

Macrae's Phase 4 Fast-track

Residual Effects Wetland Restoration Plan

for: Oceana Gold (New Zealand) Limited



DOCUMENT APPROVAL AND REVISION HISTORY

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Cover Illustration: Ephemeral Wetland at Coronation North

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1 EXECUTIVE SUMMARY

This Residual Effects Wetland Restoration Plan has been prepared for OceanaGold New Zealand Limited (OGNZL) to support the proposed Macraes Phase Four Project ("MP4" or "the Project"). The Project is being pursued under the Fast-track Approvals Act 2024 and is intended to extend the operational life of the mine through to 2039. The Project will result in permanent wetland and vegetation clearance, earthworks, de-watering and landform modification within the MP4 works footprint.

In addition to the MP4 Project, OceanaGold New Zealand Limited (OGNZL) proposes to construct and operate the Camp Creek and Coal Creek water storage reservoirs. These reservoirs were previously consented for water quality management purposes; however, additional approvals are required under the National Environmental Standards for Freshwater (NES-F) because construction and inundation will result in the loss of natural inland wetlands. While the reservoir effects have been assessed separately because they arise from different mechanisms, they form part of the overall residual effects management package considered in this report.

The MP4 Ecological Impact Assessment (Bioresearches 2026f), has identified that, despite extensive avoidance, minimisation and remediation measures, residual adverse effects on natural inland wetlands will remain. The Project and the Reservoirs will result in the permanent loss of approximately 11.50 ha of natural inland wetland extent through direct loss and indirect dewatering. This loss constitutes 4.72 ha through MP4, 3.58 ha through the implementation of Waste Rock Stack seepage capture drains, and 3.20 ha through the Camp Creek and Coal Creek Reservoirs. The affected wetlands comprise a range of wetland ecosystem type

- Ephemeral wetlands: 1.14 ha;
- Sedgeland wetlands: 1.43 ha (MP4), and 0.31 ha (the Reservoirs);
- Freshwater herbaceous wetlands: 2.10 ha (MP4), and 2.68 ha (the Reservoirs);
- Shrubland wetlands: 0.03 ha;
- Seepage wetlands: 0.02 ha;
- 3.58 ha of induced wetland (waste rock stacks); and
- Copper tussock wetland: 0.21 ha (the Reservoirs)

Table 1: Summary of the extent and type of wetlands impacted by the Project and Reservoirs, and the resultant magnitude and level of effect.

Wetland ecological type	Areal extent (ha)	Overall ecological value	Magnitude of effect	Overall residual level of effect
Ephemeral wetland	1.14	High to Very High	High	Very High.
Freshwater herbaceous vegetation	4.78 ha	High	Moderate	Low to High.
Sedgeland	1.74 ha	Moderate	Moderate	Moderate.
Shrubland	0.03	Low to Moderate	Moderate	Moderate.
Wetland seepage	0.02	High	Moderate	High.
Copper tussock	0.21	Moderate	High	Moderate.
Induced wetland	3.58	Negligible to Low	Moderate	Very Low to Low

This document sets out compensation actions to address this wetland loss. All proposed residual effects management activities will be undertaken within OGNZL landholdings within the Macraes Ecological District. This ensures restoration actions occur within the same ecological context where wetland values are being lost. The proposed compensation sites provide opportunities to enhance ecological corridors, buffer retained wetlands, and improve the long-term resilience of wetland ecosystems within the local landscape.

The proposed Project wetland compensation package includes restoration, enhancement and protection actions across 13.55 ha of wetlands at multiple locations within OGNZL landholdings. The key components include:

- Restoration and enhancement of approximately 2.78 ha of degraded ephemeral wetlands affected by stock access and weed invasion.
- Restoration and enhancement of approximately 5.23 ha of sedgeland wetland, including weed control, revegetation, buffering and stock exclusion;
- Establishment and enhancement of approximately 5.4 ha of copper tussock wetland, representing a trade-up approach from degraded exotic-dominated freshwater herbaceous wetlands;
- Restoration and protection of approximately 0.14 ha of shrubland wetland;
- Protection and stock exclusion of approximately 0.22 ha of headwater seep wetland;
- Protection and stock exclusion of approximately 1.53 ha of unclassified wetland, and 6.95 ha of unclassified riparian habitats;
- Enhancement and establishment of Threatened and At Risk wetland plants throughout restoration areas; and
- Protection and stock exclusion of 9 ha of wetland upstream of the Coal Creek reservoir (this is additional to the MP4 compensation package).

2 INTRODUCTION

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged Bioresearches to provide a Residual Effects Wetland Restoration Plan, to determine the necessary restoration measures to address any effects from the Project.

2.1 Site Location and Description

OGNZL owns and operates the Macraes Operation at Macraes, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 1 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Fraser's, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;
- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

Macrae's Phase 4 Fast-track
Residual Effects Wetland Restoration Plan

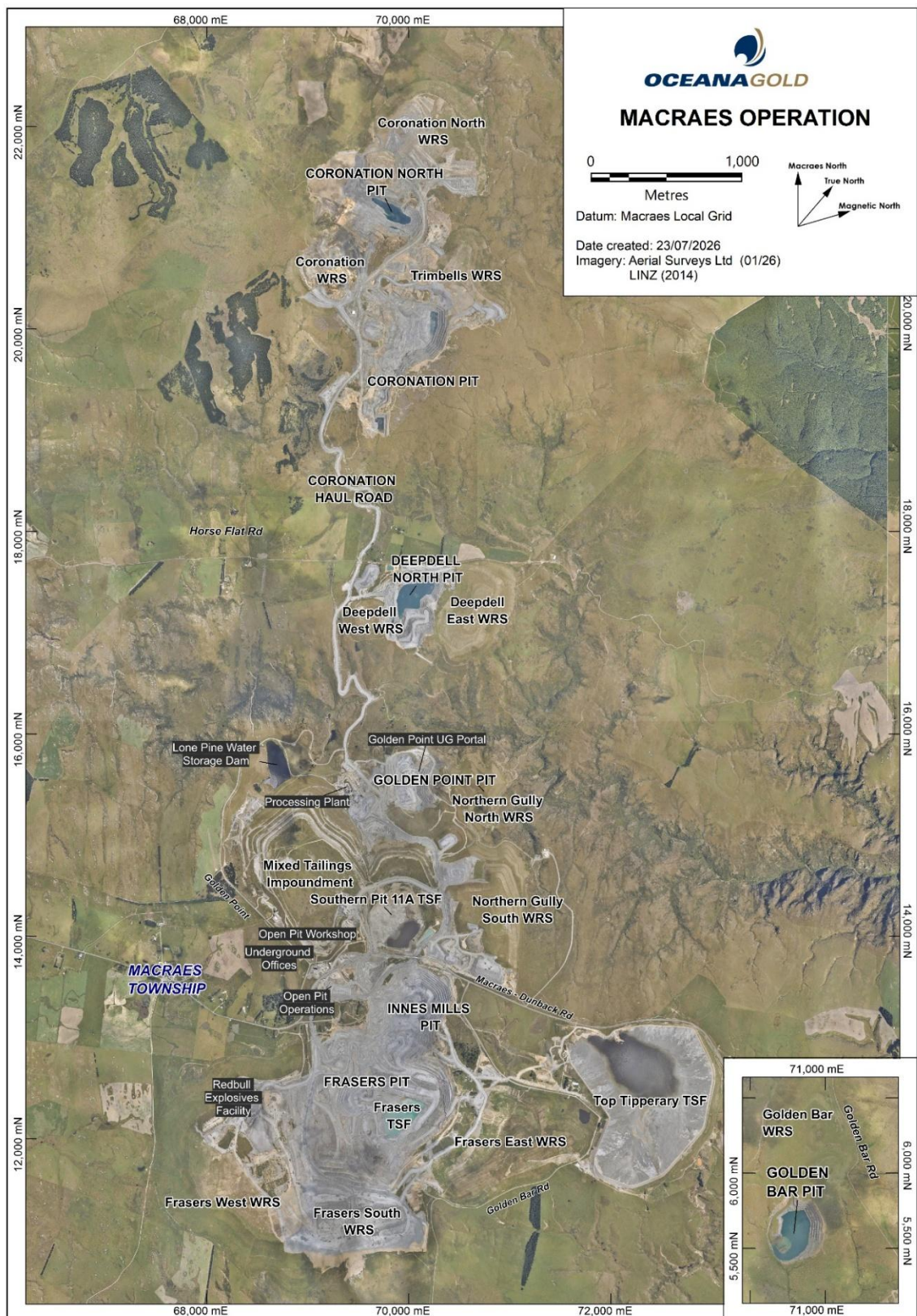


Figure 1: Existing site layout at the Macraes Operation (as of July 2026)

2.2 Project Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("GPUG").
- **Tailings management**, including:
 - Construction of the Frasers Tailings Storage Facility ("FTSF") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
 - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("MTI"), Southern Pit Option 10 TSF ("SP10"), and Southern Pit Option 11A TSF ("SP11") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
 - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
 - Construction, operation and maintenance of a Water Treatment Plant; and
 - Ongoing operation and maintenance of the Mine Water Management System ("MWMS").
- **Infrastructure and roading works**, including:
 - Realignment of Macraes Road in two stages; and
 - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
 - Murphys Ecological Enhancement Area ("MEEA") near Murphys Creek, including predator fencing, access tracks, and site facilities;
 - Mt Highlay restoration area;
 - Cranky Jims Link shrubland enhancement area;
 - Murphys Link tussock protection area; and
 - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in Figure 2 below.

Macrae's Phase 4 Fast-track
Residual Effects Wetland Restoration Plan

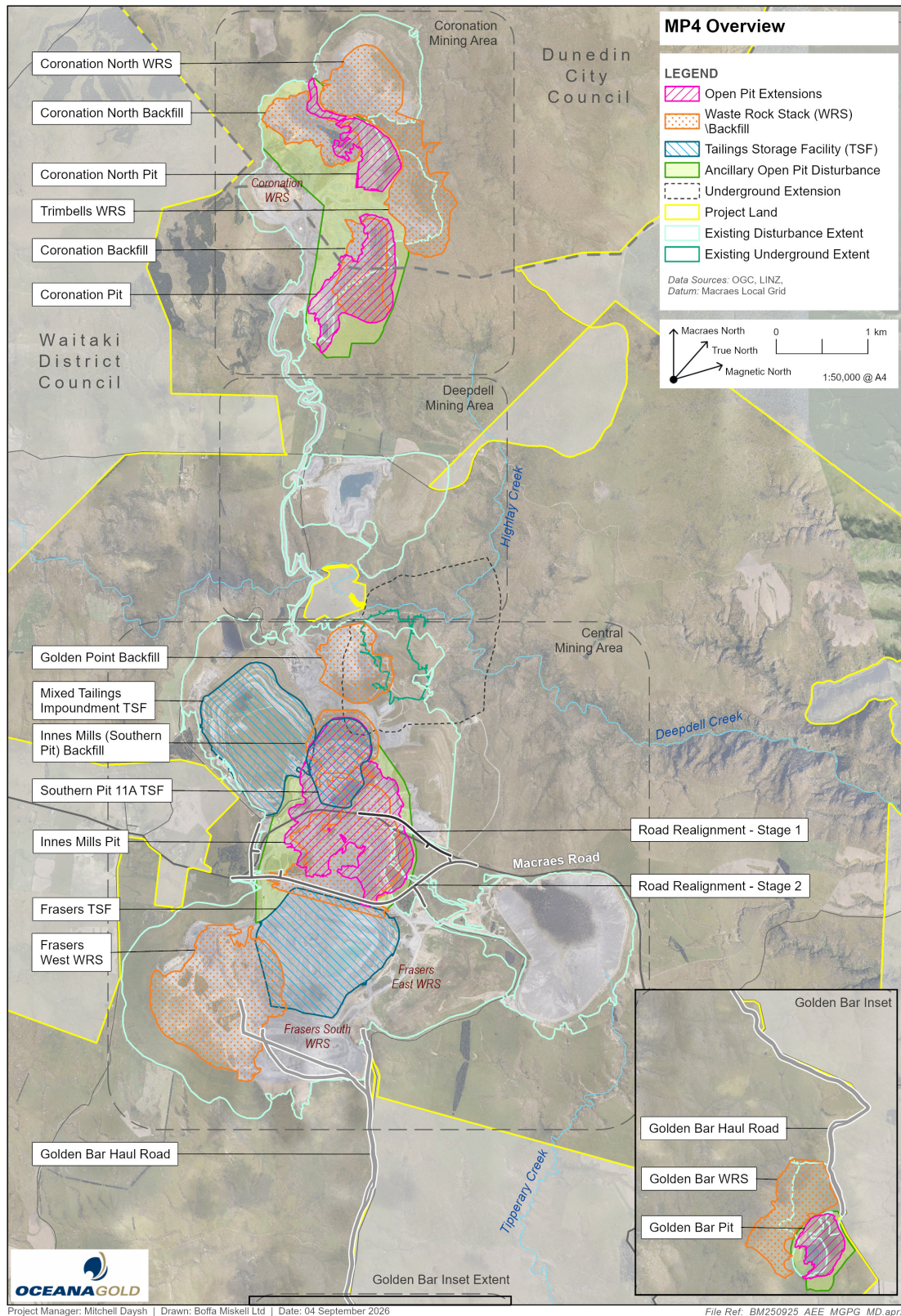


Figure 2: MP4 Overview Plan

2.3 Sequencing of Activities and Proposed Work Dates

The project is not being progressed in stages. Rather, all activities that comprise the MP4 project are included in this substantive application. Those activities are anticipated to occur across a period of 13 years, with OGNZL proposing to commence the MP4 project as soon as the necessary approvals are obtained.

