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Macraes Operation

Open Pit Mining Workshop Detailed Site Investigation (Ground Contamination)

OCEANA GOLD (NEW ZEALAND) LTD

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Investigation Summary

Williamson Water & Land Advisory (WWLA) has prepared this Detailed Site Investigation (“DSI”) report to support Oceana Gold (New Zealand) Ltd’s (“OGNZL”) resource consent application for the Macraes Phase 4 Project (“MP4” or “the Project”). The objective of this investigation was to assess actual ground contamination within the Open Pit Mining Workshop (“Workshop”) footprint which is proposed to be de-constructed as part of MP4. The findings of the soil testing will be used to inform the earthworks management decisions in regard to contaminated land. This DSI does not address potential contamination by per- and polyfluoroalkyl substances (PFAS), a concurrent process to quantify these risks on an operations wide basis is in progress. Key findings are:

Site setting and potential for contamination [Sections 2 & 3]	The site has been in use for the Workshop since the 1990s. Activities on MfE’s Hazardous Activities and Industries List (“HAIL”) are occurring. - Macraes Operation was first developed in 1990 with the Workshop dating from this time. While there have been some changes to the landform across the northern storage and laydown areas, the primary facilities around the workshop itself have remained largely unchanged over time. - While mining as a HAIL activity applies to the entire project area, specific HAIL activities apply to the Workshop: - A17: Storage tanks or drums for fuel, chemicals or liquid waste. - F4: Motor vehicle workshops. - F7: Retail or commercial refuelling facilities (for the adjacent fuel farm that supplies the workshop). - I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment (<i>potentially occurring</i>; in relation to vehicle washing, storage of materials outdoors, tyre testing). - H: Migration of a contaminant in sufficient quantity to present a risk to human health or the environment (<i>potentially occurring</i>; in relation to discharges of stormwater to the western swale). - Contamination if present was expected to be largely associated with shallow surficial soils but deeper impacts could occur in localised areas if spills of hazardous substances have occurred. Dust is considered to be the primary potential pathway for migration offsite as surface water is captured by the mine water management system (MWMS).
Soil characterisation and results [Section 4]	Soil sampling confirmed that some metals (particularly arsenic) are naturally elevated in overburden. Sediment and sludge contain the highest levels of arsenic. Low levels of hydrocarbons are present in several locations. - Fine-grained sediment and sludges contained the highest concentrations of arsenic. This is likely from accumulation of that sediment from washing down of vehicles used in more mineralised areas of the mine site. - Total petroleum hydrocarbons (“TPHs”) are present in samples around wash bays and fuel and hydrocarbon storage but are at levels that do not present a risk to human health or the environment. - Volatile organic compounds (“VOCs”) and most polycyclic aromatic hydrocarbons (“PAHs”) are below laboratory reporting limits.
Conceptual site model (“CSM”) [Section 5]	A CSM, developed to identify if and how people or the environment may be impacted by the proposed works, helps determine if there are potential risks to human health or the environment. The CSM shows there is expected to be negligible risk to human health or the environment if bulk earthworks are undertaken using large scale mining equipment, since it is fitted with appropriate control measures. However, if more localised earthworks are undertaken exposure to workers could occur. Management of dust and protection of site workers are the key controls for this work.
Soil management implications [Section 6]	MP4 works provide an opportunity for localised removal of sediment/sludge with elevated levels of arsenic to mitigate potentially complete pathways for contamination to reach surrounding environmental receptors. Fine-grained materials should be removed when earthworks are undertaken to relocate the Workshop and can be managed such as by placing in a tailings storage facility (considered most practical), removal offsite, or processing via the Processing Plant (which is less desirable due to detrimental effects on gold recovery). Suggested management areas will also address hydrocarbon contamination which is at such low levels that it

	does not present a risk to human health or the environment, but MP4 works provide an opportunity for reducing potential exposure pathways. • Subject to confirming PFAS conditions, there are no contamination-related requirements for the remainder of works, but a focus on good dust control and protection of workers should be considered.
Consenting requirements [Section 6]	The scale of earthworks proposed for MP4 means that 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 intersected by the Project, resource consent is required for a Discretionary Activity in accordance with Regulation 11. This DSI nonetheless supports the application for resource consent. • Subject to confirming PFAS conditions, additional consents are not anticipated to be required under the Otago Regional Plan: Waste for Otago for discharges from contamination-related remediation activities. However, additional consents may be required if specific management or remediation of PFAS discharges are required. But these can be obtained when required. • 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**). 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.

WWLA has prepared a Preliminary Site Investigation¹ (“PSI”) for the wider MP4 Project site, also to support the FTAA application. The PSI report identified several HAIL activities within the Macraes Operation that would require further investigation. The Open Pit Mining Workshop (“Workshop”) is one of the areas where potential for contamination was identified. This facility will be de-constructed as part of the Project. The final form of the area will be confirmed during future mine planning, but it will remain part of the wider mining operations (i.e. not a more sensitive use). The Workshop (herein referred to as “the Site”) has therefore been chosen as the first site to be subject to a DSI, other parts of the mine will be subject to DSI’s as the MP4 Project progresses with preparation of those to be managed via the Contaminated Site Management Plan (CSMP, refer to the PSI).

1.1 Project overview

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

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine (“GPUG”).
- **Tailings management**, including:
 - Construction of the Frasers Tailings Storage Facility (“FTSF”) Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
 - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment (“MTI”), Southern Pit Option 10 TSF (“SP10”), and Southern Pit Option 11A TSF (“SP11”) to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
 - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
 - Construction, operation and maintenance of a Water Treatment Plant; and
 - Ongoing operation and maintenance of the Mine Water Management System (“MWMS”).
- **Infrastructure and roading works**, including:
 - Realignment of Macraes Road in two stages; and
 - Relocation of the Open Pit Mining Workshop.

¹ Williamson Water & Land Advisory, July 2024. Preliminary Site Investigation (Ground Contamination). Prepared for Oceana Gold (New Zealand) Limited.

- **Ecological enhancements**, including establishment of:
 - Murphys Ecological Enhancement Area (“MEEA”) near Murphys Creek, including predator fencing, access tracks, and site facilities;
 - Mt Highlay restoration area;
 - Cranky Jims Link shrubland enhancement area;
 - Murphys Link tussock protection area; and
 - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in **Figure 2** (overpage).

1.2 Scope of work

The DSI has been undertaken to assess contamination at the Workshop, with the objective of informing contamination management or remediation requirements during its relocation. The scope of this report includes:

- A site walkover inspection by a Suitably Qualified and Experienced Practitioner (“SQEP”) from WWLA to confirm likely sources of contamination.
- Soil sampling in 32 locations across the Workshop footprint including support areas.
- Laboratory analysis of selected samples for likely contaminants based on WWLA’s site observations and the WWLA PSI.
- Evaluation of laboratory data against guidance applicable for:
 - Assessing the condition of soil against expected background levels for the area;
 - Assessing effects on people under commercial land use scenarios;
 - Assessing effects on the environment; and
 - Indicating expected soil disposal/reuse requirements during relocation of the workshop.
- Development of a Conceptual Site Model (“CSM”) to assess the potential effects of identified contamination in the context of mine operations.
- Preparation of this report.

1.3 Legislative requirements

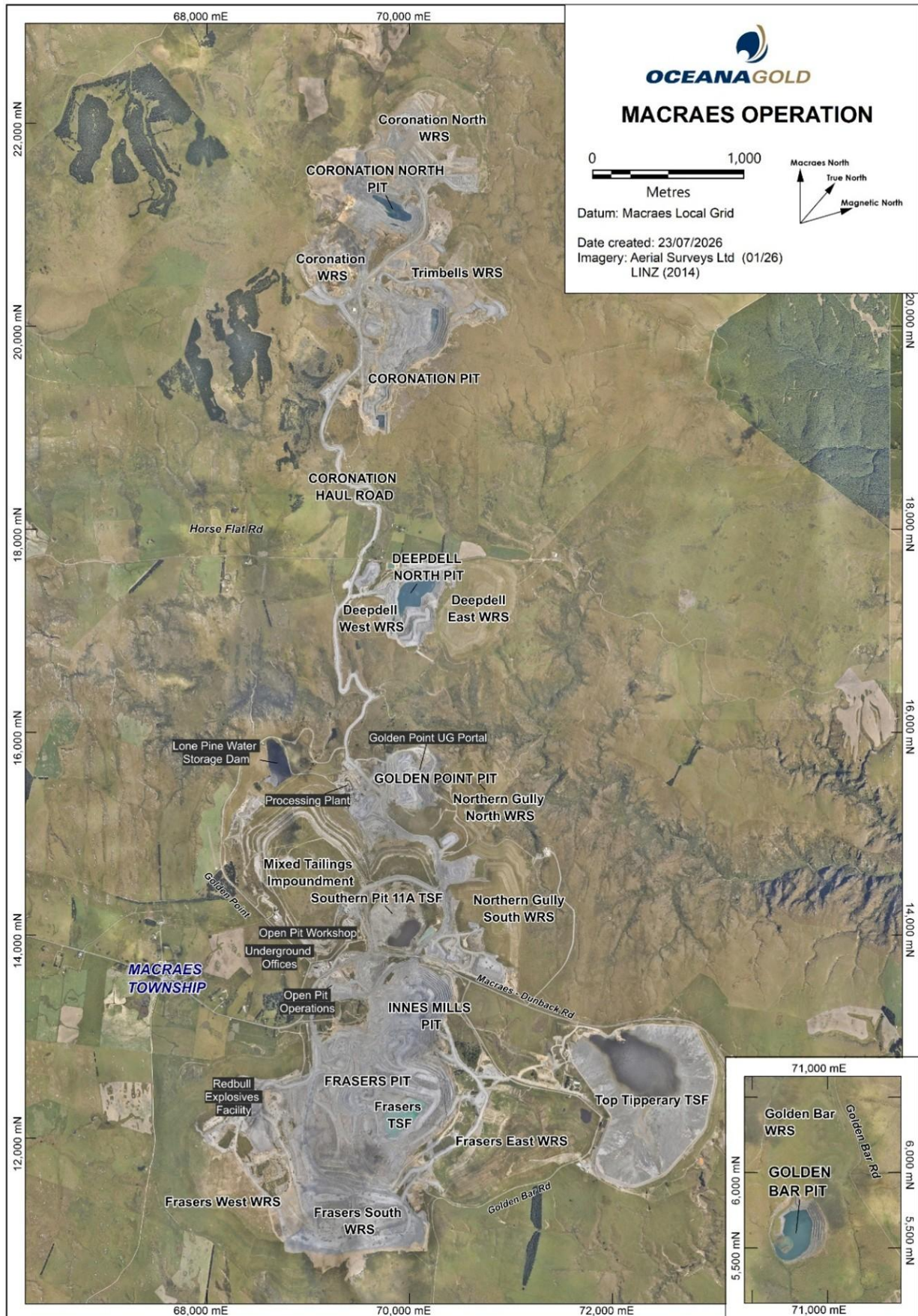
WWLA has undertaken the investigations and prepared this report in general accordance with requirements of published industry best practice guidance, including:

- Ministry for the Environment (“MfE”) Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2021), (CLMG1).
- MfE’s Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2021), (CLMG5).

This report has been prepared, reviewed, and certified by a SQEP as described in the NESCS² and NESCS Users’ Guide³. CVs confirming the SQEP status of contaminated land specialists are available on request.

² Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011

³ Ministry for the Environment, April 2012. *NESCS Users’ Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*.



Created by: K. Wallitz 23/07/2026 - M_SiteAerials_Labels

Figure 1. Macraes Operation location and key features (Source: OGNZL)

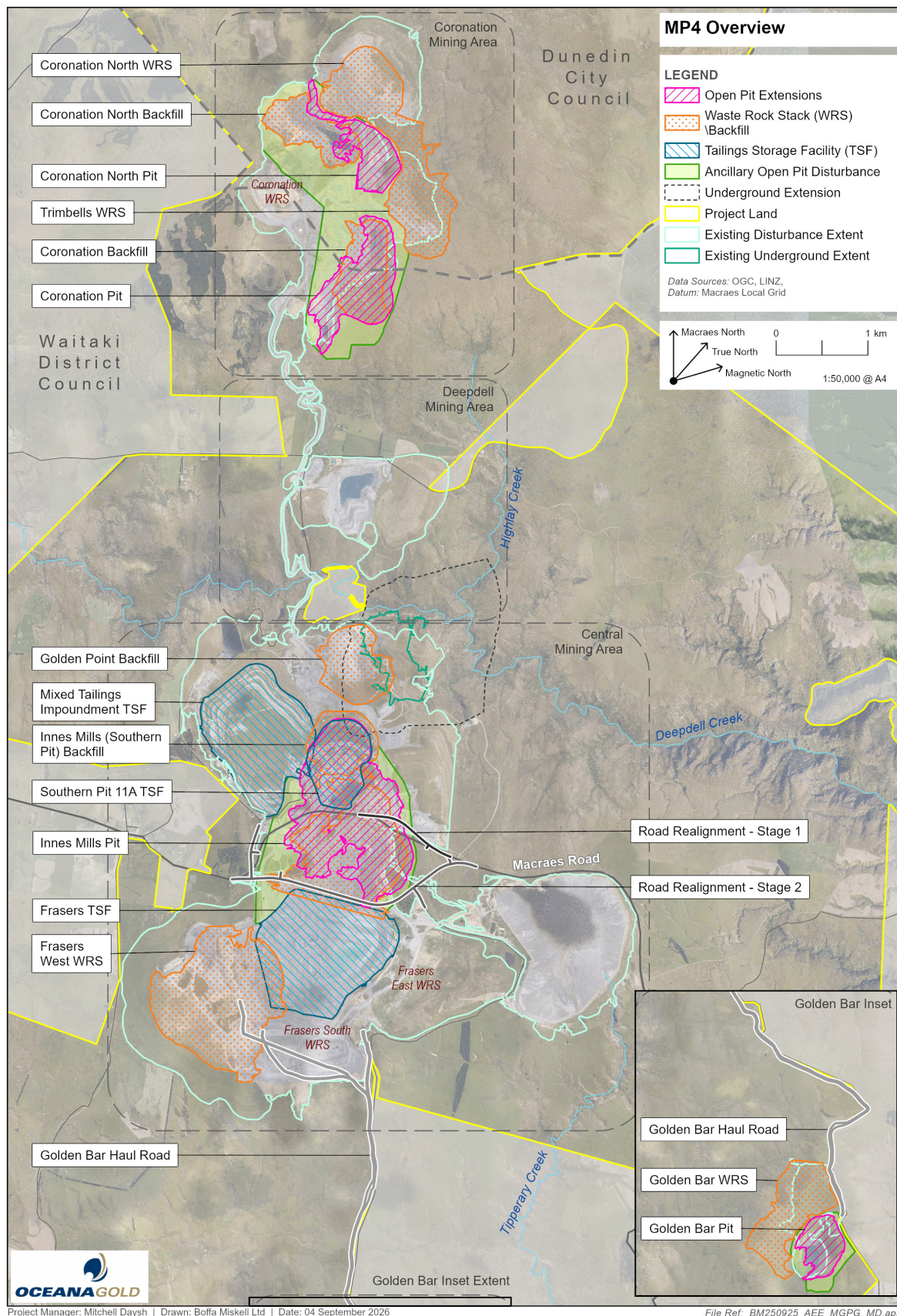


Figure 2. MP4 Project overview plan (Source: OGNZL)

2. Site Description

2.1 Macraes Operation Setting

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 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 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 2** 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.

