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Macraes Operation

Preliminary Site Investigation (Ground Contamination)

OCEANA GOLD (NEW ZEALAND) LTD

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Project manager: Shane Moore
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Williamson Water & Land Advisory

PO Box 314,
Kumeu 0841,
Auckland
T +64 21 613 408

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Investigation Summary

Williamson Water & Land Advisory (“WWLA”) has prepared this Preliminary Site Investigation (“PSI”) to assist Oceana Gold (New Zealand) Limited (“OGNZL”) in obtaining resource consent approvals under the Fast Track Approvals Act 2024 (“FTAA”) as part of the Macraes Phase 4 Project (“MP4” or “the Project”). The key findings of this PSI are summarised below.

Land use history and potential for ground contamination [Sections 2 & 4]	Various land uses listed on the Hazardous Activities and Industries List (“HAIL”) with potential to cause ground contamination are present within the mine. The key activities being: • Metalliferous ore processing; • Storage and formulation of chemicals; • Commercial refuelling facilities; • Workshops (engineering and mechanical); • Waste disposal to land; and • Electrical transformers and substations.
Risk assessment [Section 5]	This assessment has identified that there is potential for three primary types of contamination within the mine: • Localised areas of contamination, such as around workshops, fuel farms and the Processing Plant. Only some of these areas are proposed to be disturbed as part of the MP4 Project, so future investigations should be focussed on these. Investigations for other areas can be considered during decommissioning of those locations or subsequent mine closure. • Larger areas of low-level contamination, such as in outdoor storage areas and waste disposal areas. These are less likely to require contamination-specific management, and many will be re-processed during MP4 under standard mining controls. • Potential discharges resulting from mining activities, such as at the TSFs, active and former mine workings, and ore stockpiles. For MP4, discharges are expected to be monitored and managed under a comprehensive set of consent conditions and plans, so further ground contamination-specific assessment is not warranted. The exception to this is that further assessment of potential effects from the historic lawful use of per- and polyfluoroalkyl substances (PFAS) are ongoing.
Investigation requirements [Section 5.2]	Targeted investigations or Detailed Site Investigations (“DSI’s”) are recommended to enable any actual contamination in the identified HAIL areas (where soil disturbance for MP4 is proposed) to be understood, quantify and design remediation requirements, or conversely eliminate areas from requiring further investigation. The first of these has been completed for the Mining Workshop and is presented under separate cover. Additional locations that may require investigation are: • Selected fuel farms; • Selected finger storage areas; • Waste burial areas. • Workshops; and • Burnables area (if disturbed).
Consenting implications [Section 6.2]	The scale of earthworks proposed for MP4 means that resource consent is required under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (“NESCS”). As soil sampling has not been undertaken for all HAIL activities intersection by the Project, resource consent is required for a Discretionary Activity in accordance with Regulation 11. Additional consents for discharges to land are not expected to be required under the Otago Regional Plan: Waste for Otago. But if additional consents are required to authorise PFAS management or remediation options, they will be sought outside the FTAA application. A dedicated Contaminated Site Management Plan (CSMP) is recommended to guide management of contaminated land associated with MP4.

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1. Introduction

OGNZL (New Zealand) Limited (“OGNZL”) currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes, East Otago (see **Figure 1**, overpage). 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 Williamson Water and Land Advisory (“WWLA”) to provide an assessment of ground contamination in the context of the Project and, to the extent required, identify any necessary management and operation measures to address any such effects.

1.1 Background

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.

The location and key features of the Macraes Operation are shown in **Figure 1**. An overview of the proposed activities which make up the Project is shown in **Figure 2** below.

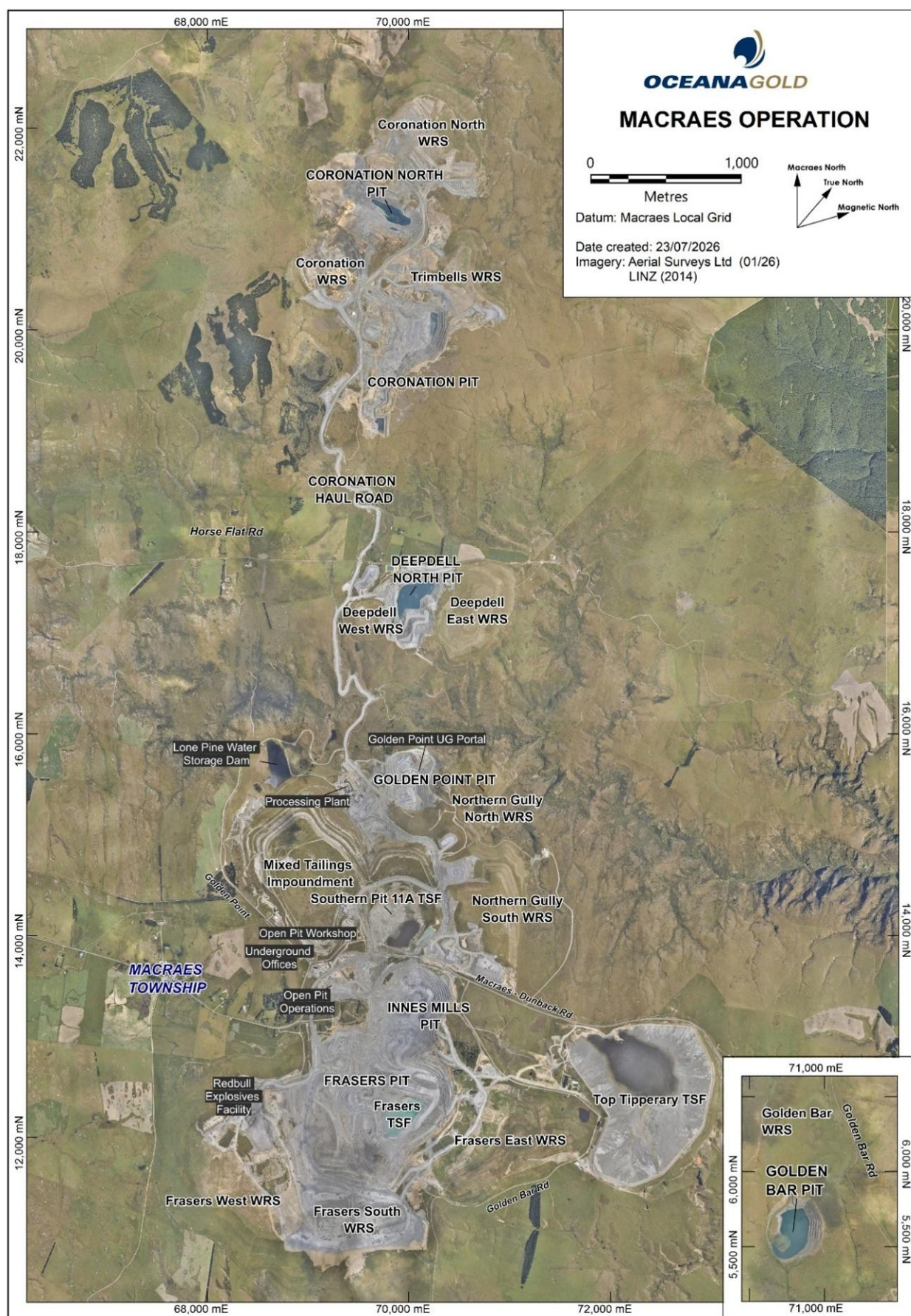


Figure 1. Macraes Operation location and key features (source: LINZ)

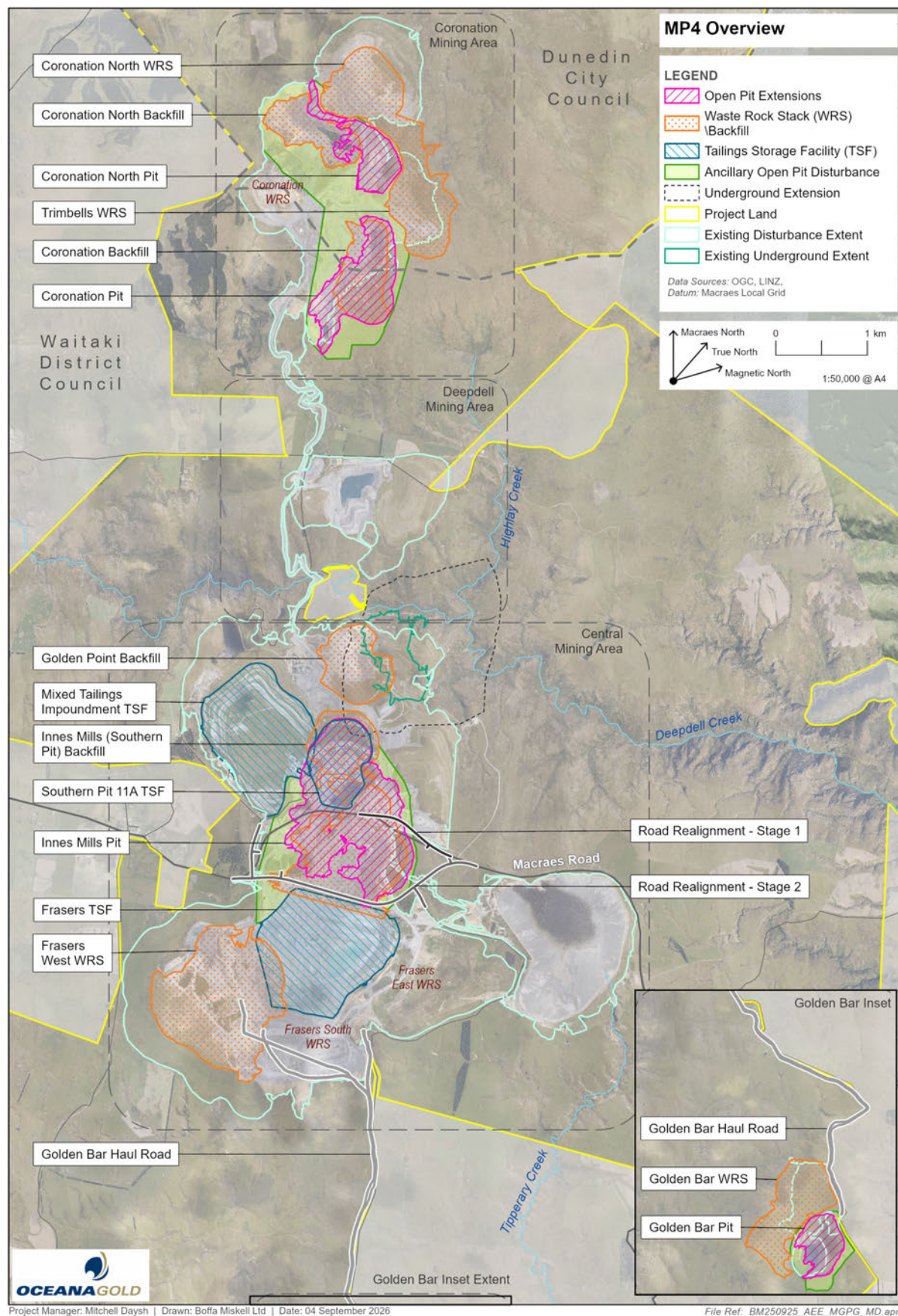


Figure 2. MP4 Project overview plan (source: OGNZL)

1.2 Objectives and scope of this report

This Preliminary Site Investigation (“PSI”) has been undertaken to identify the potential presence of ground contamination within the footprint of the MP4 Project and the likely implications this may have for project consenting and design. We have also considered activities with potential to overlap with the MP4 Project but areas where no mining or soil disturbance are proposed, and no other overlap occurs, are excluded (e.g. the Processing Plant). Where relevant, applicability of an activity or potential risk to the MP4 project has been indicated.

The scope of this report includes:

- Review of the environmental context of the site.
- Review of historical site data including:
 - Aerial photographs,
- OGNZL records (see **Appendix A**) and interviews with site staff and contractors,
 - Otago Regional Council files,
 - Archaeological information provided by Origin Heritage Ltd.
- Site walkover inspection by a Contaminated Land Specialist/Suitably Qualified Environmental Practitioner (“SQEP”).
- Assessment of the potential presence of contamination within MP4 at the Macraes Operation, based on an evaluation of current and historical land uses against the HAIL.
- Development of a preliminary Conceptual Site Model (“CSM”) including geological and expected ground conditions to assess contaminant risks and remediation requirements during mine closure.
- Evaluation of Detailed Site Investigation (“DSI”) requirements, resource consenting pathways and likely ground contamination-related implications for earthworks during mine closure.
- Evaluation of contamination-related consent requirements for the MP4 project, in the context of the FTAA process.

1.3 Legislative requirements

WWLA has prepared this investigation in general accordance with published industry best practice guidance, including:

- The Ministry for the Environment’s (“MfE’s”) Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (updated 2021);
- MfE’s Users’ Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (2012); and
- Health and Safety at Work (Asbestos) Regulation (2016), specifically as they relate to potential contamination of soils.

This PSI has been prepared, reviewed and certified by a SQEP as defined in the MfE Users’ Guide. Curriculum vitae confirming the SQEP status of WWLA contaminated land specialists are available on request.

2. Site 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 5 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 undertaken in accordance with existing resource consents. **Figure 3** 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.

The features relevant to MP4 are discussed in further detail in **Section 2.2** below. This excludes the Processing Plant, Golden Point Magazine and the Red Bull Powder Facility as these are not proposed to be disturbed as part of MP4.

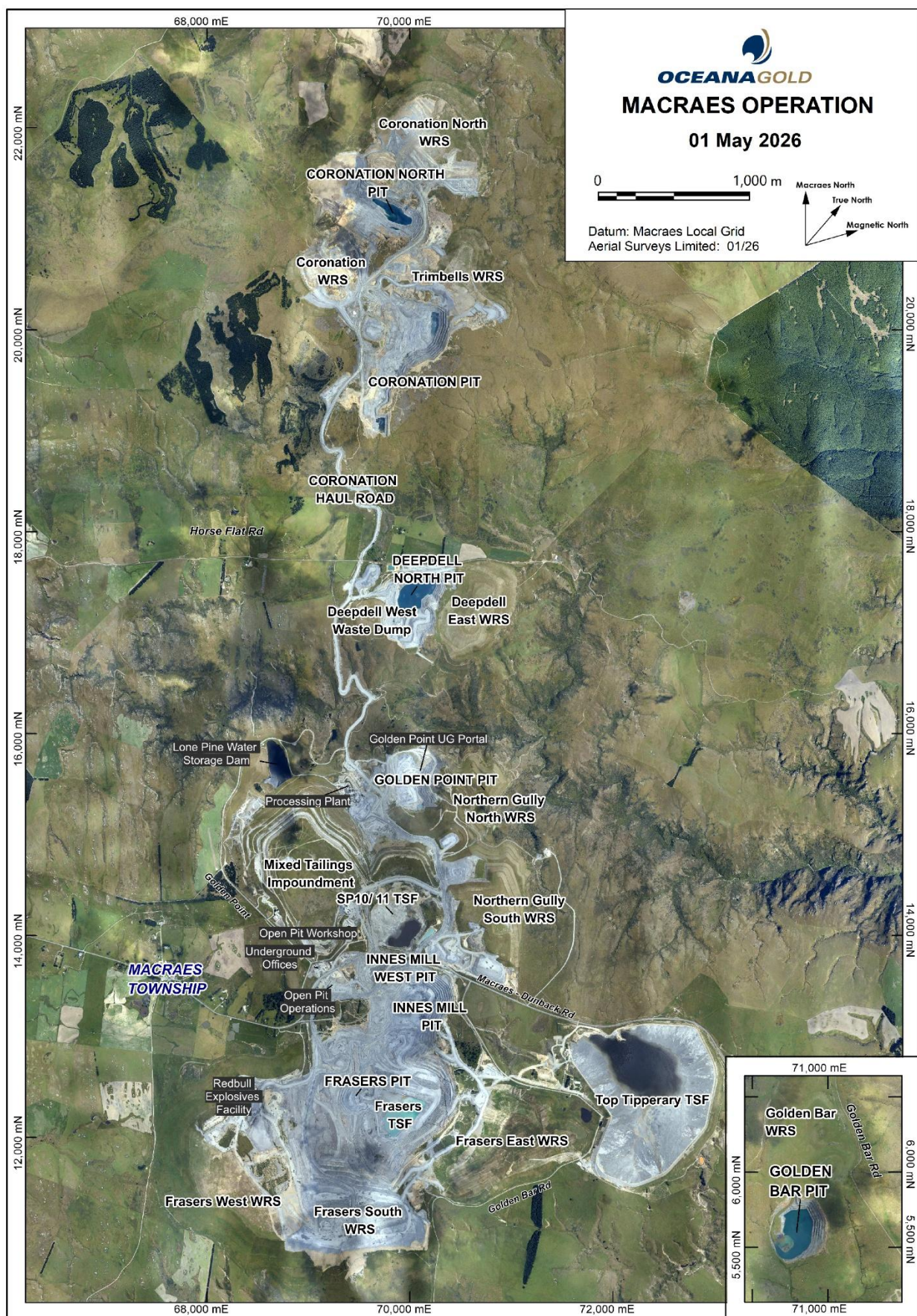


Figure 3. Existing site layout at the Macraes Operation (source: OGNZL)

2.1 Environmental setting

The environmental setting is described in **Table 1**. The features of the environmental setting are considered in the context of their potential to affect the distribution, mobility and form of contaminants (if present). These variables set the scene and inform the CSM evaluation (**Section 4**) if it is established that activities with the potential to cause ground contamination have occurred.

Table 1. Environmental setting

Topography	<i>Site topography influences where contaminants might migrate to if present.</i> The topography of the area surrounding the Macraes Operation is that of an ancient erosional surface, or peneplain, which is expressed as gently rolling hills, between approximately 500 and 550 m RL, bisected by deeply incised streams. The topography generally falls to the northeast steepening nearer the Shag River valley. Within the mine, the supporting facilities like the Processing Plant, workshops etc. have generally been cut into flat benches, with the remainder of the site dominated by the large pits, waste rock stacks and TSFs.
Surrounding land use	<i>Surrounding land may include HAIL activities that can contaminate soil or groundwater on properties nearby.</i> Surrounding land is predominantly pasture, most of which is being farmed but with some areas of reserve/public conservation land. The township of Macraes is approximately 1 km southwest of the mine offices. There are no large-scale sources of contamination on immediately surrounding land holdings but localised impacts from typical farming activities such as sheep dips, farm dumps, refuelling facilities and related to use of asbestos and lead-based paints on buildings/structures can be expected.
Geology	<i>Geological conditions are considered in the context of describing the CSM (Section 4) should potential for contamination be identified by this desk study. For example, more porous soils can enable contaminants (if present) to move more quickly and potentially further than clay-rich soils that retain/bind or prevent penetration of contaminants.</i> Macraes Operation is located within Rakaia terrane Otago Schist; ancient seabed deposits that became metamorphosed and mineralised approximately 130-140 million years ago. Gold is concentrated in mineralised 'shoots' within the Hyde-Macraes Shear Zone. Within the wider area there are small pockets of Quaternary sediments and Miocene volcanics (Figure 4). Exploratory and geotechnical drilling and landform comparison indicates that a thin layer of loess covers much of the MO area. The loess soils comprise a very stiff, light yellow grey silt, sandy silt or silty fine sand. Investigations typically encounter 0.2m to 0.4m of soils.
Hydrogeology	<i>Hydrogeological conditions affect the potential risk of contaminants (if present) entering and being transported in groundwater.</i> Depth to groundwater is expected to be highly variable across the project area based on the topographic variations and mining activities (e.g. presence of pits). However, we understand that the open pits at Macraes produce only a small quantity of groundwater. Dewatering wells are not used, with the occasional exception of depressurisation bores to reduce the risk of slope instability. Groundwater is managed by pumping from pit sumps to the MWMS. Groundwater flow is expected to follow topography and discharge to the surface water bodies described below.

