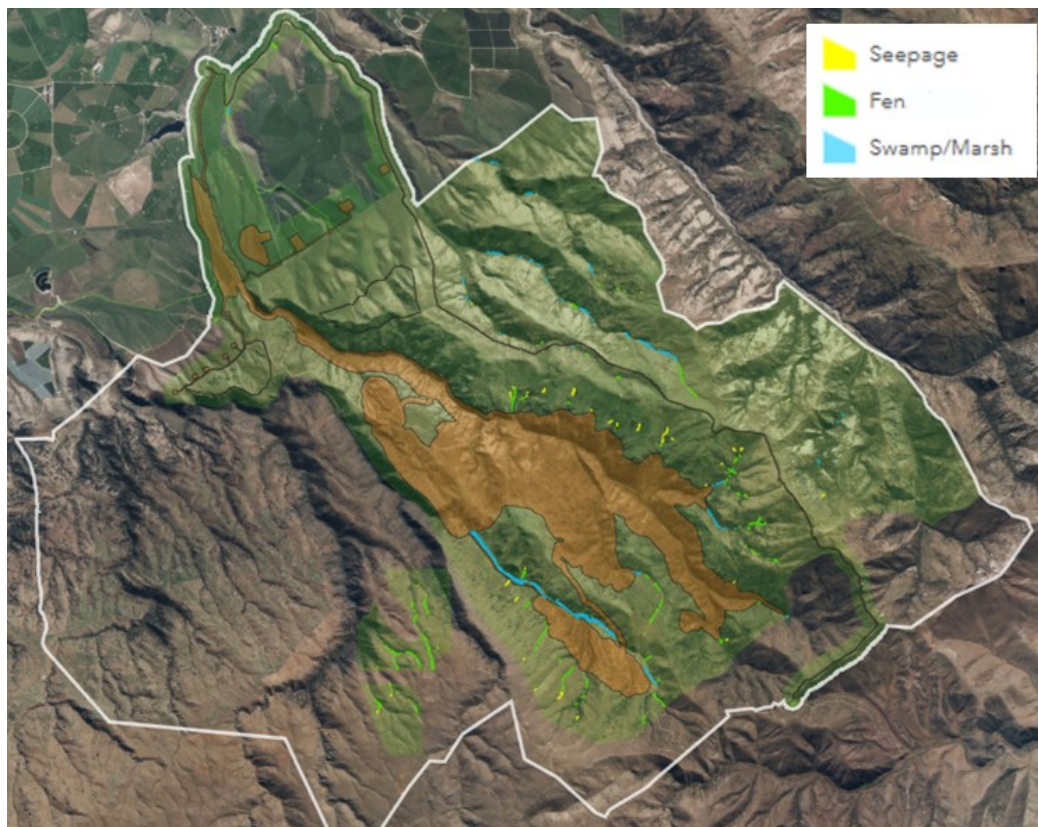


Figure 2-27: Distribution of Wetlands within Wetland Survey Area (Green Area)

2.15.2 Wetland Classification

The BOGP wetlands are classified into hillside seepages, gully fens and valley floor swamps / marshes, which are described below.

Hillside seepages are areas on slopes which carry a moderate to steady flow of groundwater and often surface water. Seepages across the Ecological Study Area are small and relatively sparse, but larger and more common on the south facing slopes above Shepherds Creek, where they commonly grade into gully fens and marshes. An example of a seepage wetland within the surrounding landscape is shown in Figure 2-28 below.



Figure 2-28: Typical Seepage Wetland within Proximity of the Direct Disturbance Footprint (W092)

Gully fens are low to moderate fertility wetlands that are located on low gradient land and primarily fed by groundwater or surface water. Fens within the Ecological Study Area mostly occur within gully landforms and are likely influenced by occasional flood events from the adjacent stream. A typical gully fen wetland located within Bendigo Station (of good condition, with low levels of pugging and moderate grazing) is shown in Figure 2-29 below.



Figure 2-29: Typical Gully Fen Wetland within Proximity of the Direct Disturbance Footprint (W217)



Swamps and marshes within the DDF are often riparian palustrine systems, with riverine components where they are heavily influenced by stream flood events least annually. These are typically the wetland communities with the greatest dominance of native species. Swamps receive a relatively rich supply of nutrients and often sediment via surface runoff and groundwater from adjacent land. They are found on valley floors and the lower end of some larger gullies. The dominant swamp and marsh vegetation within the Ecological Study Area comprises native sedgeland, exotic grassland and exotic hermland.

A typical swamp wetland within the Rise and Shine Valley floor is shown in Figure 2-30 below. The wetland has marshlands on the margins, with exotic dominated grassland and herbfield communities.



Figure 2-30: Typical Swamp Wetland within the Rise and Shine Valley Floor (W003)

2.15.3 Wetland Flora

Across the Ecological Survey Area, RMA Ecology (2025a) has identified 94 plant species, including 32 native species. In particular:

- > Eight of the native species found are obligate wetland plants, which are unique to wetlands and not found in other vegetation types in the Ecological Study Area;
- > Five native facultative wetland plants were recorded, which are primarily present in wetlands, but also present in marginally wet sites; and
- > A range of non-native facultative, facultative upland and upland plants were recorded which are not unique to wetlands.



In relation to threatened species in the DDF and the surrounding landscape surveyed for wetlands, nine regionally Threatened and nationally At-Risk species were found throughout both areas, with another one regionally At-Risk species found in only the DDF. Four Threatened or At-Risk plants were found in swamps and marshes, six in fens and two in seepages.

2.15.4 Wetland Fauna

RMA Ecology (2025a) did not detect any specialist wetland avifauna in the Ecological Study Area. While small numbers of exotic and Not-Threatened native waterfowl utilise artificial ponds in the Ecological Study Area on a transient basis, including two small shallow ponds in the DDF, these avifauna values are low.

Overall, habitat for wetland birds is limited and of poor quality, being constrained spatially and temporally. No Threatened species were detected, and the lack of dense vegetation cover (and shallow open water with suitable fringing vegetation) means the probability of these species being present in the Ecological Study Area is very low. In addition, no wetland-specific invertebrates are known to be present in the Ecological Study Area.

2.15.5 Overall Wetland Values

RMA Ecology (2025a) considers that wetland condition scores ranged from a minimum of 22 to a maximum of 31, noting a wetland condition score can range from 4 (lowest) to 40 (highest).²⁴ Swamps and marshes in Rise and Shine, Bendigo and Broad Gully catchments scored intermediate and moderately high in this range, while those in Shepherds Creek catchment tended to score comparatively low. Figure 2-31 provides a ‘heat map’ overview of overall wetland condition within the DDF and surrounding wetland survey area, with higher numbers relating to better ecological condition.

²⁴ By rating the degree of impact for nine indicator components from the Handbook for Monitoring Wetland Condition [B. R. Clarkson, B. K. Sorrell, P. N. Reeves, P. D. Champion, T. R. Partridge, and B. D. Clarkson, Handbook for monitoring wetland condition. Coordinated monitoring of New Zealand wetlands. A Ministry for the Environment SMF funded project. Wellington, New Zealand: Ministry for the Environment, 2004. [Online]. Available: <http://www.landcareresearch.co.nz/research/biocons/restoration/docs/handbook2004.pdf>]



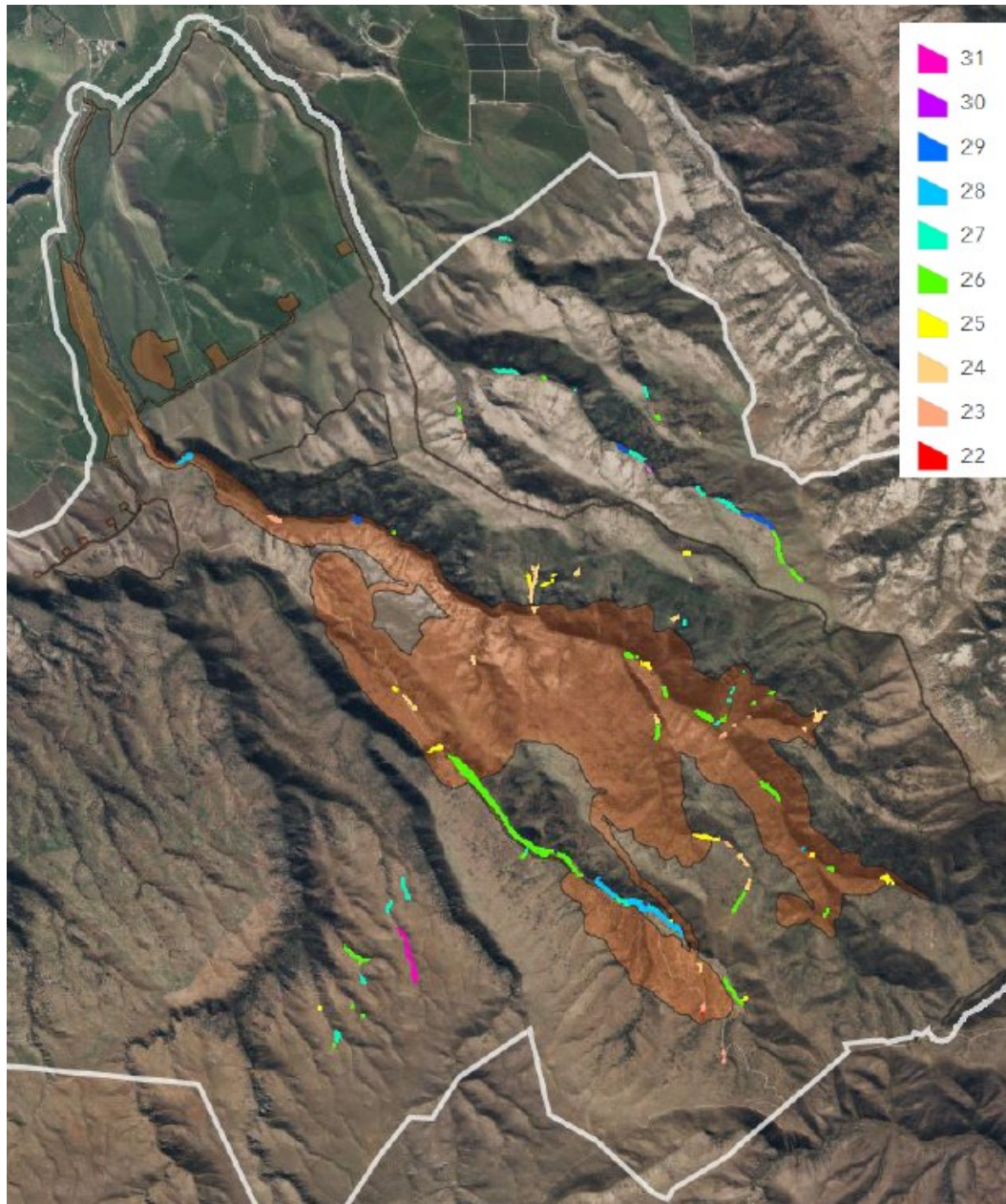


Figure 2-31: Heat Map of Overall Wetland Condition Score

Overall, the condition of wetlands in the DDF (an average score of 25.64) is lower than in the surrounding landscape surveyed for wetlands (with an average score of 26.76) largely due to greater introduced species cover and higher levels of animal disturbance.

2.16 TERRESTRIAL ECOLOGICAL VALUES

Habitat NZ Limited (“**Habitat NZ**”) and RMA Ecology have prepared a range of technical reports for the BOGP which together provide an understanding of existing terrestrial ecology



conditions across the DDF. Copies of these reports are provided in **Part B** of these application documents. In particular:

- > Habitat NZ has undertaken comprehensive mammalian pest, native bat and invertebrate surveys throughout the DDF and wider Ecological Study Area across three separate reports (Habitat NZ (2025a), (2025b) and (2025c)), respectively; and
- > RMA Ecology has undertaken a comprehensive survey and a review of existing vegetation, avifauna and lizard values throughout the DDF and wider Ecological Study Area across three separate reports (RMA Ecology (2025b), (2025c) and (2025d)), respectively.

The Habitat NZ and RMA Ecology surveys evaluate the presence of existing terrestrial ecology values across the Ecological Study Area – which is comprised of the DDF and the surrounding landscape. The Habitat NZ and RMA Ecology survey areas are shown in Figure 2-32 and Figure 2-33 below.

Overall, the various terrestrial ecological assessments consider that the majority of the ecological values within the DDF are the same as the surrounding landscape within the Ecological Study Area, with the notable exception to mixed depleted herbfield (i.e. cushionfield) vegetation.

