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Macraes Phase 4 Fast-track

Wetland Management Plan

for: Oceana Gold (New Zealand) Limited

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EXECUTIVE SUMMARY

This Wetland Management and Monitoring Plan (WMMP) has been prepared for OceanaGold (New Zealand) Limited for the Macraes Phase 4 Project (MP4). It provides the framework for managing and monitoring retained natural inland wetlands that may be subject to indirect Project effects, and for monitoring wetland restoration and enhancement undertaken as compensation for residual wetland loss.

The WMMP applies to two principal wetland categories:

- *Impact wetlands* – retained wetlands outside the direct Project footprint that may be exposed to indirect effects associated with changes in hydrology, dust and sediment deposition, water quality, or accidental encroachment and physical disturbance. Approximately 7.08 ha of wetlands are included within this category. Representative Impact wetlands have been selected for monitoring according to the principal effect pathway, with comparable Reference wetlands used to help distinguish Project-related change from natural seasonal and climatic variability.
- *Compensation wetlands* – wetlands identified for restoration and enhancement as part of the MP4 residual-effects strategy. Approximately 13.55 ha of modelled wetland compensation is proposed, with 18 wetlands monitored across Cranky Jims Link, Macraes Central and Murphys' Connection. Monitoring will assess progress toward the intended ecological outcomes and relevant Biodiversity Offset Accounting Model (BOAM)-linked performance measures

Management of Impact wetlands focuses on avoiding or minimising indirect effects through protection and demarcation of wetland areas, management of drainage and surface-water inputs, erosion, sediment and dust controls, and management of discharges through the wider MP4 water-management framework. Monitoring is then used to determine whether these measures remain effective.

Monitoring methods are tailored to the relevant wetland category and effect pathway and include vegetation surveys, wetland condition assessment, wetland extent mapping, hydrological monitoring, dust deposition monitoring and fixed photopoints. Baseline monitoring will establish the reference condition against which subsequent change and restoration progress are assessed. Surface-water quality is monitored through the wider MP4 programme, with relevant information considered where changes in wetland condition may be associated with water quality.

Adaptive-management triggers have been established separately for Impact and Compensation wetlands. For Impact wetlands, trigger exceedances are investigated against baseline and Reference wetland data, climatic and hydrological conditions, and relevant Project activities to determine whether a Project-related effect is likely. Where required, management measures will be implemented and followed by effectiveness monitoring. For Compensation wetlands, triggers are used to identify where restoration and enhancement are not progressing toward the required ecological outcomes and where additional management is necessary.

Overall, this WMMP provides the framework for minimising indirect effects on retained wetlands, identifying and responding to Project-related changes, and assessing whether Compensation wetlands are progressing toward their intended ecological outcomes.

1 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 an assessment of the Project's effects on **wetlands** and, to the extent required, identify any necessary management and operation measures to address any such effects.

This scope of this Wetland Management and Monitoring Plan (WMMP) is to:

- Establish the management and monitoring framework for wetlands associated with the Project
- Provide measures to protect and maintain wetland values
- Establish baseline conditions against which future changes in wetland characteristics
- Identify and respond to Project-related indirect effects on wetlands
- Establish performance measures for wetland condition, ecological values and biodiversity outcomes, including measures linked to the Biodiversity Offset Accounting Model (BOAM), and monitor the effectiveness of wetland restoration and enhancement
- Provide adaptive-management triggers and responses where monitoring identifies a potential decline in wetland condition or where compensation wetlands are not progressing toward their intended ecological outcomes.
- Define reporting requirements, including reporting of monitoring results, trigger exceedances, management responses and progress toward ecological and BOAM-linked outcomes.
- Provide the mechanism for ongoing management throughout the MP4 Project, enabling monitoring results to inform changes to management measures where required.

1.1 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 1-1 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 (Frasers, 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.

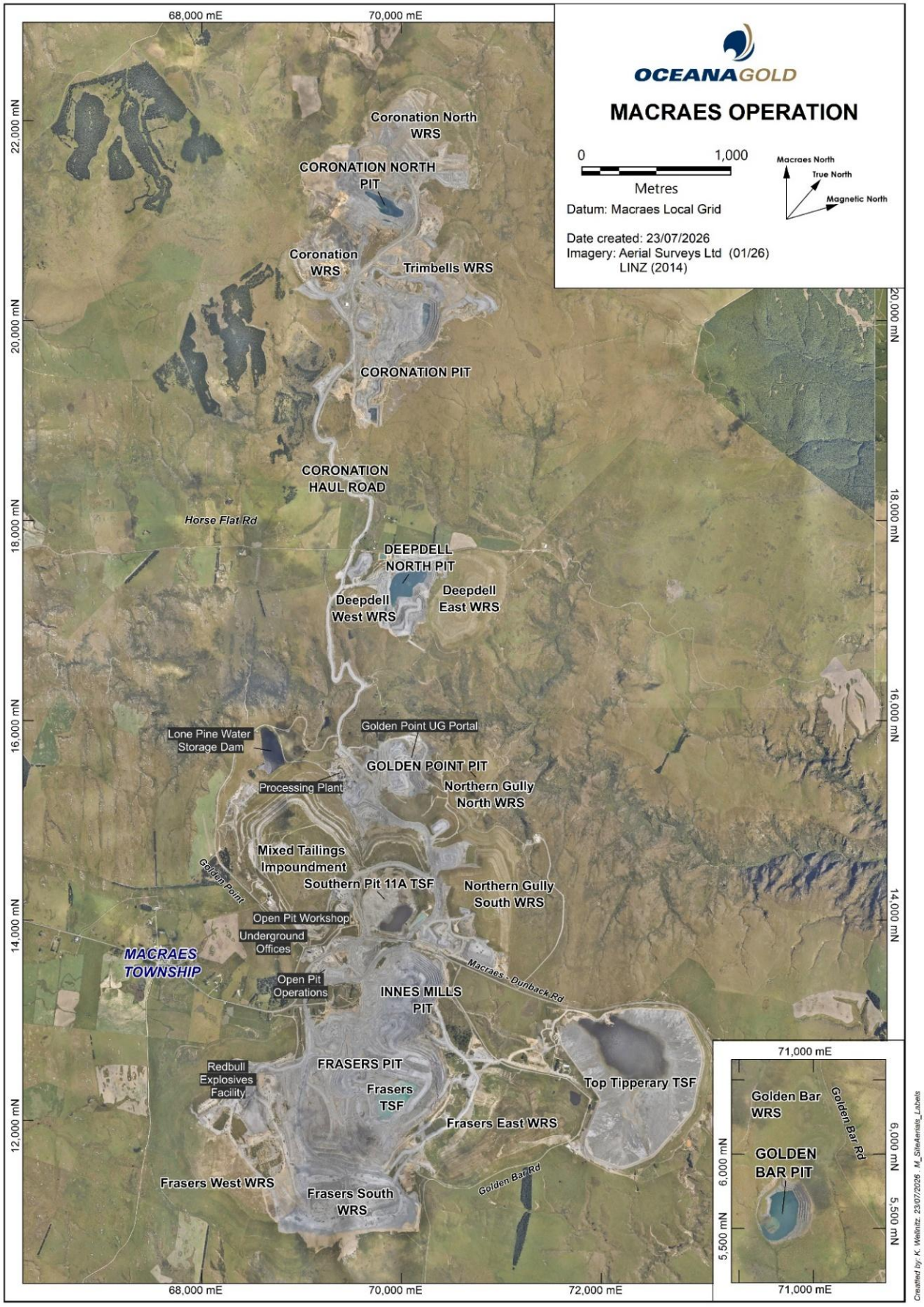

Figure 1-1. Existing site layout at the Macraes Operation (as of July 2026)

1.2 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 1-2 below.

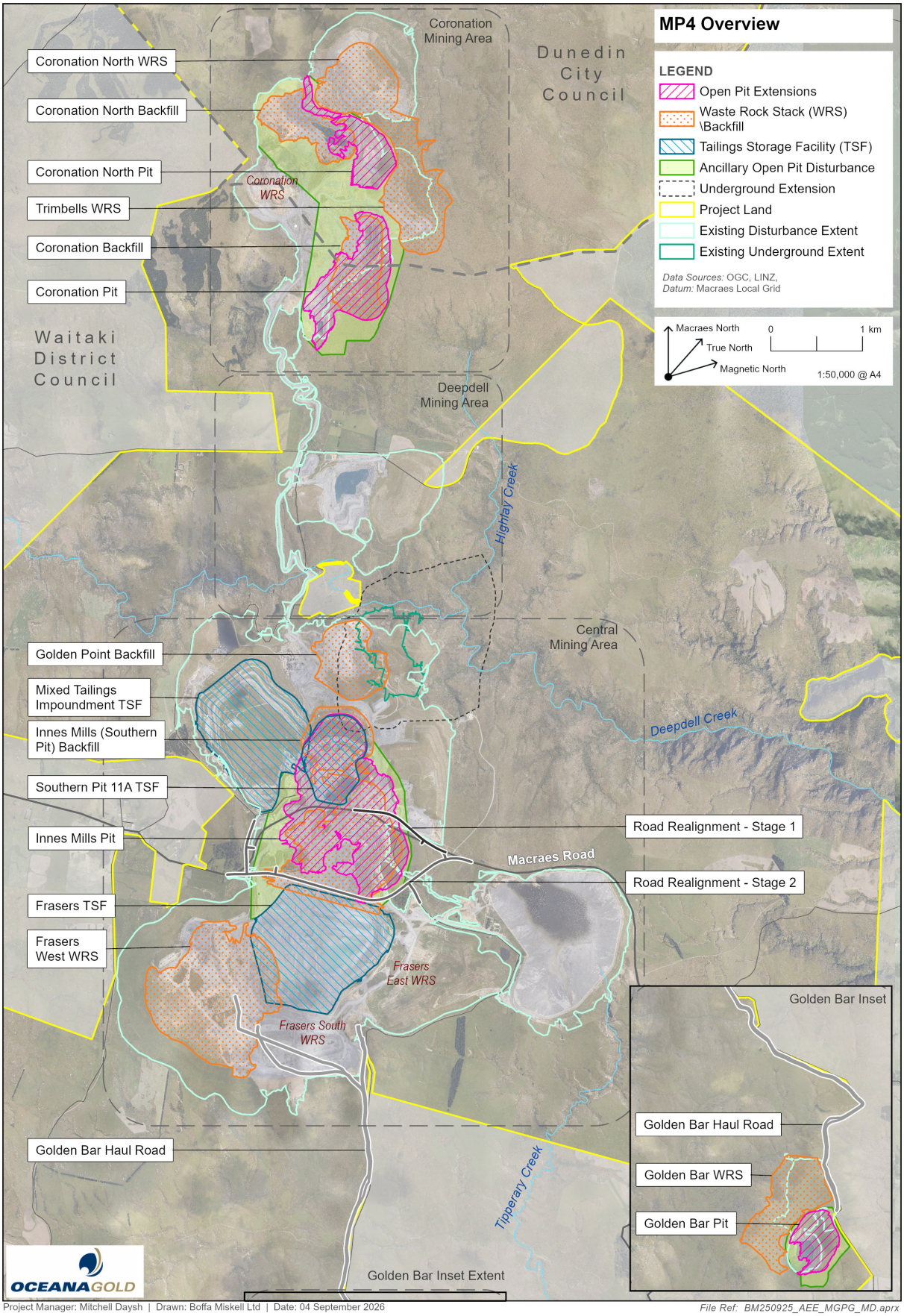

Figure 1-2. MP4 Overview Plan

1.3 Purpose and Scope

The objective of the Wetland Management Plan is to set out the activities, maintenance, monitoring, adaptive management, performance measures and reporting requirements relating to the reference, impact and compensation wetlands as part of the MP4 Project. This supports the protection of wetland values and ensures that wetland characteristics are maintained and achieve the biodiversity compensation values required by the BOAM.

The Wetland Management Plan must include, as a minimum details describing:

a) The nature and location of reference, impact, and compensation wetlands;
b) The monitoring programme including methodologies for assessing and monitoring wetland extent, hydrology, vegetation composition, and overall wetland condition;
c) The legal and physical protection mechanisms;
d) Dust and sedimentation controls;
e) Adaptive management triggers and requirements;
f) Performance measures;
g) The relationship to any other management plans and documents; and
h) Reporting requirements and deliverables for submission to the Consent Authority.

For the purposes of this WMMP, wetlands are grouped into two categories with distinct monitoring requirements:

- Impact wetlands, encompassing an area of approximately 7.08 ha.
    - Retained wetlands outside the direct Project footprint, but within 20 to 100 m, that may be exposed to indirect effects. Impact wetlands are classified as hydrology-focused or dust-focused according to the principal effect pathway, with results interpreted alongside suitable Reference wetlands.
- Compensation wetlands, encompassing an area of approximately 13.55 ha of modelled wetland compensation.
    - Wetlands selected for restoration, enhancement, protection or other compensation actions intended to address residual adverse effects on wetland values.

The proposed ongoing management and monitoring will provide a basis for identifying trends, assessing the effectiveness of management actions, and determining whether adaptive management responses are required. This approach is consistent with the MP4 residual effects framework, which identifies the need for performance thresholds, monitoring methodologies, reporting requirements, and adaptive management responses.

The WMMP is intended to protect and maintain wetland values and characteristics, manage potential Project-related effects, and ensure that Compensation wetlands achieve the intended ecological outcomes and Biodiversity Offset Accounting Model (BOAM)-linked performance measures relied upon in the residual-effects assessment.

This WMMP should be read in collaboration with the Ecological Impact Assessment, the Residual Effects Analysis: Wetlands, and Residual Effects Analysis Report: Wetland (Table 1). Collectively, these documents set out how biodiversity effects associated with the Project will be assessed, managed, and monitored,

including through habitat restoration, revegetation, pest plant and animal control, and other measures required to achieve the intended ecological outcomes.

Table 1: Ecology documents prepared for the proposed Macraes Phase 4 Project. The current document is 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 SITE ECOLOGICAL CONTEXT

The MP4 Project is located near Macraes township in inland Otago, within the Macraes Ecological District. The wider Project area occurs within a highly modified upland landscape shaped by long-term pastoral land use, mining, burning, cultivation, oversowing and fertiliser application. Historically, the Macraes Ecological District is understood to have supported montane short tussockland grading into subalpine tall tussockland, together with mixed hardwood and podocarp forest, kānuka forest and Coprosma–flax scrub (Bibby, 1997).

Within this modified landscape, natural inland wetlands remain as discrete ecological features within valley floors, seepage zones, riparian margins, poorly drained depressions and ephemeral basin systems. These wetlands contribute substantially to local ecological diversity because they support hydrological gradients, wetland plant communities and habitat for Threatened and At Risk (TAR) species. Ephemeral wetlands are of particular ecological importance, as they are known to support several distinctive and specialised turf and herb-field vegetation which are adapted to seasonal wetting and drying cycles, including some Threatened At-Risk (TAR) species (Johnson & Rogers, 2003).

