DRAFT Environmental Management Plan

Millers Flat Gold Mine

1346 – 1536 Teviot Road

Prepared for Hawkeswood Mining Limited

24th June 2024
EnviroCo ref: ENV24059
Revision 3

Document control

Revision 3

Prepared by	Richard Ablitt	24th June 2024
Reviewed by	Blair Gray	24th June 2024
Authorised by	Blair Gray	24th June 2024

Updated following comments from Simon Johnstone, James Ling and Jeremy Brabant.

Revision 2

Prepared by	Richard Ablitt	21st June 2024
Reviewed by	Blair Gray	21st June 2024
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Updated following comments from Simon Johnstone, Anita Collier and James Ling.

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Prepared by	Richard Ablitt	19th June 2024
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Updated following comments from Simon Johnstone, Anita Collier and James Ling.

Revision 0

Prepared by	Richard Ablitt	31st May 2024
Reviewed by	Blair Gray	31st May 2024
Authorised by	Blair Gray	31st May 2024

Disclaimer:

This Environmental Management Plan provides the key design outline for control measures to be provided on site. It is not possible at initial design stage to anticipate and include all site-specific design details, as some detail can only be included on the basis of in situ monitoring and adjustments. In order to be effective on site the plan will need to be implemented by a contractor experienced in sediment and erosion control. Ongoing monitoring will be required to assess its performance and make specific adjustments to its detail to respond to specific conditions on site and changes to those conditions. It is not suitable for unmonitored or unmanaged implementation or implementation by personnel who lack appropriate expertise and experience in erosion and sediment control. It is recommended that the sediment control plan be monitored regularly by appropriately experienced personnel in sediment and erosion control, who is to make such adjustments as are necessary to ensure its effective operation in view of the features, the condition or state of the site or changes to conditions on site.

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1 Introduction

EnviroCo Ltd. has been engaged by Hawkeswood Mining Limited (HML) to prepare this Environmental Management Plan (EMP) for works associated with an alluvial gold mining operation at Teviot Road, Millers Flat.

The document has been developed to ensure that appropriate environmental practices are identified and implemented during the various stages of the exploration and mining project. The role of this document is to overview of operational procedures for compliance with the conditions of consent and to provide an integrated framework for other management plans relevant to the project. This EMP is a working document that is periodically reviewed and amended throughout the project life to reflect changing environmental conditions and developments.

The EMP will refer to, and is supported by, other project documents that have been previously prepared for the project. These documents will be referenced in each section and included in the appendices.

The HML Project Manager is responsible for the implementation of this EMP with support from EnviroCo.

1.1 EMP Objectives and Environmental Context

The primary objective of this EMP is to specify environmental controls which will mitigate against the potential impact of mining activities on the environment. In summary the plan shall:

- Describe site management methods to minimise environmental impact.
- Ensure compliance with consents issued for the project.
- Provide a coordinated overview of the management plans relevant to the project.
- Outline incident response procedures.

1.1.1 Resource Consents

The EMP has been prepared to support resource consents to establish and operate an alluvial gold mining operation.

The proposal is to establish an alluvial gold mine on the site, which includes on-site processing and stockpiling of overburden. The duration of the mining permit is for 10 years, however the mining activity is estimated to be between 5 to 7 years.

The following RMA resource consents are relevant to the operation of the project:

- From Central Otago District Council (CODC):
    - RC230325 – Land use consent to establish and operate an alluvial gold mining operation
- From Otago Regional Council (ORC):
    - RM23.819.01 - Land use consent to construct a bore (mine pit pond);
    - RM23.819.02 – Water permit to take and use groundwater;
    - RM23.819.03 – Discharge permit to discharge water containing sediment to water and to land in manner that may enter water; and
    - RM23.819.04 - Discharge permit to discharge contaminants to air.

1.1.2 Other Relevant Authorisations

1.1.2.1 Mining Permits

The following permits have been granted for the site.

- Minerals Exploration Permit 60712 granted under the Crown Minerals Act 1991 on 19 October 2021 approving exclusive right to explore for gold on the site until 19 October 2024.
- Minerals Mining Permit 60908.01 granted under the Crown Minerals Act 1991 on 17 April 2023 approving exclusive right to mine for gold on the site until 17 April 2033.

1.1.2.2 Archaeological Authority

Four archaeological sites (G43/232, G43/233, G43/285 and G43/149) will be impacted by the proposed works; as such, HML were granted archaeological authority 2024/438 under the Heritage New Zealand Pouhere Taonga Act 2014 on 14 May 2024. This authorises the archaeological sites to be modified as part of the proposed works.

1.2 Site Information

The site is located at Teviot Road, Millers Flat and covers an area of 69 hectares (**Figure 1**). As mentioned in section 1.1, goldmining activity has been previously undertaken on the site. The area of land used for this activity is modified and consists of exposed gravels, soils and shrub vegetation. The remaining areas of the site consists predominantly of pasture grass and has been used for pastoral farming activities.

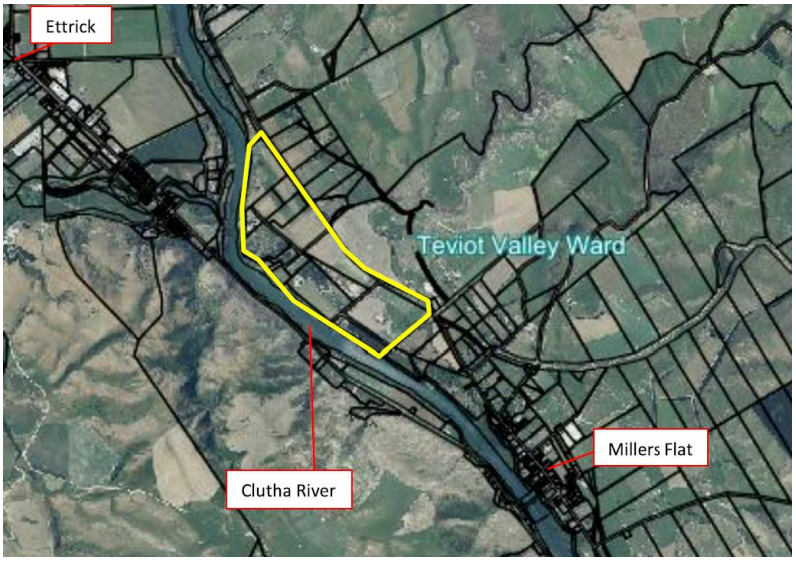

Figure 1 Site Location - indicated with yellow outline (Source: Enviroscope ESCP).

The sites terrain is gently rolling in character and is positioned on a plateau above the Clutha River to the South and West. Teviot Road forms the north-eastern perimeter. The Tima Burn intersects and meanders through the northeastern portion of the site.

Site access is via two existing gravel roads. The first access road is in the northern section of the site and is private and there is not any public access. The second access is a paper road and is council owned and provides access between Teviot Road to the gravel pit. The paper road also provides pedestrian and cyclist access to the Clutha River and is part of the Clutha Gold Cycle Trail.