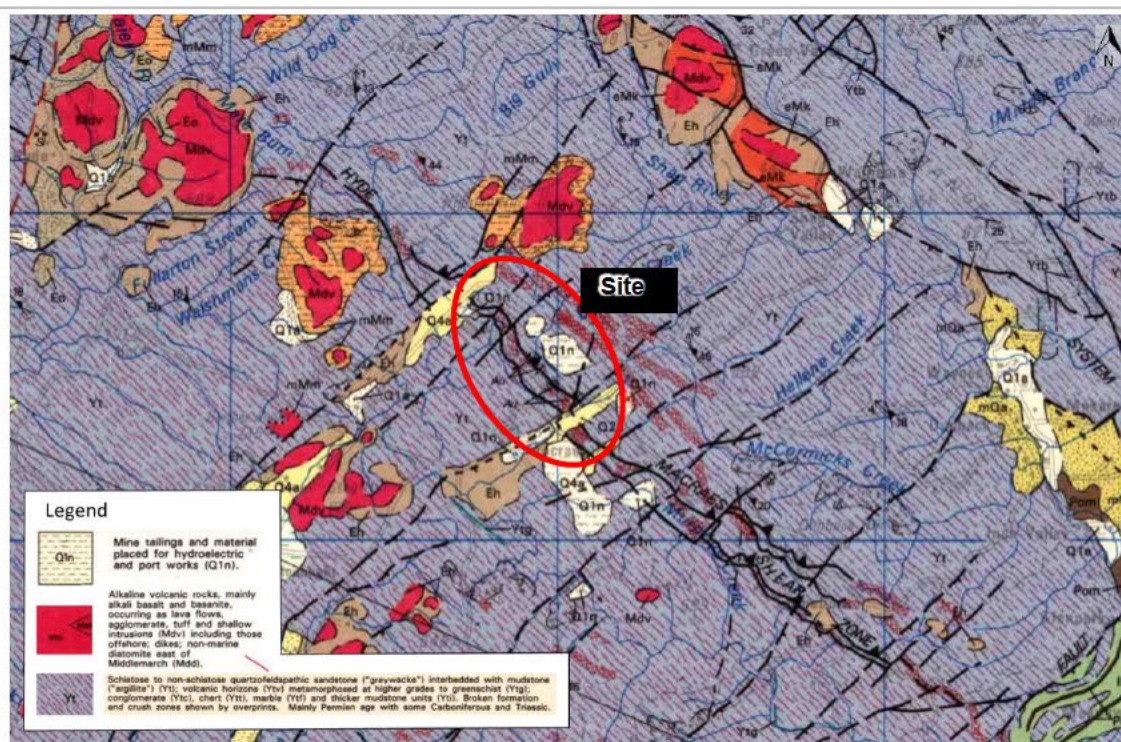


Figure 4. Published geology of the Macraes area (Source: Forsyth, P.J. (compiler) 2001. Geology of the Waitaki area. Institute of Geological and Nuclear Sciences 1:250,000 geological map 19.

Surface water bodies	Surface water features are potential receiving environments, should contaminants be present on a site. Within the mine, surface water is managed by: • Diverting clean water away from active working areas; and • Collecting runoff water in pit sumps or silt ponds and either using it for dust suppression or pumping it into the MWMS. There are several natural watercourses within the wider area of the Macraes Operation (Figure 5). These include: • North Branch Waikouaiti River drains surface water and shallow groundwater from the central western extent of the Macraes operation particularly around the Frasers West Waste Rock Stack. • Murphy's Creek catchment drains surface water and shallow groundwater from the southern extent of the central Macraes operation, particularly around the Frasers Waste Rock Stacks. It eventually flows into the North Branch Waikouaiti River. • The Tipperary Creek is located south of the Top Tipperary TSF and west of Macraes Road. • The Shag River (Waihemo) is the main watercourse on the eastern side of the mine complex, receiving water from Deepdell Creek and other water courses, and via seepage from the Frasers Innes Mills Open Pit lake. • Deepdell Creek bisects the site from east to west, between the Golden Point Pit/Underground Portal in the south and the Deepdell pit and associated rock stacks in the north. • To the north of the site, Trimble's Gully, Coal Creek and several other small tributaries drain into Mare Burn. • Near Golden Bar in the south, Clydesdale Creek and Golden Bar Creek form the main surface water features.
Sensitive receptors	Sensitive environmental receptors could include aquatic or terrestrial ecosystems. This is not an ecological assessment but is instead an initial review of the surrounding environment to assess where contaminants (if present) on the site could migrate to and the specific receptors potentially affected. Sensitive human receptors could, for example, be children at a school or kindergarten on or adjacent to a site. Workers on industrial land on or adjacent to a site would be considered less sensitive. This receptor interpretation informs the CSM and future guideline value selection for evaluation of soil data. The key sensitive receptors surrounding and within the Macraes Operation are: • Mine workers, contractors and visitors; • The residents of Macraes township and surrounding farms; • Terrestrial and aquatic ecosystems such as the various creeks and rivers; • The trout within the on-site trout hatchery.

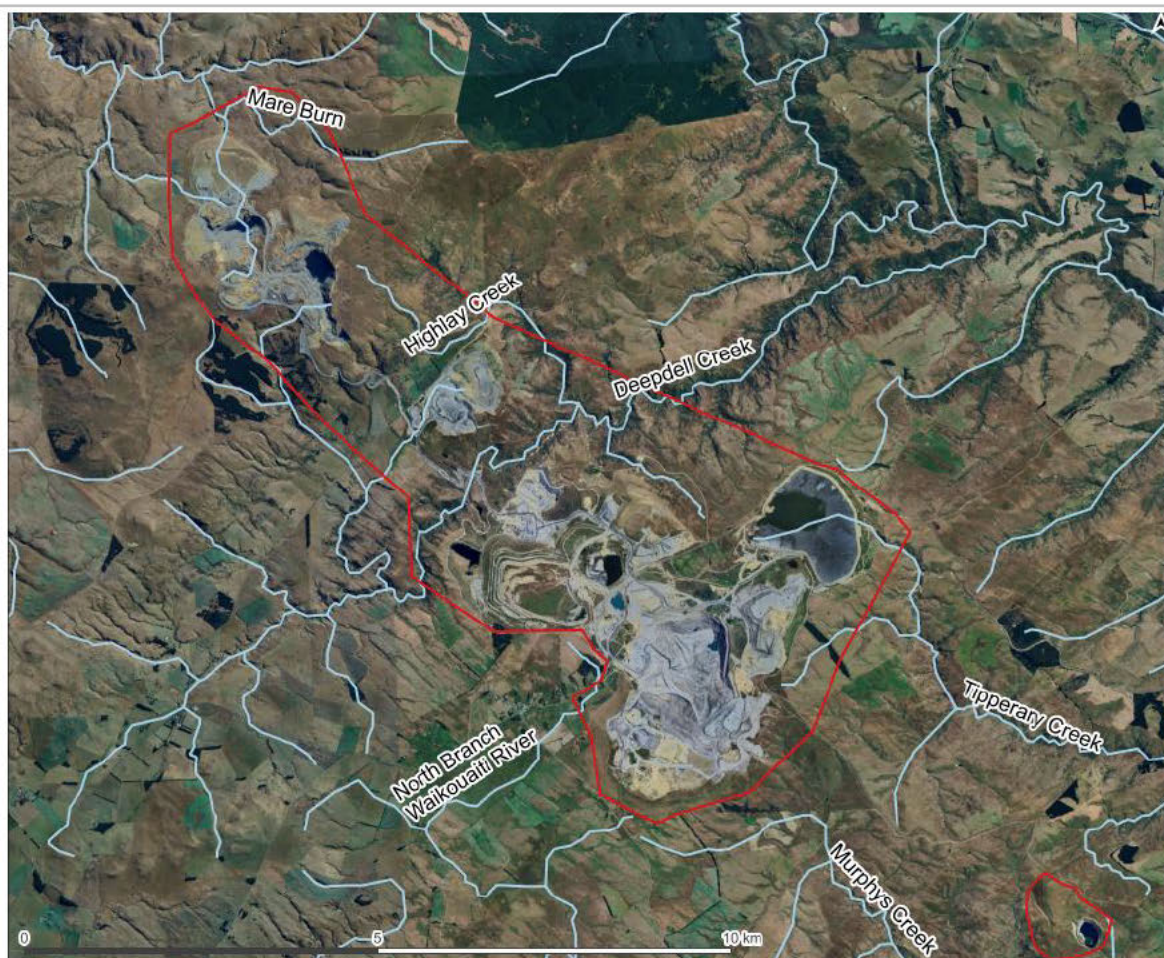


Figure 5. Streams and creeks around Macraes Operation (Source: Google Earth and TopoNZ)

2.2 Site layout

The areas of the Macraes Operation described in this section were inspected by a senior Contaminated Land Specialist/SQEP from WWLA on 14 and 15 November 2023, with a second visit to the mining workshop in January 2026 for the purpose of soil sampling (DSI, provided under separate cover¹). This section provides a summary of their observations of the site features, with changes between 2023 and 2026 observations also provided where relevant. During the 2023 visit our specialist was accompanied by [REDACTED], with other OGNZL staff accompanying for portions of the site visit. The 2026 visit was accompanied by [REDACTED] and [REDACTED] who is contracted to undertake maintenance tasks at the workshop and wider mine facilities.

For the purposes of the historical review and inspection, the Project footprint was divided into activity types. Division by the main segments or “named areas” described in **Section 1.1** (e.g. Frasers, Northern Gully, Golden Point, Coronation, etc) was deemed to be ineffective due to the wide range of activities in each area. In simple terms, the Macraes Operation operates as a series of repeating mining systems, with open pit/underground workings accompanied by waste rock stacks and relocatable refuelling areas and crib rooms. Primary supporting activities such as TSFs, workshops, contractor’s yards, explosives manufacturing and handling are more centralised.

An overview plan of the Macraes Operation is provided in **Figure 3**. Close up views of each of the above areas are illustrated on **Figures 6 – 19**.

¹ WWLA, 25 February 2026. Macraes Mine, Detailed Site Investigation (Ground Contamination): Mining Workshop. Prepared for Oceana Gold (New Zealand) Ltd. WWLA1659, Rev1

There are some mine features that were visited during site walkover inspections but are not described in this report. This is because they are not part of the proposed MP4 works; there will be no soil disturbance in these areas. These features are:

- Processing Plant.
- Red Bull Powder Facility.
- Main underground workshop.
- Alton Drilling Complex.
- Some former equipment/ machinery storage areas.
- Main office and amenity buildings, including core storage and maintenance fuel/ agrichemical storage (described only in the context of the electrical infrastructure they contain as it is typical of that seen in several locations around the Project).
- Concrete Batching Plant (to be relocated prior to MP4 Project commencing; any contamination will be remediated during those works).
- Contractor's Yard.
- Wool sheds and farm facilities.

Some facilities (e.g. Red Bull Powder Facility, underground workshop, drilling complex) include contaminants (e.g. ammonium nitrate and diesel) which will be mobile if released to ground or groundwater. If contamination has occurred at these sites they would technically be captured by HAIL category H (migration of contaminants) as it relates to the MP4 project. However, the MP4 works proposed adjacent to these facilities are generally limited to activities such as roading realignments or adding material to the existing waste rock stacks and will therefore not encounter contamination (if any exists). On this basis, these facilities have been excluded from this assessment.

2.2.1 Low grade ore stockpiles

Low grade ore stockpiles (Figure 6):

Ore is stored awaiting processing on a platform adjacent to the eastern side of the Processing Plant (labelled as "Rom Pad" on Figure 6). Sludges removed from the "Enviro Pond" (captures stormwater from the Processing Plant) are also stored temporarily in this area. In addition to this storage, low grade ores are stored at a number of locations around the wider mine site. The most recent plan of low grade ore stockpile locations is included in **Appendix B** (as provided by OGNZL). Stockpiles are subject to change frequently so **Figure B1** also includes known locations of former low grade ore stockpiles. Stockpiles collectively total several thousand tonnes of material.



Figure 6. Ore storage (Rom Pad) adjacent to the Processing Plant

2.2.2 Open pit mines

Open pit mines (Figure 3):

Several open pit mines are operational (including water and tailings storage) within the MO, including from north to south:

- Coronation North;
- Coronation;
- Deepdell North;
- Golden Point in the approximate centre of the landholding;
- Round Hill Extension located adjacent to the south of the Golden Point pit;tablInnes Mills;
- Gay Tan; and
- Frasers.

Key features of the open pit mines include:

- The pit sizes vary significantly depending on their geology and the presence/absence of associated underground mines. In general, they are all typical benched mine operations, with very few structures present.
- Due to the changing nature of the open pit landscape, fuelling stations, workshops, etc are generally established outside of the pit footprints.

See **Photograph 1** for an example open pit (taken at Frasers Pit).



Photograph 1. Example open pit (Frasers).

2.2.3 Underground portals

Underground portals (Figure 7):

Underground portals (entrances to underground mines) are also relatively nondescript but do include associated laydown areas and concrete transfer facilities. The only remaining underground portal is located at Golden Point (central). Key features are:

- A laydown area includes storage of numerous used polymer International Bulk Containers (IBCs), used for products including CF Foam and Strata Bond (**Photograph 2**).
- Other storage is general/miscellaneous equipment such as machinery parts and consumables.
- Compressed air is required to be supplied into the underground mine which involves the use of a transformer. No staining is evident at the Golden Point transformer or compressed air facility (**Photograph 3 and 4**).
- Concrete is transferred from above-ground to under-ground trucks at the portal. Washings are discharged to ground with runoff collected into a sediment trap (**Photograph 5**).



Figure 7. Location of portals to underground mines at Macraes Mine.



Photograph 2. IBC storage at Golden Point portal



Photograph 3. Compressed air facility at Golden Point



Photograph 4. Transformer at Golden Point portal



Photograph 5. Concrete washings at the Golden Point portal

2.2.4 Tailings Storage Facilities (TSFs)

TSFs (Figure 8):

There are five TSFs at Macraes;

- Frasers TSF, located within the Frasers Pit;
- Top Tipperary TSF (the largest), located in the southeast extent of the Macraes Operation;
- SP11A TSF south of the Processing Plant in the centre of the landholding;
- SP10 TSF which underlies SP11A TSF; and
- The Mixed Tailings Impoundment, immediately south of the Processing Plant, the oldest tailings dam and is no longer in active use for tailings placement (**Photograph 6**). Historically, a ~17,500 L fuel spill occurred in this area and accumulated within the remaining pond as a result of damage to the tank on a mobile servicing vehicle near the southern boundary of the main workshop area. Site staff indicated diesel was pumped off for offsite disposal (also see workshop descriptions).

TSFs generally have a robust system of water/leachate collection systems at their base, with underdrain water being collected for reuse in the Mine Water Management System to avoid uncontrolled discharge to the surrounding environment. Soils in contact with tailings leachate/water may become contaminated as a result.



Figure 8. TSFs at Macraes Operation



Photograph 6. MTI, looking toward the workshop

2.2.5 Workshops

Workshops (Figures 2, 8, 9, 10, 11):

Workshops are located at several locations around the Macraes Operation. The primary vehicle workshop is located in the centre-west of the site, immediately south of the Mixed Tailings Impoundment. Smaller workshops occur around the remainder of the site servicing particular operations, i.e. an underground or open pit mine. Key features observed at workshops are:

- **The Coronation North workshop** is located in the north of the site (**Photograph 7; Figure 9**). The workshop serviced Coronation North Pit mining from 2019 to 2022. In 2025 mining in the Coronation North Pit recommenced and the workshop was reestablished. It comprises a container building with adjoining canopy and the following features.
 - An oil catchment system, minor staining was visible around the system and the transfer lines (**Photograph 8**).
 - A parts washer was still on site along with miscellaneous parts and machinery.
 - Signage for Aqueous Fire Fighting Foams (AFFF) was visible. Historically AFFF contained per- and polyfluoroalkyl substances (PFAS). While only dry powder extinguishers were present on site at the time of the walkover, further investigation of the types of foams used is warranted due to the presence of PFAS compounds in some older foam types. This is described further at the end of this subsection and in **Section 5.1**.
 - Several bins/skips are present for waste disposal, as well as empty IBCs that had previously contained lubricants and fuel additives (e.g. Shell Tellus S3M, Adblue) (**Photograph 9 and 10**). We note that waste tyres are now (as of March 2026) being relocated to a tyre storage area, as per consents held under the National Environmental Standard for Storing Tyres Outdoors.
 - The possible location of a former fuel farm was also noted (refer **Section 2.2.6**)

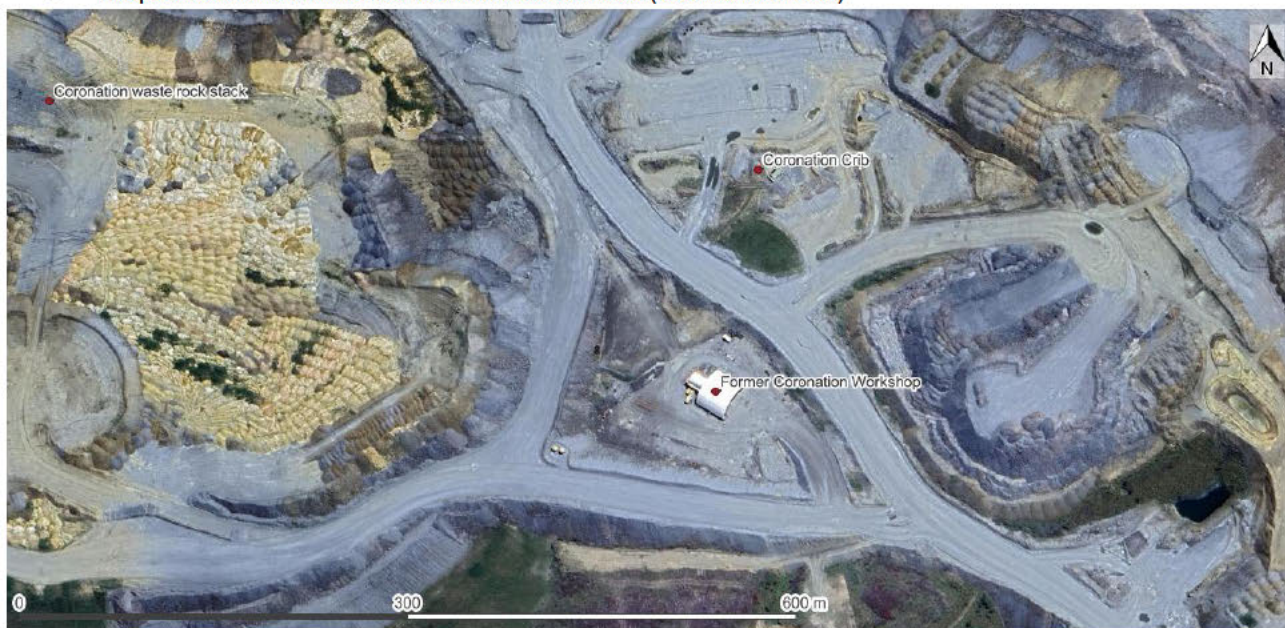


Figure 9. Coronation workshop and surrounds (image source: Google Earth)

- **Secondary workshop at Golden Point** could not be accessed due to induction/permission requirements, but staff stated that only minor servicing occurs here, significant servicing work is undertaken at the main underground workshop (**Figure 10**).
 - The canopy and container building are constructed on a concrete pad with a small apron. It is assumed that typical workshop products such as minor fuels, oils, greases and solvents are stored here.
 - A truck washing area is located immediately east of the workshop and is used to wash vehicles prior to servicing. It includes sediment tanks for water treatment prior to discharge.