In addition, Alliance Ecology (2025) notes that, with exception to woody vegetation cover, indigenous biodiversity within the Project Site landscape is generally in decline due to ongoing habitat loss and degradation. This is a result of stock browsing, topdressing and aerial over sowing with non-native pasture species, the spread of competing non-native plants (including weeds), invasive browsers and grazers (e.g. rabbits and deer) and predation by introduced mammals. A summary of these surveys is provided in the following sub-sections.



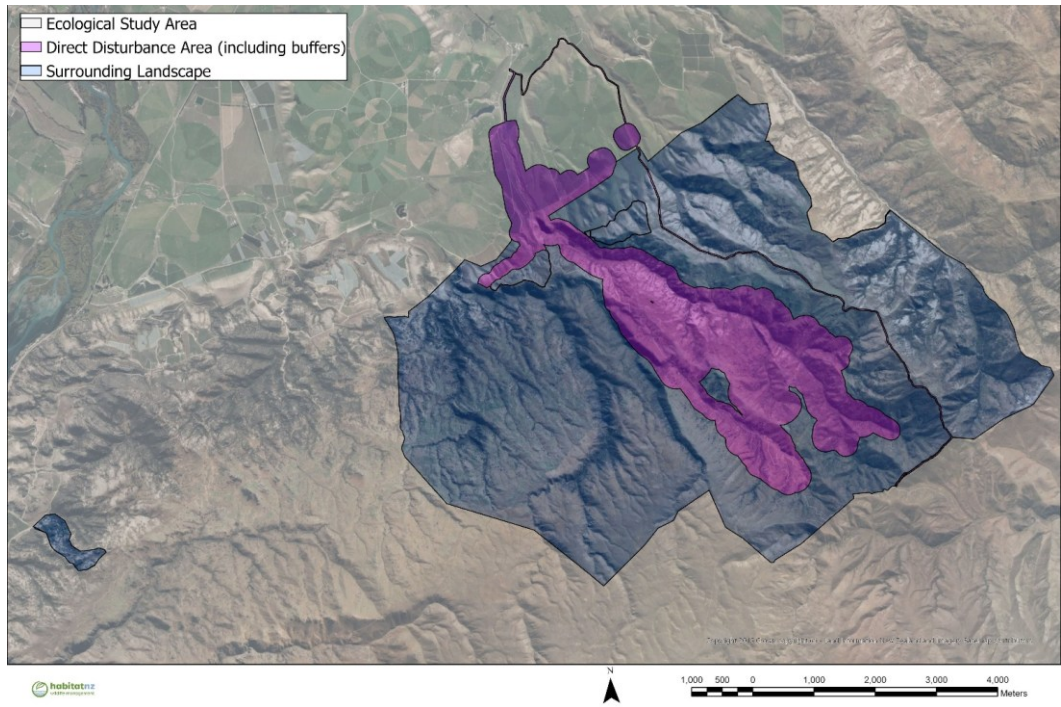


Figure 2-32: Habitat NZ Ecological Study Area for the Bendigo-Ophir Gold Project



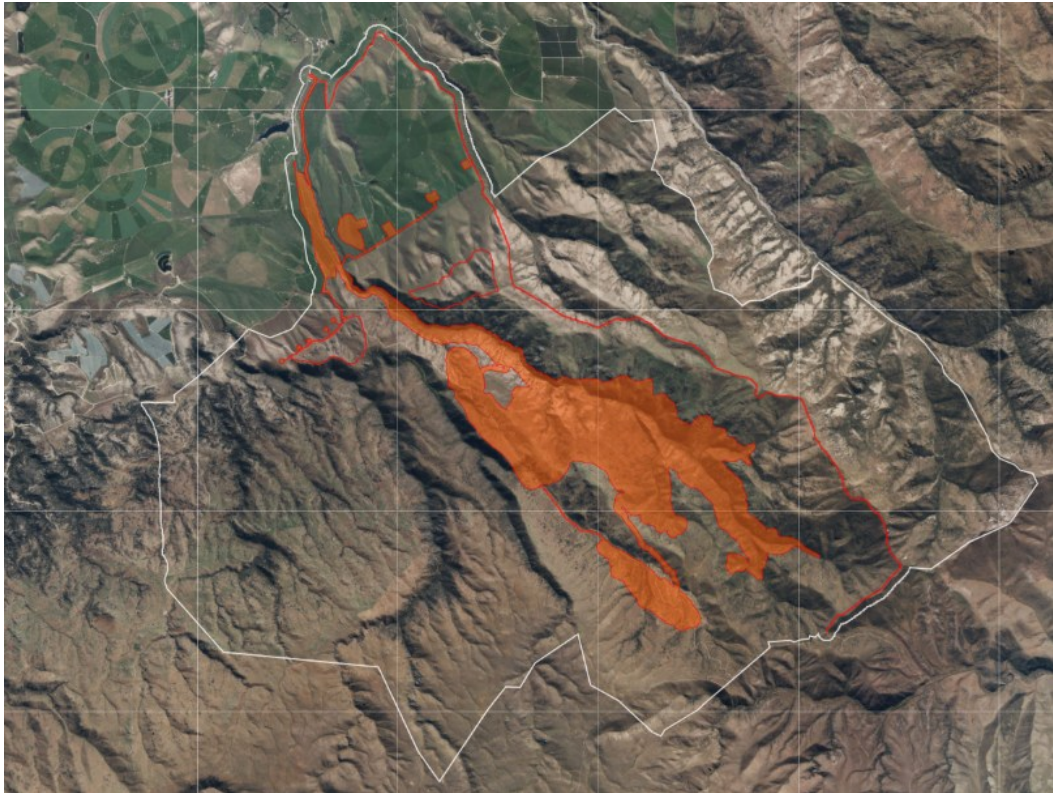


Figure 2-33: RMA Ecology Ecological Study Area for the Bendigo-Ophir Gold Project²⁵

2.16.1 Mammalian Pests

Habitat NZ (2025a) found that mammalian pests across the Ecological Study Area include feral cats, feral deer, feral goats, feral pigs, hares, hedgehogs, mice, mustelids, possums, rabbits and rats. However, there is an overall low abundance of stoats, weasels and rats. eDNA sampling from diet analysis of species also found:

- > Multiple pest species are consuming plants from genera containing Threatened and At-Risk species across the Ecological Study Area;
- > Predation of native skinks by feral cats, ferrets and hedgehogs across the site, including several southern grass skinks (At-Risk – Declining) and McCann’s skink (Not-Threatened); and
- > All target mammalian pests are eating a variety of native invertebrates, including one At-Risk moth species, as well as other species such as the endemic ground wētā.

²⁵ The direct disturbance footprint is shown in red and orange, with wider Ecological Study Area outlined in white.



2.16.2 Native Bats

Habitat NZ (2025b) undertook acoustic monitoring surveys during likely high bat activity periods during the 2023 - 2024 summer survey period. These surveys found no evidence of long-tailed or lesser short-tailed bats within the Ecological Study Area for any purpose, including resting, foraging or commuting.

Habitat NZ (2025b) notes that while the occasional presence cannot be ruled out, it is highly unlikely that long-tailed bats are regularly present and extremely unlikely that lesser short-tailed bats are present.

2.16.3 Invertebrates

Habitat NZ (2025c) collected a total of 29,538 invertebrate specimens during surveying undertaken across two field seasons. 222 native species and 29 introduced species were identified, with the remaining taxa not able to be determined at the species level.

A total of 18 notable invertebrate species were identified across the Ecological Study Area, including moths, grasshoppers, beetles and weevils. These were comprised of:

- > Four Threatened species of moth, with one considered nationally critical, one nationally endangered and two nationally vulnerable);
- > Nine At-Risk species, comprised of eight moth species (six declining and two uncommon) and one declining species of grasshopper;
- > Four new species, comprised of one species of weevil and three species of ground beetles; and
- > One unassessed species of moth thought to be of conservation importance.

Of these notable species, only one was found only in the DDF for the BOGP, being the At-Risk – Declining grasshopper *Phaulacridium otagoense*.

Habitat NZ (2025c) considers the overall invertebrate community structure and diversity is similar across the DDF of the BOGP and the surrounding landscape, with targeted monitoring sites showing a richer and more diverse invertebrate population compared to representative survey sites.

In addition, Habitat NZ (2025c) observed significant seasonal variations for moth communities, with higher species richness and abundance recorded in late summer compared to early summer.



2.16.4 Vegetation

RMA Ecology (2025b) assessed a total of 148 vegetation plots between February 2024 and January 2025 to understand the existing vegetation values within the wider Ecological Study Area and the DDF. The locations of these vegetation plots is shown in Figure 2-34 below.



Figure 2-34: Locations of Vegetation Plots Across Ecological Study Area and Direct Disturbance Footprint

RMA Ecology (2025b) describes the Ecological Study Area as consisting of the full range of Threatened Environment Classifications, ranging from less than 10% indigenous cover remaining in the cultivated basin to greater than 20% indigenous cover remaining in the higher altitude parts of the DDF.

Seven vegetation communities have been classified in RMA Ecology (2025b) across the Ecological Study Area. The areas covered by each vegetation community is visually represented in Figure 2-35 and illustrated spatially in Figures 2-36 to 2-37.

A summary of these vegetation communities is provided in the subsections below, with more detailed descriptions provided in RMA Ecology (2025b).

