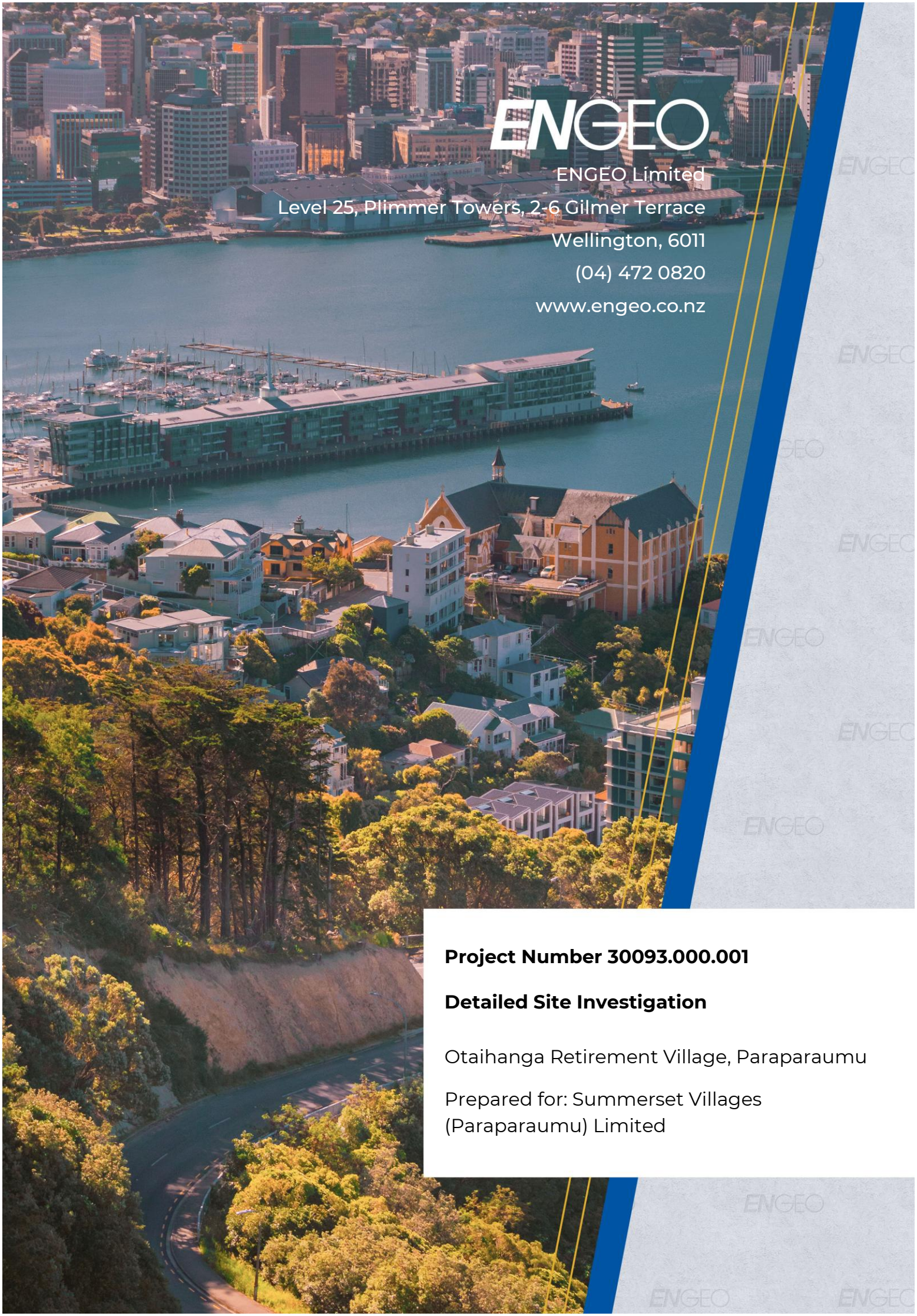


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**Project Number 30093.000.001**

# Detailed Site Investigation

Otaihanga Retirement Village, Paraparaumu

Prepared for: Summerset Villages (Paraparaumu) Limited

## Executive Summary

| | | |
|---|---|---|
| **Site Address** | 65 and 73 Ratanui Road, Paraparaumu | |
| **Legal Description** | Lot 4 DP 58017 (approximately 7.3 hectares)<br>Lot 3 DP 497389 (approximately 5.4 hectares) | |
| **Site Investigation Area** | Approximately 12.7 hectares | |
| **Proposed Redevelopment / Land Use** | Retirement Village | |
| **Adopted land use scenario from the NES:CS** | Various:<br>• High-density residential.<br>• Recreational.<br>• Commercial / Industrial (unpaved). | |
| **Historical / Current Land Use** | Rural residential (pastoral) | |
| **Analytical Results** | *Exceedance(s) of human health criteria* | No |
| | *Exceedance(s) of environmental discharge criteria* | No |
| | *Exceedance(s) of regional background criteria* | Yes |
| **Conclusions and Recommendations** | Previous reports (Riley 2025) considered that a HAIL land use (HAIL I) had potentially occurred on site. Consent for Subdivision under the NES-CS was sought and granted (KCDC reference RM250042) with consent conditions relating to management of contaminated soils to the west of the dwelling at 73 Ratanui Road.<br>Although contaminants are present on-site, ENGEO does not consider that it is "more likely than not" that an activity from the HAIL applies to the site. As a result, the NESCS should not apply to the proposed redevelopment. For simplicity, and to avoid potentially conflicting consent conditions, the client proposes to apply for consent under the NES-CS for the planned earthworks. Because the concentration of contaminants does not exceed the Soil Contaminant Standard for the proposed high density residential land use, a controlled activity under Regulation (9) of the NES-CS is proposed.<br>No exceedances of environmental assessment criteria were detected, therefore no environmental discharge consent is required under the GWRC Natural Resources Plan for soil disturbance associated with redevelopment activities.<br>Management of soils which contain contaminants above the natural background range is recommended. | |
| | Works to be managed in accordance with a Site Management Plan. | |


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**ENGEO Document Control:**

| | | | |
|---|---|---|---|
| **Report Title** | Detailed Site Investigation – Otaihanga Retirement Village, Paraparaumu | | |
| **Project No.** | 30093.000.001 | **Doc ID** | 05 |
| **Client** | Summerset Villages (Paraparaumu) Limited | **Client Contact** | Hayden Beaton |
| **PDF Distribution** | Summerset Villages (Paraparaumu) Ltd | | |

| Date | Revision Details | Author | Reviewer | WP |
|---|---|---|---|---|
| 29/09/2026 | Issued to Client | J. Green | J. Rhodes | DF |
| 19/10/2026 | Revised Post Comments Received | J. Green | J. Rhodes | HO |

**SQEP Certifying Statement**

**Statement of Experience**

This DSI has been prepared under supervision of Jamie Rhodes, who is employed as a Principal Environmental Engineer by ENGEO, an Environmental and Geotechnical Consultancy. Jamie Rhodes is based in Auckland. He provides expert advice on a variety of contaminated land projects, is a Certified Environmental Practitioner (Site Contamination Specialist) and currently serves on the New Zealand Advisory Committee for the Australasian Land and Groundwater Association.

**Code of Conduct**

While this is not a matter before the Environment Court Jamie has read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code') and has complied with that Code in the preparation of this report.

The data, information, facts and assumptions Jamie has considered as part of this report are set out in this report. The reasons for the conclusions of the report are also set out in this report. Unless stated otherwise, the matters addressed in this report are within Jamies' expertise and he has not omitted to consider material facts known to him that might alter or detract from the opinions expressed.

*I certify that the site has been assessed in accordance with current New Zealand Regulations and guidance documents and that this report has been prepared in general accordance with the Ministry for the Environment's Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand, 2021.*

*I am considered by ENGEO Limited to be a suitably qualified and experienced practitioner (SQEP) able to certify reports pursuant to the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, based on the company's definition of a SQEP as given below.*



Jamie Rhodes, CEnvP (SC)

22 October 2026

*ENGEO Limited requires that a SQEP has the following Qualifications / Experience:*

- *Tertiary science or engineering qualification relevant to environmental assessment.*
- *A minimum of ten years of relevant experience.*
- *Registration with a professional body that assess and certifies environmental professionals in the competency criteria of training, experience, professional conduct, and ethical behaviour.*

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# 1 Introduction

ENGEO Ltd was requested by Summerset Villages (Paraparaumu) Limited (Summerset) to undertake a Detailed Site Investigation at Otaihanga Retirement Village, Paraparaumu (herein referred to as 'the site', shown in Figure 1). It is understood that Summerset propose to develop the site for a retirement village. The purpose of the assessment was to support a substantive application for resource consent under the Fast-Track Approval Act 2024.

A Preliminary and Detailed Site Investigation (PSI/DSI) report was prepared by Rileys in 2025 to support the subdivision of 65 Ratanui Road and amalgamating the resultant northern lot to the parcel at 73 Ratanui Road (Rileys, 2025). The findings of the 2025 report have been considered in preparation of this report. ENGEO notes that the Riley report did not state that an activity from the Ministry for the Environment's (MfE) Hazardous Activities and Industries List (HAIL) (MfE, 2011a) had occurred on-site; however, the report recommended that restricted discretionary consent under Regulation 10 of the Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES-CS) was required to address an isolated arsenic hotspot west of the building at 73 Ratanui Road. Consent was granted from Kāpiti Coast District Council (KCDC) (consent reference RM250042, attached as Appendix 1). Conditions relating to contaminated land under the NES-CS were accepted by the applicant.

The purpose of this Detailed Site Investigation (DSI) report is to support an application for resource consent (soil disturbance and soil disposal) for the proposed retirement village. This investigation was undertaken in general accordance with the MfE Contaminated Land Management Guidelines (CLMG) No. 1: Reporting on Contaminated Sites in New Zealand (MfE, 2021a) and CLMG No 5: Site Investigation and Analysis of Soils (MfE, 2021b). The investigation was supervised, and the report reviewed and approved by a suitably qualified and experienced contaminated land practitioner in accordance with national environmental regulations for soil contamination.

## 1.1 Proposed Development

The proposed retirement village comprises 257 one-and-two level residential independent living units (ILUs) generally positioned around a main building which is central to the site. Recreational facilities near the main building include a bowling green, croquet, pickleball court, and playground. Landscaping / soft amenity features include parks, formal gardens, a BBQ area to the north, and potager gardens / greenhouse to the south. Access around the development is via a network of sealed private roads and footpaths with berms. A copy of redevelopment plans is included in Appendix 2.

ENGEO understands that land southeast of the main building is proposed for restoration and stormwater management purposes, associated with DEV3-Ratanui Development Area.

## 1.2 Objective of the Investigation

The objective of this investigation is to assess whether the potential contaminants of concern are on-site at concentrations that present an unacceptable risk to future site users (residents, visitors, and maintenance staff) or to environmental receptors.

This information obtained has been used to assess the need for further remediation or management of contaminated soil, including the consenting requirements under the NES-CS and the Greater Wellington Regional Council Natural Resources Plan (GWRC, 2023).


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### 1.3 Scope of Works

In preparing this DSI report, ENGEO undertook the following:

- Desktop review of property file information from local and regional council, the Riley 2025 PSI/DSI, and recent aerial imagery.
- Develop a preliminary conceptual site model (PCSM).
- A site walkover to visually observe ground conditions and collect soil samples for laboratory analysis of potential contaminants of concern.
- Review laboratory results (including Riley 2025 results) against relevant human health, environmental, and soil disposal criteria for the proposed land use.
- Prepare this DSI report to inform future development / land use, and the requirement for contaminated land related consents under the NES-CS and GWRC's Natural Resources Plan.

## 2 Site Information

Site information and general setting is summarised in Table 1.

**Table 1: Site Information**

| Item | Description |
|---|---|
| **Site Address** | 65 and 73 Ratanui Road, Otaihanga, Paraparaumu |
| **Legal Description** | Lot 4 DP 58017 (approximately 7.3 hectares)<br>Lot 3 DP 497389 (approximately 5.4 hectares) |
| **Current Land Use** | Rural residential (pastoral) land |
| **Proposed Land Use** | Retirement village |
| **Site Area** | 12.7 hectares |
| **Territorial Authority** | Kapiti Coast District Council (KCDC) |
| **Regional Authority** | Greater Wellington Regional Council (GWRC) |
| **Zoning** | The site is designated as Dev3 – Ratanui Development Area, and is also subject to the underlying General Residential Zone provisions under the operative Kāpiti Coast District Plan (2021). |
| **Geology** | GNS Science 250k Geology maps show the site as underlain by Holocene stable dune deposits (Holocene windblown deposits) (GNS, 2026). |


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| | |
|---|---|
| **Topography / Surface Water** | The site features undulations throughout with the highest point being 15 m RL located along the northern boundary and the lowest being 3.5 m RL as recorded on New Zealand LiDAR 1m DEM.<br>Specific low-lying features include the stormwater drain which drains east to west across the southern third of the site, and a stormwater pond located near the southern site boundary. |
| **Surrounding Land Use** | The site is generally surrounded by rural lifestyle properties to the north, east, south and southwest. To the northwest of the site, the land use is consistent with general residential. Paraparaumu College is located approximately 150 m west of the site, amongst residential land use. |

# 3 Site Historical Use

To determine the sites historical land use, ENGEO reviewed GWRC Selected Land Use Register, KCDC property file, historical aerial photographs and reports provided by the client (including the Riley 2025 PSI/DSI). Relevant information obtained during this review is summarised below.

## 3.1 Greater Wellington Regional Council

GWRC maintains a contaminated sites register, known as the Selected Land Use Register (SLUR). The register identifies properties known to have, or historically have had, land uses or activities listed on the MfE HAIL (MfE, 2011a).

ENGEO's review of the GWRC SLUR in September 2026 indicated that the site, as well as other properties within 200 m are not recorded on the SLUR.

## 3.2 Kapiti Coast District Council

### 65 Ratanui Road

The property files provided by Summerset and reviewed for 65 Ratanui Road included the Land Information Memorandum (LIM) (dated August 2022). The LIM showed no evidence of activities associated with soil contaminants on site.

Scanned Building File – BC180207 – New Storage Shed. The records primarily relate to buildings that were located on the part of 65 Ratanui Road that is not within the site boundary.

Plans from 1986 show a woolshed / implement shed located adjacent to western site boundary, immediately south of the stormwater drainage channel.

### 73 Ratanui Road

The LIM report for 73 Ratanui Road shows the stream corridor which runs east to west through the site, and that the northern section of 73 Ratanui Road is subject to ponding.

The LIM report also included information relating to the recent subdivision of the site. The resource consent on file (KCDC reference RM250042) indicated that a HAIL land use had occurred on-site.


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The consent had the following conditions that are appliable to contaminated land:

- 6. *Prior to the demolition of any existing structures on Lot 1, the consent holder shall obtain a survey for asbestos-containing materials (ACM) and lead paint prepared by a WorkSafe-licensed asbestos assessor. The consent holder shall provide a copy of this survey to Council's Development Engineer.*

  ***Note:** This assessment is required to determine compliance requirements under WorkSafe's Health and Safety at Work (Asbestos) Regulations 2016 to ensure safe demolition practices and to reduce the likelihood of soil contamination caused by the demolition.*

- *7. After demolition of any existing structures on Lot 1, the consent holder shall have soil validation sampling undertaken by a Suitably Qualified and Experienced Professional to confirm that no asbestos or lead concentrations exceeding relevant health guidelines remain. The consent holder shall provide a copy of the results of this sampling to Council's Development Engineer.*

- *8. Prior to any soil disturbance on Lot 1, the consent holder shall have the isolated arsenic hotspot adjacent to the existing shed on 73 Ratanui Road delineated, remediated and validated by a Suitably Qualified and Experienced Professional. The consent holder shall provide a copy of the Site Validation Report to Council's Development Engineer.*

  ***Note:** A Consent Notice under Section 221 of the Resource Management Act 1991 will be issued for Lot 1 to facilitate the recording of this condition, which is to be complied with on an ongoing basis.*

## 3.3 Aerial Photographs

Riley's PSI/DSI report (2025) included aerial images from 1940–2022 which are appended.

A summary of the review from Riley is not reproduced; however, findings from ENGEO's review of these images, as well as later imagery from 2023 and 2025 is below:

The 1940 image may show evidence of a small bach or crib in the northern section of 65 Ratanui Road, though this is not evident in the 1952, 1957, or 1973 images, which show the site as undeveloped land. The stormwater drainage line which passes from east to west across the site is evident in all four images, and surface ponding is evident in the southern parts of the site.

The 1987 image shows construction of the residential dwelling and woolshed / implement shed on the part of 65 Ratanui which does not form part of the site. A large shed with an access track has been constructed at the northwest of 73 Ratanui Road. No significant changes noted in the 1991, 1997, or 1998 images, though in the 1998 image there is evidence of fencelines in the northern paddocks, suggesting pastoral use.

The 2001 image shows the large shed at 73 Ratanui Road has been removed (appears that the slab remains). There is evidence of storage of construction equipment as well as chopped firewood / vegetation south of the building slab. There are multiple vehicles parked on and around the slab, with no apparent obvious purpose. Several old vehicles are evident to the northwest of the slab. At the northeast corner of 65 Ratanui Road, evidence of a circular dirt bike track (or similar) having been formed (which also reappears in the 2017 image).

The 2007 images show that the shed at 73 Ratanui Road has been replaced, and both the 2007 and 2010 images show pastoral land use across the site.


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2013 image shows removal of tress between the boundary of 65 and 73 Ratanui Road, with storage of firewood.

The 2021 image shows construction of a gravel pad / yard area around the shed at the northwest of 73 Ratanui Road, as well as removal of the remaining trees between the site and the adjacent portion of 65 Ratanui Road.

In 2023 the shelter belt located within the south-eastern paddock of 65 Ratanui Road was removed. In 2024 the trees located around the centrally located pond at 73 Ratanui Road were removed.

## 3.4 Previous Investigation Reports

The Riley 2025 PSI/DSI was prepared to support resource consent for subdivision and amalgamation of the properties at 65 and 73 Ratanui Road, resulting in the formation of the current site.

The Riley PSI/DSI report stated that based on the review of GWRC and KCDC files, and historical aerial photographs and site walkover, the only potential HAIL activity that applied to the site was HAIL I due to the placement of fill material as part of foundation platform for dwelling construction.

Riley conducted shallow hand investigations to assess the presence of fill material, and to collect soil samples to characterise potential contaminants of concern that may pose a health and / or environmental risk. Sampling targeted surface soils, and deeper soils (generally to between 0.2 and 0.6 m below ground level (bgl)). Deeper sampling to approximately 1.0 m bgl was undertaken within the dwelling footprint at 73 Ratanui Road to characterise fill.

Seventy-four samples from 45 locations across the site were submitted to an IANZ accredited laboratory (RJ Hill Labs) and analysed for heavy metals / metalloids analysis. A further 11 samples were analysed for polycyclic aromatic hydrocarbons (PAHs), ten were analysed for organochlorine pesticides (OCPs), and four were analysed for presence / absence of asbestos. A sample location plan is provided as Figure 2.

Results were compared to GWRC published background ranges, as well as the soil contaminant standards for standard and high-density residential land use, as well as outdoor worker land uses. Criteria for protection of environmental receptors were not presented.