The land surrounding the site is mainly used for pastoral farming activities. The township of Millers Flat is located 1 km to the southeast and a second township, Ettrick, is located approximately 800m northwest of the site.

The Clutha River is a Statutory Acknowledgement Area and has a range of intrinsic, cultural, recreational and aesthetic values, and is used by the general public for fishing, boating and other recreational uses. The river and riparian zones are not included in this project.

The site and surrounding area has a long history of mining and there is evidence of historical mining operations in the local area. An archaeological assessment has been undertaken and this will be covered in subsequent sections. Archaeological Authority 2024/438 has also been granted under the Heritage New Zealand Pouhere Taonga Act 2014.

The predominant soil type across the site is known as 'brown soil', according to ORCs *GrowOtago* data. This is one of the most extensive soil types in New Zealand. The soil type contains approximately 2:1 clay minerals, and includes iron and aluminium oxides which are evenly distributed through the soil.

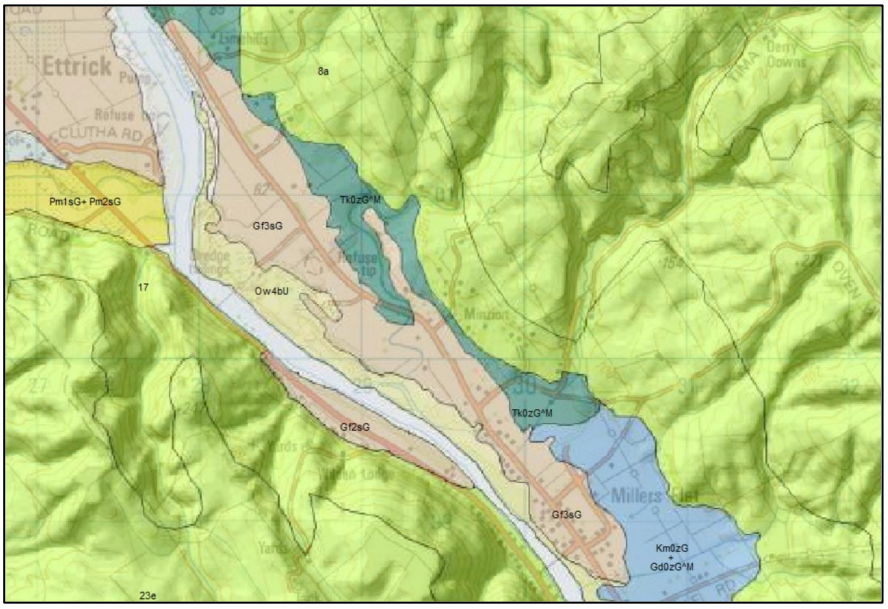

Figure 2 GrowOtago Mapping of the soils in the project area (source: ORC GrowOtago 2004).

A former landfill is located near to the project site. The landfill will be excluded from mining operations and an appropriate set back will be determined by a Contaminated Land Specialist (CLS) SQEP, Environmental Consultants Otago (EC Otago).

Two former stockyards are also located on the site, and these have been investigated by EC Otago and formally reported in a Sampling Summary Report (2024).[1]

[1] Environmental Consultants Otago Ltd. (2024). *Sampling Summary Report - 1484 and 1534 Teviot Road.* 12 February 2024. Ciaran Keogh.

1.3 Project Methodology

In summary the project proposal includes the following activities:

a. Removal and stockpiling of overburden;
b. On-site processing of gold bearing wash utilising water and gravity separation methods;
c. Replacement of tailings and overburden in the mine pit;
d. Ancillary activities, such as staff facilities, a workshop, storage area, settlement ponds, vehicle access within and to/from the site, and parking areas; and
e. Rehabilitation of the site.

The total project volume of earthworks is estimated to be approximately 12 million cubic metres. Gold bearing wash is approximately 2.3 million cubic metres, and the remainder is overburden.

The depth of the excavation will vary across the site; however the base of the gold wash layer will be between 13 m and 18 m below ground level. The earthworks will be below the natural groundwater level and the mine pit will require partial dewatering to permit access. The Gold bearing wash will be processed on the site and the Gold Recovery Plant located within the mine pit. It is anticipated that the processing rate will be approximately 180 m^3 per hour. Gravity separation methods will be used to process the gold. The tailings of non-gold bearing material will be replaced in the mine pit. There will not be any chemical processing for the extraction of gold (HML; 2024)[2].

The project area is approximately 68 hectares. The active work area, comprising the mine pit, internal haul roads and area where rehabilitation is underway is expected to be a maximum of 12 hectares. Up to 7 ha has been permitted for temporary stockpiling, however this may overlap with the active work area. A maximum of 8 ha of the project area will be occupied by ancillary activities where the surface will effectively be stabilised for the project duration, including the workshop, site office, settling ponds, bunding, and vehicle access. These areas combine to a maximum work area of 27 ha, though noting that the work area will fluctuate, and this area is proposed as a conservative maximum estimate.

The project will be completed in stages and the proposed staging is shown in **Figure 3**, below. However; each successive stage will progress while the previous is under rehabilitation due to the moving mine cell methodology. Detailed information on the proposed stages has been provided by Enviroscope (2024) in the Mine Site Rehabilitation Plan[3].

[2] Hawkeswood Mining Limited (2024). *Mining Methodology.*

[3] EnviroScope (2024). *Draft Mine Site Rehabilitation Plan (Rev A). Millers Flat Alluvial Goldmine.* April 2024. Prepared by Quinn McIntyre (Principal Environmental Consultant). 26 April 2024 (RevA).

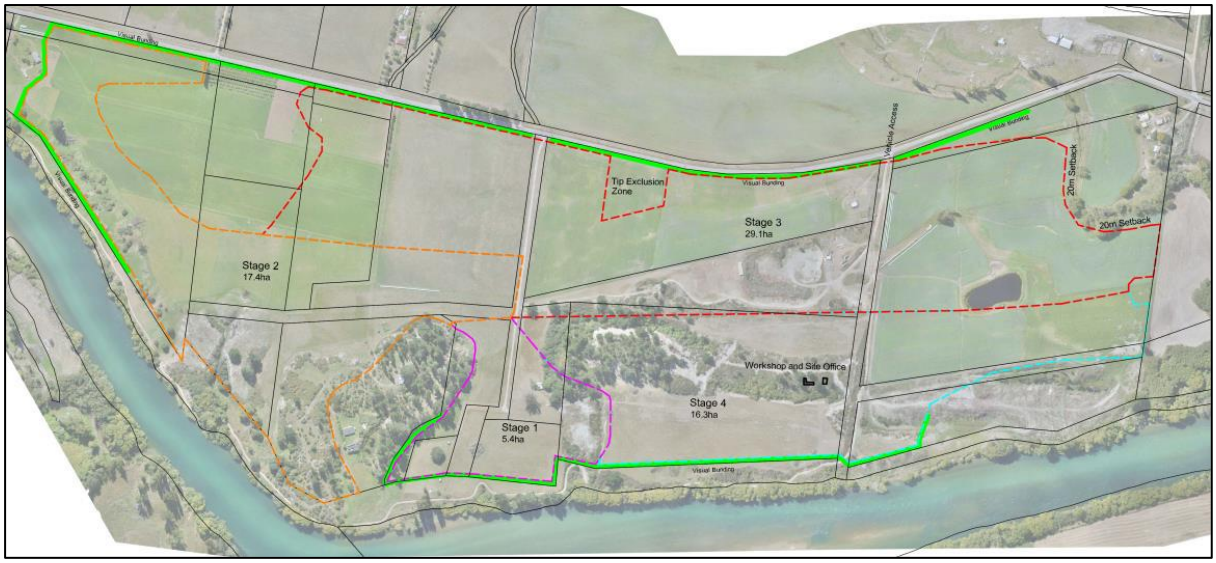

Figure 3 Stage Plan (Source: Overview Surveying / HML).