Figure 10. Golden Point secondary workshop and associated features (image source: Google Earth)

- **Mining workshop (also called the open pit workshop)** is located north of the underground workshop and is similar to the other workshops described above (**Photograph 11; Figure 11**). Key features and observations are:
 - Tidy indoor workshop areas (**Photograph 12**)
 - All bulk fuels, oils, etc are either stored in bunded areas or on/above concrete surfacing within the workshop buildings (**Photographs 13 and 14**).
 - Small quantities of hazardous substances including paints, solvents etc. are stored in dedicated purpose-built cupboards within and around the workshops.
 - Parts washing and welding occur in dedicated areas; both were tidy with no evidence of significant spills.
 - Battery charging occurs in a dedicated converted shipping container located adjacent to the workshops.
 - Servicing is undertaken both within the workshop and using purpose built mobile servicing equipment. Some of the waste oil is used within boilers for heating. Mobile servicing is generally limited to equipment that cannot readily be returned to the workshop area, such as excavators. The mobile servicing equipment includes pumps and tankage for both collection of waste oils and fuels and supply of new fluids to equipment being serviced.
 - Two truck washes are present – one for heavy vehicles (“HV”) and one for light vehicles (“LV”), (**Photographs 15 and 16**). Both washes have a sediment trap to which water drains for primary treatment. This water then drains to a combined oil-water separator that has been made out of a former truck tray (**Photograph 17**). Oil is skimmed and taken offsite periodically. Sludge/sediment from the sediment traps is allowed to dry out next to the HV wash then is disposed of offsite. This has previously been taken offsite to Green Island, and historically for short durations there has been disposal in Finger storage areas. All hydrocarbon waste is now taken offsite to a licensed disposal facility.
 - As discussed in **Section 2.2.4**, it was noted that a large historical spill occurred, resulting from damage to a fuel holding tank on a mobile service truck during a tyre change near the main workshop. Approximately 17,500 L of fuel ran down the drain along the roadside from the tyre changing area and entered the tailings dam (**Figure 11**). Wind blew the oil to one end of the tailings dam where it was able to be removed via vacuum truck and disposed offsite.



Figure 11. Main open pit workshop and surrounds (image source: Google Earth). Spill route shown as orange line



Photograph 7. Former Coronation Workshop



Photograph 8. Oil transfer system within former Coronation workshop



Photograph 9. Miscellaneous outdoor storage at Coronation workshop



Photograph 10. Miscellaneous storage including tyres at Coronation workshop (tyres in the process of being relocated)



Photograph 11. General view of main open pit workshop



Photograph 12. Tidy internal workshop areas



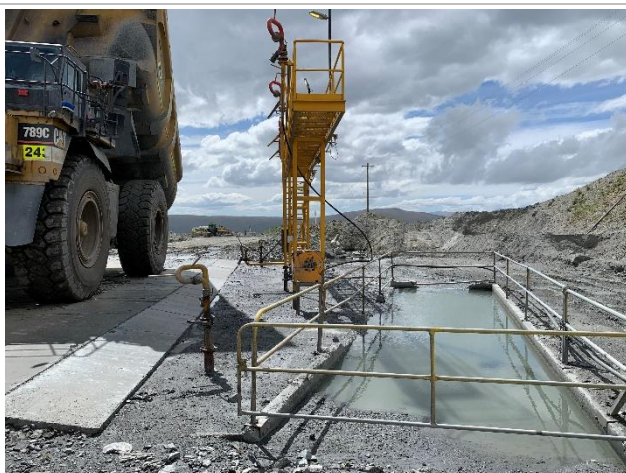
Photograph 13. Waste oil storage, banded



Photograph 14. Grease storage (left) and general storage (right) on banded concrete pad



Photograph 15. Light vehicle wash area



Photograph 16. Heavy vehicle wash



Photograph 17. Oil-water separator for both vehicle washes

As described earlier in this subsection, AFFF has historically and continues to be used for fire protection in the Macraes Operations, as is typical in the mining and other industries that have heightened risk of fires associated with use of heavy equipment. In accordance with changes in regulations, AFFF used at the mine is now fluorine free and does not contain PFAS. But PFAS containing AFFF use has historically occurred. There is therefore potential for contamination by PFAS, a group of environmental persistent and hazardous substances, to have arisen at the Macraes Operation because of historic lawful use of PFAS containing AFFF. A preliminary assessment of the risk associated with PFAS is provided under separate cover² and a concurrent process to further quantify these risks is in progress. For this reason, PFAS is not addressed in detail in this PSI, but in summary the assessment completed to date indicates that the primary sources of potential PFAS contamination in the Macraes Operations can be summarised as:

- **Mine workshops:** where most of the servicing of the fire suppression systems fitted to the mine heavy vehicle fleet occurs. There is potential for impact around the servicing areas and downstream infrastructure including stormwater systems and swales.
- **TSFs:** which are inferred to be both a secondary source of PFAS, due to intercepting PFAS discharges from the mine workshops and potentially in processed ore.
- **Process water:** which derives from the TSFs.
- **Diffuse sources:** it is possible that low levels of residual PFAS contamination are present more widely, primarily in surface water and groundwater, because of incidents, training and remote servicing in both the open pit and underground workings.

² Macraes Operation – Preliminary Assessment of PFAS Risk. Report prepared for OGNZL by WWLA, dated 21 August 2026.

2.2.6 Fuel farms and cribs

A location plan showing all fuel farms as of February 2026 is attached in **Appendix A2** (and includes the maximum volumes held at each facility) and summarised on **Figure 12** below. Historic fuel farms are discussed in **Section 3.4.2**.

Fuel farms and cribs (Figure 12, Appendix A2, also refer to workshop figures in Section 2.2.5):

Fuel farms are located throughout the mine operation to enable refuelling of vehicles close to where they are operating. They all have a similar layout and componentry and are typically associated with Cribs – lunch rooms/facilities for site staff when away from main workshops and the admin buildings:

- Fuel farms generally comprise a diesel tank of around 20,000 L capacity, associated bowsers and electrical infrastructure for lighting, pumps, etc (**Photograph 18**). Some farms include multiple tanks of the same design.
- Tanks are double-lined but generally do not have an external bund. Minor staining is typically visible around the bowsers from spills during refuelling (**Photograph 19**).
- Some fuel farms also have AdBlue and other fuel additives available for filling, such as at Golden Point Underground Fuel Farm (**Photograph 20**).
- An example of a typical former fuel farm is that which was observed during the site visit at Coronation Crib (**Figure 9**; noting this is now back in use) where only the gravel tank pad, electrical wiring and protective tyres remain. There was no evidence of residual staining at this former fuel farm (**Photograph 21**). Minor building waste, such as residual pipes, was also present at the former Coronation Crib.
- Crib facilities typically comprise a small lunchroom and toilet facilities, either with a local septic system or a holding tank that is pumped out regularly by contractors (**Photograph 22**).
- The most modern facility is at Finger 19 (**Figure 11**). It has two tanks and a modern Crib facility (**Photograph 23**).

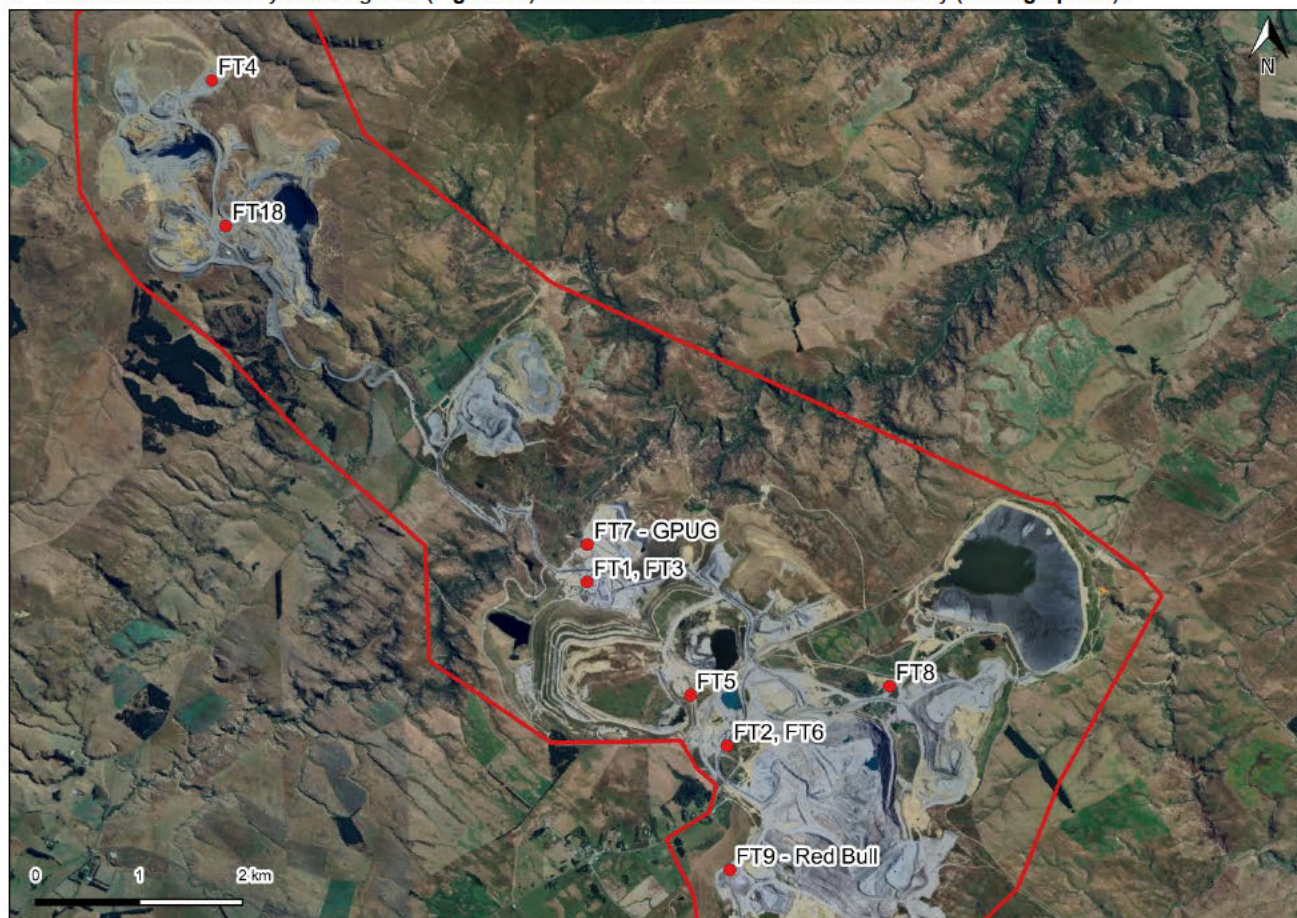


Figure 12. Fuel farms as of February 2026 (image source: Google Earth).



Photograph 18. Typical fuel farm set up at Vehicle Workshop



Photograph 19. Evidence of minor spills at the Vehicle Workshop Fuel Farm



Photograph 20. AdBlue filling station, Golden Point Underground



Photograph 21. Former Coronation Fuel Farm.



Photograph 22. Typical Crib set up at Deep Dell.



Photograph 23. Finger 19 fuel farm and crib

2.2.7 “Finger” storage areas

Finger storage areas (Figure 13):

Finger 13 and Finger 33 are storage areas created on ‘fingers’ of waste rock (**Photograph 24**). Their nature and composition varies between the two locations but generally contain outdoor storage as follows:

- Materials that are likely to be suitable for reuse are segregated from waste, etc. Reusable materials include various inert equipment, pipes, etc (**Photograph 25**).
- General wastes are stored in these areas, including spent drums, IBCs, wire, plant/equipment, etc (**Photograph 26**). Many of the drums and IBCs at Finger 13 were noted to be full of used Granular Activated Carbon (“GAC”) from the processing plant; it was expected that this would be re-processed through the plant. Some of the IBCs contained liquid, assumed to be water mixed with the original contents of the IBC. WWLA understands that as of March 2026, remediation of Finger 13 is underway.
- Finger 33 was previously used for waste storage area for the underground operations. Material stored included vent (duct) bags, tyres, core and proof drilling samples, steel rock anchors/bolts and mesh. It was observed during the site visit that some of the materials had been buried under the western portion of the platform. This has now been largely remediated, with removal of waste and disposal to a licensed landfill ongoing. Updated photos provided by OGNZL as of March 2026 are provided as **Photographs 27 and 28**.
- The majority of the wastes stored in the fingers is inert and therefore a low contamination risk, but it was noted that waste grease drums are located at Finger 33 and are not banded or covered and localised hydrocarbon staining was observed.



Figure 13. Finger 33 and Red Bull facilities (image source: Google Earth)



Photograph 24. General overview of Finger 13 and Burnables



Photograph 25. Reusables at Finger 13



Photograph 26. Waste drums at Finger 13



Photograph 27. Refuse removal largely complete at Finger 33



Photograph 28. Current (March 2026) status of Finger 33.

2.2.8 Other activities

Electrical infrastructure (Figure 14)

- A transformer and backup diesel generator are located adjacent to the main office/administration area (Photographs 29 and 30). These are typical of several such features around the wider mine site. They are generally modern and in good condition with no staining evident, although the diesel shed was locked and its interior could not be inspected.
- Golden point substation is located south of the main office building. It is bunded and drains to a holding tank. Overflow was being directed to ground at the time of the inspection and is presumably only used during maintenance activities (Photograph 31 and 32).



Figure 14. Golden point substation and administration building location (image source: Google Earth)



Photograph 29. Transformer next to office, typical of those on site



Photograph 30. Backup generator building next to main office



Photograph 30. Golden Point Substation



Photograph 32. Golden Point Substation

Water transfer pumping stations

There are multiple pumping stations around the mine that are used to pump water to where it is needed, for dewatering, or for disposal (e.g. to TSFs). Typical features include:

- A diesel generator which runs an electric pump (**Photograph 33**). Refuelling is undertaken using a mobile tank fitted on a ute.
- A large water holding tank and associated valving and pipework.

Componentry is able to be moved as required or sized up or down to meet site needs.



Photograph 33. Typical pumping station set up

Waste collection

A variety of waste collection facilities are located throughout the mine. These all appeared to be tidy and well managed at the time of the inspection. Facilities used for collection of liquid and hazardous wastes were observed to be covered. Whitestone Contracting Limited provide skips, bins etc. and collect the wastes for disposal offsite.



Photograph 34. Example of waste collection at the main office



Photograph 35. Example of covered hazardous waste collection area

Areas of suspected seepage

An area of suspected mineralisation /seepage near the northern toe of the Frasers West rock stack was visited during the walkover (Photograph 36). We understand that this is the only known area of uncontrolled seepage associated with the mine operations and a collection system is proposed as part of the MP4 Project. Some impact on grass cover was evident (Photograph 37).



Photograph 36. Overview of area of suspected mineralisation /seepage, Fraser East rock stack in background



Photograph 37. Closeup of area of suspected mineralisation /seepage

2.2.9 Golden Bar

Golden Bar (Figure 3 and Figure 15)

Golden Bar mine is located approximately 5 km south of the Frasers complex at the main Macraes Mine as illustrated on **Figure 2**. This area was mined in the early 2000s with a small open pit, associated waste rock stack and a fuel farm.

- The current surface expression of the mine comprises a lake within the former open pit and a graded and grassed waste rock stack as shown on **Figure 15**.
- Key site features at the time of mining are indicated by the 2007 aerial image (described further in the aerial review in **Section 3.1**) are shown below.



Figure 15. Golden Bar former mining area (historical features shown as per 2007 Google Earth Imagery)

3. Site History Review

This section provides a review of historical information to determine whether activities (generally those on the HAIL) previously undertaken at Macraes Operation have the potential to have caused ground contamination that may require investigation and/or management or remediation.

The land use history of the site was determined through review of the following information:

- Historical aerial imagery dating back to the 1970s sourced from Retrolens, Google Earth, and photographs supplied by OGNZL. The historical imagery was then georeferenced to the various project areas in QGIS. The findings of the aerial imagery review, alongside images from key imagery dates, is set out in **Section 3.1**.
- Otago Regional Council's HAIL Register was searched to identify Council's records of contamination at the site. The results are summarised in **Section 3.3**.
- OGNZL provided spill event records, both as a summary and detailed reports for selected events. This data is summarised in **Section 3.4**.

3.1 Historical mining

Technical reports prepared by OGNZL³ describe the earliest alluvial mining in the district as having commenced at Murphy's Flat in 1862, with Macraes, Deepdell and some parts of Horse Flat being worked soon after. Development of Golden Point mine commenced in the late 1880s and several stamper batteries (for crushing rock) operated in the vicinity of Deepdell Creek through into the 1930s. Of these, Golden Point Battery, located within the Golden Point Historic Reserve (outside the Macraes Operations), is the only complete stamper battery remaining in New Zealand.