2.2 Open Pit Mining Workshop

The Workshop (the Site) is centrally located between the MTI and SP11A tailings dam, just north of the Innes Mills and Frasers pit complexes. Key site observations made by WWLA's SQEP are described below. This description includes information provided by personnel from OGNZL, who accompanied WWLA, and Joyce's Contracting, who excavated test pits and are also contracted to undertake maintenance tasks at the workshop and wider mine facilities. The key features of the Workshop area are shown in **Figure 3**.



Figure 3. Key features in Workshop area

The main Workshop area comprises two large adjacent buildings with six (6) cantilever doors on the eastern side for vehicle entry/exit. Offices are located on a mezzanine floor and in smaller portable offices on the western side of the buildings. On their northern side, forming an “L” shape, is a half-round building of similar size that is used as a tyre workshop (~30%) and for parts storage (~70%). All buildings are of profiled steel construction with concrete floors.

Internal features were described in detail in Section 2.3.5 of the PSI, with this description focussing on external features. However, of note is that waste oil is reused for boilers and there are dedicated areas for tasks such as painting, welding and changing batteries. There was no evidence of large spills or discharges from the interior of the workshop during WWLA’s previous inspection for the PSI or during this investigation.

Key features are described as follows:

- The western side of the building is lined by hydrocarbon storage facilities and offices (**Photograph 1** and **Photograph 2**). This includes a large (20-30,000 L) waste oil container in a concrete bunker. Surplus waste oil is removed for offsite disposal and some localised oil staining was observed on the ground outside the bunker. Storage of new grease and oil is located along this side of the building. This storage is also bunded and the products are piped directly into the workshop dispensers.
- On the eastern side of the workshop are the entry/exit roller doors and a large concrete apron (**Photograph 3** and **Photograph 4**). The concrete apron is enclosed by a slot drain, which drains runoff and wash water north to a stormwater sump, before discharging to the heavy vehicle wash sump. The concrete apron extends approximately 2 m past the slot drain and was observed to effectively divert wash water into the drain while WWLA was in attendance.

- Also on the eastern side is the service truck refill area (**Photograph 5**). This comprises bowsters for fuel, oil and other products that may be required by the service truck to service equipment remotely from the workshop. Localised oil staining was observed on the concrete pad in front of the refill area.
- A small diesel bowser is located on the concrete pad near the southern roller doors (Photograph 6). The tank that supplies this is in a fuel farm southeast of the workshop (see below). Again, localised staining was observed on the concrete pad.
- Immediately south of the workshop is the gas storage area, with various gases for welding, metal cutting etc., stored in dedicated areas (**Photograph 7**).
- East of the gas storage is an open, unpaved area used for scrap metal storage (**Photograph 8**).
- Further east of the scrap metal storage are various parts and storage areas. No fuels/hazardous substances are stored here.
- North of the two main workshop buildings is the tyre workshop, various small containers, and storage areas (**Photograph 9**). On the western side of the tyre workshop is a large concrete apron and a small (1,000 L) hydrocarbon tank within a concrete bund (**Photograph 10**). The contents of this tank are not stated on the outside, but pipes leading into the workshop suggest it may be for heating oil. It does not have an external dispenser and is filled from the top. There was no staining outside the bund.
- Surrounding the workshop are a car park to the west and general traffic areas to the east. At the western extent of the car park is a container storing IBCs of new oils (**Photograph 11**), generator storage, and water tanks for emergency firefighting (**Photograph 12**).



Photograph 1. Hydrocarbon storage - waste oil bund



Photograph 2. Hydrocarbon storage - grease



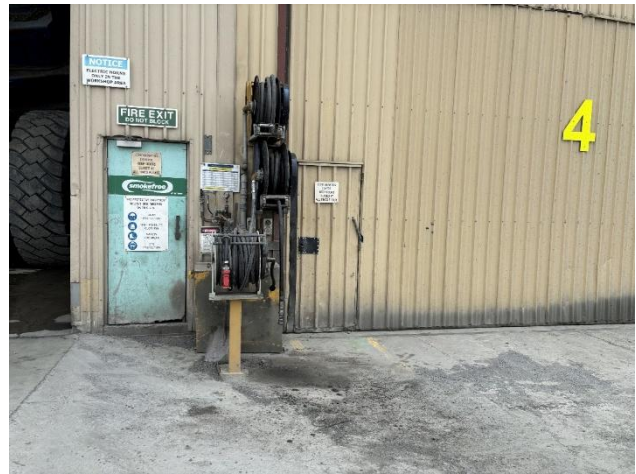
Photograph 3. Eastern side of workshop, wash water draining to slot drain



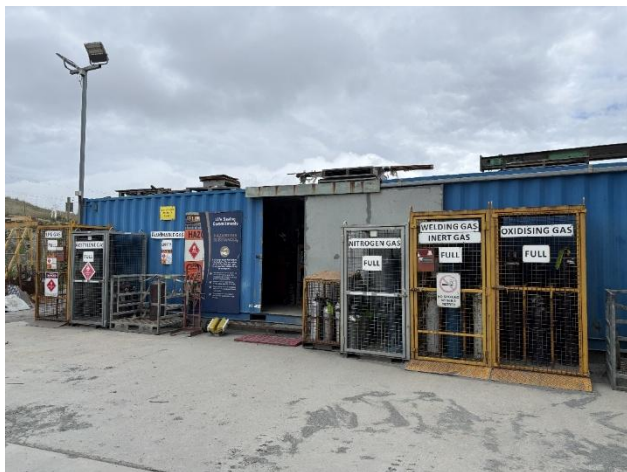
Photograph 4. Eastern side of workshop, slot drain discharges to the right of image



Photograph 5. Service truck refill area



Photograph 6. Fuel bowser on eastern side of workshop



Photograph 7. Gas storage



Photograph 8. Scrap metal storage



Photograph 9. Tyre workshop, showing concrete pad and small tank in bund



Photograph 10. Small tank and bund at tyre workshop



Photograph 11. New lubricant and product storage



Photograph 12. Water tanks, generator storage visible to left

2.2.1 Wash bays

Light and heavy vehicle wash bays are present north of the workshops:

- The heavy vehicle wash bay is to the east and comprises a large concrete pad that is slightly sloping down to the east. Scaffolding and two-high containers enable high pressure water washing (**Photograph 13**).
- Wash water drains east to a concrete lined sump. Some evidence of overflowing of wash water onto surrounding ground, by overtopping a nib wall, was observed (**Photograph 13**).
- From the concrete sump, wash water is piped to the first of two ponds, then discharges via overflow to the second pond (**Photograph 14**). From the second pond it is piped to the oil-water separator at the light vehicle wash bay (**Photograph 18**).
- The ponds are periodically mucked out and sediment left to dry in a pit within the adjacent waste rock embankment (**Photograph 15**). Once dry it is stockpiled in Finger 18 until it is disposed offsite. Previously the sediment was taken directly to Green Island landfill, and prior to that, in the early 2000s (and likely earlier), it was placed in tailings. A new offsite disposal facility is currently being secured.
- The light vehicle wash bay comprises a concrete pad and a series of sumps (some of which can be driven over) (**Photograph 16** and **Photograph 17**). At the time of the investigations the pad was covered by approximately 100 mm of sediment. Water drains from the sumps toward the north to the oil-water separator that also receives water from the heavy vehicle wash bay (**Photograph 18**).
- The separator features a modified dump truck tray with three partitions. It does not appear to be functioning as intended given that there is notable sediment deposition in the final partition, as well as evidence of overflowing. However, site staff commented that testing has shown that there are no discharges of hydrocarbons from this separator. From the separator, discharges are piped west to a stormwater gully (refer to **Section 2.2.3**).



Photograph 13. Large vehicle wash bay. Concrete pad visible with scaffolding and containers. Water drains to the sump in the left of the image, and over concrete nib wall in centre of image



Photograph 14. First and second settling pond, separated by low bund



Photograph 15. Sediment drying area adjacent to large vehicle wash pad



Photograph 16. Light vehicle wash bay. Sumps visible to the left and in centre of image (by person)



Photograph 17. Concrete identified beneath sediment at light vehicle wash bay



Photograph 18. Oil-water separator that services both wash bays

2.2.2 Northern area

The northern portion of the wider workshop area comprises laydown areas, tyre testing and vehicle parking areas as follows:

- Two equipment storage/laydown areas are present, one in the north and one in the south:
 - The northern laydown has general equipment and parts storage (**Photograph 19**). It also features a portable diesel tank for refuelling (**Photograph 20**). The bowser is located on the southern side of the tank and localised staining was evident around it.
 - The southern laydown is for smaller parts/equipment (**Photograph 21**). It also contains a fixed bunded fuel tank (**Photograph 22**). The tank is disused, but signage indicates it was previously used for storage of waste fuels, oils and/or lubricants. No odours or staining were noted around this facility. Underground pipework extends south from the bund toward the workshops.
- Between the two laydown areas is the tyre testing pad (**Photograph 23**). This comprises a concrete pad where tyres are inflated and deflated. Small volumes of lubricants, greases, and similar are present in a container adjacent to the pad, alongside another container housing an office and workshop. The tyre testing pad area is surrounded by a wall of upright tyres.
- A “park up” area is located in the northwest (**Photograph 24**). This is where heavy vehicles requiring servicing are parked until they are taken to the workshop. No servicing occurs in this area.



Photograph 19. Northern laydown area



Photograph 20. Oil tank and northern laydown



Photograph 21. Southern laydown area



Photograph 22. Disused waste oil tank at southern laydown



Photograph 23. Tyre testing pad. Containers in back right of image



Photograph 24. Large vehicle park up area

2.2.3 Western stormwater gully

This gully captures stormwater draining from the wider workshop area and directs it toward the MTI.

- Water from the main sump at the wash bays drains west to a large gully (**Photograph 25** and **Photograph 26**). This also collects general stormwater from across the site.
- The gully is constructed between the raised embankment of the workshop area to its east and the MTI to the west, with additional overburden used to create smaller ponds/check dams and isolated stockpiles.
- The ground surface within the gully is typically a fine silt with vegetation growing.
- The PSI identified that in early 2023 approximately 17,500 L of fuel, spilt from a damaged fuel holding tank on a mobile service truck, entered the gully and discharged to the MTI (**Figure 1**). Wind blew the oil to one end of the tailings dam where it was able to be removed via vacuum truck and disposed offsite. No residual evidence of contamination from this incident was observed.



Photograph 25. View east from western stormwater gully (looking up to Workshop platform)



Photograph 26. View south down stormwater gully

2.2.4 Fuel farm

A fuel farm is located at the southern extent of the workshop complex. It is raised above the remainder of the complex and supplies fuel to the bowser at the workshop as well as being used to fill light vehicles.

- A 30,000 L diesel tank is situated on a platform that has been created in a cut-to-fill manner, meaning that the ground is raised on two sides (**Photograph 27**).
- The tank is filled on its northern side, and some localised staining was observed on the ground. Underground pipes feed a bowser to the north (**Photograph 28**), which also had localised staining around its concrete platform.



Photograph 27. Fuel farm looking south, raised ground visible to left and rear



Photograph 28. Fuel farm bowser

2.2.5 AFFF use

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 per- and polyfluoroalkyl substances (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 cover⁴ and a concurrent process to further quantify these risks is in progress. For this reason, PFAS is not addressed in detail this DSI, but in summary the assessment completed to date indicates that the mine workshops are a potential source of PFAS contamination as they were (and still are) the locations where most of the servicing of the fire suppression systems fitted to the mine heavy vehicle fleet occurred. There is potential for impact around the servicing areas and downstream infrastructure including stormwater systems and swales.

⁴ Macraes Operation – Preliminary Assessment of PFAS Risk. Report prepared for OGNZL by WWLA, dated 21 August 2026.

2.3 Site Setting

The site setting is described in **Table 1**. The features of the site and 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 3.2**).

Table 1. Site setting

Site history	The first workshop buildings were constructed in 1990 with the larger multi-bay workshop constructed several years later. The northern area has been re-worked overtime, with it initially forming the main access point for disposal to the MTI. From the 2010s it has been modified as the MTI was retired and the tyre storage and laydown areas were created in the place of the original access road. The adjacent fuel farm dates from between 2012 and 2014.
Surrounding land uses	<i>Surrounding land may include HAIL activities that can contaminate soil or groundwater on properties nearby.</i> The area immediately surrounding the Workshop is entirely occupied by other mine-related activities such as TSFs, access roads, waste rock stacks. The nearest non-OGNZL owned land is approximately 470 m to the south of the Mining Workshop. Land surrounding the wider Macraes Operation 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 (1.5 km south of the Mining Workshop). 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 locally.
Topography and drainage	<i>Site topography influences where contaminants might migrate to if present. Surface water features are potential receiving environments, should contaminants be present on a site.</i> The workshop sits on a highly modified and relatively flat platform constructed from overburden material at an elevation of approximately 560 m RL. Surface water inflows at the Workshop are limited due to surrounding waste rock stack bunds preventing inflow. Surface water generated within the platform itself discharges via overland flow to the western gully and then the MTI. 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 wider Macraes Operation, surface water is managed by: • Diverting clean water away from active working areas; and • Collecting runoff water in pit sumps or silt ponds and directing it into the mine water management system (MWMS) where it can be used for mining-related activities. There are several natural watercourses of significance within the wider area of the Macraes Operation (Figure 4). None of which are in close proximity to the Mining Workshop. These include: • Murphy's creek catchment drains surface water and shallow groundwater from the southern extent of the Macraes Operation, particularly around the Frasers Waste Rock Stacks. • 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. • Deepdell Creek bisects the Macraes Operation 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 Macraes Operation, Trimbles Gully, Coal Creek and several other small tributaries drain into the Mare Burn and eventually to the Taieri River.
Geology	<i>Geological conditions are considered in the context of describing the CSM, should a 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> The 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.

	Exploratory and geotechnical drilling and landform comparison indicates that a thin layer of loess covers much of the Macraes Operation. The loess soils comprise a very stiff, light yellow grey silt, sandy silt or silty fine sand.
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 Macraes Operation based on the topographic variations and mining activities (e.g. presence of pits). However, we understand that the open pits at the Macraes Operation produce only a small quantity of groundwater. Dewatering wells are rarely used, with the occasional exception of depressurisation bores to reduce the risk of slope instability. Groundwater is primarily 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.
Sensitive receptors	<i>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 people receptor interpretation informs the CSM and future guideline value selection for evaluation of soil data.</i> The key sensitive receptors surrounding and within 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. Due to the distance of the Workshop from the township and receiving environmental receptors, only mine workers/contractors/visitors are considered sensitive human receptors, and the terrestrial and aquatic ecosystems are only considered sensitive in the context of groundwater discharges and dust migration. This is discussed further in Section 3.2.



Figure 4. Streams and creeks around Macraes Operation (Source: Google Earth and TopoNZ)

3. Potential for contamination

3.1 HAIL Assessment

The HAIL is a list of activities that have potential to result in ground contamination. It is not an exhaustive list and the presence of a HAIL activity does not confirm contamination, but it provides a framework for contamination assessment and also forms the basis of the NESCS. The HAIL Guide⁵ 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 to the wider MP4 Project in the PSI, and to the Workshop more specifically in this report.

The following HAIL activities were identified at the Workshop during the PSI and confirmed during these investigations (refer **Figure 5**):

- A17: Storage tanks or drums for fuel, chemicals or liquid waste.
- F4: Motor vehicle workshops.
- F7: Retail or commercial refuelling facilities (for the adjacent fuel farm that supplies the workshop).
- I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment (*potentially occurring*; in relation to vehicle washing, storage of materials outdoors, tyre testing).
- H: Migration of a contaminant in sufficient quantity to present a risk to human health or the environment (*potentially occurring*; in relation to discharges of stormwater to the western swale).



Figure 5. HAIL Activities identified at the Workshop

⁵ MfE, 2023. *Hazardous Activities and Industries List Guidance; Identifying HAIL Land*.