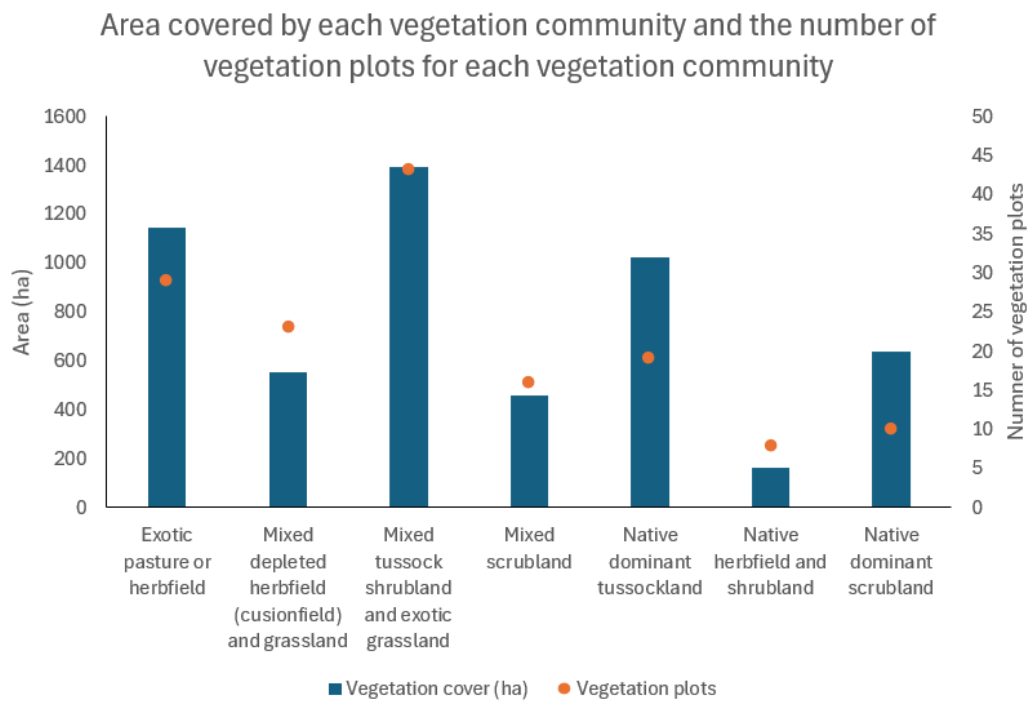


Figure 2-35: Areas Covered by Each Vegetation Community Area



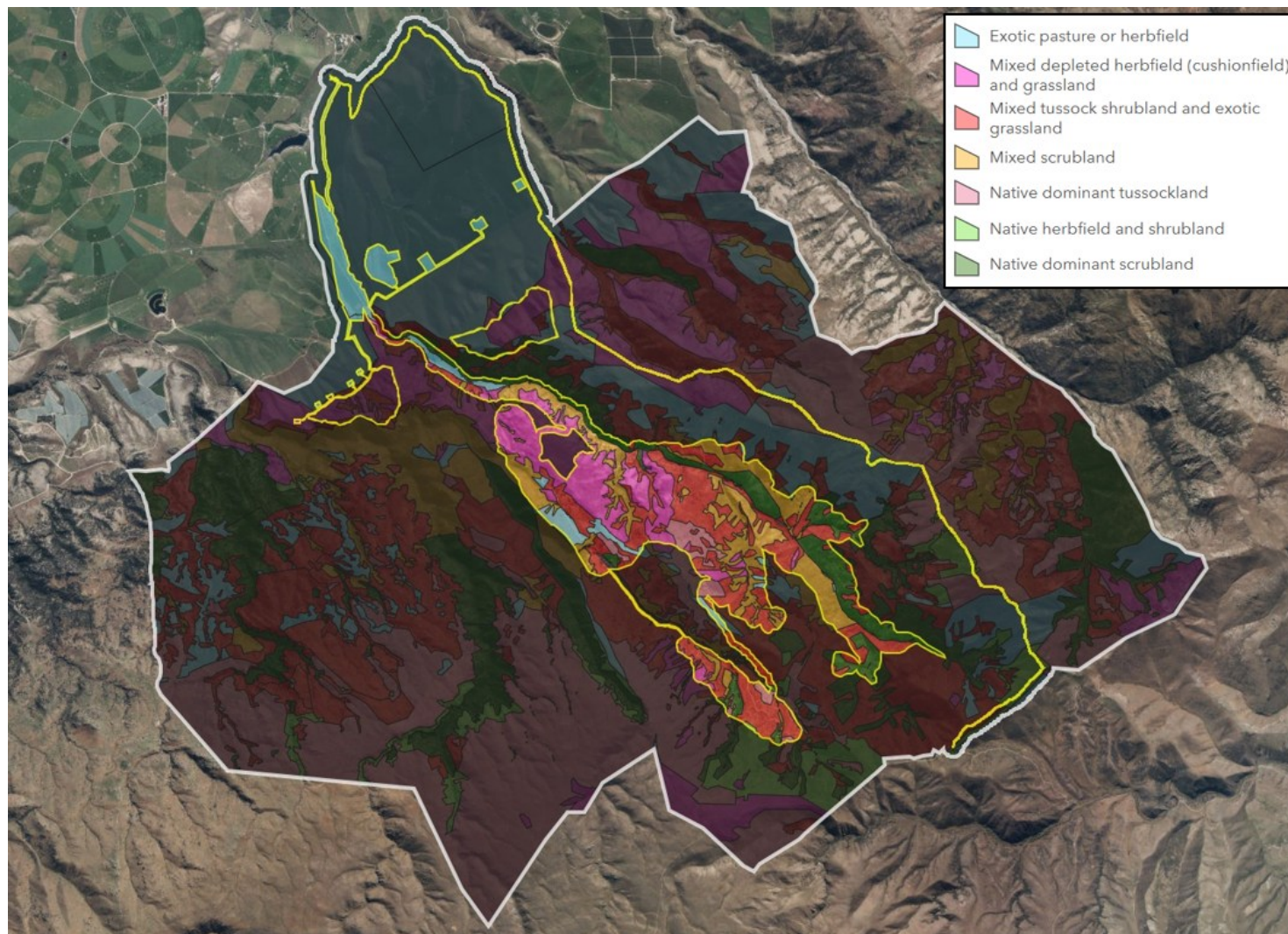


Figure 2-36: Vegetation Communities within the Direct Disturbance Footprint



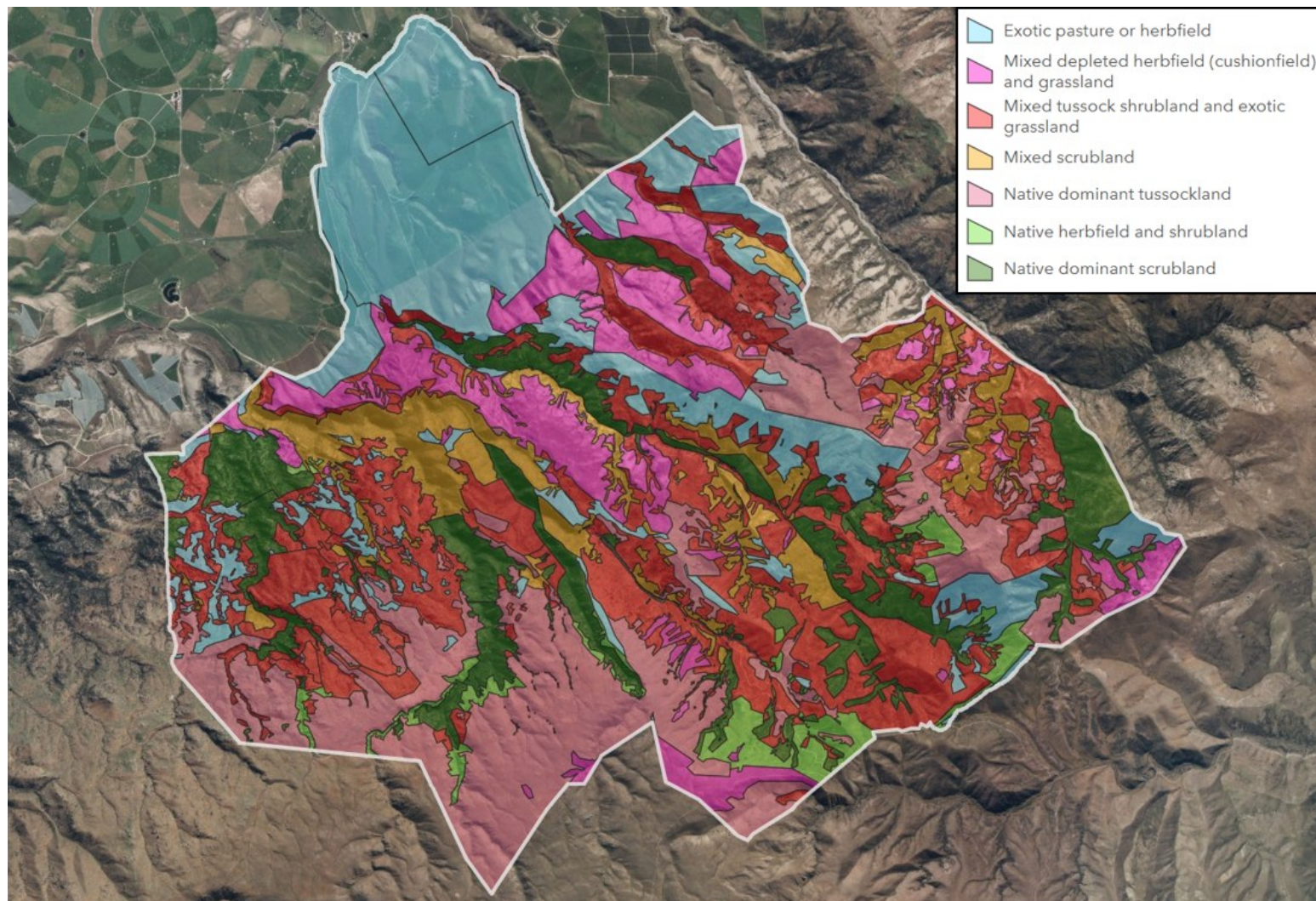


Figure 2-37: Vegetation Communities within the Ecological Study Area



2.16.4.1 Distinctive Vegetation Features

Distinctive vegetation features are also present with the project site which include relict kōwhai, and rock tors that support distinct vegetation communities. These features are not specific to any one vegetation community and occur at a finer scale than the mapped communities shown above.

Forty individual kōwhai are present across the ESA as shown in Figure 2-38 and are likely the oldest woody vegetation on site. An example of a solitary relict kōwhai is shown in Figure 2-39.

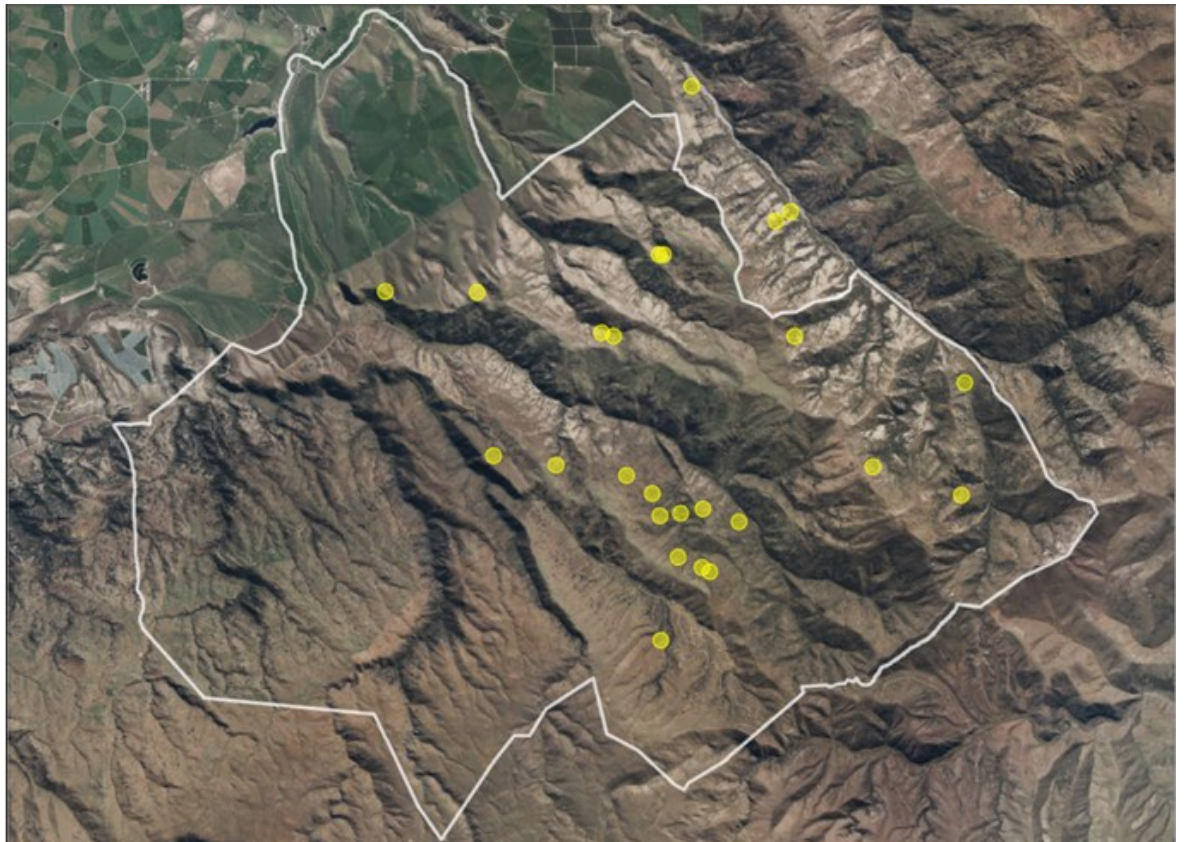


Figure 2-38: Map of Kōwhai Locations (Yellow Circles) Within and Nearby the ESA (White Border)



Figure 2-39: Example of a Solitary Relict Kowhai

Rock tors are prevalent across the landscape in all vegetation communities and offer unique conditions that support a distinctive assemblage of plants. An example of rock tors acting as refugia for native plants from fire and browsing is shown in Figure 2-40 below.



Figure 2-40: Example of Rock Tors



2.16.4.2 Exotic Plants and Herbfield

This vegetation type occurs across lower elevation areas within the Ecological Study Area (below 500 m) but also at higher elevations over 1,000 m. It comprises low-growing exotic grassland and exotic herbs with little bare ground. Exotic pasture is maintained by regular inputs of fertiliser, seed, cultivation and grazing by sheep, cattle, possums, rabbits and hares. Exotic pasture grasses (50% cover) include sweet vernal, soft brome, ripgut brome and barley grass. Other important grasses present are browntop, cocksfoot, Yorkshire fog and Kentucky bluegrass. Exotic herbs (21% cover) include clover and weed species such as hawkweeds, sheep's bur and yarrow.

At-Risk – declining species present include desert broom, common scabweed, *Raoulia beauverdii* and scented tree daisy, but only recorded on the ACFOR scale²⁶ as occasional. *Raoulia beauverdii* is also classified as Threatened – regionally vulnerable.

RMA Ecology (2025b) considers the exotic plants and herbfield within the DDF have an overall **low** ecological value.



Figure 2-41: Exotic Plants and Herbfield with Cultivated Exotic Pasture at Lower Elevation

²⁶ **Abundant** - The species is very common and easily found, often comprising 30% or more of the observed individuals; **Common** - The species is frequently encountered, but not as widespread as an "Abundant" species; **Frequent** - The species is regularly found, but less so than "Common" species; **Occasional** - The species is found occasionally, suggesting a lower density or less frequent occurrence; **Rare** - The species is seldom encountered, indicating a low abundance or infrequent presence.





Figure 2-42: Exotic Plants and Herbfield with Pasture with Scattered Shrubs at Higher Elevation

2.16.4.3 Mixed Depleted Herbfield (Cushionfield) and Grassland

RMA Ecology (2025b) identifies this vegetation community mainly occurs on moderate to steep northwest to northeast facing slopes between 400 and 800 m elevation (refer to Figure 2-40), although small areas also occur on similar slopes at higher elevations that can exceed 1,000 mRL (refer to Figure 2-41).