The activities described herein are expected to be generally sequenced as follows:

- The continuation of Innes Mills Pit mining from Year 1 to Year 12;
- The continuation of Coronation Pit mining from Year 2 to Year 6;
- Relocation of tailings from Southern Pit TSF and MTI from Year 2 to Year 12 to facilitate mining of Innes Mills Stage 13 (IM13);
- The continuation of Golden Bar Pit mining mostly in Year 3 and in Year 7;
- The continuation of GPUG mining from Year 1 to Year 10;
- The continuation of Coronation North mining from Year 1 to Year 2 and then from Year 7 to Year 10;
- Associated replenishment of stockpiles throughout the MP4 mine life; and
- Full site rehabilitation to commence in Year 11 and be completed by approximately end of Year 13.

Mine planning is fluid at complex multi-pit operations such as the Macraes Operation. Precise timing of activities depends on a range of factors and operational requirements may facilitate changes to the sequencing of some activities.

Table 2 shows the anticipated sequencing of the proposed MP4 activities across the life of the project.

Table 2: Anticipated sequencing of MP4 activities

Pit	Stage	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Innes Mills	IM8	■												
	IM9	■	■											
	IM10	■	■	■	■	■	■	■	■	■	■	■	■	■
	IM11		■	■	■	■	■	■	■	■	■	■	■	■
	IM12			■	■	■	■	■	■	■	■	■	■	■
	IM13						■	■	■	■	■	■	■	■
Coronation North	CN5	■	■											
	CN6							■	■	■	■	■	■	■
Coronation	C06		■	■	■									
	C07			■	■	■	■	■	■	■	■	■	■	■
	C08					■	■	■	■	■	■	■	■	■
Golden Bar	GB2			■	■									
	GB3						■	■	■	■	■	■	■	■
Underground	GPUG	■	■	■	■	■	■	■	■	■	■	■	■	■
Stockpiles		■	■	■	■	■	■	■	■	■	■	■	■	■

2.4 Purpose and Scope

The purpose of this plan is to detail the compensation actions required to address more than minor residual effects on wetlands as a result of the Project and the Camp and Coal Creek reservoir creation. This document is intended to be read in conjunction with a series of ecology reports relating to the proposed MP4 project, in particular those relating to wetlands within the project site: Assessment of Vegetation and Wetland Values (Whirika 2026); Ecological Impact Assessment: Terrestrial and Wetlands (Bioresearches 2026f); Residual Effects Analysis: Wetlands (Bioresearches 2026m); and Wetland Management and Monitoring Plan (Bioresearches 2026h).

Table 3. Ecology documents prepared for the proposed Macraes Phase 4 Project. Current document highlighted.

Document #	Document name	Aspects covered	Author
E1	Terrestrial and Wetland Ecology Summary		Bioresearches (2026a)
Ecological Assessments			
E2	Assessment of Vegetation and Wetland Values	Terrestrial vegetation and wetlands	Whirika (2026)
E3	Assessment of Invertebrate Values		Bioresearches (2026b)
E4	Assessment of Lizard Values		Bioresearches (2026c)
E5	Assessment of Avifauna Values		Bioresearches (2026d)
E6	Assessment of Bat Values		Bioresearches (2026e)
E7	Ecological Impact Assessment	Terrestrial and wetland ecosystems and fauna	Bioresearches (2026f)
Ecological Management			
E8	Vegetation and TAR Flora Management Plan	Indigenous vegetation and threatened plants (wetland and terrestrial)	Bioresearches (2026g)
E9	Wetland Management Plan	Management and monitoring of Wetlands and TAR wetland plants	Bioresearches (2026h)
E10	Invertebrate Management & Monitoring Plan	Effects management and monitoring for invertebrates	Bioresearches (2026i)
E11	Lizard Management & Monitoring Plan	Effects management and monitoring for lizards	Bioresearches (2026j)
E12	Avifauna Management & Monitoring Plan	Effects management and monitoring for birds	Bioresearches (2026k)
Residual Effects Analysis and Management			
E13	Residual Effects Analysis: Terrestrial Ecology	Residual effects analyses for vegetation and fauna	Bioresearches (2026l)
E14	Residual Effects Analysis: Wetlands	Residual effects analyses for wetlands	Bioresearches (2026m)
E15	Residual Effects Terrestrial Restoration Plan	Compensation planting and vegetation restoration	Bioresearches (2026n)
E16	Residual Effects Wetland Management Plan	Planting and restoration for wetlands	Bioresearches (2026o)
E17	Ecological Impact Assessment: Pest-proof Fence Construction	Terrestrial and wetland ecosystems and fauna	Bioresearches (2026p)
E18	Pest Control and Elimination Plan	Animal pest management	Alliance Ecology (2026)

2.4.1 Summary of Ecological Values and Residual Effects

The proposed MP4 Project will result in the permanent loss of 4.72 ha of natural inland wetland ecosystems that are characteristic of the Macraes ecological district through reclamation and dewatering, 3.58 ha of induced wetland loss through diversion of WRS seepage and 3.2 ha of wetland loss through vegetation alteration via inundation through the creation of Camp Creek and Coal Creek water reservoirs.

Wetland ecosystem extents within the direct MP4 footprint comprise predominantly of sedgeland (1.43 ha) and herbaceous wetlands (2.10 ha), with areas of ephemeral wetland (1.14 ha), minor areas of shrubland wetland (0.03 ha) and putative seepage wetland (0.02 ha). In addition to wetlands located within the direct impact area, 7.08 ha of wetland extent, including 3.64 ha of ephemeral wetland, is located within 100 m to the proposed works. Potential adverse impacts on these wetlands have been avoided, minimised or mitigated through project design and application of wetland management actions. These include:

Avoidance

- Wetland areas now avoided through project footprint redesign, such as the removal of Backroad Waste Rock Stack.
- Redesign of Golden Bar Haul Road to avoid direct impacts to wetlands
- Implementation of prescribed "no-go" zones within Golden Point Underground, where subsidence effects are greatest to avoid changes to the water levels within Deepdell Creek and any adjacent wetlands.

Minimisation

- Management of dust and sedimentation to minimise degradation of wetland values and extents during operations
- Demarcation of wetland edges within close proximity (i.e. 20 m) of works areas to minimise potential for accidental encroachment

Mitigation

- Hydrological augmentation to minimise the potential for wetlands drying;
- Salvage of Threatened and At Risk (TAR) and indigenous flora species from impact wetlands prior to their removal.

The measures employed to avoid, minimise and mitigate adverse impacts on wetlands located adjacent to the works area ensures the residual adverse effect on those wetlands is managed to a low level of effect.

The residual effect on wetland values located within the works footprint (i.e. impact wetlands) is assessed as being Low to Very High (Table 4). However, following the implementation of compensation measures, balancing the losses of wetland habitats with the gains in ecological restoration, the residual effect on impact wetlands is assessed to be Low.

Table 4. Summary of wetland values, area (ha) lost and residual level of effect following mitigation measures for MP4 and Camp and Coal Creek.

Ecosystem	Value	Cumulative area lost	Magnitude of direct effect
Ephemeral	Moderate to Very High	1.14	Moderate to Very High
Sedgeland	Low to Moderate	1.74	Low to Moderate
Freshwater herbaceous	Low to High	4.78	Low to High

Shrubland wetland	Moderate	0.03	Moderate
Seepage	High	0.02	High
Copper Tussock	High	0.21	High
Induced wetland	Negligible - low	3.58	Low
Overall	Moderate	11.5 ha	Moderate

2.4.2 Summary of proposed compensation actions

The actions required as part of this wetland management plan are expected to result in an overarching net positive outcome for wetland biodiversity within the immediately surrounding landscape. Key features of the compensation package include, subject to restoration and enhancement planting:

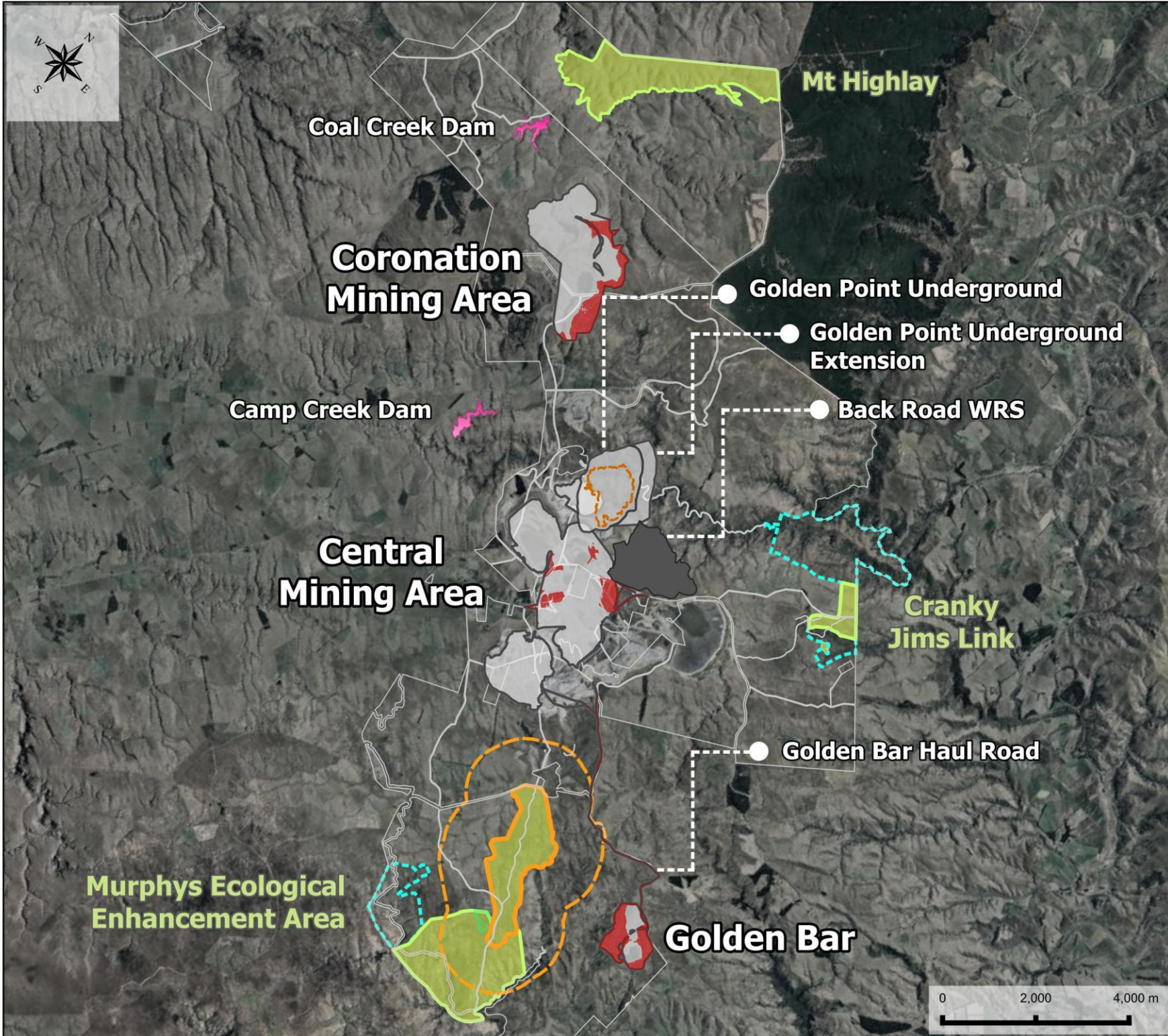
- Restoration and enhancement of approximately 2.78 ha of degraded ephemeral wetlands affected by stock access and weed invasion.
- Restoration and enhancement of approximately 5.23 ha of sedgeland wetland, including weed control, revegetation, buffering and stock exclusion;
- Establishment and enhancement of approximately 5.4 ha of copper tussock wetland, representing a trade-up approach from degraded exotic-dominated freshwater herbaceous wetlands;
- Restoration and protection of approximately 0.14 ha of shrubland wetland;

Table 5. Summary of proposed wetland compensation extents, including pond edge areas.

Compensation wetland type		Areal extent (ha)
Ephemeral wetland (restoration)		2.78 ha
Ephemeral wetland (creation)		1.14 ha
Sedgeland		5.15 ha
	Sedgeland pond edge	0.078 ha
Copper tussock wetland		3.76 ha
	Copper tussock pond edge	0.008 ha
Shrubland		0.14 ha
Reservoir pond edges (Camp and Coal Creeks)		49.76 ha*

*pond edge planting areas are located within sedgeland and copper tussock wetlands, as well as surrounding the Camp and Coal Creek reservoirs. The total area is expected to be reduced significantly where steep and rocky areas are excluded from reservoir edges.