3.2 Preliminary Conceptual Site Model

A conceptual site model (CSM) indicates known and potential sources of contamination, routes of exposure (pathways), and the receptors that are affected by contaminants moving along those pathways. Receptors may be people or the environment. The purpose of the CSM is to set out risks to people and the environment (if any) associated with any proposed activity (short or long term) on the land. A CSM is considered preliminary when it is based on desk study data only, rather than soil and water laboratory data, and it forms the basis for design of the sampling plan.

The following preliminary CSM was developed from the PSI, and formed the rationale for the sampling plan:

Sources	The key sources as shown in Figure 5 are: • Bulk storage of hydrocarbons. • Use of hydrocarbons in servicing (fuels, oils, lubricants, etc). • Accidental spills of the above substances. • Regular washing of vehicles potentially entraining contaminants in wash water. • Storage of metal and tyres outdoors. The potential contaminants sourced from these activities include hydrocarbons (total petroleum hydrocarbons ("TPH"), polycyclic aromatic hydrocarbons ("PAH"), possibly volatile organic compounds ("VOC")) and metals (primarily arsenic, cadmium, chromium, copper, lead, nickel and zinc). The following contaminants were also considered, but were not assessed further at this time for the reasons indicated below: • Tyre antioxidant compounds such as 6PPD and 6PPD-quinone are emerging contaminants of concern and were considered in relation to the tyre testing and storage area. However, at the time of these investigations none of the primary New Zealand or Australian based commercial laboratories are able to provide testing for these compounds. In addition, these contaminants typically have low mobility in soil. Although some components such as hexamethoxymethylmelamine do have greater mobility, the Users' Guide for the National Environmental Standard for Storing Tyres Outdoors (NES-STO)⁶ notes that there is generally a "<i>relatively low risk that tyres will leach contaminants throughout the soil to adversely affect an underlying aquifer</i>". • As indicated in Section 2.2.5, further assessment of PFAS contamination is currently in progress.
Pathways	Release of contaminants could occur via large spills or leaks (e.g. historical fuel tank failure), over time via smaller regular leaks (e.g. around fuel or oil bowsters), or through leaks from inground infrastructure (e.g. fuel pipelines). Once released to ground pathways for contaminant migration include: • Via runoff to surface water including: - Rainfall washing over areas of impacted ground or pavements; and - Via washing of vehicles and collection of that wash water in sumps which drain to ground (and therefore potentially groundwater, see below) or runoff to TSFs. However, stormwater runoff from the Workshop is directed to the MTI so this pathway is currently incomplete. • Potentially soakage to ground and into groundwater. However, given the hard-packed nature of the schist rubble geology (largely over burden that has been compacted significantly by heavy machinery), potential for contaminants to migrate below the surface materials (i.e. >0.5 m) is generally considered to be very low/ negligible for most of the contaminants associated with the Workshop. As indicated previously further assessment of PFAS contamination, which can be more mobile in ground, is in progress. • Through dust from vehicles tracking over contaminated ground in dry conditions (noting that OGNZL have existing dust controls in place to mitigate this risk). • Dermal contact with contaminated materials, or inhalation of dust with contaminants. This particularly relates to arsenic.
Receptors	Receptors considered were: • Human health receptors are the site workers. We note that health and safety protocols in the mine means that risks to site workers are reduced relative to a typical outdoor worker scenario contemplated by the default guidelines. OGNZL has extensive health and safety protocols, including specific consideration for arsenic and other metals which are known to be naturally elevated in the mine. This includes a requirement to wear long sleeves, long pants and gloves to minimise dermal contact, changing clothes before leaving site to avoid taking dust home, wearing of

⁶ <https://environment.govt.nz/assets/Publications/nas-storing-tyres-user-guide.pdf>

face masks in dusty environments, education about arsenic risk, and health monitoring including blood tests for arsenic. Since the limiting pathway for exposure to arsenic for site workers is via ingestion⁷ these controls significantly reduce the risks.

- Farmers working on the wider OGNZL landholding or adjacent blocks may be considered sensitive receptors, particularly related to the dust pathway (again noting that dust controls are already in place).
- Given the distance of the Workshop from publicly accessible areas, the general public are not considered to be sensitive receptors in this instance.
- The immediate surrounding mine site is not considered an environmental receptor due to its high degree of modification and general lack of natural features. This also includes TSFs which receive stormwater runoff from the Workshop.
- Users of groundwater are not considered to be receptors due to the depth below ground (likely several tens of metres in the vicinity of the Workshop) and high degree of control/dewatering undertaken around the workshop. The Macraes township drinking water supply bore is similarly excluded due to these factors and its distance (~1.6 km) from the workshop (also noting that a new bore has been constructed and will soon supply the village. This bore is 2.3 km from the workshop).
- The wider environment outside the Macraes Operation footprint is a potential environmental receptor due to potential for dust migration. The ecology in the surrounding streams and rivers could also be considered potential receptors in the event that mining operations or dewatering ceased, and discharges to groundwater and surface water were able to resume. However, as noted above, at present these pathways are incomplete.

⁷ MfE, Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health, 2011 (MfE Methodology)

4. Soil Investigation

Soil sampling was undertaken on 14 and 15 January 2026 by a SQEP from WWLA. The following provides the rationale, method and results of soil sampling and testing within the site.

4.1 Sampling and Analysis Rationale

The sampling objectives and rationale are set out as follows. Sampling locations are shown in **Figure 6**:

- Sampling objectives were to investigate actual contamination conditions in the materials most likely to be disturbed as part of MP4 works to inform potential human health and environmental risks for soil management during earthworks.
- A combination of grid-based and targeted sampling was undertaken. For example, in general laydown and trafficked areas, grid-based sampling on an approximate 50 m grid was undertaken to understand “general” ground conditions. Targeted samples were collected around point-sources such as oil tanks and wash down bays.
- Composite sampling techniques were utilised where a diffuse source of contamination could be expected; such as at the tyre testing pad (four sub-samples around the pad) and at the edge of the concrete apron around the workshop (two composites, each of three sub-samples).
- Surface soils were prioritised for sampling as these are most likely to be both contaminated by the at or above grade activities and sources that are dominant at the site (there are only limited below ground fuel lines, which could not be accessed during these investigations). Near surface soils are also most likely to be disturbed by the relocation works. Deeper samples were collected to allow the vertical delineation of contamination by follow up analysis where necessary. But a subset of deeper samples was also tested initially to screen for deeper impacts.
- Olfactory and visual indicators of contamination also influenced the sampling and testing regime.
- Potential contaminants were informed by the HAIL assessment process (**Section 3.2**). The following rationale was adopted for analysis of the samples:
 - Metals to screen for impacts from machinery servicing, wear-and-tear of machinery, and to understand natural mineralisation.
 - TPH to screen for refined petroleum hydrocarbons, the diesel fuel and oil and grease-based products used for vehicle operations and servicing.
 - A subset of samples tested for VOC to screen for solvents and other light end hydrocarbon products that may be included as additives in some products and are also commonly used for cleaning and similar activities in workshop environments.

Further detail of the sampling and analysis rationale is provided in **Table 2**.

Table 2. Sample summary

Sample ID	Contamination source/feature	Sampling method	Depths tested (m)	Testing suite
S1	Tyre storage	Targeted	0.0-0.1	Metals (7), PAH
S2	General laydown	Grid-based	0.0-0.1	Metals (7)
S3	Oil tank; samples at depth until too hard to excavate.	Targeted	0.0-0.1, 0.4, 0.7-0.8	Metals (7), TPH
S4	“Park up” area	Grid-based	0.0-0.1	Metals (7), TPH
S5 (A-D)	Tyre testing area – composite sample	Composite	0.0-0.1	Metals (7), TPH
S6	Former oil tank, surface above potential pipe.	Targeted	0.2-0.4	Metals (7), TPH

S7	Small item laydown area	Grid-based	0.0-0.1	Metals (7)
S8	Ground next to oil-water separator	Targeted	0.0	Metals (7), TPH, VOC
S9	Between light vehicle wash bay and oil-water separator	Grid-based	0.0-0.1	Metals (7)
S10 (A-C)	Light vehicle wash bay – composite sample around pad	Composite	0.0-0.1	Metals (7), TPH
S10 C	Light vehicle wash bay – depth sample	Targeted	0.3	Metals (7), TPH
S11 (A-C)	Heavy vehicle wash bay – composite sample around pad	Composite	0.0-0.1	Metals (7), TPH
S12	Runoff from heavy vehicle wash bay primary sump	Targeted	0.0-0.1, 0.3-0.4	Metals (7), TPH
S13	Sediment in heavy vehicle wash bay secondary sump/pond	Targeted	0.0-0.1	Metals (7), TPH, VOC
S14	Representative sample of stockpiled sediment drying	Targeted	-	Metals (7), TPH
S15	General trafficked area	Grid-based	0.0-0.1	Metals (7)
S16	Drain into sump from workshop	Targeted	0.0-0.1	Metals (7), TPH, VOC
S17 (A-C)	Edge of workshop apron (northern) – composite along edge	Composite	0.0-0.1	Metals (7), TPH
S18 (A-C)	Edge of workshop apron (southern) – composite along edge	Composite	0.0-0.1	Metals (7), TPH
S19	General trafficked area	Grid-based	0.0-0.1	Metals (7)
S20	Scrap metal storage	Targeted	0.0-0.1, 0.5-0.6	Metals (7)
S21	General laydown	Grid-based	0.0-0.1	Metals (7)
S22	Waste oil storage	Targeted	0.0-0.1	Metals (7), TPH, VOC
S22	Waste oil storage – depth sample (2 m offset due to hard compacted ground)	Targeted	0.3-0.4	Metals (7), TPH
S23	Hydrocarbon storage tanks (grease, etc)	Targeted	0.0-0.1	Metals (7), TPH, VOC
S24	General car park	Grid-based	0.0-0.1	Metals (7)
S26	General car park	Grid-based	0.0-0.1	Metals (7)
S27	Small hydrocarbon tank by tyre workshop	Targeted	0.0-0.1	Metals (7), TPH
S28	Diesel bowser at fuel farm	Targeted	0.0-0.1, 0.2-0.3	Metals (7), PAH, TPH
S29	Fuel farm tank – fill point	Targeted	0.0-0.1, 0.2-0.3	Metals (7), TPH
S30	Fuel farm tank – side of tank	Targeted	0.0-0.1	Metals (7), TPH
S31	Western swale – surface silt	Targeted	0.0-0.1	Metals (7), TPH, VOC
S32	Western swale – surface silt	Targeted	0.0-0.1	Metals (7), TPH, VOC

4.2 Sampling Methodology

Soil sampling was undertaken by a SQEP from WWLA, in general accordance with CLMG5 as follows:

- Sampling was principally conducted using test pitting methods. Test pits were excavated using a 5.5 tonne excavator operated by Joyce's Contracting.
- Samples were collected using freshly gloved hands either from the test pit wall, centrally from the bucket, or via trowel from the site surface. Samples were placed directly into laboratory supplied containers.

- Non-dedicated sampling equipment (trowel) was decontaminated between samples using phosphate-free detergent and fresh-water rinses.
- Couriering samples chilled, under chain of custody documentation.
- All samples were sent to IANZ accredited laboratories for testing.

The following quality assurance and quality control measures were implemented to ensure consistency and applicability of the data obtained:

- Appropriately experienced staff were used to undertake the field investigation work.
- Sampling was undertaken in accordance with methodologies recommended in national guideline documents (**Section 1.3**).
- Appropriate chain of custody documentation was used.
- Analyses were carried out by International Accreditation New Zealand ("IANZ") accredited laboratories using industry standard methods.
- Review of laboratory quality control and quality assurance data.

Duplicate soil samples were not collected for this project as high level of variability was expected given the heterogeneous nature of both the contaminant sources and ground conditions. Rather potential variability has been considered in evaluation of the analytical results.



Map Title:
Sampling Locations

Project:
MP4, Mining Workshop DSI

Client:
Oceana Gold (New Zealand) Ltd



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

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
17/02/2026

Layout Name
Workshop sampling

4.3 Field Observations

The following is a summary of onsite ground conditions observed by a WWLA SQEP during soil sampling on 14 and 15 January 2026.

Surface soils and subsoils observed during sampling around the Workshop comprised over burden as a brown-grey and red-brown silty gravel or gravelly silt. Gravel was fine to boulder sized and typically angular. Despite light drizzle/rain, ground conditions were relatively dry. Ground conditions were highly compacted and difficult to excavate in. There was no notable change in lithology to the maximum depth investigated (0.8 m). In contrast to the Workshop, ground conditions at the heavy vehicle wash bay, comprised a fine grey silt with some gravels.

Hydrocarbon odours were noted as follows:

- At the oil tank at location S3; weathered diesel odour to maximum excavation depth of 0.8 m below ground level ("bgl") (too compacted to excavate further);
- Around the heavy vehicle wash area and the oil-water separator at the light-vehicle wash. In these areas the odour was primarily in shallower silt-dominated materials, extending only to 0.3 m bgl.
- A slight hydrocarbon odour was noted adjacent to the waste oil tank bund (western side of the workshop), but only at surface and corresponding to localised staining.
- Adjacent to the bowser and fuel fill point at the fuel farm tank. The odour extended to at least 0.3 m bgl, but excavations could not go deeper due to pipelines being present.

Groundwater was not encountered in any of the investigation locations, although these investigations only extended to a maximum depth of 0.8 m.

Aside from the hydrocarbon odours described above, no visual or olfactory evidence of contamination was observed at any investigation locations.

4.4 Soil Evaluation Criteria

The analytical data was compared against the criteria set out in **Table 3**.

Table 3. Soil evaluation criteria

Protection of Human Health	• NESCS contaminant standards for commercial/industrial land use as a conservative proxy to screen potential effects on construction workers undertaking relocation works and future site workers. However, consistent with the approach set out in Section 3.2.1 of the NESCS Methodology⁸, worker safety is addressed by the relevant health and safety regulations not by the NESCS. So, an exceedance of the NESCS standards does not necessarily indicate a risk where appropriate health and safety protocols are in place. • Where NESCS standards were not provided, guidance was obtained from MfE's "Contaminated Land Management Guideline No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011)" including: - The [Australian] National Environment Protection (Assessment of Site Contamination) Measure 1999, updated 2013 for commercial use (construction workers) as appropriate; and - MfE, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Values used were for industrial/commercial sites, sandy silt (as a proxy for silty gravel), contamination at <1 m depth, and groundwater at 8 m depth.
Discharges to the Environment	• Maanaki Whenua Landcare Research, 2023. An implementation framework for ecological soil guideline values. Envirolink Tools Grant: C09X2206. Prepared for: Contaminated Land and Waste Special Interest Group and Land Monitoring Forum, July 2023. Guideline values, derived using ACL for commercial / industrial land use plus the local from background Craw (2002, see below), were adopted as screening level criteria.

⁸ MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.

	Sediment samples from the western swale and heavy vehicle wash bay have been compared to the above soil guidelines rather than ANZG sediment quality guidelines, as testing is primarily to inform disposal options and potential risk to human health or the environment during earthworks, rather than to assess impacts on ecological receptors in a discharge context. Since discharges are addressed by the compliance monitoring requirements for the wider Macraes Operations.
Expected Background	- The Macraes Operation is within a highly mineralised area where soil/rock geochemistry can differ significantly from national datasets such as those published by Maanaki Whenua Landcare Research. Instead, we have reviewed analysis of altered host rocks from the Macraes area, published by Craw (2002)⁹. A 95% Upper Confidence Limit (UCL) has been calculated using XRF data from >20 samples of host Otago Schist, or where data was not available from Otago Schist, a 95% UCL was calculated using data from mineralised host rock (arsenic and cadmium). - Background values are also commonly used as a basis for acceptance of soil to cleanfill sites, should materials require removal offsite.