The report found that:

- Cadmium in topsoil across much of the site was detected above the adopted background range (inferred to be associated with application of phosphate-based fertilisers).
- Heavy metals / metalloids were detected above the adopted background range in isolated locations.
- One isolated exceedance of the standard residential land use criteria for arsenic (adjacent to the existing shed at 73 Ratanui Road) was detected. Riley recommended delineation, removal and validation of the arsenic impacts from this location, presumably to address potential future residential land use.
- With the exception of arsenic in one location as described above, no result exceeded the residential, high density residential or outdoor worker criteria. Riley recommended that soils were suitable for reuse on the proposed subdivision.

The report also recommended an asbestos and lead-paint survey of existing structures prior to demolition, followed by validation sampling of surficial soils following demolition.


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ENGEO notes that the decision to assess soil against the criteria for a standard residential land use was conservative for the current development and likely done in the absence of detailed plans. Current development plans show the proposed land use is aligned with high density residential land use as described in the NES-CS Users Guide *(Urban residential land with limited soil contact, including small ornamental gardens but no vegetable garden (no home grown produce consumption); applicable to urban townhouses, flats and ground-floor apartments with small ornamental gardens, but not high rise apartments*). ENGEO notes that the arsenic concentration detected by Riley did not exceed the high density residential criteria.

# 4 Current Site Conditions

The site walkover and initial intrusive investigation works were completed on 7 September 2026 by an ENGEO Environmental Scientist.

Observations of conditions present at the site are summarised in Table 2. Photographs taken during the site visit are included in Appendix 3.

**Table 2: Current Site Conditions**

| Site Conditions | Comments |
|---|---|
| **Overview** | The site is used for rural residential purposes. The paddocks are generally undulating, with a pond and drainage features present. The land is being grazed by sheep and cattle with associated stock fencing throughout.<br><br>A significant mound is located along the southern boundary of 73 Ratanui Road and northern boundary of 65 Ratanui Road, which both appeared to comprise native sands with a topsoil layer.<br><br>At 73 Ratanui Road, an on-site drainage channel was observed through the central portion of the site, when water is present, to flows east to west across the southern third of the site. Various rural residential storage areas, sheds, and farm-related materials were present, including water tanks, general storage materials, and treated timber. An area of treated timber storage was noted within the property.<br><br>The shed and attached dwelling at 73 Ratanui Road is clad with painted corrugated metal and is in good condition. The shed and attached dwelling area at 73 Ratanui Road was tidy with some storage of treated timber fencing posts in two locations. There was some minor storage of cleaning chemicals in the wash pad shed. |
| **Interview with Site Personnel** | A brief conversation was held with the site owner at 73 Ratanui Road, who advised that he has occupied the property since 1983. The owner advised that the drain running through the property is generally clear, becoming sediment-laden only during periods of very high rainfall.<br><br>The owner also advised that the mounding and associated soil disturbance observed along the southern portion of the property comprises reworked native material used to form the existing mounds. He advised that no fill has been imported onto the property. |

| Site Conditions | Comments |
|---|---|
| **Potential Sources of Contamination** | Minor storage of treated timber was observed around the shed and attached dwelling at 73 Ratanui Road. Several stockpiles of natural timber were also present throughout the property, with minor inclusions of treated timber noted within some stockpiles.<br>A small amount of brick was observed at the ground surface within the paddock to the west of the shed and attached dwelling area.<br>No obvious evidence of soil staining, hydrocarbon impacts, or other visual indicators of contamination, and no potential sources of contamination evident across the balance of the site. |
| **Potential for On- or Off-Site Migration of Contaminants** | The stormwater drain that runs through the northern portion of 73 Ratanui Road could be a potential on or off-site migratory pathway.<br>Review of aerial imagery has not indicated any significant on-site contaminant sources.<br>It was noted that up gradient of the site the stormwater drain passes through from Otaihanga Transfer Station. However, the potential for on-site migration of contaminants is assessed to be low due the distance to our site as well as likely discharge compliance implications on the transfer station. |

# 5 Summary of Findings

## 5.1 Potential HAIL Activities – Contamination Sources

Based on the information reviewed as part of this environmental investigation and observations during the site walkover the following potential activities included on the HAIL have been identified at the site (shown in Figure 3):

- HAIL ID I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment
    - Treated timber products were observed stored outside at 73 Ratanui Road. The previous investigation also identified an arsenic hotspot at this area. Treated timber may contain preservative chemicals that have the potential to leach to underlying soils, particularly where bulk timber is stored directly on unsealed ground.

In addition to this, ENGEO's review identified the following activities that based on previous testing have been demonstrated to not meet the definition of a HAIL land use, but which have likely resulted in low level distribution of contaminants that may require further management.

- Historical earthworks and contouring of site, including filling and construction of building foundations, as well as stockpiling of construction materials in the paddock to the east of the shed at 73 Ratanui Road.
- Historical storage of vehicles adjacent to the dwelling area at 73 Ratanui Road.
- Application of phosphate-based fertilisers which contained cadmium[1].

[1] ENGEO notes that the presence of cadmium above the natural background ranges as a result of broad acre application of fertilisers is specifically excluded as a HAIL (Hazardous Activities and Industries List Guidance, Identifying Hail Land, MfE 2023).


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### 5.2 Sensitive Site Receptors

The primary human health receptors include future residents, maintenance staff of the completed development, and occupants of neighbouring properties. Construction workers will be exposed to a lesser degree than maintenance staff, and are not considered further. Potential exposure may occur through direct contact with soil, incidental soil ingestion, and inhalation of dust. Neighbouring properties may also be affected by the off-site transport of dust or contaminated sediment during earthworks, via wind or drainage pathways.

Environmental receptors identified at the site include terrestrial ecological receptors and groundwater (where soluble contaminants are suspected) as well as the on-site stormwater drain (in the event of sediment transport).

## 6 Preliminary Conceptual Site Model

A PCSM has been developed to assess the potential exposure pathways present at the site. A contamination CSM consists of three primary components. For a contaminant to present a risk to human health or an environmental receptor, all three components are required to be present and connected. The three components of a CSM are:

- Source of contamination.
- An exposure route, where the receptor and contaminants come into contact (e.g., ingestion, inhalation, dermal contact).
- Receptor(s) that may be exposed to the contaminants.

The PCSM is summarised in Table 3.

**Table 3: Preliminary Conceptual Site Model**

| Potential Source of Contamination | Primary Contaminants of Concern | Possible Extent of Contamination | Potential Pathway | Potential Receptor |
|---|---|---|---|---|
| Storage of Treated Timber at 73 Ratanui Road | Arsenic<br>Copper and chromium are not considered potential contaminants of concern based on Riley 2025 data | Shallow soils surrounding timber storage areas at 73 Ratanui Road (Riley 2025 investigation location SSP-19) | Direct exposure resulting in accidental soil ingestion, inhalation of dust, and / or dermal contact. | Redevelopment workers during earthworks.<br>Future site users. *(high density residential use, or maintenance workers)* |
| | | | Direct discharge to soils; mobilisation of sediment to waterways via overland flow paths; leaching into groundwater | On-site terrestrial flora and fauna.<br>Groundwater, and surface water (as transported sediments) |

| Potential Source of Contamination | Primary Contaminants of Concern | Possible Extent of Contamination | Potential Pathway | Potential Receptor |
|---|---|---|---|---|
| Historical Filling - Brick identified in Paddock at 73 Ratanui Road | Metals / metalloids, polycyclic aromatic hydrocarbons (PAHs), and asbestos fines and fibrous asbestos | Fill material identified at surface of 73 Ratanui Road | Direct exposure resulting in soil ingestion, inhalation of dust / fibres (if asbestos is present) and / or dermal contact | Redevelopment workers during earthworks.<br>Future site users. *(high density residential use, or maintenance workers)* |
| | | | Direct discharge to soils; remobilisation of sediment to waterways via overland flow paths; leaching into groundwater | On-site terrestrial flora and fauna.<br>Groundwater, and surface water (as transported sediments |
| Historical Vehicle Storage | Metals / metalloids & polycyclic aromatic hydrocarbons (PAHs), | Shallow soils surrounding previous vehicle storage area at 73 Ratanui Road | Direct exposure resulting in soil ingestion, inhalation of dust, and / or dermal contact | Redevelopment workers during earthworks.<br>Future site users. *(high density residential use, or maintenance workers)* |
| | | | Direct discharge to soils; remobilisation of sediment to waterways via overland flow paths; leaching into groundwater | On-site terrestrial flora and fauna.<br>Groundwater, and surface water (as transported sediments |

# 7 Intrusive Investigation

ENGEO visited site on 7 and 10 September 2026 to conduct intrusive investigations. The objective was to collect samples representing soils from the areas identified in the PCSM, and to assess these for potential contaminants of concern.

## 7.1 Field Investigation Methodology

Fieldwork and sampling were undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (MfE, 2021b).

Seventeen soil samples were collected from 13 locations at 73 Ratanui Road, targeting the following areas and potential contaminants of concern (refer Table 4). A sample location plan is provided in Figure 4.


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**Table 4: Investigation Methodology**

| Area of Concern | Sample Location | Investigation Methodology | Maximum Depth | Proposed Analysis Suite |
|---|---|---|---|---|
| Arsenic hotspot (Riley investigation location SSP-19) | SS11–SS13 | Hand Auger | 0.3 m | Metals / metalloids |
| Treated timber storage | SS01–SS05 | Hand Auger | 0.3 m | Metals / metalloids |
| Historical vehicle storage | SS06–SS08, SS10 | Hand Auger | 0.1 m | Metals / metalloids & polycyclic aromatic hydrocarbons (PAHs), |
| Undocumented filling with brick | SS09 | Hand Auger | 0.1 m | Metals / metalloids, asbestos & polycyclic aromatic hydrocarbons (PAHs), |

## 7.2 Quality Assurance / Quality Control

### 7.2.1 Sample Quality Control

The quality assurance / quality control (QA / QC) procedures employed during the investigation included:

- Prior to sampling and between each sample location, all sampling equipment (e.g., hand auger and spade) was decontaminated using a triple-wash procedure consisting of potable water, a Decon 90 solution, and a final rinse with deionised water to prevent cross-contamination.
- Soil samples were collected using a clean pair of nitrile gloves for each sample and placed directly into laboratory-supplied sample containers. Each sample was assigned a unique identification number, and the collection location was recorded at the time of sampling.
- Following collection, all samples were immediately stored in chilled conditions and transported under standard chain-of-custody procedures to Hills Laboratories, an International Accreditation New Zealand (IANZ)-accredited facility, for chemical analysis. Standard sample registers and chain-of-custody records were maintained for all samples in accordance with regulatory requirements.

### 7.2.2 Laboratory Quality Control

Hill Laboratories was selected to perform analysis of samples. Review of the laboratory Quality Assurance Report (reference 4311012 & 4308263) identified one notable QA / QC issues:

- Indeno(1,2,3-c,d)pyrene - The Laboratory Control Sample (LCS) spike recovery for this analyte was marginally below the accepted control limits. The laboratory notes indicate that the recovery does fall within generic recovery range of 80–120%, which was considered acceptable to the laboratory.

The above is not believed to have a significant effect on the findings or recommendations of this report, and the dataset is therefore considered suitable for interpretation. Laboratory analytical reports are presented in Appendix 4.


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# 8 Investigation Findings

## 8.1 Site Observations

In general, the soil profile at investigation locations comprised dark brown topsoil consisting of silt with trace sand and rootlets, extending to a maximum depth of approximately 0.3 m bgl. Where deeper hand augers were advanced, the topsoil was underlain by sand with varying quantities of silt.

Evidence of fill material (bricks, intermixed with topsoil) was encountered at the surface at SS09. No other significant visual or olfactory evidence of contamination was noted during the investigation.

## 8.2 Tier 1 Screening Criteria

Analytical results have been compared to the following criteria to assess risk to the identified receptors from the PCSM.

### Human Health Criteria

- The soil contaminant standards (SCS) from the Methodology for Deriving Contaminants in Soil to Protect Human Health (“the Methodology”; MfE, 2011) for:
    - High-density residential land use, and to recreational land use, to assess the risk to future site occupants;
    - Commercial / industrial outdoor worker (unpaved) to assess the risk to maintenance staff for the retirement village;
- In line with the above, the soil guideline values for high-density residential land use, recreational land use, and commercial land use, from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (NZGAMAS; BRANZ, 2024).
- In accordance with Contaminated Land Management Guidelines No.2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (CLMG 2; MfE, 2011b) for contaminants not listed above.

The NESCS does not provide soil contaminant standards for an earthworks exposure scenario, which have much more direct exposure to contaminants but over shorter duration of long-term land use scenarios. Typical health risk triggers for implementation of specific management controls arise from levels of contaminants exceeding anticipated regional background or ambient conditions.

If necessary, based on contaminant concentrations on-site, protocols to assist with mitigating risks to earthworks contractors during the redevelopment works will be outlined in a Site Management Plan or Remedial Action Plan.

Users of surrounding properties (during redevelopment and future site use) are considered to be adequately protected provided that risks to redevelopment workers and future users of the site are acceptable.

### Environmental Criteria

To assess the risk to environmental receptors, results were compared to the ‘Soil Guideline Values for the Protection of Ecological Receptors’ (Eco-SGVs; Landcare Research, 2019) for typical soils, an aged contaminant source and commercial / industrial land use. The Eco-SGVs have also been adopted as high-level screening criteria for whether significant leaching to groundwater is likely to be occurring and assess potential risks to ecological receptors.

## 8.3 Tier 1 Risk Assessment

The soil results summary table included in Appendix 5 compares soil contaminant concentrations from the 2026 investigation with the adopted Tier 1 criteria. Full analytical laboratory reports are included in Appendix 4. A summary of the chemical and asbestos results is as follows:

### Treated timber storage areas

- Eleven shallow soil samples were collected in the vicinity of the area west of the dwelling at 73 Ratanui Road. The results indicated significant variance in arsenic concentrations, with values between 7 mg/kg and 62 mg/kg. The mean concentration of arsenic in the timber storage area was calculated using USEPAs Pro-UCL. The mean arsenic concentration (based on 95% confidence limit) was 35.1 mg/kg. This is less than the SCS for the intended land use.
- There were no reported exceedances of the commercial / industrial (unpaved) land use criteria.
- The maximum arsenic detection marginally exceeded the adopted environmental criteria in one shallow soil sample (SS03). As the 95% UCL of the mean arsenic concentration was 35.1 mg/kg, this exceedance is not considered to represent a risk to ecological receptors.

### Vehicle Storage Area

- No exceedances of the SCS for protection of human health were reported.
- Zinc exceeded the adopted environmental criteria in two of the four samples representing this area (SS08 and SS10).

### Brick Fill Area

- No exceedances of the SCS for protection of human health or environmental criteria were reported.
- There was no asbestos detected in soil sample taken from surface soils at SS09.

## 8.4 Disposal Criteria

To assess soil disposal options, soil results were compared against published regional background concentrations, and soil disposal guidelines from the following sources:

- Determination of Common Pollutant Background Soil Concentrations for the Wellington Region (URS, 2003). Background Concentrations from Table 3-3 for Main Soil Type 1 (Sand).
- Class 5 Clean Fill Waste Acceptance Criteria (Sand Soil type) from the WasteMINZ Technical Guidelines for Disposal to Land (2023).
- Hazardous Waste Guidelines: Landfill Waste Acceptance Criteria and Landfill Classification (MfE, 2004). Class A Screening Criteria from Table 1.

## 8.5 Disposal Assessment

A summary of soil contaminant concentrations with disposal criteria is included in Appendix 6.

Multiple results representing topsoil and shallow soils from ENGEO's 2026 investigations exceed the Class 5 Clean Fill Waste Acceptance Criteria (WAC) for heavy metals / metalloids.


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The concentration of zinc in SS08 and SS10 exceeds the Class A landfill screening criteria. Other results from the ENGEO 2026 investigations do not exceed the Class A screening criteria.

# 9 Discussion of Results

The results of the investigation are discussed below including consideration of the results from the Riley 2025 investigation. The results table from the Riley 2025 investigation is included in Appendix 7 and corresponding analytical laboratory reports are included in Appendix 8.

## 9.1 Treated Timber Storage Area

The maximum arsenic concentration was detected above the high-density soil contaminant standard and the ecological soil guideline value in one soil sample from the ENGEO 2026 investigation (SS03), collected in an area where evidence of storage of treated timber was observed. A deeper sample from SS03 indicated that the elevated arsenic was limited to shallow soils.

A total of 14 shallow samples from the timber storage area and immediate surrounds were analysed for arsenic, with the mean concentration across shallow soils calculated to be 35.1 mg/kg, which is below the criteria for protection of human health or ecological receptors.

Although Riley (2025) reported arsenic above the rural residential, and residential land use standards, these standards are not relevant to the proposed land use. Riley 2025 results did not exceed the criteria selected above (high density residential land use) which is appropriate for the proposed land use, or the ecological criteria.

There are no published criteria for protection of groundwater. On the basis that the deeper soil sample did not exceed the natural background range, ENGEO considers that there is not significant evidence of arsenic impacts migrating to groundwater.

ENGEO considers that due to the limited extent and depth of impacts detected, soil in the vicinity of the treated timber near the western site boundary is highly unlikely to present an unacceptable risk to human health or environmental receptors for the proposed land use; however, due to existing consent conditions associated with the earlier subdivision consent (KCDC reference RM250042), remediation of soils in this area is required.

## 9.2 Vehicle Storage Area

Samples of shallow soils representing the area where old vehicles were stored in historical aerial imagery did not exceed the criteria for protection of human health.

Two samples of surface soils from the ENGEO 2026 investigation (SS08 and SS10) contained zinc above the soil guideline values for protection of ecological receptors. Three samples of surface soils from the Riley 2025 investigation from similar locations (SSP-11, SSP-16, and SSP-19) did not exceed these guidelines.

As referenced within Table 3 of the Eco-SGVs (Landcare, 2019), the ecological guideline values are not intended to be seen as remedial standards or to inform the need for remedial works. They are intended to be used to inform decisions regarding quality of soil imported to site, and to trigger further investigation in the event of significant exceedance. A significant exceedance is defined as a value that is more than 2x the ecological soil guideline value over an area of 25 $m^2$.


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As the maximum soil concentration detected on-site is less than 2x the ecological soil guideline value, ENGEO considers that the exceedance of the ecological criteria does not represent an unacceptable risk to terrestrial ecology, and that remedial works or further assessment is not required.

No deeper soil samples were collected; however, the source of the zinc is associated with surface impacts (storage of old cars and potentially galvanised site buildings). These impacts are expected to attenuate with depth, and ENGEO considers it is highly unlikely that the zinc impacts identified would migrate into groundwater beneath the site.

Management of these soils during works is recommended to prevent migration via sediment into stormwater, or incorrect soil disposal. Toxicity characteristic leaching procedure (TCLP) testing may be necessary to support disposal of surplus soils from this area if it cannot be retained on-site.

### 9.3 Shallow Fill Material

Samples of shallow fill in both the Riley 2025 and ENGEO 2026 investigations did not exceed the soil contaminant standards for the proposed land use, or the ecological criteria for protection of terrestrial receptors.

Management of fill material during works is recommended to mitigate the risk associated with incorrect disposal off-site, or discovery of unexpected contaminants in fill.