Origin Heritage provided additional archaeological records (sourced from Arch Site⁴) for historic batteries within the site. This information was reviewed to determine if there is potential for notable/significant contamination effects that may impact on OGNZL's proposed works. Reports are available on request or from Origin Heritage. In summary:

- Workings were typically small in scale and included adits, tailings, open pits, stacked stone features and buildings/foundations.
- There is mention of cyanide tanks associated with several features but the state of these or if they are still present is not clear.
- All of the remaining intact sites are outside of the current Macraes Operation footprint and are unlikely to be disturbed by the MP4 Project. This includes the Golden Point Battery with an intact stamper battery and shed with operable engine, which is managed by the Department of Conservation at the Golden Point Historic Reserve.
- There is potential for localised contamination around historical tailings and processing areas, and in surface water immediately downgradient of historical features. However, contamination is likely to be insignificant in the context of the scale of the current Macraes Operation and will be accounted for in existing surface water and groundwater monitoring regimes.

Origin Heritage also provided information regarding a historical sheep dip, dating from the 1890s, located more than 2 km south of Frasers West and 2 km west of Golden Bar. This feature is highly unlikely to impact the Macraes Operation.

³ NI 43-101 Technical Report, Macraes Gold Mine, Otago, New Zealand. Report Prepared by OceanaGold (New Zealand) Limited, dated 25 September 2020.

⁴ <https://nzaa-archsite.hub.arcgis.com/>

3.2 Aerial photograph review

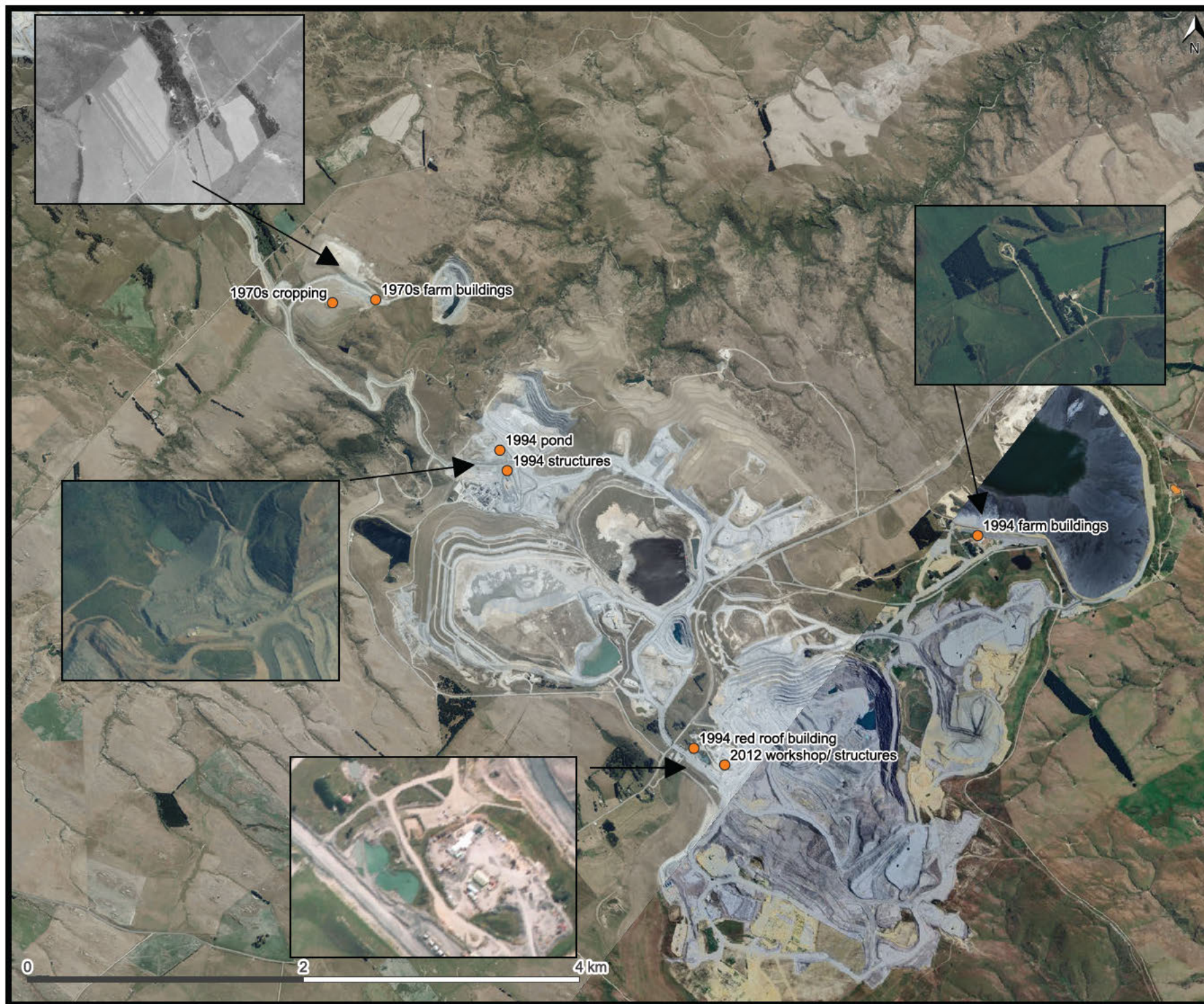
The aerial photograph review has considered key changes to the Macraes Operation, and where possible, has identified smaller historic structures such as fuel farms, sheds and workshops that may be potential contamination sources. However, we note that the significant reworking of materials within the mine footprint means that any contamination that may have derived from past activities has likely been moved within or removed from site.

Key features as identified in the site history review are summarised in **Table 2** and shown on **Figure 16**.

Table 2. Aerial imagery review summary

Year and source	Description
1947 to 1977 Retrolens	From the 1940s through to 1970s the site was predominantly farmland. Very few structures were present except in isolated areas around the current Deepdell and Frasers pits: - In the vicinity of Deepdell pit there was a farmhouse with associated sheds. Immediately surrounding the farmhouse were paddocks being used for cropping. A series of farm and potentially public roads (Horse Flat Road) also crossed this area. - Isolated farm buildings were also present in the south, along the road from Macraes township to Makaraeo.
1985 Google Earth	The resolution of this image is poor so individual details are not distinguishable, but it shows that the area remains in use as farmland as in 1977.
1991, 1994 Retrolens (SN9196, SN9330)	Aerial imagery coverage is poor in 1991, with only the central portion of the Macraes Mine site is shown. Imagery improves in 1994: - In 1991, mining had commenced with imagery showing the mixed tailings impoundment in the central west of Macraes Mine having been formed. This is the only area captured in 1991. - The 1994 imagery shows the mixed tailings impoundment dam has increased in size and evidence of the adjacent current Golden Point pit. Mine workings at this time extended south into what is now the Round Hill backfill and SP11A Tailings Dam. The Northern Gully North Waste Rock Stack is being formed. - In the vicinity of the SP11A Tailings Dam is a series of structures that look like a potential magazine or aggregate storage. - The Processing Plant is visible in the same location as it is today, albeit smaller (it has since expanded to the northwest). - Northeast of the Processing Plant is a group of small structures that may be a workshop or temporary fuel farm. Immediately north of this is a pond that has since been filled and is now a general laydown area. - What is the current underground workshop and offices have been established with three large buildings present (it is noted that underground operations didn't start until much later, so this was the general workshop, or may have been related to explosives manufacture by former supplier Orica that was active in this area during that time (pers comms; Bernie O'Leary (former OGNZL General Manager). - The buildings in the Deepdell area remain largely unchanged but no cropping is visible (only hay making). There are several more farm buildings located north of the Round Hill and Golden Point pits, as well as in the vicinity of the current Top Tipperary TSF in the east of Macraes Mine. A building with a red roof is located near the current mine site entrance and remains today (constructed between 1991 and 1994).
2006-2007 Google Earth	The 2006-2007 imagery shows a significant expansion of mining as follows: - Mining has expanded into the Deepdell area, including an open pit at the location of what is now the Deepdell East waste rock stack. - The Golden Point Pit has been significantly expanded, while the Northern Gully North waste rock stack has been completed. - Northern Gully South waste rock stack is being actively constructed with significant changes in the surrounding area, including construction of the SP11A Tailings Dam. - Mining has commenced at Frasers with an open pit (Gay Tan Pit) and backfill occurring in the vicinity of the Innes Mills Pit Stage 6. Frasers South and West rock stacks are being actively constructed.

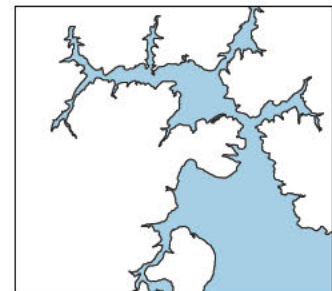
Year and source	Description
	- West of Frasers, in the location of the Frasers West Backfill, is a large laydown area that includes several structures – this may have been a workshop. A pond is also located here. - South of Frasers at Golden Bar, mining is underway with an open pit visible in the south of the complex and a waste rock stack to the north/northeast. A fuel farm can be seen immediately north of the open pit.
2012 OGNZL	The mine footprint has expanded significantly in the 6 year aerial imagery period: - Frasers Pit and associated waste rock stacks are being formed (both east and west rock stacks). The farm buildings north of Top Tipperary are still present. - Further north, the SP11A tailings dam has been expanded and the rock stacks to its east have been stabilised. - The main open pit workshop (main workshop) is present on the southern side of these tailings facilities, with structures largely as they are today. All previous structures, ponds, potential magazines, etc as seen in 1994 have been removed and the ground around them significantly re-worked/mined (Golden Point Pit). - The Lone Pine water storage dam has also been formed. - The processing plant has expanded slightly and essentially covers the same footprint as it does today. - A structure is visible north of the Northern Gully south waste rock stack and remains unchanged to today. - The facilities on the western side of Frasers have been expanded, with water tanks now visible. - Mining at Golden Bar has ceased and the area is being re-graded and grassed.
2013 OGNZL	- The only change of note is that road formation has commenced toward the Top Tipperary TSF. - The Red Bull Powder Company and associated magazine are also visible on the western side of the Frasers Waste Rock Stack.
2014 OGNZL	The main change relative to 2013 is that the Top Tipperary TSF has been formed and is in use. Most of the farm buildings to its west remain.
2015 OGNZL	The main change relative to 2014 is that mining has commenced at Coronation. Mining is in its very early stages with no structures visible.
2016 OGNZL	- Mining has expanded at Coronation, with the Coronation Workshop also now visible. - In the south of the site, the Top Tipperary TSF has expanded west but farm buildings remain.
2017 OGNZL	Exploration drilling is occurring in the northern portion of the Coronation complex.
2018 OGNZL	- Structures/workshop established near the mine entrance in the 2012 image are in the process of being removed. - The underground workshop and offices have been reconfigured and facilities expanded. - Mining at Coronation has expanded to the north, including formation of the waste rock stack at the very northern extent of the mine complex.
2020 OGNZL	One structure remains in the former workshop location near the mine entrance, with the surrounding area being used as a laydown/storage area.
2023 OGNZL	- The Frasers West Backfill has replaced the former workshop/laydown/storage area with no structures now present. - Mining has expanded significantly at Deepdell but surrounding farm buildings remain.



Map Title:
Historical aerial photograph review

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



Legend

- Historic site features

Data Provenance
Aerial Imagery derived from Google Earth

Drawn by: Lauren Windross
26/02/2026

Layout Name
Historical aerals

3.3 ORC HAIL Register

Otago Regional Council's (ORC's) Selected Land Use Sites (or SLUS) Register⁵ was searched in March 2026 to obtain an understanding of its classification and knowledge of the site and surrounds. ORC lists the three portions of the Macraes Operation on its register, being the Coronation Section, the central portion (Fraser's, the processing area), and the Golden Bar pit to the south (refer Figure in **Appendix A2**), as shown in Figure 17.

All three areas are tagged as HAIL Activity E7: Mining Activities, with all being "verified" HAIL activities but none having any records of investigations being carried out.

The smaller areas to the west and east (distal) of the mine are identified as Macraes Flat Landfill and Cooks Transport Depot Fuel Storage (west) and potential timber treatment at Shag Valley Station timber mill (east). The Cooks Transport site has been remediated. Neither of these are known to be connected to mine activities or have any impact on the MP4 Project.

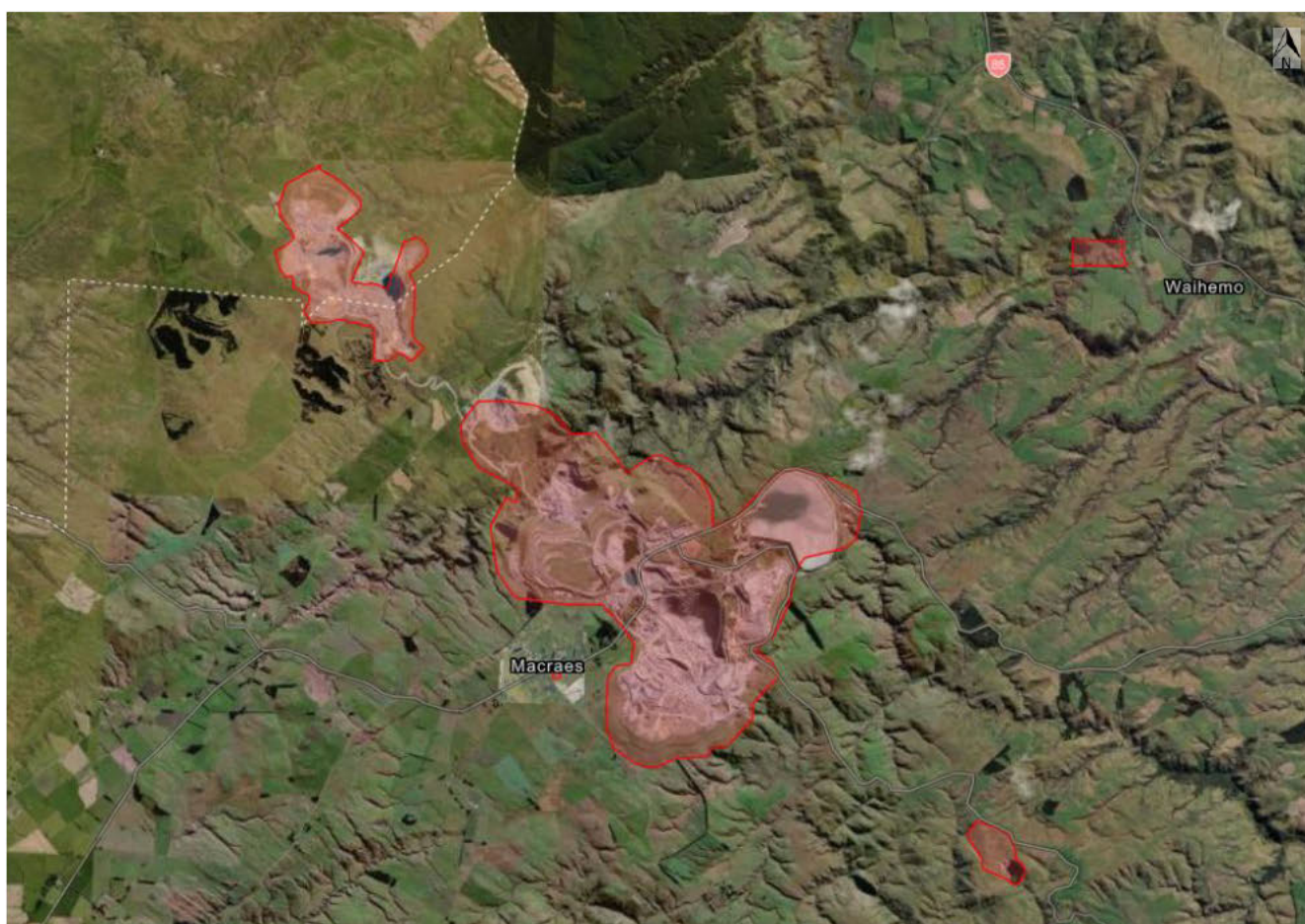


Figure 17. Extract from ORC HAIL register.

3.4 OGNZL Records

3.4.1 Spill and incident records

OGNZL maintains a register of environmental incidents including spills of hazardous substances within the mine. WWLA has been provided with a summary of all incidents between May 2016 and December 2023 as an example of the typical nature of incidents reported. We are not aware of any significant incidents since December 2023 that would impact on potential for ground contamination. In addition, a selection of different

⁵<https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=052ba04547d74dc4bf070e8d97fd6819>

incident reports was provided for review to better understand the nature of environmental incidents and their potential to cause contamination. In summary review of these documents shows:

- Most incidents relate to hydrocarbon spills such as oil leaks, blown hydraulic hoses, leaking brake hoses and accidental spills. Most of these incidents are relatively small volumes (<200 L) in the context of the scale of the mine operations and are unlikely to result in discharges to the wider environment.
- Water related incidents typically relate to either sediment release out of a pond/holding facility, rock release to a waterway, contaminant release to water, or identification of a leak/leachate that may impact either waterways or drinking water (either visually or chemically) if controls are not applied.
- Records of waste related incidents are relatively rare and typically relate to identification of waste being buried in a waste rock stack or similar location. Other incidents are highly unlikely to have an effect on ground contamination, such as disposal of waste oil in the incorrect container.
- Air discharge related incidents have also been recorded, typically associated with dust or entrainment of a “contaminant” within air. These incidents have not been reviewed further as they are highly unlikely to result in material ground contamination.

Examples of two (2) incidents from each of the hydrocarbon, water, and waste categories are summarised below to give an indication of the nature of incidents that can occur. An evaluation of the potential for each incident to have resulted in significant ground contamination is also provided.