Overall, the extent of this vegetation type is relatively limited in the Ecological Study Area (approximately 10%) but is more widespread within the DDF (approximately 17%). This depleted vegetation type has the highest proportion of bare ground and rocks with otherwise sparse low growing grasses and herbs dominating.

Vegetation type often comprises large cushionfields of scabweed or *Raoulia beauverdii* as well as exotic herbs and grasses, with native tussocks rare. The cushionfields are the most valuable ecosystem present within the Project Site and surrounding Ecological Study Area with respect to biodiversity values. 21 plant species classified as Threatened and At-Risk are present within this vegetation community, including the following endemic spring annuals:

- > *Ceratocephala pungens*, classified as Threatened – nationally critical;
- > *Myosotis brevis*, classified as Threatened – nationally vulnerable; and
- > New Zealand mousetail, classified as At-Risk – declining.



RMA Ecology (2025b) notes the two nationally Threatened spring annuals above may account for up to 33% and 80% of the regional populations, however, the exact extent of these species is unknown.

RMA Ecology (2025b) also records the indigenous (but not endemic) biennial New Zealand carrot (*Daucus glochidiatus*) which is classified as Threatened – nationally vulnerable. Several At-Risk – declining species of herb and woody plants were also identified of which three are abundant (common scabweed, *Raoulia beauverdii*, and desert poa) and one is common. Some of the species classified as At-Risk – declining are also classed as regionally Threatened.²⁷

In light of the above, RMA Ecology (2025b) considers the mixed depleted herbfield vegetation community has **very high** ecological value.



Figure 2-43: Mixed Depleted Herbfield (Cushionfield) and Grassland

²⁷ *Acaena buchananii*, blue wheat grass (*Anthosachne aprica*), *Colobanthus brevisepalus*, *Pimelea aridula* subsp. *aridula*, *Raoulia beauverdii*, celadon mat daisy (*Raoulia parkii*), and *Rytidosperma maculatum*.





Figure 2-44: Mixed Depleted Herbfield (Cushionfield)

2.16.4.4 Mixed Tussock Shrubland and Grassland

This vegetation type occurs at mid to low elevations, largely below 900 m but extending up to 1,020 m in places. It comprises predominantly exotic grassland, but with a moderate component of native tussocks and with scattered to patchy shrubland. It is the most widespread vegetation type in both the wider Ecological Study Area (approximately 26%) and the DDF (approximately 31%).

Exotic pasture grasses are the dominant species, although native tussocks (including hard tussock, silver tussock and blue tussock) can be locally common. Shrubs such as native matagouri and exotic sweet brier are scattered with moderate bare ground cover.





Figure 2-45: Exotic Pasture Species with Scattered Native and Exotic Shrub Species in Mixed Tussock Shrubland and Grassland



Figure 2-46: Mosaic of Localised Stands of Scrub, Tussock, or Exotic Pasture in Mixed Tussock Shrubland and Grassland

RMA Ecology (2025b) notes that no plant species classified as Threatened were recorded, although several species classified as At-Risk – declining are present including three recorded as frequent (scented tree daisy, common scabweed, and *Raoulia beauverdii*). *Raoulia beauverdii* is also ranked as Threatened – regionally vulnerable.

RMA Ecology (2025b) assesses this vegetation community as having **high** ecological value.

2.16.4.5 Mixed Shrubland

This vegetation type is relatively limited over the Ecological Study Area (approximately 9%) but more widespread with the DDF (approximately 20%). It predominantly occurs in gullies and on moderate to steep north facing slopes between 400 and 800 m elevation (refer Figure 2-44 below).

This vegetation type is dominated by often dense scrubland, with exotic grassland and bare ground between patches of scrub. The scrubland is dominated by both native and exotic species such as matagouri, exotic sweet brier and less commonly native *Coprosma propinqua*



Figure 2-47: Mixed Shrubland (Sweet Brier is Light Green and Matagouri is Dark Green)

RMA Ecology (2025b) did not record any plant species classified as Threatened within this vegetation type, although the At-Risk – declining scented tree daisy was recorded as frequent. Twelve other species classified as At-Risk were recorded, of which seven are also regionally Threatened – vulnerable.

RMA Ecology (2025b) assesses the ecological value of mixed shrubland vegetation communities as **high**.

2.16.4.6 Native Dominated Tussockland

This vegetation type occurs at higher elevations (mainly above 800 m) across a variety of slopes and aspects, particularly in the south of the Ecological Study Area, and as such, occurs more frequently in the Ecological Study Area (approximately 19%) and less in DDF (approximately 4%). It is structurally herbaceous and dominated by grasses, tussocks and herbs, with shrubs a minor component.

The vegetation community is described as a depleted short tussock grassland, with the native hard tussock, blue tussock, and to a lesser extent, silver tussock. Exotic herbs and grasses are also an important component. The large native herb *taramea* can be locally common.

RMA Ecology (2025b) recorded only one plant species classified as Threatened – vulnerable from this vegetation type, being coral broom, which is rare and only outside of the DDF. However, 16 species classified as At-Risk – declining were identified, of which four were recorded as frequent (common scabweed, *Raoulia beauverdii*, desert broom, scented tree daisy). Of these, only *Raoulia beauverdii* is classed as regionally Threatened. A further six plant species classed as regionally Threatened were recorded, but all of these were occasional or rare.

RMA Ecology (2025b) assess the ecological value of native dominated tussockland as **high**.



Figure 2-48: Typical Native Dominated Tussockland



2.16.4.7 Native Herbfield and Shrubland

This minor vegetation type occurs mostly in the highest elevation areas between 800 to 1,100 m both in the Ecological Study Area (approximately 1%) and the DDF (approximately 3%). This vegetation type is structurally herbaceous and includes native tussocks, exotic grasses, native and exotic herbs, and moss. The large native herb *taramea* is distinctive and grows within grass and herbs with scattered short tussocks. The herbaceous sward is dominated by exotic grasses and herbs. Several native herbs can be locally abundant in this herbaceous layer, with *matagouri* also locally abundant.

RMA Ecology (2025b) did not record any plant species classified as Threatened, however, 11 At-Risk species are present, noting all were recorded as occasional or rare. While six of the species are also classified as regionally Threatened, these were again occasional or rare in their abundance.

Overall, RMA Ecology (2025b) assesses the native herbfield and shrubland vegetation type as having **high** ecological value.



Figure 2-49: Native Herbfield and Shrubland Showcasing *Taramea*

2.16.4.8 Native Dominant Scrubland

This vegetation type occurs across a range of elevations and landforms throughout the Ecological Study Area, with similar abundance within the DDF (approximately 14%) and the wider Ecological Study Area (approximately 12%). It is particularly common in gullies and on south facing slopes and comprises structurally dense shrubland dominated by native shrub species.



RMA Ecology (2025b) found two distinct forms of this shrubland. The most common form occurring across most of the Ecological Study Area is dominated by matagouri and scented tree daisy forming a closed canopy 2-3 m tall (refer to Figure 2-47 below). The main exotic shrub is sweet brier with native vines in places. In the west of the Ecological Study Area is locally extensive *Kunzea serotina* shrubland. Other native woody species are usually uncommon, although tātārāmoa can be locally common climbing up through the canopy.

RMA Ecology (2025b) did not record any plant species classified as Threatened, although 14 species classed as At-Risk were present, including two that were recorded as common (scented tree daisy) or frequent (desert broom). Eight of the species recorded from this vegetation type are regionally Threatened although these were again occasional or rare in their abundance.

This vegetation type was assessed in RMA Ecology (2025b) as having **very high** ecological value.



Figure 2-50: Steep-sided Gully Covered by Matagouri

2.16.4.9 Hilly Landscape Unit and Basin Landscape Unit

RMA Ecology (2025b) delineated two landscape units, the Hilly Landscape Unit and the Basin Landscape Unit as shown in Figure 2-48 below.



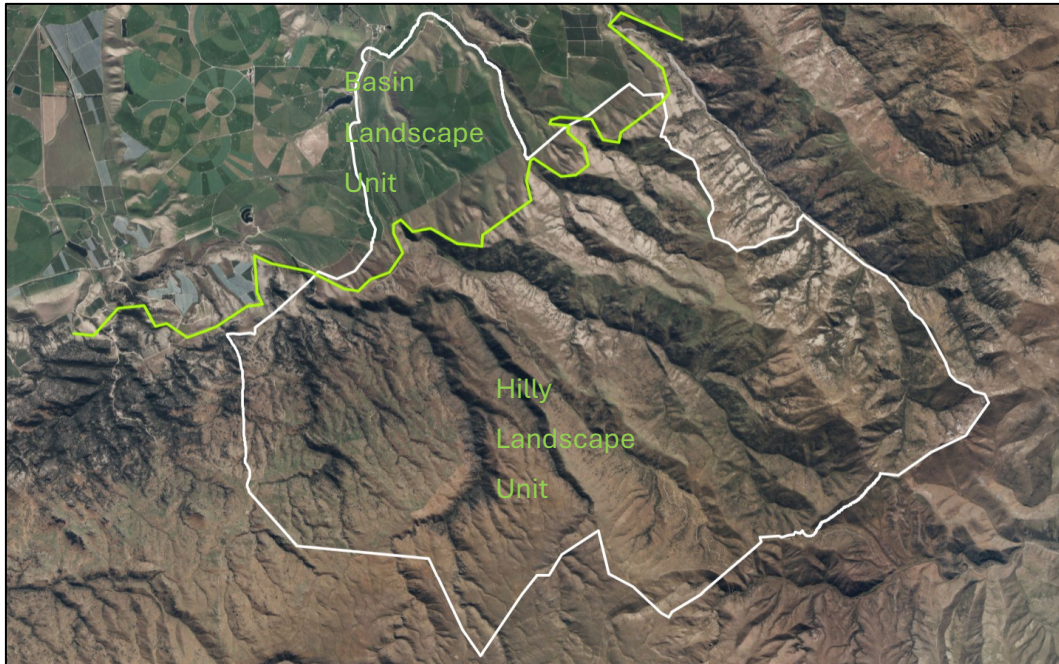


Figure 2-51: Hilly Landscape Unit and Basin Landscape Unit within the Ecological Study Area Bordered in White

The Hilly Landscape Unit forms an area of approximately 559 hectares in the DDF and supports several vegetation communities including mixed depleted herbfield (cushionfield) and grassland, native dominant tussockland, native herbfield and shrubland, and native dominant scrubland. This unit supports 58 nationally or regionally Threatened or At-Risk plant species and the regional endemic plant species *Anthosachne aprica*.

Only a small portion of the DDF is within the Basin Landscape Unit. This unit comprises almost only exotic pasture or herbfield and is not representative of indigenous vegetation with very few native, nationally or regionally Threatened or At-Risk plant species.

As such, RMA Ecology (2025b) has only assessed the ecological value of the Hilly Landscape Unit of the Ecological Study Area as it represents a continuous and integrated general ecological system. The vegetation values in the Hilly Landscape Unit are assessed as having an overall **very high** ecological value.

2.16.4.10 Summary

A summary of the overall ecological values for each vegetation community is provided in Table 2-3 below (noting the vegetation communities within the Hilly Landscape Unit are included in the vegetation types below).



Table 2-3: Ecological Values for Vegetation Communities within Direct Disturbance Footprint

Vegetation Community	Ecological Value
Exotic Plant and Herbfield	Low
Mixed Depleted Herbfield (Cushionfield)	Very high
Mixed Tussock Scrubland and Grassland	High
Mixed Scrubland	High
Native Dominated Tussockland	High
Native Herbfield and Scrubland	High
Native Dominant Scrubland	Very high

2.16.5 Avifauna

The avifauna survey was comprised of both desktop assessment and field surveys and provides a comprehensive baseline of the avifauna present within the Ecological Study Area. The key findings from this survey are presented below.

The desktop assessment indicates 48 bird species are present in the Ecological Study Area. This includes 30 native species, of which three are classified as Threatened species and eight are At-Risk species.

During general and targeted field surveys, 30 bird species were detected within the DDF, including 11 native species, one Threatened species (New Zealand falcon) and two At-Risk species (New Zealand pipit and black shag). An additional five Threatened or At-Risk bird species are likely to be present as residents or occasional visitors. In five-minute bird counts, exotic birds dominate in terms of species richness and abundance. RMA Ecology (2025c) found no significant difference in the abundance and species richness of native birds in the DDF compared to the surrounding landscape within the wider Ecological Study Area.