4.5 Results and Discussion

The laboratory data is summarised in **Table 5** and full laboratory transcripts are included in **Appendix A**.

In summary, sediment and sludge in some locations contains arsenic at concentrations that have the potential to present a risk to human and/or environmental health. This risk is low in the context of the Macraes Operation but consideration should be given to managing these materials during deconstruction/relocation of the Workshop. Elsewhere, while contaminants are present above background concentrations, they do not present a risk to human health or the environment in the context of the Macraes Operation.

A few key features are immediately evident in the dataset as a whole, while some specific exceedances are relevant to particular areas. Overarching themes are:

- **Arsenic:** Concentrations are typically below the “mineralised” background for the Macraes Operation area (~278 mg/kg), with some sporadic exceptions within sediment and sludge which are discussed in **Table 4** below.
 - However, almost all samples contain arsenic at concentrations exceeding the NESCS human health criteria for outside workers (70 mg/kg). This is because the NESCS threshold is lower than the background levels at the mine. As discussed in **Section 3.2**, OGNZL has extensive health and safety protocols to protect site workers from the primary pathways of dust inhalation, dermal contact and ingestion. In accordance with the NESCS Methodology (refer to **Section 4.4**), since worker safety is addressed by the relevant health and safety regulations not by the NESCS, arsenic is only considered in a human health context in this assessment where it also exceeds expected background concentrations, since this is more likely to indicate conditions that have not otherwise been considered by OGNZL health and safety protocols.
 - The Eco-SGV values for protection of ecological health do consider the background values (value of 422 mg/kg has been calculated), but there are isolated exceedances. These are discussed in more detail in **Table 4**.
- Most other **metals** are below or only slightly above expected background concentrations for Otago Schist. None of the other metal concentrations present an unacceptable risk to human health or the environment.
- **TPH** was detected in most samples where it was tested. However, none of the concentrations identified present an unacceptable risk to human health or the environment. Chromatograms indicate that most of the TPH identified is diesel (including weathered diesel), or heavy-end products (oil or grease), or a combination of these.
- Where **PAHs** were tested for (largely in hydrocarbon use and storage areas), they were generally less than the limit of laboratory reporting. Minor detections are discussed in **Table 4** below.

⁹ Craw, D., 2002. Geochemistry of late metamorphic hydrothermal alteration and graphitisation of host rock, Macraes gold mine, Otago Schist, New Zealand. Published in Chemical Geology, 191, 257-275

- No **VOCs** were identified above the laboratory limit of reporting.

The results are described further by area in **Table 4**.

Table 4. Laboratory Results and discussion

Tyre storage and testing	• Contaminants generally at low levels, with below-background arsenic and only very low TPH at the testing compound. • There is no unacceptable risk to human health or the environment.
General laydown/parking/trafficked areas	• Contaminants generally at low levels, with metals below or slightly above background and TPH only slightly above laboratory limits of reporting. • There is no unacceptable risk to human health or the environment.
Hydrocarbon storage tanks	• As expected, TPH was detected in almost all samples, particularly diesel and oil range compounds. • Arsenic presents a potential human health and environmental risk at S6, adjacent to a disused oil tank, with a concentration of 525 mg/kg. The elevated arsenic may be associated with wash water discharge from the adjacent light vehicle wash bay (see below).
Oil-water separator and vehicle wash bays	• Metal concentrations are generally within expected background ranges, with some TPH detected. • Arsenic exceeds background, environmental and/or human health criteria in several samples, both at surface and at 0.3-0.4 m depth; concentrations increase with depth in at least two locations. This may be due to discharges of sediment and wash water from vehicles which spend more time in mineralised parts of the mine (where arsenic concentrations are higher). Management of these materials during soil disturbance is recommended. • Hydrocarbon concentrations are highest in the ponds receiving runoff from the heavy vehicle wash bay and in the drying sediment. This is as expected due to these being the final accumulation points. But the concentrations do not present an unacceptable risk to human health or the environment.
Workshop apron edge and drain	• Contaminants generally at low levels, with below-background arsenic and only very low TPH. Trace pyrene (a PAH) was also detected, but this is a common byproduct of combustion, and the low concentrations present could reflect deposition from vehicle emissions or other natural and anthropogenic sources. • There is no risk to human health or the environment.
Scrap metal storage	• Contaminants generally at low levels and there is no unacceptable risk to human health or the environment. With the exception of copper, metals are not elevated relative to other parts of the site, suggesting that there is only limited impact from storage of scrap metal.
Fuel farm	• Contaminants generally at low levels, with below-background arsenic and only very low TPH at the testing compound. Trace pyrene was also detected. • There is no risk to human health or the environment.
Western swale	• Arsenic presents a potential human health and environmental risk within shallow silt in the swale, with two of the highest concentrations recorded in the investigation (815 and 1,210 mg/kg). This suggests that runoff from the Workshop platform and surrounds entrains sediment with deposition occurring as runoff velocity slows in the swale. As with other areas of elevated arsenic, management is recommended during any future soil disturbance. However, it is noted that discharges are captured by the MTI, so effects on the receiving environment are currently mitigated (refer Section 5). • TPH concentrations were only slightly above laboratory limits of reporting.

Table 5. Summary soil analytical results

Sample information			Metals							TPH			PAH		VOCs
Sample Location	Depth (m bgl)	Material type	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	C ₇ -C ₉	C ₁₀ -C ₁₄	C ₁₅ -C ₃₈	Pyrene	All other PAHs	Volatile organic compounds
NESC Commercial/ Industrial/ Outdoor worker ¹			70	1,300	6,300	>10,000	3,300	6,000 ⁴	400,000 ⁴	500 ⁵	1,700 ⁵	>20,000 ⁵	>20,000 ⁵	-	-
Eco-SGV ²			422	33	703	358	3,070	-	581	>20,000 ⁵	>20,000 ⁵	>20,000 ⁵	>20,000 ⁵	-	-
Predicted background ³			278	0.1	62	19	21	29	118	-	-	-	-	-	-
Tyre storage	S1 0-0.1 m	Silty gravel	179	0.072	13.1	27	17	24.1	93.5	-	-	-	<0.020	<LR	-
Tyre testing	COMP S5A-D 0-0.1 m	Silty gravel	113	0.076	21.9	28.9	14.2	31.1	85.8	<10.0	22.4	428	-	-	-
General laydown/ parking/ traffic areas	S2 0-0.1 m	Silty gravel	40.6	0.065	12.8	25.8	14.4	27.1	102	-	-	-	-	-	-
	S4 0-0.1 m	Silty gravel	83.6	0.064	14.3	21.2	13.7	20.5	71.7	<10.0	<15.0	30.1	-	-	-
	S7 0-0.1 m	Silty gravel	5.28	0.068	62.7	69.2	2.76	111	63.3	-	-	-	-	-	-
	S15 0-0.1 m	Silty gravel	78	0.089	30.2	35.1	8.51	68.8	78.6	-	-	-	-	-	-
	S19 0-0.1 m	Silty gravel	54	0.103	34.4	39.2	8.16	55.3	86.5	-	-	-	-	-	-
	S21 0-0.1 m	Silty gravel	93.2	0.078	79.8	53.2	12.4	82.1	84.6	-	-	-	-	-	-
	S24 0-0.1 m	Silty gravel	26.9	0.069	46.8	61.6	5.69	81.8	72.6	-	-	-	-	-	-
Hydrocarbon storage	S26 0-0.1 m	Silty gravel	142	0.085	19.5	28.4	13	36.4	86.8	-	-	-	-	-	-
	S3 0-0.1 m	Silty gravel	102	0.073	26.4	22.7	16.1	22.9	86	<10.0	938	2090	-	-	-
	S3 0.4 m	Silty gravel	48.3	0.105	18.1	27	18.8	34.8	96	15.6	1600	2500	-	-	-
	S3 0.7-0.8 m	Silty gravel	31	0.106	17.4	21.6	16.4	28.8	91.2	<10.0	298	549	-	-	-
	S6 0.2-0.4 m	Topsoil	525	0.054	15.1	27.3	23	21.5	87.6	<10.0	<15.0	<25.0	-	-	-
	S22 0-0.1 m	Silty gravel	94.3	0.161	22.8	26.2	10.2	31.1	116	<10.0	18.2	1930	-	-	<LR
	S22 0.3-0.4 m	Silty gravel	249	0.075	15.4	26.5	20.3	23.9	96.2	<10.0	<15.0	979	-	-	-
Oil-water separator	S23 0-0.1 m	Silty gravel	151	0.135	23.7	32.2	14.5	32.8	196	<10.0	<15.0	3430	-	-	<LR
	S27 0-0.1 m	Silty gravel	119	0.129	40.4	56.6	10.8	53.1	225	<10.0	<15.0	129	-	-	-
	S8 0 m	Silt/ sediment	186	0.09	15.2	27.2	12.2	25.5	87.3	<10.0	<15.0	110	-	-	<LR
	S9 0-0.1 m	Silty gravel	43.7	0.059	49.3	61.4	3.99	90.6	61.1	-	-	-	-	-	-
	COMP S10A-C 0.0-0.1 m	Sandy gravel	372	0.091	18.2	30.9	14.4	30.4	98	<10.0	<15.0	227	-	-	-
	S10C 0.3 m	Sandy gravel	875	0.082	35.9	41.7	14.7	53.3	84.9	<10.0	<15.0	<25.0	-	-	-
	COMP S11A-C 0.0-0.1 m	Sandy gravel	342	0.098	16.1	36	17.1	31.7	85	<10.0	<15.0	390	-	-	-
Heavy vehicle wash bay	S12 0.0-0.1 m	Sandy gravel	151	0.14	11.9	27.1	21.1	22.4	110	<10.0	<15.0	507	-	-	-
	S12 0.3-0.4 m	Sandy gravel	314	0.113	14.3	28.9	24	26.2	91.1	<10.0	<15.0	262	-	-	-
	S13 0-0.1 m	Sediment	93	0.094	18.3	25.6	13.9	26.4	104	<10.0	33.8	1570	-	-	<LR
	S14 -	Silt	142	0.157	18.5	28.1	16.4	26.7	117	<10.0	111	3330	-	-	-
Workshop apron edge and drain	S16 0-0.1 m	Silty gravel	144	0.117	31.2	62.5	14	54.2	88.3	<10.0	<15.0	1140	-	-	<LR
	COMP S17A-C 0-0.1 m	Silty gravel	91.8	0.118	32.5	35.9	13	50.5	117	<10.0	178	4190	-	-	-
	COMP S18A-C 0-0.1 m	Silty gravel	98.3	0.105	48.7	62.4	12.4	55.5	90.9	<10.0	18.2	1480	0.046	<LR	-
Scrap metal storage	S20 0-0.1 m	Silty gravel	178	0.09	47.8	117	11.3	48.1	111	-	-	-	-	-	-
	S20 0.5-0.6 m	Silty gravel	67	0.112	19.1	33.9	19.8	34.6	112	-	-	-	-	-	-
Fuel farm	S28 0-0.1 m	Silty gravel	103	0.066	29.9	31.1	11.1	40.6	76.9	<10.0	56.2	1360	0.079	<LR	-
	S28 0.2-0.3 m	Silty gravel	145	0.074	33.1	36.1	15.2	41.7	86.5	<10.0	58.1	522	0.026	<LR	-
	S29 0-0.1 m	Silty gravel	51.6	0.065	57.4	58.2	5.14	87.3	88.1	<10.0	45.2	901	-	-	-
	S29 0.2-0.3 m	Silty gravel	231	0.063	34.8	40.8	22.9	72.3	73.7	<10.0	<15.0	42.1	-	-	-
	S30 0-0.1 m	Gravelly silt	187	0.117	53.3	49.7	8.2	111	89.9	<10.0	54.6	2110	-	-	-
Western swale	S31 0.0-0.1 m	Silt	1210	0.069	12	38.8	15.3	24.9	65.7	<10.0	<15.0	226	-	-	<LR
	S32 0.0-0.1 m	Silt	815	0.05	9.46	29.3	10.7	20.6	49	<10.0	<15.0	44.5	-	-	<LR

Notes:

All values are presented in mg/kg

<LR indicates concentration below the laboratory limit of reporting.

A dash (-) indicates no value provided.

Grey values are below expected background values, black values exceed either background or the laboratory reporting limit if no background value has been provided, **bold values** exceed Eco SGVs environmental criteria and blue shaded values exceed applicable NESCS criteria.

1. MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated). Soil Contamination Standard - Commercial/Industrial land use.

2. Maanaki Whenua Landcare Research, 2023. An implementation framework for ecological soil guideline values. Envirolink Tools Grant: C09X2206. Prepared for: Contaminated Land and Waste Special Interest Group and Land Monitoring Forum, July 2023. Guideline values derived using ACL (at E30) for commercial / industrial land use plus the local from background Craw (2002, see below). Typical soils, aged contaminants where relevant..

3. Craw, 2002. Geochemistry of late metamorphic hydrothermal alteration and graphitisation of host rock, Macraes gold mine, Otago Schist, New Zealand. UCL 95% of "black mineralised rocks".

4. National Environment Protection Council [Australia] - National Environment Protection Measure (Assessment of Site Contamination). Health Investigation Levels - Commercial/Industrial land use (HIL D)

5. MfE, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Tier 1 Soil acceptance criteria, sandy silt (as a proxy for silty gravel), contamination <1 m depth, commercial/industrial use. 5b: Protection of Groundwater Quality, groundwater at 8 m.

4.6 Data Quality

Laboratory quality assurance data has been reviewed and full laboratory transcripts are available as excel files on request. We note:

- Relative percentage differences (“RPDs”) have been assessed for two samples where laboratory-selected duplicate testing was undertaken for metals. For all duplicates, RPDs are less than 15% for all analytes, indicating a low level of variability in the laboratory analysis.
- Matrix spike results are generally within the acceptable range of 80-120%.
- Method blanks were all well below laboratory reporting levels.

As noted in **Section 4.2**, field duplicate samples were not tested as a high level of variability was expected due to the heterogeneous nature of both the contaminant sources and ground conditions (from natural mineralisation). This effect is evident in the data with metals (especially arsenic, copper and nickel) showing significant variability across the site regardless of the associated use of the area sampled, i.e. the variability reflects the natural mineralisation of the materials rather than impact by contamination. Widespread impact by hydrocarbons was also identified as expected, but the variability in this data generally collates with the nature of the activity in the sampled area, i.e. highest in hydrocarbon/fuel storage areas, around the workshop, wash bays and in swales but lower elsewhere.

4.7 Data Gaps

The data collected is considered sufficient to meet the requirements of informing soil management controls for relocation of the Workshop. However, there are some areas where further data or information would help to inform the risk assessment and management options further. These are:

- As indicated in **Section 2.2.5**, further assessment of PFAS contamination is currently in progress. Given the solubility of PFAS compounds combined with limited sorption capacity of waste rock materials and underlying natural schist rock, it is unlikely that significant additional soil remediation works will be triggered by the presence of these contaminants around the Workshop area. Rather some localised removal or treatment around the workshop apron and downstream areas may be necessary. Management of PFAS discharges is more likely to be focussed on surface and groundwater discharges. But it is proposed that this DSI and the CSMP will be amended as this information is collected.
- As oil storage systems, fuel farms and similar were in operation at the time, sampling was unable to be undertaken in close proximity to these facilities. Removal of these facilities will need to be undertaken in accordance with the requirements of the NESCS and MfE 1999 (hydrocarbon guidelines). These regulations and guidelines specify sampling requirements, which will need to be complied with. Noting that removal of some of this infrastructure is provided for as a permitted activity under the NESCS, subject to the relevant requirements being met (including sampling). In a similar manner, a SQEP should also assess the need for further sampling in the footprint of buildings and other infrastructure once removed.
- While national environmental standards have been provided for tyres, there is little in the way of specific contaminant thresholds related to some of the tyre-specific contaminants. If such data becomes available in future, soil testing to understand if there is a potential human or environmental health risk is recommended, particularly in the tyre testing area.
- Management options are set out in **Section 6** but this can be further refined once earthworks plans for the Workshop relocation are confirmed. For example, if significant earthworks are required vs minor earthworks, and if the area is to be raised or lowered, will impact what potential management option is selected.