### 9.4 Soil Disposal

Based on the frequent detections of metals / metalloids above the clean fill waste acceptance criteria in the ENGEO 2026 and Riley 2025 investigations, surplus material removed from site must be transported to a facility that is licensed to accept the concentration of contaminants present.

Toxicity characteristic leaching procedure (TCLP) testing may be necessary to support disposal of surplus soils containing elevated zinc from the vehicle storage area, if this cannot be retained on-site.

## 10 Conceptual Site Model

The PCSM from Section 6 has been updated based on the findings of the intrusive investigation and is summarised in Table 5.


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**Table 5: Conceptual Site Model**

| Potential Source of Contamination | Primary Contaminants of Concern | Potential Pathway | Potential Receptor | Risk Assessment |
|---|---|---|---|---|
| Storage of Treated Timber at 73 Ratanui Road and Arsenic Hotspot (SSP-19) | Arsenic | Direct exposure resulting in accidental soil ingestion, inhalation of dust, and / or dermal contact. | Redevelopment workers during earthworks.<br>Future site users. *(high density residential use, or maintenance workers)* | Complete Linkage<br>**Remediation of these soils is required to address consent conditions of KCDC consent RM250042**<br>**Following remediation, management of residual soils during works may also be necessary to prevent impact to more sensitive land uses, or incorrect soil disposal.** |
| | | Direct contact with terrestrial ecology. | On-site terrestrial flora and fauna. | Partially Complete Linkage<br>The concentrations detected does not represent a significant exceedance to ecological receptors.<br>No evidence of migration to groundwater.<br>**Management of these soils during works is recommended to mitigate the risk of sediments being mobilised into surface water, or incorrect soil disposal.** |
| | | In sediment transported to waterways via overland flow paths; leaching into groundwater | Stormwater drains – aquatic habitats, and in groundwater. | |
| Brick identified in paddock<br>Undocumented Filling | Metals / metalloids, polycyclic aromatic hydrocarbons (PAHs), and asbestos fines and fibrous asbestos | Direct exposure resulting in soil ingestion, inhalation of dust / fibres (if asbestos is present) and / or dermal contact. | Redevelopment workers during earthworks.<br>Future site users *(high density residential use, or maintenance workers)* | No Unacceptable Risk<br>Heavy metal / metalloid and PAH concentrations were below the relevant human health criteria for high density residential land use and below regional background levels.<br>No asbestos was detected.<br>No specific management measures are considered necessary for this area. |
| | | Direct discharge to soils; remobilisation of sediment to waterways via overland flow paths; leaching into groundwater. | On-site terrestrial flora and fauna.<br>Groundwater, and surface water (as transported sediment). | |
| Historical Vehicle Storage | Metals / metalloids & polycyclic aromatic hydrocarbons (PAHs) | Direct exposure resulting in soil ingestion, inhalation of dust, and / or dermal contact | Redevelopment workers during earthworks.<br>Future site users *(high density residential use, or maintenance workers)* | No Unacceptable Risk<br>Contaminant concentrations were reported below the relevant human health criteria for high density residential land use.<br>No specific management measures are considered necessary |
| | | Direct discharge to soils; remobilisation of sediment to waterways via overland flow paths; leaching into groundwater | On-site terrestrial flora and fauna.<br>Groundwater, and surface water (as transported sediment) | Partially Complete Linkage<br>Zinc concentrations were reported in exceedance of Eco-SGVs at SS08 & SS10. The concentration detected does not represent a significant exceedance to ecological receptors.<br>Surficial impacts are considered unlikely to impact groundwater on site.<br>**Management of these soils during works is recommended to mitigate the risk of sediments being mobilised into surface water, or incorrect soil disposal.** |


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# 11 Consenting Requirements

In the Welington Region, management of potentially contaminated soils is covered by the following regulations:

- Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS, 2011).
- Natural Resources Plan for the Wellington Region (GWRC, 2023).

## 11.1 The NESCS

The NESCS may apply to specific activities on sites where an activity on the HAIL (MfE, 2011a) has, or is more likely than not to have, occurred.

While treated timber products have historically been stored on unsealed ground at 73 Ratanui Road, the observed activity is considered to represent small-scale rural residential storage of fencing and landscaping materials rather than a timber treatment, timber preservation, or commercial timber storage activity. The associated arsenic impact identified by both the Riley (2025) and current investigation is localised, shallow and limited in extent, and does not present an unacceptable risk for the proposed redevelopment. The nature and scale of the activity is not considered sufficient to support the finding that a HAIL activity (specifically HAIL I) is more likely than not to have occurred on the site.

The activities to which the NESCS applies are listed in Table 6, which is based on the template provided in the Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ("the Users' Guide"; MfE, 2012).


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**Table 6: Applicability of NESCS**

| NESCS Checklist | |
|---|---|
| Is an activity described on the HAIL currently being undertaken on the piece of land to which this application applies? | No[2] |
| Has an activity described on the HAIL ever been undertaken on the piece of land to which this application applies? | |
| Is it more likely than not that an activity described on the HAIL is being or has been undertaken on the piece of land to which this application applies? | |
| *If 'Yes' to any of the above, then the NES for Assessing and Managing Contaminants in Soil to Protect Human Health may apply. Check the five activities to which the NES applies:* | |
| Is the activity you propose to undertake removing or replacing a fuel storage system or parts of it? | No |
| Is the activity you propose to undertake sampling soil? | No |
| Is the activity you propose to undertake disturbing soil? | Yes |
| Is the activity you propose to undertake subdividing land? | No |
| Is the activity you propose to undertake changing the use of the land? | No |
| *If also 'Yes' to any of the above activities, then the NES for Assessing and Managing Contaminants in Soil to Protect Human Health is likely to apply.* | |

## 11.2 Natural Resources Plan (GWRC)

Rules R82 and R83 from the GWRC Natural Resources Plan (GWRC, 2023) relate to discharges from contaminated land.

***Rule R82: Discharges from contaminated land – permitted activity***

The discharge of a contaminants from contaminated land where a contaminant may enter water is a permitted activity provided the following conditions are met:

a. a detailed site investigation has been undertaken, reported and provided to Wellington Regional Council in accordance with Rule 81; and

b. the results of the detailed site investigation indicates that the discharge does not pose unacceptable risks to human health or the environment – on-site or off-site; or

[2] Although this DSI has concluded that it is not "more likely than not" that an activity from the HAIL has occurred on site, previous consenting works has associated elevated arsenic from storage of treated timber with HAIL I. For consistency, the client has elected to apply for consent under the NES-CS to conduct the proposed earthworks (soil disturbance / disposal) on site.

c. the discharge from SLUR Category III land or SLUR Category IV land does not, or is not likely to, result in:

   i. water quality exceeding the maximum acceptable value (MAV) in the Drinking-Water Standards New Zealand 2005 (Revised 2008) or 50% of the MAV in a community drinking water supply protection area shown on Maps 39, 40, 41, 42 or 43 at the following locations:

      1. at the property boundary, or within 50 m from the source of the discharge, whichever is the lesser distance; or

      2. in an existing bore within the property boundary or within 50 m from the source of the discharge, whichever is the lesser distance, used to abstract water for any use other than water quality monitoring,

   ii. water quality in a surface water body within the property boundary or within 50 m from the source of the discharge, whichever is the lesser distance, exceeding a value in Schedule V for the protection of 95% of species.

Based on the results of the detailed site investigation, the identified soil contamination does not pose an unacceptable risk to human health or the environment, either on-site or off-site. Subject to the detailed site investigation being provided to Wellington Regional Council in accordance with Rule R81, and sediment control measures being put in place, the discharge of contaminants is considered to meet the relevant conditions of Rule R82 and is therefore a permitted activity.

# 12 Recommendations

Existing KCDC consent RM250042 Conditions 6 to 8 require:

*6. Prior to demolition of any structures on Lot 1, the consent holder shall obtain a survey for asbestos-containing materials (ACM) and lead based paint prepared by a Worksafe-licensed asbestos assessor. The consent holder shall provide a copy of this survey to Council's Development Engineer.*

*7. After demolition of any existing structures on Lot 1, the consent holder shall have soil validation sampling undertaken by a Suitably Qualified and Experienced Professional to confirm that no asbestos or lead concentrations exceeding relevant health guidelines remain. The consent holder shall provide a copy of the results of this sampling to Council's Development Engineer.*

*8. Prior to any soil disturbance on Lot 1, the consent holder shall have the isolated arsenic hotspot adjacent to the existing shed on 73 Ratanui Road delineated, remediated and validated by a Suitably Qualified and Experienced Professional. The consent holder shall provide a copy of the Site Validation Report to Council's Development Engineer.*

In preparing the recommendations, ENGEO has assumed that the above works will be completed.

This DSI has identified that site soils are suitable for the proposed land use, and that remedial works are not required. For consistency with previous application for subdivision consent, the client has proposed to apply for consent under the NES-CS to conduct the proposed earthworks (soil disturbance / disposal) on-site. As the concentration of contaminants in soils on-site does not exceed the relevant soil contaminant standard for the proposed land use, a controlled activity consent under Regulation 9 is proposed.

ENGEO recommends that a Site Management Plan is prepared to support earthworks. The Site Management Plan will outline controls required during earthworks to mitigate potential discharge of sediment into surface water, the soil quality testing requirements to meet contaminated land consent conditions of KCDC consent reference RM250042, and the measures to be implemented to ensure that soil is disposed to a site that is licensed to accept the concentration of contaminants present.

Subject to implementation of consent conditions from RM250042, the recommended Site Management Plan, (including appropriate sediment, soil handling and disposal controls) the proposed development is highly unlikely to present an unacceptable risk to human health or the environment. Any actual or potential contaminated-land effects associated with construction and operation of the proposed retirement village are therefore assessed as being less than minor and can be appropriately managed through the measures identified in this report. On this basis, contaminated land does not present a constraint to granting the resource consents sought under the Fast-Track Approvals Act 2024.

## 12.1 Sustainability Opportunities

Site soils are suitable for retention and reuse on-site. Where possible, ENGEO recommends incorporating a plan into the redesign during redevelopment that aims to retain as much material as possible on-site to reduce the cost and carbon footprint associated with off-site cartage and disposal.


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# 13 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Summerset Villages (Paraparaumu) Limited, their professional advisers, the Expert Consenting Panel, and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ / ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (04) 472 0820 if you require any further information.

Report prepared by



**Josh Green**

Environmental Scientist

Report reviewed by



**Jamie Rhodes, CEnvP (SC)**

Principal Environmental Engineer

## References

BRANZ, 2024. The Building Research Association New Zealand. (2024). New Zealand Guidelines for Assessing and Managing Asbestos in Soil.

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# Figures



**Legend**

Property Boundaries

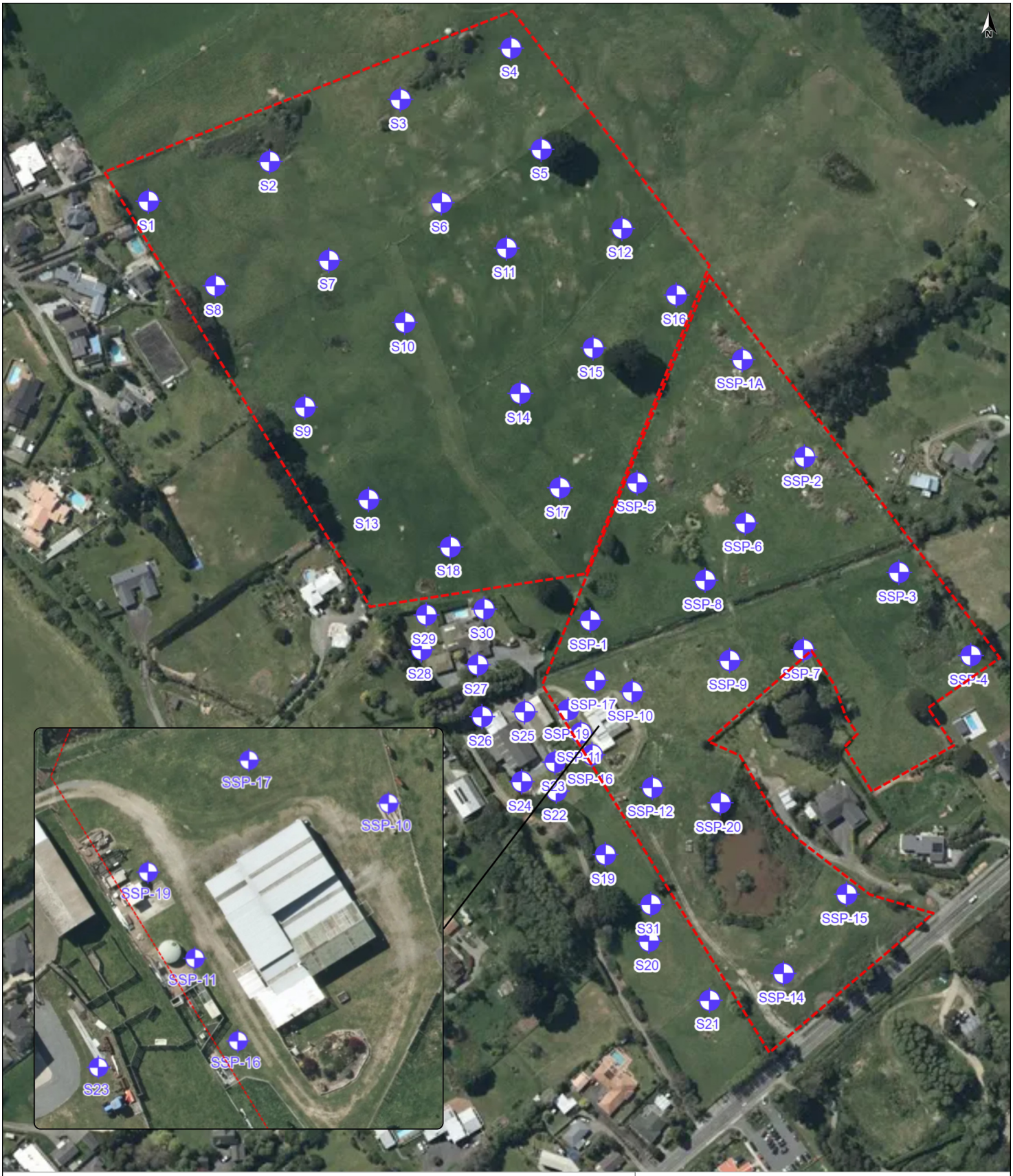
0 50 m 100 m

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ENGEO

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| | | |
|---|---|---|
| Title: Site Plan | | |
| Client: Summerset Management Group Limited | | Size: A4 |
| Project: Summerset Paraparaumu | Drawn: JG | Figure No.: 1 |
| Date: 23-09-2026 | Checked: JR | |
| Proj No: 30093 | Scale: 1:4000 | Version: Final |




**Legend**

- Property Boundaries
- Riley Drill Sample

0 50 m 100 m

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ENGEO

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| | | |
|---|---|---|
| Title: Rileys Sample Location Plan | | |
| Client: Summerset Management Group Limited | | Size: A4 |
| Project: Summerset Paraparaumu | Drawn: JG | Figure No.: 2 |
| Date: 23-09-2026 | Checked: JR | |
| Proj No: 30093 | Scale: 1:3000 | Version: Final |



**Legend**

- Property Boundaries
- Current Brick Fill Area
- Current Treated Timber Storage Areas
- Historic Vehicle Storage

0 10 m 20 m

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| | | |
|---|---|---|
| Title: Potential HAIL Activities | | |
| Client: Summerset Management Group Limited | | Size: A4 |
| Project: Summerset Paraparaumu | Drawn: JG | Figure No.: 3 |
| Date: 25-09-2026 | Checked: JR | |
| Proj No: 30093 | Scale: 1:900 | Version: Final |




**Legend**

ENGEO Sample Locations

0 10 m 20 m

© Nearmap

ENGEO

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| | | |
|---|---|---|
| Title: Sample Location Plan | | |
| Client: Summerset Management Group Limited | | Size: A4 |
| Project: Summerset Paraparaumu | Drawn: JG | Figure No.: 4 |
| Date: 25-09-2026 | Checked: JR | |
| Proj No: 30093 | Scale: 1:700 | Version: Final |

# Appendix 1:

Resource Consent RM250042

12 May 2025

Welhom Developments Limited
C/- Torrey McDonnell
Incite
PO Box 2058
Wellington 6140

Dear Welhom Developments Limited

**RE: Notice of Decision for RM250042 Subdivision consent for a two-lot rural subdivision not creating any additional allotments and NESCS consent to subdivide land that a HAIL activity has been undertaken on at 65 and 73 Ratanui Road, Paraparaumu**

We are pleased to enclose the decision on your Resource Consent application.

As you will see from the decision, there are a number of conditions that need to be complied with.

If you do not agree with the conditions of your consent, you may lodge an objection with the Council in accordance with Section 357 of the Resource Management Act 1991. The objection would be heard by Hearing Commissioners. Please note that, if you do wish to object, you must advise the Resource Consents Manager no later than 15 working days from the date of receiving this consent.

If you have any concerns regarding the conditions, please contact me prior to lodging an objection to discuss, as it may be possible to make minor amendments or corrections outside of the objection process.

If the deposit paid at the time of lodging your resource consent application has not been able to cover the Council's costs of considering your application, then you will receive an invoice in the next few weeks.

Please note that this consent will lapse within five years of the date of issue of this decision unless it is given effect to within that time. You may apply for an extension of the consent before the consent lapses. Please contact the Council to find out more if you wish to do this.

To help us improve the customer experience with Kāpiti Coast District Council, we would appreciate you taking a couple of minutes to complete this survey by clicking on the following link:
https://www.kapiticoast.govt.nz/your-council/surveys/resource-consents-customer-experience-survey/.

Yours sincerely



Megan Barr
Consultant Planner - Contractor

**RESOURCE CONSENT UNDER PART VI OF THE RESOURCE MANAGEMENT ACT 1991**

**CONSENT: RM250042**

| | |
|---|---|
| **Applicant** | Welhom Developments Limited |
| **Location of activity** | 65 and 73 Ratanui Road, Paraparaumu |
| **Description of activity** | To undertake a two-lot rural subdivision not creating any additional allotments and consent under the NESCS to subdivide land that a HAIL activity has been undertaken on |

**Decision:**

Granted subject to conditions on 12 May 2025.

That the undersigned officers, acting under authority delegated from the Council and pursuant to Sections 104 and 104B of the Resource Management Act 1991, hereby **grant** consent to undertake a two-lot rural subdivision not creating any additional allotments and consent under the NESCS to subdivide land that a HAIL activity has been undertaken on at 65 and 73 Ratanui Road, Paraparaumu (Lot 4 DP 58017 and Lot 3 DP 497389), subject to the following conditions which were imposed under Sections 108 and 220 of the Resource Management Act 1991.

**Conditions:**

General

1. The consent holder shall ensure that the proposed activity is undertaken in general accordance with the plans, information and specifications lodged with the application and the information and further information supplied by the consent holder and held on the file RM250042, except where modified by conditions of consent, with reference to the following plans stamped as "Final Approved Plans" on 12 May 2025:

    - Scheme Plan titled '*Proposed 2 Lot Subdivision, Lot 4 DP 58017 & Lot 3 DP 497389, 65-73 Ratanui Road, Paraparaumu*', Drawing Set No. KAP-1247-SCH, Sheets 1 and 2 of 2, prepared by Leith Consulting and dated 19 February 2025.