Natural inland wetlands within and adjacent to the MP4 Project area include sedgeland, freshwater herbaceous wetland, seepage wetland, shrubland wetland and ephemeral wetland communities (Bioresearches, 2026). These wetlands vary in extent, condition and ecological value. The general condition of wetlands in the MP4 landscape reflects both their natural setting and the long history of surrounding land-use modification. Key pressures include stock access, grazing, pugging, soil compaction, exotic plant dominance, weed invasion, altered drainage, edge effects and disturbance associated with mining and pastoral land use. In this context, even small or modified wetlands may retain ecological importance where they support wetland hydrology, indigenous wetland vegetation, TAR flora, or representative examples of naturally uncommon wetland systems (Lee & Johnson, 2024).

Descriptions of the Impact wetlands can be found in the Assessment of Vegetation and Wetland Values (Whirika, 2026). Potential effects to those wetlands are described in the Ecological Impact Assessment (Bioresearches, 2026f).

3 SUMMARY OF INDIRECT EFFECTS

The EcIA adopted a "zone of influence", comprising the Project footprint and a 100-metre buffer to account for indirect effects associated with MP4. For the purposes of this WMMP, these are referred to as "*Impact wetlands*".

Impact wetlands will not be directly reclaimed or excavated but may be affected by changes in hydrology, dust or sediment deposition, water quality, or accidental encroachment and physical disturbance. Wetlands within 20 m of mining operations, and those assessed as being at high risk of groundwater drawdown, have been conservatively treated as lost and incorporated into the residual-effects assessment and compensation quantum. These wetlands are therefore excluded from further consideration as Impact wetlands under this WMMP. Wetlands adjacent to haul roads are treated separately where they remain intact and may be exposed to indirect effects such as dust deposition.

Impact wetlands encompass approximately 7.08 ha, including approximately 3.72 ha of ephemeral wetland. Ephemeral wetlands are particularly sensitive to hydrological change because their ecological character depends on seasonal wetting and drying cycles. Prolonged drying may reduce germination and recruitment of annual wetland plants and increase invasion by dryland species, while sustained increases in water levels may alter vegetation composition and habitat diversity.

Figure 2.1 presents an overview of the Impact wetlands identified within 100 m of the MP4 Project Area. The principal indirect effects are summarised in Section 3.1.5, with further information provided in the EcIA.

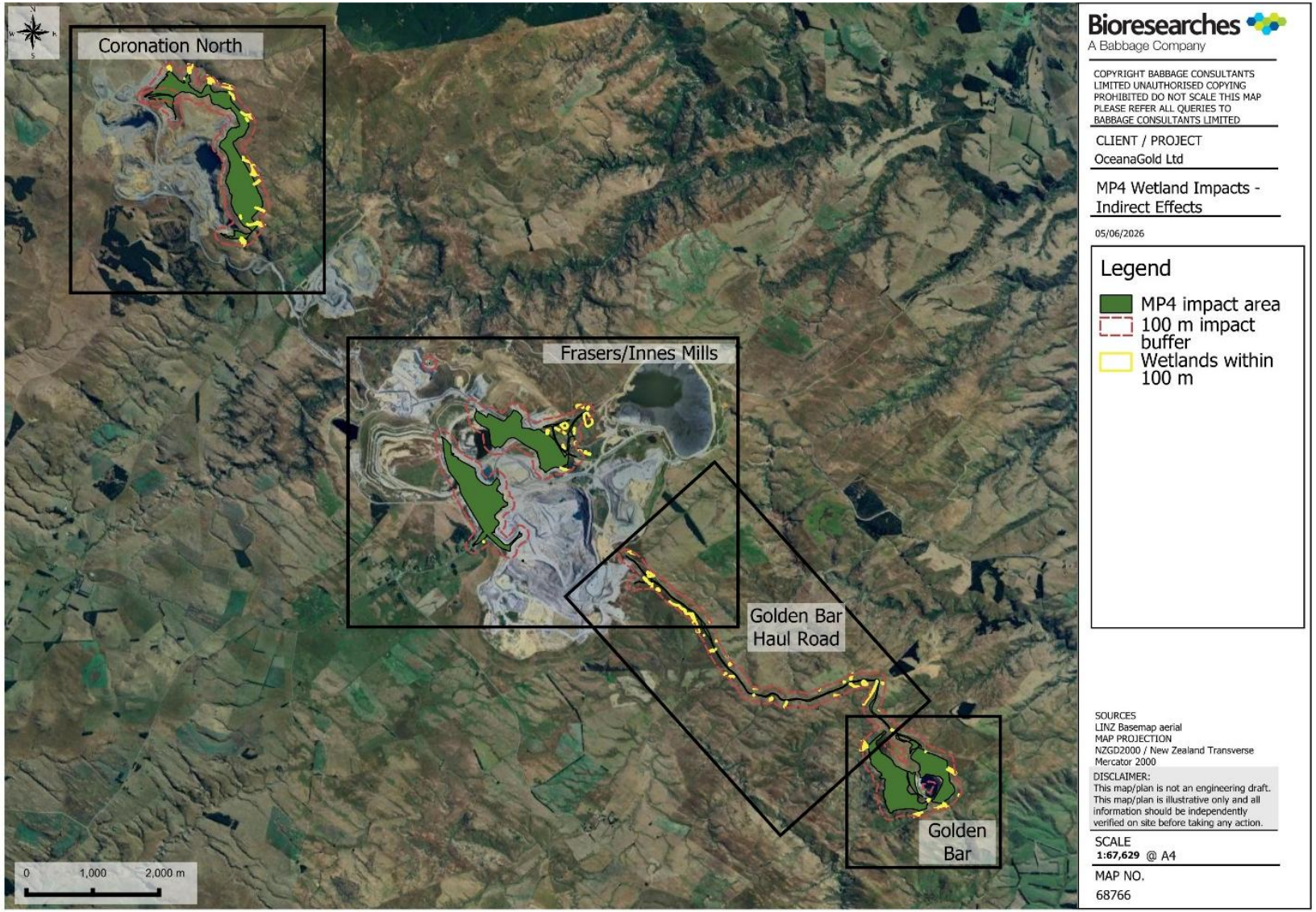

Figure 3-1: Overview of wetlands with the potential for indirect effects within 100 m of the Project area.

3.1 Indirect effects and management

This section describes the principal indirect effects that may occur to retained wetlands as a result of MP4 and the management measures to be implemented prior to and during works to avoid or minimise those effects, where applicable. These measures are intended to reduce the likelihood and severity of effects associated with changes in hydrology, water quality, dust and sediment deposition, and accidental encroachment or physical disturbance.

Monitoring of Impact wetlands will be undertaken in accordance with Section 5 to assess whether these measures are effective and to identify any emerging Project-related effects. Where monitoring indicates that an adverse Project-related effect is occurring, the adaptive-management triggers and response measures set out in Section 6 will apply.

3.1.1 Dewatering and drainage

Earthworks and underground mine expansion have the potential to alter the surface water catchments and groundwater interactions that support Impact wetlands located outside the direct Project footprint. These changes may reduce wetland hydrology through:

- Reduced overland flows and surface water flows due to catchment alteration and surface water diversion, resulting in the complete or partial drainage of wetlands; or
- Loss of interaction with the water table through groundwater drawdown and reduced height of the groundwater table, resulting in the complete or partial dewatering of wetlands.

For the purpose of this WMMP, drainage refers to the loss of surface water interaction to wetlands and dewatering refers to the loss of groundwater interaction to wetlands.

Disconnection from surface water and groundwater can dry wetland soils and impair hydrological functioning, leading to less permanent or seasonal saturation and a shift from hydric wetland vegetation to more terrestrial plant communities. Prolonged drying can disrupt seasonal vegetation cycles, reduce seed viability, and increase the risk of transition to a fully terrestrial ecosystem. Reduced water levels can also place wetland vegetation under additional stress, making it more vulnerable to disease and other pressures such as climate change, and increasing the likelihood of wetland condition decline or loss.

Wetlands assessed as being at high risk of dewatering have been conservatively treated as lost, or reclaimed, and are incorporated in the residual effects analysis, and these wetlands are not considered further in this plan.

Wetlands assessed as being at low or moderate risk remain within the retained wetland framework and will be subject to risk-based monitoring and adaptive management under the hydrology pathway of this WMMP, targeting representative wetlands. The spatial relationship between modelled groundwater drawdown and wetlands within 100 m of the Project works at Coronation North and Golden Bar is shown in Figure 3-2.

Potential dewatering of wetland extent is conservatively assessed to be:

- Moderate risk potential of 0.38 ha of wetland at Coronation; and
- Moderate risk potential 0.39 ha of wetland at Golden Bar.
- Low risk potential of 0.36 ha of wetland at Coronation

Where monitoring identifies that Project-related drainage, dewatering or altered surface-water inputs are adversely affecting an Impact wetland, hydrological management measures will be implemented to maintain or restore wetland hydrology within the expected seasonal range. The specific response will be determined in accordance with the hydrological trigger and management framework set out in Section 6.1.1.

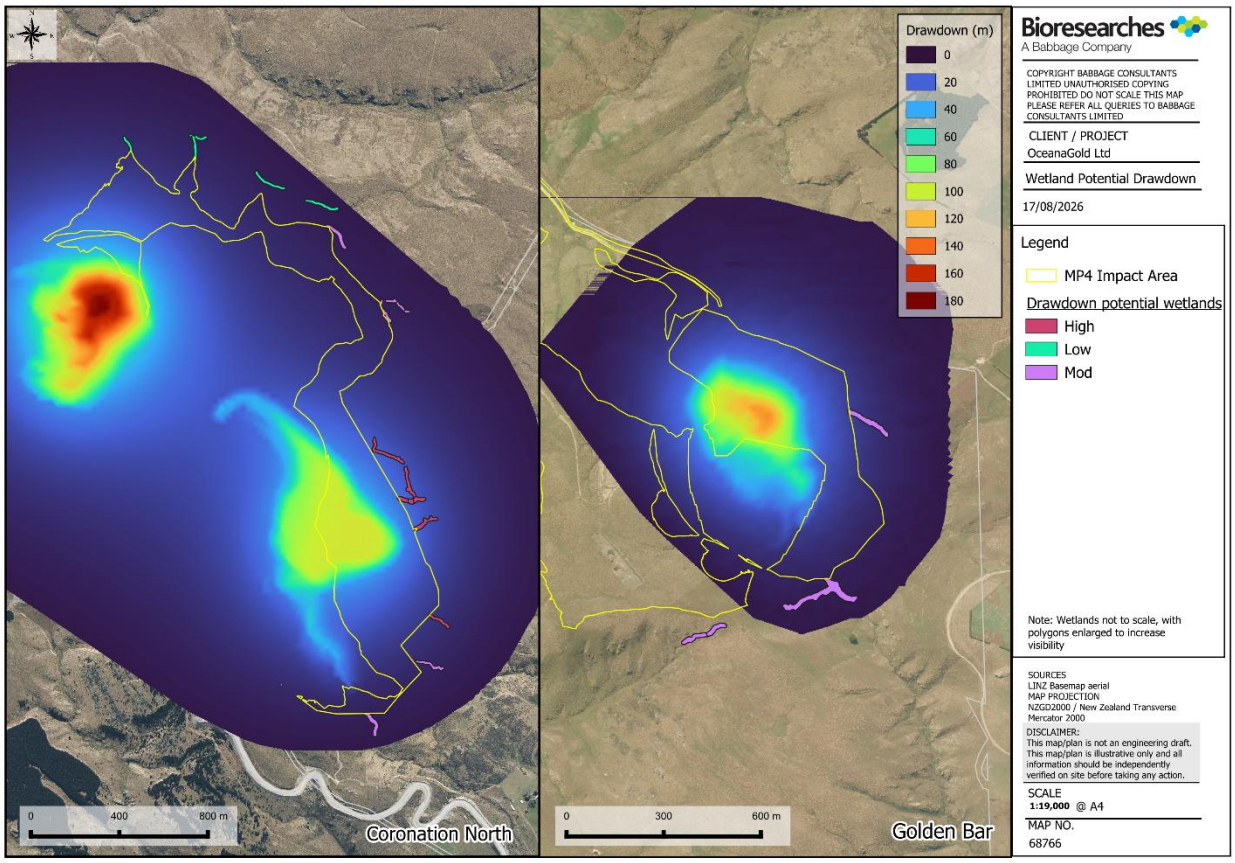

Figure 3-2: Modelled drawdown (GHD, 2026) at Coronation North (left; assuming a total of 10 years drawdown) and Golden Bar (right; assuming a total of 6 years drawdown), relative to the wetlands within 100 m of the works area.

3.1.2 Catchment increase

Earthworks and mine expansion have the potential to alter the overall contributing catchment to of Impact wetlands outside of the direct Project footprint by redirecting additional surface water toward them. This may increase wetland water levels, the duration or frequency of saturation, and, in some cases, overall wetland extent as adjoining terrestrial areas become more regularly inundated or waterlogged.

This increased hydrology may result in shifts in ecosystem classification within the wetlands, potentially reducing habitat complexity and mosaics throughout individual wetlands. For the purpose of this WMMP, mosaics refer to the shifts in vegetation structure and pattern, and hydrological varieties, throughout the wider wetland body, i.e. herbaceous to sedgeland and/or saturated soils to open water.

Increases in water depth within the wetland may result in the submersion of “facultative” (such as *Ranunculus foliosus*) and “facultative wetland” (such as *Schoneus pauciflorus*) plants which are adapted to slightly drier conditions or partial saturation, rather than the open water and saturated conditions “obligate” wetland plants, such as *Carex secta*, inhabit. A sustained increase in water levels may therefore favour wetter-affinity species and reduce the abundance of species adapted to shallower or more

seasonally saturated conditions, potentially changing the existing wetland community and habitat structure.

Prior to works commencing, the relevant surface-water management and drainage design will be reviewed by the Project ecologist and Project hydrologist to confirm that wetland catchments are maintained and that substantial increases in runoff to retained Impact wetlands are avoided.

Where monitoring identifies a Project-related increase in wetland hydrology, the adaptive management framework in Section 6.1.1 will apply.

3.1.3 Sedimentation and dust

Works within the Project Area can generate sediment and dust that could adversely affect adjacent Impact wetlands and downstream receiving environments. Sediment mobilised from earthworks, together with deposited dust, may accumulate within wetlands, smother vegetation, reduce the depth of open-water pools and channels, alter substrate conditions, and degrade water quality. Impact wetlands located at the edge of the Project footprint, including wetlands where upper portions are to be reclaimed, may also provide pathways for the transport of fine sediment and dust into downstream reaches and receiving catchments.

These potential effects will be managed through the implementation and maintenance of appropriate erosion and sediment controls and dust-suppression measures. An Erosion and Sediment Control Plan, Dust Management Plan, and an Air Quality Management Plan (AQMP) have been prepared by suitably qualified and experienced practitioners to set out the controls, inspection requirements, monitoring procedures and response measures required to minimise the generation, mobilisation and deposition of sediment and dust.

This WMMP complements those plans by providing wetland-specific monitoring and adaptive-management requirements to assess whether the controls are effectively protecting Impact wetlands, targeting a dust-specific pathway to address the site conditions.

3.1.4 Accidental Encroachment and Physical Disturbance

Wetlands are sensitive to infilling, soil compaction from humans and vehicles. During the construction and active mining operations of MP4, the surrounding wetlands are at risk of being damaged by vehicles or construction materials.

Wetlands located within 20 m of the direct Project footprint (excluding Golden Bar Haul Road) have been conservatively treated as lost or reclaimed for the purposes of the EcIA and residual-effects assessment and are incorporated into the wetland compensation quantum. However, where wetland habitat within this area is not physically reclaimed, measures will still be implemented to avoid unnecessary disturbance.