With respect to habitat values, RMA Ecology (2025c) notes that woody vegetation supports the highest numbers of native birds, and no wetland birds were detected in the Ecological Study Area.



The wetland habitat for birds is of low to moderate quality due to the lack of shallow water and tall vegetation during the breeding season. While two native duck species were detected within the two small waterbodies within the DDF, these were both classified as Not Threatened.

In terms of threatened species, RMA Ecology (2025c) detected the following species of relevance:

- > New Zealand falcon (Threatened – vulnerable) in the DDF, which are classified as having very high ecological value
- > Black fronted terns (Threatened – nationally endangered) within the Clutha River / Matau-Au which are likely to visit the cultivated fields on the Ardour / Bendigo terraces on occasion. They are classified as having very high ecological value;
- > South Island Pied Oystercatcher and Black-billed gulls (both At-Risk – declining) are also likely to occasionally visit the cultivated fields on the Ardour / Bendigo terraces. They are both assigned high ecological value; and
- > The New Zealand pipit (At-Risk – declining) are dispersed throughout the DDF and the surrounding landscape and are assigned high ecological value.

In summary, RMA Ecology (2025c) conclude that of the avifauna species present, or likely to be present in the DDF, two species are classified as having very high ecological value, four are assigned high ecological value, two are assigned moderate-high ecological value, and one species is assigned moderate ecological value. The remainder of the species are classified as having low ecological values.

2.16.6 Lizards

Lizard surveys were undertaken throughout the DDF and across comparable and representative areas of the surrounding Ecological Study Area. Multiple survey methods were utilised which are further detailed in RMA Ecology (2025d), with approximately 620 hours dedicated to searching for lizards across the Ecological Study Area and associated areas throughout 2023 and 2024.

As previously noted, the landforms and lizard habitat within the DDF are highly modified through clearance of original woody vegetation, historic mining activities, stock browse, repeated burning (to encourage pasture regrowth) and lack of pest control.

RMA Ecology (2025d) identify that the McCann's skink, Kowarau gecko and tussock skink are abundant across the DDF and the Ecological Study Area.

However, there is an absence of arboreal geckos and large-bodied skinks²⁸ which is likely attributed to the highly modified environment. The distribution and abundance for each of the species found within the DDF and Ecological Study Area is summarised as follows:

- > The McCann's skink is the most widely distributed lizard with the DDF. It occupies all vegetation communities, with greatest abundance within taramea communities and where mixed shrubland included rank grassland or rockland. RMA Ecology (2025d) estimates the abundance of McCann's skinks in the DDF is in the low 100,000's;
- > The Kawarau gecko is widely distributed within the DDF and occupies all vegetation communities. Numbers are locally abundant where rock exists in scattered piles or tors, with fewer individuals found in communities that lack rock crevices or other suitable refuges. The estimated abundance of Kawarau geckos in the DDF is in the low 1,000's; and
- > The Tussock skink was found within most vegetation types within the DDF, but at low abundance relative to other species. Tussock skink have the greatest presence in valley floors and other places where ground cover and moisture were most likely to persist over the summer months. The estimated abundance of Tussock skink in the DDF is in the low 10,000's.

RMA Ecology (2025d) also assessed existing predator pressure on lizards using the proportion of lizards that have lost their tails as an indicator. Tail regeneration occurrence was approximately 26% for McCann's skink, approximately 36% for tussock skink and approximately 30% for Kawarau gecko. Based on comparisons with similar studies in the region, RMA Ecology (2025d) concludes that geckos and skinks within the Ecological Study Area and DDF are experiencing pressure from uncontrolled levels of introduced mammalian predators.

2.17 NATURAL CHARACTER AND LANDSCAPE VALUES

The existing landscape and natural character values attributed to the Project Site for the BOGP are detailed in Boffa Miskell (2025), a copy of which is provided in **Part B** of these application documents.

²⁸ In particular the Otago skink, grand skink, green skink and jewelled gecko.



2.17.1 Dunstan Mountains Outstanding Natural Landscape

2.17.1.1 Overview

As noted, the BOGP is located within the Dunstan Mountains ONL, which is recognised for the following characteristics in the District Plan:

The mountain range forms part of the backdrop to the Manuherikia Valley to the east and the Upper Clutha Valley to the west and is a memorable feature of the Central Otago landscape. The crest is an extensive summit plateau extending from Haehaeata / Leaning Rock northwards, distinctive rock tors are visible on the skyline.

With respect to landform, the Dunstan Mountains are located within the Dunstan-Cairnmuir land type, which are characterised by glacial formations including features such as steep mountain slopes and crests, extensive schist tors, seeps and bogs. The Dunstan Mountains are a distinctive feature within the Upper Clutha and Manuherikia catchments, with Dunstan summit reaching 1,667 mRL. Slopes across the Dunstan Mountains are generally steep to the north and comparatively gradual to the south. There are also gentle and steep incised gullies dispersed throughout the mountain range.

The streams within the Dunstan Mountains are largely unmodified, however the former construction of dams along the Rise and Shine Creek remain evident in some areas in association with historic gold mining activity.

Landcover within the Project Site is discussed in several sections above (Sections 2.4.1 and 2.16.1 of this report) and reflects an area that has been modified by human activities. The landcover is dominated by historic and ongoing pastoral farming practices, historic mining activities, a range of indigenous and exotic vegetation communities and the effects of significant numbers of introduced pests such as rabbits.

2.17.1.2 Landscape Character Assessment

Boffa Miskell completed an initial landscape assessment in May 2024 for the purpose of understanding the important landscape values within the Dunstan Mountains ONL.²⁹ Boffa Miskell (2025) considers landscape character can be conceptualised and described using three overlapping physical, perceptual and associative dimensions. A description of the relevant landscape values for the Dunstan Mountains ONL identified through this assessment are summarised below.

²⁹ Bendigo-Ophir Mining Project, Assessment of Dunstan Mountains Outstanding Natural Landscape, 14 May 2024.



With respect to the physical dimension, the landscape character of the Dunstan Mountains ONL is characterised as follows:

- > *Highly intact mountain sequence, expressive of its tectonic, and glacial formative processes;*
- > *Remnant peneplain from the Cretaceous period remains highly legible and forms an extensive and distinct summit plateau feature to the south;*
- > *At higher altitudes, vegetation including blue tussock, hard tussock, snow tussock and extensive alpine cushionfield and herbfield remain present. These are recognised as valuable remnants of historic vegetation within the area; and*
- > *Within the Project Site and adjoining Bendigo Scenic Reserve is a remnant stand of kānuka valued as one of a few remnants left in Otago associated with former gold mining activity.*

With respect to the perceptual dimension, the landscape character of the Dunstan Mountains ONL is characterised as follows:

- > *Panoramic views of a broader mountain backdrop and unobstructed skyline are highly valued and broadly visible throughout the Upper Mata au / Clutha and Manuherikia catchments;*
- > *Important local landmarks and wayfinding features include the Mata-au gorge, Haehaeata and Thomsons Gorge;*
- > *The underlying geology and geomorphology of the landform is an important feature of this landscape. Schist tors, the gradual movement of soil at higher elevations (solifluction), and intricate network of streams and creeks form legible characteristics which express their formative processes;*
- > *The shifting shadows across open landforms different times of the day and year form a key dynamic characteristic of this mountain backdrop alongside changing weather patterns and transient influences of winter snowfall and fog;*
- > *Rugged kānuka covered promontory along the immediate skyline adjoins the north-eastern end of Lake Dunstan before transitioning into a broader more defined grassland plateau and mountain backdrop above; and*
- > *General lack of visible structures and modifications ensures the landform remains largely open and is perceived as natural.*

With respect to the associative dimension, the landscape character of the Dunstan Mountains ONL is characterised as follows:

- > *The Dunstan Mountains formed part of a traditional travel route between Makarora and Moeraki. The area is recognised as a mahika kai site where weka and tikumu (mountain daisy) were gathered, as well as taramea (wild spaniard) which was gathered for its perfume. The Mata au (Clutha River) to the south of this ONL was also significant for gathering tuna (eels), kanakana (lamprey) and*



kokopu. This section of the river formed part of a traditional travel route, prior to passing through the Matakinui /Dunstan Mountains.

- > *The Bendigo area is renowned for its gold mining history from the mid-1800s. Remnants of this time period are still present today near the settlement of Bendigo.*
- > *Several stations including Bendigo, Northburn, Matakanui, Cloudy Peak and Cluden Stations support a strong farming history in the area that dates to the 1850's when the large Morven Hills Station was formed. This land use is ingrained in the character and shared associations of the landscape; and*
- > *The Dunstan Mountains are highly valued for their recreational opportunities, including hunting, tramping, mountain biking, 4WD, and horse trekking. Day walks are available near Bendigo in addition to backcountry experiences including within the larger Lauder Basin Conservation Area which is located to the north-east of the ONL.*

Overall, Boffa Miskell (2025) reinforces that the Dunstan Mountains retain a high sense of naturalness albeit entrenched in human influence over several centuries.

The broader landscape, including the skyline, remains distinctive and coherent and predominantly void of obvious built form or modification. The landscape is predominantly characterised by extensive areas of sub-alpine vegetation and tussockland at higher elevations and areas of pasture on the lower slopes, with the stunted nature of this vegetation allowing for expansive views of the Dunstan Mountain Range and valleys below. Within the valleys, kānuka, mānuka, and matagouri grey scrub are prominent, and the valleys include influences from ongoing human activity including previous mining activity.

As a low point, Thomsons Saddle formed part of a traditional travel route in the region, and in the later years the mountains became the site of gold exploration within the Bendigo area, of which relics of this time are still present today. The present land use is largely associated with farming of merino sheep with grazing typically more evident on the lower slopes.

2.17.2 Landscape Character of the Project Site

Boffa Miskell (2025) describes the landscape character of the Project Site and has used several viewpoints supported by a series of site appraisal photographs showing the existing character of the site. These photographs are provided as part of the accompanying graphic supplement to Boffa Miskell (2025), with a summary of the assessment from the viewpoints provided below.



The western extent of the site comprises the lower extent of the Shepherds Creek Valley and lower slopes of ridgeline extending west of Battery Hill.³⁰ The exposed ridgeline to the south of Shepherds Creek is characterised by grazed pasture, steep rocky slopes and sporadic areas of tussock and shrubland. The ridgeline gradually slopes towards the toe of Battery Hill as demonstrated in **Site Appraisal Photograph A**.

Within the lower reaches of Shepherds Creek are remnants of a dam which forms a large pond area, as shown in **Site Appraisal Photograph B**. The ridgeline to the north of Shepherds Creek in comparison is characterised by more intensively grazed pasture within Ardour Station as shown within **Site Appraisal Photographs B and C**.

In **Site Appraisal Photograph D**, the slopes are characterised by a series of unnamed incised tributaries of the lower, more sheltered area of the Shepherds Creek catchment containing a mixture of exotic and native shrubs, grazed pasture, and tussockland.

The base of the valley forms the margins of Shepherds Creek, characterised by a gently undulating valley system, sheltered by the ridges to the north, and south of the creek. The valley is currently grazed by stock and contains extensive areas of grey shrubland, tussockland, and pasture as shown in **Site Appraisal Photograph E**.

The topography of the ridgeline steadily climbs towards Battery Hill further east and the nature of the valley narrows towards the Shepherds Creek gorge as demonstrated in **Site Appraisal Photograph F**.

Site Appraisal Photograph G shows a gully that is broad, and open, extending from 500 mRL at Shepherds Creek to 800 mRL at the base of Battery Hill. The gully includes extensive cover of scrubland and tussock grazed by stock. Interspersed between the vegetation are large schist outcrops and boulders, and several single lane gravel tracks traverse the slopes.

To the south the landform falls steeply towards Rise and Shine Creek. The Rise and Shine Creek catchment is characterised by historic gold workings, which have formed the flat topography found within the valley floor. The lower reaches of the valley intersect with Thomson Gorge Road before passing through the Rise and Shine Creek gorge shown in **Site Appraisal Photograph H**.

Site Appraisal Photograph I shows an existing pond and dam structure currently used for storing water and for stock access above the gorge. From this viewpoint Battery Hill is a prominent feature on the skyline, separating the Rise and Shine Creek Valley from the Shepherds Creek Valley. To the north of Battery Hill, the ridge continues to steadily climb

³⁰ A local and legible feature on the Matakanui / Dunstan Mountains skyline.



towards the Thomsons Saddle. Along this ridgeline, there are open views towards the upper reaches of Shepherds Creek, including one of its main tributaries Jean Creek.

Jean Creek as shown in **Site Appraisal Photograph J** is a steep gully system with a narrow creek which traverses the base of the valley. The valley is characterised by its undulating topography, with grass and sparse tussock within the upper, more exposed reaches, and areas of dense matagouri scrubland within the lower reaches.