Figure 3. (below) Overview of the Project components of MP4



MP4 Project Areas

Date: 05/08/2026

Drawn By: MS

Client: OceanaGold New Zealand Ltd

Scale: 1:110,000

Legend

OGI landholdings

Mining Areas

Mp4 Project Components

Areas of habitat/vegetation loss within the MP4 Project

Camp and Coal Creek Dams

Backroad Waste Rock Stack

GPUG Consented Boundary

Offset/Compensation Sites

Sites of Protection/Restoration for Compensation Package

Predator exclusion fence

Predator exclusion fence buffer

Existing Ecology Covenants

OGI landholdings

SOURCES

LINZ Basemap aerial

MAP PROJECTION

NZGD2000 / New Zealand Transverse
Mercator 2000

Bioresearches
A Babbage Company

2.4.3 Landscape and ecological context

The Macraes Ecological District (ED) is one of two ecological districts that comprise the Lammerlaw Ecological Region. The district was once characterised by extensive dryland forest and shrubland communities, interspersed with montane short tussockland transitioning into subalpine tall tussockland (Bibby 1997). Areas of mixed hardwood and podocarp forest, kānuka woodland, and *Coprosma*–flax scrub were also historically widespread across the district. However, much of this original vegetation cover has been profoundly altered over the past c. 750 years, primarily through repeated anthropogenic burning associated with human land use practices (McGlone et al. 1995; Whitaker 1996). Following European settlement in the 1850s, large areas were further modified through repeated burning, gold mining, cultivation, oversowing, and fertiliser application, resulting in the widespread establishment of exotic pasture systems (Thompson 1949, Whitaker 1996).

Today, the Macraes ED represents a highly modified landscape, with approximately 75% of the district dominated by exotic vegetation types, particularly improved pasture. The remaining indigenous vegetation is fragmented and largely confined to narrow-leaved tussock grassland, copper tussock wetlands, and grey shrubland communities, with only very small and isolated remnants of original forest ecosystems persisting across the district (Bibby 1997; Thorsen pers. obs.).

Despite this extensive modification, the vegetation of the Macraes ED is considered botanically diverse and supports a high number of plants classified as 'Threatened' or 'At-Risk' (TAR). This is supported by surveying of the proposed works extent, which identified 47 TAR plant species within the footprint and buffer areas of the works extent. The Macraes area has been recommended to the New Zealand Plant Conservation Network as an Important Plant Area due to the high diversity of threatened and uncommon plants and as a stronghold for a number of threatened species (Thorsen 2008).

Threatened environment classification mapping of the district (available on Manaaki Whenua Landcare Research) indicates that all land within the proposed project footprint falls within four classifications: environments with less than 10% indigenous cover left, those with 10-20% or indigenous cover left, those with 20-30% indigenous cover left and those with up to 30% indigenous cover left, but no more than 10% of this is protected.

Wetland ecosystem types present in the ED include copper tussock wetlands (WL16), sedgeland wetlands (WL22), seeps, herbaceous wetlands and ephemeral wetlands. Across Aotearoa New Zealand 90% of wetlands have been lost since European arrival, and these losses continue (Dymond, *et. al.*, 2021, Godsen, Kelly & McIntosh, 2026). Ephemeral wetlands, in particular, are classified as threatened ecosystems and are known to support a fifth of our indigenous vascular flora. A large proportion of these plants are classified as TAR species.

2.5 Proposed restoration actions

In order to compensate for the loss of 4.96¹ ha of natural inland wetlands it is proposed to plant 5.40 ha of copper tussock wetland, 5.23 ha of sedgeland wetland and 3.92 ha of ephemeral wetland (a combined 2.78 ha of restoration and 1.14 ha of newly constructed ephemeral wetlands). Wetlands will be buffer planted, with 20 m of riparian planting for ephemeral and pond-edges and 15 m for sedgeland, shrubland

¹ MP4 and Camp Creek wetland extent

and copper tussock wetlands. This buffering will provide benefits such as shading, reducing weed invasion, providing fauna habitat and water filtration. Designated pond and reservoir edges will also receive 20 m riparian buffer planting where their edges fall outside the host wetland's extent.

Indigenous wetland plants located within the installation footprint of the Murphys predator proof fence are to be salvaged and relocated to adjacent areas of the same wetlands outside the impact area.

To address uncertainty in the success of ephemeral wetland restoration, new experimental ephemeral wetlands are proposed to be created and planted in addition to those being restored.

Up to 0.22 ha of headwater seep wetlands occur within the new Murphys Link covenant. This area is to be fenced to exclude livestock, encompassing and thus protecting these wetlands.

2.5.1 Order and timing of works:

1. Seed collection: To begin immediately and be done for a minimum of 2 years before any impacts on wetlands, or removal of plants. (See Section 3 for more detail and qualifications to this)
2. Weed control and site preparation: Initial weed control for site preparation 1 month before planting, regularly thereafter following the guidelines set out in (Sections 4.1, 7.1.2)
3. Salvage: Once seed collection has been completed, then to be done during spring/summer and also immediately prior to wetland removal (if this is to occur outside this season) (Section 4.2)
4. Planting: April-Sept once plants have been propagated, to begin no more than two years after Project commencement (Sections 5, 6)
5. Maintenance: Fencing and initial pest animal and plant control to be completed before planting for all receiver sites, then regularly following maintenance guidelines (Sections 4.3, 7.1.1 and 7.1.2)
6. Monitoring (as described in Macraes MP4 Wetland Monitoring Plan, Bioresearches 2026p)

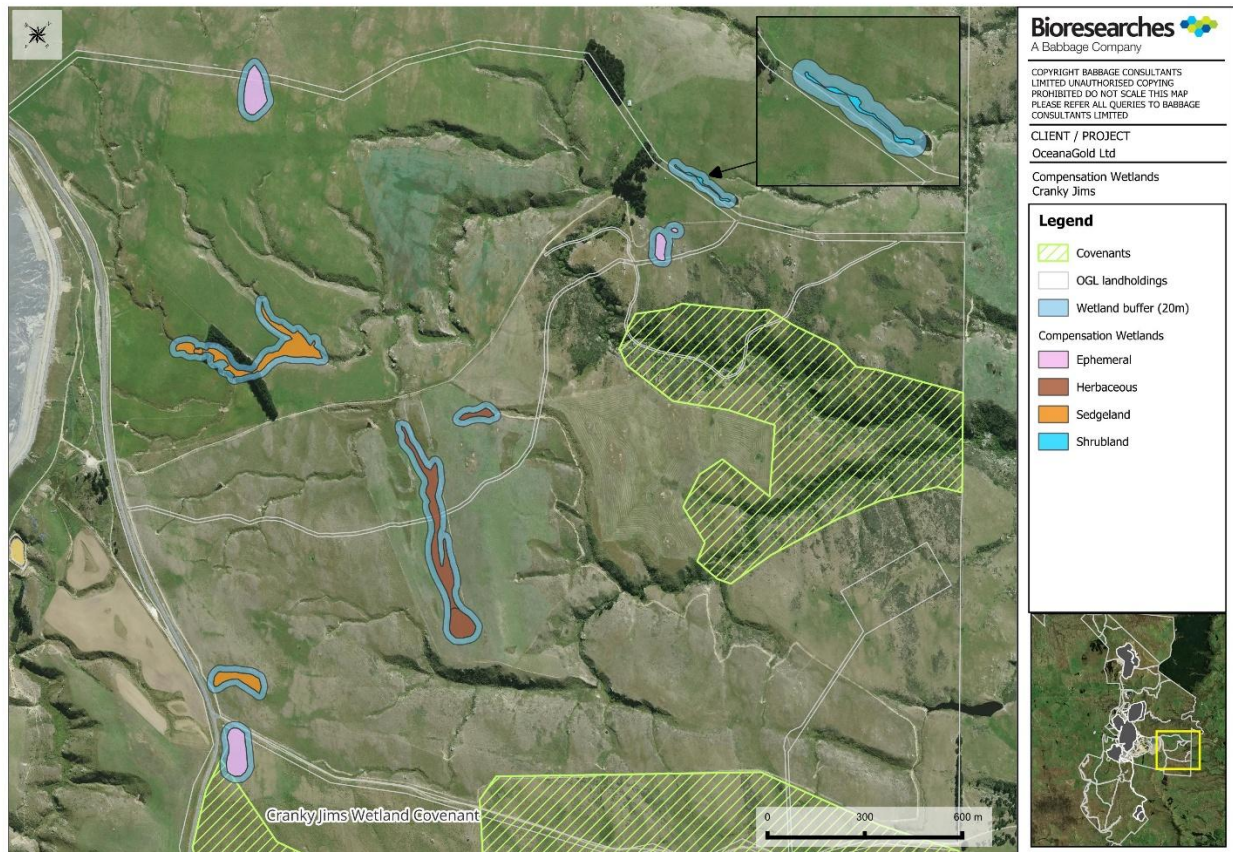


Figure 4: Indicative wetland compensation locations within the Cranky Jim's area

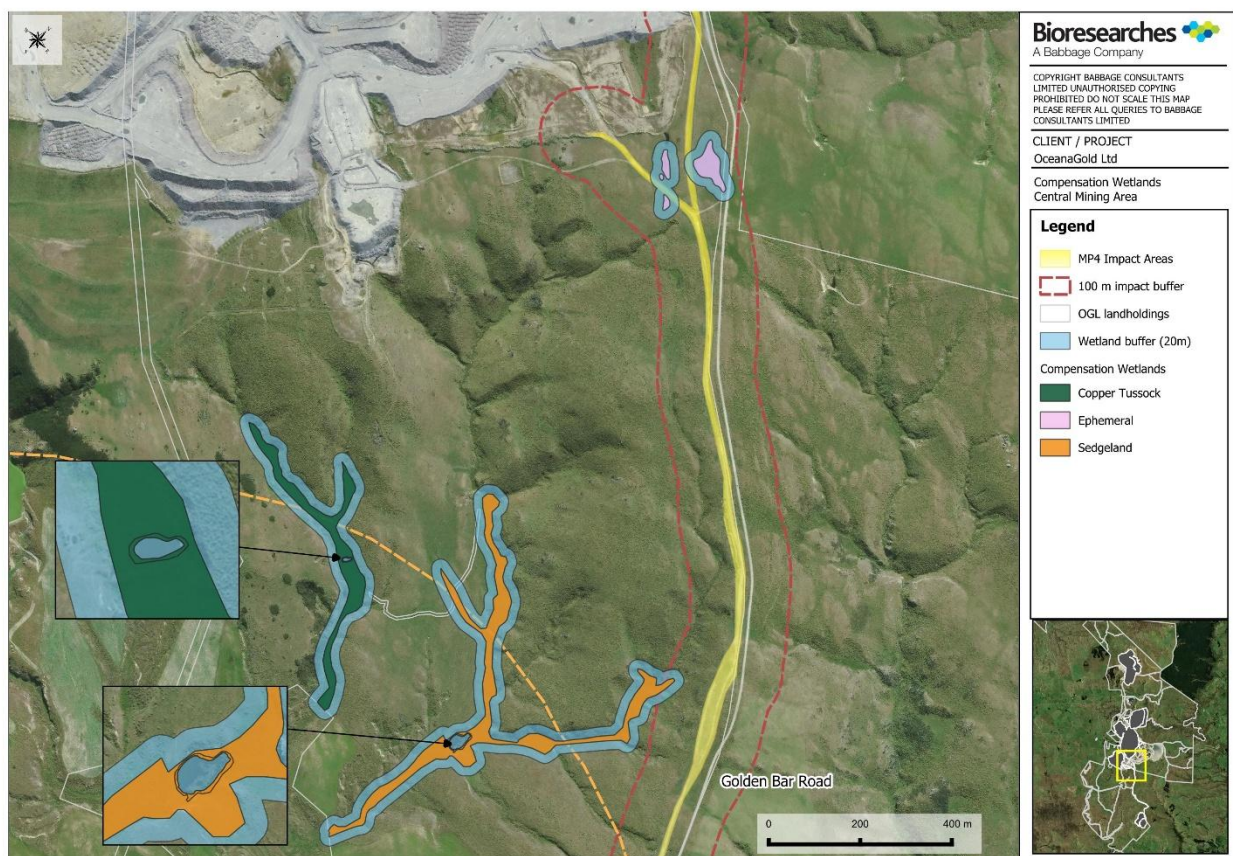


Figure 5: Indicative wetland compensation locations within Macraes Central. Note pond edge planting within each of the copper tussock and sedgeland wetlands (inset).