5. Conceptual Site Model

The preliminary CSM described in **Section 3.2** informed the sampling plan, and results from sampling can now be used to form an updated CSM for the Workshop relocation.

Investigations show that arsenic is naturally elevated across the site. We have considered the potential for human health risk only where exceedances of natural concentrations are present, as these may indicate situations for which OGNZL has not planned. These exceedances are typically observed in the finer-grained materials such as sediment and sludge, which are unlikely to be suitable for reuse in future mining operations.

It is rare for PFAS to be present at concentrations that exceeds the available standards for the protection of the health of site workers under a commercial / industrial land use scenario. In addition, OGNZL has robust health and safety procedures to minimise exposure to contaminants such as arsenic. If these are carried out, they will also protect workers from risks associated with PFAS contamination. As a result, the CSM is unlikely to change significantly if PFAS contamination is identified, nevertheless it will be updated once this information becomes available.

The CSM for the Workshop is presented in **Table 6**. Colour coding in the table is used to indicate the:

- **Complete pathways** indicate where there is a risk to human health or the environment and specific remedial action is necessary.
- **Partially Complete pathways** i.e. those where there may be a risk to people and/or the environment if appropriate procedures or controls are not in place; and
- **Incomplete exposure pathways** where there is no risk to human or environmental receptors.

Table 6. CSM for Macraes Open Pit Mining Workshop

Source	Receptor	Exposure pathway	Risk assessment
Arsenic above human health and/or environmental criteria in sediment and sludge.	Construction workers during soil disturbance and post-works	Inhalation of dust, dermal contact, ingestion of soil	Risk present but can be managed Arsenic may present a risk to site works where it is present above typical background levels. The risk is expected to be negligible if bulk earthworks are undertaken using large scale mining equipment, since it is fitted with appropriate control measures (High-Efficiency Particulate Air (HEPA) filters, pressurised cabins and similar). However, if more localised earthworks are undertaken exposure to workers could occur. These risks can be managed by addition of respiratory protection measures as a compulsory requirement in OGNZL's health and safety protocols for dusty situations and for anyone manually handling soils in these areas during remediation. Avoiding eating/drinking in works areas will also be a key control to minimise ingestion of soil.
	Ecological receptors at the nearest surface water bodies.	Dust, sediment and surface water runoff to surface water bodies.	Risk present but can be managed Runoff discharges to the MTI, so effects from this pathway can be managed within the existing MWMS. Dust and sediment discharges can be managed by implementation of standard earthworks controls. If the opportunity arises and subject to the necessary consents being held, sludges and sediments could be placed in tailings impoundments or otherwise contained to limit discharges.

Source	Receptor	Exposure pathway	Risk assessment
	Workers/occupiers at an offsite soil disposal site.	Inhalation of dust, dermal contact, ingestion of soil	Risk present but can be managed It is highly unlikely that contaminated materials will be taken offsite. However, if offsite disposal was required, disposal facilities would need to confirm acceptance before any soils left site. The disposal facility will be required to have suitable controls in place relevant to the short-term risk to workers and the environment.
	Ecological receptors at the receiving site	Dust, sediment and surface water runoff to surface water bodies.	Risk present but can be managed If soil is taken to a facility consented to take the levels of contamination present, then controls will be in place to mitigate potential effects.
TPH, PAH and other metals above background concentrations throughout the Workshop footprint	Construction workers during soil disturbance and post-works	Inhalation of dust, dermal contact, ingestion of soil, inhalation of vapours from hydrocarbons	No risk indicated The are no exceedances of applicable human health criteria so no unacceptable risks are expected.
	Ecological receptors at the nearest surface water bodies.	Dust, sediment and surface water runoff to surface water bodies.	No risk indicated The are no exceedances of applicable environmental criteria so no unacceptable risks are expected.
	Workers/occupiers at an offsite soil disposal site for any contaminated material.	Inhalation of dust, dermal contact, ingestion of soil, inhalation of vapours from hydrocarbons	Risk can be managed It is unlikely that low-level contaminated soils will be taken offsite. However, if offsite disposal was required, disposal facilities would need to confirm acceptance before any soils left site. The disposal facility will be required to have suitable controls in place relevant to the short-term risk to workers and the environment.
	Ecological receptors at the receiving site for any contaminated material.	Dust, sediment and surface water runoff to surface water bodies.	Risk present but can be managed If soil is taken to a facility consented to take the levels of contamination present, then controls will be in place to mitigate potential effects.

6. Summary and Implications

Key conclusions from our investigation are summarised below in the context of soil disturbance for the relocation of the Workshop. This relates to the removal and remediation associated with the workshop itself; consideration of naturally elevated contaminants in waste rock and the impacts on subsequent mining are not considered, as mining-related controls are likely to manage any risks presented at this stage. There may be requirement for additional consents to use some of the proposed mitigation measures. These can be applied for outside the FTAA process.

As noted previously, this DSI does not address potential contamination by PFAS compounds, a concurrent process to quantify these risks on an operations wide basis is in progress. This DSI and the complimentary CSMP will be amended as this information is collected.

Management requirements	Under a typical contamination assessment scenario, the concentrations of arsenic presented would require remediation to make a site “safe” for further use. The Macraes Operation scenario is different, in that an elevated level of arsenic (and other contaminants) is expected, accounted for in day-to-day management, and able to be mitigated using on-site facilities such as the Processing Plant, tailings impoundments and water management system. For these reasons remediation is not currently required in relation to the Workshop. However, the Project offers an opportunity for targeted management of elevated arsenic contamination to mitigate future risks to both site workers and the environment: - Sediment from the wash bays could be removed when these structures are removed and the sediment placed in with tailings or another secure location. Although it is not required in the context of the wider Macraes Operation, it would remove a source of fine-grained sediment which is more likely to generate dust and runoff than over burden. - The swale discharges to the MTI which has much higher concentrations of arsenic than recorded across the Workshop site. Discharges from the MTI currently comply with its discharge criteria, so it is unlikely that the discharge from the swale is having an effect on the receiving environment. However, as per the wash bays, surface sediment from the swale could be removed and disposed of to a tailings facility or other secure location. An alternative may be to encourage vegetation to become more established to prevent dust and runoff generation. Suggested management areas are set out in Figure 7 and are discussed as follows. All relate to arsenic contamination as no other metals or hydrocarbons exceed human health or environmental criteria.		
	Location	Description	Area/Volume (estimate)
	Light vehicle truck wash	Particularly relating to S6 and S10, but more broadly to address the presence of hydrocarbons. Removal of sediment to between 0.1 and 0.5 m bgl (maximum) based on site observations and topography. Includes sediment in the tank pit and the oil-water separator.	1,200 m ² 600 m ³ (worst case, 0.5 m depth)
	Heavy vehicle truck wash	Particularly S12, but more broadly to address the presence of hydrocarbons. Removal of material from surface to 0.4 m bgl is recommended. Extent of removal includes low-lying areas where wash water may overtop the sump or flow off the wash pad.	2,000 m ² 800 m ³
	S31-32	Silt in the swale has accumulated elevated arsenic concentrations. This will require further delineation, but we have assumed that if this area requires disturbance for MP4, approximately half of the swale will require remediation, to a depth of 0.3 m. There is no need to remediate if no disturbance is proposed.	2,000 m ² 600 m ³
Management methods	Within the management areas (highlighted orange in Figure 7), management should be considered via one of the following methods: - Excavation of impacted soils and processing them through the Processing Plant, which can remove soil contamination, provided there is no detrimental effect on gold recovery. Removal offsite. This is likely to be costly given the distance to suitable receiving sites, but may be the most suitable option for any soil with high levels of contamination (not identified to date, but potential to exist; this option will be included in the CSMP).		

	3. Mixing of soils with other sediment or over burden with lower concentrations of arsenic and hydrocarbons, so that the overall concentration is reduced. This would require further testing to ensure that the “clean” material is suitably clean to ensure success, and to determine the mixing rates. Dust controls are essential when undertaking soil mixing. This method is unlikely to be practical (volumes and area required, mixing fine-grained material with waste rock) and may not be effective due to the naturally elevated arsenic present in waste rock. 4. Excavation of impacted soils and placing them either in a TSF or in a containment bund/stockpile. A TSF would be the preferred method of these two as TSFs have existing leachate/runoff controls, water management and ongoing monitoring requirements. A separate containment bund/stockpile would require implementation of similar controls and may not be practical in the long-term life of the mine. 5. Hydrocarbons could also be addressed by proposed hydrocarbon treatment previously considered by WWLA¹⁰. This may require further testing post-treatment to determine if treatment of arsenic is also required.
Earthworks controls for management areas	Disturbance of sediment/sludge with high levels of arsenic will need to be undertaken with specific consideration for protection of human (site worker) and environmental (surface water body) receptors. As well as standard earthworks controls, particular focus should be to: • Keep materials separate from surrounding soils. This is to prevent cross-contamination and avoid having to manage larger areas. Separation can be done by avoiding stockpiling in clean areas or using geotextile to separate materials and loading trucks within the remediation area. If soil mixing is undertaken, then a dedicated mixing area can be established. • Minimise dust from remediation works, via use of water carts or misters, and avoiding work in strong wind conditions (in accordance with OGNZL's existing Dust Management Plan for the Macraes Operation). • Minimise discharge from site, by preventing clean water infiltration (i.e. clean water diversion bunds) and treating dirty water via settlement to remove sediment before discharge, or diverting it to tailings. • Ensuring site workers have long sleeves, long pants, gloves and dust masks when working outside vehicles. Vehicles should be fitted with filters on their air conditioning units to minimise dust exposure. • Workers should separate work and break areas, wash hands before eating/drinking, and change clothes before leaving site. Dirty clothing should be laundered in a commercial facility before being returned to workers. These controls should be set out in the Contamination Site Management Plan (“CSMP”).
Earthworks controls for other soils	Subject to confirmation of PFAS conditions: • All other soils can be retained, reused or redistributed across the Macraes Operation without contamination-related constraints. • Standard earthworks controls will apply with no specific contamination-related constraints. However, controls to protect site workers and minimise dust (as above) should still be considered.
Consenting implications	The scale of earthworks proposed for MP4 means that 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 intersected by the Project, resource consent is required for a Discretionary Activity in accordance with Regulation 11. Contaminant discharges from the Macraes Operation to the wider environment are provided for by existing resource consents. Potential discharges to land or water from remediation during Workshop relocation (e.g. runoff from the light vehicle truck wash) will be managed in accordance with the CSMP and will be captured within the existing Mine Water Management System 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 remediation of the Workshop. It is acknowledged that additional consents may be required if specific management or remediation of PFAS discharges are required. But these can be obtained when required

¹⁰ WWLA, 7 December 2023. Hydrocarbon Treatment Plan, Macraes Mine, Otago. Prepared for Oceana Gold (New Zealand) Ltd. Rev 1.



Map Title:
Spoil Management Areas

Project:
MP4, Mining Workshop DSI

Client:
**Oceana Gold (New Zealand)
Ltd**



Legend
 Management Areas

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
25/02/2026

Layout Name
Workshop remediation



Figure 7

7. Conclusions

This report has been prepared to comply with requirements of a DSI and has been undertaken to support an application for resource consents under the FTAA and to inform earthworks and soil management decision making in regard to OGNZL's relocation of the Workshop as part of MP4. The key findings of this study are:

- Several activities listed on MfE's HAIL have occurred at the Workshop, including A17 (Storage tanks or drums for fuel, chemicals or liquid waste), F4 (Motor vehicle workshops), F7 (Retail or commercial refuelling facilities (for the adjacent fuel farm that supplies the workshop)), I (Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment (*potentially occurring*; in relation to vehicle washing, storage of materials outdoors, tyre testing)), and H (Migration of a contaminant in sufficient quantity to present a risk to human health or the environment (*potentially occurring*; in relation to discharges of stormwater to the western swale)).
- Soil sampling confirmed that some metals (particularly arsenic) are naturally elevated in waste rock. Sediment and sludge contain the highest levels of arsenic and will require consideration during future earthworks. TPH was recorded more widely but does not present a potential human health or environmental risk.
- A CSM, developed to identify if and how people or the environment may be impacted by the proposed works, shows there is expected to be negligible effects if bulk earthworks are undertaken using large scale mining equipment, since it is fitted with appropriate control measures. However, if more localised earthworks are undertaken exposure to workers could occur. Management of dust and protection of site workers are the key controls for this work. The ongoing effects of arsenic and hydrocarbons could also be managed by processing these materials through the Processing Plant, placement in tailings storage facilities or via the existing hydrocarbon contamination management process.
- For the remainder of the Workshop site, subject to confirming PFAS conditions, there are no contamination-specific management requirements.
- The NESCS applies to the wider MP4 project and resource consent is being sought under the NESCS for the disturbance of soil across the MP4 project areas. It is recommended separate DSIs are undertaken for areas identified in the PSI where the presence of contaminated soil is likely.

This DSI does not address potential contamination by PFAS compounds, a concurrent process to quantify these risks on an operations wide basis is in progress. This DSI and the complimentary CSMP will be amended as this information is collected.

Appendix A. Laboratory Transcripts



CERTIFICATE OF ANALYSIS

Work Order : NH2600183

Client : **Williamson Water & Land Advisory**
Contact : Lauren Windross
Address : 10/1 Putaki Drive
Kumeū Auckland New Zealand 0810
Telephone : ----
Project : MP4 WWLA1659
Order number : WWLA1659
C-O-C number : ----
Sampler : Lauren Windross
Site : ----
Quote number : EN/444
No. of samples received : 64
No. of samples analysed : 39

Laboratory : Environmental Hamilton
Contact : Customer Services NH
Address : Ruakura Research Centre, 10 Bisley Rd
Hamilton WKO New Zealand 3214
Telephone : +64 7 974 4740
Date Samples Received : 16-Jan-2026 08:05
Date Analysis Commenced : 27-Jan-2026
Issue Date : 02-Feb-2026 16:15



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below.

Signatories	Position	Accreditation Category
Astra Southerwood	Section Supervisor - Organics	Organics, Hamilton, Waikato
Divya Goundar	Laboratory Technician	Organics, Hamilton, Waikato
Lekeisha Tanner	Laboratory Technician	Soil Prep, Hamilton, Waikato
Samantha Hill	Senior Laboratory Technician	Organics, Hamilton, Waikato
Tharanga Samarasinghe	Senior Laboratory Technician	Trace, Hamilton, Waikato



General Comments

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number: CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR: Limit of Reporting (detection limit).

Unit	Description
%	Percent
mg/kg dry weight	mg/kg dry weight

>: greater than.
<: less than.
ø: ALS is not IANZ accredited for these tests.
^: This result is computed from individual analyte detections at or above the level of reporting.
~: Indicates an estimated value.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Samples were collected by yourselves (or your agent) and analysed as received at ALS NZ (or at the subcontracted laboratories, when applicable). Samples were in acceptable condition unless otherwise noted on this report.