1.4 Operating Hours

The operation will operate Monday to Friday 7am – 7pm and Saturday 7am – 1pm. There will not be any earthworks or processing work on Sundays or public holidays. Machinery maintenance, dewatering and dust control activities may occur on Saturday afternoons, Sundays, and public holidays.

1.5 Key Contacts, Roles and Responsibilities

Key personnel involved in this project are still to be determined. The following table will be updated as roles are assigned.

Table 1 Key contacts

Name	Company	Position	Mobile	Email
Key Internal Contacts				
Simon Johnstone	HML	Project Manager	027 415 8406	simon@hawkeswood.co.nz
TBC	HML	Environment, Compliance and Safety Officer	TBC	TBC
Key External Contacts				
Anita Collie	Town Planning Group	Principal Planner	021 568 335	anita@townplanning.co.nz
Tom Heller	Environmental Associates Limited	Director	027 7255 703	theller@gmail.com
Richard Ablitt	EnviroCo	Senior Environmental Consultant	027 226 9294	richard@enviroco.nz

Name	Company	Position	Mobile	Email
Ciaran Keogh	Environmental Consultants Otago Ltd.	Principal and Senior Environmental Planner. CLS SQEP	0274 128 004	ciaran@ecotago.co.nz
Victoria Ross	New Zealand Heritage Properties Ltd	Principal Archaeologist	027 291 5913	victoria@heritageproperties.co.nz
Key Authority Contacts				
Pollution Hotline (Otago)	Otago Regional Council (ORC)	Spill Hotline	0800 800 033	-
TBC	Otago Regional Council (ORC)	Resource Management Officer	TBC	TBC
TBC	Central Otago District Council (CODC)	Resource Management Officer	TBC	TBC

The Project Manager (HML) shall be responsible for the implementation and maintenance of the EMP. However, all updates/revisions to the plan will be documented and reviewed by EnviroCo.

The HML Environment, Safety and Compliance Officer is the functional lead for the project's environmental obligations and is the primary contact for environmental related issues.

1.6 Communication Protocols

The movement and provision of information in a timely manner is paramount to ensuring successful outcomes to the project. Communication with relevant parties will be undertaken as per the protocols identified in **Table 2**.

Table 2 Communication protocol for relevant parties

Party	Communication Protocol
Otago Regional Council (ORC)	Through the appointed Compliance Monitoring Officer
Central Otago District Council (CODC)	Through the appointed Compliance Monitoring Officer
Staff	Weekly toolbox meetings with all site personnel, including sub-contractors.
Aukaha	Via the Site Manager to update on key milestones, progression of the Tima Burn enhancement project and generally as required.
Neighbours	A copy of the Site Manager's phone number is to be provided to all neighbours within 500m of the mine footprint. A member of staff is to be accessible for conversations as and when required, including to respond to any complaints.

Information management

Regular communication shall be maintained via:

- 24-hour a day communication through after-hours transfer to cell phones for emergencies and complaints.
- Regular meetings between relevant parties, as identified above in Table 3.
- Weekly management meetings including the Project Manager and Site Supervisor.
- Weekly toolbox meetings with all site personnel, including sub-contractors.

Complaints

A register of complaints will be kept by HML with the following information:

- Name and address.
- Contact telephone number and/or email.
- Nature and description of the complaint.
- Location of the complaint.
- Date and time of the complaint.
- Weather conditions (including wind direction).
- How the complaint was followed up and resolved.

All complaints will be followed up within 24 hours of being made. If deemed relevant to resource consent condition compliance, the relevant Consent Authority shall be notified within a 24-hour period. The complaints register shall be made available to the Consent Authority upon request.

2 Environmental Risk Summary

Table 3 provides a summary of information on the project's environmental key risks with corresponding control strategies and the associated management document detailed methodology is provided within. HML actively employs an adaptive management approach to enhance environmental controls and promptly address any areas requiring improvement.

Table 3 Environmental risk summary

Key Environmental Risk	Control Strategies	Management Document
Groundwater levels	• Groundwater level monitoring • Alternative water supplies to be provided 48 hours prior to a nearby well's water supply becoming non-viable.	• Water Management Plan • Consent Conditions
Archaeology/Cultural Heritage	• s45 Approved Person to present in high-risk areas and on call elsewhere. • Salvage of both known (POI 19, POI 23, POI 26, and POI 38) and unknown artefactual remains followed by public interpretation (where appropriate). • Earthworks in risk areas to be completed using a hydraulic excavator with flat edge bucket and shallow excavation scrapes unless otherwise specified by a section 45 approved archologist	• Archaeological Authority 2024/438 under Heritage New Zealand Pouhere Taonga 2014. • Archaeological Management Plan • Consent Conditions

Key Environmental Risk	Control Strategies	Management Document
	• If archaeology is found under the OCP while using the bulldozer, works must stop to allow for recording with excavations continuing using the above prescribed hydraulic excavator. • If any kōiwi (human remains) are encountered, all work should cease within 25 metres of the discovery until future actions have been agreed by all parties.	
Biodiversity	• Site to be progressively rehabilitated to a productive pastoral and/or agricultural ecosystem • Indigenous biodiversity enhancement project along a section of the Tima Burn • Regular monitoring and control of pest species within the project area.	• Site Rehabilitation and Enhancement Plan • Consent Conditions
Contaminated Land	• The site is not considered to be contaminated or potentially contaminated. • In the event of an unexpected discovery of potentially contaminated material, all work in the vicinity (within 5m) shall stop and the Project Manager shall contact the Environmental Consultant. The area shall be isolated by fencing or other visual means and the project team informed of the discovery. • A Contaminated Land Specialist (SQEP) shall be engaged for any contamination findings and associated contamination management.	• Consent conditions
Dust	• Dust suppressants (i.e. water, polymers) • Stockpiling best practice (i.e., compaction, profiling and stabilisation) • High risk dusty activities to cease when strong winds and dry conditions are present • Restricted vehicle speeds of 15 km/hr • Existing tree shelter belts maintained • Maintain unsealed roads • Dust monitoring, including dust monitors in predominant downwind locations on the site boundary.	• Dust Management Plan • Consent conditions