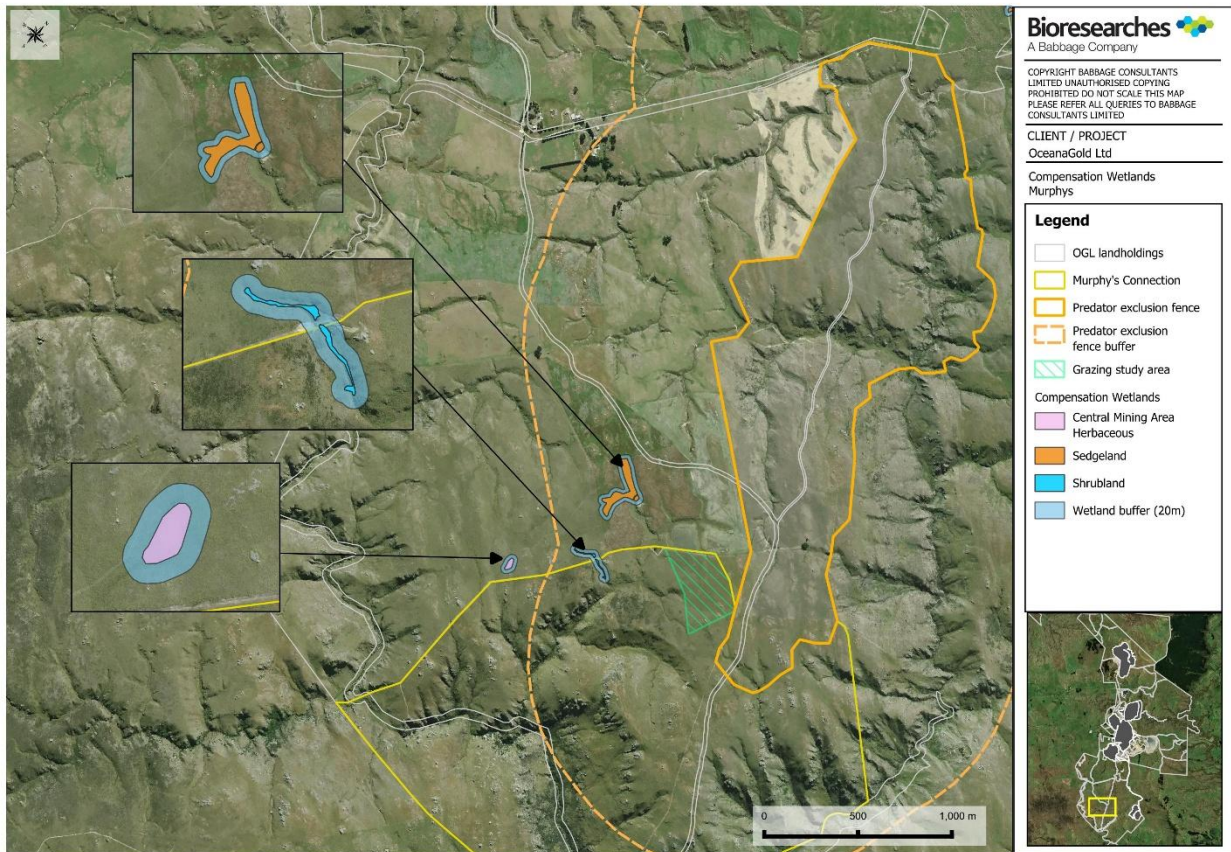


Figure 6. Indicative wetland compensation locations within and adjacent to the Murphy's Connection covenant

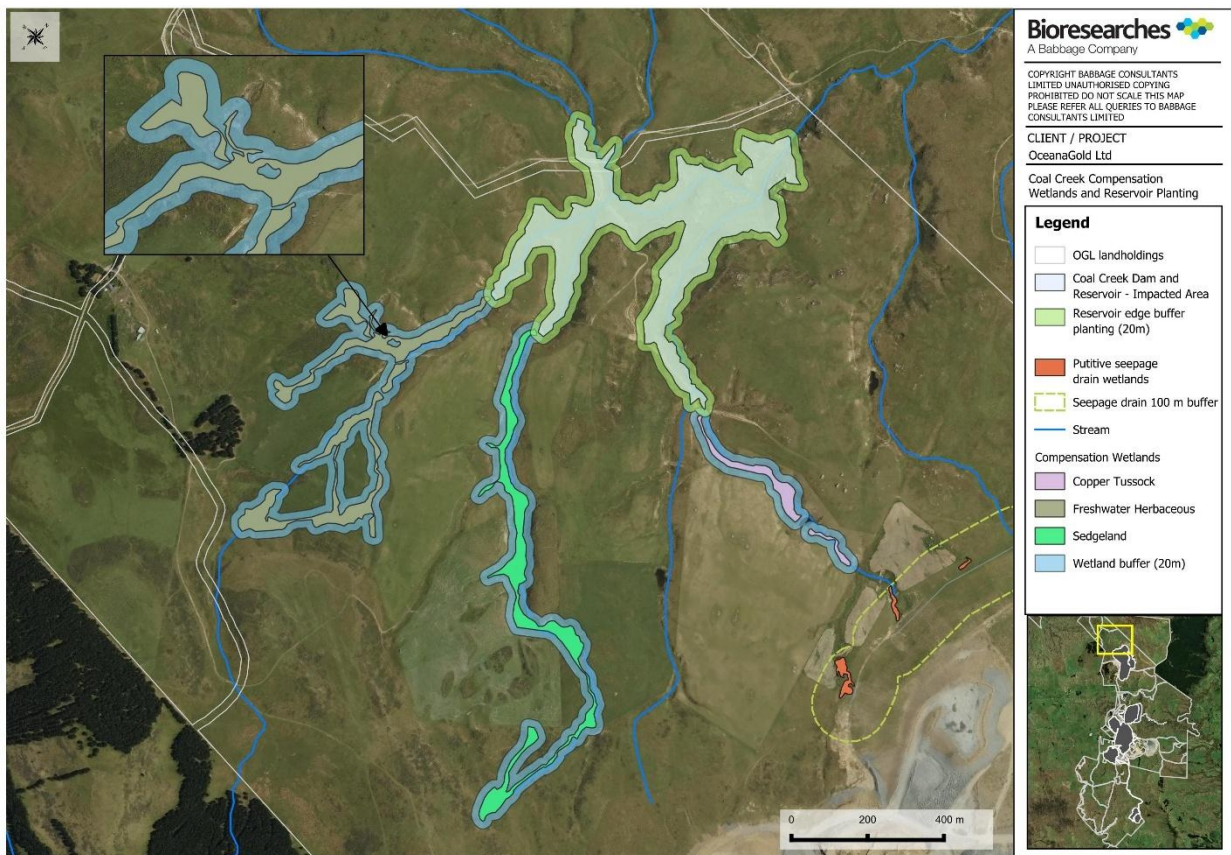


Figure 7: Indicative wetland compensation locations for Coal Creek, including reservoir edge and wetland buffer planting.

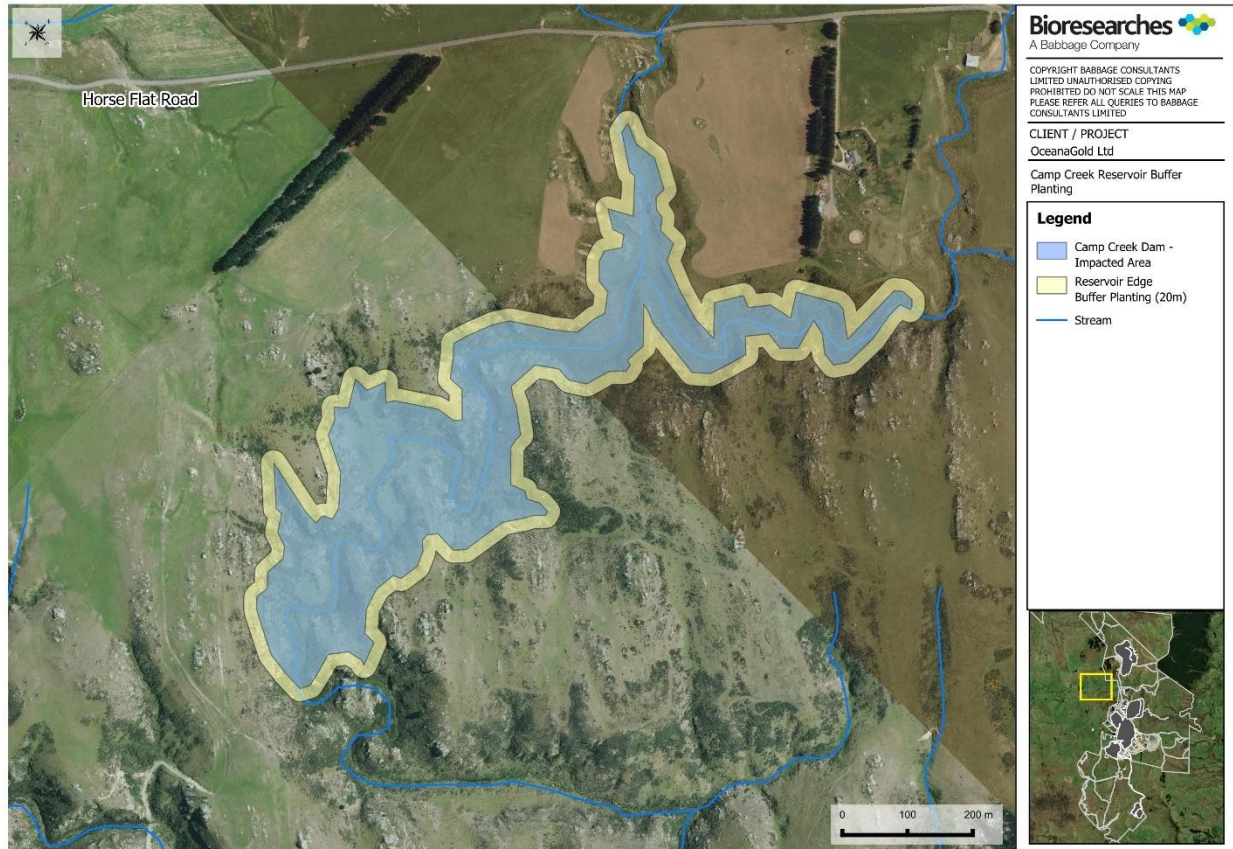


Figure 8: Indicative reservoir edge planting area around Camp Creek.

3 PLANT SOURCING, SEED COLLECTION AND PROPAGATION

3.1 Eco-sourcing

All plants specified in planting lists must be eco-sourced from within the Macraes Ecological District and records kept of source locations. Where possible, this should be from within the impact wetlands to provide an opportunity to preserve the genetics of these plant populations. Because eco-sourcing requires collection of seed and growing up of young plant stock for replanting, long lead-in times are typical; often in the order of 12 to 18 months, or more, prior to the planting season. Cultivation from seed, with a wide range of parent plants, is preferred in order to represent as much of the genetic diversity present in the population as possible. Should cuttings or division of plants be used for propagation, these must be collected from as many individual plants as possible. Where a species has a small population (less than 100 mature individuals) present in the Macraes ED, additional seed and/or other material may be collected from neighbouring ecological districts, preferably from plants growing in similar climatic zones.

A number of listed plants are slow growing and seed production is not guaranteed each year. Long lead times are typically required for successful plant propagation and planting. A minimum of two years is recommended for wetland plant propagation and it is expected that propagation will be ongoing for a number of years as different species mature.

3.2 Seed collection

Engagement of a nursery, seed collection and propagation of plants must begin as early as possible. Collection of seed and other material for cultivation should be done, or supervised, by a botanist with strong plant identification skills, who is familiar with the species in the planting lists. Many of these are cryptic and require specialised knowledge to identify.

Seed must be collected from impact areas for a minimum of two seasons for all listed species prior to impact or plant removal. This is to ensure that adequate seed is able to be collected from as many individuals within the population as possible. Plants may not produce seed every year and other factors such as adverse weather, fire or herbivory may destroy seed before it is ripe. The MP4 Project has staged clearances, which will result in some areas being cleared before two years' worth of seed can be collected. In this instance, as much seed as possible must be collected from plants within these early clearance areas (at least one seed collection from all areas is essential to preserve genetics). Further seed collection from the same species outside these areas is expected to continue after clearance. Areas scheduled to be cleared later in the Project's timeframe should nevertheless begin seed collection as soon as possible and continue this up to clearance.

As much seed as possible should be collected off plants located within impact areas. For plants within buffer areas, or the wider ED, only 10% of seed from any one plant should be collected to ensure that natural seed dispersal can still occur. A minimum of 100 plants, or 100% of the plant population (whichever is smaller) must be collected for any one species, prioritising collection from plants in impact areas. Care must be taken not to cause damage to plants when collecting seed to ensure plants in impact areas are in good condition for salvage and to prevent harming populations outside direct impact areas.

Seed must be provided to the relevant nursery for propagation immediately and must not be stored for more than 1 week.

3.3 Propagation

Propagation must be done by an experienced nursery, ideally with knowledge of propagating Otago endemic species and eco-sourced native plants. More than one nursery may need to be engaged and this will reduce risk should stock from one grower fail for unforeseen circumstances. Plants should be grown within the Macraes ED, or where this is not possible, then plants must be hardened off within the Macraes ED for a minimum of three months prior to planting.