Analytical Results

Sub-Matrix: COMPOSITE

(Matrix: SOIL)

Client Sample ID				COMP S5A-D 0-0.1m Comp of sample 008,009,010,011	COMP S10A-C Comp of sample 019, 020, 021	COMP S11A-C Comp of sample 023, 024, 025	COMP S17A-C Comp of sample 033, 034, 035	COMP S18A-C Comp of sample 036, 037, 038
Client Sampling date / time				14-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00
Compound	CAS Number	LOR	Unit	NH2600183-012	NH2600183-061	NH2600183-062	NH2600183-063	NH2600183-064
				Result	Result	Result	Result	Result
HM_S: Elements in Soil								
⌀ Arsenic	7440-38-2	0.125	mg/kg dry weight	113	372	342	91.8	98.3
⌀ Cadmium	7440-43-9	0.005	mg/kg dry weight	0.076	0.091	0.098	0.118	0.105
⌀ Chromium	7440-47-3	0.125	mg/kg dry weight	21.9	18.2	16.1	32.5	48.7
⌀ Copper	7440-50-8	0.075	mg/kg dry weight	28.9	30.9	36.0	35.9	62.4
⌀ Lead	7439-92-1	0.25	mg/kg dry weight	14.2	14.4	17.1	13.0	12.4
⌀ Nickel	7440-02-0	0.05	mg/kg dry weight	31.1	30.4	31.7	50.5	55.5
⌀ Zinc	7440-66-6	0.05	mg/kg dry weight	85.8	98.0	85.0	117	90.9
MC_S: Moisture Content								
Moisture Content	----	0.1	%	7.2	10.7	9.8	2.0	3.6
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS								
Naphthalene	91-20-3	0.010	mg/kg dry weight	----	----	----	----	<0.010
2-Methylnaphthalene	91-57-6	0.010	mg/kg dry weight	----	----	----	----	<0.010
1-Methylnaphthalene	90-12-0	0.010	mg/kg dry weight	----	----	----	----	<0.010
Acenaphthylene	208-96-8	0.010	mg/kg dry weight	----	----	----	----	<0.010
Acenaphthene	83-32-9	0.010	mg/kg dry weight	----	----	----	----	<0.010
Fluorene	86-73-7	0.010	mg/kg dry weight	----	----	----	----	<0.010
Phenanthrene	85-01-8	0.010	mg/kg dry weight	----	----	----	----	<0.010
Anthracene	120-12-7	0.010	mg/kg dry weight	----	----	----	----	<0.010
Fluoranthene	206-44-0	0.020	mg/kg dry weight	----	----	----	----	<0.020
Pyrene	129-00-0	0.020	mg/kg dry weight	----	----	----	----	0.046
Benz(a)anthracene	56-55-3	0.020	mg/kg dry weight	----	----	----	----	<0.020
Chrysene	218-01-9	0.010	mg/kg dry weight	----	----	----	----	<0.010
Benzo(b)&(j)fluoranthene	205-99-2 20 5-82-3	0.020	mg/kg dry weight	----	----	----	----	<0.020
Benzo(k)fluoranthene	207-08-9	0.010	mg/kg dry weight	----	----	----	----	<0.010
Benzo(a)pyrene	50-32-8	0.010	mg/kg dry weight	----	----	----	----	<0.010
Indeno(1,2,3-cd)pyrene	193-39-5	0.010	mg/kg dry weight	----	----	----	----	<0.010
Dibenzo(a,h)anthracene	53-70-3	0.010	mg/kg dry weight	----	----	----	----	<0.010
Benzo(g,h,i)perylene	191-24-2	0.020	mg/kg dry weight	----	----	----	----	<0.020



Analytical Results

Sub-Matrix: COMPOSITE

(Matrix: SOIL)

				Client Sample ID	COMP S5A-D 0-0.1m Comp of sample 008,009,010,011	COMP S10A-C Comp of sample 019, 020, 021	COMP S11A-C Comp of sample 023, 024, 025	COMP S17A-C Comp of sample 033, 034, 035	COMP S18A-C Comp of sample 036, 037, 038
Client Sampling date / time					14-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00	16-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-012	NH2600183-061	NH2600183-062	NH2600183-063	NH2600183-064
				Result	Result	Result	Result	Result	Result
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS									
^ Benzo(a)pyrene TEQ (LOR)	----	0.010	mg/kg dry weight	----	----	----	----	----	0.026
^ Benzo(a)pyrene TEQ (zero)	----	0.010	mg/kg dry weight	----	----	----	----	----	<0.010
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
C10 - C14 Fraction	----	15.0	mg/kg dry weight	22.4	<15.0	<15.0	178	18.2	
TPH C15-C36	----	25.0	mg/kg dry weight	428	227	390	4190	1480	
TPH C7-C36	----	50.0	mg/kg dry weight	451	227	390	4370	1500	
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS (Surrogates)									
Anthracene-d10	1719-06-8	0.10	%	----	----	----	----	----	110



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S1 0-0.1m ----	S2 0-0.1m ----	S3 0-0.1m ----	S3 0.4m ----	S3 0.7-0.8m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-001	NH2600183-003	NH2600183-004	NH2600183-005	NH2600183-006
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		179	40.6	102	48.3	31.0
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.072	0.065	0.073	0.105	0.106
Chromium	7440-47-3	0.125	mg/kg dry weight		13.1	12.8	26.4	18.1	17.4
Copper	7440-50-8	0.075	mg/kg dry weight		27.0	25.8	22.7	27.0	21.6
Lead	7439-92-1	0.25	mg/kg dry weight		17.0	14.4	16.1	18.8	16.4
Nickel	7440-02-0	0.05	mg/kg dry weight		24.1	27.1	22.9	34.8	28.8
Zinc	7440-66-6	0.05	mg/kg dry weight		93.5	102	86.0	96.0	91.2
MC_S: Moisture Content									
Moisture Content	----	0.1	%		5.6	----	3.8	2.9	3.5
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS									
Naphthalene	91-20-3	0.010	mg/kg dry weight		<0.010	----	----	----	----
2-Methylnaphthalene	91-57-6	0.010	mg/kg dry weight		<0.010	----	----	----	----
1-Methylnaphthalene	90-12-0	0.010	mg/kg dry weight		<0.010	----	----	----	----
Acenaphthylene	208-96-8	0.010	mg/kg dry weight		<0.010	----	----	----	----
Acenaphthene	83-32-9	0.010	mg/kg dry weight		<0.010	----	----	----	----
Fluorene	86-73-7	0.010	mg/kg dry weight		<0.010	----	----	----	----
Phenanthrene	85-01-8	0.010	mg/kg dry weight		<0.010	----	----	----	----
Anthracene	120-12-7	0.010	mg/kg dry weight		<0.010	----	----	----	----
Fluoranthene	206-44-0	0.020	mg/kg dry weight		<0.020	----	----	----	----
Pyrene	129-00-0	0.020	mg/kg dry weight		<0.020	----	----	----	----
Benz(a)anthracene	56-55-3	0.020	mg/kg dry weight		<0.020	----	----	----	----
Chrysene	218-01-9	0.010	mg/kg dry weight		<0.010	----	----	----	----
Benzo(b)&(j)fluoranthene	205-99-2 20 5-82-3	0.020	mg/kg dry weight		<0.020	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.010	mg/kg dry weight		<0.010	----	----	----	----
Benzo(a)pyrene	50-32-8	0.010	mg/kg dry weight		<0.010	----	----	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	0.010	mg/kg dry weight		<0.010	----	----	----	----
Dibenzo(a,h)anthracene	53-70-3	0.010	mg/kg dry weight		<0.010	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.020	mg/kg dry weight		<0.020	----	----	----	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S1 0-0.1m ----	S2 0-0.1m ----	S3 0-0.1m ----	S3 0.4m ----	S3 0.7-0.8m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-001	NH2600183-003	NH2600183-004	NH2600183-005	NH2600183-006
					Result	Result	Result	Result	Result
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS									
^ Benzo(a)pyrene TEQ (LOR)	----	0.010	mg/kg dry weight		0.026	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.010	mg/kg dry weight		<0.010	----	----	----	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		----	----	<10.0	15.6	<10.0
C10 - C14 Fraction	----	15.0	mg/kg dry weight		----	----	938	1600	298
TPH C15-C36	----	25.0	mg/kg dry weight		----	----	2090	2500	549
TPH C7-C36	----	50.0	mg/kg dry weight		----	----	3030	4120	847
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS (Surrogates)									
Anthracene-d10	1719-06-8	0.10	%		109	----	----	----	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S4 0-0.1m ----	S6 0.2-0.4m ----	S7 0-0.1m ----	S8 0m ----	S9 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-007	NH2600183-015	NH2600183-016	NH2600183-017	NH2600183-018
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		83.6	525	5.28	186	43.7
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.064	0.054	0.068	0.090	0.059
Chromium	7440-47-3	0.125	mg/kg dry weight		14.3	15.1	62.7	15.2	49.3
Copper	7440-50-8	0.075	mg/kg dry weight		21.2	27.3	69.2	27.2	61.4
Lead	7439-92-1	0.25	mg/kg dry weight		13.7	23.0	2.76	12.2	3.99
Nickel	7440-02-0	0.05	mg/kg dry weight		20.5	21.5	111	25.5	90.6
Zinc	7440-66-6	0.05	mg/kg dry weight		71.7	87.6	63.3	87.3	61.1
MC_S: Moisture Content									
Moisture Content	----	0.1	%		3.0	8.6	----	11.6	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		<10.0	<10.0	----	<10.0	----
C10 - C14 Fraction	----	15.0	mg/kg dry weight		<15.0	<15.0	----	<15.0	----
TPH C15-C36	----	25.0	mg/kg dry weight		30.1	<25.0	----	110	----
TPH C7-C36	----	50.0	mg/kg dry weight		<50.0	<50.0	----	110	----
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS									
Vinyl Chloride	75-01-4	0.10	mg/kg dry weight		----	----	----	<0.10	----
Trichlorofluoromethane	75-69-4	0.10	mg/kg dry weight		----	----	----	<0.10	----
Trichloroethene	79-01-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
trans-1,3-Dichloropropene	----	0.050	mg/kg dry weight		----	----	----	<0.050	----
trans-1,2-Dichloroethene	----	0.050	mg/kg dry weight		----	----	----	<0.050	----
Toluene	108-88-3	0.10	mg/kg dry weight		----	----	----	<0.10	----
Tetrachloroethene	127-18-4	0.050	mg/kg dry weight		----	----	----	<0.050	----
tert-Butylbenzene	98-06-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
Styrene	100-42-5	0.050	mg/kg dry weight		----	----	----	<0.050	----
sec-Butylbenzene	135-98-8	0.050	mg/kg dry weight		----	----	----	<0.050	----
p-Isopropyltoluene	99-87-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
o-Xylene	95-47-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
n-Propylbenzene	103-65-1	0.050	mg/kg dry weight		----	----	----	<0.050	----
n-Butylbenzene	104-51-8	0.050	mg/kg dry weight		----	----	----	<0.050	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S4 0-0.1m ----	S6 0.2-0.4m ----	S7 0-0.1m ----	S8 0m ----	S9 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-007	NH2600183-015	NH2600183-016	NH2600183-017	NH2600183-018
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

Naphthalene	91-20-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Methylene chloride	75-09-2	0.20	mg/kg dry weight	----	----	----	<0.20	----
Methyl tert-butyl ether (MTBE)	1634-04-4	0.50	mg/kg dry weight	----	----	----	<0.50	----
m & p-Xylenes	179601-23-1	0.10	mg/kg dry weight	----	----	----	<0.10	----
Isopropylbenzene	98-82-8	0.050	mg/kg dry weight	----	----	----	<0.050	----
Iodomethane	74-88-4	0.20	mg/kg dry weight	----	----	----	<0.20	----
Hexachlorobutadiene	87-68-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Ethylbenzene	100-41-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
Dichlorodifluoromethane	75-71-8	0.10	mg/kg dry weight	----	----	----	<0.10	----
Dibromomethane	74-95-3	0.050	mg/kg dry weight	----	----	----	<0.050	----
Dibromochloromethane	124-48-1	0.10	mg/kg dry weight	----	----	----	<0.10	----
cis-1,3-Dichloropropene	----	0.050	mg/kg dry weight	----	----	----	<0.050	----
cis-1,2-Dichloroethene	----	0.050	mg/kg dry weight	----	----	----	<0.050	----
Chloromethane	74-87-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Chloroform	67-66-3	0.050	mg/kg dry weight	----	----	----	<0.050	----
Chloroethane	75-00-3	0.25	mg/kg dry weight	----	----	----	<0.25	----
Chlorobenzene	108-90-7	0.050	mg/kg dry weight	----	----	----	<0.050	----
Carbon Tetrachloride	56-23-5	0.050	mg/kg dry weight	----	----	----	<0.050	----
Carbon disulfide	75-15-0	0.050	mg/kg dry weight	----	----	----	<0.050	----
Bromomethane	74-83-9	0.25	mg/kg dry weight	----	----	----	<0.25	----
Bromoform	75-25-2	0.10	mg/kg dry weight	----	----	----	<0.10	----
Bromodichloromethane	75-27-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
Bromobenzene	108-86-1	0.050	mg/kg dry weight	----	----	----	<0.050	----
Benzene	71-43-2	0.050	mg/kg dry weight	----	----	----	<0.050	----
4-Methyl-2-pentanone (MIBK)	108-10-1	0.20	mg/kg dry weight	----	----	----	<0.20	----
4-Chlorotoluene	106-43-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
2-Hexanone (MBK)	591-78-6	0.10	mg/kg dry weight	----	----	----	<0.10	----
2-Chlorotoluene	95-49-8	0.050	mg/kg dry weight	----	----	----	<0.050	----
2-Chloroethyl vinyl ether	110-75-8	0.250	mg/kg dry weight	----	----	----	<0.250	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S4 0-0.1m ----	S6 0.2-0.4m ----	S7 0-0.1m ----	S8 0m ----	S9 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-007	NH2600183-015	NH2600183-016	NH2600183-017	NH2600183-018
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

2,2-Dichloropropane	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,4-Dioxane	----	1.0	mg/kg dry weight	----	----	----	----	<1.0	----
1,4-Dichlorobenzene	106-46-7	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3-Dichloropropane	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3-Dichlorobenzene	541-73-1	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3,5-Trimethylbenzene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dichloropropane	78-87-5	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dichloroethane	107-06-2	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2-Dichlorobenzene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dibromoethane	106-93-4	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.20	mg/kg dry weight	----	----	----	----	<0.20	----
1,2,4-Trimethylbenzene	95-63-6	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2,4-Trichlorobenzene	120-82-1	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2,3-Trichloropropane	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2,3-Trichlorobenzene	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,1-Dichloropropene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1-Dichloroethene	75-35-4	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1-Dichloroethane	75-34-3	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1,2-Trichloroethane	79-00-5	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,1,2,2-Tetrachloroethane	79-34-5	0.20	mg/kg dry weight	----	----	----	----	<0.20	----
1,1,1-Trichloroethane	71-55-6	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1,1,2-Tetrachloroethane	630-20-6	0.20	mg/kg dry weight	----	----	----	----	<0.20	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)