Fencing[1] or demarcation around the wetlands must be constructed, particularly those within proximity to the footprint (i.e. 20 m for non-ephemeral wetlands, and 50 m for ephemeral wetlands). This fencing is for physical protection and demarcation of the wetland from Project activities and does not require a change to existing grazing management. Appendix A provides a list of wetlands, their location and size. The demarcation and fencing of wetlands are to be established and maintained for the duration of mining activities or construction activities including closure and rehabilitation.

[1] Fencing may be constructed via waratahs or pig-tail fencing with bunding, rope or flagging tape to ensure wetland boundaries are visible.

Fencing or demarcation of wetlands along the Golden Bar Haulage Road will be targeted to the areas where wetlands are most at risk:

- On the western side of the buffer, fencing installed where wetlands occur close to the haulage road; and
- On the eastern side, fencing limited to the area between the Golden Bar Haul Road and Golden Bar Road.

This approach reflects the existing constraint created by Golden Bar Road, which prevents the haulage road from extending eastward into several wetlands within the eastern buffer.

Where fencing or demarcation is damaged, displaced or breached, it will be reinstated within two working days. Where accidental encroachment or physical disturbance has occurred, the Project ecologist will be notified within one working day and provided with sufficient information to assess the nature and extent of the disturbance and determine the required remediation.

Remediation will be proportionate to the disturbance and may include removal of deposited material, reinstatement of wetland boundaries or surface-water pathways, relief of localised compaction where this can be achieved without causing further damage, replacement planting, weed control and follow-up monitoring.

Required remediation will be implemented as soon as possible following ecological assessment and within the timeframe specified by the Project ecologist. Where the affected wetland has already been treated as loss within the residual-effects assessment, remediation will focus on avoiding or reducing any additional unnecessary damage to the remaining habitat. Where disturbance extends beyond the area already accounted for as loss, or results in an additional residual effect that cannot be adequately remediated, the effect will be assessed to determine whether further biodiversity compensation is required.

3.1.5 Water quality effects

Project-related discharges, seepage, spills or changes in surface-water flow have the potential to alter water quality where they enter or influence Impact wetlands or their contributing catchments. Potential changes may include increased suspended sediment, nutrients, metals or other contaminants, or changes in pH and other physicochemical conditions.

Changes in water quality may affect:

- wetland vegetation composition and condition;
- plant growth, germination and survival;
- wetland soils and sediment chemistry;
- aquatic and semi-aquatic habitat;
- nutrient and sediment dynamics; and
- overall wetland ecological condition.

To manage water quality within wetlands, Project discharge points will be located outside wetland catchments where necessary to avoid adverse effects. Where discharge to a wetland catchment is appropriate, including where treated or post-settlement water contributes to maintaining wetland hydrology, the discharge will be managed so that water quality does not degrade existing wetland values. Treatment measures, such as settlement ponds, will be implemented where required to ensure discharge concentrations do not cause adverse effects in the receiving environment.

Water-quality discharge limits are detailed in the Surface Water Quality Compliance Framework (Viridis, 2026). Surface-water quality and ecology is monitored through the wider Macrae's operations and is therefore not duplicated under this WMMP. Relevant water-quality data will be made available to the Project ecologist and considered where Impact wetland monitoring identifies an adverse change that may be associated with water quality.

The review will consider relevant water-quality trends, repeated or acute exceedances, non-compliance events, operational incidents and, where available, control-site data to help distinguish Project-related effects from natural or wider catchment variability. Relevant findings will be incorporated into the wetland monitoring report where they assist in determining the likely cause or significance of the observed change.

4 MONITORING SITES

4.1 Impact and Reference Wetlands

Impact wetlands are natural inland wetlands located outside the direct works footprint but within the potential zone of indirect effects associated with MP4 works. These wetlands will not be directly reclaimed or excavated as part of MP4; however, they may be affected by changes in surface-water inputs, groundwater levels, dust or sediment deposition, water quality, or vegetation composition.

Impact wetlands will be separated into two monitoring categories based on the relevant potential effect pathway.

- Hydrology Impact wetlands, selected where groundwater drawdown is expected to present low to moderate risk at: the open pit extensions at Golden Bar, Coronation, and Coronation North.
- Dust Impact wetlands, selected where wetlands are located within 20 m of haul roads and are therefore more exposed to dust deposition, predominantly along the Golden Bar Haul Road.

Sixteen representative Impact wetlands have been selected for monitoring, including eight Dust Impact wetlands and eight Hydrology Impact wetlands. The Dust Impact wetlands comprise six adjacent to the Golden Bar Haul Road and two near Macraes Central, while the Hydrology Impact wetlands comprise three at Golden Bar and five at Coronation North.

At least one reference wetland per impact area and relative catchment[1] is to be selected within local, unaffected catchments to provide a control for interpreting monitoring results. These wetlands are intended to be broadly comparable to the Impact wetlands in wetland type, vegetation composition, hydrology and landscape setting, and will be selected in collaboration with OGL, at the time of establishing baseline assessments and before works commence.

Maps of the Impact Wetlands selected for monitoring are provided in Figure 4-1 and Figure 4-2.

[1] For example, works required at Coronation will impact wetlands within both the Mare Burn and Deepdell Creek catchments; therefore, two reference wetlands will be selected (i.e. one within each catchment).

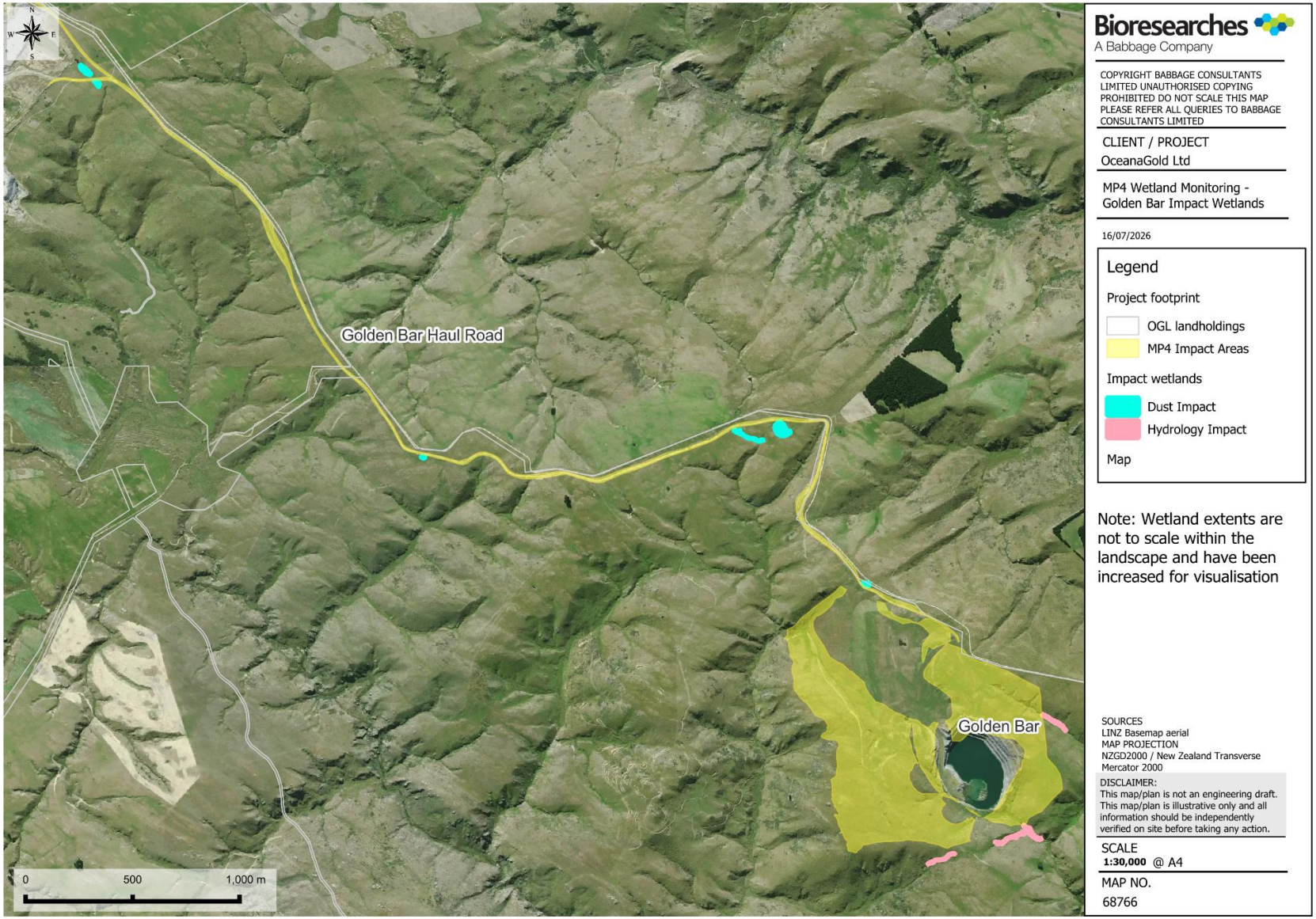

Figure 4-1: Golden Bar Impact wetlands selected for dust and hydrology monitoring

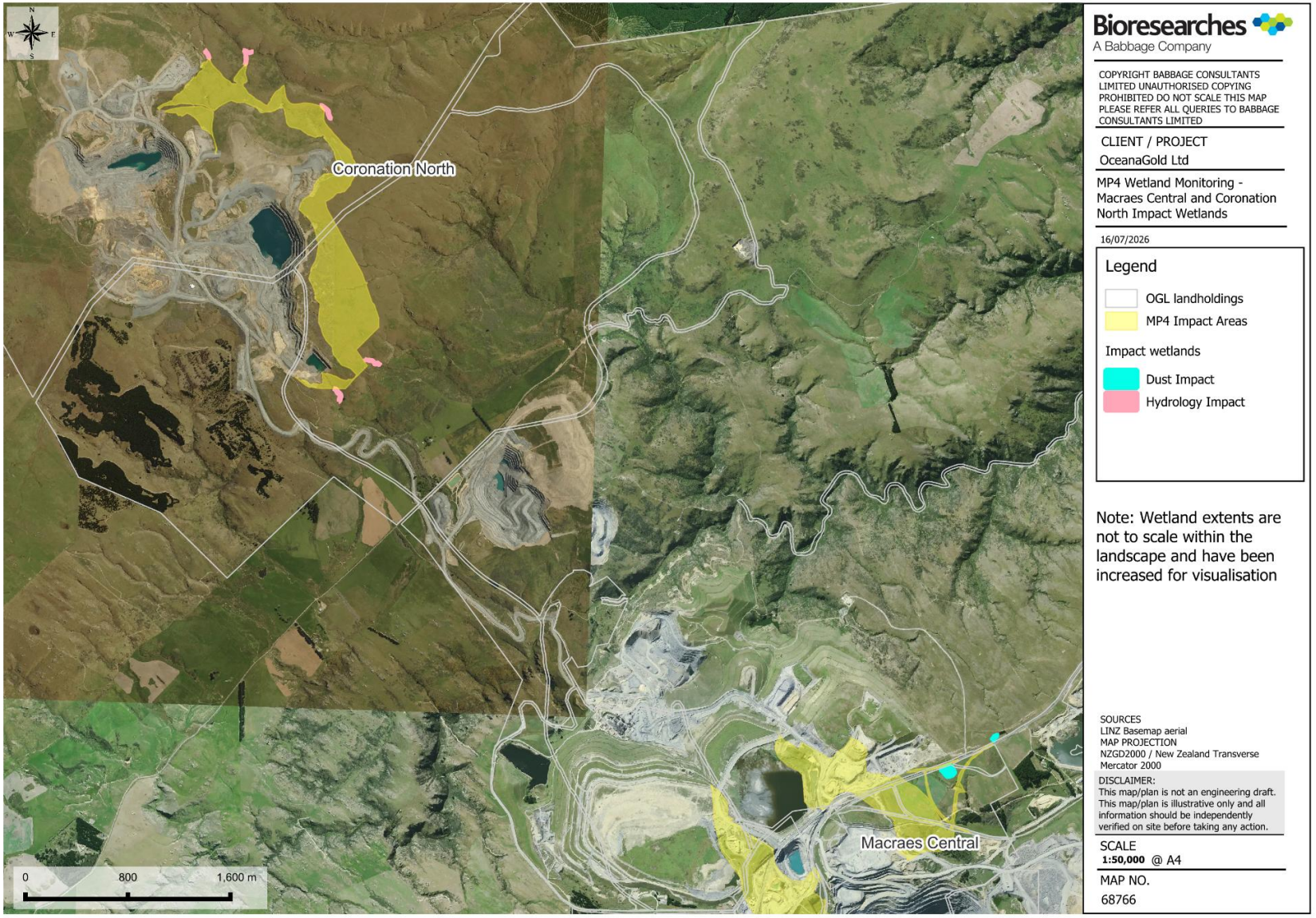

Figure 4-2: Macraes Central and Coronation North Impact Wetlands selected for dust and hydrology monitoring

4.2 Compensation wetlands

Compensation wetlands have been identified through the MP4 wetland residual effects management strategy as locations for restoration and enhancement to address residual wetland loss, as detailed in the Residual Effects Analysis: wetlands (Bioresearches, 2026m). This approach is consistent with the NPS-FM direction to protect the values of natural inland wetlands and promote their restoration. The detailed design and implementation of wetland restoration is addressed separately in the Wetland Restoration Plan (Bioresearches, 2026o).

Monitoring will assess whether these wetlands are progressing toward the intended ecological outcomes and relevant BOAM-linked performance measures, and whether adaptive management is required. The specific performance attributes, triggers and adaptive-management responses are set out in Section 6.2.

A total of 18 modelled Compensation wetlands will be monitored across Murphys' Connection, Cranky Jims Link and Macraes Central, comprising three, nine and six wetlands respectively.

The relevant areas are displayed in Figure 4-3, with the Compensation wetlands subjected to monitoring included in Figure 4-4 to Figure 4-6.