Nurseries growing plants for the MP4 Project compensation planting must provide regular (twice per year) updates on plant numbers, plant growth and progress for each species. Difficulties in cultivating a species must be communicated early and shared with OGNZL, and the Project botanist, so that appropriate responses can be made. Minor alterations in plant production (e.g. pot size) may be allowed, but should be confirmed with the Project botanist before propagation begins.

It is anticipated that some species will grow faster than others and so these may be planted earlier than other species. Where the difference in expected planting times is more than 6 months (i.e. more than one planting season) planting is likely to be staggered, with different species planted in different years. Planting completion shall be the year when the last plants from the complete planting list have been planted.

4 SITE PREPARATION

Site preparation actions must be undertaken before any planting of compensation wetlands or salvage of wetland plants. Additional specific site preparation requirements for ephemeral wetlands is described in section 6.1 ephemeral wetland preparation.

4.1 Weed control

Before planting can begin, pest plants (weeds) must be removed from planting sites. Pest plants are environmental weeds which have the potential to outcompete, smother, or kill native vegetation and may modify the environment in which indigenous plants are growing. A wide range of exotic plants are present in the immediate vicinity of the planting areas, including pasture grasses, herbs, woody shrubs and trees. It is not necessary to remove all exotic species. For practicality, and to limit damage to any indigenous plants that may be present, only those weeds listed below need to be removed prior to planting. This list may be amended by the Project botanist at any time to ensure effective adaptive weed control is applied and changes in pest plants can be responded to appropriately.

Only herbicides that are appropriate for use near or in aquatic environments should be used during weed control, following guidance for use around water to avoid damage to aquatic animals and ecosystems. Ongoing weed control for each compensation wetland is required and described in (Section 7.1: Maintenance).

Weed control should follow best practice guidelines and be targeted to individual pest plants, or discrete infestations, to prevent spray drift and incidental harm to any surrounding native vegetation. Hand-weeding is required where herbicide is likely to harm native species (for example where plants are growing intertwined). Any person conducting weed control work must have good visual recognition of target weed species, as well as native species and be trained and signed-off by the project botanist for skills in identification of appropriate species. Weed control should be conducted to a level where no live adult plants are present and any seedlings are removed as soon as identified. Weed control must be audited regularly (at least once per year) to check that herbicide has been applied in a targeted manner with no overspraying of surrounding non-target plants, and to ensure that all weeds have been detected and properly controlled within planting areas and their buffers. If an audit identifies poor practice or inefficient control this must be addressed within one month. This may include replanting of lost native vegetation.

4.1.1 Weed control timing

Initial weed control must be completed no more than six weeks and no less than one month prior to planting, to ensure that no residual herbicide is present when new plants go into the ground. After initial weed control to prepare the site for planting, weed control should follow a regular twice-yearly schedule with control applied in late Spring and mid-Summer.

4.1.2 Wetland weed species

Weed species that must be controlled in wetlands and wetland buffers prior to planting:

- *Glyceria* spp.
- *Ranunculus flammula*
- *Carex leporina*
- *Alopecurus geniculatus*
- *Festuca rubra*
- *Ulex europaeus*
- *Cytisus scoparius*
- Conifer species
- *Salix* spp.

4.1.3 Buttercup control and care

Note that the exotic buttercup *Ranunculus flammula* should be removed as a pest plant in compensation wetlands, but other native buttercups are also present and must not be damaged or removed. This is particularly important as this genus is host to an At-Risk moth species (*Asaphodes recta*) subject to management actions including buttercup salvage, which requires protection on site (Invertebrate Management & Monitoring Plan, Bioresearches 2026i). To avoid damage to native buttercups or caterpillars it is important that anyone conducting weed control is briefed on this and is confident in distinguishing buttercup species.

4.2 Salvage

All indigenous species from impact wetlands are to be salvaged from all impacted wetlands and replanted into covenanted wetlands within the wider OGNZL landholdings. For non-TAR plants (unless otherwise specified) this is to be up to 100 plants for each species, or the total population of any species with fewer than 100 individuals present in impacted wetlands. Replanting areas for salvaged plants may include compensation wetlands, but is additional to required compensation planting. Vegetation direct transfer (VDT) may be used for salvage if advised by the Project botanist. Replanting locations for each species shall be decided before salvage begins and be directed by the Project Botanist, who will support indigenous plant identification and guide plant removal and replanting.

4.2.1 Salvage timings

Salvage should occur during late Spring (October – November), after initial weed control has been done in the wetlands receiving the salvaged plants. A number of wetland plants, particularly those inhabiting ephemeral wetlands, are only present during Spring and Summer and still more species require flowers or seeds to be present for accurate identification. The timing of salvage is therefore important to ensure that annual and short-lived species are in their growth phase and that cryptic or difficult plants are able to be identified.

Where clearance is to be done outside this season a first full salvage should be initially done the Spring prior to clearance and a second salvage done immediately before clearance to ensure no plants are missed. Plants salvaged outside Spring may need to be taken into cultivation, or managed storage rather than directly transferred to a new site, under Project botanist direction. Vegetation direct transfer (VDT)

may be appropriate for the second salvage, if supported by the Project botanist. In this case, careful maintenance of soil moisture must be ensured during and after the salvage and/or VDT.

4.2.2 Salvage methods

1. Receiver wetlands to be identified and planting locations marked for each species by the Project botanist;
2. Initial weed and animal control to be completed at receiver wetlands, along with stock fencing where required;
3. Where specific species salvage details are provided in the existing Oceana Gold Plant Rescue Species Management spreadsheet (Whirika) these should be followed for that species; or
4. Each plant (or clump/mat of plants) must be dug out (by hand, or with small machinery), including the entire root mass, leaving, where possible, a protective soil mass entirely surrounding plant roots (including secondary roots);
5. Any significant weeds must be carefully hand-weeded from root balls, taking care not to disturb soil;
6. Roots to be wrapped in wetted hessian;
7. Plants should be transported to receiver wetland upright (unless otherwise directed by Project botanist), supported to prevent movement during transfer and in a single layer (not stacked);
8. Plants must be planted into receiver wetland/s on the same day they are salvaged, under botanist supervision;
9. If same day replanting is not advisable, plants may be put into cultivation on the same day;
10. Plants must be planted into receiver wetlands so that the soil around their roots is just below the level of soil in the receiver wetland and are gently firmed in to the ground;
11. Once re-planted, locations of salvaged plants must be recorded on a GPS and physically marked for post-salvage monitoring.

4.2.3 Salvage of buttercups (*Ranunculus* spp.)

Native buttercups (*Ranunculus* species including, but not limited to *R. glabrifolius* and *R. amphitrichus*) are present within impact wetlands. These have been identified as potential food sources for the caterpillars of an At Risk – Declining moth species: *Asaphodes recta*. As part of compensation actions to address potential impacts of this project upon this species there is a particular requirement to salvage all native buttercups from wetlands. This shall be done following the procedure for salvage of other native species. Planting however, must be done into sites with existing native buttercups, with salvaged buttercups planted so that their foliage is in contact with existing buttercup plants. This will allow any caterpillars to move between plants and ensure that a host is available should the salvage fail.

4.3 Fencing

All compensation wetlands, with the exception of ephemeral wetlands, must be fenced prior to planting in order to exclude stock and prevent damage to new plantings. Fences must be of sheep netted (gridded wire to prevent sheep pushing through) design and be placed outside the 20 m wetland buffer setback. All cattle must be excluded permanently from all wetlands and planting areas.

Fencing of ephemeral wetlands should follow an adaptive management approach, with full stock exclusion as the initial management measure to allow newly planted plants to settle and establish. After

one year sheep grazing may be allowed, if supported by the Project botanist. This may not be a permanent measure so later changes to sheep numbers or presence may apply depending on wetland monitoring results. Should sheep grazing be allowed within ephemeral wetlands care must be taken to ensure that this does not inadvertently provide stock with access to adjacent planted areas or other terrestrial covenants. Additional fencing may be required in this case.

Fences must be checked and repaired (where damaged) monthly for all compensation wetlands.

4.4 Pest animal control

Pest animals have the potential to cause significant damage to indigenous plants. New plantings are particularly vulnerable as small plants are more likely to be killed by browsing pressure or trampling. All compensation wetlands shall be included in pest animal control as set out in the MP4 Pest Animal Management Plan (Alliance Ecology, 2026).

Due to the large scale of the proposed planting, and small size of many of the plants, plant guards are not recommended for new plantings. However, new plants are vulnerable to browsing pests while they establish. To prevent plant mortality visual checks of all planting areas should be done every two months for the first six months after planting, and four times per year after this for the first two years. All plants should be checked, but species known to be disproportionately susceptible to herbivory must be particularly monitored. If damage caused by mammalian pests is seen or expected to have resulted in the mortality or reduced reproductive capacity of 20% or more of any one species, or overall plant numbers, this shall trigger immediate additional pest animal control. If particular species are found to suffer high levels of damage or mortality they must have plant guards or cages installed for protection and any dead plants must be replaced in the following planting season. Photos of damage, with date and location included, notes on areas checked, plant condition and any responses to herbivory must be kept and included in monitoring reports.

4.5 Pond edge grading

Grading back the edges of ponds and reservoirs must be completed as part of planting preparation, in order to create habitat for Threatened and At Risk plant species suitable for pond margins and to reduce the vigour of weeds invading this area. Edges should be scraped back to mineral soil or gravel bases (if possible, depending on soil depth) using an excavator. Pond edges shall be graded to very gradual slopes of between 1 and 10% for at least 5 m of width (except where bounded by a rock outcrop, where significant indigenous vegetation is currently growing and should be avoided, or where the surrounding ground is too steep to be able to achieve this) and planted with indigenous turf species to create turf-like edges that will naturally exhibit seasonal water fluctuations as pond water levels rise and fall. Reservoir edge grading should be done once the water levels have reached their full extent, which may be several years after the MP4 Project has started. Plants should be grown on in anticipation of planting at this delayed date.

4.6 Biosecurity and plant hygiene

Compensation wetlands are vulnerable to degradation by weeds, which can potentially be introduced through equipment, vehicles and soil transfer. All footwear, spades, excavator buckets and vehicle wheels must be cleaned of all soil and any plant matter before entering a compensation wetland area, or constructed ephemeral wetland (including during the construction phase). When planting or transferring

salvaged plants, each must be checked before planting to ensure that no weeds are growing in the pot or transferred root-ball. If weeds are found they must be removed and destroyed.

Plants should be of good health when transferred or planted. If plants appear to be diseased or significantly infested with pests, these should be put aside, away from other plants, and advice from the Project botanist sought before planting.

4.7 Legal protection

All compensation wetlands, created ephemeral wetlands and buffer planting areas must be either covenanted, or be within larger covenants that are being created as part of MP4. These covenants must allow for actions to be done for the purposes of protecting native plants, particularly TAR species, including providing for the ability to graze sheep.

5 PLANTING – COPPER TUSSOCK WETLANDS, SEDGELAND WETLANDS, SHRUBLAND WETLANDS AND POND EDGES

The below sections describe the planting methodologies for the copper tussock wetland, sedgeland wetland, shrubland wetland and pond edge planting zones, as well as for their respective 20 m buffer planting areas.

Following weed control, planting may occur directly into the identified recipient wetlands for the copper tussock and sedgeland wetlands, as well as pond edge areas. Ephemeral wetlands are discussed separately in section 6, as planting into both existing and constructed ephemeral wetlands requires careful timing, as well as consideration of hydrology and species-specific drought tolerances.

5.1 Targets

All wetland and buffer areas in this section have a target of 90% coverage by indigenous vegetation five years after planting. If this is not achieved then infill planting shall be done until this target is met. Pond edge planting includes turfing species in graded edges that seasonally dry and so are expected to include some bare ground. Pond edge planting therefore has a lower target of 80% coverage by indigenous species by five years after planting.

5.2 Timing

Planting of copper tussock, sedgeland and shrubland wetlands, their buffer areas, as well as pond edges, should occur during the planting season (April-September). This is to ensure that new plants are planted when soil moisture levels are high and ground is soft, which will support root development ahead of spring winds and high summer temperatures, which dry soil and may cause plant stress or mortality. The coldest period of winter is usually not practical for this, so avoid planting when the ground is frozen or substantial snow is expected. Compensation planting for all wetlands and buffers must be started by year two of the MP4 Project, with the exception of the reservoir edge planting, which should be started by two years after the reservoirs have been completely filled.

5.3 Buffer Planting

Buffer planting lists have been provided for each wetland type. These are to be planted in a 20 m extent around each ephemeral wetland and pond edge, and 15 m for shrubland, sedgeland and copper tussock wetlands. For sedgeland wetlands this buffer may be instead 'planted' with a 15 m buffer of high-density tussock vegetation direct transfer (VDT). If VDT is to be used it must follow the methods set out in the Threatened and At Risk Plant Management Plan (Bioresearches 2026). If less than 70% of the indigenous plant coverage in the VDT is surviving after two years, this buffer must be re-planted with the original planting list.