Hydrocarbon incidents	Date: July 2020 OGNZL Reference: 426908 Location: Open pit workshop Description: A fuel truck arrived for servicing and it was noticed that fuel was leaking from the bulk tank. Approximately 100-200 L was lost from the tank before a drain tray could be placed under the truck. An excavator was then used to “clean up” spill fuel and it was placed into a bund for subsequent disposal to “dump”. The specific disposal location is not provided. WWLA comments: This incident is typical of many that occur within the mine operations. The ground immediately surrounding the incident would typically be impacted, with remediation sometimes being undertaken by removing impacted gravel. There are a wide range of locations where contaminated soils/gravels are disposed of (both onsite and offsite) and in other situations, hydrocarbons would have been left to naturally degrade/volatilise (a widely accepted remediation method). <i>Overall, there is potential for localised areas of high concentrations of contamination to result from these incidents. However, the relatively low mobility and toxicity of the contaminants (diesel and oil range hydrocarbons), means there is a low risk of adverse effects on either site workers or the environment. Given the scale of the mine discharges are typically expected to attenuate before reaching the mine boundaries, in most instance there is expected to be negligible potential for adverse effect on the nearest environmental receptors.</i>
	Date: April 2023 OGNZL Reference: 542393 Location: Main workshop Description: A bulk fuel delivery pipeline was broken during a routine tyre change on a mobile servicing truck. Immediate attempts were made to reduce/slow the leak from the bulk tank, but approximately 17,000 L of diesel was spilt. Most of this flowed to the western swale which led to the Mixed Tailings Impoundment (Figure 11) and was removed from site via vacuum truck. Surficial gravels at the spill site were excavated and taken to a “contaminated stockpile” in the Gay Tan pit area. Following the incident, soil sampling was undertaken by Eurofins for OGNZL in August 2023, both in the disposal location and at the incident site. We have been provided with some of the sampling information and laboratory results. To summarise, at the disposal location, hydrocarbons were detected but none of the concentrations recorded present a risk to human health or the environment in the industrial setting of the mine (this is discussed further under separate reporting). At the incident site, both water and sediment samples were taken in the workshop sumps, as well as soil samples in the drain leading to the Mixed Tailings Impound and in the Impound itself. It was noted that the road alongside the swale had been reworked significantly since the incident, and any contamination would now likely be covered with new roading material. The results for the swale and Mixed Tailings Impound were

	not included, but if contamination was able to be accurately characterised after the roading changes, it is highly likely that it would have reflected the disposal site data. WWLA comments: While incidents such as this are rare, it documents that hydrocarbon spill remediation has previously been ad-hoc at the site. Site staff are well trained in the initial response, but there has previously been a general misunderstanding that some parts of the waste rock stacks are suitable for disposal of contaminated material. We understand that the consents currently held do not specifically provide for this activity. A Hydrocarbon Management Plan⁶ is now in place to provide clear guidance on hydrocarbon management. <i>Overall, there is potential for localised areas of high concentrations of contamination to result from these incidents. However, the relatively low mobility and toxicity of the contaminants (diesel and oil range hydrocarbons), means there is a low risk of adverse effects on either site workers or the environment. However, the movement of historical contamination around the mine site unknowingly may open up new pathways by which contamination can reach receptors, particularly if there is no prior treatment of the waste and no tracing of disposal locations.</i>
Water incidents	Date: December 2020 OGNZL Reference: 443562 Location: Golden Point Road stormwater drain Description: A rain event washed two spent drums of hazardous substances (not yet cleaned) into a stormwater drain (location not specified). Drums were removed and taken for cleaning as per standard operating procedures. WWLA comments: Poor housekeeping can result in minor incidents such as this particular event. <i>Potential for significant contamination from such events is low, particularly given a lot of surface water flows are directed back into the mine, although there may be impacts on receiving water bodies if significant spills occur without effective remediation..</i>
	Date: February 2021 OGNZL Reference: 449636 Location: Deepdell Creek, Golden Point side Description: Drilling contractor was observed discharging drilling cuttings directly to ground, which were then running through vegetation and into Deepdell Creek, resulting in discolouration in the water. Estimated flow rate of 0.5 L/second., total discharge of 500 L. Contractor informed of breach of standard operating procedure (to allow cuttings to settle in a sump before discharge) and discharge ceased. Creek running clear again shortly after. WWLA comments: This is likely to be typical of water incidents which may occur within the mine, particularly those relating to natural watercourses. <i>It is unlikely that any chemical contaminants were released into the creek in significant volumes, but such events are unlikely to be desirable in terms of OGNZL's commitment to responsible environmental management.</i>
Waste incidents	Date: August 2018 OGNZL Reference: 315960 Location: Finger 13 Description: Contractor observed burying waste within gravels at Finger 13. Instructed by OGNZL staff to remove waste. It is not recorded if this was undertaken or not. Waste comprised pipes and "other non-organic waste". WWLA comments: Given the scale of the mine, burial of non-organic waste is unlikely to have resulted in contamination at concentrations that would be a risk to human health or the wider environment. However, such actions may have future implications if the burial area is re-worked. <i>Overall, contamination risk is low from such events, but they do not align with OGNZL's commitment to responsible environmental management.</i>
	Date: December 2020 OGNZL Reference: 443060 Location: Burnables area Description: On inspection of area prior to burning it was observed that inappropriate waste (hydrocarbon waste, explosive packaging, etc) had been put within the burnables area. The source of the waste was traced and materials removed.

⁶ OceanaGold, September 2024. Hydrocarbon Management Plan. Document Ref: MAC-206-PLN-003

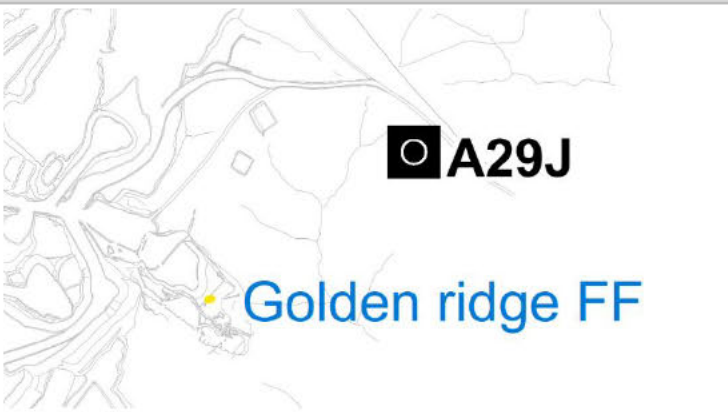
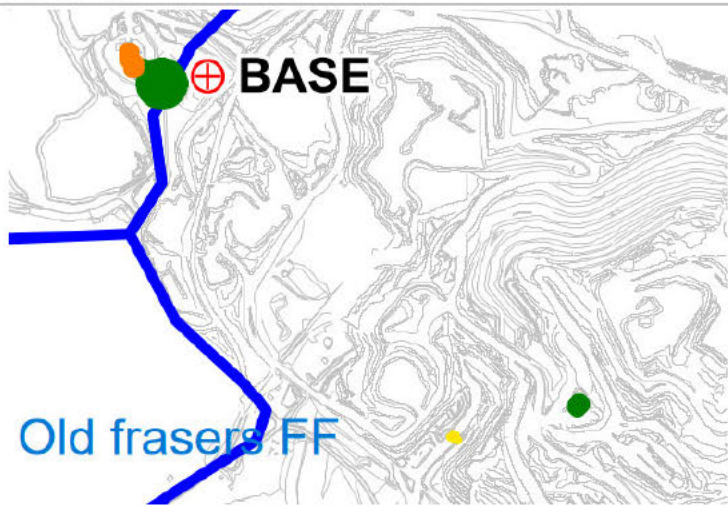
WWLA comments: Again, such an incident is unlikely to have resulted in any contamination at concentrations presenting a risk to human health or the environment. However, as with hydrocarbon disposal, it suggests that there are some inconsistencies in waste management which, if not appropriately addressed, could result in contamination.

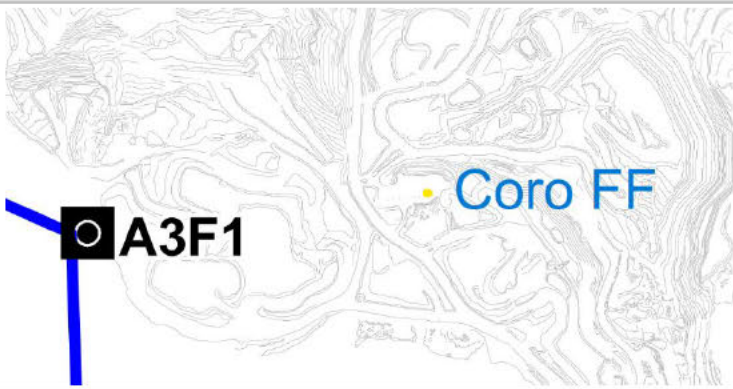
3.4.2 Historical fuel farms

As described in **Section 2.2.7**, fuel farms are temporary in nature and designed to be able to be moved as mining needs dictate. While the Macraes Operation currently keeps a record of discontinued and current fuel farms, there are likely to be further past fuel farm locations that either are not recorded (from very early mining days) or that have been significantly altered as a result of subsequent mining operations. Former fuel farm locations are known to include those in **Table 3** (images are extracted from a plan provided by OGNZL). An overview figure is provided in **Appendix A2**.

In addition to the historical fuel farms shown below, another historical fuel farm was visible in aerial imagery at the former Golden Bar open pit to the south of the main Macraes complex. Refer to **Figure 15**.

Table 3. Former fuel fam locations

Name	Refer location in yellow Note: Survey locations are black squares, current fuel locations in orange and green and permit boundary as blue line
Golden Ridge	
Old Frasers	

Name	Refer location in yellow Note: Survey locations are black squares, current fuel locations in orange and green and permit boundary as blue line
Coronation	
Coronation North	

4. Potential for Contamination

The site walkover and history information (**Sections 2.2 and 3**) establishes the potentially contaminating (HAIL) activities. This section evaluates the potentially contaminating activities, and associated key contaminants, against site specific factors such as geology, hydrogeology, receptors etc. to determine how likely it is for each potential source of contamination to have resulted in contamination that could present a risk to human health or the environment and therefore could require ongoing management or remediation.

4.1 Potentially contaminating activities

The primary potential sources of contamination that have been identified at the site are set out in **Table 4**. The activities have been grouped by the primary operational activity in each area (consistent with groupings in **Section 2.2**). The locations have been identified on a GIS layer but are also summarised by Activity ID no. in **Figures 18-20**.

As the regulatory framework for contaminated sites is linked to the occurrence of HAIL, **Table 4** also identifies the primary HAIL activity(ies) associated with each potentially contaminating activity. The HAIL Guide⁷ notes that large-scale industries are likely to encompass more than one HAIL activity. It recommends that such activities should be recorded as specifically as possible, which may result in a site having more than one HAIL activity assigned to it, this approach has been applied in **Table 5**. Further detail regarding subsidiary activities within each activity area is expected to be captured by subsequent more detailed investigation of those areas (where required). We note the following exclusions have been applied:

- We have not given detailed consideration to use of asbestos containing building materials or lead-based paint due to the modern nature of the facilities (mining commenced after lead-based paint had been phased out, and during the phasing out of asbestos building materials). However, where suspect building materials were observed it has been noted.
- We have also not considered septic systems associated with small scale activities, such as crib rooms, due to their domestic nature, which the HAIL Guide provides a specific exclusion for. However, septic systems have been considered where they treat discharges from areas of the site that have high staffing densities (such as the main office, workshops or the plant) and/or may include entrained contaminants (such as workshops or the plant). In addition, inappropriate disposal of septic tank wastes is captured by potentially contaminating activity number 11.
- Waste rock stacks are not considered HAIL activities for the purpose of this assessment. The discharges from these activities are considered in detail as part of the mine design and operational assessments^{8,9}. They are subject to specific monitoring programmes and mitigation measures which are expected to be incorporated into the conditions of consent for the MP4 Project. Duplication of these requirements in the contaminated land framework adds no value to the existing process and has the potential to result in unintended inconsistency or conflict in the management of these activities. The exception arises where waste disposal has occurred within waste rock stacks, as addressed by activity number 11 below. Only a limited number of waste rock stacks are likely to be impacted by waste disposal.
- Pit lakes are also not considered HAIL activities. The sediment within the lakes has been derived from the side walls of the pits, which are comprised of natural rock, so there are no sources of contamination that would trigger application of the HAIL.
- Only activities included in the site layout description (Section 2.3) are addressed by this assessment.

⁷ MfE, 2023. *Hazardous Activities and Industries List Guidance; Identifying HAIL Land*.

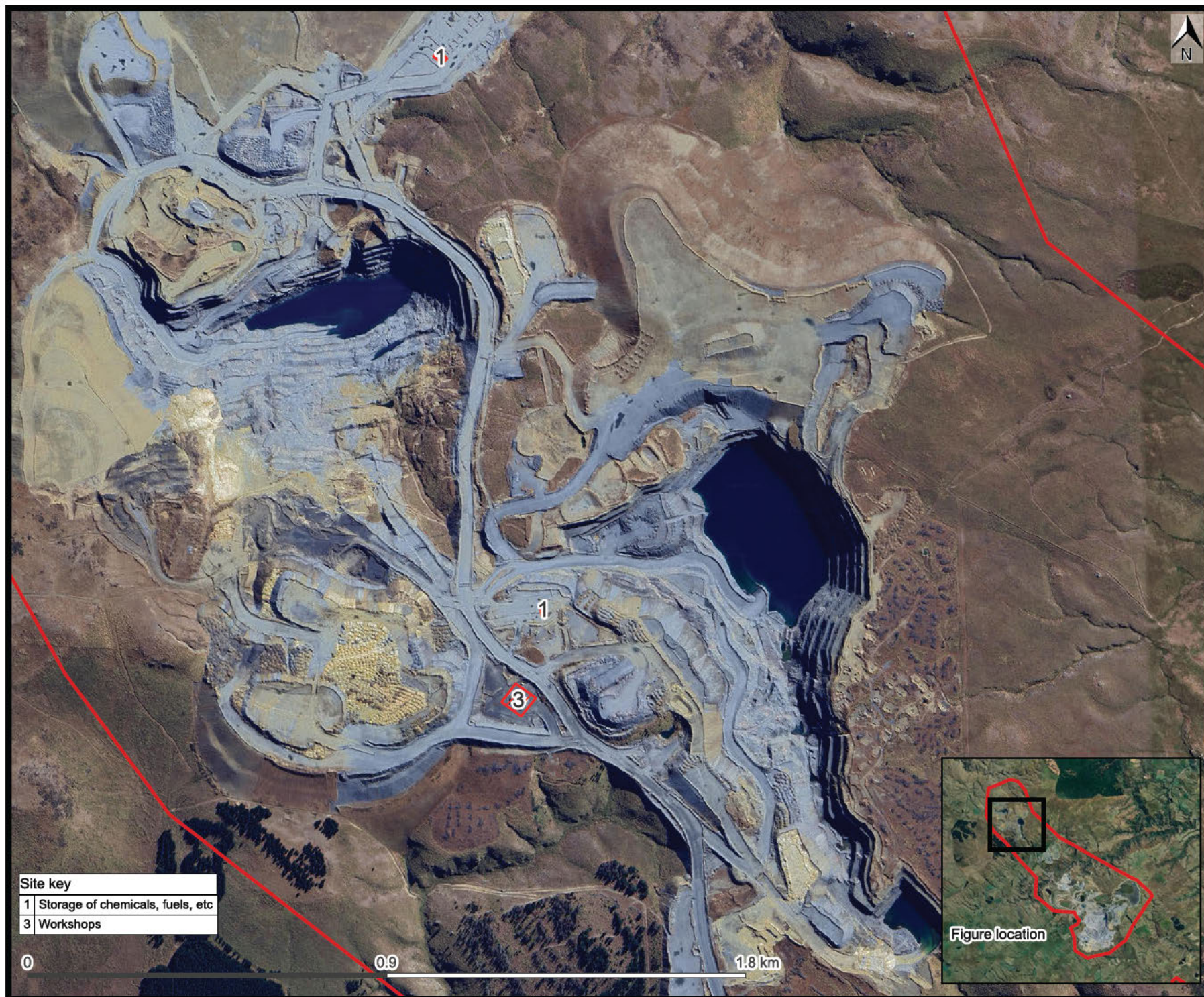
⁸ Macraes Phase 4 FTA, Surface and Groundwater Assessment. Report prepared for OGNZL by GHD Limited, dated August 2026.

⁹ Macraes MP4 Project, Assessment of Aquatic Environmental Effects. Report prepared for OGNZL by Viridis Limited, dated August 2026.

Table 4. Potential HAIL Activities identified at Macraes Operation and applicability to MP4 Project

ID no.	Operational activity/area		Primary HAIL Activity category	Key contaminants associated with primary HAIL category	Applicability to MP4
1	Storage of chemicals, fuels, etc	Waste oil tanks	A17: Storage tanks or drums for fuel, chemicals or liquid waste	Primarily diesel, oil and grease, refer to Processing Plant for chemicals	Mining Workshop
		Fuel farms	F7: Retail or commercial refuelling facilities	Diesel, nitrogen compounds (AdBlue)	Yes (selected only, likely FT4, FT5, FT7)
2	Electrical transformers and substations		B2: Electrical transformers B4: Power stations, substations	Metals, hydrocarbons (site post-dates use of polychlorinated biphenyls and asbestos)	Selected only, various locations
3	Workshops ¹⁰		A17: Storage tanks or drums for fuel, chemicals or liquid waste D5: Engineering workshops with metal fabrication F4: Motor vehicle workshops B2: Electrical transformers	Metals, hydrocarbons (diesel, oil, grease), potentially solvents	Mining Workshop
4	TSFs		E7: Mining industries	Metals, sulphides	Yes
5	Ore stockpiles		E7: Mining industries	Metals, sulphides	Selected only, distributed across the MP4 area)
6	Waste disposal to waste rock stacks		G5: Waste disposal to land	Depends on wastes previously buried – potentially metals, combustion byproducts, hydrocarbons	Selected only; particularly around Frasers West and Coronation North
7	Effluent disposal fields/septic systems		G5: Waste disposal to land	Bacteria, viruses, metals and hydrocarbons are common	Selected only
8	Concrete washing at underground portals		I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment.	High pH water (may cause mobilisation of metals)	Only Golden Point Underground expansion
9	Outdoor storage of used materials		I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment.	Depends on materials being stored – hydrocarbons and metals are common	Selected only, various locations
10	Migration of contaminants from the mine to surrounding lands		H: Migration of a contaminant in sufficient quantity to present a risk to human health or the environment.	Metals, sulphate and hydrocarbons are most likely, but PFAS is possible	Yes
11	Use of building materials containing lead-based paints and/or asbestos containing materials		I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment.	Lead, asbestos	Selected only, various locations

¹⁰ A Detailed Site Investigation (DSI) for the Mining Workshop has been carried out in parallel to this PSI. It includes a more detailed list of HAIL activities for the workshop, including A17 for fuel and oil storage, F7 for the adjacent fuel farm, and I and H related to various associated activities such as the wash bays and stormwater discharges. This provides an example of how this assessment has highlighted the primary HAIL, but multiple, typically more isolated, HAIL activities may be present at individual MGP facilities. Each future DSI will be required to undertake an independent assessment of the HAIL activities present and design a sampling plan to suit the potential for contamination.