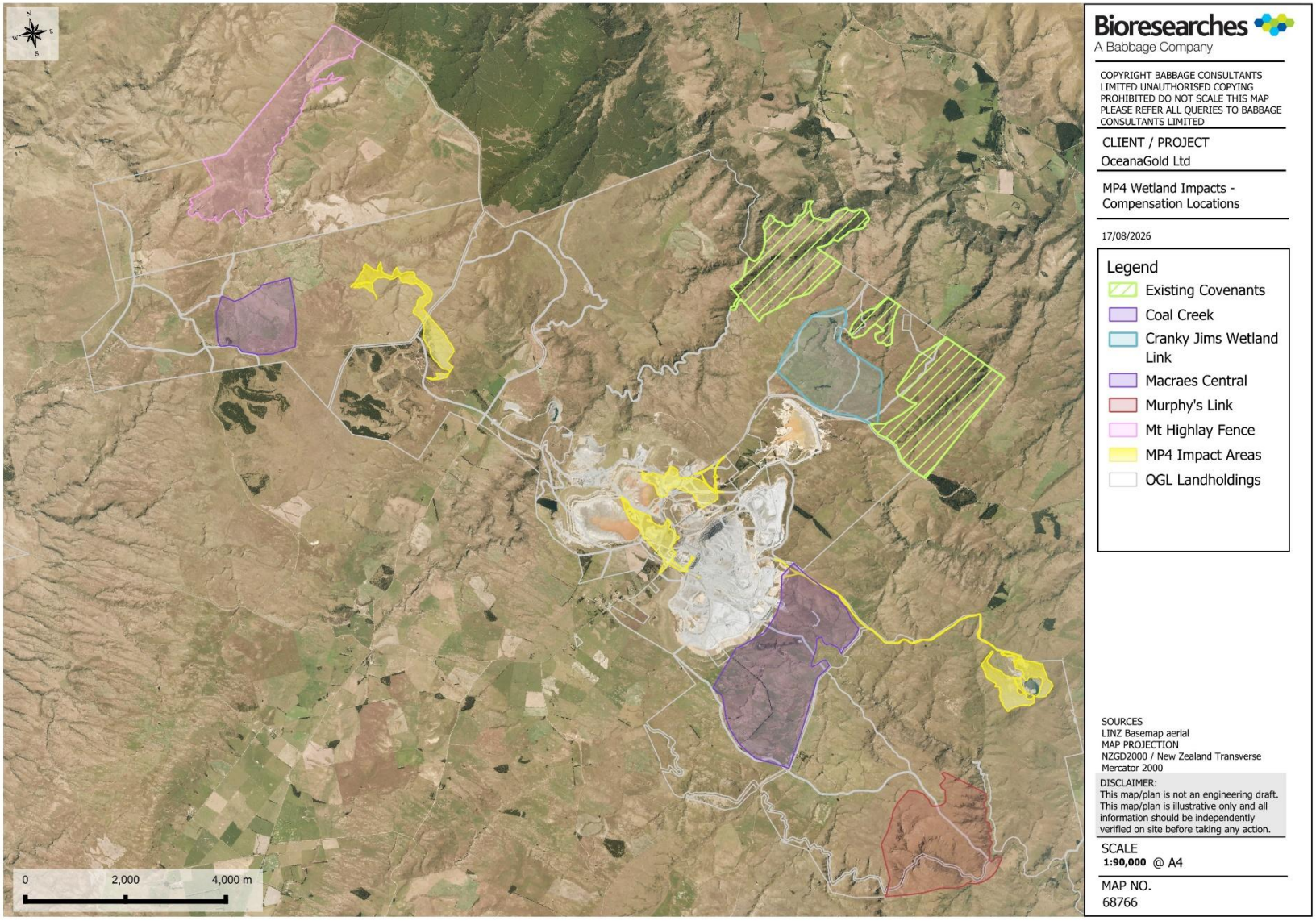

Figure 4-3: Locations of areas for wetland compensation

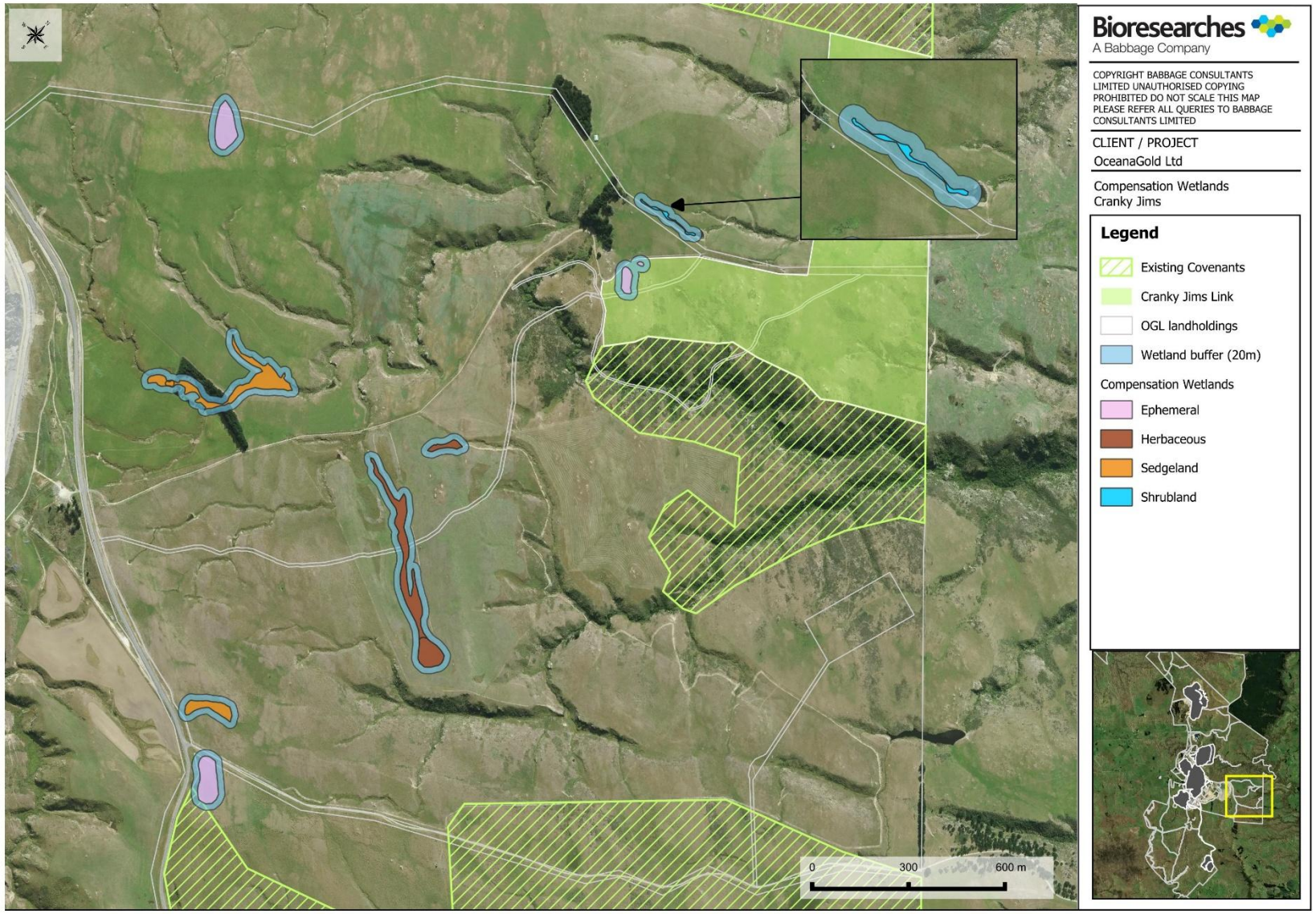

Figure 4-4: Compensation wetlands in Cranky Jims Connection

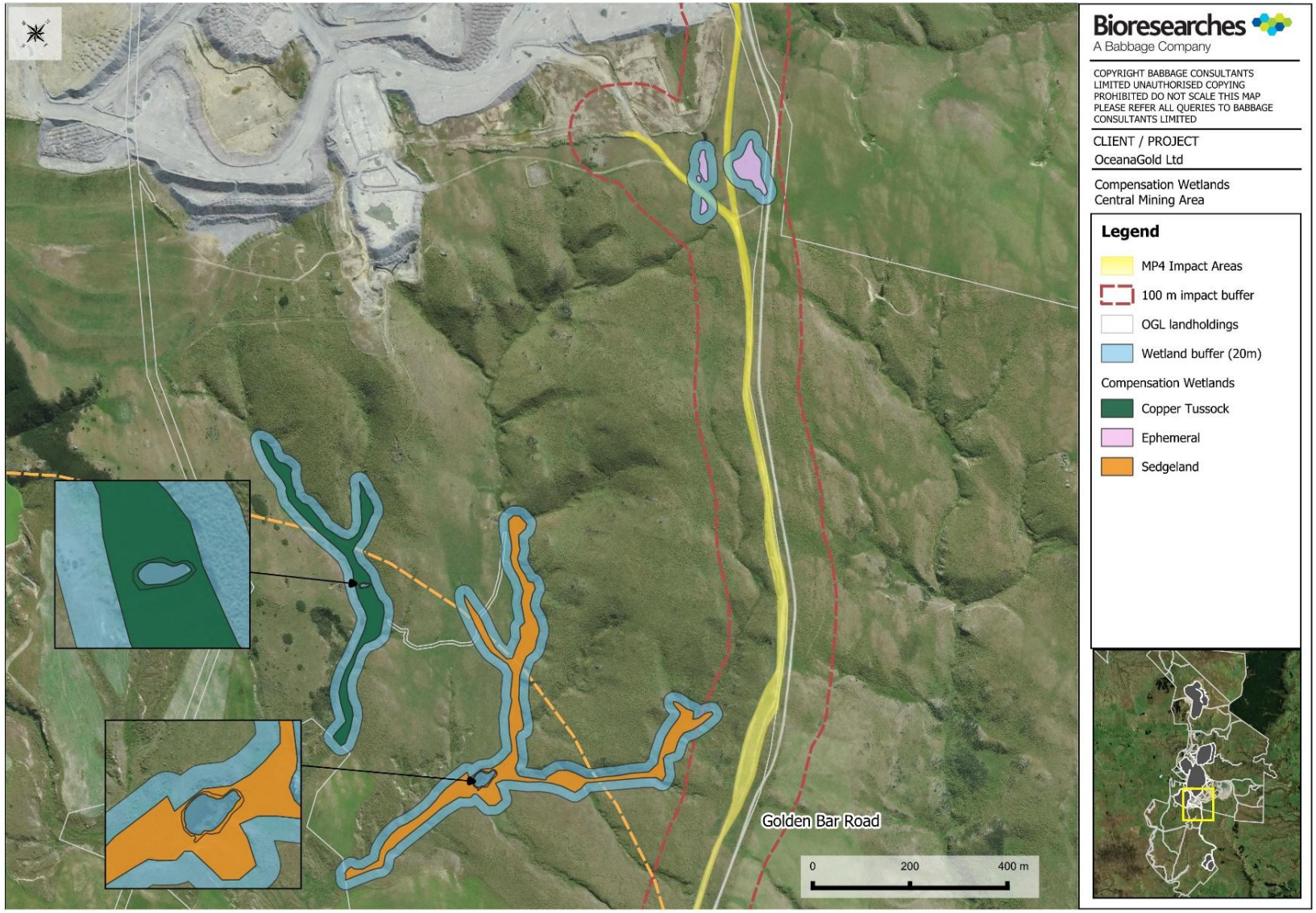

Figure 4-5: Compensation wetlands in Macraes Central

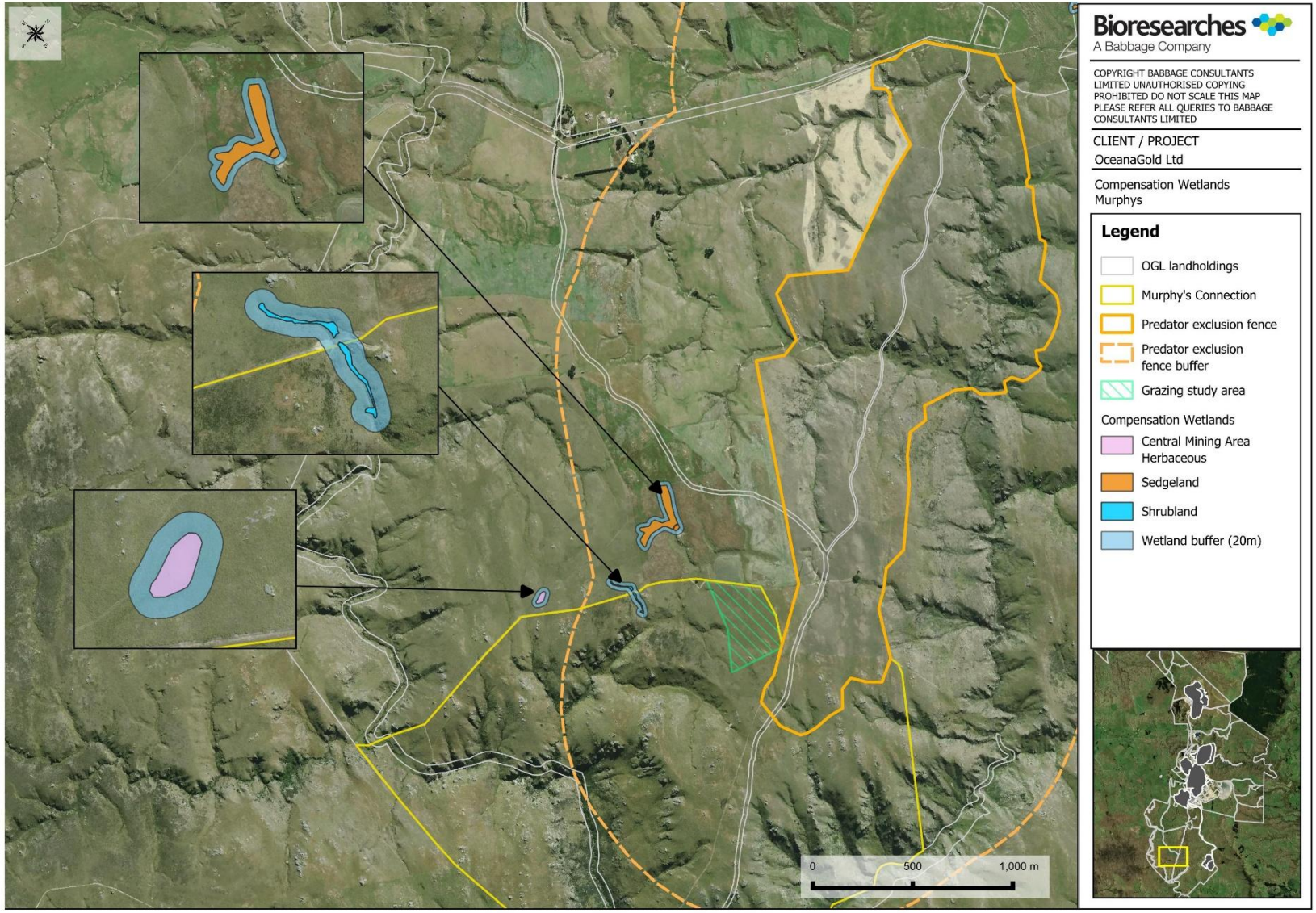

Figure 4-6: Compensation wetlands in Murphy's Connection

5 METHODOLOGY

Monitoring frequency and components will vary by wetland category and the relevant monitoring purpose, as summarised in Table 2, and will be on-going for the duration of the consent. Where seasonal ecological monitoring is required, surveys will be undertaken near the middle of the relevant season to improve consistency and comparability between monitoring rounds.

The monitoring approach is generally in accordance with the wetland condition framework developed by Clarkson et al. (2004), which uses wetland-wide indicators and plot-based data to assess changes in wetland condition over time. The approach is recommended by the Ministry for the Environment and has been adapted for the Macraes context.

Table 2: Summary of monitoring frequency and components for each wetland category

Wetland Category	Purpose	Site visit	Monitoring components
Impact	Dust	Monthly	Dust deposition
	Hydrology	Seasonally for the first five years, then bi-annually for duration of consent	Wetland extent Wetland condition assessment Vegetation surveys Hydrology Photo-points
Reference	-	Seasonally for the first five years, then bi-annually for duration of consent	Dust deposition Wetland extent Wetland condition assessment Vegetation surveys Hydrology Photo-points
Compensation	-	Annually (Spring)	Wetland condition assessment Vegetation surveys Photo-points

5.1 Wetland extent

Wetland extent monitoring will be undertaken by a suitably qualified ecologist, or under the guidance of a suitably qualified environmental practitioner (SQEP).