5.4 Planting locations and quantum

The maps shown in figures 2-6 indicate planting locations for different wetland types required as part of the compensation package. In total, the compensation package proposes to plant:

- Copper tussock wetland (5.4 ha, plus 15 m buffer)
- Sedgeland wetland (5.23 ha, plus 15 m buffer)
- Shrubland wetland (0.12 ha, plus 15 m buffer)
- Ephemeral wetlands (2.78 ha restored, 1.14 ha created, plus 20m buffer to all, detailed in Section 6)
- Pond and reservoir edges (approximately 49.85 ha as 20 m buffer, although this figure is expected to decrease after inappropriate areas are excluded)

5.5 Species selection

Plant lists for each wetland type and associated buffer have been developed to align with the wetland compensation outcomes identified in the Residual Effects Analysis Report: Wetland Ecology (Bioresearches, 2026m). Species have been selected with reference to wetland vegetation recorded within the OGNZL Macraes Flat landholdings, the Macraes Ecological District, local reference wetlands, recommended planting lists for wetlands in the Otago Region (Wildlands, 2022) and the habitat requirements of Threatened and At Risk (TAR) plant species proposed for rescue and propagation. Care has been taken to include a high proportion of TAR plant species within each in order to provide locations for plants salvaged from vegetation removal required as part of the MP4 Project and to attempt to increase populations of these species within the Ecological District. TAR species have been selected based on observations during site visits and records from within the local area to match appropriate habitat needs.

Species substitutions for any of these planting lists shall only occur if approved by the Project ecologist or botanist and shall maintain the intended wetland type, hydrological function, indigenous cover, indigenous species richness and TAR plant outcomes relied on in the Residual Effects Analysis Report.

5.6 Copper Tussock, Sedgeland and Shrubland Wetland Restoration Plant Lists

The tables below set out plant species, numbers, proportions, sizes and spacing for copper tussock, sedgeland and shrubland wetland restoration sites, as well as a respective 15 m buffer planting mix for each.

Spacing has been set to provide close plantings with the aim of reducing the time plantings will take to fill bare ground, to reduce weed incursions.

Table 6: Planting list for copper tussock wetland restoration (5.4 ha)

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Carex dipsacea</i>	Teasel sedge	Regionally At Risk - Declining	0.5	0.5	6	14,851
<i>Carex kaloides</i>	Sedge	At Risk - Declining	0.5	0.5	2	4,950
<i>Carex sinclairii</i>	Sinclair's sedge	Not Threatened	0.5	0.5	4.5	11,138
<i>Carex strictissima</i>	Handsome bastard grass	Threatened - Endangered	0.5	0.5	0.5	1,238
<i>Carex tenuiculmis</i>	Slender wine sedge	At Risk - Declining	0.5	0.5	7	17,326

<i>Chionochloa rubra</i> sbsp. <i>cuprea</i>	Copper tussock	Not Threatened	0.5	0.5	65	160,887
<i>Schoenus pauciflorus</i>	Bog rush	Not Threatened	0.5	0.5	15	37,128

Table 7: Buffer planting list for copper tussock wetlands (1.27 ha)

Botanic Name	Common Name	Threat Status	Distance from wetted edge	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Austroderia richardii</i>	Toetoe	Not Threatened	0-20	0.5	1	5	728
<i>Carex coriacea</i>	Rautahi	Not Threatened	0-10	0.5	0.5	7	4,075
<i>Chionochloa rigida</i>	Snow tussock	Not Threatened	0-20	0.5	0.5	55	32,017
<i>Coprosma propinqua</i>	Mingimingi	Not Threatened	0-20	0.5	3	3	49
<i>Cordyline australis</i>	Ti kōuka	Not Threatened	0-20	0.5	1	1	146
<i>Phormium cookianum</i>	Wharariki	Not Threatened	0-10	0.5	1	5	728
<i>Olearia bullata</i>	Tree daisy	At Risk - Declining	0-20	1	3	11	178
<i>Olearia lineata</i>	Tree daisy	At Risk - Declining	0-20	1	6	5	20
<i>Sophora microphylla</i>	Kōwhai	Not Threatened	0-20	1	6	3	12
<i>Veronica odora</i>	Hebe	Not Threatened	0-20	0.5	3	5	81

Table 8: Planting list for sedgeland wetland restoration (5.23 ha)

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Carex coreacea</i>	Rautahi	Not threatened	0.5	0.5	4	9,589
<i>Carex diandra</i>	Sedge	Regionally - Naturally Uncommon	0.5	0.5	7	16,781
<i>Carex dipsacea</i>	Teasel sedge	Regionally At Risk - Declining	0.5	0.5	8	19,178
<i>Carex flagellifera</i>	Trip me up (Murray)	Not threatened	0.5	0.5	7	16,781
<i>Carex gaudichaudiana</i>	Gaudichaud's sedge	Not threatened	0.5	0.5	7	16,781
<i>Carex kaloides</i>	Sedge	At Risk - Declining	0.5	0.5	2	4,795
<i>Carex secta</i>	Pukio	Not threatened	0.5	0.5	15	35,959
<i>Carex sinclairii</i>	Sinclair's sedge	Not threatened	0.5	0.5	5	11,986
<i>Carex strictissima</i>	Handsome bastard grass	Threatened - Endangered	0.5	0.5	0.5	1,199
<i>Carex tenuiculmis</i>	Slender wine sedge	At Risk - Declining	0.5	0.5	8.5	20,377
<i>Carex virgata</i>	Pukio	Not threatened	0.5	0.5	7	16,781
<i>Deschampsia cepitosa</i>	Wavy hair grass	At Risk - Declining	0.5	0.5	7	16,781
<i>Eleocharis acuta</i>	Sharp spike sedge	Not threatened	0.5	0.5	5	11,986
<i>Juncus distegus</i>	Rush	Regionally At Risk - Declining	0.5	0.5	10	23,973

<i>Schoenus pauciflorus</i>	Bog rush	Not threatened	0.5	0.5	7	16,781
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Table 9: Buffer planting list for sedgeland wetland restoration (2.7 ha)

Botanic Name	Common Name	Threat Status	Distance from wetted edge	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Austroderia richardii</i>	Toetoe	Not Threatened	0-20	0.5	1	5	1,547
<i>Chionochloa rigida</i>	Snow tussock	Not Threatened	0-20	0.5	0.5	85	105,195
<i>Festuca novae-zelandiae</i>	Hard tussock	Not Threatened	0-20	0.5	0.5	10	12,376

Table 10: Planting list for shrubland wetland restoration (0.12 ha)

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Carex virgata</i>	Pukio	Not Threatened	0.5	0.5	5	275
<i>Coprosma dumosa</i>		Not Threatened	1	1.5	8	49
<i>Coprosma propinqua</i>	Mingimingi	Not Threatened	1	1.5	10	61
<i>Fuchsia excorticata</i>	Kōtukutuku	Not Threatened	1	3	9	14
<i>Fuchsia perscandens</i>	Scrambling fuchsia	Not Threatened	1	1.5	8	49
<i>Leptospermum scoparium</i>	Mānuka	Not Threatened	1	1.5	4	24
<i>Myrsine divaricata</i>	Weeping mapou	Not Threatened	1	1.5	9	55
<i>Shawia bullata</i>	Twiggy daisy	Regionally Naturally Uncommon	1	1.5	25	153
<i>Shawia lineata</i>		At Risk - Declining	1	3	12	18
<i>Sophora microphylla</i>	Small-leaved kōwhai	Not Threatened	3	3	10	15

Table 11: Buffer planting list for shrubland wetland (0.82 ha)

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)	Composition (%)	No. Plants
<i>Coprosma dumosa</i>		Not Threatened	1	1.5	6	252
<i>Coprosma propinqua</i>	Mingimingi	Not Threatened	1	1.5	10	419
<i>Corokia cotoneaster</i>	Korokio	Not Threatened	1	1.5	10	419
<i>Discaria toumatou</i>	Matagouri	Not Threatened	1	1.5	15	629
<i>Helichrysum lineata</i>	Niniao	Not Threatened	1	1.5	5	210
<i>Melicytus alpinus</i>	Porcupine shrub		1	1.5	8	336
<i>Myrsine divaricata</i>	Weeping mapou	Not Threatened	1	1.5	8	336
<i>Ozothamnus vauvilliersii</i>	Mountain tauhinu	Not Threatened	1	1.5	5	210
<i>Shawia lineata</i>		At Risk - Declining	1	3	12	126

<i>Sophora microphylla</i>	Small-leaved kōwhai	Not Threatened	3	3	12	126
<i>Veronica rakaiensis</i>	Hebe	Not Threatened	1	1.5	5	210
<i>Veronica salicifolia</i>	Hebe	Not Threatened	1	1.5	4	168

5.7 Pond edge planting

Within two compensation wetlands in the Central Mining Area there are dammed stream sections that have formed artificial ponds. In addition to this, the Camp and Coal Creek reservoirs will form large artificial water bodies. To improve water quality through increased shading and filtration, as well as provide additional habitat for TAR plant species, pond edge planting is proposed. A total of approximately 49.85 ha of planting is proposed as a 20 m buffer to these ponds and reservoirs. Species selected for this planting have differing preferences for soil moisture; maximum distances from the water edge have been provided for in the planting lists.

Grading of pond edges to shallow margins stripped back to mineral soils/gravel has been required in order to include a range of TAR wetland species that inhabit seasonal shallow water. These species should be planted into the graded area, where water levels are expected to naturally fluctuate with the seasons. An approximate distance from water edge has been provided, based on the water levels during summer (when ponds are anticipated to be at their most reduced extent). This is approximate only and guidance from the Project botanist will be required for planting to ensure the appropriate placement of plants in relation to the water edge. Grading is only required where surrounding land is mostly bare of native plants and relatively low gradient. It is not required where there is bare rock, where the surrounding ground is very steep, where there is existing healthy native vegetation or where grading would disturb rare species within the buffer. Mapping of pond edge and reservoir buffers has not measured where these limitations are present, however the steep rocky terrain present in areas of the Camp and Coal Creek reservoir areas make it likely that the total estimated area of pond/reservoir edge planting will be less than that currently given. An updated map providing this detail, as well as confirming the total size and extent of the reservoir edge planting must be provided with updated plant numbers before these areas are flooded.

Pond edges should be planted during the planting season (April – September), before or at the same time as other wetland planting. Suggested spacings are close, in order to fill the planting areas as much as possible and exclude exotic weeds. Site preparation should follow that described for copper tussock and sedgeland wetlands (Section 4), with the addition of water-edge grading. Reservoir planting should be begun no more than two years after the reservoirs have filled, although plant cultivation should begin immediately. Planting of pond edges within compensation wetlands in the Central Mining area should be started by or before year two of the MP4 Project.

VDT may be used in place of the outer section of pond planting (described for planting between 2.5-20 m from the water's edge). This must follow the guidelines set out in the Vegetation and TAR Flora Management Plan (Bioresearches, 2026). If VDT is used for this, then the tree daisy species (*Shawia bullata* and *S. lieata*) are still required to be planted into the transferred VDT. High density tussock must be used for the VDT and survival monitored. If less than 70% native coverage is surviving two years after VDT then this area must be re-planted according the specified list.

Table 12: Planting list for pond edge and buffers (approximately 49.85 ha)

Botanic Name	Common Name	Threat Status	Distance from water edge	Grade (L)	Spacing (m)	Composition (%)	No. Plants	Notes
Plant into water (1m – 30 cm deep)								
<i>Typha orientalis</i>	Raupo	Not threatened	in water	0.5	0.5	15	500	Taoka species.
Plant in shallow graded water edge (0-1m from water edge as observed during high summer = 24,925 m ²)								
<i>Epilobium komarovianum</i>	Willowherb	Regionally At Risk – Naturally Uncommon	0-2m		0.3	10	31,735	
<i>Euchiton ensifer</i>		At Risk - Declining	0-2m		0.3	10	31,735	
<i>Gratiola</i> aff. <i>concinna</i> (AK 251855; South Island)	Gratiola	Threatened – Nationally Vulnerable	0-2m		0.3	10	31,735	
<i>Lachnagrostis striata</i>	Purple wind grass	Regionally Threatened - Vulnerable	0-2m		0.3	20	63,471	
<i>Lilaeopsis ruthiana</i>		Regionally At Risk – Naturally Uncommon	0-2m		0.3	20	63,471	
<i>Lobelia ionantha</i>		At Risk - Declining	0-2m		0.3	10	31,735	
<i>Lobelia perpusilla</i>		Regionally Threatened - Vulnerable	0-2m		0.3	10	31,735	
<i>Ranunculus brevis</i> *		Threatened – Nationally Endangere	0-2m		0.3	5*	15,868	
Plant on outside margin of graded edge (1-2.5m from water edge as observed during high summer = 37,387.5 m ²)								
<i>Carex dipsacea</i>	Teasel sedge	Regionally At Risk – Declining	2-5m	0.5	0.3	20	95,206	
<i>Carex kaloides</i>	Sedge	At Risk - Declining	2-5m	0.5	0.3	10	47,603	
<i>Carex strictissima</i>	Handsome bastard grass	Threatened - Endangered	2-5m	0.5	0.3	7	33,322	
<i>Carex tenuiculmis</i>	Slender wine sedge	At Risk - Declining	2-5m	0.5	0.3	20	95,206	
<i>Deschampsia cepitosa</i>	Wavy hair grass	At Risk - Declining	2-5m	0.5	0.3	25	119,008	In damp soil only
<i>Juncus australis</i>		Regionally Data Deficient	2-5	0.5	1	3	1,285	

Botanic Name	Common Name	Threat Status	Distance from water edge	Grade (L)	Spacing (m)	Composition (%)	No. Plants	Notes
<i>Juncus distegus</i>	Wīwī	Regionally At Risk - Declining	2-5m		1	15	6,426	Taoka species
Plant beyond graded margin (2.5-20 m from water edge as observed during high summer = 436,187.5 m ²)								
<i>Austroderia richardii</i>	Toetoe	Not threatened	0-10m	0.5	1	15	74,975	Taoka species
<i>Chionochloa rigida</i>	Snow tussock	Not threatened	5-20m	0.5	0.5	40	799,734	
<i>Festuca novae-zelandiae</i>	Hard tussock	Not Threatened	0-20m	0.5	0.5	20	399,867	
<i>Shawia bullata</i>	Tree daisy	At Risk - Declining	5-20m	1	3	15	8,331	
<i>Shawia lineata</i>	Tree daisy	At Risk - Declining	5-20m	1	6	10	1,388	

**Ranunculus brevis* only to be included if plant record from Camp Creek is confirmed to be this species. This plant is aquatic so will need to be planted into shallow water edge if included/salvaged and numbers will be additional to other planting.