2. The consent holder shall ensure that the e-survey dataset is in general conformity with the Scheme Plan titled '*Proposed 2 Lot Subdivision, Lot 4 DP 58017 & Lot 3 DP 497389, 65-73 Ratanui Road, Paraparaumu*', Drawing Set No. KAP-1247-SCH, Sheets 1 and 2 of 2, prepared by Leith Consulting and dated 19 February 2025, except where modified by conditions of consent.

Fees, Levies and Contributions

3. Prior to the issue of a Section 224(c) certificate under the Resource Management Act 1991, the consent holder shall pay Council Engineering Fees comprising a per lot deposit of $358.00 (total **$716.00**) for work that may be required for plan approvals, site inspections and consent compliance monitoring, plus any further monitoring charge or changes to recover the actual and reasonable costs that have been incurred to ensure compliance with the conditions attached to this consent.

Engineering

4. At all times, the consent holder shall comply with the requirements of the Kāpiti Coast District Council's Land Development Minimum Requirements 2022 (LDMR: 2022), unless alternatives are proposed by the consent holder and accepted by the Council's Development Engineer.

5. The consent holder shall ensure that any future foundation design and construction for any new building or additions and alterations to a building on Lot 1 takes into account the findings and recommendations contained within the Geotechnical Report prepared by Riley Consultants Limited and dated 25 February 2025, Report Reference: 220306-E.

   ***Note:*** *A Consent Notice under Section 221 of the Resource Management Act will be issued to facilitate the recording of this condition, which is to be complied with on an on-going basis.*

Contaminated Land

6. Prior to the demolition of any existing structures on Lot 1, the consent holder shall obtain a survey for asbestos-containing materials (ACM) and lead paint prepared by a WorkSafe-licensed asbestos assessor. The consent holder shall provide a copy of this survey to Council's Development Engineer.

   ***Note:*** *This assessment is required to determine compliance requirements under WorkSafe's Health and Safety at Work (Asbestos) Regulations 2016 to ensure safe demolition practices and to reduce the likelihood of soil contamination caused by the demolition.*

7. After demolition of any existing structures on Lot 1, the consent holder shall have soil validation sampling undertaken by a Suitably Qualified and Experienced Professional to confirm that no asbestos or lead concentrations exceeding relevant health guidelines remain. The consent holder shall provide a copy of the results of this sampling to Council's Development Engineer.

8. Prior to any soil disturbance on Lot 1, the consent holder shall have the isolated arsenic hotspot adjacent to the existing shed on 73 Ratanui Road delineated, remediated and validated by a Suitably Qualified and Experienced Professional. The consent holder shall provide a copy of the Site Validation Report to Council's Development Engineer.

***Note:*** *A Consent Notice under Section 221 of the Resource Management Act 1991 will be issued for Lot 1 to facilitate the recording of this condition, which is to be complied with on an ongoing basis.*

Stormwater

9. Prior to the construction of any buildings and structures on Lot 1, the consent holder shall submit a final Stormwater Disposal Design Report for Lot 1. The Stormwater Disposal Design shall be in accordance with the principles contained in Part (v) Section E of the Kāpiti Coast District Council's Land Development Minimum Requirements 2022. No work shall commence until Council's Development Engineer, certifies in writing that the proposed stormwater design plans and specifications fulfil the requirements of this condition.

***Note:*** *A Consent Notice under Section 221 of the Resource Management Act 1991 will be issued for Lot 1 to facilitate the recording of this condition, which is to be complied with on an on-going basis.*

Access

10. The consent holder shall provide a vehicle crossing and access for Lot 1 that complies with the relevant standards in Chapter TR of the Kāpiti Coast Operative District Plan and the requirements of the Council's Land Development Minimum Requirements 2022. The vehicle crossing shall be formed, metalled, and sealed between the carriageway edge and the road boundary at the entry to Lot 1.

***Note:*** *In the event that the vehicle crossing is not formed prior to the application for certification pursuant to Section 224(c) of the Resource Management Act 1991, a Consent Notice pursuant to Section 221 of the Resource Management Act 1991 will be issued for Lot 1 to facilitate the recording of this condition, which is to be complied with on an ongoing basis.*

Plans and meeting of conditions

11. The consent holder shall supply a copy of the title sheets of the e-survey dataset and shall list and indicate how each condition has been met to the satisfaction of the Council.

**Advice Notes:**

- Should a residential unit ever be constructed on Lot 1 on the eastern side of the highly modified stream that bisects the site (including at the location indicated in the Geotechnical Assessment for a potential building platform), the owner should be aware that any stream crossing to access the building platform would be subject to additional Greater Wellington Regional Council regulatory requirements.
- If you disagree with any of the above conditions, or disagree with the additional charges relating to the processing of the application, you have a right of objection pursuant to sections 357A or 357B of the Resource Management Act 1991. Any objection must be made in writing to the council within 15 working days of notification of the decision.

- Under Section 125 of the Resource Management Act 1991, this resource consent will lapse in five years, unless it is given effect to within that time.
- It is the consent holder's responsibility to comply with any conditions imposed on this resource consent prior to and during (as applicable) exercising this resource consent.
- All costs arising from any of the above conditions shall be borne by the consent holder.
- The consent holder shall notify the Council's RMA Compliance Officer of the start and completion dates of the works in writing 48 hours before the works are carried out. The consent holder shall fill out and return (by email to the duty compliance officer at compliance.dutyofficer@kapiticoast.govt.nz, or by fax to (04) 2964 830 or by post to Private Bag 60601, Paraparaumu) the form that is attached to the decision letter.
- The consent holder shall pay to the Kāpiti Coast District Council the actual and reasonable costs associated with the monitoring of conditions (or review of consent conditions), or supervision of the resource consent as set in accordance with Section 36 of the Resource Management Act 1991. These costs* may include site visits, correspondence and the actual costs of materials or services which may have to be obtained. *Please refer to Kāpiti Coast District Council's current schedule of Resource Management fees for guidance on the current hourly rate chargeable for Council's staff.
- The consent holder is responsible for obtaining all other necessary consents, permits, and licences, including those under the Building Act 2004, and the Heritage New Zealand Pouhere Taonga Act 2014. This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007 and the Health and Safety in Employment Act 1992), regulations, relevant Bylaws, and rules of law.
- Please note that a resource consent is not a consent to build. This consent does not constitute building consent approval. Please check whether a building consent is required under the Building Act 2004. A building consent must be issued prior to any building work being undertaken.

**Reasons for Decision:**

In accordance with Sections 104 and 104B of the Resource Management Act 1991, Kāpiti Coast District Council has granted consent to this application for the reasons that:

1. The actual and potential effects associated with the proposed activity are less than minor.
2. The proposal is consistent with the relevant objectives and policies of the Kāpiti Coast Operative District Plan.
3. The proposal is consistent with Part 2 of the RMA.

A full copy of the reasons for granting consent is contained in the decision report.



Courtenay Isherwood
Principal Resource Consents Planner

# Appendix 2:

Development Plans




1 MASTERPLAN - UNIT TYPES & MIX PLAN

1 : 1000

## LEGEND

1. INDOOR POOL
2. SCOOTER BUILDING
3. PICKLEBALL COURT
4. OUTDOOR KITCHEN
5. PLAYGROUND
6. CROQUET COURT
7. WINTER GARDEN
8. BOWLING GREEN
9. FORMAL GARDEN
10. PETANQUE
11. POTAGER GARDENS & GREENHOUSE
12. MAINTENANCE SHED
13. SARWF
14. HOBBIES BUILDING
15. BBQ AREA
16. MAIN ENTRY GATE
17. TX1 & GENERATOR ENCLOSURE
18. TX2 TRANSFORMER ENCLOSURE
19. U/G WASTE WATER PUMP STATION TBC
20. STAFF BIKE SHED
21. VIEWING PLATFORM

## LEGEND

- GENERAL SITE AREA
- PARK / OUTDOOR SPACE
- BIO RETENTION POND
- SW POND
- VEGETABLE PLANTER BOX
- PROPOSED PLANTING
- OVERLAND FLOW
- RETAINING WALL
- EV CHARGE STATIONS RELATIVE TO PMB T.B.C
- PG PEDESTRIAN GATE

| SITE AREA INFORMATION | |
|---|---|
| *Total site area* | **127025 m²** |
| **SITE COVERAGE %** | **27.2%** |
| *Total ILU footprint area* | 29049 m² |
| *Total MB footprint area* | 5031 m² |
| *Total ancillary buildings footprint area* | 432 m² |
| **TOTAL BUILDING FOOTPRINT AREA** | **34512 m²** |
| *Impervious area (excluding buildings)* | 27033 m² |
| *Total building footprint area* | 34512 m² |
| **TOTAL IMPERVIOUS AREA** | **61545 m²** |
| **TOTAL IMPERVIOUS AREA (%)** | **48.5%** |

**NOTE :**

**EXISTING NEIGHBOUR DWELLINGS SHOWN FORM LIDAR AND AERIAL RECORD INFORMATION**

**REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DETAIL & PLANTING**

| TYPOLOGIES | COTTAGES | | | VILLAS | | | | | | TOWNHOUSE | | TERRACE | | | TOTAL ILU's |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.5B C1 C3 | 2B C2 C4 | 1B C5 C6 | 2B Mid V1 | 2B End V2 | 2B End V3 | 3B End V4 | 3B End V5 | 3B End V6 | 2B Lwr TH1 | 3B Upr TH2 | 2B NPT16 | 2B U2 | 3B U3 | |
| COUNT | 8 | 10 | 0 | 53 | 53 | 40 | 51 | 4 | 6 | 16 | 16 | 0 | 0 | 0 | **257** |
| ROUNDED % MIX | 3.1% | 3.9% | 0.0% | 20.6% | 20.6% | 15.6% | 19.8% | 1.6% | 2.3% | 6.2% | 6.2% | 0.0% | 0.0% | 0.0% | 100% |
| ILU RATIO % | 7.0% | | | 80.5% | | | | | | 12.5% | | 0.0% | | | |

| MAIN BUILDING | | | |
|---|---|---|---|
| 1B ALS | CARE BEDS CB | MC SUITES MCS | TOTAL MB |
| 40 | 30 | 20 | **90** |
| 44.4% | 33.3% | 22.2% | 100% |

| GRAND TOTAL |
|---|
| **347** |

| RC - AMENITY AREAS | |
|---|---|
| **Type** | **Area** |
| SMG_064_Bowling Green (3 Lane offset) | **528 m²** |
| Croquet Court | **280 m²** |
| Pickleball Court | **167 m²** |
| Petanque Court | **36 m²** |
| MB Scooter Shelter | **27 m²** |
| Scooter Building | **20 m²** |
| EV Charging Station | **0 m²** |
| EV Charging Station | **0 m²** |
| EV Charging Station | **0 m²** |
| Total | 1058 m² |

| RC - ANCILLARY BUILDING AREA SCHEDULE | |
|---|---|
| **Type** | **Area** |
| Hobbies & Maintenance Shed | **184 m²** |
| SMG_Gen T MSDB | **52 m²** |
| Glass House - (3.8x7.7m) | **29 m²** |
| MB Scooter Shelter | **27 m²** |
| Scooter Building | **20 m²** |
| SMG_Backflow Preventer | **19 m²** |
| Glass House - (3.8x5.1m) | **19 m²** |
| Glass House - (3.8x5.1m) | **19 m²** |
| Glass House - (3.8x5.1m) | **19 m²** |
| Staff Bike Shed | **8 m²** |
| SARWF (Otaihanga) | **7 m²** |
| SARWF (Otaihanga) | **7 m²** |
| SARWF (Otaihanga) | **7 m²** |
| SARWF (Otaihanga) | **7 m²** |
| SARWF (Otaihanga) | **7 m²** |
| EV Charging Station | **0 m²** |
| EV Charging Station | **0 m²** |
| EV Charging Station | **0 m²** |
| **Total** | **432 m²** |

| RC - IMPERVIOUS AREA SCHEDULE | |
|---|---|
| Driveways | 5837 m² |
| Patio | 3713 m² |
| Paving | 47 m² |
| Road Calming | 960 m² |
| Roads | 15795 m² |
| Walkways | 603 m² |
| **Total Impervious Area (excl. buildings)** | **26955 m²** |

| RC - ROOF AREA - UNIT TYPE | |
|---|---|
| **Villa Type** | **Roof Area** |
| C1 | **323 m²** |
| C2 | **212 m²** |
| C3 | **341 m²** |
| C4 | **868 m²** |
| N-TH | **706 m²** |
| S-TH | **2022 m²** |
| V1 | **6635 m²** |
| V2 | **6805 m²** |
| V3 | **5415 m²** |
| V4 | **7297 m²** |
| V5 | **969 m²** |
| V6 | **1448 m²** |
| **Total** | **33040 m²** |

NOTE:
LANDSCAPE SHOWN INDICATIVE - REFER TO LANDSCAPE DRAWINGS FOR FURTHER DETAILS.

| Rev | Date | Description |
|---|---|---|
| A | 15.10.26 | RESOURCE CONSENT - FAST TRACK APPLICATION |

Client.

Summerset

Summerset Head Office Ph. 04 894 7320 Fax. 04 894 7319
headoffice@summerset.co.nz www.summerset.co.nz

**Project Name.**
OTAIHANGA
RETIREMENT VILLAGE

**Project Stage.**
RESOURCE CONSENT

**Drawing Title.**
MASTER PLAN - UNIT TYPES & MIX PLAN

0 10 20 30 40 50 60 70 80 90 100

Graphical print scale in millimeters for original sheet size refer title block

DO NOT SCALE DRAWINGS. DATE
Original Sheet Size: A1 **15/10/26**
Project Number. Drawing Number. Rev
**064** **AR.011** **A**

15/10/2026 4:12:13 pm

# Appendix 3:

Site Photographs




Photo 1: 73 Ratanui Road Site Entrance (East Facing) 7/09/26



Photo 2: On-site Drain located at entrance to 73 Ratanui Road 7/09/26



Photo 3: Water tank and storage area at 73 Ratanui Road 7/09/26



Photo 4: Treated Timber Storage at 73 Ratanui Road 7/09/26



Photo 5: Wash Pad Shed at 73 Ratanui Road 7/09/26



Photo 6: Shed and attached dwelling at 73 Ratanui Road 7/09/26



Photo 7: Storage of treated timber (SS05) at 73 Ratanui Road 7/09/26



Photo 8: Attached residential dwelling yard area at 73 Ratanui Road 7/09/26



Photo 9: Timber Pile (SS04) at 73 Ratanui Road 7/09/26



Photo 10: Undulating mounds along southern boundary at 73 Ratanui Road 7/09/26



Photo 11: Central pond at 73 Ratanui Road 7/09/26



Photo 12: Brick at SS09 at 73 Ratanui Road 7/09/26



Photo 13: Eastern pond at 73 Ratanui Road 7/09/26



Photo 14: Tree felling stockpiles in north-eastern portion of 73 Ratanui Road 7/09/26



Photo 15: Eastern paddocks at 65 Ratanui Road (North facing) 7/09/26



Photo 16: Western paddocks at 65 Ratanui Road paddocks (West facing) 7/09/26



Photo 17: Northern Boundary mound at 65 Ratanui Road 7/09/26



Photo 18: Southern Pond at 65 Ratanui Road 7/09/26



Photo 1: Former Dirt Bike Track at 65 Ratanui Road 7/09/26



Fhoto 20: Former Car Storage area at 73 Ratanui Road 7/09/26

# Appendix 4:

Laboratory Results and QC Reports

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

**0508 HILL LAB** (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

# Certificate of Analysis



| | | | | |
|---|---|---|---|---|
| **Client:** | Engeo Limited | **Lab No:** | 4311012 | SPv1 |
| **Contact:** | C Davies | **Date Received:** | 10-Sept-2026 | |
| | C/- Engeo Limited | **Date Reported:** | 15-Sept-2026 | |
| | PO Box 305136 | **Quote No:** | 142181 | |
| | Triton Plaza | **Order No:** | | |
| | Auckland 0757 | **Client Reference:** | 30093.000.001 | |
| | | **Submitted By:** | Josh Green | |

**Sample Type: Soil**

| | | Sample Name: | SS10 @ 0.1m 10-Sept-2026 | SS11 @ 0.1m 10-Sept-2026 | SS11 @ 0.3m 10-Sept-2026 | SS12 @ 0.1m 10-Sept-2026 | SS11.1 @ 0.1m 10-Sept-2026 |
|---|---|---|---|---|---|---|---|
| | | **Lab Number:** | 4311012.1 | 4311012.2 | 4311012.3 | 4311012.4 | 4311012.6 |
| Heavy Metals, Screen Level | | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | | 10 | 23 | 4 | 9 | 14 |
| Total Recoverable Cadmium | mg/kg dry wt | | 0.25 | 0.13 | < 0.10 | 0.13 | 0.12 |
| Total Recoverable Chromium | mg/kg dry wt | | 13 | 23 | 7 | 13 | 16 |
| Total Recoverable Copper | mg/kg dry wt | | 31 | 28 | 5 | 23 | 17 |
| Total Recoverable Lead | mg/kg dry wt | | 37 | 17.1 | 3.9 | 29 | 23 |
| Total Recoverable Nickel | mg/kg dry wt | | 12 | 9 | 6 | 14 | 11 |
| Total Recoverable Zinc | mg/kg dry wt | | 400 | 64 | 24 | 110 | 83 |

| | | Sample Name: | SS13 @ 0.1m 10-Sept-2026 |
|---|---|---|---|
| | | **Lab Number:** | 4311012.8 |
| Heavy Metals, Screen Level | | | |
| Total Recoverable Arsenic | mg/kg dry wt | | 7 |
| Total Recoverable Cadmium | mg/kg dry wt | | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | | 9 |
| Total Recoverable Copper | mg/kg dry wt | | 15 |
| Total Recoverable Lead | mg/kg dry wt | | 19.2 |
| Total Recoverable Nickel | mg/kg dry wt | | 13 |
| Total Recoverable Zinc | mg/kg dry wt | | 60 |

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

**Sample Type: Soil**

| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| Environmental Solids Sample Drying* | Air dried at 35°C<br>Used for sample preparation.<br>May contain a residual moisture content of 2-5%.<br>(Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). | - | 1-4, 6, 8 |
| Heavy Metals, Screen Level | Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition. | 0.10 - 4 mg/kg dry wt | 1-4, 6, 8 |

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 12-Sept-2026 and 15-Sept-2026. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Kim Harrison MSc
Client Services Manager - Environmental

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

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www.hill-labs.co.nz

# Certificate of Analysis



| | | | | |
|---|---|---|---|---|
| **Client:** | Engeo Limited | **Lab No:** | 4308263 | SPv2 |
| **Contact:** | C Davies | **Date Received:** | 07-Sept-2026 | |
| | C/- Engeo Limited | **Date Reported:** | 18-Sept-2026 | **(Amended)** |
| | PO Box 305136 | **Quote No:** | 142181 | |
| | Triton Plaza | **Order No:** | | |
| | Auckland 0757 | **Client Reference:** | 30093.000.001 | |
| | | **Submitted By:** | Josh Green | |