Where wetland margins are accessible, the wetland edge will be walked and recorded using a handheld GPS, with boundaries subsequently digitised and mapped in GIS. Where wetland margins are inaccessible, the wetland boundary will be interpreted using a combination of field observations, contour data and high-quality aerial imagery. Any assumptions or limitations associated with wetland boundary mapping will be recorded.

5.2 Wetland condition assessment

A Wetland Record Sheet will be completed for relevant monitored wetlands (i.e. hydrology pathway Impact, Reference, and Compensation wetlands) in general accordance with Clarkson et al. (2004), with an exemplar record sheet included in Appendix A. This should be done by a suitably qualified ecologist, or under the guidance of a SQEP.

The record sheet will be used to assess whole-wetland condition, including hydrological integrity, physicochemical condition, ecosystem intactness, browsing or animal disturbance, and dominance of

native plants. The associated pressure assessment will also be completed to record catchment hydrology modification, water quality pressures, animal access, undesirable plant species and introduced vegetation in the surrounding catchment.

5.3 Vegetation surveys

Vegetation surveys will be undertaken using permanent vegetation plots established within each monitored wetland, and in general accordance with Clarkson et al (2004). The purpose of the plots is to provide a repeatable measure of vegetation composition, structure and condition over time, with an exemplar of the associated Wetland Plot Sheet included in Appendix C.

Each permanent plot will be 2 m × 2 m, with the location recorded using GPS coordinates. Plots will be permanently marked with a stake at each of the corners to ensure that the same area is reassessed during each monitoring event. The stakes will be retained for the entirety of the monitoring period and labelled to ensure data is recorded against the correct location. Plot locations will be confirmed during baseline monitoring and will vary depending on whether the wetland is being monitored as an Impact (see Section 5.3.1) or Compensation wetland (see Section 5.3.2).

All plant species present within each plot will be identified and assigned to the relevant vegetation layer, including canopy, subcanopy and groundcover. The percentage cover of each species will be recorded, alongside the height of tallest individual of each subcanopy or canopy forming species based on foliage. Whilst not a biodiversity attribute prescribed in the BOAM, vegetation height is an indicator for indigenous plant growth and therefore, establishment and health. Any plant species in the vicinity that are growing in the same vegetation type (or zone) and were not encountered within the plot will be noted, as well as any other notable species (e.g., TAR species) observed within the area, and their locations marked with a GPS point. Appendix D provides the full planting palette for the Compensation Wetlands, including TAR species, with mature heights listed for sub-canopy and canopy forming species.

Plot indicator scores and condition indices will be calculated based on the vegetation present. However, these scores are primarily influenced by native and exotic species cover and may not fully detect hydrological change where one native wetland species is replaced by another native species with lower wetland affinity. To address this, dominance and prevalence tests will also be applied using the New Zealand Wetland Plant Indicator Status Ratings. These tests will provide a quantitative measure of wetland-affinity and assist in detecting shifts from obligate or facultative wetland species toward species more typical of drier conditions.

5.3.1 Vegetation survey plot locations for impact and reference wetlands

For relevant Impact wetlands (i.e. hydrological pathways) and Reference wetlands, plots will be positioned to detect change at both the wetland margin and within the wetland interior. Where wetland size and morphology allow, two transects will be established perpendicular to the mapped wetland boundary on opposite sides of the wetland.

Each transect will comprise either:

- two adjacent plots: one outside and one inside the wetland boundary; or
- four adjacent plots: two outside and two inside the wetland boundary.

The number of plots used will depend on wetland size, shape, access and vegetation pattern. Up to eight margin plots will therefore be established per wetland where practicable (Figure 5-1). This will assist in

detecting wetland contraction, expansion or vegetation change at the margin. Additional interior plots may be established where required to represent the main wetland vegetation communities present.

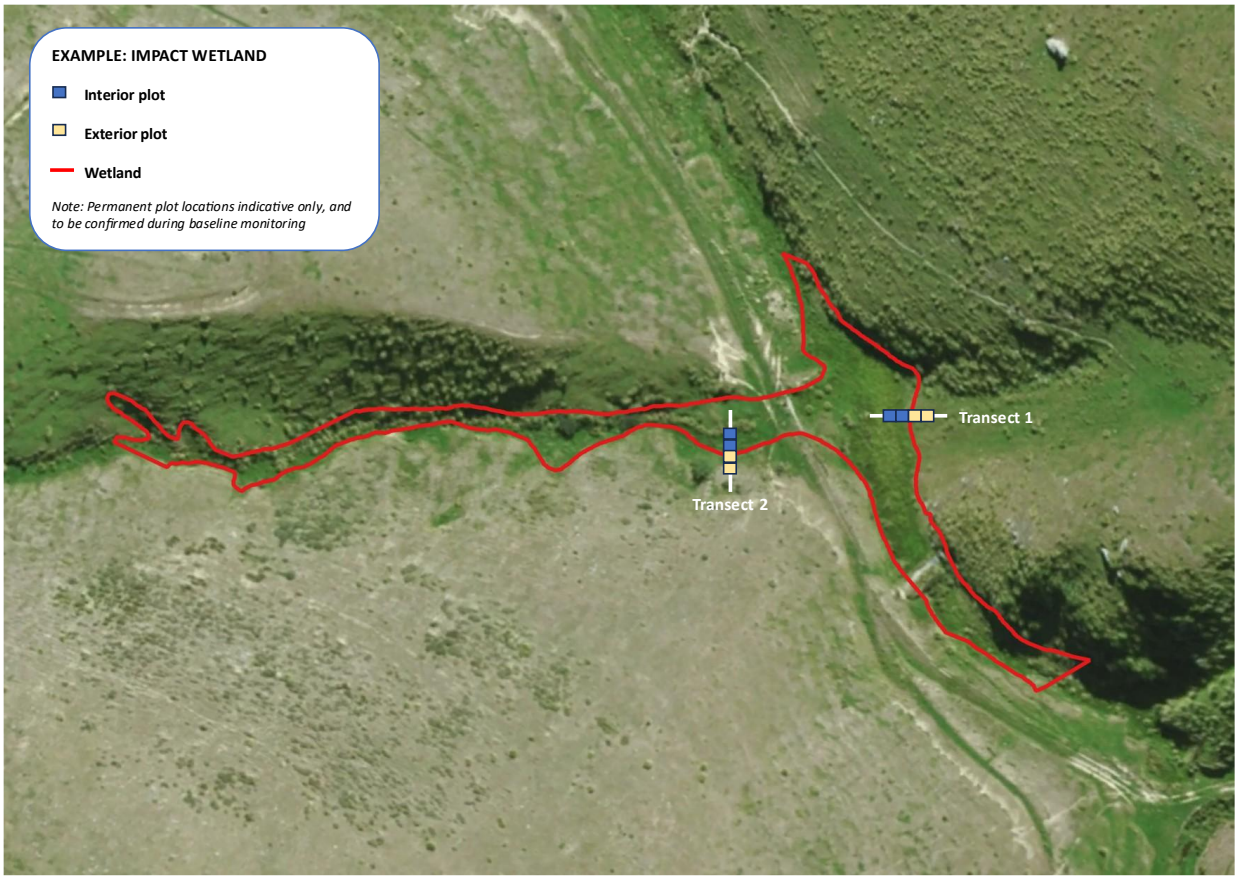

Figure 5-1: Example Impact and Reference wetland plot layout. Optional interior plots may be added to represent main wetland vegetation communities, with plot locations determined during baseline monitoring.

5.3.2 Vegetation survey plot locations for compensation wetlands

For Compensation wetlands, plots will be positioned to provide a representative sample of restoration and enhancement areas, including areas targeted for the translocation of Threatened or At-Risk (TAR) species. The requirements and methodology for the salvage, translocation and propagation of wetland TAR species is detailed in the Vegetation and TAR Flora Management Plan (Bioresearches, 2026g).

Where practicable, plots will be arranged along transects (Figure 5-2) to capture wetland gradients and variation in vegetation communities, with the number and location of plots confirmed during baseline monitoring. Plot locations will be selected to allow progress toward the relevant BOAM-linked performance measures to be assessed, including indigenous species richness, indigenous vegetation cover, wetland-affinity and establishment of translocated TAR species, as detailed in the Vegetation and TAR Flora Management Plan.

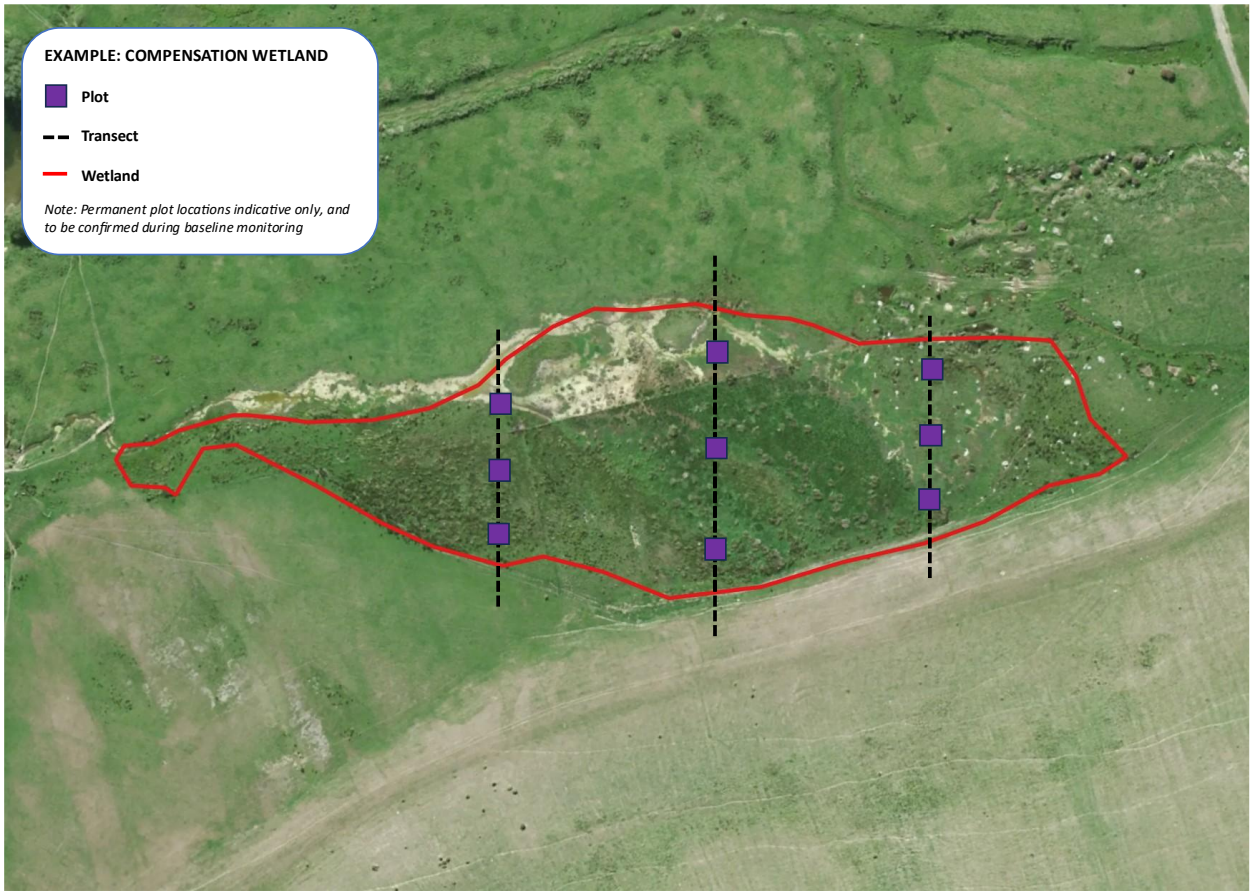

Figure 5-2: Example Compensation vegetation plots. The number and location of the plots and transects will be adapted for each wetland, and confirmed during baseline monitoring

5.4 Hydrological monitoring

A minimum of two hydrological monitoring points will be installed within the selected hydrological-pathway Impact and Reference wetland where reliable water-level monitoring is feasible. No project-related effects on the hydrology of the Compensation wetlands are anticipated; thus, they are excluded from this analysis.

Hydrological monitoring will be undertaken using level loggers installed within shallow dipwells or piezometers to allow continuous water-level recording, with equipment positioned to represent typical wetland hydrology and the areas' most likely to respond to Project-related change. Water levels will be recorded daily, with data logged to an automated system to enable ongoing review of wetland hydrological conditions.

Short-term inundation ephemeral wetlands will generally be excluded from level-logger monitoring where they do not support a persistent shallow water table suitable for continuous water-level recording. For these wetlands, hydrological condition will instead be interpreted through vegetation monitoring. Long-term inundation ephemeral wetlands, where standing water is present over the summer months (Whirika, 2026), will be subject to hydrological monitoring.

5.5 Dust deposition

Dust deposition monitoring will commence as soon as practicable and before the commencement of the MP4 expansion to establish baseline background deposition rates.

Two dust gauges will be installed at each relevant wetland: one at the edge closest to the haul road and one at the farthest edge. The gauges will be sampled monthly to assess the magnitude and spatial pattern of dust deposition across each wetland by a suitably qualified OGL staff member.

Photographs will be taken at each gauge location during each monitoring occasion to document the condition of adjacent vegetation and any visible dust accumulation on plant surfaces. Dust-gauge data and photographs will be provided to the project ecologist following each monitoring round.

5.6 Photopoints

Fixed photopoints will be established within each monitored wetland to provide a repeatable visual record of wetland condition, vegetation structure and change over time. Photographs will be taken from these locations during each monitoring event, in accordance with the frequencies and requirements specified in Table 2.

Photopoints will be located where clear views across representative wetland vegetation types, wetland margins and any restoration or impact areas can be obtained. The number and location of photopoints will be confirmed during the baseline monitoring visit and may be increased where required to adequately capture the range of wetland vegetation types or site-specific features.

Each photopoint will be recorded using GPS coordinates and will be marked with a stake or other durable marker. The photograph direction and bearing will be recorded to ensure repeat photographs are taken from the same location and orientation during future monitoring events. Once the photopoints have been established and documented by a SQEP, repeat photographs may be taken by appropriately briefed OGL staff, provided the specified location, orientation and photographic method are followed.

Drone aerial imagery will also be collected where practicable to provide an overhead record of wetland extent, vegetation patterns, restoration areas, bare ground, surface water expression and any visible disturbance. Drone imagery will be particularly useful for comparing changes in wetland boundaries, vegetation cover and hydrological expression between monitoring rounds.

5.7 Baseline monitoring

Baseline monitoring for all monitored wetlands will be undertaken in accordance with the ongoing monitoring methodology set out in the previous sections, and will target the relevant effect pathway, associated monitoring components and frequency identified in Table 2.

Baseline monitoring of Impact and Reference wetlands will commence at the earliest available opportunity following approval of MP4. As MP4 will be implemented in stages, monitoring will be established in advance of each relevant stage of works. Where at least 12 months is available before commencement of an activity capable of affecting a monitored wetland, a minimum of 12 months of baseline monitoring will be completed before that activity commences.