Erosion and sediment	• Minimising erosion:
	  ○ Setbacks from surface waterways
	  ○ Rehabilitate and stabilise exposed areas back to pasture in a progressive manner
	• Retaining sediment:
	  ○ Perimeter protection through cut below ground level, which effectively contains water within the project areas
	  ○ Stabilised access
	  ○ Sediment retention ponds
	  ○ Defined discharge points
	• Monitoring and Maintenance
	  ○ Check clean water diversions for any evidence of scouring and or sediment.
		• Erosion and Sediment Control Plan
		• Consent Conditions

Key Environmental Risk	Control Strategies	Management Document
	○ Clean out sediment of erosion and sediment control as soon as 20% capacity has been reached.	
Flood Hazard	• Area within Flood Hazard Area on the GeoSolve drawing 'Flood Hazard Assessment Site Plan' to be backfilled as soon as mining operations in that location are complete, prioritising backfill along the edges of the pit. • In the event that a Red rainfall or flooding warning is issued by MetService for the site, any open parts of the mine pit within stages 3 and 4, within the Geosolve Flood Hazard Area are buttressed to as shallow a batter angle as reasonably practical, prior to the event occurring.	• Site Emergency Response Plan
Freshwater Ecology	• Maintenance of dissolved oxygen levels through augmentation water being conveyed via a diffuser. • Maintenance of flows	• Water Management Plan • Consent Conditions
Groundwater Quality	• Buffer around old landfill site • Groundwater quality monitoring • If monitoring shows samples exceed NZDWS values, affected well owners will receive an alternative water supply within 48 hours. • Engagement of a SQEP to assess causes and significance of groundwater quality exceedances to determine if the exceedance was due to mine dewatering and if it affects any current drinking water wells.	• Water Management Plan • Consent Conditions
Land Stability	• Temporary batter slopes with angles of at least 45 degrees unless otherwise advised by a Geologist.	• Consent Conditions
Noise and Vibration	• The site cut minimises the potential for noise. • Noise control bunding to be established in accordance with site plans. • Works to only occur between 07:00 and 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays. • Machinery and plant will be regularly serviced to minimise excessive noise generation. • Compliance with the following noise limits within a notional boundary or at any point within the Rural Residential Resource Area (excluding notional boundary of any dwelling owned by HML, Jacks Ridge Limited or within the mine site): ○ On any day 07:00 to 22:00: 55 dBA L_{10} ○ 22:00 to 07:00 the following day: 40 dBA L_{10} and 70 dBA Lmax. • Compliance with DIN 4150-3:1999 *Vibration in Buildings*.	• Operational Noise Management Plan • Consent Conditions
Public Access	• Public access to the mine site will be prevented • Alternative access points to the Clutha / Mata-au provided with signage prior to public accesses being impeded	• Consent conditions

Key Environmental Risk	Control Strategies	Management Document
	• Temporary diversion of the Clutha Gold cycle trail with signage dictating the duration of the relocation and location	
Spills	• Spill Management Plan • Spill kits • All spills to be cleaned up as soon as practicable.	• Site Emergency Management Plan

Stream Depletion	• Tima Burn Flow Augmentation
	  ○ Flow monitoring to calculate if stream depletion is occurring; then
	  ○ Discharge of clean groundwater to maintain required flows
		• Water Management Plan
		• Consent Conditions

Surface Water Quality	• Sufficient setbacks to waterbodies • Maintenance of dissolved oxygen levels through augmentation water being conveyed via a diffuser. • Primarily discharge to land with only clean abstracted groundwater discharged as part of the augmentation project	• Water Management Plan • Consent Conditions
Transport	• Vehicle accesses constructed in accordance with NZTA guidelines • Restricted heavy vehicle movements during peak school pick up and drop off times (*Heavy vehicle movements associated with the mine shall be scheduled so they do not pass Millers Flat School between 8am and 9am and 2pm and 3pm on any school day*).	• Consent Conditions

3 Project Management Plans

This project is supported by a series of management plans, represented in **Figure 4** below. The management plans are addressed in further detail in subsequent sections of this document. However, these sections are intended to provide an overview for the overall project management and the complete management plans are included as appendices to this document.

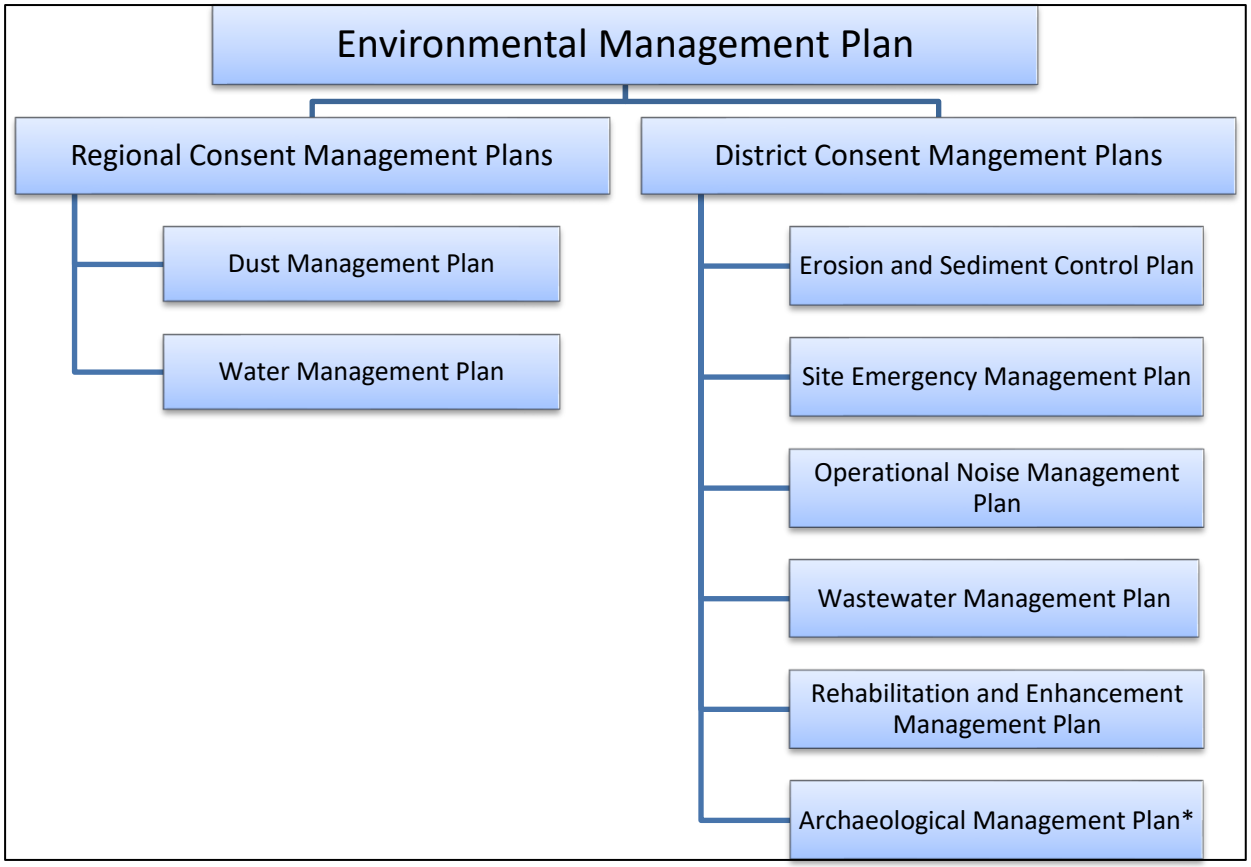

Figure 4 Project Management Plans and structure.