Toluene-D8	2037-26-5	1.0	%	----	----	----	----	98.9	----
4-Bromofluorobenzene	460-00-4	1.0	%	----	----	----	----	101	----
1,2-Dichloroethane-D4	----	1.0	%	----	----	----	----	104	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S10C 0.3m ----	S12 0-0.1m ----	S12 0.3-0.4m ----	S13 0-0.1m ----	S14 ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-022	NH2600183-027	NH2600183-028	NH2600183-029	NH2600183-030
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		875	151	314	93.0	142
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.082	0.140	0.113	0.094	0.157
Chromium	7440-47-3	0.125	mg/kg dry weight		35.9	11.9	14.3	18.3	18.5
Copper	7440-50-8	0.075	mg/kg dry weight		41.7	27.1	28.9	25.6	28.1
Lead	7439-92-1	0.25	mg/kg dry weight		14.7	21.1	24.0	13.9	16.4
Nickel	7440-02-0	0.05	mg/kg dry weight		53.3	22.4	26.2	26.4	26.7
Zinc	7440-66-6	0.05	mg/kg dry weight		84.9	110	91.1	104	117
MC_S: Moisture Content									
Moisture Content	----	0.1	%		6.5	8.1	7.9	23.8	15.1
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		<10.0	<10.0	<10.0	<10.0	<10.0
C10 - C14 Fraction	----	15.0	mg/kg dry weight		<15.0	<15.0	<15.0	33.8	111
TPH C15-C36	----	25.0	mg/kg dry weight		<25.0	507	262	1570	3330
TPH C7-C36	----	50.0	mg/kg dry weight		<50.0	507	262	1610	3440
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS									
Vinyl Chloride	75-01-4	0.10	mg/kg dry weight		----	----	----	<0.10	----
Trichlorofluoromethane	75-69-4	0.10	mg/kg dry weight		----	----	----	<0.10	----
Trichloroethene	79-01-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
trans-1,3-Dichloropropene	----	0.050	mg/kg dry weight		----	----	----	<0.050	----
trans-1,2-Dichloroethene	----	0.050	mg/kg dry weight		----	----	----	<0.050	----
Toluene	108-88-3	0.10	mg/kg dry weight		----	----	----	<0.10	----
Tetrachloroethene	127-18-4	0.050	mg/kg dry weight		----	----	----	<0.050	----
tert-Butylbenzene	98-06-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
Styrene	100-42-5	0.050	mg/kg dry weight		----	----	----	<0.050	----
sec-Butylbenzene	135-98-8	0.050	mg/kg dry weight		----	----	----	<0.050	----
p-Isopropyltoluene	99-87-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
o-Xylene	95-47-6	0.050	mg/kg dry weight		----	----	----	<0.050	----
n-Propylbenzene	103-65-1	0.050	mg/kg dry weight		----	----	----	<0.050	----
n-Butylbenzene	104-51-8	0.050	mg/kg dry weight		----	----	----	<0.050	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S10C 0.3m ----	S12 0-0.1m ----	S12 0.3-0.4m ----	S13 0-0.1m ----	S14 ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-022	NH2600183-027	NH2600183-028	NH2600183-029	NH2600183-030
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

Naphthalene	91-20-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Methylene chloride	75-09-2	0.20	mg/kg dry weight	----	----	----	<0.20	----
Methyl tert-butyl ether (MTBE)	1634-04-4	0.50	mg/kg dry weight	----	----	----	<0.50	----
m & p-Xylenes	179601-23-1	0.10	mg/kg dry weight	----	----	----	<0.10	----
Isopropylbenzene	98-82-8	0.050	mg/kg dry weight	----	----	----	<0.050	----
Iodomethane	74-88-4	0.20	mg/kg dry weight	----	----	----	<0.20	----
Hexachlorobutadiene	87-68-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Ethylbenzene	100-41-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
Dichlorodifluoromethane	75-71-8	0.10	mg/kg dry weight	----	----	----	<0.10	----
Dibromomethane	74-95-3	0.050	mg/kg dry weight	----	----	----	<0.050	----
Dibromochloromethane	124-48-1	0.10	mg/kg dry weight	----	----	----	<0.10	----
cis-1,3-Dichloropropene	----	0.050	mg/kg dry weight	----	----	----	<0.050	----
cis-1,2-Dichloroethene	----	0.050	mg/kg dry weight	----	----	----	<0.050	----
Chloromethane	74-87-3	0.10	mg/kg dry weight	----	----	----	<0.10	----
Chloroform	67-66-3	0.050	mg/kg dry weight	----	----	----	<0.050	----
Chloroethane	75-00-3	0.25	mg/kg dry weight	----	----	----	<0.25	----
Chlorobenzene	108-90-7	0.050	mg/kg dry weight	----	----	----	<0.050	----
Carbon Tetrachloride	56-23-5	0.050	mg/kg dry weight	----	----	----	<0.050	----
Carbon disulfide	75-15-0	0.050	mg/kg dry weight	----	----	----	<0.050	----
Bromomethane	74-83-9	0.25	mg/kg dry weight	----	----	----	<0.25	----
Bromoform	75-25-2	0.10	mg/kg dry weight	----	----	----	<0.10	----
Bromodichloromethane	75-27-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
Bromobenzene	108-86-1	0.050	mg/kg dry weight	----	----	----	<0.050	----
Benzene	71-43-2	0.050	mg/kg dry weight	----	----	----	<0.050	----
4-Methyl-2-pentanone (MIBK)	108-10-1	0.20	mg/kg dry weight	----	----	----	<0.20	----
4-Chlorotoluene	106-43-4	0.050	mg/kg dry weight	----	----	----	<0.050	----
2-Hexanone (MBK)	591-78-6	0.10	mg/kg dry weight	----	----	----	<0.10	----
2-Chlorotoluene	95-49-8	0.050	mg/kg dry weight	----	----	----	<0.050	----
2-Chloroethyl vinyl ether	110-75-8	0.250	mg/kg dry weight	----	----	----	<0.250	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S10C 0.3m ----	S12 0-0.1m ----	S12 0.3-0.4m ----	S13 0-0.1m ----	S14 ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-022	NH2600183-027	NH2600183-028	NH2600183-029	NH2600183-030
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

2,2-Dichloropropane	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,4-Dioxane	----	1.0	mg/kg dry weight	----	----	----	----	<1.0	----
1,4-Dichlorobenzene	106-46-7	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3-Dichloropropane	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3-Dichlorobenzene	541-73-1	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,3,5-Trimethylbenzene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dichloropropane	78-87-5	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dichloroethane	107-06-2	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2-Dichlorobenzene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2-Dibromoethane	106-93-4	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.20	mg/kg dry weight	----	----	----	----	<0.20	----
1,2,4-Trimethylbenzene	95-63-6	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,2,4-Trichlorobenzene	120-82-1	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2,3-Trichloropropane	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,2,3-Trichlorobenzene	----	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,1-Dichloropropene	----	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1-Dichloroethene	75-35-4	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1-Dichloroethane	75-34-3	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1,2-Trichloroethane	79-00-5	0.10	mg/kg dry weight	----	----	----	----	<0.10	----
1,1,2,2-Tetrachloroethane	79-34-5	0.20	mg/kg dry weight	----	----	----	----	<0.20	----
1,1,1-Trichloroethane	71-55-6	0.050	mg/kg dry weight	----	----	----	----	<0.050	----
1,1,1,2-Tetrachloroethane	630-20-6	0.20	mg/kg dry weight	----	----	----	----	<0.20	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)

Toluene-D8	2037-26-5	1.0	%	----	----	----	----	100	----
4-Bromofluorobenzene	460-00-4	1.0	%	----	----	----	----	101	----
1,2-Dichloroethane-D4	----	1.0	%	----	----	----	----	104	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S15 0-0.1m ----	S16 0-0.1m ----	S19 0-0.1m ----	S20 0-0.1m ----	S20 0.5-0.6m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-031	NH2600183-032	NH2600183-039	NH2600183-040	NH2600183-041
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		78.0	144	54.0	178	67.0
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.089	0.117	0.103	0.090	0.112
Chromium	7440-47-3	0.125	mg/kg dry weight		30.2	31.2	34.4	47.8	19.1
Copper	7440-50-8	0.075	mg/kg dry weight		35.1	62.5	39.2	117	33.9
Lead	7439-92-1	0.25	mg/kg dry weight		8.51	14.0	8.16	11.3	19.8
Nickel	7440-02-0	0.05	mg/kg dry weight		68.8	54.2	55.3	48.1	34.6
Zinc	7440-66-6	0.05	mg/kg dry weight		78.6	88.3	86.5	111	112
MC_S: Moisture Content									
Moisture Content	----	0.1	%		----	5.0	----	----	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		----	<10.0	----	----	----
C10 - C14 Fraction	----	15.0	mg/kg dry weight		----	<15.0	----	----	----
TPH C15-C36	----	25.0	mg/kg dry weight		----	1140	----	----	----
TPH C7-C36	----	50.0	mg/kg dry weight		----	1140	----	----	----
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS									
Vinyl Chloride	75-01-4	0.10	mg/kg dry weight		----	<0.10	----	----	----
Trichlorofluoromethane	75-69-4	0.10	mg/kg dry weight		----	<0.10	----	----	----
Trichloroethene	79-01-6	0.050	mg/kg dry weight		----	<0.050	----	----	----
trans-1,3-Dichloropropene	----	0.050	mg/kg dry weight		----	<0.050	----	----	----
trans-1,2-Dichloroethene	----	0.050	mg/kg dry weight		----	<0.050	----	----	----
Toluene	108-88-3	0.10	mg/kg dry weight		----	<0.10	----	----	----
Tetrachloroethene	127-18-4	0.050	mg/kg dry weight		----	<0.050	----	----	----
tert-Butylbenzene	98-06-6	0.050	mg/kg dry weight		----	<0.050	----	----	----
Styrene	100-42-5	0.050	mg/kg dry weight		----	<0.050	----	----	----
sec-Butylbenzene	135-98-8	0.050	mg/kg dry weight		----	<0.050	----	----	----
p-Isopropyltoluene	99-87-6	0.050	mg/kg dry weight		----	<0.050	----	----	----
o-Xylene	95-47-6	0.050	mg/kg dry weight		----	<0.050	----	----	----
n-Propylbenzene	103-65-1	0.050	mg/kg dry weight		----	<0.050	----	----	----
n-Butylbenzene	104-51-8	0.050	mg/kg dry weight		----	<0.050	----	----	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S15 0-0.1m ----	S16 0-0.1m ----	S19 0-0.1m ----	S20 0-0.1m ----	S20 0.5-0.6m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-031	NH2600183-032	NH2600183-039	NH2600183-040	NH2600183-041
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

Naphthalene	91-20-3	0.10	mg/kg dry weight	----	<0.10	----	----	----
Methylene chloride	75-09-2	0.20	mg/kg dry weight	----	<0.20	----	----	----
Methyl tert-butyl ether (MTBE)	1634-04-4	0.50	mg/kg dry weight	----	<0.50	----	----	----
m & p-Xylenes	179601-23-1	0.10	mg/kg dry weight	----	<0.10	----	----	----
Isopropylbenzene	98-82-8	0.050	mg/kg dry weight	----	<0.050	----	----	----
Iodomethane	74-88-4	0.20	mg/kg dry weight	----	<0.20	----	----	----
Hexachlorobutadiene	87-68-3	0.10	mg/kg dry weight	----	<0.10	----	----	----
Ethylbenzene	100-41-4	0.050	mg/kg dry weight	----	<0.050	----	----	----
Dichlorodifluoromethane	75-71-8	0.10	mg/kg dry weight	----	<0.10	----	----	----
Dibromomethane	74-95-3	0.050	mg/kg dry weight	----	<0.050	----	----	----
Dibromochloromethane	124-48-1	0.10	mg/kg dry weight	----	<0.10	----	----	----
cis-1,3-Dichloropropene	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
cis-1,2-Dichloroethene	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
Chloromethane	74-87-3	0.10	mg/kg dry weight	----	<0.10	----	----	----
Chloroform	67-66-3	0.050	mg/kg dry weight	----	<0.050	----	----	----
Chloroethane	75-00-3	0.25	mg/kg dry weight	----	<0.25	----	----	----
Chlorobenzene	108-90-7	0.050	mg/kg dry weight	----	<0.050	----	----	----
Carbon Tetrachloride	56-23-5	0.050	mg/kg dry weight	----	<0.050	----	----	----
Carbon disulfide	75-15-0	0.050	mg/kg dry weight	----	<0.050	----	----	----
Bromomethane	74-83-9	0.25	mg/kg dry weight	----	<0.25	----	----	----
Bromoform	75-25-2	0.10	mg/kg dry weight	----	<0.10	----	----	----
Bromodichloromethane	75-27-4	0.050	mg/kg dry weight	----	<0.050	----	----	----
Bromobenzene	108-86-1	0.050	mg/kg dry weight	----	<0.050	----	----	----
Benzene	71-43-2	0.050	mg/kg dry weight	----	<0.050	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	0.20	mg/kg dry weight	----	<0.20	----	----	----
4-Chlorotoluene	106-43-4	0.050	mg/kg dry weight	----	<0.050	----	----	----
2-Hexanone (MBK)	591-78-6	0.10	mg/kg dry weight	----	<0.10	----	----	----
2-Chlorotoluene	95-49-8	0.050	mg/kg dry weight	----	<0.050	----	----	----
2-Chloroethyl vinyl ether	110-75-8	0.250	mg/kg dry weight	----	<0.250	----	----	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S15 0-0.1m ----	S16 0-0.1m ----	S19 0-0.1m ----	S20 0-0.1m ----	S20 0.5-0.6m ----
				Client Sampling date / time	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00	14-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-031	NH2600183-032	NH2600183-039	NH2600183-040	NH2600183-041
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

2,2-Dichloropropane	----	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,4-Dioxane	----	1.0	mg/kg dry weight	----	<1.0	----	----	----
1,4-Dichlorobenzene	106-46-7	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,3-Dichloropropane	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,3-Dichlorobenzene	541-73-1	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,3,5-Trimethylbenzene	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,2-Dichloropropane	78-87-5	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,2-Dichloroethane	107-06-2	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,2-Dichlorobenzene	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,2-Dibromoethane	106-93-4	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.20	mg/kg dry weight	----	<0.20	----	----	----
1,2,4-Trimethylbenzene	95-63-6	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,2,4-Trichlorobenzene	120-82-1	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,2,3-Trichloropropane	----	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,2,3-Trichlorobenzene	----	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,1-Dichloropropene	----	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,1-Dichloroethene	75-35-4	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,1-Dichloroethane	75-34-3	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,1,2-Trichloroethane	79-00-5	0.10	mg/kg dry weight	----	<0.10	----	----	----
1,1,2,2-Tetrachloroethane	79-34-5	0.20	mg/kg dry weight	----	<0.20	----	----	----
1,1,1-Trichloroethane	71-55-6	0.050	mg/kg dry weight	----	<0.050	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	0.20	mg/kg dry weight	----	<0.20	----	----	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)

Toluene-D8	2037-26-5	1.0	%	----	102	----	----	----
4-Bromofluorobenzene	460-00-4	1.0	%	----	104	----	----	----
1,2-Dichloroethane-D4	----	1.0	%	----	109	----	----	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S21 0-0.1m ----	S22 0-0.1m ----	S22 0.3-0.4 ----	S23 0-0.1m ----	S24 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-042	NH2600183-043	NH2600183-044	NH2600183-045	NH2600183-047
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		93.2	94.3	249	151	26.9
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.078	0.161	0.075	0.135	0.069
Chromium	7440-47-3	0.125	mg/kg dry weight		79.8	22.8	15.4	23.7	46.8
Copper	7440-50-8	0.075	mg/kg dry weight		53.2	26.2	26.5	32.2	61.6
Lead	7439-92-1	0.25	mg/kg dry weight		12.4	10.2	20.3	14.5	5.69
Nickel	7440-02-0	0.05	mg/kg dry weight		82.1	31.1	23.9	32.8	81.8
Zinc	7440-66-6	0.05	mg/kg dry weight		84.6	116	96.2	196	72.6
MC_S: Moisture Content									
Moisture Content	----	0.1	%		----	8.9	5.8	6.9	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		----	<10.0	<10.0	<10.0	----
C10 - C14 Fraction	----	15.0	mg/kg dry weight		----	18.2	<15.0	<15.0	----
TPH C15-C36	----	25.0	mg/kg dry weight		----	1930	979	3430	----
TPH C7-C36	----	50.0	mg/kg dry weight		----	1950	979	3430	----
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS									
Vinyl Chloride	75-01-4	0.10	mg/kg dry weight		----	<0.10	----	<0.10	----
Trichlorofluoromethane	75-69-4	0.10	mg/kg dry weight		----	<0.10	----	<0.10	----
Trichloroethene	79-01-6	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
trans-1,3-Dichloropropene	----	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
trans-1,2-Dichloroethene	----	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
Toluene	108-88-3	0.10	mg/kg dry weight		----	<0.10	----	<0.10	----
Tetrachloroethene	127-18-4	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
tert-Butylbenzene	98-06-6	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
Styrene	100-42-5	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
sec-Butylbenzene	135-98-8	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
p-Isopropyltoluene	99-87-6	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
o-Xylene	95-47-6	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
n-Propylbenzene	103-65-1	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----
n-Butylbenzene	104-51-8	0.050	mg/kg dry weight		----	<0.050	----	<0.050	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S21 0-0.1m ----	S22 0-0.1m ----	S22 0.3-0.4 ----	S23 0-0.1m ----	S24 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-042	NH2600183-043	NH2600183-044	NH2600183-045	NH2600183-047
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