Where less than 12 months is available before commencement of a particular stage of works, baseline monitoring will commence before the relevant activity begins and will continue until a minimum 12-month monitoring dataset has been established. The timing, location and nature of any Project activity occurring during that period will be recorded and accounted for when interpreting monitoring results.

Baseline monitoring will characterise seasonal variability in hydrology, dust deposition, vegetation condition and wetland extent, where applicable. For hydrology-focused wetlands, baseline data will be used to establish an initial seasonal range in water levels, including typical and low-water conditions. Suitable existing groundwater and hydrological data will be incorporated where available. Where a full 12-month pre-works baseline cannot be achieved, data from comparable Reference wetlands will also be used to assist in characterising seasonal and interannual variability. This information will inform wetland-specific hydrological trigger levels, which will be reviewed and refined as the monitoring record develops, particularly for ephemeral wetlands.

Baseline monitoring of Compensation wetlands will commence in the spring following the completion of restoration works within each relevant wetland. This will allow early issues to be addressed with respect to plant establishment and/or survival.

The final locations of permanent vegetation plots, photopoints, hydrological monitoring points and dust deposition gauges will be confirmed by a suitably qualified person following the initial baseline monitoring visits. This will allow locations to be selected that are representative, repeatable, safe to access and unlikely to be affected by foreseeable access constraints, while accounting for site-specific conditions such as wet ground, steep terrain, operational activities, wetland morphology, and the distribution of wetland vegetation types.

The baseline reporting will include:

- A map and list of the GPS coordinates of the established vegetation plots, photopoint locations, and any other relevant monitoring features.
- Baseline vegetation cover, composition and condition data for each established wetland vegetation plot.
- Photographs showing the sampled plots and the vegetation present.
- Baseline wetland surface water levels for relevant Impact and Reference wetlands.
- Baseline dust levels for relevant Impact wetlands
- Aerial imagery showing the mapped extent of wetlands, including any relevant wetland vegetation zones or features.

The baseline data will provide the reference condition against which future monitoring results will be compared. This will allow changes in wetland extent, hydrology, vegetation composition and condition to be identified over time, and will inform any adaptive management responses where required.

This WMMP will be reviewed following the completion of the initial baseline monitoring. Resultant updates should be made to improve the effectiveness and practicality of the monitoring method, including the specific locations of monitoring components.

6 ADAPTIVE MANAGEMENT

Adaptive-management triggers have been developed to identify potential adverse changes in Impact wetland condition and, for Compensation wetlands, where restoration and enhancement outcomes are not progressing as expected.

The triggers and associated responses differ between wetland categories. For Impact wetlands, triggers relate to the relevant monitored indirect-effect pathways. For Compensation wetlands, they assess progress toward the required ecological outcomes.

Activation of a trigger does not, by itself, confirm that a Project-related effect has occurred. Where a trigger is activated, monitoring results will be reviewed alongside relevant baseline data, Reference wetland trends, climatic conditions, water-quality or operational information, and Project activities to assess the likely cause of the observed change. Where a Project-related effect is considered likely, the relevant adaptive-management response will be implemented and its effectiveness assessed through subsequent monitoring.

The following sections set out the adaptive management triggers, potential management responses, and reporting for Impact wetlands (Section 6.1) and Compensation (Section 6.2) wetlands separately.

6.1 Impact wetland triggers

Impact wetland triggers are intended to identify potential adverse changes in retained wetlands that may be associated with MP4 activities. The triggers apply only to the relevant indirect-effect pathway (i.e. hydrology and dust).

Whereby a trigger is activated, the Impact wetland trigger-response process shown in Figure 6-1 will apply, as summarised below:

- The trigger will be investigated within *5 working days* through a review of monitoring results, baseline data, Reference wetland trends, rainfall records and relevant Project activities. Where water quality is a plausible cause, relevant information from the wider MP4 surface-water monitoring programme will also be reviewed.
- Where a Project-related effect is considered likely, an appropriate management response will be implemented as soon as possible and no later than 10 working days following trigger activation.
- Follow-up monitoring will be undertaken within 20 working days of management implementation to determine whether the relevant physical and ecological conditions are stabilising or improving.

As Impact wetland monitoring is undertaken at representative wetlands, the investigation will also consider whether the identified effect could extend to other retained wetlands exposed to the same Project activity or effect pathway. Where this is considered likely, those wetlands will be inspected and, where necessary, incorporated into the monitoring and adaptive-management response.

Monitoring will follow the relevant pathway-specific methodology in Section 5, but may be targeted to the parameter associated with the trigger and the management response. Where the management response is not effective, management measures will be modified or escalated and further follow-up monitoring undertaken.

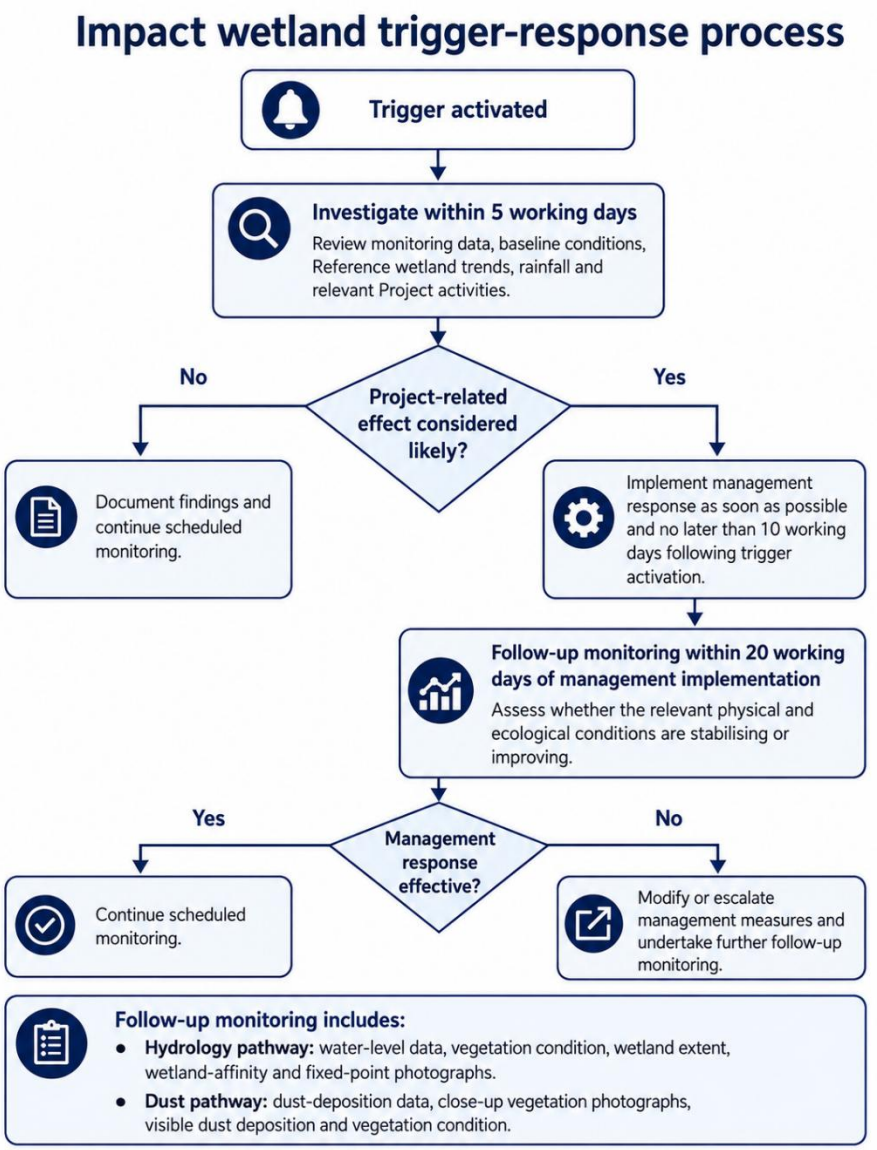

Figure 6-1: Impact wetland trigger-response process for hydrology- and dust-pathway Impact wetlands, showing investigation, management response and follow-up monitoring timeframes.

6.1.1 Hydrology-pathway

Hydrology-pathway monitoring applies to Project-related reductions or increases in wetland water availability. The following vegetation and water-level triggers are used to identify adverse change and determine whether the hydrological management responses in Section 6.1.1.3 are required.

6.1.1.1 Vegetation response

Changes in wetland hydrology may be reflected in vegetation composition as well as directly measured water levels.

A shift toward facultative upland (FACU) and upland (UPL) species may indicate drying associated with reduced water availability. Vegetation wetland-affinity will therefore be assessed using the New Zealand Wetland Plant Indicator Status Ratings (Clarkson et al., 2021) as a supporting indicator of hydrological change. As Clarkson et al. (2004) does not prescribe specific trigger values for changes in wetland ecological value, triggers for this monitoring programme are based on changes in vegetation wetland affinity.

An adaptive-management trigger will be activated where a comparable seasonal survey records either:

- a **25% or greater relative reduction** in the cover or dominance of OBL and FACW species relative to the equivalent baseline season; or
- a **25% or greater relative increase** in the cover or dominance of FACU and UPL species relative to the equivalent baseline season.

For example, an increase in FACU and UPL cover from 20% at baseline to 25% would represent a 25% relative increase and activate the trigger. Conversely, a decline from 80% OBL species cover at baseline to 60% OBL species cover in the following comparable season would activate the trigger.

The thresholds are intended as precautionary investigation triggers rather than measures of ecological failure. A 25% relative change was selected to identify a material shift in vegetation composition that is greater than minor variation in cover estimates between monitoring events, while allowing investigation and management to occur before substantial conversion toward dryland vegetation is established

Monitoring results will be compared primarily with the corresponding baseline season, while the previous equivalent-season survey, Reference wetland trends and hydrological data will be used to help distinguish Project-related change from natural seasonal or climatic variability.

Where the vegetation trigger is activated and Project-related hydrological change is considered likely, the management responses set out in Section 6.1.1.3 will apply.

6.1.1.2 Hydrological trigger

Hydrological triggers will be based on the natural seasonal range established for each monitored wetland during baseline monitoring. The trigger level will generally be set at the lowest and highest recorded baseline water level or hydrological expression for the comparable season.

An adaptive management trigger will be activated where water levels in an Impact wetland fall below the established seasonal low, or rise above the established seasonal high, for either:

- *seven consecutive days; or*
- *a cumulative total of 14 or more days within any 30-day period;* ***and***
- *a comparable trend is not recorded in the relevant Reference wetland.*

Where a low-water trigger is activated, wetland extent, vegetation plots, wetland-margin plots and fixed-point photographs will be reviewed for evidence of wetland contraction, movement of the wetland boundary, vegetation stress or a shift toward drier-affinity vegetation.

Where a high-water trigger is activated, the same monitoring information will be reviewed for evidence of prolonged inundation, expansion of open water, waterlogging beyond the normal wetland extent, vegetation dieback, loss of vegetation mosaic or a material shift toward wetter conditions.

Where assessment indicates that Project-related drainage, dewatering or altered surface-water inputs are the likely cause of the hydrological change, a management response will be implemented to maintain or restore wetland hydrology within the expected seasonal range. The response will be proportionate to the nature and magnitude of the effect and will be selected from the measures set out in Section 6.1.1.3.

6.1.1.3 Hydrological management responses

The management response will be selected according to the direction, cause and magnitude of the hydrological change. These will apply whereby a comparable trend is not recorded in the Reference wetlands.

Where monitoring suggests **reduced** wetland hydrology (i.e. a vegetation response or lower hydrological trigger is activated), responses may include:

- **Supplementation of wetland water levels** with water from the storage ponds, or the Coal or Camp Creek Dams.
- Supplementary water additions are to be either directly, where the water is suitable for the receiving wetland[1], or indirectly via groundwater soakage through sand/gravel beds.
    - The water input and ground soakage locations will be determined by the Project hydrologist and ecologist. These should be determined prior to the commencement of works affecting the relevant wetland communities so that supplementation can be implemented promptly.
    - The volume and timing of supplementation will be informed by one or more of:
        - Wetland water level monitoring;
        - Reference wetland hydrology;
        - Prevailing climatic conditions;
- A dynamic wetland water balance model (if available); and
        - The progression of mining within the pits
- Supplementation will aim to restore water levels toward the expected seasonal range and address any Project-related hydrological deficit.
- Supplementation may be progressively reduced or ceased once the source of dewatering/drainage has been identified and remediated, water levels remain stable without artificial input and are consistent with Reference wetland and prevailing climatic conditions. Supplementation will not be required solely in response to natural drought or seasonal drying where a comparable trend is evident in Reference wetlands.
- Temporary reduction, or cessation of dewatering as a last resort, where preceding measures are insufficient to restore wetland water levels toward the expected seasonal range as defined by baseline and Reference wetland trends.

Where monitoring indicates **increased** wetland hydrology (i.e. an upper hydrological trigger is activated), responses may include:

- inspection and modification of drains, culverts, bunds or diversions;
- redirection or attenuation of excess surface-water inputs;
- reinstatement of pre-Project drainage or catchment pathways where practicable; and
- other modifications to surface-water management required to return wetland hydrology toward its expected seasonal range.

The effectiveness of the hydrological management response will be assessed through follow-up monitoring in accordance with Section 6.1.

[1] For the purposes of this WMMP, water used for direct supplementation must comply with applicable MP4 surface-water quality requirements (Viridis, 2026) and be of a quality that will not adversely affect wetland vegetation, soils or ecological condition.

Follow-up monitoring may be targeted to the affected wetland and relevant hydrological or ecological parameters, including continuous water-level data, wetland extent, vegetation composition, wetland-affinity, visible vegetation stress or deterioration, and fixed-point photographs. Where the response is not effective, management measures will be modified or escalated and further follow-up monitoring undertaken.

Where hydrological conditions have not been adequately restored, or the subsequent biannual ecological monitoring identifies a residual adverse effect despite implementation of mitigation measures, the effect will be assessed in accordance with the MP4 residual-effects framework to determine whether additional biodiversity compensation is required.

6.1.2 Dust deposition

An adaptive management trigger will be activated where monthly dust deposition measured via dust gauges shows a sustained increase above the baseline range (i.e. that recorded prior to MP4 expansion activities) for two consecutive monitoring months. Photographs of the permanent dust plots, alongside data from dust deposition gauges, will be reviewed by a suitably qualified ecologist and/or SQEP.

Whereby dust deposition is identified to be coating the vegetation in such a manner that photosynthesis and growth rates of plants are likely to be impeded, the source of dust will be investigated. Given that the monitored wetlands are generally adjacent to publicly used roads (i.e. Golden Bar Haul Road), activation of the trigger will indicate a change from established conditions, but will not by itself confirm that the increase is attributable to MP4 activities.

6.1.2.1 Dust deposition management responses

Where Project activities are considered a likely material contributor to observed dust deposition or associated deterioration in wetland condition, appropriate dust-management responses will be implemented in accordance with the Dust Management Plan (DMP, 2024).

Responses will be proportionate to the nature, extent and likely source of the observed effect and may include review of nearby dust-generating activities, increased dust suppression, modification of operational practices, or additional site-specific controls where required.