5.8 Planting layout

For all planting areas plants should be planted according to the spacing given in the table above. In order to ensure a natural appearance, each plant species should be planted in groups of roughly 5-7 plants, which are randomly alternated with groups of different species. This should form a mosaic of different species and ensure a widely mixed distribution across planting sites.

6 PLANTING - EPHEMERAL WETLANDS

Ephemeral wetlands are characterised by shallow rain-fed depressions that often undergo seasonal drying. The MP4 Project will result in the removal of 1.14 ha of existing ephemeral wetlands. Compensation for this shall be the restoration planting of 2.78 ha of degraded existing ephemeral wetlands. In addition, 1.14 ha of new ephemeral wetlands will be created and planted.

There are two sub-types of ephemeral wetland present in the Macraes ED: long-inundation ephemeral wetlands and short-inundation ephemeral wetlands. These represent two ends of a spectrum, which can grade together to create more intermediate forms. Both forms shall be used as compensation wetlands and both will additionally be created.

Ephemeral wetlands are classified as a threatened ecosystem type. In addition to destruction through removal and alteration of water regimes, pest plants pose a significant risk to the flora that inhabit this class of wetlands. Weed control is therefore of particularly high importance for ephemeral wetland restoration. Planting has been designed to create dense turfs, with the hope that this will help exclude exotic weeds. This means that plant spacings are closer than typical for wetland plantings.

6.1 Site preparation – existing ephemeral wetlands

Site preparation must be specific for each ephemeral wetland. Ephemeral wetlands may vary considerably in the flora that they support, and in the degree to which they may be degraded by exotic plants. Before planting of compensation ephemeral wetlands the following is required for planting preparation:

- Early Summer plant survey by specialised ephemeral wetland botanist to confirm and record what species are present;
- Selective removal of exotic plants in ephemeral wetlands which are no more than partly degraded by exotic weeds, or support TAR plants;
- Removal of all exotic plants using herbicide in highly degraded wetlands; or
- Removal of topsoil layer using excavator in highly degraded ephemeral wetlands (those with no TAR species present and very low (less than 10%) native coverage, if supported by Project botanist);
- Initial pest animal control; and
- Rabbit-proof fencing installed if required (as advised by Project botanist).

6.2 Creation of new ephemeral wetlands

In addition to the restoration of existing ephemeral wetlands, a total of 1.14 ha of new ephemeral wetlands are to be created as part of compensation actions. Constructed ephemeral wetlands offer research opportunities into wetland creation and rehabilitation, as well as ephemeral wetland biodiversity. These constructed ephemeral wetlands will be used to test whether this naturally uncommon ecosystem type can be successfully re-established within the modified Macraes landscape. This is described in the Residual Effects Analysis Report: Wetlands (Bioresearches 2026m). These created wetlands are additional to the formal compensation package and are not relied on to achieve the BOAM modelled compensation outcomes.

By creating new ephemeral wetlands, it is hoped that new habitat will be provided for the specialised plants that live in these ecosystems and new populations can be established through planting.

Ephemeral wetlands should be constructed during Summer (January – March) using excavators to scrape back soil to create shallow 1-2 m deep depressions. Exact locations, hydrology, soil seedbank use, turf translocation, seasonal inundation and adaptive management requirements for ephemeral wetland creation must be specified and overseen by the Project ecologist and botanist prior to construction.

A minimum of ten new ephemeral wetlands are to be created, with a minimum cumulative size of 1.14 ha. This will ensure that a mix of both short and long inundation types, with variety in sizes and shapes can be created. Once new wetlands have been created a settling period of one month is required to determine if any weed species are present in soil and removal of any that germinate.

All created ephemeral wetlands must be covenanted, or be within covenants being created to address other MP4 effects. This must allow for controlled sheep grazing, for the purposes of TAR plant preservation (to maintain low-growing or close-cropped vegetation, ensuring that cattle are permanently excluded at all times). Fencing of created wetlands may be required, if requested by the Project botanist.

6.3 Ephemeral wetland planting

6.3.1 Planting target

Ephemeral wetlands have a planting target of 80% coverage by indigenous vegetation by year five after planting. Some areas of bare ground are acceptable as part of normal seasonal fluctuations. Measurement of plant coverage in ephemeral wetlands should be done in late Spring or early Summer when plants are at their peak growth. Many ephemeral wetland species die off outside this season and so coverage measurements must take this into consideration.

6.3.2 Plant sourcing

Few ephemeral wetland plants are commercially available from nurseries. It will be necessary to engage a specialised native plant nursery at an early stage in works preparation to grow the selected species. These must be eco-sourced from the Macraes Ecological District, ideally from ephemeral wetlands that are in or near the works footprint. A long lead time will be required for this to ensure that adequate seed can be collected for propagation. Note that some plant species may not produce seed every year and so multiple years should be allowed for seed collection.

6.3.3 Timing

Planting of ephemeral wetlands should occur during Spring, ***as water levels are dropping and soil is becoming exposed***. Many ephemeral wetland plants are short-lived or seasonal; Spring is when these species are beginning growth and flowering phases, which will lead to best establishment in new sites. It is important that this planting is triggered by environmental cues (water levels beginning to drop), rather than temporal cues because spring conditions are variable from year to year and site to site.

Planting of ephemeral wetlands must be annual for at least the first five years, to ensure that as many species as possible can be cultivated and planted. Propagation may take some time for some species and so allowing multiple years of planting increases the likelihood of including the full suite of species recommended for planting.

6.3.4 Ephemeral wetland buffer planting

A buffer planting list has been provided for ephemeral wetlands in order to provide additional buffering from exotic weed invasion. This buffer is to be planted in a 20 m extent around each wetland (both compensation and created ephemeral wetlands). Alternatively, this buffer may instead be 'planted' with a 20 m buffer of high-density tussock vegetation direct transfer (VDT). If VDT is to be used it must follow the methods set out in the Threatened and At Risk Plant Management Plan (Bioresearches 2026). If less than 70% of the indigenous plant coverage in the VDT is surviving after two years, this buffer must be re-planted with the original planting list.

6.3.5 Species selection

Plant species for ephemeral wetlands have been chosen based on species lists from surveyed ephemeral wetlands within the wider Macraes landholdings, in particular those at Coronation North, Redbank and Deepdell North, as well as Manaaki Whenua Landcare Research's published lists of ephemeral wetland species. This is a diverse selection of species, however planting, particularly of constructed ephemeral wetlands, is experimental and carries a degree of uncertainty, as does the cultivation of many of the selected species. Including a broad range of species helps address this uncertainty in relation to sourcing and cultivation, as it is expected that some species will 'take' better than others and this may vary from site to site. A large proportion of the species included in the ephemeral wetland planting list are classified as "Threatened" or "At Risk" (TAR). This reflects the threats and ongoing loss that this ecosystem type faces.

6.3.6 Planting lists

The following tables set out the recommended species, sizes and spacing required for planting within both restoration and constructed ephemeral wetlands. A 20 m buffer planting list is also included.

The composition and quantity of each species has not been provided for ephemeral wetland planting. This is intentional to enable a more flexible and adaptive manner of planting ephemeral wetlands, due to their varied and particular conditions and the unpredictability inherent in this ecosystem. Instead it is expected that each ephemeral wetland (both compensation and constructed) shall receive a minimum of 40% of the species included in the planting list during the first year's planting season, with a minimum of 20 plants of each species. Subsequent planting seasons should infill and increase diversity, with a minimum of 80% of the species included in the planting list to be planted into each wetland by year five. For some species seed scattering into the wetland may be appropriate to complement planting and if done this should be recorded, germination included in monitoring checks and seed scattering repeated for at least two seasons. Close coordination between the Project botanist and the nursery is required throughout the growing and planting process to ensure that adequate plant supply is being grown and to guide each year's planting and species composition.

Each species must be planted into a minimum of three ephemeral wetland sites. Additional species beyond those listed may be included in plantings, subject to approval from a botanist with strong knowledge of ephemeral wetland systems in the Macraes ED. Planting of ephemeral wetlands and the planning of forthcoming ephemeral wetland planting seasons must be supervised by the Project botanist.

6.3.7 Uncertainty

Ephemeral wetlands and the plants adapted to grow in them are naturally variable and often have subtle requirements that are difficult to predict. How species will respond to cultivation and planting is unknown for many ephemeral wetland plants. Some species may exhibit seasonal or multi-year patterns of dying off and re-growing. Abiotic factors such as soil mineral content are likely to influence how well certain plants survive or not in different ephemeral wetlands. There is not enough information currently available to know which species are likely to thrive in planted and constructed ephemeral wetlands than others. Because of this, a large list of species has been specified for planting and all species must be included in planting. A wide diversity of appropriate species gives the greatest confidence in achieving the target of 80% indigenous plant coverage in ephemeral wetlands by year five. Built into this approach is the assumption that not all species will survive long-term, but enough diversity is included to overcome this uncertainty and meet the target. The Project botanist will monitor planting progress and species' survival and assess how ephemeral wetland planting lists and efforts should be adjusted over time.

6.3.8 Planting

Planting within existing ephemeral wetlands shall be limited to hand-planted plugs or translocated turf in locations approved by the Project botanist, avoiding unnecessary disturbance to intact turf, seedbank-bearing soils and natural basin hydrology.

Plant spacing has been suggested, however some discretion may be required with this and planting should follow the direction of the Project botanist. The aim of these plantings is to create a close turf, so close spacing is recommended, whilst still providing some space for plants to grow into, which will vary from species to species. To minimise root disturbance and in recognition of the short life-cycles of many ephemeral wetland species, plugs should be used to plant, rather than larger pots. Those species that are perennial and of a larger size have been recommended at a 0.25L pot size for planting as a guide. Plants should be planted in clusters of 3-7 of each species, mixed with clusters of other species to create a random mosaic. Planting in grids or lines should be avoided to achieve a natural appearance.