**Sample Type: Soil**

| | Sample Name: | SS01 @ 0.1m 07-Sept-2026 | SS02 @ 0.1m 07-Sept-2026 | SS03 @ 0.1m 07-Sept-2026 | SS03 @ 0.3m 07-Sept-2026 | SS04 @ 0.1m 07-Sept-2026 |
|---|---|---|---|---|---|---|
| | **Lab Number:** | 4308263.1 | 4308263.3 | 4308263.4 | 4308263.5 | 4308263.6 |
| Individual Tests | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | - | - | - | 5 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 14 | 42 | 62 | - | 37 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.19 | 0.24 | 0.15 | - | 0.17 |
| Total Recoverable Chromium | mg/kg dry wt | 16 | 25 | 28 | - | 24 |
| Total Recoverable Copper | mg/kg dry wt | 34 | 31 | 31 | - | 27 |
| Total Recoverable Lead | mg/kg dry wt | 41 | 27 | 24 | - | 13.4 |
| Total Recoverable Nickel | mg/kg dry wt | 25 | 13 | 12 | - | 4 |
| Total Recoverable Zinc | mg/kg dry wt | 100 | 97 | 91 | - | 42 |

| | Sample Name: | SS04 @ 0.4m 07-Sept-2026 | SS05 @ 0.1m 07-Sept-2026 | SS06 @ 0.1m 07-Sept-2026 | SS07 @ 0.1m 07-Sept-2026 | SS08 @ 0.1m 07-Sept-2026 |
|---|---|---|---|---|---|---|
| | **Lab Number:** | 4308263.7 | 4308263.8 | 4308263.10 | 4308263.11 | 4308263.12 |
| Individual Tests | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 5 | - | - | - | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | - | 18 | 5 | 4 | 10 |
| Total Recoverable Cadmium | mg/kg dry wt | - | 0.11 | < 0.10 | < 0.10 | 0.23 |
| Total Recoverable Chromium | mg/kg dry wt | - | 18 | 10 | 9 | 13 |
| Total Recoverable Copper | mg/kg dry wt | - | 18 | 9 | 8 | 21 |
| Total Recoverable Lead | mg/kg dry wt | - | 17.5 | 7.3 | 7.7 | 31 |
| Total Recoverable Nickel | mg/kg dry wt | - | 7 | 6 | 6 | 9 |
| Total Recoverable Zinc | mg/kg dry wt | - | 63 | 45 | 37 | 380 |

| | Sample Name: | SS09 @ 0.1m 07-Sept-2026 | SS02.1 @ 0.1m 07-Sept-2026 | SS03.1 @ 0.1m 07-Sept-2026 | SS02 @ 0.3m 07-Sept-2026 |
|---|---|---|---|---|---|
| | **Lab Number:** | 4308263.13 | 4308263.15 | 4308263.16 | 4308263.17 |
| Individual Tests | | | | | |
| Dry Matter | g/100g as rcvd | 54 | - | - | - |
| Total Recoverable Arsenic | mg/kg dry wt | - | 39 | 19 | 4 |
| Heavy Metals, Screen Level | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 6 | - | - | - |
| Total Recoverable Cadmium | mg/kg dry wt | 0.24 | - | - | - |
| Total Recoverable Chromium | mg/kg dry wt | 8 | - | - | - |
| Total Recoverable Copper | mg/kg dry wt | 13 | - | - | - |
| Total Recoverable Lead | mg/kg dry wt | 23 | - | - | - |
| Total Recoverable Nickel | mg/kg dry wt | 4 | - | - | - |
| Total Recoverable Zinc | mg/kg dry wt | 53 | - | - | - |

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

| Sample Type: Soil | | | | | |
|---|---|---|---|---|---|
| **Sample Name:** | | SS09 @ 0.1m 07-Sept-2026 | SS02.1 @ 0.1m 07-Sept-2026 | SS03.1 @ 0.1m 07-Sept-2026 | SS02 @ 0.3m 07-Sept-2026 |
| **Lab Number:** | | 4308263.13 | 4308263.15 | 4308263.16 | 4308263.17 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | < 0.5 | - | - | - |
| 1-Methylnaphthalene | mg/kg dry wt | < 0.019 | - | - | - |
| 2-Methylnaphthalene | mg/kg dry wt | < 0.019 | - | - | - |
| Acenaphthylene | mg/kg dry wt | < 0.019 | - | - | - |
| Acenaphthene | mg/kg dry wt | < 0.019 | - | - | - |
| Anthracene | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[a]anthracene | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | < 0.044 | - | - | - |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | < 0.044 | - | - | - |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[e]pyrene | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[g,h,i]perylene | mg/kg dry wt | < 0.019 | - | - | - |
| Benzo[k]fluoranthene | mg/kg dry wt | < 0.019 | - | - | - |
| Chrysene | mg/kg dry wt | < 0.019 | - | - | - |
| Dibenzo[a,h]anthracene | mg/kg dry wt | < 0.019 | - | - | - |
| Fluoranthene | mg/kg dry wt | < 0.019 | - | - | - |
| Fluorene | mg/kg dry wt | < 0.019 | - | - | - |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | < 0.019 | - | - | - |
| Naphthalene | mg/kg dry wt | < 0.10 | - | - | - |
| Perylene | mg/kg dry wt | < 0.019 | - | - | - |
| Phenanthrene | mg/kg dry wt | < 0.019 | - | - | - |
| Pyrene | mg/kg dry wt | < 0.019 | - | - | - |

## Analyst's Comments

**Amended Report:** This certificate of analysis replaces report '4308263-SPv1' issued on 15-Sept-2026 at 4:02 pm.
Reason for amendment: Additional testing added as per client request.

Appendix No.1 - Chain of Custody

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

| Sample Type: Soil | | | |
|---|---|---|---|
| **Test** | **Method Description** | **Default Detection Limit** | **Sample No** |
| Environmental Solids Sample Drying* | Air dried at 35°C<br>Used for sample preparation.<br>May contain a residual moisture content of 2-5%.<br>(Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). | - | 1, 3-8, 10-13, 15-17 |
| Environmental Solids Sample Preparation | Air dried at 35°C and sieved, <2mm fraction.<br>Used for sample preparation<br>May contain a residual moisture content of 2-5%.<br>(Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). | - | 5, 7, 15-17 |
| Total of Reported PAHs in Soil | Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270. | 0.03 mg/kg dry wt | 13 |
| Heavy Metals, Screen Level | Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition. | 0.10 - 4 mg/kg dry wt | 1, 3-4, 6, 8, 10-13 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270. | 0.010 - 0.05 mg/kg dry wt | 13 |

| Sample Type: Soil | | | |
|---|---|---|---|
| **Test** | **Method Description** | **Default Detection Limit** | **Sample No** |
| Dry Matter | Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550. | 0.10 g/100g as rcvd | 13 |
| Total Recoverable digestion | Nitric / hydrochloric acid digestion. US EPA 200.2 (modified), APHA 3125 B: Online Edition. | - | 5, 7, 15-17 |
| Total Recoverable Arsenic | Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2 (modified), APHA 3125 B: Online Edition. | 2 mg/kg dry wt | 5, 7, 15-17 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment. | 0.024 mg/kg dry wt | 13 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997). | 0.024 mg/kg dry wt | 13 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 11-Sept-2026 and 18-Sept-2026. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Ara Heron BSc (Tech)
Client Services Manager - Environmental

# HillLabs

# ANALYSIS REQUEST

R J Hill Laboratories Limited
Level 3, 204 Thorndon Quay
Pipitea
Wellington 6011, New Zealand

0508 HILL LAB (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

Job No: **430 8263**

Date Recv: 07-Sep-26 16:12

Received by: Kelsey Rohloff

3143082632

Quote No 142181

Primary Contact Claire Davis

Submitted By Josh Green

Client Name ENGEO LTD

Address Plimmer Towers Level 25/2-6 Gilmer Terrace Wellington Postcode 6011

Phone [redacted] Mobile

Email C.Davies@engeo.co.nz

Charge To

Client Reference 30095.000.001

Order No

Results To Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.

☑ Email Primary Contact ☑ Email Submitter ☐ Email Client

☐ Email Other J.green@engeo.co.nz

☐ Other

## CHAIN OF CUSTODY RECORD

**Sent to Hill Laboratories**

Date & Time: 7/09/2026.

Name: Josh Green

☐ Tick if you require COC to be emailed back

Signature:

*Samples will be processed at a Hill Labs site with the appropriate testing capability and capacity. Please inform the lab if you wish samples to be retained and analysed at the site of receipt.*

**Received at Hill Laboratories**

Date & Time:

Name:

Signature:

## ADDITIONAL INFORMATION

Hold cold all.

**Priority** ☐ Low ☑ Normal ☐ High

☐ **Urgent** (ASAP, extra charge applies, please contact lab first)

*Requested Reporting Date:*

*Please ensure all asbestos samples are **individually double bagged** upon submission to the laboratory.*

| No. | Sample Name | Sample Type | Sample Location | Sample Date | Tests Required (if not as per Quote) |
|---|---|---|---|---|---|
| 1 | SS01 @ 0.1m | Soil | | 7/09/26 | |
| 2 | SS01 @ 0.3m | | | | |
| 3 | SS02 @ 0.1m | | | | |
| 4 | SS02 @ | | | | |
| 5 | SS03 @ 0.1m | | | | |
| 6 | SS03 @ 0.3m | | | | |
| 7 | SS04 @ 0.1m | | | | |
| 8 | SS04 @ 0.4m | | | | |
| 9 | SS05 @ 0.1m | | | | |
| 10 | SS05 @ 0.3m | | | | |
| 11 | SS06 @ 0.1m | | | | |
| 12 | SS07 @ 0.1m | | | | |
| 13 | SS08 @ 0.1 | | | | |

| No. | Sample Name | Sample Type | Sample Location | Sample Date | Tests Required (if not as per Quote) |
|---|---|---|---|---|---|
| 14 | SS09 @ 0.1m | Soil | | 7/09/26 | |
| 15 | SS01.1 @ 0.1m | " | | " | |
| 16 | SS02.1 @ 0.1 | " | | " | |
| 17 | SS03.1 @ 0.1 | " | | " | |
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R J Hill Laboratories Limited
1/17 Print Place
Middleton
Christchurch 8024 New Zealand

**0508 HILL LAB** (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

# Certificate of Analysis



| | | | | |
|---|---|---|---|---|
| **Client:** | Engeo Limited | **Lab No:** | 4308262 | A2Pv1 |
| **Contact:** | C Davies | **Date Received:** | 07-Sept-2026 | |
| | C/- Engeo Limited | **Date Reported:** | 15-Sept-2026 | |
| | PO Box 305136 | **Quote No:** | 142181 | |
| | Triton Plaza | **Order No:** | | |
| | Auckland 0757 | **Client Reference:** | 30093.000.001 | |
| | | **Submitted By:** | Josh Green | |

**Sample Type: Soil**

| | | |
|---|---|---|
| **Sample Name:** | | SS09 @ 0.1m 07-Sept-2026 |
| **Lab Number:** | | 4308262.1 |
| Asbestos Presence / Absence | | Asbestos NOT detected. |
| Description of Asbestos Form | | - |
| Asbestos in ACM as % of Total Sample* | % w/w | < 0.001 |
| Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* | % w/w | < 0.001 |
| Asbestos as Fibrous Asbestos as % of Total Sample* | % w/w | < 0.001 |
| Asbestos as Asbestos Fines as % of Total Sample* | % w/w | < 0.001 |
| As Received Weight | g | 717.5 |
| Dry Weight | g | 428.9 |
| Moisture* | % | 40 |
| | | |
| Sample Fraction >10mm | g dry wt | 4.6 |
| Sample Fraction <10mm to >2mm | g dry wt | 30.3 |
| Sample Fraction <2mm | g dry wt | 391.9 |
| <2mm Subsample Weight | g dry wt | 54.2 |
| Weight of Asbestos in ACM (Non-Friable) | g dry wt | < 0.00001 |
| Weight of Asbestos as Fibrous Asbestos (Friable) | g dry wt | < 0.00001 |
| Weight of Asbestos as Asbestos Fines (Friable)* | g dry wt | < 0.00001 |

**Glossary of Terms**

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

**Please refer to the BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.**
**https://www.branz.co.nz/asbestos**

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

## Analyst's Comments

Appendix No.1 - Chain of Custody

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

**Sample Type: Soil**

| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| New Zealand Guidelines Semi Quantitative Asbestos in Soil | | | |
| As Received Weight | Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g | 1 |
| Dry Weight | Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g | 1 |
| Moisture* | Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100. | 1 % | 1 |
| Sample Fraction >10mm | Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g dry wt | 1 |
| Sample Fraction <10mm to >2mm | Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g dry wt | 1 |
| Sample Fraction <2mm | Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g dry wt | 1 |
| Asbestos Presence / Absence | Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples. | 0.01% | 1 |
| Description of Asbestos Form | Description of asbestos form and/or shape if present. | - | 1 |
| Weight of Asbestos in ACM (Non-Friable) | Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos in ACM as % of Total Sample* | Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Weight of Asbestos as Fibrous Asbestos (Friable) | Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos as Fibrous Asbestos as % of Total Sample* | Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Weight of Asbestos as Asbestos Fines (Friable)* | Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos as Asbestos Fines as % of Total Sample* | Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* | Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed on 15-Sept-2026. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Dexter Paguirigan Dip Chem Engineering Tech
Laboratory Technician - Asbestos

# Hill Labs

# ANALYSIS REQUEST

R J Hill Laboratories Limited
Level 3, 204 Thorndon Quay
Pipitea
Wellington 6011, New Zealand

0508 HILL LAB (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

Job No: **430 8262**

Date Recv: 07-Sep-26 16:12

Received by: Kelsey Rohloff

3143082620

**Quote No** 142181

**Primary Contact** Claire Davis

**Submitted By** Josh Green

**Client Name** ENGEO LTD

*Address* Plimmer Towers, Level 25/2-6 Gilmer Terrace Wellington *Postcode* 6011

*Phone* [redacted] *Mobile*

*Email* C.Davies@engeo.co.nz

**Charge To**

*Client Reference* 30095.000.001

*Order No*

**Results To** *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

☑ Email Primary Contact ☑ Email Submitter ☐ Email Client

☐ Email Other J.green@engeo.co.nz

☐ Other

## CHAIN OF CUSTODY RECORD

**Sent to Hill Laboratories**

*Date & Time:* 7/09/2026.

*Name:* Josh Green

☐ *Tick if you require COC to be emailed back*

*Signature:*

*Samples will be processed at a Hill Labs site with the appropriate testing capability and capacity. Please inform the lab if you wish samples to be retained and analysed at the site of receipt.*

**Received at Hill Laboratories**

*Date & Time:*

*Name:*

*Signature:*

## ADDITIONAL INFORMATION

Hold cold on.

**Priority** ☐ Low ☑ Normal ☐ High

☐ **Urgent** (ASAP. extra charge applies. please contact lab first)

*Requested Reporting Date:*

*Please ensure all asbestos samples are **individually double bagged** upon submission to the laboratory.*

| No. | Sample Name | Sample Type | Sample Location | Sample Date | Tests Required (if not as per Quote) |
|---|---|---|---|---|---|
| 1 | SS01 @ 0.1m | So.1 | | 7/09/26 | |
| 2 | SS01 @ 0.3m | | | | |
| 3 | SS02 @ 0.1m | | | | |
| 4 | SS02 @ | | | | |
| 5 | SS03 @ 0.1m | | | | |
| 6 | SS03 @ 0.3m | | | | |
| 7 | SS04 @ 0.1m | | | | |
| 8 | SS04 @ 0.4m | | | | |
| 9 | SS05 @ 0.1m | | | | |
| 10 | SS05 @ 0.3m | | | | |
| 11 | SS06 @ 0.1m | | | | |
| 12 | SS07 @ 0.1m | | | | |
| 13 | SS08 @ 0.1 | | | | |

| No. | Sample Name | Sample Type | Sample Location | Sample Date | Tests Required (if not as per Quote) |
|---|---|---|---|---|---|
| 14 | SS09 @ 0.1m | Soil | | 7/09/25 | |
| 15 | SS01.1 @ 0.1m | | | | |
| 16 | SS02.1 @ 0.1 | | | | |
| 17 | SS03.1 @ 0.1 | | | | |
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R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

**0508 HILL LAB** (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

# Quality Assurance Report



| | | | | |
|---|---|---|---|---|
| **Client:** | Engeo Limited | **Lab No:** | 4311012 | QCPv1 |
| **Contact:** | C Davies | **Date Received:** | 10-Sept-2026 | |
| | C/- Engeo Limited | **Date Reported:** | 15-Sept-2026 | |
| | PO Box 305136 | **Quote No:** | 142181 | |
| | Triton Plaza | **Order No:** | | |
| | Auckland 0757 | **Client Reference:** | 30093.000.001 | |
| | | **Submitted By:** | Josh Green | |

## Blank QCs

### Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.13

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

### Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.31

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

### 50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.72

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

### Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.13

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |

| Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.13 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.31 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

## Reference Material QCs

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.4 ± 2.2 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.86 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.5 ± 3.7 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.5 ± 2.5 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 34.2 ± 6.4 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.4 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 206 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.51 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.9 ± 2.3 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.87 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 25.6 ± 3.6 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 14.4 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 35.8 ± 6.7 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.5 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 208 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14635.73 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.8 ± 2.3 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.87 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 27.2 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 14.0 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 37.0 ± 7.0 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.9 ± 2.4 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 210 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 12.3 ± 2.3 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.90 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.9 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 14.2 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 36.6 ± 6.9 | 26 – 40 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Nickel | mg/kg dry wt | 14.5 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 207 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14637.51 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.0 ± 2.1 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.84 ± 0.16 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 25.0 ± 3.6 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.2 ± 2.5 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 34.6 ± 6.5 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 13.4 ± 2.2 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 193 ± 29 | 162 – 230 | No |

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# Quality Assurance Report



| | | | | |
|---|---|---|---|---|
| **Client:** | Engeo Limited | **Lab No:** | 4308263 | QCPv2 |
| **Contact:** | C Davies | **Date Received:** | 07-Sept-2026 | |
| | C/- Engeo Limited | **Date Reported:** | 18-Sept-2026 | **(Amended)** |
| | PO Box 305136 | **Quote No:** | 142181 | |
| | Triton Plaza | **Order No:** | | |
| | Auckland 0757 | **Client Reference:** | 30093.000.001 | |
| | | **Submitted By:** | Josh Green | |

## Sample Specific QCs

### Polycyclic Aromatic Hydrocarbons Screening in Soil

| | | 4308263.13 | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| 1-methylnaphthalene-d10 | % | 83 | 65 – 130 | No |
| Benzo[a]pyrene-d12 | % | 82 | 70 – 140 | No |
| Fluoranthene-d10 | % | 79 | 66 – 130 | No |