Where monitoring indicates sustained increase in dust deposition, additional assessment of wetland extent may be undertaken for the affected wetland and, where appropriate, adjacent wetlands exposed to the same dust source, to determine whether any reduction in wetland area has occurred.

6.1.3 Impact wetland reporting

Where monitoring of an Impact wetland identifies that an adaptive management trigger has been exceeded, a response report will be prepared by a suitably qualified and experienced ecologist and provided to OGNZL.

OGNZL will then provide the report to the Otago Regional Council within 20 working days of the trigger being confirmed. The response report will include:

a. the Impact wetland/s affected;

b. the adaptive management trigger exceeded;

c. the monitoring results that confirmed the exceedance;

d. comparison with baseline data, previous monitoring results and Reference wetland trends;

e. assessment of the likely cause of the exceedance, including whether the change is likely to be Project-related;

f. consideration of whether the effect may extend to other retained wetlands exposed to the same Project activity or effect pathway;

g. the management response required in accordance with the relevant provisions of this WMMP;

h. the timeframe for implementing those actions; and

i. any additional monitoring required to assess whether the response has been effective.

Where relevant, Impact wetland monitoring results will also be considered alongside freshwater fauna and stream compensation monitoring (Viridis, 2026) undertaken under the relevant freshwater management plans to assist in interpreting wider freshwater ecosystem outcomes.

The outcome of follow-up monitoring will be documented and provided to OGNZL. Where the initial management response is not effective, the report will identify the additional or escalated measures required and the timeframe for further monitoring.

Where monitoring identifies a substantial or immediate adverse change, including rapid drying, unexpected inundation, significant vegetation dieback or another material deterioration in wetland condition, the Manager of Environment and Social Performance will be notified within one working day so that remedial action is not delayed.

6.2 Compensation wetland triggers

Routine restoration and maintenance required to achieve the intended ecological outcomes, including establishment and replacement planting, weed and pest control, and maintenance of stock-exclusion measures, will be undertaken in accordance with the Wetland Restoration Plan (Bioresearches, 2026o) and will continue independently of adaptive-management triggers.

Adaptive-management triggers will apply where monitoring indicates that, despite these routine measures, a Compensation wetland is not progressing toward the intended ecological outcomes or relevant BOAM-linked performance measures in Appendix E. Trigger interpretation will consider restoration age, baseline condition, previous monitoring results, seasonal conditions, expected restoration trajectory, and any atypical environmental events (i.e. droughts, wildfire, unusually wet periods) that may have influenced the monitoring outcome.

Where a trigger is activated, the investigation will consider potential contributing factors including poor plant establishment or survival, unsuitable hydrological conditions, drainage or altered water inputs, weed or dryland plant invasion, sedimentation, browsing, pest impacts, stock disturbance and atypical climatic conditions, as relevant to the observed change. The likely cause and required management response will be identified within the annual report (see Section 6.3).

Management actions that are not seasonally dependent, including additional pest control, stock-exclusion repairs or other corrective measures, will be initiated within 20 working days of report submission. Seasonally dependent actions, including replacement or supplementary planting and relevant TAR management, will be undertaken within the next suitable management window in accordance with the Wetland Restoration Plan (Bioresearches, 2026o) and relevant TAR management requirements.

Where corrective action cannot be implemented immediately because of seasonal or other ecological constraints, the Project ecologist will assess whether the delay could affect the restoration trajectory or

achievement of the relevant performance measure, and whether interim measures or additional monitoring are required. Where the expected improvement is not achieved, or delay materially affects the anticipated restoration trajectory, management measures will be modified or escalated and the timeframe for achieving the relevant performance measure reassessed.

6.2.1 Indigenous vegetation cover

Indigenous vegetation cover will be monitored as a BOAM-linked measure of native dominance and restoration progress. Cover will be recorded during vegetation surveys in general accordance with Clarkson et al. (2004), using permanent vegetation plots to measure the percentage cover of indigenous and exotic plant species over time.

An adaptive-management trigger will be activated where:

- the relevant BOAM-linked indigenous vegetation cover target is not achieved within the specified timeframe; or
- indigenous vegetation cover declines by 20% or more between consecutive monitoring surveys, while the relevant BOAM-linked target remains unmet.

6.2.1.1 Indigenous vegetation cover management responses

Where the indigenous vegetation cover trigger is activated, the likely cause of the decline or lack of progress will be assessed before management responses are implemented. Management will be proportionate to the cause, extent and duration of the observed effect.

Potential management responses may include:

- supplementary, replacement or enrichment planting;
- adjustment of the planted species;
- increased weed control;
- pest-animal control;
- repair or improvement of fencing or stock-exclusion measures;
- review of hydrological conditions and site suitability; and
- remediation of sedimentation or other physical disturbance.

Where supplementary planting is required, species selection is to be based on planting which has successful established within the monitored wetlands, and a botanic audit of adjacent wetlands shall be undertaken. The purpose of this botanic audit is to identify indigenous plant specimens which are present within the local catchment and may be a suitable species candidate for supplementary planting. Such events will not automatically be treated as a failure of the compensation programme.

6.2.2 TAR species

Threatened and At Risk (TAR), Data Deficient and locally uncommon plant species will be monitored within all Compensation wetlands, as TAR species are included as a BOAM-linked performance measure for each wetland type. Methodology pertaining to the translocation, salvage and propagation of wetland flora TAR species, and the monitoring of TAR species establishment and survival is addressed in the TAR Flora Management Plan (Bioresearches, 2026g); however, vegetation plots for Compensation wetlands will, where practicable, be located to capture areas targeted for TAR species translocation and planting.

BOAM-linked TAR species performance goals vary by wetland type (Appendix E) and require the establishment of between one and three TAR species within relevant Compensation wetlands.

An adaptive management trigger will be activated where:

- the number of TAR species required to meet the relevant BOAM-linked performance goal is not achieved; and
- a previously recorded TAR species is no longer recorded in a comparable monitoring survey.

6.2.2.1 TAR species management response

Where the TAR species trigger is activated, the likely cause of the decline, loss or lack of establishment will be investigated with reference to the TAR Flora Management Plan (Bioresearches, 2026g) and associated planting records.

Management responses will be proportionate to the cause and extent of the observed effect and may include:

- targeted weed control;
- increased pest-animal or stock exclusion;
- supplementary or replacement planting;
- protection of individual plants;
- adjustment of planting or translocation locations;
- review of hydrological suitability;
- increased monitoring of affected populations;
- survey of TAR flora within the wetland, and adjacent wetlands which has successfully established to identified potential surrogate species; and
- refinement of the planting palette to favour TAR species demonstrating greater establishment success under site conditions, while remaining consistent with the relevant BOAM-linked performance goals and TAR Flora Management Plan.

6.2.3 Indigenous species richness

Indigenous species richness will be monitored as a BOAM-linked biodiversity attribute within Compensation wetlands. An adaptive management trigger will be activated where indigenous species richness is not tracking toward the relevant BOAM endpoint or expected restoration trajectory.

An adaptive-management trigger will be activated where:

- the relevant BOAM-linked species-richness target is not achieved within the specified timeframe; or
- indigenous species richness declines by 20% or more between consecutive comparable monitoring events.

6.2.3.1 Indigenous species management responses

Where the indigenous species richness trigger is activated, monitoring results will be reviewed to identify the likely cause of the decline or lack of progress. Management responses will be proportionate to the nature and extent of the observed effect and may include:

- enrichment planting with additional indigenous wetland species;
- supplementary or replacement planting;
- increased weed control;
- repair or improvement of stock-exclusion measures;
- review of hydrological suitability;
- protection of vulnerable or poorly establishing species;
- survey of indigenous flora within the wetland, and adjacent wetlands which has successfully established to identified potential surrogate species; and
- adjustment of the planting palette to improve species diversity and establishment success.

6.2.4 Hydric vegetation cover

Hydric vegetation cover will be monitored as a BOAM-linked measure of wetland character and hydrological suitability. This will be assessed using vegetation plot data, New Zealand Wetland Plant Indicator Status Ratings, dominance and prevalence tests, and field observations of wetland hydrology and seasonal wetland expression.

An adaptive-management trigger will be activated where:

- the relevant BOAM-linked hydric vegetation target is not achieved within the specified timeframe; or
- a comparable monitoring event records a 20% or greater decline in hydric vegetation cover and/or a corresponding deterioration in prevalence-index results, indicating a shift toward species more typical of drier conditions.

6.2.4.1 Hydric vegetation cover management responses

Where the hydric vegetation cover trigger is activated, monitoring results will be reviewed to identify the likely cause of the observed decline or lack of progress.

Management responses will be proportionate to the nature and extent of the observed effect and may include:

- review of hydrological suitability and drainage conditions;
- modification or reinstatement of water inputs where appropriate;
- remediation of drainage or other hydrological constraints;
- increased weed or dryland plant control;
- supplementary or replacement planting with appropriate hydric species;
- repair or improvement of stock-exclusion measures; and
- increased monitoring where required to assess recovery and confirm whether the wetland is returning toward the expected restoration trajectory.

6.2.5 Animal impacts

All Compensation wetlands will be fenced to exclude stock, except where wetlands are already protected within existing covenants or other legally protected areas, and be subject to pest control, as outlined in the Pest Control and Elimination Plan (Alliance Ecology, 2026).

Damage by domestic or feral animals will be assessed as part of the wetland condition assessment, in general accordance with Clarkson et al (2004). This includes recording evidence of browsing, grazing, pugging, trampling, pig damage, or other animal-related disturbance that may affect wetland vegetation, soils or hydrological function.

Where practicable, the likely source of damage will be inferred from the type and pattern of evidence present. For example, pig activity may be indicated by rooting, cattle or sheep by pugging, grazing and dung, and deer by browsing height, tracks or pellets. Where the source cannot be identified reliably, the damage will be recorded as unidentified animal disturbance, and a broader pest-control response may be required.

An adaptive management trigger will be activated where the animal damage score is less than 4 (i.e. greater than low), or where monitoring records new or ongoing animal damage that is likely to compromise wetland condition or restoration success.

6.2.5.1 Animal impact management responses

Where the animal impact trigger is activated, the likely source and extent of the disturbance will be reviewed to determine the appropriate management response. Management will be proportionate to the type and severity of damage and may include:

- repair, reinforcement or installation of stock-exclusion fencing;
- improved control of stock access;
- increased or targeted pest-animal control in accordance with the Pest Control and Elimination Plan;
- protection of vulnerable or recently established plantings;
- remediation of pugged, trampled, rooted or otherwise disturbed areas where required;
- supplementary or replacement planting where animal damage has affected establishment; and
- increased monitoring where required to confirm that disturbance has ceased and recovery is occurring.

Where the source of animal damage cannot be reliably identified, a broader pest-management response may be implemented in consultation with the Project ecologist and pest-management specialist.

6.3 Compensation wetland reporting

Monitoring and reporting for Compensation wetlands will be undertaken annually for the first five years following implementation of the relevant restoration or enhancement actions. Where restoration is progressing as expected and there are no triggers identified in the annual monitoring, reporting may reduce to two-yearly (i.e. biannually) from Year 6, and will continue for the two years after the BOAM prescribed BOAM target endpoint (being 15 years for ephemeral wetlands and 7 years for non-ephemeral wetlands).

The annual reports will be provided within 20 working days of monitoring, and will include:

- *results of the vegetation surveys, wetland condition assessment and photopoint monitoring, including the relevant BOAM-linked performance measures and restoration indicators;*
- *comparison with baseline condition, previous monitoring results and the expected restoration trajectory;*
- *identification and assessment of any adaptive-management trigger activated, including the likely cause and any relevant atypical environmental conditions;*
- *the management response required under Section 6.2, including implementation timeframes and any interim measures or additional monitoring required; and*
- *an overall assessment of progress toward the intended ecological outcomes and recommendations for maintaining or improving restoration success.*

Where a substantial decline is attributable to an external event outside the control of OGNZL, such as wildfire or an unusually severe drought, the event and its effects will be documented and assessed in the context of the expected restoration trajectory. Any required recovery actions will be identified, taking account of the extent of damage and the potential for natural recovery.

Where implementation of a corrective action is delayed by seasonal or other ecological constraints, the report will document the reason for the delay, any interim measures or additional monitoring required, and any resulting change to the expected restoration trajectory or timeframe for achieving the relevant performance measure.

A detailed review will be undertaken at Year 5 to assess restoration trajectory, progress toward compensation objectives and relevant BOAM-linked performance measures. Where restoration is progressing as expected and there are no unresolved triggers, reporting may reduce to two-yearly (i.e. biannually) from Year 6.

A further detailed review will be undertaken at Year 10, including assessment of ephemeral wetlands where outcomes are expected to develop over a longer timeframe. Where ecological outcomes and BOAM-linked performance measures have been achieved and are being maintained, bi-annual monitoring and reporting will continue for the remainder compensation establishment timeframe.

Where performance measures have not been achieved, or subsequent monitoring identifies a material decline or loss of an achieved outcome, annual monitoring will continue or resume until the wetland is again stable and progressing toward the intended outcomes.

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Appendix A Wetlands within 100 m from the impact area

ID	Location*	Type	Area (m²)	NZTM coordinates (centre of wetland)		Minimum distance from impact area (m)**
				Easting	Northing	
1	CN	Riparian - Sedgeland	279	1395281.11	4979068.41	0
2	CN	Wetland - Seepage	27	1395506.35	4978908.85	0
3	CN	Riparian - Red Tussock	252	1395594.49	4979099.87	81
4	CN	Riparian - Freshwater Herbaceous	444	1395581.79	4979047.74	0
5	CN	Riparian - Red Tussock	511	1395911.58	4978898.35	49
6	CN	Riparian	233	1395894.18	4978866.93	0
7	CN	Wetland - Freshwater Herbaceous	952	1396230.13	4978652.88	0
8	CN	Riparian - Freshwater Herbaceous	590	1396174.11	4978788.26	78
9	CN	Wetland - Sedgeland	165	1396240.68	4978776.38	89
10	CN	Wetland - Freshwater Herbaceous	280	1396352.14	4976826.17	0
11	CN	Riparian - Freshwater Herbaceous	1087	1396391.06	4976452.74	0
12	CN	Wetland - Freshwater Herbaceous	717	1396437.29	4977690.81	15
13	CN	Wetland - Freshwater Herbaceous	173	1396395.79	4978381.03	0
14	CN	Wetland - Freshwater Herbaceous	159	1396413.78	4978366.46	0
15	CN	Wetland - Freshwater Herbaceous	83	1396435.88	4978362.56	7
16	CN	Wetland - Freshwater Herbaceous	297	1396449.08	4978297.81	0
17	CN	Wetland - Sedgeland	141	1396473.33	4978359.81	26
18	CN	Riparian - Freshwater Herbaceous	146	1396508.85	4978338.68	65
19	CN	Wetland - Freshwater Herbaceous	299	1396526.08	4977464.11	0
20	CN	Wetland - Freshwater Herbaceous	68	1396537.81	4978313.61	80
21	CN	Wetland - Sedgeland	1015	1396637.78	4977366.65	0
22	CN	Wetland - Freshwater Herbaceous	667	1396524.42	4976712.18	0
23	CN	Wetland - Sedgeland	376	1396564.25	4977456.30	25
24	CN	Riparian - Freshwater Herbaceous	738	1396552.33	4977537.55	52
25	CN	Riparian - Freshwater Herbaceous	456	1396646.19	4976717.60	12
26	CN	Wetland - Freshwater Herbaceous	382	1396599.29	4977464.28	56
27	CN	Wetland - Freshwater Herbaceous	277	1396615.06	4976952.31	0
28	CN	Wetland - Freshwater Herbaceous	433	1396696.43	4976913.94	0
29	MC	Ephemeral Wetland	144	1400024.53	4971925.10	18
30	MC	Ephemeral Wetland	1418	1400988.19	4973580.44	0
31	MC	Wetland - Sedgeland	770	1401172.65	4973603.34	28
32	MC	Ephemeral Wetland	5900	1401248.65	4973673.40	6
33	MC	Wetland - Sedgeland	646	1401244.39	4973015.72	0
34	MC	Wetland - Freshwater Herbaceous	259	1401234.64	4973348.47	22
35	MC	Wetland - Freshwater Herbaceous	86	1401245.44	4973561.63	36
36	MC	Wetland - Sedgeland	110	1401227.49	4973374.18	34
37	MC	Wetland - Sedgeland	167	1401309.79	4972999.45	83
38	MC	Wetland - Sedgeland	505	1401393.45	4973596.74	24
39	MC	Ephemeral Wetland	495	1401413.16	4973413.17	81