*The Archaeological Management Plan relates to both the District Council Consents and the Archaeological Authority.

3.1 Erosion and Sediment Control Plan

Enviroscope have prepared a comprehensive Erosion and Sediment Control Plan (2024)[4] for the project and the following section provides a summary of some of the key elements of erosion and sediment control.

The ESCP has been prepared for Stage 1 area of the project area. Subsequent ESCP's will be prepared for future stages of the development and will follow similar sequencing and ESC management as Stage 1.

The ESCP has been prepared in accordance with industry best practice and meets requirements in the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region – Guideline Document (GD2016/005).

All staff and contractors will be required to attend an Environmental Induction onsite prior to works to ensure that they are fully aware of the project's environmental risks and their responsibilities.

[4] EnviroScope (2024). *Draft Erosion and Sediment Control Plan (Rev B). Millers Flat Alluvial Goldmine.* April 2024. Prepared by Quinn McIntyre (Principal Environmental Consultant). 12 April 2024 (RevB).

3.2 Dust Management Plan

Air Matters have prepared a Dust Management Plan[5] for the project site and the following provides a summary of control strategies to minimise potential dust issues.

There is the potential for dust issues from project operations and dust will be managed in accordance with good industry practice. This includes the use of watercarts, irrigation and ensuring that vehicles travel at slower speeds on unsealed roads. Vegetation will be established on perimeter bunds and areas maintained as stabilised surfaces (i.e. pasture) for as long as possible.

Progressive stabilisation and rehabilitation will be important to minimise dust issues. Furthermore, the active works area will be limited to approximately 12 ha at a time. In some circumstances dust suppression polymers can be used to manage exposed ground conditions in areas that are to be left undisturbed for a period of time, including stockpiles.
Regular maintenance of unsealed access roads will follow industry best practices, including grading and fresh metal application and existing shelter belts of trees along the site boundary will be preserved. The requirements for dust suppression techniques will be weather-dependent and will be routinely used during dry and windy months (October to March), and as needed during wetter months (April to September). Ample water for dust suppression is available from mine void dewatering.

HML will have at least one large volume water cart on site at all times which will be used to dampen access ways and stockpiles. The water cart will be fitted with forward facing sprays and a water cannon which can also be used to water stockpiles when necessary. The water cart will be supplemented with sprinkler systems where required.

Dust monitoring will be undertaken with dust monitors with telemetered data and supported by a weather monitoring station. This information will be monitored and recorded electronically. Real time information and notifications will be provided to the Site Manager or their delegate when wind speeds are triggered as stated in the Dust Management Plan.

3.3 Water Management Plan

EnviroCo have prepared a Water Management Plan[6] for the project site and the following provides a summary of control strategies to manage groundwater and surface water effects as a result of the proposed alluvial gold mine as well as supporting with resource consent compliance requirements relating to water monitoring (as set out in Section 4 and Table 4 below) and associated trigger/response actions.

The Water Management Plan sets out protection measures and the relevant monitoring requirements and trigger/response actions in relation to:

- Potential stream depletion of the Tima Burn and augmentation requirements;
- Groundwater level monitoring and replacement water supplies;

[5] Air Matters (2024). *Hawkeswood Mining Limited: Dust Management Plan. Millers Flat Gold Mine 1346 – 1536 Teviot Road.* 07 June 2024.

[6] EnviroCo (2024). Draft Water Management Plan. Millers Flat Gold Mine. Revision 3. Prepared for Hawkeswood Mining Limited. ENV24059. 13th June 2024.

- Groundwater quality monitoring and response to any exceedances;
- Groundwater abstraction for the purpose of dewatering; and
- Discharge of dewatered groundwater.

3.4 Operational Noise Management Plan

Hegley Acoustics Consultants have prepared an Assessment of Noise Effects (2023)[7] and have modelled the noise effects of the proposed activities at seven locations internal to the site. These locations were selected for their proximity to surrounding residences.

The noise modelling for the assessment was undertaken with the assumption that all machinery was located/used at the ground surface. However, this is recognised as the worst case scenario as, for the majority of the time, machinery will be located/used below the ground surface which will further mitigate noise levels.

All noise levels were recorded as being greater than 50dBA L_{10}, noting the District Plan daytime noise limit is 55dBA L_{10}.

The document also highlighted the requirement for the installation of perimeter bunds to minimise noise emissions from the project operations. The bunds would ensure that the mining activities comply with the District Plan daytime noise provisions. The bunds would be constructed in accordance with the following guidelines:

- The bund will be constructed at 4m in height across the northern perimeter and nominally 300m down from the western perimeter of the site and 700m down from the eastern side of the site.
- A specific bund will be installed adjacent to the dwelling at 5386 Ettrick-Raes Junction Road of at least 3m in height and 300m long.

3.5 Contamination and Land Management

In 2021 Environmental Consultants Otago Ltd. (EC Otago) completed a Preliminary Site Investigation (PSI) [8] on behalf of HML. The PSI confirmed that HAIL Category G3 (Landfill Sites) applies to the parcel of land. No other HAIL activities were identified within the site. A mining perimeter was established, and the report noted 'that soil sampling and analysis did not identify any contaminants that exceed the natural background levels along the mining perimeter.' EC Otago confirmed that 'there is highly unlikely to be a risk to human health or the environment from soil contamination due to past historical activities outside the mining perimeter'.

[7] Hegley Acoustics Consultants (2023). *Proposed alluvial mining. Millers Flat. Assessment of Noise Effects*. 20 March 2023. Nevil Hegley.

[8] Environmental Consultants Otago Ltd. (2021). *Preliminary Site Investigation. 1484 Teviot Road, Millers Flat. For Hawkeswood Mining Limited*. 28 June 2021. Ciaran Keogh.

A a subsequent report was prepared and titled as a Sampling Summary Report[9]. The report was concerned with two stockyard areas that were not included in the area of the initial PSI. These areas were not included in the PSI at that time as they were excluded from the mining project area. The stockyard areas are now part of the project area.

The Sampling Summary Report included sampling from a variety of locations within the stockyard locations. In conclusion the 'results of sampling and analysis indicate that contaminant concentrations at all sampling locations are consistent with the predicted background levels, indicating that the presence of the stockyards on the site does not constitute a HAIL activity. Consequently, the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES) does not apply to these two sections of land'. The report stated that 'the concentrations of contaminants were found to be well below the applicable human and environmental health guidelines and the soils are highly unlikely to present a risk to human or environmental health'.

The existing historic landfill area will be avoided and excluded from mining operations. HML will engage with EC Otago to ensure that there is an appropriate setback from the landfill to avoid any soil disturbance.

[9] Environmental Consultants Otago Ltd. (2024). *Sampling Summary Report - 1484 and 1534 Teviot Road*. 12 February 2024. Ciaran Keogh.