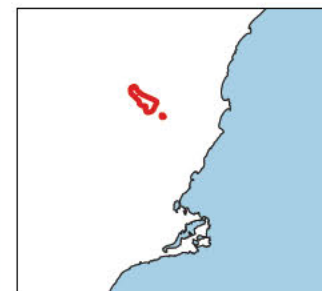


Site key	
1	Storage of chemicals, fuels, etc
3	Workshops

Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



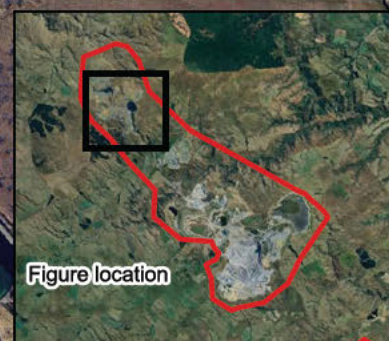
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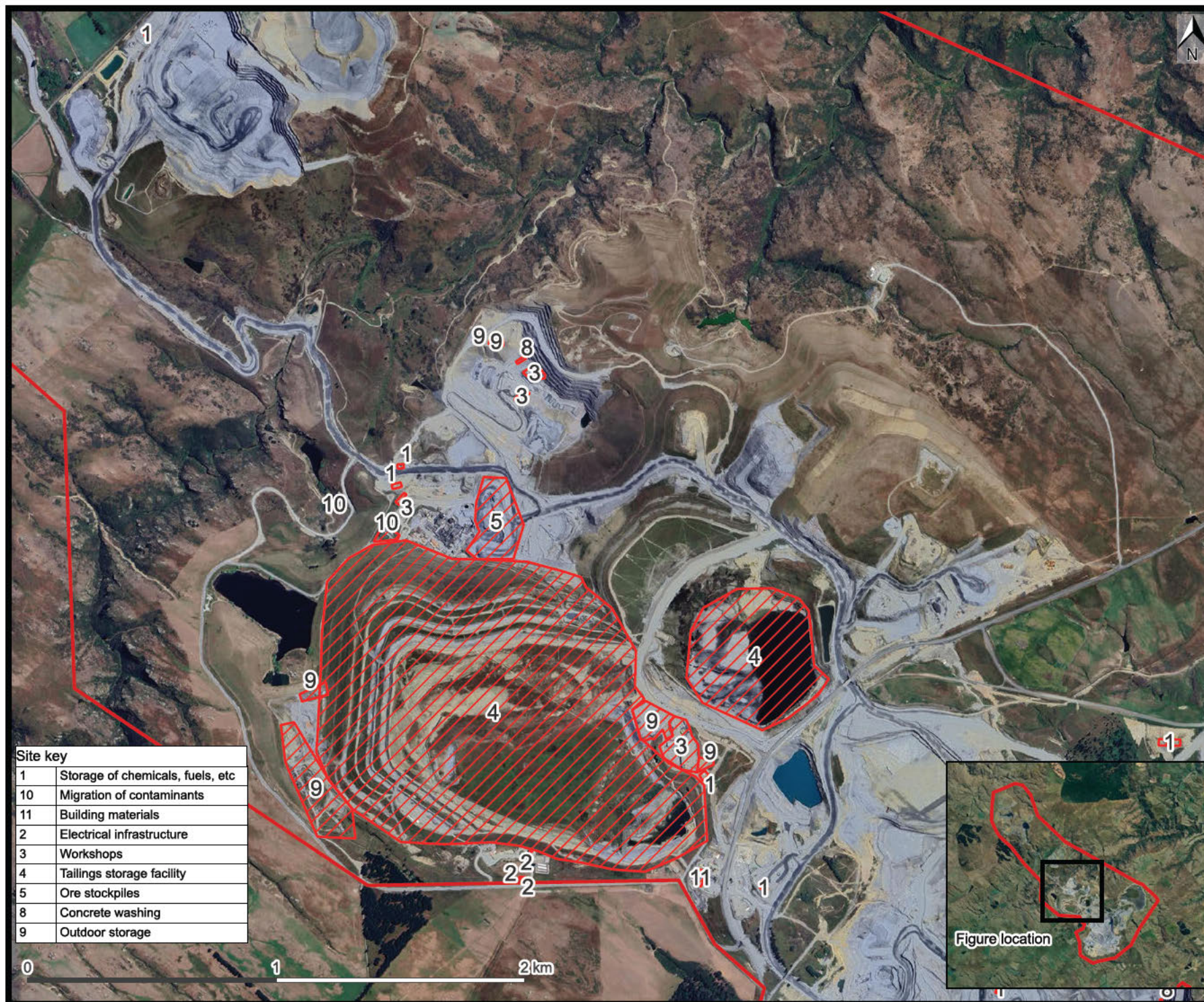
- Site boundary
- Potential contamination

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
05/05/2026

Layout Name
Contaminated sites template



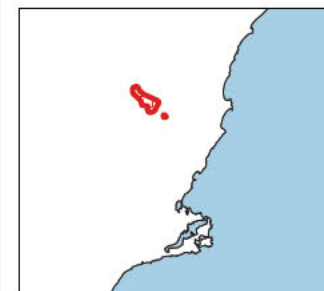


Site key	
1	Storage of chemicals, fuels, etc
10	Migration of contaminants
11	Building materials
2	Electrical infrastructure
3	Workshops
4	Tailings storage facility
5	Ore stockpiles
8	Concrete washing
9	Outdoor storage

Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



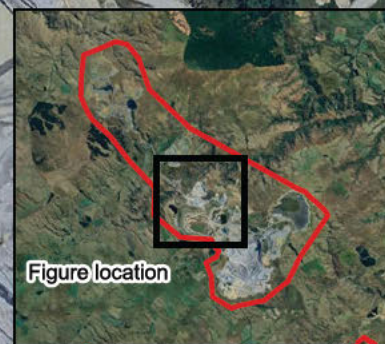
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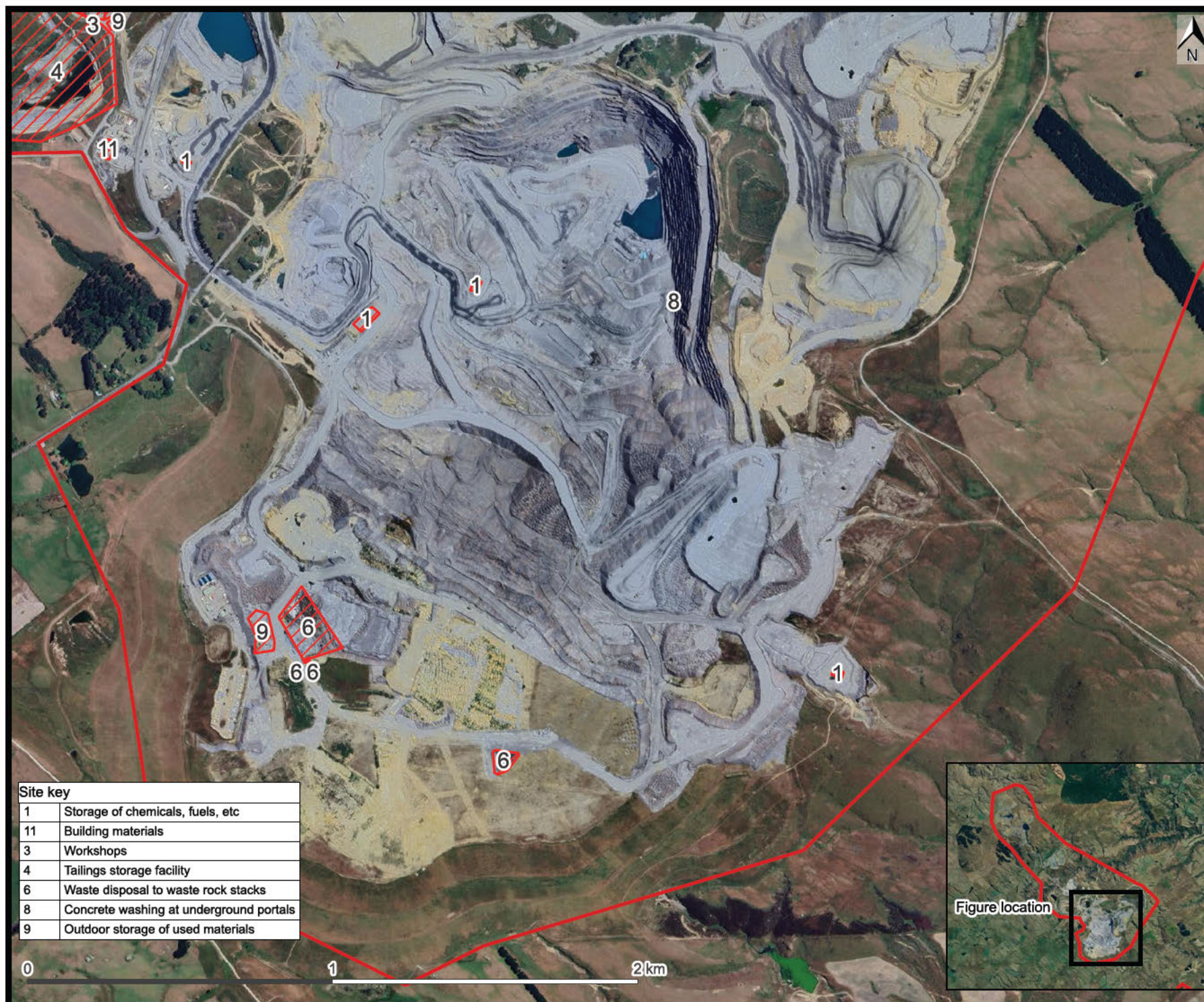
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- Potential contamination

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
06/05/2026

Layout Name
Contaminated sites template



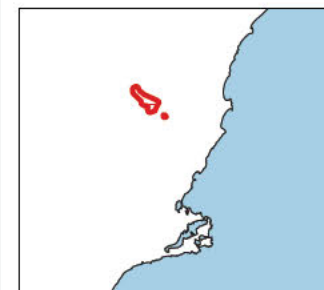


Site key	
1	Storage of chemicals, fuels, etc
11	Building materials
3	Workshops
4	Tailings storage facility
6	Waste disposal to waste rock stacks
8	Concrete washing at underground portals
9	Outdoor storage of used materials

Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



Legend

- Site boundary
- Potential contamination

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
05/05/2026

Layout Name
Contaminated sites template



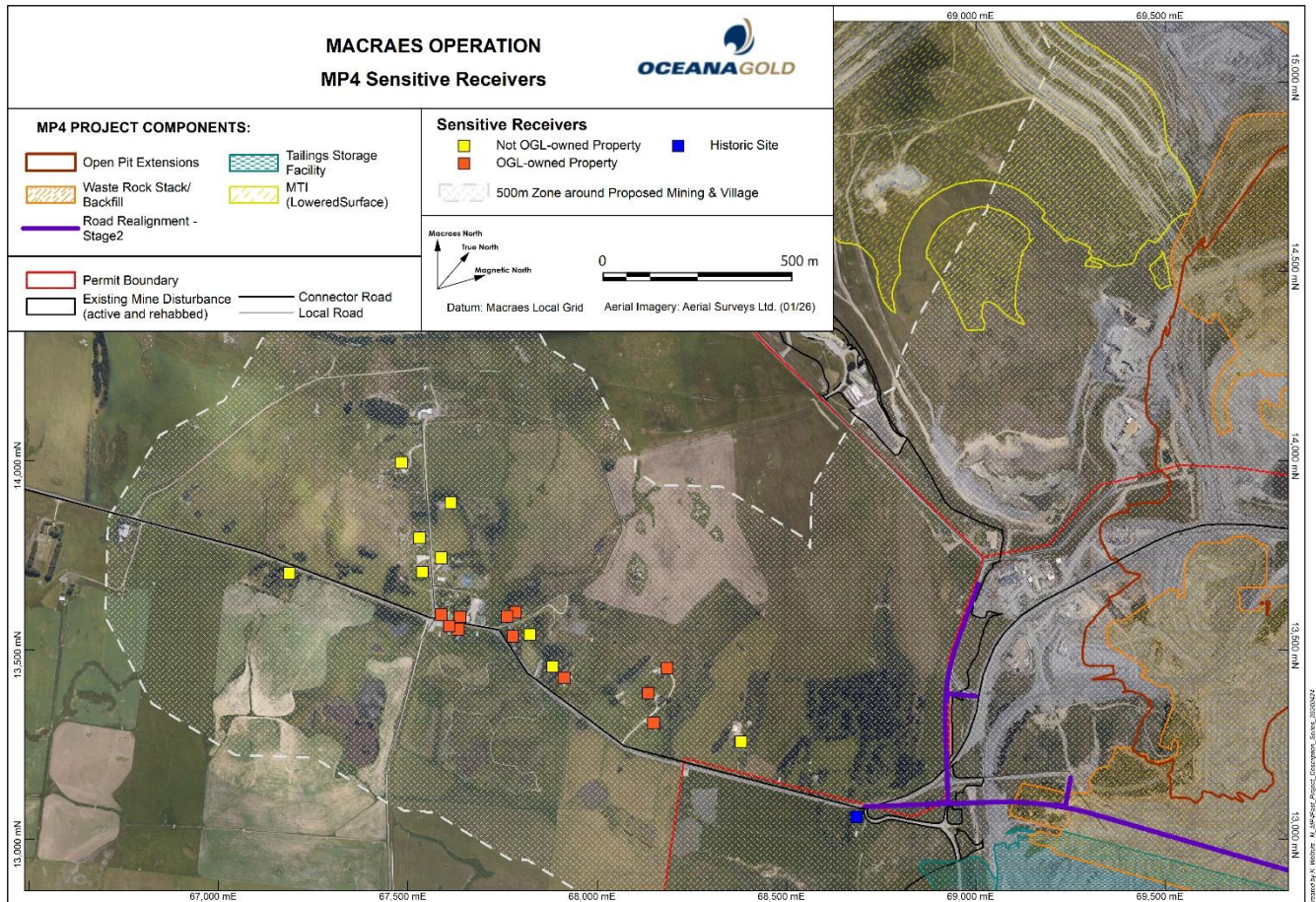
4.2 Risk factors

The potential risk associated with contamination in any specific scenario depends on many factors and complete hazard-pathway-receptor linkages. Risk factors include considerations such as the proximity and sensitivity of receptors, the characteristics or properties of the contaminants such as mobility or persistence, and environmental factors such as permeability of the soils and depth to groundwater. Collectively these factors combine to define the **conceptual site model (CSM)** for the site.

A CSM indicates known and potential sources of contamination, routes of exposure (“pathways”), and receptors that may be affected by contaminants moving along those pathways. Receptors may be people or environmental. Investigation and potentially remediation are required where contamination is present at elevated concentrations and there is potential for complete pathways between sources of contamination and receptors. The following risk factors have been taken into account in preparation of the risk assessment (Section 4.3).

Primary receptors	For the following reasons ecological receptors, specifically those associated with the surrounding streams, are the primary receptors of any ground contamination derived from Macraes Mine: • Users of the mine and immediate surrounds are currently restricted to workers, either mine personnel or farmers /farm hands on adjoining leasehold lands. Workers are not generally considered to be sensitive receptors as exposures are required to be managed via health and safety legislation. OGNZL provides a high level of health and safety control and education, which goes beyond what would typically be expected in a commercial/industrial outdoor worker scenario. • Entry is provided through the mine so that members of the public can access the Golden Point Historic Reserve. However, the distance of the reserve from operational areas of the mine (>200 m) and short duration of typical visits to the area means that these receptors are highly unlikely to be exposed to unacceptable levels of contamination. • In general, the nearest residences are located more than several hundred metres from operational areas of the mine and residents are therefore highly unlikely to be exposed to unacceptable levels of contamination. Refer Figure 21 and Figure 22. Generation of dust from the mine provides the primary pathway by which contaminants could reach residences, although OGNZL has effective dust mitigation plans and monitoring in place to minimise this potential risk. • We understand that potable water was supplied to the Macraes township from two groundwater bores located within the township. The bores ran dry in 2025 and OGNZL commenced trucking in a potable water supply to ensure the supply was maintained while a new bore was drilled. The new bore is proposed to be located 2.3 km from the Macraes Operation, further reducing the risk of contamination.
Key contaminants	Many of the key contaminants used at Macraes Mine, as identified in Table 5, for example diesel, oils, grease have low mobility in the environment. They are strongly absorbed to soils, and also having low solubility, once spilt to ground are highly unlikely to discharge to surface or groundwater at concentrations that cause unacceptable effects.
Ground conditions	Ground conditions are an important factor in the ability of contaminants to migrate in the environment. For example, more porous soils can enable contaminants to move more quickly and potentially further than clay-rich soils that retain/bind or prevent penetration of contaminants. Natural soils generally comprise fine grained loess which would be expected to retard contaminant movement, however, soil thickness is limited in the wider area and has generally been removed within the operational area. Most of the working area of the mine comprises a very thin veneer of crushed and powdered rock over either insitu or reworked rock. While the surficial material is expected to have a strong affinity for absorbing contaminants its capacity is limited by its volume. As a result, large or ongoing spills could soak into the underlying insitu or reworked rock. While it is possible that large or ongoing leaks of contaminants could soak almost directly into rock, the depth of groundwater and/or influence on groundwater flow created by mining operations means that flow paths are likely to be lengthy, promoting attenuation of contamination inground (i.e. there is a low potential for direct connection between contaminant sources areas and the receiving environment). In a similar manner to groundwater, many mine facilities have perimeter drains that feed into a range of surface water

collection/retention ponds/systems, thereby minimising the potential for direct discharges to streams and natural waterways.