ID	Location*	Type	Area (m²)	NZTM coordinates (centre of wetland)		Minimum distance from impact area (m)**
				Easting	Northing	
40	MC	Wetland - Freshwater Herbaceous	180	1401484.77	4973294.68	100
41	MC	Ephemeral Wetland	2931	1401476.95	4973966.73	63
42	MC	Ephemeral Wetland	17695	1401598.43	4973762.17	3
43	MC	Wetland - Sedgeland	1348	1401589.31	4973258.75	128
44	MC	Wetland - Sedgeland	478	1401599.07	4973943.91	20
45	GB	Riparian - Sedgeland	657	1405771.00	4968874.67	31
46	GB	Wetland - Freshwater Herbaceous	5	1405820.77	4968820.87	0
47	GB	Ephemeral Wetland	363	1406193.07	4969081.69	1
48	GB	Ephemeral Wetland	8	1406565.72	4967796.80	75
49	GB	Riparian - Sedgeland	300	1406552.84	4967800.78	52
50	GB	Wetland - Sedgeland	251	1406619.60	4967829.54	28
51	GB	Ephemeral Wetland	59	1406699.73	4968753.84	0
52	GB	Wetland - Sedgeland	6	1406730.54	4968006.87	0
53	GB	Wetland - Freshwater Herbaceous	117	1406741.61	4968017.39	0
54	GB	Wetland - Freshwater Herbaceous	140	1406745.68	4968035.21	0
55	GB	Wetland - Sedgeland	2340	1407005.18	4967945.10	0
56	GB	Riparian - Sedgeland	767	1407105.45	4968462.18	0
57	GB	Wetland - Sedgeland	118	1407206.16	4968090.08	83
58	GB	Wetland - Freshwater Herbaceous	117	1407200.29	4968100.41	73
59	GBHR	Wetland - Freshwater Herbaceous	138	1402299.98	4971745.46	91
60	GBHR	Wetland - Sedgeland	615	1402251.17	4971764.19	71
61	GBHR	Ephemeral Wetland	876	1402466.37	4971360.58	17
62	GBHR	Ephemeral Wetland	102	1402478.32	4971334.98	7
63	GBHR	Ephemeral Wetland	3616	1402543.70	4971429.70	22
64	GBHR	Ephemeral Wetland	366	1402525.66	4971301.72	1
65	GBHR	Wetland - Sedgeland	338	1402565.41	4971252.98	26
66	GBHR	Ephemeral Wetland	737	1402659.21	4971203.63	45
67	GBHR	Wetland - Freshwater Herbaceous	1311	1402929.71	4970964.48	43
68	GBHR	Wetland - Sedgeland	550	1403050.87	4970897.93	30
69	GBHR	Wetland - Freshwater Herbaceous	774	1403100.58	4970848.17	29
70	GBHR	Riparian - Freshwater Herbaceous	1480	1403197.23	4970747.90	27
71	GBHR	Wetland - Freshwater Herbaceous	31	1403351.98	4970511.69	42
72	GBHR	Ephemeral Wetland	178	1403446.12	4970719.49	85
73	GBHR	Wetland - Sedgeland	652	1403450.00	4970275.30	31
74	GBHR	Wetland - Freshwater Herbaceous	68	1403484.35	4970293.58	23
75	GBHR	Wetland - Freshwater Herbaceous	194	1403494.16	4970277.93	12
76	GBHR	Ephemeral Wetland	31	1403531.43	4970306.63	4
77	GBHR	Wetland - Freshwater Herbaceous	142	1403549.29	4970428.33	55
78	GBHR	Wetland - Freshwater Herbaceous	444	1403671.46	4969927.07	64
79	GBHR	Wetland - Freshwater Herbaceous	36	1403690.74	4970202.89	83
80	GBHR	Wetland - Sedgeland	504	1403768.16	4969891.07	25
81	GBHR	Ephemeral Wetland	629	1403745.69	4970078.23	41

ID	Location*	Type	Area (m²)	NZTM coordinates (centre of wetland)		Minimum distance from impact area (m)**
				Easting	Northing	
82	GBHR	Ephemeral Wetland	140	1404103.55	4969608.32	6
83	GBHR	Wetland - Freshwater Herbaceous	107	1404108.66	4969717.28	74
84	GBHR	Wetland - Freshwater Herbaceous	122	1404140.49	4969715.99	80
85	GBHR	Wetland - Freshwater Herbaceous	56	1404352.58	4969503.26	85
86	GBHR	Wetland - Sedgeland	478	1404366.23	4969538.25	44
87	GBHR	Wetland - Sedgeland	258	1404571.74	4969444.95	54
88	GBHR	Wetland - Freshwater Herbaceous	185	1404593.95	4969488.96	12
89	GBHR	Ephemeral Wetland	355	1405090.69	4969695.68	79
90	GBHR	Wetland - Freshwater Herbaceous	144	1405329.74	4969606.48	54
91	GBHR	Wetland - Sedgeland	233	1405375.51	4969603.12	70
92	GBHR	Ephemeral Wetland	223	1405470.88	4969807.54	35
93	GBHR	Ephemeral Wetland	613	1405570.18	4969861.09	34
94	GBHR	Wetland - Sedgeland	984	1405613.53	4969755.50	6
95	GBHR	Wetland - Freshwater Herbaceous	269	1405589.66	4969914.06	80
96	GBHR	Ephemeral Wetland	2994	1405774.95	4969789.43	1
97	GBHR	Wetland - Sedgeland	2074	1405917.16	4969697.72	23
98	GBHR	Wetland - Freshwater Herbaceous	140	1405963.32	4969804.67	4
99	GBHR	Wetland - Freshwater Herbaceous	148	1406004.22	4969391.68	81
100	GBHR	Ephemeral Wetland	310	1406049.88	4969789.96	45

*GB = Golden Bar, GBHR = Golden Bar Haul Rd, *MC = Macraes Central, CN = Coronation

**Wetlands that border the project footprint (0 m distance) or are extremely close are considered to be a total loss and are included within the compensation package. However, a portion of these wetlands are located within the 100 m buffer and therefore included within this table for completeness due to uncertainty.

Note: Non-ephemeral wetlands within 20 m, and ephemeral wetlands within 50 m, are highlighted. These wetlands will require fencing or demarcatio

Appendix B Wetland Record Sheet

Table 2: Wetland Record Sheet

Wetland name: **Date:**
Region: **GPS/Grid Ref.:**
Altitude: **No. of plots sampled:**

Classification: I System	IA Subsystem	II Wetland Class	IIA Wetland Form

Field team:

Indicator	Indicator components	Specify and Comment	Score 0– 5[1]	Mean score
Change in hydrological integrity	Impact of manmade structures			
	Water table depth			
	Dryland plant invasion			
Change in physico-chemical parameters	Fire damage			
	Degree of sedimentation/erosion			
	Nutrient levels			
	von Post index			
Change in ecosystem intactness	Loss in area of original wetland			
	Connectivity barriers			
Change in browsing, predation and harvesting regimes	Damage by domestic or feral animals			
	Introduced predator impacts on wildlife			
	Harvesting levels			
Change in dominance of native plants	Introduced plant canopy cover			
	Introduced plant understorey cover			
Total wetland condition index /25				

[1]Assign degree of modification thus: 5=v. low/ none, 4=low, 3=medium, 2=high, 1=v. high, 0=extreme

Main vegetation types:

Native fauna:

Other comments:

Pressure	Rating[2]	Specify and Comment
Modifications to catchment hydrology		
Water quality within the catchment		
Animal access		
Key undesirable species		
% catchment in introduced vegetation		
Other pressures		
Total wetland pressure index /30		

[2]Assign pressure scores as follows: 5=very high, 4=high, 3=medium, 2=low, 1=very low, 0=none

Appendix C Wetland Plot Sheet

Table 3: Wetland Plot Sheet

Wetland name: **Date:** **Plot no:**
Plot size (2m x 2m default)**:** **Altitude:** **GPS/GR:**
Field leader: **Structure:** **Composition:**

Canopy (bird's eye view)			**Subcanopy**			**Groundcover**		
Species[1] (or Substrate)	**%**	**H**	**Species**	**%**	**H**	**Species**	**%**	**H**

[1] % = % cover: total canopy % cover = 100%; H = maximum height in m; indicate introduced species by *

Additional species in vicinity in same vegetation type:

Comments:

Indicator (use plot data only)	**%**	**Score 0–5**[2]	**Specify & Comment**
Canopy: % cover introduced species			
Understorey: % cover introduced spp[3]			
Total species: % number introduced spp			
Total species: overall stress/dieback	NA		
Total plot condition index /20	NA		

[2] 5=0%: none, 4=1–24%: very low, 3=25–49%; low, 2=50–75%: medium, 1=76–99%: high, 0=100%; very high
[3] Add subcanopy and groundcover % cover for introduced species

Appendix D Compensation Wetlands Planting Palette

Botanic Name	Common Name	Threat Status	Height at maturity (m; subcanopy and canopy only)
Agrostis muscosa	Pincushion grass	Regionally At Risk - Declining	
Agrostis pallescens		At Risk - Naturally Uncommon	
Amphibromus fluitans	Water brome	At Risk - Declining	
Argyrotegium mackayi		Regionally At Risk - Naturally Uncommon	
Austroblechnum penna-marina	Alpine hard fern	Not Threatened	
Cardamine mutabilis	Tarn bittercress	Threatened - Nationally Critical	
Carex breviculmis	Grassland sedge	Not Threatened	
Carex dipsacea	Teasel sedge	Regionally At Risk - Declining	
Carex gaudichaudiana	Gaudichaud's sedge	Not Threatened	
Carex resectans	Desert sedge	At Risk - Declining	
Carex sinclairii	Sinclair's sedge	Not Threatened	
Carex tenuiculmis	Slender wine sedge	At Risk - Declining	
Chaerophyllum colensoi var. delicatulum	Myrrh	Threatened - Nationally Endangered	
Chionochloa rubra subsp. cuprea	Copper tussock	Not Threatened	1
Crassula mataikona		At Risk - Naturally Uncommon	
Crassula multicaulis		Threatened - Nationally Endangered	
Crassula peduncularis		Threatened - Nationally Critical	
Crassula sinclairii		Not Threatened	
Deschampsia cespitosa	Wavy hair-grass	At Risk - Declining	0.2 – 0.5
Dichondra brevifolia	Dichondra	Not Threatened	
Elatine gratioloides		Not Threatened	
Eleocharis acuta	Sharp spike sedge	Not Threatened	
Eleocharis gracilis	Slender spike sedge	Not Threatened	
Epilobium komarovianum	Creeping willowherb	Regionally Naturally Uncommon	
Euchiton ensifer		At Risk - Declining	
Euchiton japonicus		Regionally Data Deficient	
Euchiton lateralis		Not Threatened	
Euchiton traversii		Regionally Naturally Uncommon	
Galium (b) (CHR 469914; aff. G. perpusillum; "lacustrine")		Not Assessed	
Gentianella amabilis	Gentian	Regionally Naturally Uncommon	
Glossostigma diandrum	Mudmat	Not Threatened	
Glossostigma elatinoides	Glossostigma	Not Threatened	
Gonocarpus micranthus subsp. micranthus		Not Threatened	
Gratiola aff. Concinna	Gratiola	Threatened - Vulnerable	
Hydrocotyle sulcata	Pennywort	Not Threatened	
Hypericum rubicundulum	Hypericum	Threatened - Endangered	

Isolepis basilaris	Pygmy clubrush	At Risk - Naturally Uncommon	
Juncus distegus		Regionally At Risk - Declining	0.25 – 0.7
Juncus edgariae	Wiwi	Not Threatened	0.6 – 2.5
Juncus pusillus	Dwarf rush	At Risk - Naturally Uncommon	
Lachnagrostis filiformis	NZ wind grass	Regionally Threatened - Vulnerable	
Lachnagrostis striata	Purple wind grass	Regionally Threatened - Vulnerable	
Leptinella (f) (; "seep")		Not Assessed	
Leptinella maniototo		At Risk - Declining	
Lilaeopsis novae-zelandiae		Not Threatened	
Lilaeopsis ruthiana		Regionally At Risk - Naturally Uncommon	
Limosella australis	Mudwort	Not Threatened	
Lobelia ionantha	Hypsela	At Risk - Declining	
Lobelia perpusilla	Lobelia	Regionally Threatened - Vulnerable	
Myosotis glauca		Threatened - Nationally Vulnerable	
Myosurus minimus subsp. novae-zelandiae	NZ mouse-tail	At Risk - Declining	
Myriophyllum propoinquum	Common water milfoil	Not Threatened	
Oreobolus strictus	Comb sedge	Not Threatened	
Plantago triandra	Starweed	Not Threatened	
Ranunculus amphitrichus	Waoriki	Not Threatened	
Ranunculus ternatifolius		At Risk - Declining	
Rorippa palustris	Poniu	Not Threatened	
Rytidosperma nigricans	Bristle grass	Not Threatened	
Stylidium subulatum		Regionally At Risk - Naturally Uncommon	
Tetrachondra hamiltonii		Threatened - Nationally Vulnerable	
Viola cunninghamii	Mountain violet	Not Threatened	
Wurmbea novae-zelandiae	Iphigenia	Threatened - Nationally Endangered	

Appendix E BOAM performance attributes

Area	Wetland type	Timeframe	Indigenous coverage (%)	TAR species present	Hydric vegetation (%)	Indigenous species richness
Coronation North	Sedgeland	7 years	90	5	95	13
	Freshwater herbaceous	7 years	90	5	95	10
	Ephemeral	15 years	50	3	-	8
Golden Bar	Sedgeland	7 years	85	2	95	12
	Freshwater herbaceous	7 years	90	2	95	12
	Ephemeral	10 years	50	3	-	6
Macraes Central	Sedgeland	7 years	90	2	95	8
	Freshwater herbaceous	7 years	90	2	95	10
	Ephemeral	15 years	50	2	-	8
Golden Bar and Macraes Central	Shrubland	5 years	95	3	0.95	9

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.

Maps and Images

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