Table 13: Planting list for ephemeral wetland planting (3.92 ha combined area)

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)
<i>Agrostis muscosa</i>	Pincushion grass	Regionally At Risk - Declining	Plug	0.2
<i>Agrostis pallescens</i>		At Risk - Naturally Uncommon	0.25 L	0.2
<i>Amphibromus fluitans</i>	Water brome	At Risk - Declining	0.25 L	0.2
<i>Argyrotegium mackayi</i>		Regionally At Risk - Naturally Uncommon	Plug	0.2
<i>Austroblechnum pennamarina</i>	Alpine hard fern	Not Threatened	Plug	0.2
<i>Cardamine mutabilis</i>	Tarn bittercress	Threatened - Nationally Critical	Plug	0.2
<i>Carex dipsacea</i>	Teasel sedge	Regionally At Risk - Declining	0.25 L	0.5
<i>Carex gaudichaudiana</i>	Gaudichaud's sedge	Not Threatened	0.25 L	0.2
<i>Carex resectans</i>	Desert sedge	At Risk - Declining	0.25 L	0.2
<i>Carex sinclairii</i>	Sinclair's sedge	Not Threatened	0.25 L	0.5
<i>Carex tenuiculmis</i>	Slender wine sedge	At Risk - Declining	0.25 L	0.5

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)
<i>Chaerophyllum colensoi</i> var. <i>delicatum</i>	Myrrh	Threatened - Nationally Endangered	Plug	0.2
<i>Chionochloa rubra</i> subsp. <i>cuprea</i>	Copper tussock	Not Threatened	0.25 L	0.5
<i>Crassula mataikona</i>		At Risk - Naturally Uncommon	Plug	0.2
<i>Crassula multicaulis</i>		Threatened - Nationally Endangered	Plug	0.2
<i>Crassula peduncularis</i>		Threatened - Nationally Critical	Plug	0.2
<i>Crassula sinclairii</i>		Not Threatened	Plug	0.2
<i>Deschampsia cespitosa</i>	Wavy hair-grass	At Risk - Declining	0.25 L	0.5
<i>Dichondra brevifolia</i>	Dichondra	Not Threatened	Plug	0.2
<i>Elatine gratioloides</i>		Not Threatened	Plug	0.2
<i>Eleocharis acuta</i>	Sharp spike sedge	Not Threatened	0.25 L	0.5
<i>Eleocharis gracilis</i>	Slender spike sedge	Not Threatened	0.25 L	0.5
<i>Epilobium komarovianum</i>	Creeping willowherb	Regionally Naturally Uncommon	Plug	0.2
<i>Euchiton ensifer</i>		At Risk - Declining	Plug	0.2
<i>Euchiton japonicus</i>		Regionally Data Deficient	Plug	0.2
<i>Euchiton lateralis</i>		Not Threatened	Plug	0.2
<i>Euchiton traversii</i>		Regionally Naturally Uncommon	Plug	0.2
<i>Galium</i> (b) (CHR 469914; aff. <i>G. perpusillum</i> ; "lacustrine")		Not Assessed	Plug	0.2
<i>Gentianella amabilis</i>	Gentian	Regionally Naturally Uncommon	Plug	0.2
<i>Glossostigma diandrum</i>	Mudmat	Not Threatened	Plug	0.2
<i>Glossostigma elatinoides</i>	Glossostigma	Not Threatened	Plug	0.2
<i>Gonocarpus micranthus</i> subsp. <i>micranthus</i>		Not Threatened	Plug	0.2
<i>Gratiola</i> aff. <i>concinna</i>	Gratiola	Threatened - Vulnerable	Plug	0.2
<i>Hydrocotyle sulcata</i>	Pennywort	Not Threatened	Plug	0.2
<i>Hypericum rubicundulum</i>	Hypericum	Threatened - Endangered	Plug	0.2
<i>Isolepis basilaris</i>	Pygmy clubrush	At Risk - Naturally Uncommon	Plug	0.2
<i>Juncus distegus</i>		Regionally At Risk - Declining	0.25 L	0.5
<i>Juncus edgariae</i>	Wiwi	Not Threatened	0.25 L	0.5
<i>Juncus pusillus</i>	Dwarf rush	At Risk - Naturally Uncommon	Plug	0.2
<i>Lachnagrostis filiformis</i>	NZ wind grass	Regionally Threatened - Vulnerable	0.25 L	0.5
<i>Lachnagrostis striata</i>	Purple wind grass	Regionally Threatened - Vulnerable	0.25 L	0.5
<i>Leptinella</i> (f) (; "seep")		Not Assessed	Plug	0.2
<i>Leptinella maniototo</i>		At Risk - Declining	Plug	0.2
<i>Lilaeopsis novae-zelandiae</i>		Not Threatened	Plug	0.2
<i>Lilaeopsis ruthiana</i>		Regionally At Risk - Naturally Uncommon	Plug	0.2
<i>Limosella australis</i>	Mudwort	Not Threatened	Plug	0.2
<i>Lobelia ionantha</i>	Hypsela	At Risk - Declining	Plug	0.2
<i>Lobelia perpusilla</i>	Lobelia	Regionally Threatened - Vulnerable	Plug	0.2

Botanic Name	Common Name	Threat Status	Grade (L)	Spacing (m)
<i>Myosotis brevis</i>		Threatened - Nationally Vulnerable	Plug	0.2
<i>Myosurus minimus</i> subsp. <i>novae-zelandiae</i>	NZ mouse-tail	At Risk - Declining	Plug	0.2
<i>Myriophyllum propinquum</i>	Common water milfoil	Not Threatened	Plug	0.2
<i>Oreobolus pectinatus</i>	Cushion sedge	Not Threatened	Plug	0.2
<i>Oreobolus strictus</i>	Comb sedge	Not Threatened	Plug	0.2
<i>Plantago triandra</i>	Starweed	Not Threatened	Plug	0.2
<i>Ranunculus amphitrichus</i>	Waoriki	Not Threatened	Plug	0.2
<i>Ranunculus ternatifolius</i>		At Risk - Declining	Plug	0.2
<i>Rorippa palustris</i>	Poniu	Not Threatened	Plug	0.2
<i>Rytidosperma nigricans</i>	Bristle grass	Not Threatened	Plug	0.2
<i>Stylidium subulatum</i>		Regionally At Risk - Naturally Uncommon	Plug	0.2
<i>Tetrachondra hamiltonii</i>		Threatened - Nationally Vulnerable	Plug	0.2
<i>Viola cunninghamii</i>	Mountain violet	Not Threatened	Plug	0.2
<i>Wurmbea novae-zelandiae</i>	Iphigenia	Threatened - Nationally Endangered	Plug	0.2

Table 14: Buffer planting list for ephemeral wetlands (20m buffer)

Botanic Name	Common Name	Threat Status	Distance from wetland edge	Grade (L)	Spacing (m)	Composition (%)	Notes
<i>Carex breviculmis</i>	Grassland sedge	Not Threatened	0-20	0.5	0.5	3	
<i>Chionochloa rigida</i>	Snow tussock	Not Threatened	0-20	0.5	0.5	80	
<i>Festuca novae-zelandiae</i>	Hard tussock	Not Threatened	0-20	0.5	0.5	5	
<i>Myosotis brevis</i>		Threatened - Nationally Vulnerable	Plug	0.2	<i>Myosotis brevis</i>	2	
<i>Myosotis glauca</i>	Forget-me-not	Threatened - Nationally Vulnerable	0-20	plug	0.2	3	
<i>Poa cita</i>	Silver tussock	Not Threatened	0-20	0.5	0.50	4	Taoka species
<i>Poa colensoi</i>	Blue tussock	Not Threatened	0-20	0.5	0.5	3	

7 POST PLANTING

7.1 Maintenance

Maintenance of planting sites is essential for their success. Maintenance must include pest animal and plant control, replacement planting and monitoring. These are required in order to meet the modelled outcomes of the biodiversity offset accounting model (BOAM), which sets a limit of 20 years to reach targets.

- Animal control – as per the MP4 Pest Animal Management Plan (Alliance Ecology, 2026)
- Weed control – four times per year for years 0-5, then three times per year for years 6-20
- Monitoring – Once annually, during late Spring
- Plant protection response – following monitoring as required
- Plant replacement – annual during planting season

7.1.1 Pest animal control

Pest animals may damage or kill plants and their control is essential for both initial establishment and ongoing plant survival. Compensation wetlands and constructed ephemeral wetlands shall be included in the pest animal control as set out in the MP4 Pest Animal Management Plan (Alliance Ecology, 2026).

Regular monitoring of compensation wetlands and constructed ephemeral wetlands must be conducted, following the methods described in the Wetland Monitoring Plan (Bioresearches 2026h). If mammalian herbivory on more than 10% of a planting area, or more than 20% of an individual species, is detected this will trigger adaptive management of pest animal control. This should be responsive to the species of animal pest and the damage being done and may include additional trapping, baiting or shooting, repairing or reinforcing fencing, or installing plant guards or cages around species proving to be particularly palatable. Should this responsive action fail to reduce herbivory more intensive pest animal control must be undertaken within no more than one month.

7.1.2 Weed control

Weeds are environmental pest plants which have the potential to outcompete, smother, kill or otherwise harm native vegetation. Ongoing, regular weed control is essential for compensation planting success. This should follow the methods set out in section 4.1. Should any weeds not specified in this section become problematic within wetlands over the maintenance period (for example by smothering native vegetation) they must be added to the control list and included in weed control going forward.

Ongoing wetland weed control post-planting should be done four times per year (Spring, early and mid-Summer and Autumn) for the first five years after planting and three times per year (Spring, Summer and Autumn) for years 6-20 following planting.

Weed control should follow best practice guidelines and be targeted to individual pest plants, or discrete patches, to prevent spray drift and incidental harm to any surrounding native vegetation. Any person conducting weed control work must have good visual recognition of target weed species, as well as native species and be supervised by a qualified botanist.

Weed control should be conducted to a level where no live adult plants are present. Seedlings must be removed as soon as possible. Weed control must be audited regularly (at least once per year) to check that herbicide has been applied in a targeted manner with no overspraying of surrounding non-target plants and to ensure that all weeds have been detected and properly controlled within planting areas and their buffers. If an audit identifies poor practice or inefficient control this must be addressed and corrected within one month.

7.1.3 Plant protection and replacement

Should monitoring identify that particular species of plant, or planting sites are failing (more than 10% mortality observed, or damage preventing reproduction on 20% or more plants), this shall trigger additional plant protection measures. OGNZL and the Project botanist should be advised and a response agreed upon. Fencing should be checked and repaired if needed, or grazing rates altered. Plant guards or cages may be installed around any species showing high failure rates due to mammalian herbivory. Snail bait may also be applied if slug or snail damage is suspected.

Where monitoring shows that more than 10% of any one species, or planting area has died, this must be replaced with the same species during the following planting season. This must be directed by the Project botanist, who shall have discretion to adjust planting locations and techniques. If failure continues the Project botanist should be consulted to discuss causes of mortality, whether it is appropriate to continue planting this species and alternative replacement species.

7.1.4 Adaptive management

For all maintenance actions, adaptive management should be applied and where best practice methods change, or responses to new challenges are required, these should be incorporated into management regimes on site. This should be guided by expert botanist advice and must be done solely for the purpose of achieving best ecological outcomes. The reason for any change must be documented and communicated with OGNZL and any relevant stakeholders.

7.2 Ephemeral wetland maintenance

Maintenance of ephemeral wetlands must ensure that vegetation remains low and open, with limited competition from exotic vegetation. Many of the indigenous flora adapted to ephemeral wetlands are diminutive and sensitive to competition from exotic weeds, particularly tall grasses. As such, the success of ephemeral wetland restoration is dependent on maintaining these conditions. Grazing (of sheep, not cattle) may be used to keep turf close-cropped.

Maintenance of ephemeral wetlands must involve regular, targeted weed control, using hand removal in the first instance and spot spraying should repeat control be required. Grazing levels should be assessed and any fencing checked to ensure that the intended sheep stock rate is being achieved. All persons involved in ephemeral wetland maintenance must be trained to identify both indigenous ephemeral wetland plants as well as pest plants to avoid damage to sensitive and rare species.

Ephemeral wetland maintenance targets are:

- Exotic species occupy no more than 15% of a wetland
- Targeted invasive weeds are removed to a target of 0% density
- 80% of the wetland vegetation is short turf (less than 15cm tall – noting that some areas may be unvegetated and bare ground is outside this target)
- Hydrological conditions are maintained (i.e. depressions are not filled or opened, unless at direction of Project botanist)

Wetland maintenance should occur four times per year (Spring, early and mid-Summer and Autumn) and records kept of each check and actions undertaken, along with photopoint records.

Should maintenance within this schedule not be sufficient to control pest plant numbers (exotic species taller than 15cm have established over more than 20% of the wetland), this must trigger adaptations to management. This response will probably be unique to each wetland. If weeds exceed this limit the Project botanist must be advised and provide direction on an appropriate response (which may include changes in stock numbers, or weed control frequency increasing).

If adaptive measures are triggered and fencing is altered to allow sheep access to any ephemeral wetland, this should be done in a way that does not open grazing into any other adjacent planted or covenanted areas. Additional rabbit-proof fencing may be required to prevent this.

Where maintenance measures have changed and monitoring shows continued increases in exotic weeds, as well as losses in indigenous species, this must be discussed with the Project botanist and further adaptive responses considered and applied. This may involve reversing management approaches.

Plant protection and replacement within ephemeral wetlands should follow that set out in section 7.1.3. It is essential that the project botanist is informed of any significant plant losses within ephemeral wetlands as soon as possible due to the high proportion of TAR species they will contain, which may require particular response methods.

7.3 Monitoring

Monitoring of compensation wetlands and constructed ephemeral wetlands is set out in the Wetland Maintenance and Monitoring Report (Bioresearches 2026h). This details the monitoring actions, frequency and records required to be kept.

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Oceana Gold (New Zealand) Limited as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk. Babbage/Bioresearches acknowledges that this report will be relied on by a Panel appointed under the Fast Track Approvals Act 2024 and these disclaimers do not prevent that reliance.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate legal advice.

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All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Babbage Consultants Limited.

Reliability of Investigation

Babbage/ Bioresearches has performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

Recommendations and opinions in this report are based on discrete sampling data. The nature and continuity of matrix sampled away from the sampling points are inferred and it must be appreciated that actual conditions could vary from the assumed model.

There is no investigation that is thorough enough to preclude the presence of materials at the site that presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable may in the future become subject to different regulatory standards, which cause them to become unacceptable and require further remediation for this site to be suitable for the existing or proposed land use activities.

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