Site Appraisal Photographs K and L show the upper reaches of Shepherds Creek which have a more remote and exposed character in comparison to the western extent of the site. The character of the valley comprises a steep undulating topography which falls towards the narrow creek bed at the base of the valley. The Shepherds Creek catchment splits into two within the upper reaches before reaching its headwaters at the Thomsons Saddle. The exposed ridgelines remain predominantly clad in pasture and tussockland, while within the sheltered steep gullies below contain more dense vegetation in the form of grey scrubland.

Within the headwaters of the catchment the Project Site becomes highly exposed near the summit of the Thomsons Saddle. Vegetation present transitions into areas of taramea, native herbland, and tussockland, as shown in **Site Appraisal Photograph M**.

Site Appraisal Photograph N shows the character of upper Rise and Shine Creek Valley to the south of the Shepherds Creek headwaters to be characterised by the grazed slopes of Mt Moka, and areas of grey scrubland on the lower slopes. The area is currently grazed and traversed by Thomson Gorge Road to the true left of the creek bed.

Beyond the valley, the Project Site is characterised by the lower terraces on the fringes of the Dunstan Mountains as demonstrated in **Site Appraisal Photograph O**. From this viewpoint, the skyline and backdrop of the Dunstan Mountains becomes more evident, including features such as Battery Hill.

To the north of the Shepherds Creek Valley is Ardgour Station which transitions from the more intensely farmed landscape to the northwest, to the exposed upper slope of the Dunstan Mountain Range. **Site Appraisal Photographs P and Q** demonstrates the character of the adjacent valley which transitions into a rugged and exposed landscape containing several schist tors, tussockland, and taramea in the upper reaches.

Overall, the visual character of the site forms part of the vast schist tor landscape interwoven with areas of pasture, tussockland, grey scrubland, kānuka forest and remnants of mining activity adjoining the Bendigo Historic Reserve.

2.17.3 Visual Catchment of the BOGP

Boffa Miskell (2025) notes that partial views of the BOGP are available within the Upper Clutha basin, including from near the settlements of Tarras (approximately 10 km from the Project Site), Queensbury (approximately 14 km from the Project Site), Lindis Crossing (approximately 7 km from the Project Site) and as far south as Mount Pisa Settlement (approximately 13 km from the Project Site). The available viewing audience includes users of the three main state highways and local roads, as well as private viewing audiences such as dwellings and nearby conservation and recreational areas. In summary:

- > Views from the southwest of the Project Site, at Bendigo Scenic Reserve, are limited and at higher elevations, and are largely truncated by intervening landform within the South Dunstan Mountains;
- > Views from immediately west of the Project Site, primarily from Thomson Gorge Road, are equally limited due to intervening topography and are limited to the ridgeline to the north of Shepherds Creek, and the presence of Battery Hill on the skyline;
- > Views from SH8, approximately 6 km northwest of the site, include the upper reaches of the Shepherds Creek Valley and Battery Hill. These views are transient and, in some areas, truncated by intervening terraces;
- > Views of the Project Site become more evident from local roads to the west of SH8 ((i.e. Māori Point Road alongside the Clutha River / Mata-Au);
- > Long distance views are available from the residential dwellings and local access roads to the northwest of the Tarras township;
- > Views of the Project Site are available from several elevated residential areas and public viewpoints near the settlement of Queensbury;
- > The Pisa Ridge Range Track provides long distance open views of the broader Upper Clutha basin, and the transition between the defined ridgeline of the North Dunstan Mountains, and the highly legible peneplain to the south; and
- > Long distance, transient views of the Project Site are available from SH6 which runs to the southwest of the Upper Clutha Valley.

Refer to Boffa Miskell (2025) for series of site context photographs which provide a more detailed descriptions of the existing views of the site from across the viewing catchment.

2.18 ARCHAEOLOGICAL AND HERITAGE VALUES

The existing heritage values associated with the Project Site and surrounding environment are typically associated with historic mining activities and assessed in NZHP (2025a).



Further to this, the heritage values for specific components of the BOGP – including the temporary construction workers accommodation, magazine and emulsion tank area, Ardgour Rise realignment and the relocated walking track to the Come-in-Time Battery - are assessed in memorandums provided as NZHP (2025b, 2025c, 2025d, 2025e), respectively.

These reports are provided in **Part B** of these application documents. A summary of the heritage values for the sites recorded within the Project Site is provided below.

2.18.1 Previously Recorded Archaeological Sites

NZHP (2025a) has identified a range of existing archaeological sites that are located within the Project Site. These sites and their historic heritage values are listed in Table 2-4 below, with their distribution illustrated in Figure 2-49 below. The BOGP is also located with a small part of the Bendigo Quartz Reefs Historic Area, which comprises a group of interrelated historic places including the Rise and Shine claims, the Come-in-Time Battery and other associated archaeological sites. The Bendigo Quartz Reefs Historic Area is shown in Figure 2-50 below.

Importantly, the areas of highest heritage values in both the Bendigo Conservation Covenant Area and the Bendigo Quartz Reef Historic Area are located beyond the Project Site and will not be impacted by the BOGP.

It is noted that not all archaeological sites within the Project Site will be disturbed by the BOGP, including Site 9097 where only willow management activities and the replacement walking route to the Come-in-Time Battery will be undertaken. Refer to Section 6.19 of this report for further details.

Table 2-4: Previously Recorded Archaeological Sites within the Project Site

Site Number	Site Type	Site Description	Heritage Value
9097	Historic Area	Bendigo Quartz Reefs Historic Area	High
G41/4	Pastoral / Agricultural	Stone Hut (Rabbiter's Hut)	Medium - High
G41/5	Pastoral / Agricultural	Stone Stockyards	Medium - High
G41/6	Industrial	Water Race	Low
G41/251	Mining – Gold	Come-in-Time Battery	Medium- High



Site Number	Site Type	Site Description	Heritage Value
		(10-stamper battery, two adits, mullock, track, wall, and possible ore bin)	
G41/256	Mining – Gold	Gold Workings	Low
G41/259	Mining – Gold	Gold Workings	Low
G41/264	Mining – Gold	Rise and Shine Gold Workings (Gold workings, water race, dam, adit, breastwork, tailings, terrace & sluice faces)	Medium
G41/265	Historic – Domestic	Stone Hut	Medium
G41/266	Historic - Domestic	Stone Hut	Medium
G41/267	Historic – Domestic	Stone Hut with Chimney	Medium
G41/269	Mining – Gold	Rise and Shine Dam	Medium
G41/273	Historic – Domestic	Stone Hut	Low
G41/277	Mining – Gold	Rise and Shine Mine and Battery (Mine and battery site, adits, sluicing face, spoil, machine foundations, dam, stone faced terrace (possible dam))	Medium
G41/310	Mining-Gold	Area of Gold Workings	-
G41/584	Industrial	Rise and Shine Water Race	Medium
G41/586	Industrial	Come-in-Time Water race	Medium
G41/587	Mining-gold	Terraces	-
G41/589	Transport / Communication	Revetted Road	Low



Site Number	Site Type	Site Description	Heritage Value
G41/604	Mining – Gold	Battery and Turbine	Medium
G41/605	Mining – Gold	Mining Workings	Medium
G41/606	Historic – Domestic	Stone Hut	Low - Medium



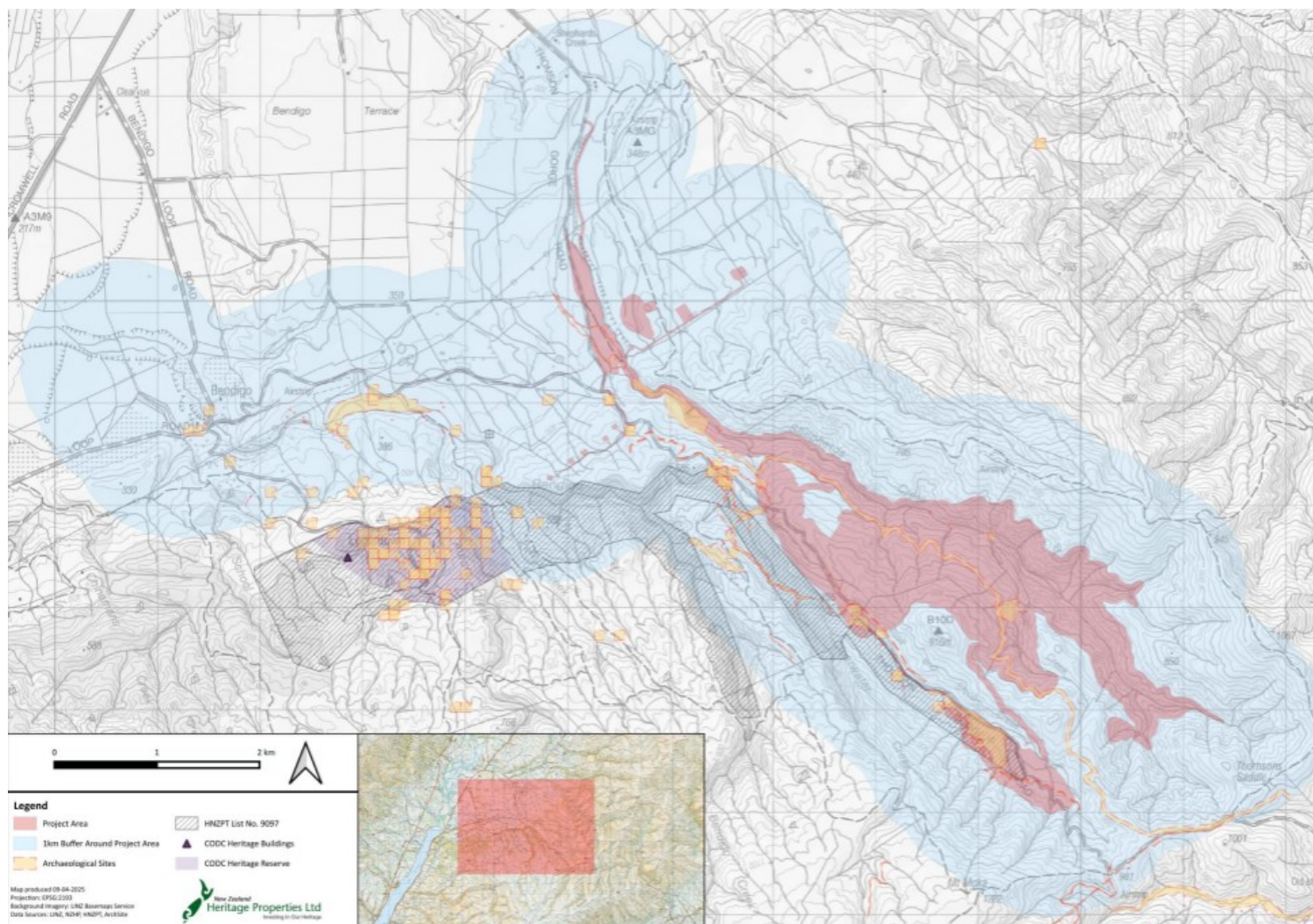


Figure 2-52: Distribution of Previously Recorded Archaeological Sites within Project Site and the Wider Landscape



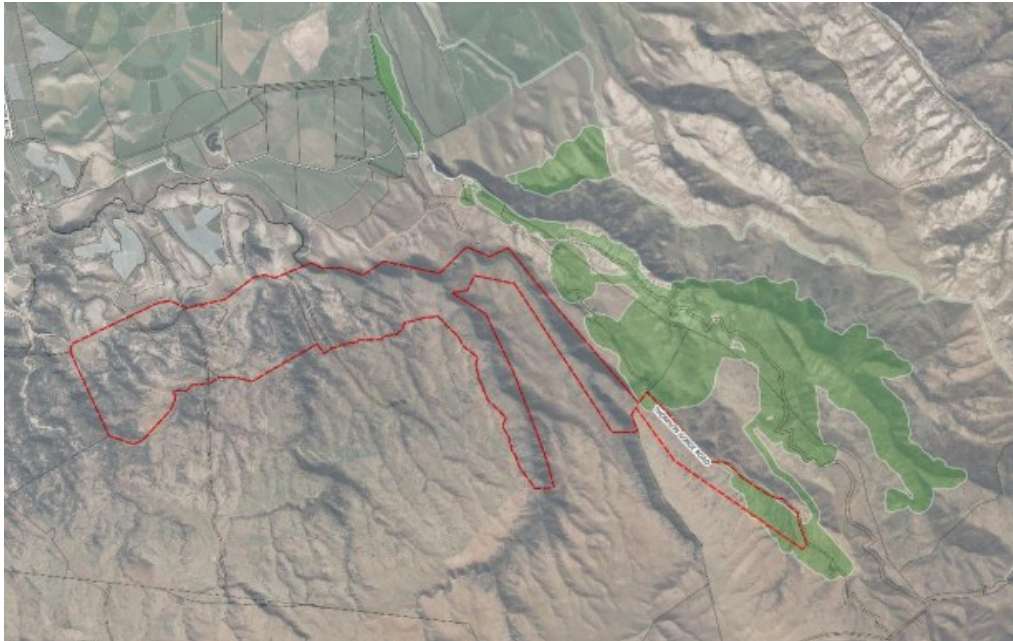


Figure 2-53: Extent of Bendigo Quartz Reefs Historic Area (Red) and Project Site (Green)

2.18.2 New Identified Archaeological Sites

Several surveys of the Project Site have been undertaken between November 2017 and March 2025. These surveys recorded the extent and condition of visible archaeology, identified areas of modification within the Project Site that may affect the condition of subsurface archaeology and identify any new unrecorded archaeological sites.