3.5.1 Accidental Discovery of Contaminated Material

In the event of an unexpected discovery of potentially contaminated material, all work in the vicinity (within 5 m) shall stop and the Project Manager notified. The area shall be isolated by fencing or other visual means. The Project Contaminated Land Specialist must be immediately informed. The Project Manager shall determine the appropriate course of action, which will include notifying ORC and the preparation of relevant Remediation Action Plan(s).

The following procedure shall be adhered to in the event of the discovery of contaminated material.

- **CEASE EXCAVATION** works in that area.
- **CONTACT** the Project Manager immediately.
- Any **UNCONTROLLED DISCHARGE** of contaminants (e.g. ruptured drum) should be contained where practical to prevent further discharge.
- **ISOLATE**/fence/barricade the area of concern to prevent other site workers from entering the area.
- **STOP ALL WORKS** as soon as suspected asbestos is encountered. This may be in the form of soils or fragments of Asbestos Containing Materials (ACM) such as cement sheeting or pipes. Implement. Implement dust suppression methods such as spraying water on the area.
- **CONTACT** the Contaminated Land Specialist immediately to determine the appropriate course of action in relation to the environmental and human health requirements and the need to characterise the soils to assess the risk to site workers.
- **DO NOT ENTER** excavations or subsurface confined spaces where volatile compounds are present (i.e., possible toxic or hazardous atmospheric zones) without approval/permission by a person qualified to issue permits.

If **PETROLEUM HYDROCARBON**/solvent contaminated or unusually coloured soils are encountered during excavation, seek advice from the Contaminated Land Specialist to assess whether any extra precautions are necessary with regard to the protection of human health or explosion risks.

3.6 Archaeological Management Plan

An Archaeological Management Plan[10] has been prepared in accordance with the Archaeological Authority obtained by HML, being 2024/438. The document outlines the procedures to be followed with regard to archaeology.

This section provides summary information from the Archaeological Management Plan.

- Victoria Ross is the section 45 approved archaeologist for the project.
- The role of the section 45 approved person is detailed in the document
- Contractor responsibilities are included, including the on-call procedures (included in the following section).
- On site briefings will be undertaken for all operational project staff.

[10] Heritage Properties (2024). 1346-1536 Teviot Road, Roxburgh. An Archaeological Management Plan for Authority 2024/438. Revision A. 21st May 2024

- Section 45 approved person will be present in areas of known archaeological sites and the risk of encountering those archaeological sites during the course of the project earthworks.
- Detailed information is provided for monitoring dependent on the assigned risk category.
- Specific items for salvage are to be documented, stored and later displaying the reinstated items for public interpretation.
- Procedures for Archaeological Investigations are provided and summary information on Level II minimum recording standards.

3.6.1 On-call Protocol

In the case that suspected archaeological material is encountered during works, an on-call protocol in line with **Figure 5** is to be implemented.

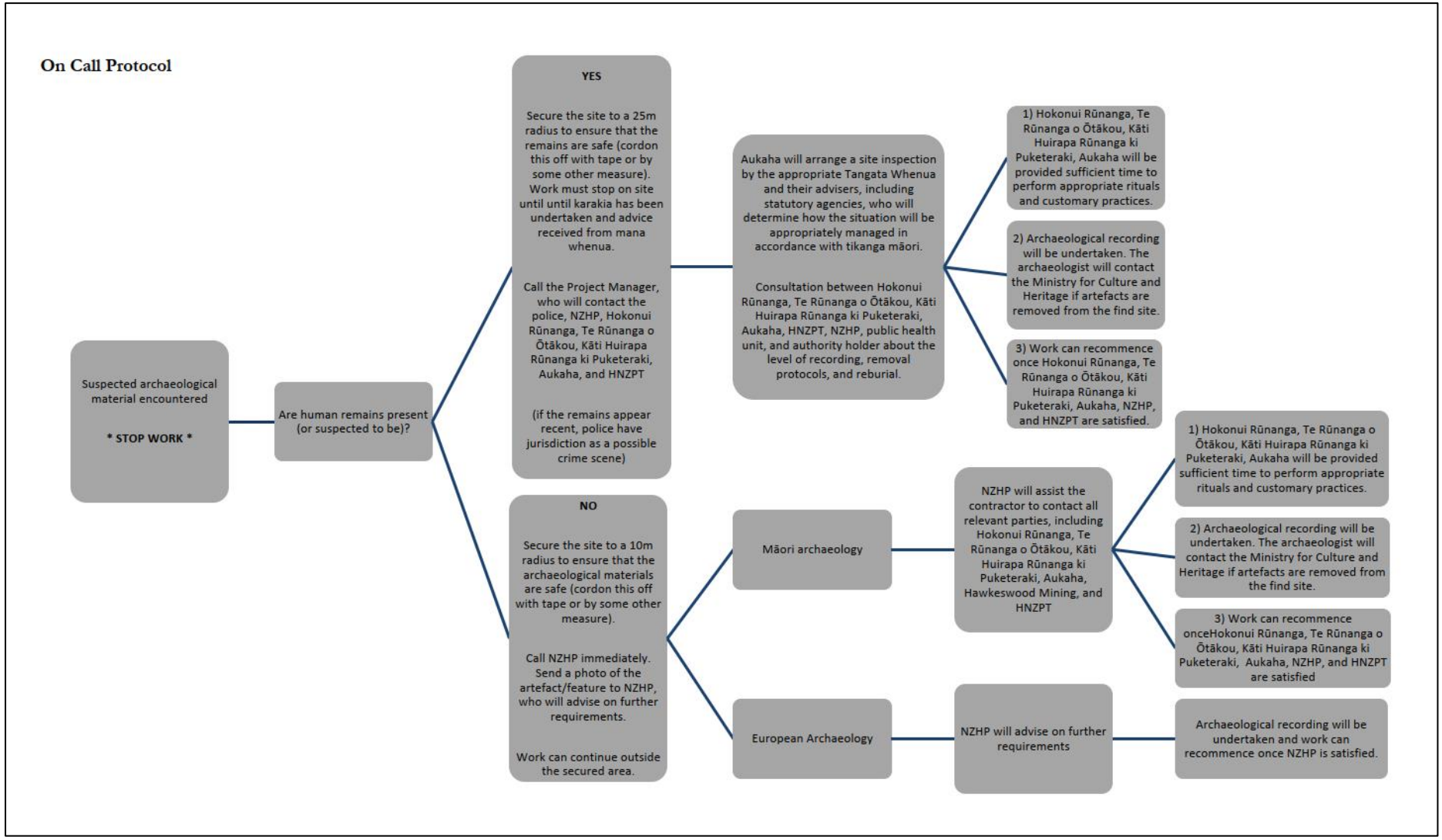

Figure 5 Archaeological On-call Protocol (Source New Zealand Heritage Properties Ltd. – Archaeological Management Plan).

3.7 Rehabilitation and Enhancement Management Plan

The project area will be rehabilitated post mining activities. The intention of the rehabilitation programme is to return the land to a similar or improved quality to that which was present prior to mining activities. This will be in the form of productive pastoral land. HML also propose to undertake an enhancement programme whereby a section of the Tima Burn that sits outside of the site and the mining activities will be proactively enhanced with indigenous planting.