## Blank QCs

### Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14636.13

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

### Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14636.57

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

### Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14638.13

| | | Results | Control Limits | Outside Limit (Yes/No) |
|---|---|---|---|---|
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14638.31 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

| Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 18722.1 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| 1-Methylnaphthalene | mg/kg dry wt | < 0.010 ± 0.031 | 0.0 – 0.0100 | No |
| 2-Methylnaphthalene | mg/kg dry wt | < 0.010 ± 0.032 | 0.0 – 0.0100 | No |
| Acenaphthylene | mg/kg dry wt | < 0.010 ± 0.0066 | 0.0 – 0.0100 | No |
| Acenaphthene | mg/kg dry wt | < 0.010 ± 0.0061 | 0.0 – 0.0100 | No |
| Anthracene | mg/kg dry wt | < 0.010 ± 0.0060 | 0.0 – 0.0100 | No |
| Benzo[a]anthracene | mg/kg dry wt | < 0.010 ± 0.0062 | 0.0 – 0.0100 | No |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | < 0.010 ± 0.0065 | 0.0 – 0.0100 | No |
| Benzo[e]pyrene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Benzo[g,h,i]perylene | mg/kg dry wt | < 0.010 ± 0.0065 | 0.0 – 0.0100 | No |
| Benzo[k]fluoranthene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Chrysene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Dibenzo[a,h]anthracene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Fluoranthene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Fluorene | mg/kg dry wt | < 0.010 ± 0.0066 | 0.0 – 0.0100 | No |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Naphthalene | mg/kg dry wt | < 0.05 ± 0.031 | 0.0 – 0.050 | No |
| Phenanthrene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |
| Perylene | mg/kg dry wt | < 0.010 ± 0.0066 | 0.0 – 0.0100 | No |
| Pyrene | mg/kg dry wt | < 0.010 ± 0.0067 | 0.0 – 0.0100 | No |

| Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.13 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.31 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 ± 0.065 | -0.100 – 0.100 | No |
| Total Recoverable Chromium | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Copper | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.31 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Lead | mg/kg dry wt | < 0.4 ± 0.26 | -0.40 – 0.40 | No |
| Total Recoverable Nickel | mg/kg dry wt | < 2 ± 1.4 | -2.0 – 2.0 | No |
| Total Recoverable Zinc | mg/kg dry wt | < 4 ± 2.7 | -4.0 – 4.0 | No |

| Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.13 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.32 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

| 50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.78 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

| Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14662.13 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

| Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14662.22 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | < 2 ± 1.3 | -2.0 – 2.0 | No |

## QC Spike QCs

| LCS PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 18722.2 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| 1-Methylnaphthalene | % | 100 ± 25 | 78 – 122 | No |
| 2-Methylnaphthalene | % | 96 ± 24 | 72 – 117 | No |
| Acenaphthylene | % | 99.0 ± 9.0 | 75 – 118 | No |
| Acenaphthene | % | 102 ± 29 | 84 – 119 | No |
| Anthracene | % | 99 ± 30 | 79 – 121 | No |
| Benzo[a]anthracene | % | 98 ± 26 | 81 – 123 | No |
| Benzo[a]pyrene (BAP) | % | 96.0 ± 7.3 | 76 – 123 | No |
| Benzo[b]fluoranthene + Benzo[j]fluoranthene | % | 90 ± 19 | 80 – 121 | No |
| Benzo[e]pyrene | % | 79.0 ± 6.1 | 70 – 100 | No |
| Benzo[g,h,i]perylene | % | 91 ± 16 | 80 – 124 | No |
| Benzo[k]fluoranthene | % | 95 ± 12 | 79 – 121 | No |
| Chrysene | % | 85 ± 13 | 83 – 121 | No |
| Dibenzo[a,h]anthracene | % | 92 ± 12 | 78 – 124 | No |
| Fluoranthene | % | 97.0 ± 9.8 | 81 – 122 | No |
| Fluorene | % | 96 ± 12 | 86 – 122 | No |
| Indeno(1,2,3-c,d)pyrene | % | 80.0 ± 7.4 | 83 – 123 | **Yes** [#1] |
| Naphthalene | % | 94 ± 23 | 84 – 118 | No |
| Phenanthrene | % | 100 ± 15 | 84 – 120 | No |
| Perylene | % | 100.0 ± 7.7 | 80 – 120 | No |
| Pyrene | % | 95 ± 13 | 79 – 123 | No |

## Reference Material QCs

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14636.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.4 ± 2.2 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14636.14 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Cadmium | mg/kg dry wt | 0.81 ± 0.16 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.8 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.2 ± 2.5 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 35.2 ± 6.6 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.5 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 201 ± 30 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14636.33 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | 11.6 ± 2.2 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.86 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 27.0 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.4 ± 2.5 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 34.4 ± 6.5 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.5 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 201 ± 30 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14638.14 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | 11.5 ± 2.2 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.84 ± 0.16 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.8 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.9 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 34.6 ± 6.5 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.3 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 204 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14638.51 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | 12.2 ± 2.3 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.85 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.9 ± 3.8 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 13.7 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 35.1 ± 6.6 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.7 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 208 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.14 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | 11.4 ± 2.2 | 8.9 – 13.5 | No |
| Total Recoverable Cadmium | mg/kg dry wt | 0.89 ± 0.17 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 26.4 ± 3.7 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 14.0 ± 2.6 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 35.3 ± 6.6 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 14.7 ± 2.3 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 206 ± 31 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.51 | | | | |
|---|---|---|---|---|
| | | Results | Control Limits | Outside Limit (Yes/No) |
| Total Recoverable Arsenic | mg/kg dry wt | 13.0 ± 2.4 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14640.51 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Cadmium | mg/kg dry wt | 0.93 ± 0.18 | 0.67 – 0.99 | No |
| Total Recoverable Chromium | mg/kg dry wt | 27.8 ± 3.9 | 21 – 30 | No |
| Total Recoverable Copper | mg/kg dry wt | 15.0 ± 2.7 | 10.5 – 16.2 | No |
| Total Recoverable Lead | mg/kg dry wt | 37.2 ± 7.0 | 26 – 40 | No |
| Total Recoverable Nickel | mg/kg dry wt | 15.5 ± 2.4 | 11.6 – 16.7 | No |
| Total Recoverable Zinc | mg/kg dry wt | 217 ± 32 | 162 – 230 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.5 ± 2.2 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.41 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 11.9 ± 2.3 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14658.79 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 10.3 ± 2.1 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14662.14 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 12.4 ± 2.3 | 8.9 – 13.5 | No |

| SETOC-704 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 14662.31 | | | | |
|---|---|---|---|---|
| | | **Results** | **Control Limits** | **Outside Limit (Yes/No)** |
| Total Recoverable Arsenic | mg/kg dry wt | 12.0 ± 2.3 | 8.9 – 13.5 | No |

## Analyst's Comments

**Amended Report:** This quality assurance report replaces report '4308263-QCPv1' issued on 15-Sept-2026 at 4:02 pm.
Reason for amendment: Additional testing added as per client request.

[#1] The Laboratory Control Sample (LCS) spike recovery for this analyte was below the acceptable recovery range of the method. The corresponding sample result was accepted as the recovery is deemed to be fit for purpose when compared against generic 80-120% limits.

# Appendix 5:

Results Summary Table

## Results Table 1: Soil Results

| | | | | Heavy Metals / Metalloids | | | | | | | Polycyclic Aromatic Hydrocarbons | Asbestos | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Arsenic | Cadmium | Chromium | Copper | Lead | Nickel | Zinc | Total PAHs | Asbestos as ACM | Asbestos as AF/FA |
| Human Health Criteria - Commercial / Industrial [1] | | | | 70 | 1300 | 6300 [6] | 10000 [7] | 3300 [8] | 6000 [9] | 400000 [9] | Various | 0.05 [10] | 0.001 [10] |
| Human Health Criteria - High-Density Residential [2] | | | | 45 | 230 | 1500 [6] | 10000 [7] | 500 [8] | 1200 [11] | 60000 [11] | Various | 0.04 [12] | 0.001 [12] |
| Human Health Criteria - Recreational [3] | | | | 80 | 400 | 2700 [6] | 10000 [7] | 880 [8] | 1200 [13] | 30000 [13] | Various | 0.02 [14] | 0.001 [14] |
| Ecological Soil Guideline Value (Residential / Recreational Land use) [4] | | | | **60** | **12** | **390** | **240** | **900** | - | **300** | **Various** | - | - |
| Background Concentrations (Main Soil Type 1 - Sand) [5] | | | | <2 - 7 | <0.1 - 0.1 | 7 - 12 | 4 - 10 | 4.5 - 180.0 | 4 - 9 | 28 - 79 | Various | - | - |
| **Sample Location** | **Depth (m bgl)** | **Date Sampled** | **Soil Description** | | | | | | | | | | |
| SS01 | 0.1 | 7-Sept-26 | [Topsoil] | 14 | 0.19 | 16 | 34 | 41 | 25 | 100 | - | - | - |
| SS02 | 0.1 | | [Topsoil] | 42 | 0.24 | 25 | 31 | 27 | 13 | 97 | - | - | - |
| | 0.3 | | [Native] silty sand | 4 | - | - | - | - | - | - | - | - | - |
| SS02.1 | 0.1 | | [Topsoil] | 39 | - | - | - | - | - | - | - | - | - |
| SS03 | 0.1 | | [Topsoil] | **62** | 0.15 | 28 | 31 | 24 | 12 | 91 | - | - | - |
| | 0.3 | | [Native] silty sand | 5 | - | - | - | - | - | - | - | - | - |
| SS03.1 | 0.1 | | [Topsoil] | 19 | - | - | - | - | - | - | - | - | - |
| SS04 | 0.1 | | [Topsoil] | 37 | 0.17 | 24 | 27 | 13.4 | 4 | 42 | - | - | - |
| SS04 | 0.4 | | [Native] silty sand | 5 | - | - | - | - | - | - | - | - | - |
| SS05 | 0.1 | | [Topsoil] | 18 | 0.11 | 18 | 18 | 17.5 | 7 | 63 | - | - | - |
| SS06 | 0.1 | | [Topsoil] | 5 | <0.1 | 10 | 9 | 7.3 | 6 | 45 | - | - | - |
| SS07 | 0.1 | | [Topsoil] | 4 | <0.1 | 9 | 8 | 7.7 | 6 | 37 | - | - | - |
| SS08 | 0.1 | | [Topsoil] | 10 | 0.23 | 13 | 21 | 31 | 9 | **380** | - | - | - |
| SS09 | 0.1 | | [Topsoil] | 6 | 0.24 | 8 | 13 | 23 | 4 | 53 | <LOR | NAD | NAD |
| SS10 | 0.1 | 10-Sept-26 | [Topsoil] | 10 | 0.25 | 13 | 31 | 37 | 12 | **400** | - | - | - |
| SS11 | 0.1 | | [Topsoil] | 23 | 0.13 | 23 | 28 | 17.1 | 9 | 64 | - | - | - |
| | 0.3 | | [Native] silty sand | 4 | <0.1 | 7 | 5 | 3.9 | 6 | 24 | - | - | - |
| SS11.1 | 0.1 | | [Topsoil] | 14 | 0.12 | 16 | 17 | 23 | 11 | 83 | - | - | - |
| SS12 | 0.1 | | [Topsoil] | 9 | 0.13 | 13 | 23 | 29 | 14 | 110 | - | - | - |
| SS13 | 0.1 | | [Topsoil] | 7 | <0.1 | 9 | 15 | 19.2 | 13 | 60 | - | - | - |

Table Notes:
All results and criteria are presented in milligram per kilogram (mg/kg) on a dry weight basis, except asbestos which is reported as % weight of asbestos / weight of sample (%w/w)
Soil descriptions indicative only - refer to report for full descriptions
Selected results shown; Full results are included in the laboratory reports
LOR: Limit of Reporting; Results below LOR or exceeding no criteria are shown in grey text
- : not analysed or no applicable criteria, NAD: No Asbesots Detected, AF/FA: Asbestos Fines/Fiberous Asbestos, ACM: Asbestos Containing Material
m bgl: metres below ground level

Criteria notes:
1: Human Health Criteria for Commercial / Industrial Land use selected in general accordance with CLMG No. 2 (MfE, 2011). Unless otherwise stated, criteria are from MfE (2011) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Commercial / Industrial Land Use)
2: Human Health Criteria for High-Density Residential Land use selected in general accordance with CLMG No. 2 (MfE, 2011). Unless otherwise stated, criteria are from MfE (2011) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (High-Density Residential Land Use)
3: Human Health Criteria for Recreational Land use selected in general accordance with CLMG No. 2 (MfE, 2011). Unless otherwise stated, criteria are from MfE (2011) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Recreational Land Use)
4: Updated Development of Soil Guideline Values for the Protection of Ecological Receptors (Eco-SGVs): Technical Document (Landcare Research, June 2019). Eco-SGVs for typical soil, aged contamination source, and a residential/recreational land use
5: Determination of Common Pollutant Background Soil Concentrations for the Wellington Region (URS, 2003). Background Concentrations from Table 3-3 for Main Soil Type 1 (Sand)
6: Criterion applies to Cr(VI). Conservatively applied to total Cr laboratory result
7: No limit; 10,000 mg/kg conservatively applied. Derived human health value exceeds values likely to be encountered on-site and phytotoxicity threshold
8: Applies to inorganic lead only
9: Australian National Environment Protection (Assessment of Site Contamination) Measure 2013; Health Investigation Levels for 'Commercial / Industrial D' Land Use
10: New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2024). Soil Guidelines Values for Commercial and Industrial land use
11: Australian National Environment Protection (Assessment of Site Contamination) Measure 2013; Health Investigation Levels for 'Residential B' Land Use
12: New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2024). Soil Guidelines Values for High-Density Residential land use
13: Australian National Environment Protection (Assessment of Site Contamination) Measure 2013; Health Investigation Levels for 'Recreational C' Land Use
14: New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2024). Soil Guidelines Values for Recreational land use

# Appendix 6:

Disposal Characterisation

## Results Table 2: Soil Results (Disposal Criteria)

| | | | | Heavy Metals / Metalloids | | | | | | | Polycyclic Aromatic Hydrocarbons | Asbestos | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Arsenic | Cadmium | Chromium | Copper | Lead | Nickel | Zinc | Total PAHs | Asbestos as ACM | Asbestos as AF/FA |
| Class A Landfill Screening Criteria [1] | | | | 100 | 20 | 100 | 100 | 100 | 200 | 200 | Various | - | - |
| Class 5 Waste Acceptance Criteria [2] | | | | **<2 - 7** | **<0.1 - 0.1** | **7 - 12** | **4 - 10** | **4.5 - 180.0** | **4 - 9** | **28 - 79** | **Various** | - | - |
| **Sample Location** | **Depth (m bgl)** | **Date Sampled** | **Soil Description** | | | | | | | | | | |
| SS01 | 0.1 | 7-Sept-26 | [Topsoil] | **14** | **0.19** | **16** | **34** | 41 | **25** | **100** | - | - | - |
| SS02 | 0.1 | | [Topsoil] | **42** | **0.24** | **25** | **31** | 27 | **13** | **97** | - | - | - |
| | 0.3 | | [Native] silty sand | 4 | - | - | - | - | - | - | - | - | - |
| SS02.1 | 0.1 | | [Topsoil] | **39** | - | - | - | - | - | - | - | - | - |
| SS03 | 0.1 | | [Topsoil] | **62** | **0.15** | **28** | **31** | 24 | **12** | **91** | - | - | - |
| | 0.3 | | [Native] silty sand | 5 | - | - | - | - | - | - | - | - | - |
| SS03.1 | 0.1 | | [Topsoil] | **19** | - | - | - | - | - | - | - | - | - |
| SS04 | 0.1 | | [Topsoil] | **37** | **0.17** | **24** | **27** | 13.4 | 4 | 42 | - | - | - |
| SS04 | 0.4 | | [Native] silty sand | 5 | - | - | - | - | - | - | - | - | - |
| SS05 | 0.1 | | [Topsoil] | **18** | **0.11** | **18** | **18** | 17.5 | 7 | 63 | - | - | - |
| SS06 | 0.1 | | [Topsoil] | 5 | <0.1 | 10 | 9 | 7.3 | 6 | 45 | - | - | - |
| SS07 | 0.1 | | [Topsoil] | 4 | <0.1 | 9 | 8 | 7.7 | 6 | 37 | - | - | - |
| SS08 | 0.1 | | [Topsoil] | **10** | **0.23** | **13** | **21** | 31 | 9 | **380** | - | - | - |
| SS09 | 0.1 | | [Topsoil] | 6 | **0.24** | 8 | **13** | 23 | 4 | 53 | <LOR | NAD | NAD |
| SS10 | 0.1 | 10-Sept-26 | [Topsoil] | **10** | **0.25** | **13** | **31** | 37 | **12** | **400** | - | - | - |
| SS11 | 0.1 | | [Topsoil] | **23** | **0.13** | **23** | **28** | 17.1 | 9 | 64 | - | - | - |
| | 0.3 | | [Native] silty sand | 4 | <0.1 | 7 | 5 | 3.9 | 6 | 24 | - | - | - |
| SS11.1 | 0.1 | | [Topsoil] | **14** | **0.12** | **16** | **17** | 23 | **11** | **83** | - | - | - |
| SS12 | 0.1 | | [Topsoil] | **9** | **0.13** | **13** | **23** | 29 | **14** | **110** | - | - | - |
| SS13 | 0.1 | | [Topsoil] | 7 | <0.1 | 9 | **15** | 19.2 | **13** | 60 | - | - | - |

Table Notes:
All results and criteria are presented in milligram per kilogram (mg/kg) on a dry weight basis, except asbestos which is reported as % weight of asbestos / weight of sample (%w/w)
Soil descriptions indicative only - refer to report for full descriptions
Selected results shown; Full results are included in the laboratory reports
LOR: Limit of Reporting; Results below LOR or exceeding no criteria are shown in grey text
- : not analysed or no applicable criteria, NAD: No Asbesots Detected, AF/FA: Asbestos Fines/Fiberous Asbestos, ACM: Asbestos Containing Material
m bgl: metres below ground level

Criteria notes:

1: Hazardous Waste Guidelines: Landfill Waste Acceptance Criteria and Landfill Classification (MfE, 2004). Class A Screening Criteria from Table 1

2: Class 5 Waste Acceptance Criteria from Tables H-1 and H-2 of 'Technical Guidelines for Disposal to Land' (WasteMINZ, 2023). Background Concentrations from Table 3-3 for Main Soil Type 1 (Sand) have been adopted for inorganic elements. Cleanfill criteria for contaminants not listed is assumed to be the laboratory limit of reporting

# Appendix 7:

Summary Results (Riley 2025)