In summary, 10 new archaeological sites were identified within the Project Site. These site types range from historic huts, historic tracks / roads and historic mining activities and are generally considered of low heritage value. These sites are listed in Table 2-5 below.

NZHP (2025a) consider there is also high potential for further unrecorded archaeological / heritage features to be encountered, specifically associated with historic mining activity and historic-domestic occupation.

Table 2-5: New Archaeological Sites Recorded within Project Site

Site Number	Site Type	Site Description	Heritage Value
G41/658	Historic – Domestic	Hut Terrace	Low - Medium
G41/782	Transport / Communication	Matakanui-Bendigo Road	Low
G41/783	Transport / Communication	Pre-1900s Track	Low

Site Number	Site Type	Site Description	Heritage Value
G41/784	Historic – Domestic	Hut Terraces	Low
G41/785	Historic – Domestic	Hut Site	Low
G41/786	Historic – Domestic	Hut Site	Low
G41/787	Mining – Gold	Tailings	Low
G41/788	Mining – Gold	Tailings	Low
G41/789	Mining – Gold	Sluicing	Low
G41/790	Industrial	Water Race	Low

2.18.3 Additional Heritage Memorandums

In terms of the memorandums prepared separately, NZHP (2025b) and NZHP (2025d) confirm that no archaeological or heritage sites have been identified within the proposed magazine and emulsion tank area or Ardgour Rise realignment area.

NZHP (2025c) notes that two identified water race sites³¹ and further potential unrecorded water race sites are within the proposed construction camp and administration area on the Ardgour terraces. The identified water races are assessed as having low heritage value while the potential unrecorded water races are considered to have low-medium heritage values (refer to the tables above).

NZHP (2025e) confirms that the section of the proposed alignment for the walking route to the Come-in-Time Battery that was accessible to survey does not intersect any known heritage sites. In addition, while seven previously recorded heritage sites are in the vicinity of the inaccessible portion of the proposed route, these will be able to be avoided during vegetation clearance and way marker installation.

2.18.4 Summary of Heritage Values

NZHP (2025a) considers the majority of the new identified heritage sites are of low heritage value, while previously recorded sites range from low to medium-high heritage value. The

³¹ Sites G41/6 and G41/790 as set out in Tables 2-3 and 2-4, respectively.



potential unrecorded sites that are likely to be encountered (related to historic gold mining activities or domestic activities (e.g. huts) are likely to have low-medium heritage values.

NZHP (2025a) considers the Project Site as a whole has high heritage values based on the range of aesthetic, archaeological, historical, and technological values, and the significance of these values.

2.19 CONTAMINATED LAND

Potential ground contamination in the Project Site is addressed by Geocontam Risk Management (“**GRM**”) (2025), a copy of which is provided in **Part B** of these application documents.

This includes a Preliminary Site Investigation (“**PSI**”) to identify the existing and potential future risk to human health associated with the historic and proposed future land uses to ensure any potential risks can be appropriately managed.

The PSI concluded that soil sampling and surface water monitoring identified potentially elevated concentrations of metals in shallow soils (including arsenic and cadmium), surface water (including arsenic, chromium, copper and zinc) and groundwater (including aluminium, cobalt, copper and thallium). The PSI notes the concentrations of arsenic have been identified at concentrations above the industrial land use human health protection criteria and above 60% and 80% Eco-SGV³² in shallow soils within parts of the Project Site. These elevated arsenic levels are a result of historic gold mining activities but also occur naturally in undisturbed areas due to natural processes (i.e. the surface expression of the RSSZ where weathering of arsenopyrite has resulted in elevated levels of arsenic in overlying soils).

Cadmium has also been identified at levels above 80% Eco-SGV but below the industrial land use human health protection criteria and may require management during mine operations to meet post-closure land use objectives.

For clarity, it is noted these existing elevated concentrations of metals outlined above form part of the existing environment against which the BOGP is to be assessed against.

³² Eco-SGV is the reference name for the assessment criteria for assessing risk to ecosystems in land use settings (Landcare Research New Zealand Ltd and Hawke’s Bay Regional Council (2023) Determining Background Soil Concentrations of Trace Elements across New Zealand).



Figure 2-51 below shows the areas of the Project Site and surrounding landscape that contain arsenic-rich soils.³³

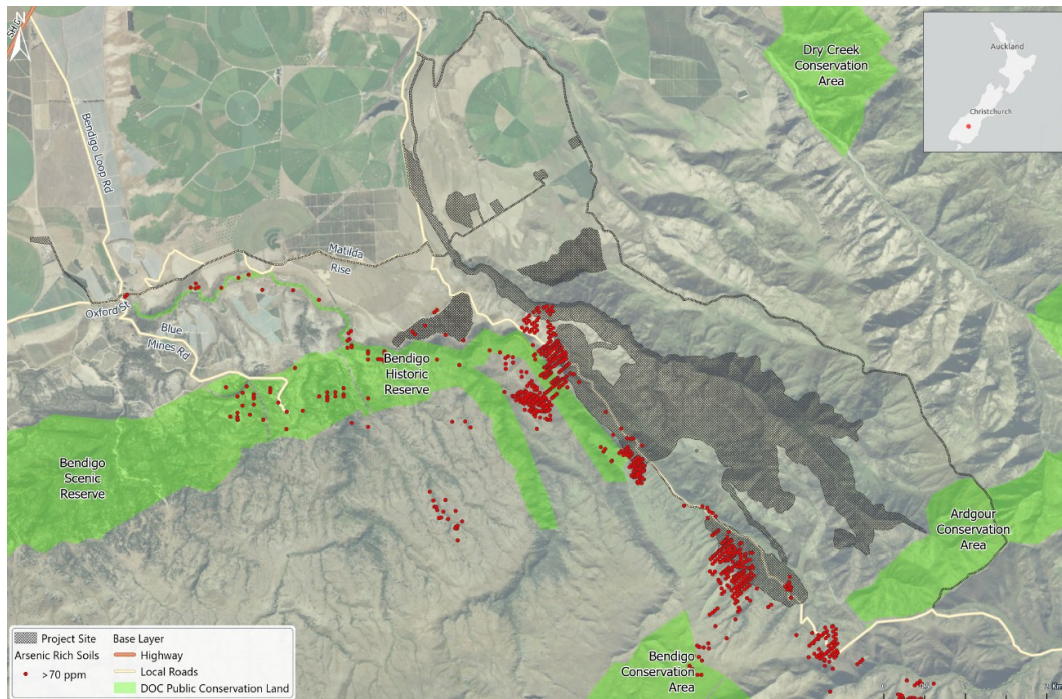


Figure 2-54: Areas of Arsenic-Rich Soils

In addition, GRM (2025) has undertaken a review of the Hazardous Activities and Industries List (“**HAIL**”) Site View Maps administered by the ORC, which do not identify any registered HAIL sites within a 1 km radius of the Project Site. There is, however, historic and proposed mining activities within the site and surrounds which meet the definition of HAIL Category E7 – Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings.

2.20 NOISE

The existing noise environment within the vicinity of the Project Site is described in Marshall Day (2025), a copy of which is provided in **Part B** of these application documents.

There are several residential dwellings and commercial properties, including vineyards, located to the north and west of the Project Site, with the closest residential receiver located at 218 Thomson Gorge Road, approximately 3.2 km northwest of the processing plant area.

³³ Arsenic-rich soils are defined as soils containing greater than 70 parts per million.



The nearest noise sensitive receivers to the Project Site are shown as yellow dots in Figure 2-52 below.

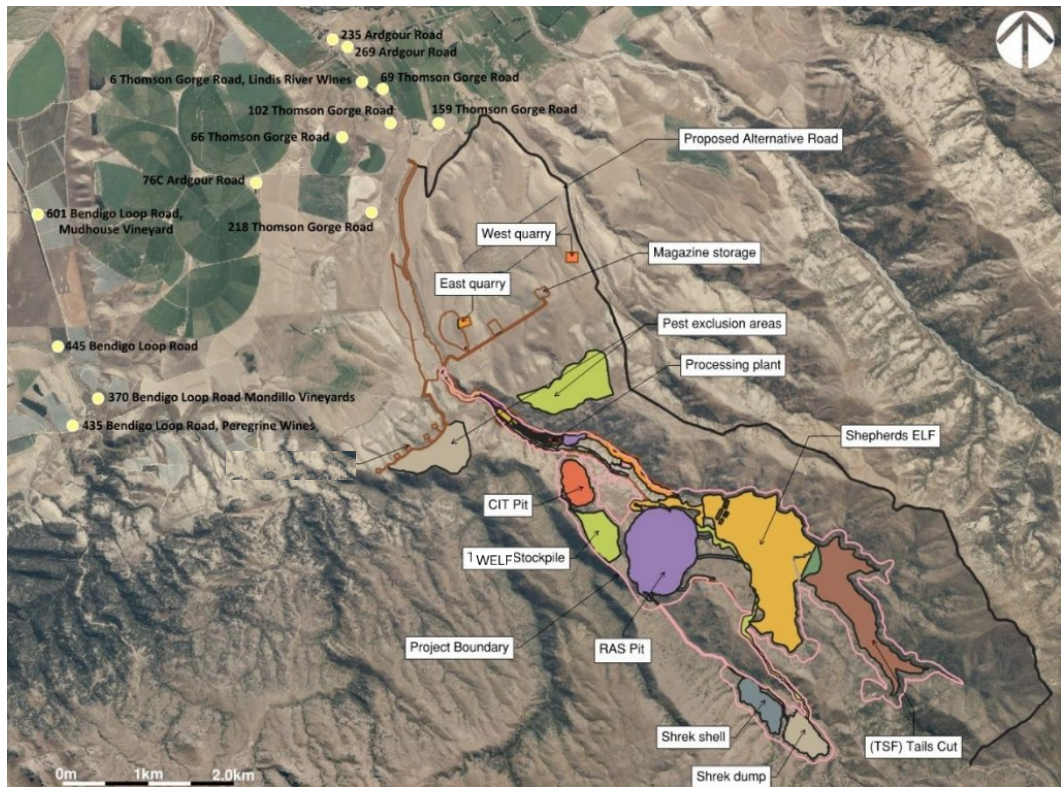


Figure 2-55: Nearest Noise Sensitive Receivers to the Project Site

Marshall Day (2025) measured the existing noise environment at the Project Site from three positions on the Bendigo Terrace to assess the existing rural residential noise environment in the vicinity of the site. Monitoring sites were located within proximity to Ardour Road, Thomson Gorge Road and Bendigo Loop Road.

The noise environment at all locations included birdsong, wind generated noise, intermittent traffic on local roads, farm machinery, and the continuous underlying traffic noise from SH8 during the daytime, with distant traffic and wind noise at night.

Daytime noise levels during core workday hours (i.e. between 7 am to 5 pm) are relatively consistent, being in the order of 40 to 50 dB, after which time noise levels begin to reduce to approximately 30 to 40 dB in the early evening and into the night-time. However, there is a notable increase in noise between 1:30 and 2:30 am attributed to irrigation mechanical plant or similar (i.e. frost fans).



2.21 AIR QUALITY, METEOROLOGY AND CLIMATE

The effects of the discharge of contaminants, including both dust and gaseous emissions, to air as a result of the BOGP is assessed in PDP (2025), a copy of which is provided in **Part B** of these application documents.

PDP (2025) includes a description of the meteorology and climate at the site which plays a key role in assessing air quality impacts, with both wind and rain specifically influencing the dispersion of dust and emissions. Kōmanawa (2025b) also describes the existing climate conditions within the Inland Otago Region. PDP (2025) notes that four wind monitoring sites have been operating within the Project Site since February 2023, which are shown in Figure 2-53 below.