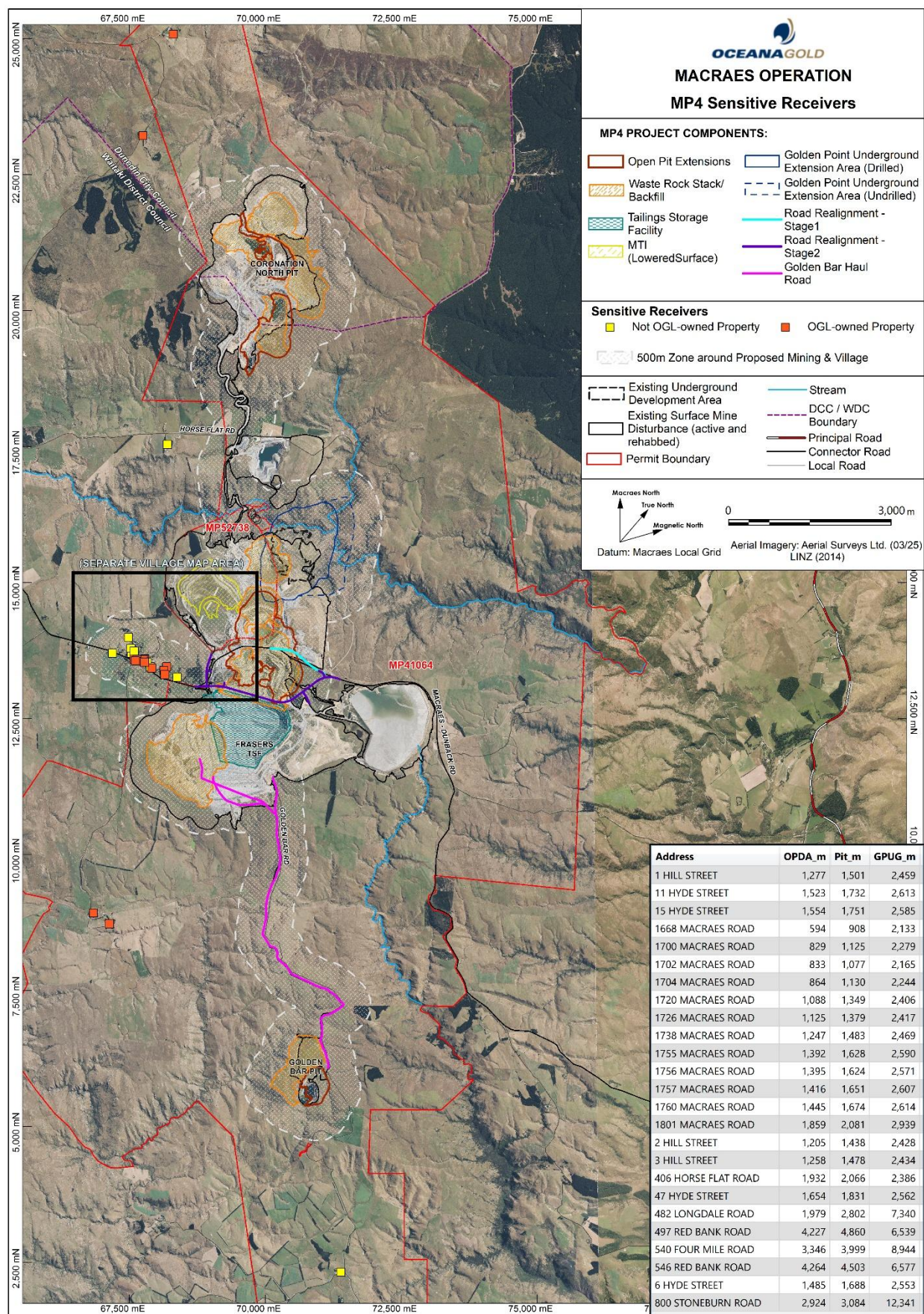


Figure 22. Sensitive human receptors (dwellings; project wide). Image source: OGNZL

4.3 Risk assessment for MP4

Overall, the contamination risk is assessed as moderate to low. While there are likely to be several areas where contamination is present, it is highly likely to be isolated around the source and in most cases is not expected to require remediation as pathways to receptors are likely to be incomplete (i.e. no risk) when mine-standard controls are in place.

This section evaluates the risk of the potential effects arising from the identified sources of contamination (HAIL activities) in the context of the MP4 project. Remediation is not considered to be required in the typical context of a contaminated site (i.e. when remediating a vehicle workshop for a more sensitive land use such as housing), but we expect that MP4 will provide some opportunities to reduce contamination where it is identified. We have considered the risk factors /CSM described in **Section 4.2** in preparing the risk assessment. Potential HAIL activities that are not relevant to MP4 (refer **Section 2.2**) have not been incorporated into this assessment.

Table 5 presents the risk assessment for the site. This has been presented according to operational activity (grouped as per **Section 2.2**), with associated key HAIL activities listed for each operational activity.

The risk assessment is colour coded as follows.

- **Red** having a high potential that some ongoing management (or remediation) will be required;
- **Orange** has a moderate potential and will depend on sampling results; and
- **Green** indicates where unacceptable human health or environmental risks are not anticipated and therefore contamination-specific management is unlikely to be required from a technical perspective.

Table 5. Ground contamination risk assessment for MP4

ID No.	Operational activity	HAIL Activity categories	Potential contaminants	Discussion, including possible extent and magnitude of contamination	Potential to require contamination-specific management in the context of the MP4 project
1	Fuel farms	F7	Hydrocarbons (diesel)	Frequent small spills of hydrocarbons around fuel farms means that the ground immediately beneath and around the tanks and bowlers is likely to require investigation when fuel farms are decommissioned or relocated. The generally low mobility and toxicity of the primary contaminants may mean that the actual risk is acceptable, particularly for historical facilities.	Moderate
2	Electrical facilities including transformers (various) and substations (Golden Point, Processing Plant)	B2 B4	Metals, hydrocarbons (site post-dates use of PCBs and asbestos)	Electrical infrastructure is relatively modern and in good condition and therefore unlikely to have resulted in contamination to a degree where contamination-specific management is necessary. However, sampling when facilities are decommissioned or relocated is recommended.	Low
3	Workshops	A17 D5 F4 B2	Metals, hydrocarbons (diesel, oil, grease), potentially solvents	Storage and use of hydrocarbons and other chemicals varies between workshops, but for the most part is in appropriate storage and bunding, and maintenance is carried out inside where possible. However, frequent small-scale spills mean that there may be areas where localised remediation or contamination-specific management is required. The need for this should be informed by workshop-specific investigations as the generally low mobility and toxicity of the primary contaminants may mean that the actual risk is acceptable. Key risk areas for further investigation and potential contamination management include the aprons/surrounds to covered workshops, outdoor storage areas, vehicle wash bays and the receiving sumps (including water and sediment), and fuel storage areas. Associated facilities such as fuel farms and electrical transformers are addressed below.	Moderate (for localised areas associated with fuel/chemical storage and spills)
4	Tailings storage facilities	E7	Metals, sulphides	TSFs are engineered and designed with leachate/runoff being captured and reused as mine process water, with treatment required prior to discharge. Given the modern nature of the facilities, and regular ongoing monitoring that is occurring, it is considered highly unlikely that the TSFs are having a significant impact on the receiving environment. Relocation of tailings during MP4 will be undertaken within a set of mining-specific controls that will be designed to mitigate the particular risks associated with TSFs.	Not expected to require contamination-specific management as reprocessing of tailings to be undertaken with mining-specific controls. All facilities have ongoing monitoring requirements

ID No.	Operational activity	HAIL Activity categories	Potential contaminants	Discussion, including possible extent and magnitude of contamination	Potential to require contamination-specific management in the context of the MP4 project
5	Low grade ore stockpiles	E7	Metals, sulphides	Storage of low-grade ore is intended to be temporary before it is processed through the processing plant. Prolonged storage may result in leaching of acids etc to the mine environment. It is expected that many of these areas will be processed during the MP4 project, so residual soils can be managed as per open pits and underground workings within the existing mining controls.	Highly unlikely to require contamination-specific management if processed as intended
5	Open pit mines	E7 F7 I (outside storage)	Metals, sulphides, acid	High levels of some metals may be associated with the open pits but these are highly unlikely to migrate outside of the mine footprint. The ammonium nitrate explosives used within the mine have the potential to leave residues of nitrogen compounds, but we understand that this is addressed by the existing consents and associated monitoring programmes. As with other mining activities, risks will be managed within mining-specific controls and procedures.	Highly unlikely to require contamination-specific management
6	Underground portals	E7 F7 I (concrete washing and outside storage) B2	Metals, sulphides, changes in pH	As with the open pits, high levels of some metals may be present in underground workings but these are highly unlikely to migrate outside of the mine footprint. The ammonium nitrate explosives used within the mine have the potential to leave residues of nitrogen compounds, but we understand that this is addressed by the existing consents and associated monitoring programmes. Washing of concrete trucks may have resulted in localised areas of high pH however this is expected to be rapidly buffered in ground. As with other mining activities, risks will be managed within mining-specific controls and procedures.	Highly unlikely to require contamination-specific management
7	Burial of wastes in rock stacks and fingers	G5	Hydrocarbons, metals, solvents	Disposal of contaminated soils from spills/incidents to waste rock stacks is known to have occurred, particularly at Frasers rock stacks and Gay Tan pit area. The volumes of soil disposed are likely to be low relative to the volumes of waste rock present, and soil testing from one large incident suggests that there is unlikely to be a significant risk to either human health or the environment (i.e. no remediation required). However, this does result in cross-contamination and may introduce new pathways by which the surrounding environment can be impacted, i.e. if wastes are placed in an area where runoff is not controlled. We note that removal of a significant volume of waste has occurred since 2023, with further removal anticipated. This will significantly reduce the potential for contamination to be present, but residual contamination from former storage cannot be ruled out. Many of the waste rock stacks and fingers will be reprocessed or relocated during MP4. This provides an opportunity to manage contaminants and buried wastes, where present, under mining-specific controls.	Moderate to high. Likely to be some requirement for localised contamination-specific management.

ID No.	Operational activity	HAIL Activity categories	Potential contaminants	Discussion, including possible extent and magnitude of contamination	Potential to require contamination-specific management in the context of the MP4 project
8	Concrete washing at underground portals	I	Elevated pH, may caused mobilisation of metals and other contaminants	pH changes will be temporary and likely to return to background levels after washing ceases, and short-term discharges are expected to be captured by the MWMS. There are unlikely to be many contaminants present at particularly elevated concentrations at the underground portal locations where this primarily occurs, so mobilisation is also unlikely to be a significant risk.	Low
9	"Finger" storage areas	I (outside storage)	Hydrocarbons, metals	Storage of spent drums/containers may have resulted in widespread but low levels of contamination in surface soils. Potential to require contamination-specific management is low for most of the fingers as it is unlikely that there will be significant exceedances of human health or environmental criteria. However, there may be isolated areas where contamination-specific management is required.	Moderate (in isolated locations)
10	Migration of contaminants from the mine to surrounding land	H (migration of contaminants)	Metals, hydrocarbons and other contaminants associated with the Processing Plant	Given the modern nature of the mine, resource consents in place and ongoing regular monitoring requirements, it is unlikely that mine activities have had a significant impact on surrounding land such that remediation is required. An area of suspected mineralisation /seepage near the northern toe of the Frasers West rock stack has been identified as requiring collection/capture as part of MP4. Mine monitoring data should also be reviewed on a regular basis to determine if there is potential for impacts to arise that require the implementation of mitigation measures. As described in Section 2.2.5 , assessment of potential effects arising from PFAS discharges is in progress.	Low to moderate (recommend investigation of areas of suspected seepage and PFAS discharges)
11	Use of building materials containing lead-based paints and/or asbestos containing materials	I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment.	Lead, asbestos	Use of these materials is likely to be very limited, and contamination, if present, confined to surface soils around the impacted structures. Potential to require contamination-specific management is low, but this should be informed by an asbestos survey prior to demolition of any buildings constructed pre-2000.	Low

5. Data gaps

5.1 Desk study information requirements

The site walkover also identified the following activities that we consider would benefit from further consideration at the DSI stages:

- Site-specific consideration of hazardous goods for each workshop is recommended so that the DSI for that area can be tailored to suit the potential contaminants present. This can be undertaken during a site walkover for each DSI stage.
- As described in **Section 2.2.5**, a preliminary assessment of the risk associated with PFAS has been prepared and a concurrent process to further quantify these risks is in progress. For this reason, PFAS is not addressed in detail in this PSI.
- Tyres may have been buried in parts of the mine. While there is an active and ongoing project to remove this waste, the inclusion of tyres could represent a residual source of stabilising additives such as 6PPD-Quinone which are known to have a significant effect on some fish species. Potential tyre burial locations were identified during a previous consenting process to establish a dedicated tyre storage location; the process of removal and relocation is underway and is likely to be well progressed or even complete by the time MP4 commences.
- Low grade ore stockpiles should be considered if they are to be relocated, as testing may be required to inform any contamination-related constraints on placement or handling. If they are being processed then testing is not required.

5.2 Intrusive investigation requirements

Targeted investigations are recommended to enable any actual contamination in the identified HAIL areas to be understood, quantify and design remediation requirements, or conversely eliminate areas from requiring further investigation and confirm the assumptions set out in **Table 5**.

There are several opportunities for undertaking investigations as the MP4 Project progresses, both before and during works. Understanding the specific nature of contamination in areas of disturbance will enable safe and appropriate management of spoil during works, and provide an opportunity for localised remediation (where required) prior to eventual mine closure. Understanding the local baseline ground conditions will also be important to providing context to the data interpretation, particularly given the hydrothermal alteration of the geology.

Investigation data will also inform potential remediation solutions, such as what soils are suitable to be addressed by processing through the Processing Plant, relative to other onsite remediation methods such as hydrocarbon attenuation, disposal in TSFs, or offsite disposal.

Investigations suggested for moderate to high-risk areas as set out in **Table 6** (overpage). The Mining Workshop DSI has been completed in parallel with this PSI, and the investigation plan for the investigation is included in **Figure 23**.

Typically, shallow and localised contamination would be investigated via hand auger or trowel. Ground conditions at Macraes are unlikely to be conducive to these methods, so use of small (<10 tonne) excavators (some mine equipment maybe also be suitable) to dig test pits is likely to be more appropriate. Drilling could be considered in areas where deeper soils or groundwater needs to be sampled or soil disturbance needs to be minimised (again existing equipment in use at the mine maybe suitable). Sampling densities would be determined using the MfE's *Contaminated Land Management Guideline No 5: Site Investigation and Analysis of Soils (updated 2021)* as a guide. Results could be reported in a series of DSI reports addressing each area as required. It is expected that a requirement for pre-works screening, with sampling where necessary, will be included conditions of consent for the MP4 project.

Table 6. Suggested investigation methodologies

Operational activity	Proposed investigation (contaminants, areas, strategy)
Areas recommended for sampling:	
Fuel farms that are being relocated or decommissioned	- Undertake soil sampling around tanks and bowsters at a selection of historical and current fuel farms to quantify risks. Results could be extrapolated across all farms. - Assess if the existing groundwater monitoring network provides opportunities for supporting groundwater sampling (if required; i.e. if concentrations in soil are significantly elevated). - Analysis for total petroleum hydrocarbons (TPH) and selected samples for polycyclic aromatic hydrocarbons (PAH).
"Finger" storage areas that are being relocated	- Composite sampling of shallow soils across outdoor storage areas, including where removal of waste has already occurred. - Analysis will depend on materials stored/ previously stored but typically metals and hydrocarbons (TPH and PAH) as a minimum. - Discharge areas (i.e. perimeter drains, receiving environments) and existing groundwater monitoring network should also be reviewed to assess sampling opportunities (if required). - Sampling of these areas is not required if spoil is to be reprocessed through the Processing Plant, as this will be managed under standard mining controls. However, a Contaminated Site Management Plan (CSMP), that includes procedures for unexpected contamination, will be prepared for the mine operations so that if buried wastes are encountered they can be appropriately managed.
Waste burial areas that are being disturbed	- Interview operational personnel to establish areas of potential former burial activities in addition to Frasers West, Gay Tan pit. - Assess if the existing groundwater monitoring network provides opportunities for supporting groundwater sampling (if required). - Sampling methods will depend on the nature and location of the burial activity. - Testing to be determined by materials buried, but likely to be focussed on metals and hydrocarbons. - As above, sampling of these areas is not required if spoil is to be reprocessed through the processing plant, as this will be managed under standard mining controls. However, the CSMP will include procedures for unexpected contamination, so that if buried wastes are encountered they can be appropriately managed.
Areas where preliminary sampling could be undertaken to better quantify contamination management requirements	
Mining Workshop (partially complete)	- Both discrete and composite sampling recommended for the Mining Workshop as it is proposed to be relocated. Nature of sampling relates to the site features observed (e.g. discrete sampling at discharge points, composite may be appropriate at apron edges). - Testing for metals, hydrocarbons. Solvents adjacent to solvent storage and use. - Also testing of sumps at wash bays and discharge drains etc that receive workshop runoff.
Mine wide screening for PFAS	As described in the preceding sections, an assessment to further quantify potential risks associated with historic PFAS contamination is in progress. This is expected to comprise surface and groundwater monitoring from OGNZL's existing compliance monitoring network (both within and outside the Macraes Operation), assessment of discharges from the TSFs, process water and target sampling around former and current workshop facilities.



Map Title:
Sampling Locations

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



- Legend**
- Discrete sample
 - Composite sample
- Workshop HAIL Activities
- Orange box: A17. Storage tanks/ drums
 - Blue box: F4. Motor vehicle workshop
 - Yellow box: F7. Commercial refuelling
 - Pink box: I. Intentional or accidental release (various)
 - Green box: H. Migration of a contaminant

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
17/02/2026

Layout Name
Workshop sampling

6. MP4 Project Implications

6.1 Contamination management and remediation options

The ground contamination assessment indicates there are three primary types of potential contamination within the Macraes Operation:

1. Localised areas of contamination, such as around workshops and fuel farms that are being removed or relocated. Only some of these areas are proposed to be disturbed as part of the MP4 Project, so future investigations should be focussed on these. Investigations for other areas can be considered during decommissioning of those locations or subsequent mine closure and are not part of the MP4 consent package.
2. Larger areas of low-level contamination, such as in outdoor storage areas and former waste disposal areas. These are less likely to require contamination-specific management, and many will be re-processed during MP4 under standard mining controls.
3. Potential discharges resulting from mining activities, such as at the TSFs, active and former mine workings, ore stockpiles and waste rock stacks have been considered in the context of long-term life of the mine, and/or at mine closure^{8,9}. These discharges are expected to be monitored and managed under a comprehensive set of consent conditions and management plans, so further ground contamination-specific assessment is not warranted.

The exception to this is, as noted in **Section 5**, is that assessment of potential PFAS discharges from the wider mine activities are ongoing². However, the working hypothesis is that much of the mass of PFAS contamination derived from the mine operations is likely to be entrained in process water and tailings. An overall low risk to offsite receptors is therefore inferred. The works and compliance monitoring proposed as part of the MP4 Project provide an opportunity to quantify, and if necessary, mitigate effects that may have arisen from these historic activities.

There are a range of options OGNZL could implement to manage or remediate contamination. These will be addressed in more detail in a site-wide CSMP. As described in **Section 5.2**, targeted investigations are recommended to confirm if management or remediation is required. Additional consents may be required to authorise management or remediation options. Additional consents would be sought outside the FTAA application.

6.2 Consenting implications

6.2.1 NESCS

The NESCS sets out nationally consistent planning controls for assessing potential human health effects related to contaminants in soil. The NESCS applies to specific activities (soil disturbance and removal, subdivision, bulk soil sampling, land use change) undertaken on land where an activity included on the HAIL has occurred.