A Draft Rehabilitation and Enhancement Management Plan (REMP) has been prepared by Enviroscope (2024)[11]. This REMP describes the following aspects:

- The location and environmental context of the proposed site.
- Rehabilitation objectives to be achieved.
- Rehabilitation methodology and staging.
- Strategies to manage environmental aspects and risks, based on associated best practice.
- The Tima Burn enhancement programme.
- Framework for monitoring, reporting, review, and continual improvement.

The REMP will utilise the expertise and experience of professional consultants, including biodiversity/ecology, landscape architect, geotechnical engineer and farm consultants / agronomists.

The rehabilitation will ensure that the site is returned to a productive pastoral land of identical or better quality prior to the commencement of the mining operation. The improved pastoral land will include exotic pastoral mixes consisting of grasses and legumes which thrive on the soils in this location. The land will also be prepared so it is suitable to grow feed crops such as brassicas and other greenfeed crops typical in the Teviot Valley.

The REMP also includes enhancement along the embankment of the Tima Burn, across two sub zones referred to as Planting Zones A and B. Planting Zone A encompasses a 1,652 m^2 area and Planting Zone B encompasses a 1,494 m^2 area. Two existing willows will be removed and indigenous species appropriate to the site and area are proposed within an already fenced area, as agreed with the landowners. Species are limited to those with a mature height of less than 4 m to comply with landowner requirements. To minimise significant adverse effects on flow within the waterway, higher species are kept back from the stream sides and two planting mixes are proposed.

4 Monitoring

Project monitoring has been included in each of the relevant management plan documents. The monitoring requirements vary and are dependent on the type of management / control strategies being undertaken.

Monitoring is of importance throughout the duration of the project to ensure that there are not any adverse impacts on the local environment. The frequency of monitoring to be undertaken will be appropriate to the type of activity, level of environmental risk and consent requirements.

[11] EnviroScope (2024). *Draft Mine Site Rehabilitation Plan (Rev A). Millers Flat Alluvial Goldmine.* April 2024. Prepared by Quinn McIntyre (Principal Environmental Consultant). 26 April 2024 (RevA).

The monitoring provisions that are to be undertaken throughout the project are summarised in Table 4 below with reference to the relevant management plan and conditions where this is to be implemented in detail:

Table 4 Summary of monitoring requirements

Management Plan	Location within Management Plan	Relevant Conditions	Monitoring Requirements
Environmental Management Plan	N/A		Environmental and compliance monitoring will also be undertaken by an Environment, Compliance and Safety Officer employed by HML. The inspections will assess compliance with resource consents, regional rules and the EMP. Site inspection reports detailing compliance and any corrections required will be made available to staff electronically within 48 hours and advised to staff verbally at the time of inspection. Additional advice during a significant weather event will be provided as requested.
Site Emergency Management Plan	N/A	N/A	N/A
Erosion and Sediment Control Plan	Section 3.3		Weekly environmental inspections to: • Confirm that all environmental controls are present, functional, and adequate. • Identify any activities that may cause an environmental incident or actual or potential environmental effects. • Identify maintenance requirements for implemented management measures. Prior to a significant rain event a Pre-Event Inspection will be undertaken to inform any preventative work required and may result in the Rapid Response Procedure (as outlined in Section 4.5 of the ESCP) being implemented. During a significant rain event, Rain Event Monitoring will be undertaken to ensure that: • Erosion and sediment control devices continue to function correctly and inform any necessary emergency responses. • Sediment retention devices are functioning effectively and have capacity available. • No dirty water is crossing the boundary of the site. Immediately following a significant rain event a Post-Event Inspection will be undertaken with any observations and corrective actions recorded in the daily job diary.

Management Plan	Location within Management Plan	Relevant Conditions	Monitoring Requirements
Dust Management Plan	Section 6		To ensure dust mitigation measures are implemented and are effective at minimising dust, the following monitoring are to be implemented: - Check weather forecast for strong winds and rainfall daily before works start; - Observe weather conditions from observations and data from weather station in real time; - Inspect stockpiles to ensure a reasonable dampness is maintained daily and as conditions change; - Inspect dust generating activities to ensure dust emissions are effectively controlled in real-time and as conditions change; and - Inspect watering systems to ensure equipment is maintained and functioning weekly. Further, two real-time dust monitors will be installed in predominant downwind locations on (or near) the site boundary to measure the concentrations of fine particulate matter (PM_{10}). If trigger levels, as outlined in the Dust Management Plan, are exceeded an investigation into the cause and a review of controls will be undertaken.
Water Management Plan	Section 3		**Groundwater Abstraction Rates** Groundwater abstraction rates and volumes are to be monitored using standard metering techniques and recorded as to not exceed the prescribed abstraction limits. Daily checks will be undertaken to: - Determine whether pond water levels are suitable for mining operations. - To ensure that the dewatering pumps and delivery pipelines are functioning correctly. - Ensure the meter is functioning correctly (on the basis of expected abstraction flows). - Determine and ensure that water abstraction is occurring within the limits provided above.
	Appendix A - Section 5		**Discharge to Land** During dewatering discharge to land, at least a daily check shall be undertaken to: - Ensure there is no direct run off of sediment laden water or discharge to any surface watercourse. - Ensure there is no flooding or erosion of land instability as a result of the discharge. - Checking to confirm sediment retention ponds are suitably sized to allow appropriate treatment of sediment laden water prior to the discharge infiltration area. If the discharge is visually dirty, then additional sediment pond area and/or use of non-toxic and biodegradable flocculants can be used to lower sediment concentrations.

Management Plan	Location within Management Plan	Relevant Conditions	Monitoring Requirements
			- To ensure that the discharge sediment ponds and final infiltration area is suitably sized to enable effective treatment, including adequate freeboard to ensure there is no overflow of sediment laden water from the discharge area. Discharge quality monitoring is to be undertaken quarterly from the settlement pond outlet (to discharge to land) for the final operational discharge infiltration area. Monitoring/sampling methodology, parameters and reporting (for the surface grab sample) shall be consistent with that required by the general groundwater quality site monitoring and reporting management plan as detailed below.
	Section 7.1		**Groundwater Levels:** Groundwater monitoring at the mine site involves using piezometers located at the lateral boundaries. HML has consistently monitored water levels across the site monthly since November 2022 to establish baseline levels. Measurements are taken using a standard dip meter, referencing a surface point (typically the top of casing). All recorded water levels are associated with piezometer numbers and stored in a spreadsheet for analysis and reporting to the Consent Authority. During mine dewatering operations, water levels in the monitoring piezometers should be measured weekly. If any piezometer experiences more than a 0.2 m drawdown due to dewatering (in addition to seasonal variation), daily monitoring is necessary. Seasonal variation data can be obtained from specific piezometers, depending on the mine pit pond position or established baseline measurements. If required, an alternative water supply arrangement will be provided to any well users 48 hours prior to their water supply becoming non-viable. After HML activities are completed, monitoring continues until steady state conditions are achieved in the aquifer (determined by the Project Hydrologist
	Section 7.2		**Groundwater Quality:** Monitoring will be initially undertaken prior to the start of activities and form baseline information (within 3 months of commencement). Existing wells in the local area will also be utilised for this purpose (subject to authorisation). Following this periodic groundwater quality monitoring will be undertaken on a quarterly basis. If monitoring shows samples exceed NZDWS values, affected well owners will receive an alternative water supply within 48 hours.