Naphthalene	91-20-3	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Methylene chloride	75-09-2	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----
Methyl tert-butyl ether (MTBE)	1634-04-4	0.50	mg/kg dry weight	----	<0.50	----	<0.50	----
m & p-Xylenes	179601-23-1	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Isopropylbenzene	98-82-8	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Iodomethane	74-88-4	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----
Hexachlorobutadiene	87-68-3	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Ethylbenzene	100-41-4	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Dichlorodifluoromethane	75-71-8	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Dibromomethane	74-95-3	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Dibromochloromethane	124-48-1	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
cis-1,3-Dichloropropene	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
cis-1,2-Dichloroethene	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Chloromethane	74-87-3	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Chloroform	67-66-3	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Chloroethane	75-00-3	0.25	mg/kg dry weight	----	<0.25	----	<0.25	----
Chlorobenzene	108-90-7	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Carbon Tetrachloride	56-23-5	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Carbon disulfide	75-15-0	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Bromomethane	74-83-9	0.25	mg/kg dry weight	----	<0.25	----	<0.25	----
Bromoform	75-25-2	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
Bromodichloromethane	75-27-4	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Bromobenzene	108-86-1	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
Benzene	71-43-2	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
4-Methyl-2-pentanone (MIBK)	108-10-1	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----
4-Chlorotoluene	106-43-4	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
2-Hexanone (MBK)	591-78-6	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
2-Chlorotoluene	95-49-8	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
2-Chloroethyl vinyl ether	110-75-8	0.250	mg/kg dry weight	----	<0.250	----	<0.250	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S21 0-0.1m ----	S22 0-0.1m ----	S22 0.3-0.4 ----	S23 0-0.1m ----	S24 0-0.1m ----
				Client Sampling date / time	14-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-042	NH2600183-043	NH2600183-044	NH2600183-045	NH2600183-047
					Result	Result	Result	Result	Result

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

2,2-Dichloropropane	----	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,4-Dioxane	----	1.0	mg/kg dry weight	----	<1.0	----	<1.0	----
1,4-Dichlorobenzene	106-46-7	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,3-Dichloropropane	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,3-Dichlorobenzene	541-73-1	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,3,5-Trimethylbenzene	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,2-Dichloropropane	78-87-5	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,2-Dichloroethane	107-06-2	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,2-Dichlorobenzene	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,2-Dibromoethane	106-93-4	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----
1,2,4-Trimethylbenzene	95-63-6	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,2,4-Trichlorobenzene	120-82-1	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,2,3-Trichloropropane	----	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,2,3-Trichlorobenzene	----	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,1-Dichloropropene	----	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,1-Dichloroethene	75-35-4	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,1-Dichloroethane	75-34-3	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,1,2-Trichloroethane	79-00-5	0.10	mg/kg dry weight	----	<0.10	----	<0.10	----
1,1,2,2-Tetrachloroethane	79-34-5	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----
1,1,1-Trichloroethane	71-55-6	0.050	mg/kg dry weight	----	<0.050	----	<0.050	----
1,1,1,2-Tetrachloroethane	630-20-6	0.20	mg/kg dry weight	----	<0.20	----	<0.20	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)

Toluene-D8	2037-26-5	1.0	%	----	98.4	----	101	----
4-Bromofluorobenzene	460-00-4	1.0	%	----	106	----	110	----
1,2-Dichloroethane-D4	----	1.0	%	----	109	----	103	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S26 0-0.1m ----	S27 0-0.1m ----	S28 0-0.1m ----	S28 0.2-0.3m ----	S29 0-0.1m ----
				Client Sampling date / time	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-050	NH2600183-051	NH2600183-053	NH2600183-054	NH2600183-055
					Result	Result	Result	Result	Result
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		142	119	103	145	51.6
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.085	0.129	0.066	0.074	0.065
Chromium	7440-47-3	0.125	mg/kg dry weight		19.5	40.4	29.9	33.1	57.4
Copper	7440-50-8	0.075	mg/kg dry weight		28.4	56.6	31.1	36.1	58.2
Lead	7439-92-1	0.25	mg/kg dry weight		13.0	10.8	11.1	15.2	5.14
Nickel	7440-02-0	0.05	mg/kg dry weight		36.4	53.1	40.6	41.7	87.3
Zinc	7440-66-6	0.05	mg/kg dry weight		86.8	225	76.9	86.5	88.1
MC_S: Moisture Content									
Moisture Content	----	0.1	%		----	5.6	4.8	7.2	8.3
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS									
Naphthalene	91-20-3	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
2-Methylnaphthalene	91-57-6	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
1-Methylnaphthalene	90-12-0	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Acenaphthylene	208-96-8	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Acenaphthene	83-32-9	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Fluorene	86-73-7	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Phenanthrene	85-01-8	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Anthracene	120-12-7	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Fluoranthene	206-44-0	0.020	mg/kg dry weight		----	----	<0.020	<0.020	----
Pyrene	129-00-0	0.020	mg/kg dry weight		----	----	0.079	0.026	----
Benz(a)anthracene	56-55-3	0.020	mg/kg dry weight		----	----	<0.020	<0.020	----
Chrysene	218-01-9	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Benzo(b)&(j)fluoranthene	205-99-2 20 5-82-3	0.020	mg/kg dry weight		----	----	<0.020	<0.020	----
Benzo(k)fluoranthene	207-08-9	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Benzo(a)pyrene	50-32-8	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Indeno(1,2,3-cd)pyrene	193-39-5	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Dibenzo(a,h)anthracene	53-70-3	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
Benzo(g,h,i)perylene	191-24-2	0.020	mg/kg dry weight		----	----	<0.020	<0.020	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S26 0-0.1m ----	S27 0-0.1m ----	S28 0-0.1m ----	S28 0.2-0.3m ----	S29 0-0.1m ----
				Client Sampling date / time	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00
Compound	CAS Number	LOR	Unit		NH2600183-050	NH2600183-051	NH2600183-053	NH2600183-054	NH2600183-055
					Result	Result	Result	Result	Result
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS									
^ Benzo(a)pyrene TEQ (LOR)	----	0.010	mg/kg dry weight		----	----	0.026	0.026	----
^ Benzo(a)pyrene TEQ (zero)	----	0.010	mg/kg dry weight		----	----	<0.010	<0.010	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		----	<10.0	<10.0	<10.0	<10.0
C10 - C14 Fraction	----	15.0	mg/kg dry weight		----	<15.0	56.2	58.1	45.2
TPH C15-C36	----	25.0	mg/kg dry weight		----	129	1360	522	901
TPH C7-C36	----	50.0	mg/kg dry weight		----	129	1420	580	946
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS (Surrogates)									
Anthracene-d10	1719-06-8	0.10	%		----	----	115	76.0	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S29 0.2-0.3m ----	S30 0-0.1m ----	S31 0-0.1m ----	S32 0-0.1m ----	----
				Client Sampling date / time	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	----
Compound	CAS Number	LOR	Unit		NH2600183-056	NH2600183-057	NH2600183-059	NH2600183-060	----
					Result	Result	Result	Result	----
HM_S: Elements in Soil									
Arsenic	7440-38-2	0.125	mg/kg dry weight		231	187	1210	815	----
Cadmium	7440-43-9	0.005	mg/kg dry weight		0.063	0.117	0.069	0.050	----
Chromium	7440-47-3	0.125	mg/kg dry weight		34.8	53.3	12.0	9.46	----
Copper	7440-50-8	0.075	mg/kg dry weight		40.8	49.7	38.8	29.3	----
Lead	7439-92-1	0.25	mg/kg dry weight		22.9	8.20	15.3	10.7	----
Nickel	7440-02-0	0.05	mg/kg dry weight		72.3	111	24.9	20.6	----
Zinc	7440-66-6	0.05	mg/kg dry weight		73.7	89.9	65.7	49.0	----
MC_S: Moisture Content									
Moisture Content	----	0.1	%		7.5	11.2	15.7	8.3	----
svTPH_S: Semi-Volatile Total Petroleum Hydrocarbons - Soil by Gas Chromatography									
C7 - C9 Fraction	----	10.0	mg/kg dry weight		<10.0	<10.0	<10.0	<10.0	----
C10 - C14 Fraction	----	15.0	mg/kg dry weight		<15.0	54.6	<15.0	<15.0	----
TPH C15-C36	----	25.0	mg/kg dry weight		42.1	2110	226	44.5	----
TPH C7-C36	----	50.0	mg/kg dry weight		<50.0	2160	226	<50.0	----
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS									
Vinyl Chloride	75-01-4	0.10	mg/kg dry weight		----	----	<0.10	<0.10	----
Trichlorofluoromethane	75-69-4	0.10	mg/kg dry weight		----	----	<0.10	<0.10	----
Trichloroethene	79-01-6	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
trans-1,3-Dichloropropene	----	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
trans-1,2-Dichloroethene	----	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
Toluene	108-88-3	0.10	mg/kg dry weight		----	----	<0.10	<0.10	----
Tetrachloroethene	127-18-4	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
tert-Butylbenzene	98-06-6	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
Styrene	100-42-5	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
sec-Butylbenzene	135-98-8	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
p-Isopropyltoluene	99-87-6	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
o-Xylene	95-47-6	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
n-Propylbenzene	103-65-1	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----
n-Butylbenzene	104-51-8	0.050	mg/kg dry weight		----	----	<0.050	<0.050	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S29 0.2-0.3m ----	S30 0-0.1m ----	S31 0-0.1m ----	S32 0-0.1m ----	----
				Client Sampling date / time	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	----
Compound	CAS Number	LOR	Unit		NH2600183-056	NH2600183-057	NH2600183-059	NH2600183-060	----
					Result	Result	Result	Result	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

Naphthalene	91-20-3	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Methylene chloride	75-09-2	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----
Methyl tert-butyl ether (MTBE)	1634-04-4	0.50	mg/kg dry weight	----	----	<0.50	<0.50	----
m & p-Xylenes	179601-23-1	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Isopropylbenzene	98-82-8	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Iodomethane	74-88-4	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----
Hexachlorobutadiene	87-68-3	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Ethylbenzene	100-41-4	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Dichlorodifluoromethane	75-71-8	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Dibromomethane	74-95-3	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Dibromochloromethane	124-48-1	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
cis-1,3-Dichloropropene	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
cis-1,2-Dichloroethene	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Chloromethane	74-87-3	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Chloroform	67-66-3	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Chloroethane	75-00-3	0.25	mg/kg dry weight	----	----	<0.25	<0.25	----
Chlorobenzene	108-90-7	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Carbon Tetrachloride	56-23-5	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Carbon disulfide	75-15-0	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Bromomethane	74-83-9	0.25	mg/kg dry weight	----	----	<0.25	<0.25	----
Bromoform	75-25-2	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
Bromodichloromethane	75-27-4	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Bromobenzene	108-86-1	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
Benzene	71-43-2	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
4-Methyl-2-pentanone (MIBK)	108-10-1	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----
4-Chlorotoluene	106-43-4	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
2-Hexanone (MBK)	591-78-6	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
2-Chlorotoluene	95-49-8	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
2-Chloroethyl vinyl ether	110-75-8	0.250	mg/kg dry weight	----	----	<0.250	<0.250	----



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

				Client Sample ID	S29 0.2-0.3m ----	S30 0-0.1m ----	S31 0-0.1m ----	S32 0-0.1m ----	----
				Client Sampling date / time	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	15-Jan-2026 00:00	----
Compound	CAS Number	LOR	Unit		NH2600183-056	NH2600183-057	NH2600183-059	NH2600183-060	----
					Result	Result	Result	Result	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS

2,2-Dichloropropane	----	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,4-Dioxane	----	1.0	mg/kg dry weight	----	----	<1.0	<1.0	----
1,4-Dichlorobenzene	106-46-7	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,3-Dichloropropane	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,3-Dichlorobenzene	541-73-1	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,3,5-Trimethylbenzene	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,2-Dichloropropane	78-87-5	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,2-Dichloroethane	107-06-2	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,2-Dichlorobenzene	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,2-Dibromoethane	106-93-4	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----
1,2,4-Trimethylbenzene	95-63-6	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,2,4-Trichlorobenzene	120-82-1	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,2,3-Trichloropropane	----	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,2,3-Trichlorobenzene	----	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,1-Dichloropropene	----	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,1-Dichloroethene	75-35-4	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,1-Dichloroethane	75-34-3	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,1,2-Trichloroethane	79-00-5	0.10	mg/kg dry weight	----	----	<0.10	<0.10	----
1,1,2,2-Tetrachloroethane	79-34-5	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----
1,1,1-Trichloroethane	71-55-6	0.050	mg/kg dry weight	----	----	<0.050	<0.050	----
1,1,1,2-Tetrachloroethane	630-20-6	0.20	mg/kg dry weight	----	----	<0.20	<0.20	----

VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)

Toluene-D8	2037-26-5	1.0	%	----	----	99.1	95.5	----
4-Bromofluorobenzene	460-00-4	1.0	%	----	----	97.3	99.4	----
1,2-Dichloroethane-D4	----	1.0	%	----	----	106	103	----



Surrogate Control Limits

Sub-Matrix : COMPOSITE

Sub-Matrix : COMPOSITE		Recovery Limits (%)	
Compound	CAS Number	Low	High
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS (Surrogates)			
Anthracene-d10	1719-06-8	70.0	130

Surrogate Control Limits

Sub-Matrix : SOIL

Sub-Matrix : SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
VOC_S: Volatile Organic Compounds - Soil by Headspace GCMS (Surrogates)			
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
Toluene-D8	2037-26-5	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
4-Bromofluorobenzene	460-00-4	70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
1,2-Dichloroethane-D4		70.0	130
PAH_S: Polycyclic Aromatic Hydrocarbons - Soil by GCMS (Surrogates)			
Anthracene-d10	1719-06-8	70.0	130
Anthracene-d10	1719-06-8	70.0	130
Anthracene-d10	1719-06-8	70.0	130



Brief Method Summaries

Analytical Methods	Method	Matrix	Method Descriptions
Heavy Metals in Soil	HM_S	SOIL	Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.
Moisture Content in Soil	MC_S	SOIL	Moisture content is determined gravimetrically by drying at 103 °C.
Polycyclic Aromatic Hydrocarbons in Soil	PAH_S	SOIL	Analysis by GC-MS. Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH. Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation. Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to 'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'. Ministry for the Environment. 2011. (In accordance with in-house procedure).
Semi-Volatile Total Petroleum Hydrocarbons in Soil	svTPH_S	SOIL	Analysis by GC-FID (C7-C36). (In accordance with in-house procedure based on US EPA 8015).
Volatile Organic Compounds in Soil	VOC_S	SOIL	Methanol extraction in accordance with US-EPA 5030A, analysis via GCMS with headspace sample introduction. (In-house procedure based on US EPA Method 5021).