The degree of contamination and scale of soil disturbance needs to be known to assess the applicability of the NESCS to each of the individual HAIL activities that are or have occurred at the Macraes Operation. It is possible that in some HAIL areas the volume and duration of soil disturbance proposed during MP4 will comply with the permitted activity thresholds set out in Regulation 8 of the NESCS. However, in aggregate the works will exceed the permitted activity duration of 2 months. On this basis it is recommended that consent is sought under the NESCS. As soil sampling to date is not sufficient to meet the requirements of a DSI for the full MP4, it is recommended that consent is sought on a Discretionary Activity basis under Regulation 11 of the NESCS.

A site-wide CSMP, that provides a framework for complying with the requirements of the NESCS, will be prepared to support the application for consent.

6.2.2 Regional Plans

As described in **Section 1.1**, contaminant discharges from the Macraes Operation to the wider environment are provided for by existing resource consents. Potential discharges from remediation activities (for example stormwater discharged during excavation of contaminated material) will be managed in accordance with the CSMP and is expected to be addressed by the existing MWMS so that no new off-site discharges occur. The nature of the existing off-site discharges is highly unlikely to change as a result of localised contamination remediation, so there is not anticipated to be any need for new or revised discharge permits associated with contaminated land remediation.

However, further assessment of potential effects from the historic lawful use of PFAS are ongoing. The working hypothesis is that much of the mass of PFAS contamination derived from the mine operations is likely to be entrained in process water and tailings. An overall low risk to offsite receptors is therefore inferred. The works and compliance monitoring proposed as part of the MP4 Project provide an opportunity to quantify, and if necessary, mitigate effects that may have arisen from these historic activities. But if additional consents are required to authorise management or remediation options, they will be sought outside the FTAA application.

7. Conclusions and Recommendations

WWLA has prepared this PSI to identify the presence of ground contamination within the footprint of the Macraes Operation, and assess the likely implications for investigation, management and consenting for the proposed MP4 Project. This assessment has identified that there are three key types of potential contamination within the mine:

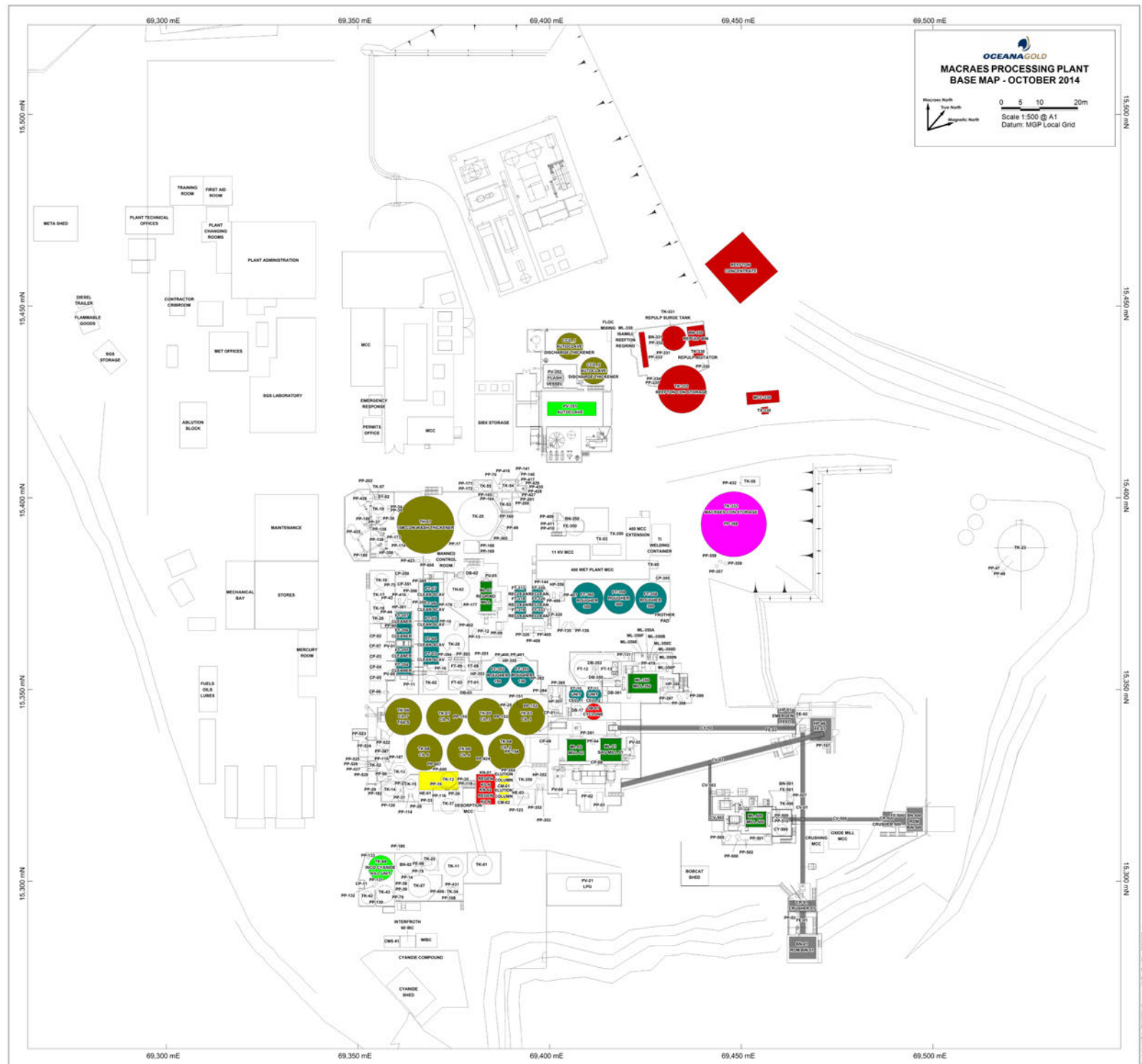
1. Localised areas of contamination, such as around workshops, fuel farms and the Processing Plant. Only some of these areas are proposed to be disturbed as part of the MP4 Project, so future investigations should be focussed on these. Investigations for other areas can be considered when they are decommissioned or subsequently at mine closure.
2. Larger areas of low-level contamination, such as in outdoor storage areas and waste disposal areas. These are less likely to require contamination-specific management, and many will be re-processed during MP4 under standard mining controls.
3. For MP4, discharges from contamination-related remediation activities are typically expected to be less than minor and will be managed via a CSMP.

Targeted investigations are recommended to enable any actual contamination in the identified HAIL areas proposed to be disturbed to be understood, quantify and design remediation requirements, or conversely eliminate areas from requiring further investigation. This is not required where materials are being reprocessed under mining-related controls. For example, investigations should be undertaken in the following areas that may be disturbed/relocated:

- Fuel farms.
- Finger storage areas.
- Waste burial areas.
- The Mining Workshop (*partially complete*).

It is recommended that consent is sought as a Discretionary Activity under both the NESCS and the Regional Plan. A site-wide CSMP, that provides a framework for complying with the requirements of the NESCS, will be prepared to support the application for consent

Appendix A. Client provided information



DIESEL TANK LOCATIONS

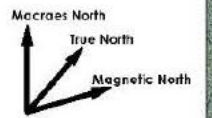
At February 2026

MACRAES GOLD PROJECT
8 JANUARY 2023



0 800 m

MGP Local Grid
Aerial Surveys Limited: 8 January 2023



CORONATION
NORTH PIT

CORONATION
CRIBROOM

CORONATION
WASTE ROCK
STACK

TRIMBELLS
WASTE ROCK
STACK

CORONATION
PIT

FT4
40,000L
Electric (gen set)

FT18
60,000L
Mains Electric

DEEPELL
NORTH PIT

DEEPELL
EAST WASTE
ROCK STACK

DEEPELL
SOUTH PIT
BACKFILL

TROUT
HATCHERY

LONE
PINE
WATER
STORAGE
DAM

FT1 (54,000L)
FT3 (54,000L)
Electric (mains)

PLANT

GOLDEN
POINT
PIT

GPUG
PORTAL

NORTHERN GULLY
NORTH WASTE
ROCK STACK

FT7 - GPUG
40,000L
Electric (mains)

ROM

ROUND HILL
PIT BACKFILL

MIXED
TAILINGS
DAM

FT5
43,500L
Electric (mains)

MINING /
MANAGEMENT
OFFICE

SP11A
TAILINGS
DAM

NORTHERN GULLY
SOUTH WASTE
ROCK STACK

BACK ROAD
WASTE ROCK
STACK

FT2 (50,000L)
FT6 (43,500L)
Electric (mains)

MINING
WORKSHOP

UNDERGROUND
OFFICES

INNES
MILLS
PIT

FT9 - Red Bull
20,000L
Electric (mains)

FRASERS
WEST

FRASERS /
GAY TAN
PIT

FRUG
PORTAL

FRASERS EAST
WASTE ROCK STACK

TOP
TIPPERARY

FT8
55,000L
Diesel

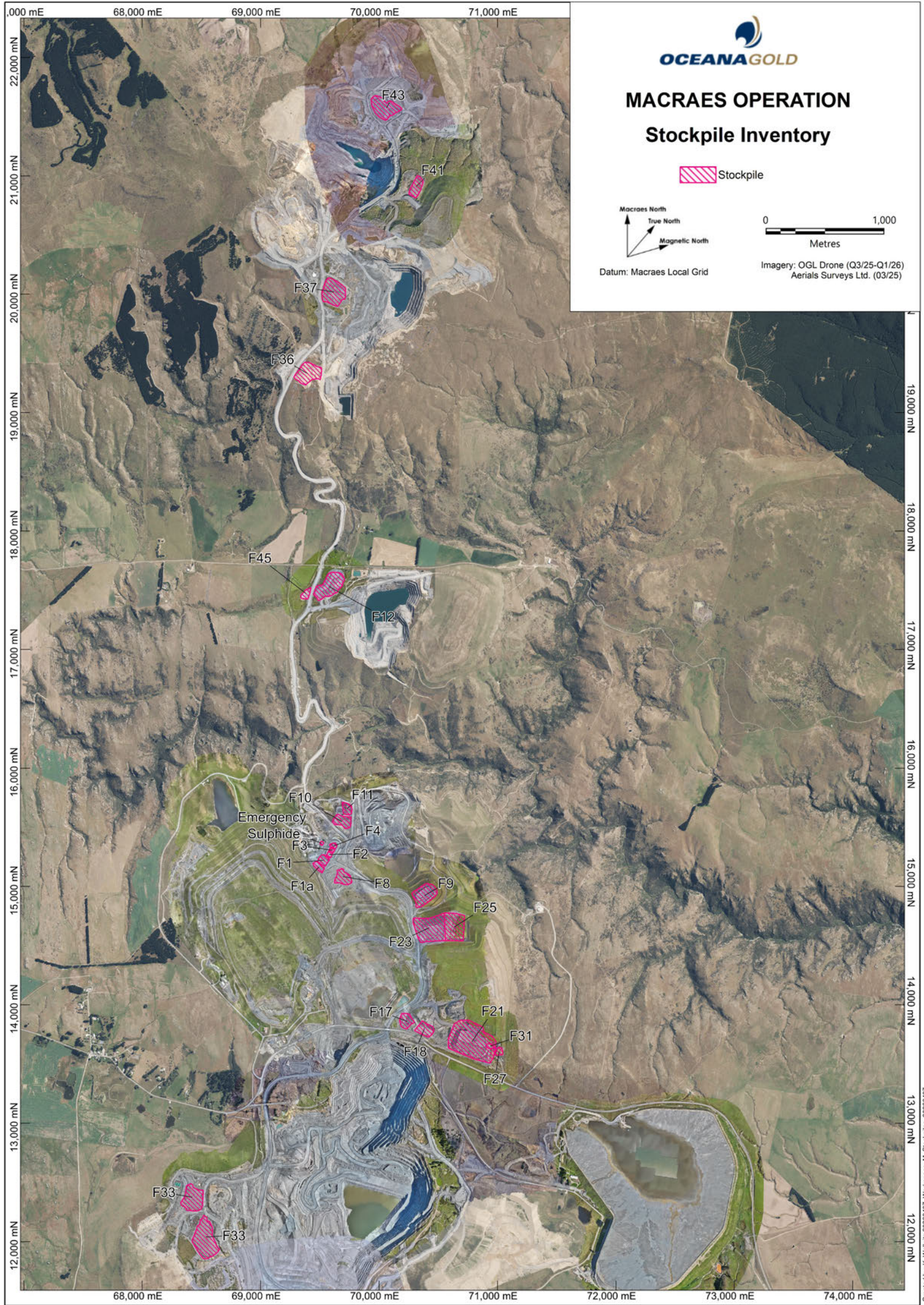
FRASERS WEST
WASTE ROCK STACK

FRASERS SOUTH
WASTE ROCK STACK

Golden Bar Rd

Appendix B. Low Grade Ore Stockpile Data

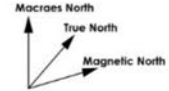
B.1 Figure showing low grade ore stockpiles



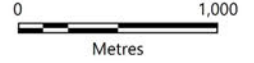
MACRAES OPERATION

Stockpile Inventory

 Stockpile



Datum: Macraes Local Grid



Imagery: OGL Drone (Q3/25-Q1/26)
Aerials Surveys Ltd. (03/25)

Rom Pad	Field18	Last Changed	Royalt	Tonnes	Grade	PRF
1 ROM Pad						
	Finger 1	30-Nov-23	R	27,548.00	0.81	
				27,548.00		
	Finger 2	29-Nov-23	R	24,294.00	0.83	
		27-Nov-23	R	32,725.00	0.62	0.00
				57,019.00		
	Finger 3	30-Nov-23	R	16,266.00	0.66	
		30-Nov-23	R	216.00	0.58	0.00
				16,482.00		
	Finger 7	10-Jul-22	R	5,173.00	0.49	0.00
				5,173.00		
	Finger 5a GPUG	27-Nov-23	R	2.00	1.12	
				2.00		
	Emergency Sulphide	27-Nov-23	R	109.00	0.61	0.00
		27-Nov-23	R	8,810.00	0.73	
				8,919.00		
2 ROM Oxide						
	Finger 17a	14-Jun-13	R	247,067.00	0.71	
				247,067.00		
	Finger 8 Oxide	09-Jun-19	R	9,720.00	0.93	
				9,720.00		
	Finger 9a	20-Dec-18	R	73,329.00	0.96	
				73,329.00		
	Coro Oxide (36)	31-Dec-20	R	125,105.00	1.10	
				125,105.00		
	CoroOxide (41)	27-Jan-19	R	149,901.00	0.95	
				149,901.00		
3 ROM Grade						
	Finger GB06	15-Dec-06	R	0.00	0.99	
				0.00		
	GPUG 1	30-Nov-23	R	6,668.00	1.24	
				6,668.00		
4 ROM Pad Med						
	Finger 518	29-May-03	G	18,057.00	0.84	
		29-May-03	GR	65.00	1.18	

		29-May-03	R	11,951.00	0.76	
				30,073.00		
5 Oxide						
	Finger 10 oxide	17-Jun-20	R	19.00	0.81	
		17-Jun-20	R	30,823.00	1.06	0.00
				30,842.00		
	Finger 11	26-Jul-21	R	12,343.00	0.88	
				12,343.00		
	Finger 31	06-Mar-06	R	27,304.00	1.09	
				27,304.00		
6 Medium Grade						
	Finger 15	10-May-10	G	22,896.00	0.74	
		10-May-10	H	49,131.00	0.70	
		10-May-10	HR	258.00	0.65	
		03-Jul-11	R	5,218.00	0.54	
				77,503.00		
7 Low Grade						
	Finger 10	31-Oct-23	R	13,404.00	0.59	
				13,404.00		
	Finger 14	25-Jul-03	GR	825.00	0.68	
		16-Aug-03	R	82,227.00	0.65	
				83,052.00		
	Finger 18	07-Nov-23	R	5,055.00	0.55	
		07-Nov-23	R	6,252.00	0.55	0.00
				11,307.00		
	Finger 5R	02-Dec-11	GR	3,779.00	0.61	
		11-Dec-11	R	17,995.00	0.58	
				21,774.00		
	Coro Alv (40)	09-May-18	R	1,088.00	0.50	
				1,088.00		
8 Low Grade Oxide						
	Finger 9	20-Nov-03	GR	3,421.00	0.68	
		07-Oct-04	H	152,951.00	0.62	
		12-Dec-21	R	227,795.00	0.78	

		17-Jan-23	R	36,836.00	0.58	0.00
				421,003.00		
	Finger 27	29-Aug-04	G	215.00	0.63	0.00
		29-Aug-04	GR	7,072.00	0.57	
		29-Aug-04	R	36,634.00	0.68	
				43,921.00		
9 Super Low Grade						
	Finger 10a	28-Sep-23	R	78,846.00	0.41	0.00
				78,846.00		
	Finger 12	26-Jun-23	R	1,232,534.00	0.39	
		21-Sep-22	R	1,689.00	0.43	0.00
				1,234,223.00		
	Finger 1g	27-Mar-18	G	0.00	0.62	
		27-Mar-18	GR	0.00	0.64	
		14-Aug-18	H	22.00	0.35	
		14-Aug-18	R	44,858.00	0.45	
		29-Jul-23	R	7,604.00	0.40	0.00
				52,484.00		
	Finger 21	27-Nov-23	R	1,325,375.00	0.39	
		29-Nov-23	R	1,064,761.00	0.38	0.00
				2,390,136.00		
	Finger 23	20-Sep-22	R	4,603.00	0.40	0.00
		30-Sep-22	R	1,168.00	0.36	
				5,771.00		
	Finger 25	09-Jun-23	R	3,373,759.00	0.39	
		03-Aug-22	R	27,478.00	0.53	0.00
				3,401,237.00		
	Finger 33	08-Sep-21	H	600.00	0.35	
		18-Jun-23	R	1,418,144.00	0.42	

		27-Jul-23	R	33,420.00	0.40	0.00
				1,452,164.00		
	Finger 47 (PS)	23-Aug-23	R	82,363.00	0.40	0.00
				82,363.00		
	Coro PS (37)	30-Oct-21	R	709,390.00	0.42	
				709,390.00		
	Coro PS (43)	01-Sep-21	R	175.00	0.47	0.00
		22-Mar-22	R	771,807.00	0.42	
				771,982.00		
	Finger 45	16-Aug-21	R	35,599.00	0.52	
				35,599.00		
	GT Sheeting	17-Jun-23	R	534.00	0.36	0.00
				534.00		
None						
	GPUG ROM Base	19-Mar-23	R	12,521.00	0.36	0.00
				12,521.00		
	ROM Pad sheeting	07-Jun-05	GR	308.00	0.57	
		08-Jul-13	R	16,791.00	0.63	
				17,099.00		