Figure 2-56: Wind Monitoring Site Locations

In summary, wind data recorded within the vicinity of the Project Site identified that:

- > Wind conditions experienced at the Bendigo / Ardgour terraces indicate a predominantly easterly and northerly wind direction, low frequency westerly quarter winds, very low frequency southerly direction winds, and windspeeds exceeding 7.5 m/s (which are high risk for dust events) occurring approximately 5% of the time;



- > Wind conditions experienced within the Project Site indicate a predominantly north-westerly and southeasterly wind direction, very low frequency winds from other directions and a low frequency of windspeeds exceeding 7.5 m/s, which only occur 4% of the time. These wind patterns are different to the wider Bendigo area due to the surrounding topography.

Kōmanawa (2025b) notes annual precipitation in Otago typically decreases with distance from the Southern Alps, and as such, Inland Otago is the driest region in Otago. In particular, the valley floors of the Bendigo-Tarras districts are among the driest in Otago with dry spells of more than two weeks occurring frequently.

The average rainfall measured at the Project Site is approximately 30 mm per month. While rainfall is slightly higher in the spring months (September, October and November), there is no clear seasonal pattern of rainfall in the area. On average, rainfall only exceeds 5 mm per day for approximately 1.8 days per month.

Kōmanawa (2025b) notes that temperatures within Inland Otago are on average lower than the rest of New Zealand with frosts and snowfalls occurring relatively frequently throughout the autumn, winter and spring months. However, hot dry conditions which exceed temperatures of 30 °C are normal during the summer and early autumn months.

PDP (2025) has also assessed the existing air quality within the vicinity of the Project Site through the installation of five dust deposition monitoring sites shown in Figure 2-54 below. The Ardgour Flats site provides background dust data, the CIT Battery site provide dust data at a publicly accessible location, and the other three sites are close to major dust sources.

A real time PM₁₀ monitor has also been installed at the Lake Clearview site (refer to Figure 2-53 above) to provide indicative data only.³⁴

³⁴ The data from this instrument does not meet the requirements of the National Environmental Standard for Air Quality as the use of an instrument that has an air-conditioned enclosure and mains power supply was not practical for this site.





Figure 2-57: Locations of Dust Deposition Monitoring Sites

Overall, the PM₁₀ concentrations at the Lake Clearview site show a clear seasonal pattern. Lower PM₁₀ concentrations are observed over the April to September months - with these concentrations typical of a rural background site – while frequent and relatively high PM₁₀ concentrations are observed over the November to April months, which are higher than expected for a rural background site, indicating a relatively dusty area.

Between February 2023 to November 2024, the strongest source of PM₁₀ was located to the east of the Lake Clearview site, with the highest concentrations generated under low windspeeds (less than 2.5 m/s) and most likely attributed to traffic using the Matilda Rise unsealed road. The second strongest source of PM₁₀ was north of the site with the highest concentrations experienced during high windspeeds.

The average daily dust deposition rates from the dust deposition monitoring sites range from 0.52 to 1.41 g/m² and are summarised as follows:

- > 0.52 g/m² at the Ardgour Flats site;
- > 0.65 g/m² at the CIT Valley site;
- > 1.41 g/m² at the CIT Stamper site;
- > 1.10 g/m² at the CIT Valley North site; and
- > 0.78 g /m² at the RAS site.



Overall, these dust deposition rates are below the Ministry for the Environment (“MfE”) recommended mitigation trigger value for dust deposition of 4 g/m² per day.

2.22 ROADING AND TRAFFIC

The transportation environment and road network within and surrounding the Project Site is detailed in Stantec (2025), a copy of which is included in **Part B** to these application documents. The key considerations of the transportation environment and network is provided below.

The BOGP will be located east of SH8 which is the primary state highway providing access to the Bendigo area. The local road network, including the roads from which the site is accessed, are shown in Figure 2-55 below. The roads where access is provided from are SH8, Ardour Road, Thomson Gorge Road (north and south of Matilda Rise), Bendigo Loop Road (north and south) and Matilda Rise.



Figure 2-58: Road Network Surrounding the Bendigo-Ophir Gold Project

SH8 can generally be described as having a rolling and curbing alignment, two lanes, narrow shoulders and a 100 km/h speed limit. The SH8 Lindis River single lane bridge has had regular crashes (reported at an average rate of approximately 1.8 crashes per year), although most are non-injury. South of the southern Bendigo Loop Road intersection, the annual traffic volume on SH8 was approximately 1,900 vehicles / day from 2018 to 2022, increasing to 2,360 vehicles / day in 2024. There is strong seasonal variation, with as many as 4,000 vehicles / per day during the summer months to as few as 1,500 vehicles / day in the winter months.



Ardgour Road is a two-lane sealed road, with a seal width of approximately 5.5 m and a 100 km/h speed limit. Between SH8 and Thomson Gorge Road, the road is generally level with a gentle winding horizontal alignment. No crashes are recorded on this road. Traffic counts on Ardgour Road east of SH8 in November 2024 recorded daily volumes of 230 to 300 vehicles / day during the week, with 270 vehicles / day on Saturdays and less than 200 vehicles / day on Sundays. Heavy vehicles accounted for about 20% of all movements.

Thomson Gorge Road is a single lane unsealed road. No crashes are recorded on this road. Stantec (2025) recorded daily weekday volumes of 100 to 125 vehicles / day on Thomson Gorge Road south of the Ardgour Road intersection, with volumes of less than 100 vehicles / day recorded during the weekend. During weekdays heavy vehicles accounted for about 20% of all vehicle movements.

There are multiple sections of Thomson Gorge Road that have been formed outside of the legal road boundaries.

The southern section of Bendigo Loop Road, between SH8 and Matilda Rise, is a low volume rural local road that has until recently been unsealed along its length. The first 0.4 km from SH8 remains unsealed and the remaining 3 km section to Matilda Rise has a low-cost Otta seal. The northern section Bendigo Loop Road, between SH8 and Matilda Rise, generally consists of a straight with connecting curves, and contains a tighter S-bend section nearer Matilda Rise. The first 250 m is sealed, and there are two locations comprised of Otta seal for dust suppression purposes. No crashes are recorded on this road.

Matilda Rise is formed to a low standard with a primary role of providing an access function. It is unsealed along its length, and includes sections that are steep and narrow, as well as some sections that are along flat open terrain. Several alignments are currently formed, one a public route and another a private route through the Bendigo Station property but able to be used by the public. No crashes are recorded on this road.

2.23 PUBLIC ACCESS AND RECREATION

Greenaway (2025) provides an assessment of the existing public access and recreation values and activities that are undertaken within the vicinity of the Project Site, a copy of which is provided in **Part B** to these application documents.

The key recreation settings are Thomson Gorge Road, Ardgour Conservation Area and the Bendigo Historic Reserve, as illustrated in Figure 2-56 below (road reserves in purple).

There is also an unformed legal road running generally parallel to Thomson Gorge Road, between the northern end of Thomson Gorge Road and Thomsons Saddle, however it has no



apparent public recreational use. The use of this unformed road area for mining purposes has been addressed separately between MGL and the CODC.

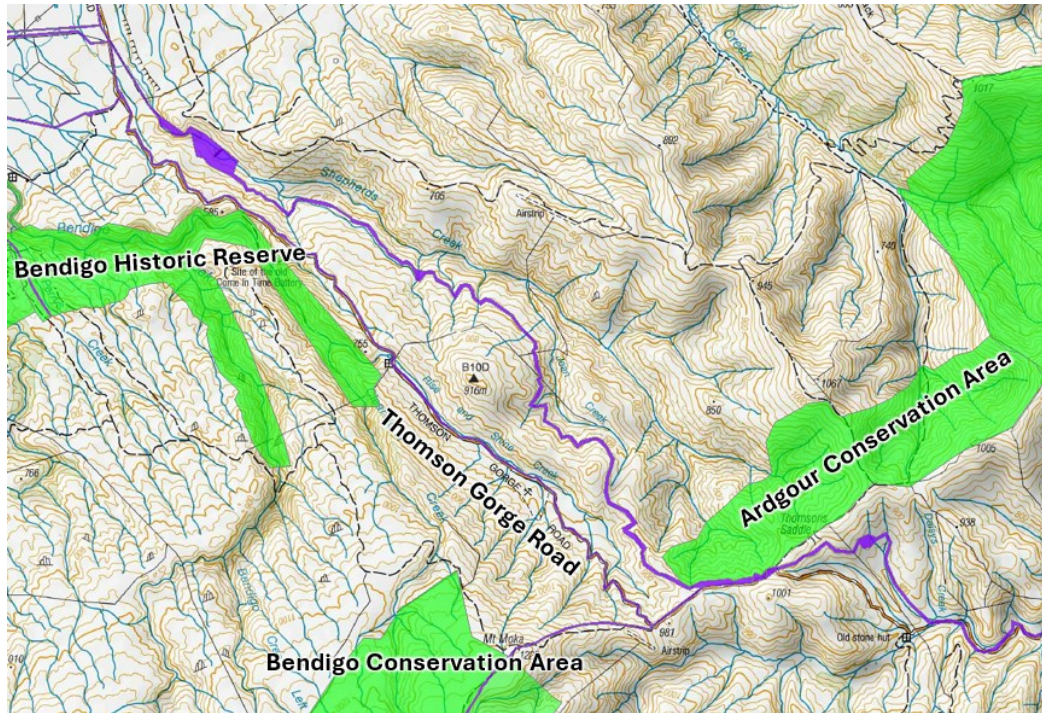


Figure 2-59: Key Recreation Settings within the Vicinity of the Project Site

As previously noted, the Ardour Conservation Area, Bendigo Historic Reserve and Bendigo Conservation Area are administered by the Department of Conservation.

The Bendigo Historic Reserve provides opportunities for day trips and walks around gold mining relics. The Ardour Conservation Area is more remote and isolated, with mountain top walks that have views of Central Otago and its surrounding ranges. Mountain biking and cross-country skiing is also possible. The landowners of Ardour Station have been transferred a right-of-way over the southern portion of the Ardour Conservation Area. This is interpreted by Greenaway (2025) as allowing the landowner to permit public passage over the right-of-way.

The Bendigo Conservation Area is outside of the Project Site but includes walking via Thomson Gorge Road along a short public easement.

The Bendigo Conservation Covenant, which covers part of Bendigo Station, allows for various degrees of public access from Thomson Gorge Road to the Come-in-Time Battery and primarily hunting and 4WD access from Thomson Gorge Road to the Bendigo Conservation Area.



With respect to public access, vehicle access to the Bendigo and Ardgour Conservation Areas is available from the top of Thomson Gorge Road. There is also walking access to the Bendigo Conservation Area off SH8, located 5 km south of Bendigo Loop Road.

Greenaway (2025) describes Thomson Gorge Road as a well-established recreational driving and 4WD route and is not suitable for general vehicles. It is a dry weather track, connecting Omakau to the Upper Clutha Valley.

With respect to walking and running, pedestrian activity is centred on the Bendigo Historic Reserve and the western end of Thomson Gorge Road.

Cycling activity is primarily focussed on Thomson Gorge Road and surrounding roads, including Matilda Rise, part of Bendigo Loop Road and Ardgour Road, and with some activity in the Bendigo Historic Reserve. In addition:

- > Thomson Gorge Road is a recognised cycling tour route (based on Strava data) but does not appear in national-level cycle guides;
- > Interviewees in Greenaway (2025) report the value of the Thomson Gorge Road setting is for its scenic values, easy access and it being a component of several long-distance national bikepacking events and general cycle touring options;
- > Tourism Central Otago does not identify Thomson Gorge Road amongst its top 'Trails and Tracks' however the road is listed amongst 19 identified mountain bike trails. Tourism Central Otago describes Thomson Gorge Road as a 30 km, grade 3-4 intermediate level bike trail with steep climbs and variable terrain, which passes remnants of old gold mining sites, including stone huts and the historic Come-in-Time Battery.

Hunting for large game is permitted in the Ardgour Conservation Area (also described by the Department of Conservation as 'North Dunstan') with permits able to be obtained online. The Ardgour Conservation Area includes goats and pigs, however, hunting opportunities are very limited. A restricted permit must be issued by the local Department of Conservation office to hunt small game including rabbits and hares. 4WD vehicles are not permitted in the Ardgour Conservation Area, and access from Thomson Gorge Road must be on foot only.

No hunting is permitted in the Bendigo Historic Reserve.

Greenaway (2025) notes that Thomson Gorge Road is also a popular local equestrian route with highest use between the months of April and October (avoiding summer heat and fire risks and peak use for other road users). The road has also been used as part of the annual Goldfields Cavalcade, which is primarily a wagon and horse event relying on multiple routes via which participants meet at a common destination, which varies yearly.