## Soil Analytical Results

| | Sample IDs | Sample Depth (m) | Units | Analytes | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metals | | | | | | | Organochlorine Pesticides | | Polycyclic Aromatic Hydrocarbons | | | | | | | Asbestos in soil Presence/Absence |
| | | | | Arsenic | Cadmium | Chromium | Copper | Lead | Nickel | Zinc | (Total DDT)[6] | Dieldrin[6] | Anthracene | B[a]Pyrene | B[a]P Potency Equivalency Factor[7] | Fluoranthene | Naphthalene | Phenanthene | Pyrene | AF/FA[5] |
| 65 Ratanui Rd (Lot 4 DP 58017) | S1 | 0.1 | mg/kg | 6 | **0.18** | 10 | 7 | 4.3 | 5 | 31 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 3.8 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S2 | 0.1 | mg/kg | 5 | **0.12** | 9 | 8 | 4.3 | 6 | 32 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 3 | 3.6 | 4 | 15 | - | - | - | - | - | - | - | - | - | - |
| | S3 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 3.9 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 4 | 3.6 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S4 | 0.1 | mg/kg | 4 | **0.13** | 7 | 4 | 4.3 | 6 | 30 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 4 | 4.3 | 6 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S5 | 0.1 | mg/kg | 3 | **0.15** | 7 | 4 | 5.7 | 4 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | <2 | < 0.10 | 5 | 2 | 3.2 | 3 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S6 | 0.1 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.8 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.6 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | S7 | 0.1 | mg/kg | 5 | **0.21** | 10 | 7 | 4.3 | 5 | 34 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.2 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S8 | 0.1 | mg/kg | 4 | **0.13** | 8 | 5 | 4.5 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.8 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S9 | 0.2 | mg/kg | 4 | **0.22** | 8 | 6 | 4.5 | 6 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.9 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S10 | 0.1 | mg/kg | 4 | **0.21** | 8 | 6 | 5.9 | 5 | 33 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 3 | 4.1 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | S11 | 0.1 | mg/kg | 4 | **0.15** | 7 | 5 | 4.3 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.8 | 6 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S12 | 0.1 | mg/kg | 4 | **0.17** | 7 | 5 | 4.5 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.9 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S13 | 0.1 | mg/kg | 3 | **0.24** | 8 | 7 | 5.2 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.9 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S14 | 0.1 | mg/kg | 4 | **0.17** | 7 | 5 | 4.5 | 5 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.8 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S15 | 0.1 | mg/kg | 4 | **0.22** | 7 | 6 | 4.8 | 5 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.5 | 6 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S16 | 0.1 | mg/kg | 4 | **0.13** | 6 | 6 | 4.3 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.3 | 5 | 21 | - | - | - | - | - | - | - | - | - | - |
| | S17 | 0.1 | mg/kg | 5 | **0.21** | 8 | 6 | 4.3 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 6 | 4 | 4 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S18 | 0.1 | mg/kg | 4 | **0.16** | 7 | 5 | 5 | 4 | 33 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 6 | < 0.10 | 6 | 4 | 4 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | S19 | 0.1 | mg/kg | 4 | **0.14** | 7 | 5 | 4.8 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 3 | < 0.10 | 6 | 4 | 4.1 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S20 | 0.1 | mg/kg | 4 | < 0.10 | 6 | 5 | 4.9 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 6 | 5 | 4.1 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S21 | 0.1 | mg/kg | 4 | **0.15** | 7 | 5 | 5 | 5 | 30 | - | - | - | - | - | - | - | - | - | - |
| | | 0.6 | mg/kg | 4 | < 0.10 | 7 | 4 | 3.7 | 6 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S22 | 0.1 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 5 | 23 | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.4 | 5 | 21 | - | - | - | - | - | - | - | - | - | - |
| | S23 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 5.1 | 4 | 28 | - | - | <0.013 | <0.013 | < 0.031 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.9 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | S24 | 0.1 | mg/kg | 6 | < 0.10 | **17** | **13** | 13.4 | **12** | 55 | - | - | <0.012 | <0.012 | < 0.028 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.5 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S25 | 0.1 | mg/kg | 6 | < 0.10 | **19** | **17** | 20 | **16** | 68 | - | - | < 0.011 | < 0.011 | < 0.026 | < 0.011 | <0.06 | < 0.011 | < 0.011 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 5 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S26 | 0.1 | mg/kg | 6 | < 0.10 | 10 | 6 | 7.2 | 5 | **190** | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 3 | 4.3 | 4 | 71 | - | - | - | - | - | - | - | - | - | - |
| | S27 | 0.1 | mg/kg | 4 | **0.16** | 7 | 5 | 5.5 | 6 | 30 | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 5 | 3.9 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S28 | 0.1 | mg/kg | 7 | < 0.10 | 9 | 7 | 11.1 | 6 | 30 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 4 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S29 | 0.1 | mg/kg | 6 | **0.11** | 9 | 7 | 4.7 | 5 | 29 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.6 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S30 | 0.1 | mg/kg | 7 | < 0.10 | 11 | **12** | 12.4 | 7 | 42 | - | - | <0.012 | 0.021 | 0.029 | 0.017 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 5 | 4 | 3.4 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S31 | 0.1 | mg/kg | 4 | **0.13** | 7 | 5 | 4.4 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 2 | < 0.10 | 6 | 5 | 3.7 | 4 | 23 | - | - | - | - | - | - | - | - | - | - |
| | | 1.0 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 5 | 26 | - | - | <0.012 | <0.012 | < 0.028 | <0.012 | <0.06 | <0.012 | <0.012 | not detected |
| 73 Ratanui Rd (Lot 3 DP 497389) | SSP-1 | 0.1 | mg/kg | 4 | **0.17** | 7 | 4 | 5.2 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | SSP1A | 0.1 | mg/kg | 3 | **0.17** | 7 | 6 | 6 | 5 | 38 | | - | - | - | - | - | - | - | - | - |
| | SSP-2 | 0.1 | mg/kg | 4 | **0.18** | 8 | 4 | 4.4 | 5 | 27 | | - | - | - | - | - | - | - | - | - |
| | SSP-3 | 0.1 | mg/kg | 3 | **0.2** | 9 | 9 | 6.6 | 6 | 35 | < 0.015 | < 0.015 | - | - | - | - | - | - | - | - |
| | SSP-4 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.8 | 5 | 24 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| | SSP-5 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.6 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | SSP-6 | 0.1 | mg/kg | 3 | **0.2** | 8 | 4 | 4.3 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 1.0 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.1 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | SSP-7 | 0.1 | mg/kg | 2 | < 0.10 | 5 | 5 | 4 | 4 | 28 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| | SSP-8 | 0.1 | mg/kg | 4 | **0.18** | 9 | 5 | 4.4 | 5 | 27 | **0.015** | - | - | - | - | - | - | - | - | - | - |
| | SSP-9 | 0.1 | mg/kg | 4 | < 0.10 | 6 | **21** | 3.3 | 3 | 25 | < 0.03 | < 0.03 | <0.03 | <0.03 | < 0.068 | <0.03 | <0.14 | <0.03 | <0.03 | - |
| | | 0.5 | mg/kg | 6 | < 0.10 | 10 | **39** | 5.4 | 4 | 37 | < 0.03 | < 0.03 | <0.03 | <0.03 | < 0.071 | <0.03 | <0.15 | <0.03 | <0.03 | - |
| | SSP-10 | 0.1 | mg/kg | 5 | < 0.10 | 8 | 5 | 8.4 | 4 | 30 | < 0.013 | < 0.013 | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | not detected |
| | SSP-11 | 0.1 | mg/kg | **11** | **0.14** | **17** | **23** | 28 | **16** | **167** | < 0.015 | < 0.015 | - | - | - | - | - | - | - | not detected |
| | SSP-12 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 4 | 4.4 | 5 | 23 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | SSP-14 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.6 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | SSP-15 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 6 | 5 | 4 | 29 | < 0.011 | < 0.011 | - | - | - | - | - | - | - | - |
| | SSP-16 | 0.1 | mg/kg | 6 | < 0.10 | 8 | 8 | 8.5 | 6 | **86** | - | - | - | - | - | - | - | - | - | not detected |
| | SSP-17 | 0.1 | mg/kg | 4 | < 0.10 | 10 | 9 | 5.9 | 4 | 38 | - | - | < 0.03 | < 0.03 | < 0.052 | < 0.03 | <0.11 | < 0.03 | < 0.03 | not detected |
| | SSP-19 | 0.1 | mg/kg | **26** | **0.12** | **16** | **24** | 21 | 8 | 70 | < 0.012 | < 0.012 | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | SSP-20 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 4 | 6 | 27 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| Criteria | **Background Concentrations[1]** | | mg/kg | 7 | 0.1 | 12 | 10 | 180 | 9 | 79 | - | - | 0.01 [8] | 0.08 [8] | - | 0.14 [8] | 0.01 [8] | 0.07 [8] | 0.12 [8] | - |
| | **95%UCL (Cadmium only)** | | mg/kg | - | 0.18 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | **NES-CS Rural Residential/lifestyle block 25% produce[2]** | | mg/kg | 17 | 0.85 | 290 (Cr VI) | 10,000 | 160 | 1200 [4] | 60,000 [4] | 45 | 1.1 | - | - | 6 | - | - | - | - | - |
| | **NES-CS Residential 10% produce[2]** | | mg/kg | 20 | 3 | 460 (Cr VI) | 10,000 | 210 | 1200 [4] | 60,000 [4] | 70 | 2.6 | - | - | 10 | - | - | - | - | - |
| | **NES-CS High-Density Residential[2]** | | mg/kg | 45 | 230 | 1500 (Cr VI) | 10,000 | 500 | 1200 [4] | 60,000 [4] | 240 | 45 | - | - | 24 | - | - | - | - | - |
| | **NES-CS Outdoor Worker[3]** | | mg/kg | 70 | 1,300 | 6300 (Cr VI) | 10,000 | 3,300 | 6,000 [4] | 400,000 [4] | 1,000 | 160 | - | - | 35 | - | - | - | - | - |
| | **Health Protection Criteria [5]** | | mg/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | >0.001 |

Notes

**B** Bolded results exceed predicted background concentrations.

Purple shaded results exceed background[1], and NES-CS for residential 10% produce land use[2].

Orange shaded results exceed background[1], and NES-CS for high density residential land use[2].

Pink shaded results exceed background[1], NES-CS for high density residential land use[2] and NES-CS for outdoor worker (unpaved) landuse[3].

[1] Resource Investigations Department . Greater Wellington Regional Council. Soil quality monitoring technical report 2006. Table 5 Soil Type 1.

[2] MfE, 2011. NES-CS Users' Guide: Soil contaminant standards for high-density/10%/25% residential landuse.

[3] MfE, 2011. NES-CS Users' Guide: Soil contaminant standards for commercial/industrial outdoor worker (unpaved) landuse.

[4] National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM). Schedule B1: Guideline on Investigation Levels for Soil and Groundwater.

[5] BRANZ, 2012. New Zealand Guidelines for Assessing and Manafing Asbestos in Soil.

[6] Entire suite of OCPs were analysed - only reporting compounds with human health based guidelines.

[7] The carcinogenic suite of PAHs is represented by benzo(a)pyrene potency equivalency factor (B[a]Peq). The equivalent concentration of benzo(a)pyrene is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-cd)pyrene), multiplied by their respective potency equivalency factors.

[8] Greater Wellington Regional Council. URS, 2003. Determination of Common Pollutant Background Soil Concentrations for the Wellington Region, Table ES-1 Main Soil Type 1 (sand).

# Appendix 8:

Laboratory Results (Riley 2025)

# Preliminary and Detailed Site Investigation, Contaminated Land

65 and 73 Ratanui Road, Paraparaumu

RILEY

# Preliminary and Detailed Site Investigation, Contaminated Land
# 65 and 73 Ratanui Road, Paraparaumu

| | |
|---|---|
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# Appendices


Appendix A: Historic Aerial Photographs
Appendix B: Site walkover photographic record
Appendix C: SLUR Site Contamination Enquiry
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Appendix E: Laboratory Transcripts
Appendix F: Riley Dwg: 220306-60

# Preliminary and Detailed Site Investigation, Contaminated Land 65 and 73 Ratanui Road, Paraparaumu

## 1.0 Introduction

Riley Consultants Ltd (Riley) has been engaged by Welhom Developments Ltd (Welhom) to conduct a Preliminary and Detailed Site Investigation (PSI/DSI) for 65 and 73 Ratanui Road, Paraparaumu.

The proposed subdivision works involve creating two new lots within 65 Ratanui Road (Lot 1 and Lot 2, see Figure 1) and amalgamating the lot at 73 Ratanui Road with the northern lot of 65 Ratanui Road to form a single, larger parcel (see Figure 2). These changes are part of the subdivision consent process, which is necessary to prepare the site for future residential use.




Figure 1: Proposed subdivision at 65 Ratanui Rd, Paraparaumu (source: Kāpiti Coast District Council/KCDC GIS)

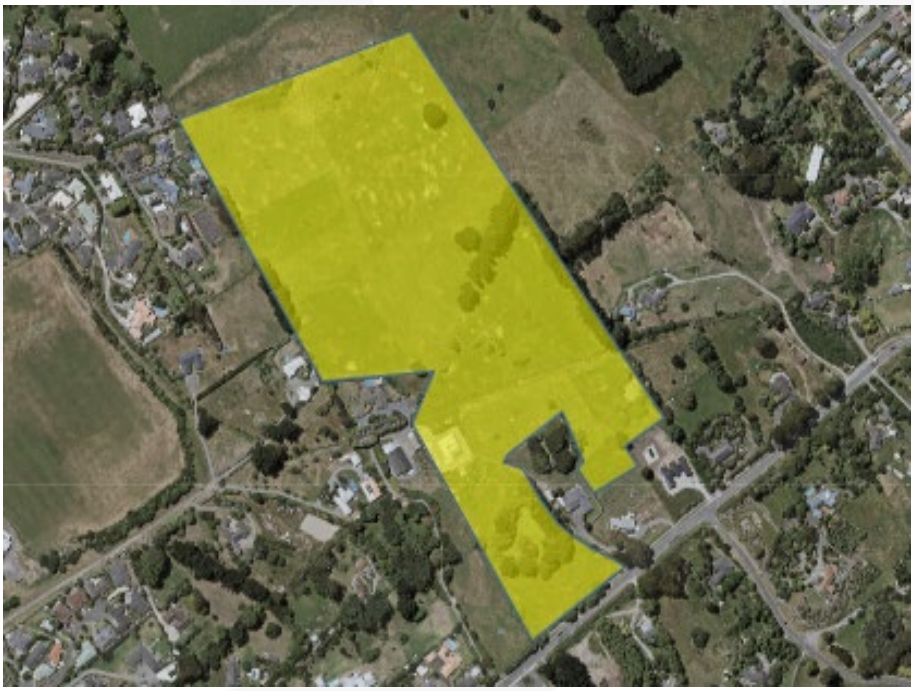


**Figure 2: The Site amalgamating 73 Ratanui Rd and the northern balance of 65 Ratanui Rd, Paraparaumu (source: Kāpiti Coast District Council/KCDC GIS)**

This report has been reviewed by a suitably qualified and experienced contaminated land practitioner (SQEP), as required by the NES-CS. It meets the general requirements of a DSI in accordance with the Ministry for the Environment's (MfE's) Contaminated Land Management Guidelines (CLMG) #1[3] and #5[4].

# 2.0 Site Description

## 2.1 Site Location

The site has a total approximate area of 12.65ha and is located to the north of Paraparaumu in Kāpiti Coast.

The site comprises the following lots:

- Lot 4 DP 58017 (65 Ratanui Road) - to be subdivided in the manner described above; and
- Lot 3 DP 497389 (73 Ratanui Road)

The site is currently zoned for rural lifestyle use. It is surrounded by residential and semi-rural properties (predominately open pasture) and is bounded to the south by Ratanui Road for the portion of 73 Ratanui Road with road frontage.

[2] National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011.
[3] Ministry for the Environment, revised 2021: Contaminated Land Management Guidelines #1: Reporting on Contaminated Land in New Zealand.
[4] Ministry for the Environment, revised 2021: Contaminated Land Management Guidelines #5: Site Investigation and Analysis of Soils.

The site has previously been used for cattle grazing including pasture activities and is mainly covered in grass. The site is located to the north of Paraparaumu on the Kāpiti Coast and is surrounded by residential and semi-rural properties (predominately open pasture) while also being bounded to the south by Ratanui Road. It is currently zoned as Rural Lifestyle with reference to the KCDC Operative District Plan 2021.

The site is generally undulating, consisting of a dwelling, sheds and farm paddocks. There is a stormwater channel crossing the site (east-west) and several ponds scattered across the site.

### 2.2 Proposed Development

The approximate subdivided lot and proposed building platform (for subdivision purposes nominally located within the northern portion of No. 65, which currently does not contain a dwelling or designated building platform) is presented within Riley Dwg: 220306-60, Appendix F.

The balance of the northern portion of No.65 Ratanui Rd is intended to be amalgamated with No. 73 Ratanui Rd lot creating a new lot for future residential development.

### 2.3 Geology and Hydrogeology

According to the GNS Science (1:250k scale) Geological Map, the site is likely to be underlain by Holocene windblown sand dune deposits which are typically known to be sands of variable density. Based on soil investigations undertaken by Riley, sand was underlain by alluvium materials.

Groundwater monitoring during Riley's geotechnical investigations in February 2023 and May 2024 indicated that the groundwater table was approximately 2.1m to 5.0m below ground level (bgl) at those times.

## 3.0 Desktop Investigation

### 3.1 Historic Aerial Photograph Review

An overview of available historic aerial photographs, dated 1940 to 2022 (refer Appendix A) is presented in Table 1:

Table 1: Review of Available Historic Photographs

| Date | Description | |
|---|---|---|
| | 65 Ratanui Road - Lot 4 DP 58017 | 73 Ratanui Road - Lot 3 DP 497389 – |
| 1940 | This lot is undeveloped and appears to be in pasture or used for crop growing. There is a small shed within the central portion of the lot. An area along the northern boundary is vegetated. A section of a secondary road crosses the lot at the southern edge. | This lot appears to be undeveloped with the presence of seasonal surface water ponds.<br>A road crosses the middle of the lot from west to east. |
| 1952 | The lot is still undeveloped and in pasture. No dwellings were observed. Vegetation at the northern boundary is still present. | There are no visible changes evident. |
| 1957 | There are no visible changes evident. | There are no visible changes evident. |
| 1973 | The site is still undeveloped and in pasture. Part of the vegetation at the northern boundary of the lot has been removed. No further changes are evident. | The presence of seasonal surface water accumulation appears to be reduced when compared with previous images. |
| 1987 | Two dwellings (a house and a horse shed) have been constructed at the end of the right-of-way, including a horse yard circuit. Approximately 350m$^2$ of land disturbance related to dwelling construction is visible.<br>A right-of-way is visible connecting the dwelling area and Ratanui Road. The majority of the lot area is still undeveloped and in pasture. | A dwelling is present in the north-western boundary of the lot including an internal road that connects the building with the main road. The presence of fill material around the dwelling is also visible.<br>A pond is also visible within the centre of the lot. |
| 1991 | Some unknown filling material is observed between the house and shed area.<br>A garden is visible between the house and shed area, with a tree fence along the right-of-way. Most of the lot area is still undeveloped and in pasture. | Another pond is observed at the eastern boundary of the lot.<br>No further changes are evident. |
| 1998 | Auxiliary sheds have been constructed around the house and next to the horse shed.<br>A water storage above ground tank is also observed. A plant fence is noted around the house footprint, and the wider site has been internally divided and fenced.<br>Cattle and or/sheep grazing is evident within the wider site. | Old/used cars have been placed in the vicinity of the existing dwelling.<br>An additional pond is visible at the north-eastern edge of the lot.<br>Cattle and or/sheep grazing is evident within the wider site.<br>No further changes are evident. |

| Date | Description | |
|---|---|---|
| | 65 Ratanui Road - Lot 4 DP 58017 | 73 Ratanui Road - Lot 3 DP 497389 – |
| 2001 | Topsoil cutting and lawn maintenance activities are visible across the site.<br>Debris and unknown fill materials are present to the south of the horse shed area.<br>Recreational activities related to dirt biking at the north-eastern part of the site are visible.<br>Cattle and or/sheep grazing is evident within the wider site. | Soil disturbance and fill activities are observed around the dwelling area.<br>The existing dwelling has been dismantled, and old/used cars are parked in the former dwelling's footprint. Older/used cars have been placed at the western boundary of the former dwelling.<br>Two sheds at the eastern side of the old dwelling are present.<br>The main pond appears to be dry.<br>Cattle and or/sheep grazing is evident within the wider site. |
| 2007 | Soil preparation for sowing, lawn maintenance and cattle grazing are the main activities over the site.<br>Pool installation at north of the main house is observed.<br>Farm equipment is identified besides the horse yard area. Debris and unknown fill are still present on the shed area on different spots.<br>Some seasonal surface water bodies are observed over the wider site. | A new dwelling has been built in the same area as the original dwelling.<br>Fewer old/used cars are evident on-site.<br>The presence of various seasonal ponds is observed as well as grass maintenance activities.<br>Sheds installed at the eastern of the old dwelling appear to have been decommissioned.<br>No additional filling activities are identified.<br>Soil preparation for sowing, lawn maintenance and cattle grazing are the main activities over the site. |
| 2010 | Debris and unknown fill are still present within the shed area in different locations.<br>Cattle grazing appears to be the main activity over the site.<br>No further changes are identified. | Fences have been installed to divide the lot into different sections.<br>Cattle grazing appears to be the main activity over the site.<br>No further changes are evident. |
| 2013 | Debris and unknown fill remain present within the shed area in different locations.<br>No further changes are evident. | An excavator is visible at the southern side of the dwelling, indicating that soil disturbance and/or filling activities have been undertaken.<br>Cattle drinking troughs are visible in the eastern side of the lot. |

| Date | Description | |
|---|---|---|
| | 65 Ratanui Road - Lot 4 DP 58017 | 73 Ratanui Road - Lot 3 DP 497389 – |
| 2017 | Recreational activities related to dirt biking at the north-east part of the site are visible.<br>Debris and unknown fill remain present within the shed area in different locations.<br>Greenwaste stockpiling is present at the southern boundary of the site, very close to the site entrance. | A significant amount of fill/greenwaste (wood) is observed between the main pond and the new dwelling.<br>Small fill piles are visible within the north-eastern portion of the lot. |
| 2021 | Debris, unknown fill, and green waste (grass clippings, leaves, branch cuttings, weeds, etc.) have been removed from this lot. | Significant soil disturbance, and fill piles are visible in the vicinity of the dwelling. An above ground water tank is visible at the western boundary.<br>Fill/greenwaste piles are visible across the site.<br>Some fallen trees are evident. |
| 2022 | Seasonal surface water bodies are present over the wider lot.<br>Cattle and sheep grazing appears to be the primary activity on the lot. | Extension of green cover (lawn and pasture) has been increased across the site and fewer fill piles are observed.<br>Some farm machines are observed at the western side of the dwelling. |

Based on the historic aerial photographs review, only historic filling activities (HAIL category I) were identified as potential MfE HAIL[3] activities within each lot for the construction of dwellings and/or internal roads.