Management Plan	Location within Management Plan	Relevant Conditions	Monitoring Requirements
			A SQEP will assess causes and significance of groundwater quality exceedances to determine if the exceedance was due to mine dewatering and if it affects any current drinking water wells.
	Section 5		**Surface Water Flows:** The Tima Burn flow rates will be monitored upstream of the Tima Burn Bridge and near to the Clutha River for downstream monitoring, using vertical staff gauges. This data will be used to calculate whether any stream depletion is occurring, and water can be augmented to reinstate proper stream flows.
Wastewater Management Plan	Section 2.1; and Section 2.2		The Service Provider will schedule emptying of holding tanks and record filled volume in each tank. Regular checking for any leaks or damages and subsequent repair will be undertaken to ensure all components are in proper working order. HML to perform regular visual inspections.
Operational Noise Management Plan	Section 9		Noise levels during each stage of mining will be checked either at the closest dwelling boundary or a representative monitoring location. A permanent noise data logger will provide detailed continuous monitoring. If mine noise is within 3dBA L_{10} of the consented limit, professional acoustic advice will be sought to ensure the correct monitoring and assessment techniques are followed. Monitoring details will be recorded.
Rehabilitation and Enhancement Management Plan	Section 8		Monitoring occurs throughout project works, rehabilitation stages, and annually for three years after the final stage of works. The goals include evaluating method effectiveness, identifying issues (such as pests or poor establishment), and understanding local climate influences. The monitoring program provides an overview of work progression, confirms environmental controls, and identifies erosion or dust issues. It also monitors survival rates and health of indigenous plantings. Specific methods include site walkovers, water and soil sampling, and visual documentation. Annual reporting covers extraction progress, success areas, and improvement recommendations.
Archaeological Management Plan	Section 5-6		An archaeologist must be present and monitoring earthworks during excavations within the red and orange zones as shown in Figure 10-1 of the management plan. These zones are based on the presence of known archaeological sites and the risk of encountering them during the course of the project earthworks.
	Page 9		In all other zones an on-call protocol is to be implemented.

Management Plan	Location within Management Plan	Relevant Conditions	Monitoring Requirements
Topsoil Management Plan	Throughout		Monitor length of topsoil storage periods to ensure that after a period of 36 months the appropriate maintenance is undertaken. Standard soil sampling and profile analysis is to be carried out across each stage prior to stripping to establish baseline soil conditions for the 'in situ' soil resource on the advice of a soil scientist. This will then be undertaken across rehabilitated soil areas following completion of soil replacement for each mining stage, ensuring soils meet or exceed baseline levels as assessed pre-stripping. Prior to rehabilitated land reverting to farmed agricultural production again, a field evaluation of topsoil condition will be carried out based on an assessment on the following soil properties: - Soil pH; - Total carbon; - Total nitrogen; - Anaerobically mineralizable nitrogen; - Olsen phosphorus; and - Bulk density. Surface depressions resulting from fill and soil settling which show by way of surface ponding to be monitored and levels remedied until such time as the landowner resumes full management of the area.

HML shall cooperate with any external environmental auditing in relation to compliance with consents, regional rules or other legislation. This includes assisting with routine compliance inspections from ORC and CODC monitoring officers.

5 Training and Project Staff Development

All staff shall receive environmental training that is appropriate/relevant to their role, discipline, and position. As a minimum all staff shall have received introductory training on the project's key environmental risks, controls and their responsibilities. All personnel will also have an awareness of the site's consents. This information shall be communicated to staff via site inductions and discussions with the Environmental Consultant.

Other staff training opportunities may include the following:

- Toolbox talks can be delivered for training purposes and can be related to a specific area of works, such as spill kit training, installation of silt fences and dirty water management. This method of training is an effective method of providing environmental training and can be modified during the course of the project.

- Pre-start meetings are typically used prior to the commencement of new work activities. It is important that all safety and environmental issues are discussed and these meeting provide a good opportunity to identify environmental risks and ways to mitigate the risks. The meetings will also include information on the reporting of incidents.
- Training for specific staff based on position and responsibilities. For example, water quality monitoring, spill prevention and control, erosion and sediment control.

The level of training is the responsibility of the Project Manager.

6 Incident response procedures

All project staff have a responsibility to prevent an incident from occurring, or, where potential harm is observed, to report all potential incidents to their manager or other representative.

The Project Manager holds overall responsibility for environmental incidents and response. However, in the event of an incident the Project Manager will work in collaboration with the Environment, Compliance and Safety Officer. All incidents will be documented by HML in accordance with company procedures.

The cause of all incidents will be subjected to a root cause analysis to determine the cause(s) of the incident and to ensure that remedial / corrective action is implemented to ensure that a reoccurrence is avoided.

A summary of incidents for the duration of the project will be provided and included in monthly project reviews.

Validated complaints will be recorded on HML reporting forms and will follow communication protocols as discussed in **Section 1.6**.

The Regulator (CRC, CODC) shall be notified of incidents that trigger notification as defined in the applicable Resource Consents. These triggers include offsite discharges, unauthorised disturbance or destruction of fauna, flora or heritage sites, and breaches and non-conformances of licences and permits issued for the project. The Project Manager and Environment, Compliance and Safety Officer are responsible for notifying relevant regulators and key stakeholders.

7 Decommissioning or Abandonment

In the event that the site is to be abandoned prior to the project completion, HML will inform the relevant authorities (ORC and CODC) and stakeholders. HML will undertake actions to ensure that the site is decommissioned to an acceptable standard to ensure that all risks are sufficiently managed and mitigated.

The following provides a summary of actions that may be initiated by HML in a situation of decommissioning or abandonment.

- Removal of all fuels and chemicals from the operational site and storage in bunded storage facility.

- Removal of all vehicles and machinery.
- Disconnection of dewatering pumps and associated water infrastructure, once all equipment has been removed.
- Stabilisation of exposed surfaces.
- Protection of archaeological features and known archaeological sites.

HML will engage with the environmental specialists and regulatory authorities to ensure that there is not any current or future potential for negative environmental impacts.

A bond is to be in place to serve as a contingency in case of project abandonment and will be issued in accordance with consent conditions.

Appendix A: Relevant Approval Conditions

Appendix B: Erosion and Sediment Control Plan

Appendix C: Dust Management Plan

Appendix D: Water Management Plan

Appendix E: Operational Noise Management Plan

Appendix F: Vibration Management

Appendix G: Preliminary Site Investigation

Appendix H: Sampling Summary Report – Contamination

Appendix I: Archaeological Management Plan

Appendix J: Archaeological Authority

Appendix K: Rehabilitation and Enhancement Management Plan

Appendix L: Wastewater Management Plan

Appendix M: Site Emergency Management Plan