## 3.2 Council File Searches

### 3.2.1 Site Contamination Enquiries

Riley contacted Greater Wellington Regional Council (GWRC) to confirm whether new contamination data yet to be uploaded to the SLUR was available; GWRC confirmed that no new data was on file. A copy of this site contamination email enquiry is included in Appendix C.

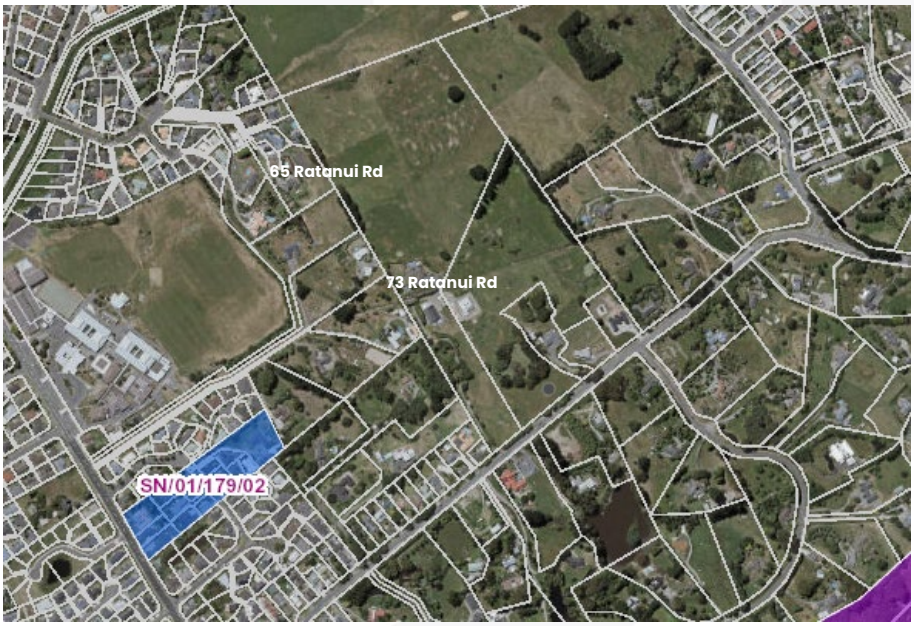



Figure 3: SLUR sites in Paraparaumu from GWRC GIS

## 3.3 Hazardous Activities and Industries List Activities On-Site

GWRC maintains a site contamination database titled the Selected Land Use Register (SLUR). All known properties that currently have or historically have had activities or industries included on the MfE HAIL occurring on-site, are included on the SLUR and are presented as a graphical information system layer via GWRC WebMaps.

Based on GWRC records, neither Lot 4 DP 58017 (65 Ratanui Road, Paraparaumu) nor Lot 3 DP497389 (73 Ratanui Road, Paraparaumu) are listed on the SLUR as having had any current or historic MfE HAIL activities. No historic resource consents have been applied for in relation to these lots.

Review of the aerial photographs In Retrolens, KCDC and GWRC files, and outcomes from the site walkover have indicated that unknown filling activities (HAIL category I) represent the only potential historic MfE HAIL activity within the site.

## 3.4 Desktop Review Conclusions

The review of property files and the GWRC SLUR database has not identified potential MfE HAIL activities on-site. Due to the placement of fill material as part of foundation platform for dwelling construction, MfE HAIL Category I has potentially occurred on-site.

Soil testing across the dwelling and shed areas has been undertaken in order to assess if past filling activities may have impacted soils, and whether these soils pose a health and/or environmental risk for current and future land uses. Soil testing outcomes are presented in Section 7.0

## 4.0 Detailed Site Investigation

Soil testing was carried out to identify potential contamination from placement of uncontrolled filling for construction, pasture and cattle grazing activities, and to identify off-site disposal and sustainable on-site reuse options for future soil disturbance activities.

The investigation was undertaken in two rounds, the first round for 65 Ratanui Road on 16 and 17 February 2023, and the second round for 73 Ratanui Road on 7 May 2024. Soil samples were collected from a total of 50 sampling locations (31 locations at 65 Ratanui Road and 19 locations at 73 Ratanui Road), with 63 samples having been collected from 65 Ratanui Road and 22 samples collected from 73 Ratanui Road.

Samples were collected from surface soils (0.1 m) as well as some deeper samples across the site from 0.2 -0.6m below ground level (m bgl). Deeper samples (1.0m) within the dwelling footprint at 65 Ratanui Road and 73 Ratanui Road were collected due to the presence of fill material.

All sampling locations are shown on Riley Dwg: 220306-60 (Appendix F).

### 4.1 Site Walkover

The site was accessed via a driveway off Ratanui Road which leads to a farm track beyond the dwelling. The farm track to the northern extent of the site had fenced grassed paddocks to either side. Consistent with the desktop review, the paddocks were noted to be undulating, with existing ponding or historic ponding visible in lowlands across the site.

Anecdotal evidence from the homeowner of No. 65 Ratanui Road confirmed a small deposit of fill (likely non-engineered) near the southern portion of the property that was historically intended to be used to create a flat platform for a proposed dwelling.

Regarding No. 73 Ratanui Road, some areas showed signs of soil disturbance with evidence of debris at surface (brick pieces, gravels, etc). Storage of different chemicals were observed at the Shed as well as gardening to the south-west area. In addition, some old tyres and old metallic drums and other metal sheets were found besides the gardening area.

No further observations were made in relation to potential land contamination.

A photographic record of the walkover findings is attached in Appendix B.

### 4.2 Soil Sampling Procedures

Soil sampling was undertaken in general accordance with the requirements of the NES-CS and MfE CLMG #5.

Soil samples were collected according to the following procedure:

- Discrete soil samples were collected from surface, 0.2 - 0.6m bgl and in some cases 1.0m bgl depths.

- Freshly gloved hands were used to collect soil samples from hand augers, which were placed immediately into the appropriate laboratory supplied sample containers.
- Decontamination of sampling equipment was carried out between sampling using Decon-90 (a biodegradable phosphate-free detergent), followed by fresh-water rinsing of equipment.
- Samples were couriered to IANZ-certified Hill Laboratories Ltd under chain of custody documentation.

### 4.3 Observations

In general, the following materials were encountered within the hand-augered boreholes:

**Table 2: Materials Encountered Within Boreholes**

| Depths (m) | Description |
|---|---|
| 0-0.2 | Topsoil and presence of fill material in the vicinity of existing dwellings. |
| 0.2-0.5/1.0 | Aeolian deposits were present beneath the topsoil. The material was predominately a fine sand with varying quantities of silt. |

## 5.0 Laboratory Testing

Hill Laboratories Ltd (Hill) performed chemical analysis on soil samples collected from boreholes advanced at the site. Hill is an IANZ-accredited laboratory in accordance with international standard ISO/IE 17025:2005 – General Requirements for the Competence of Testing and Calibration.

Eighty-five (85) samples from 50 locations were scheduled for heavy metals analysis, sixteen (16) samples for polycyclic aromatic hydrocarbons (PAH) analysis, ten samples for organochlorine pesticides (OCP), and five (5) samples for asbestos (presence/absence) analysis. A detailed table with sample ID's, depths and testing is included in Appendix D. Full laboratory transcripts are included in Appendix E.

### 5.1 Data Quality

A quality assurance and quality control (QA/QC) programme was implemented as part of field procedures to confirm that the soil analytical data was fit for purpose.

The programme included:

- The jars used in the collection of soil samples were supplied by Hill.
- The soil samples were labelled as they were collected.
- Transportation of samples with accompanying chain of custody documentation.
- Comparison of field and analytical data.
- Compliance with sample holding times.

The laboratory quality assurance program included the analysis of laboratory duplicate samples, methods blanks, matrix spikes and samples of reference materials, in accordance with the Analytical Protocol. Laboratory QA/QC reports are available on request.

## 6.0 Acceptance Criteria

For the purposes of this report, a preliminary assessment of potential health and environmental risks from soils on-site has been undertaken by comparing the concentrations recorded against selected standards and guideline values.

It is important to note that there are no published soil background levels for the KCDC area. Therefore, Riley has contacted the Contaminated Land Team within GWRC, who have recommended reference to the GWRC's Resource Investigation Department's Soil Quality Monitoring Technical Report[5].

Contaminant concentrations from samples analysed have been compared against the following criteria:

- Resource Investigations Department. Greater Wellington Regional Council - Soil Quality Monitoring Technical Report, 2006.
- NES-CS soil contaminant standard for outdoor worker (unpaved) land use scenario, with respect to the protection of workers during soil disturbance activities.
- NES-CS soil contaminant standard for high-density residential land use scenario, in relation to potential future high-density residential development.
- NES-CS soil contaminant standard for residential (10% produce) land use scenario, in relation to potential future residential development and cleanfill acceptance criteria.

## 7.0 Results

A summary of the laboratory test results compared against relevant criteria is provided in Appendix D, with full laboratory transcripts included within Appendix D.

The soil testing results identified the following:

### 7.1 65 Ratanui Road[6]

- No soil parameters tested exceeded NES-CS health-based soil contaminant standards for high-density residential, for residential (10% produce[7]), nor for outdoor worker (unpaved) land use scenarios.

[5] Bruce Croucher, 2005. Soil quality monitoring technical report. Resource Investigations Department, Greater Wellington Regional Council.
[6] Note: soil sampling undertaken on 16 and 17 February 2023.
[7] Note: Standard residential lot, for single dwelling sites with gardens, including homegrown produce consumption. 10% produce refers to the proportion of home-grown produce assumed be consumed by people living on-site.

- Eighteen (18) surficial samples identified cadmium[8] exceeding adopted background concentrations.
- Sample S30 (0.1m) identified copper exceeding adopted background concentrations.
- Isolated PAH were detected in sample SS30 (0.1m) at concentrations below the relevant NES-CS soil contaminant standards. Detected PAH concentrations did not exceed the adopted background criterion. However, the detection limit for naphthalene is above the background concentration of 0.01mg/kg for Type 1 Soils.

## 7.2 73 Ratanui Road[9]

- No soil contaminants of concern exceeded NES-CS health-based soil contaminant standards for high-density residential nor outdoor worker (unpaved) land use scenarios. However, sample SSP-19 adjacent to the shed identified an arsenic concentration of 26mg/kg, which exceeds the NES-CS soil contaminant standard for residential (10% produce) land use. This area will require delineation and removal to an appropriate off-site facility).
- No other compounds of concern were detected at concentrations exceeding the NES-CS health-based soil contaminant standards for residential (10% produce) land use.
- Asbestos testing around the shed's periphery was undertaken for surface samples SSP-10, SSP-11, SSP-16 and SSP-17; no asbestos was detected in any of these samples.
- Samples SSP-11 (0.1m) and SSP-19 (0.1m – see above) identified arsenic exceeding adopted background concentrations.
- Eight surficial samples identified cadmium exceeding adopted background concentrations.
- Samples SSP-11 (0.1m) and SSP-19 (0.1m) identified chromium concentrations exceeding adopted background concentrations.
- Samples SSP-11 (0.1m) and SSP-16 (0.1m) identified zinc exceeding adopted background concentrations.
- Samples SSP-9 (0.1m and 0.5m), SSP-11 (0.1m) and SSP-19 (0.1m) identified copper exceeding adopted background concentrations.
- Sample SSP-11 (0.1m) identified nickel exceeding adopted background concentrations.
- Samples SSP-9 (0.5m) and SSP-10 (0.1m) identified low-level PAH exceedances of adopted background concentrations, in the form of perylene.
- Sample SSP-11 (0.1m) identified zinc exceeding adopted background concentrations.
- Sample SSP-8 identified low-level OCP concentrations of 4,4'-DDE and 4,4'-DDT exceeding adopted background concentrations.

[8] Note: Application of Upper Confidence Level of 95% (UCL95) for both lots confirms cadmium exceedances against adopted background concentrations. These cadmium results are considered likely to have been caused by grazing animals on wet soils[8] as has been identified across the site through review of historic aerial images.
[9] Note: soil sampling undertaken on 7 May 2024.

## 7.3 Conceptual Site Model

A post-investigation conceptual site model (CSM) has been developed to summarise the sources of contamination at the site, the human receptors that may be exposed to those contaminants, and the potential pathways for exposure.

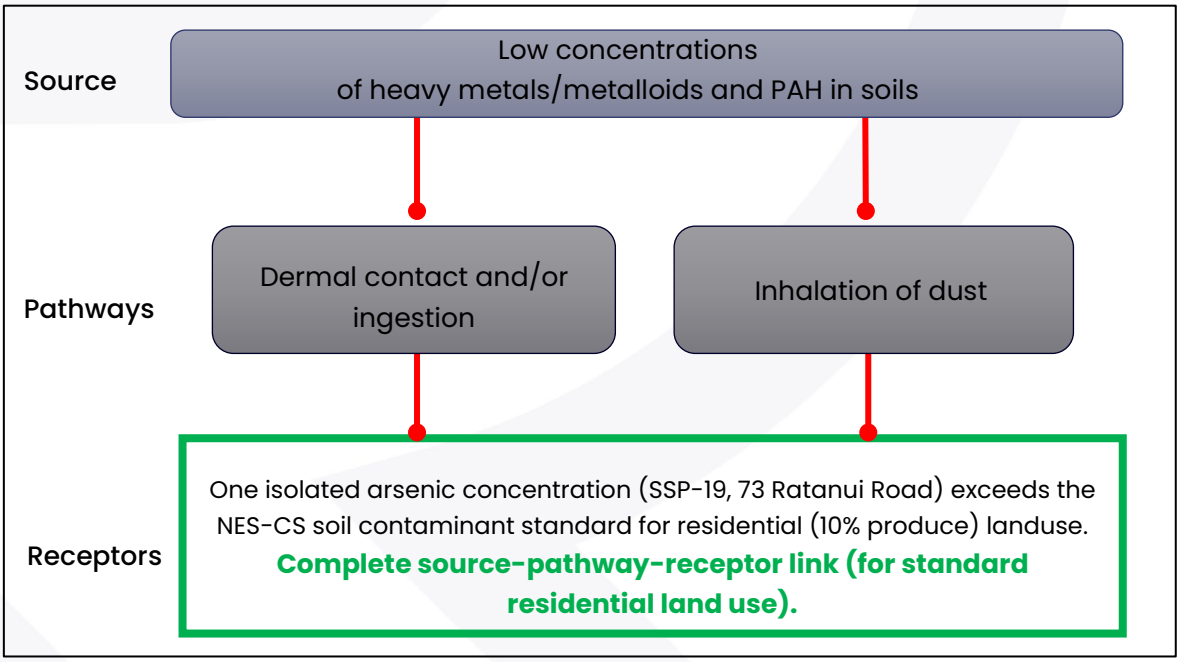



Figure 4: Conceptual Site Model

# 8.0 Regulatory Implications

The rules relating to the control of contaminated sites and potentially contaminated sites, specific to the protection of human health are specified in the NES-CS.

Land subdivision is covered under Section 31 of the Resource Management Act 1991 (RMA) relating to contaminated land. Specifically, Section 31(b)(iia) introduced a requirement for "the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land".

## 8.1 NES-CS

Under Clause 5 (5) of the NES-CS, subdividing land is an activity triggering assessment of potential consenting requirements under the NES-CS.

Testing results from the DSI have identified widespread minor exceedances of cadmium and isolated, low-level PAH across the site; arsenic and other heavy metals have also been identified exceeding background concentrations within 73 Ratanui Rd. One arsenic concentration (26mg/kg) adjacent to the shed on 73 Ratanui Rd exceeds the health-based NES-CS soil contaminant standard for residential (10% produce) landuse.

Based on the isolated concentration of arsenic near the shed at 73 Ratanui Road (SSP-19), the widespread background exceedances of cadmium across the site, the presence of other more localised heavy metals/metalloids (likely related to the use of phosphate-based fertilizers for pasture that contains cadmium as a mineral impurity[11]) and the past use of OCP, future disturbance of soils will require a restricted discretionary activity resource consent under the NES-CS from KCDC.

If the isolated arsenic hotspot at 73 Ratanui Road is delineated, remediated and validated in advance, the remaining soil contamination on site will require a controlled activity resource consent under the NES-CS.

This PSI/DSI report can be submitted to KCDC to support Resource Consent application under the NES-CS associated with the subdivision/amalgamation process.

## 9.0 Conclusions and Implications

A PSI/DSI was conducted to support the proposed subdivision/amalgamation and to assess future resource consenting requirements. The purpose of this work was to identify any potential MfE HAIL activities, evaluate options for on-site and off-site soil reuse or disposal, and assess any health and environmental risks related to soil contaminants that could impact the site's intended residential use.

- Based on KCDC and GWRC records, no current or past MfE HAIL activities were identified at 65 Ratanui Rd nor 73 Ratanui Rd.
- No soil contaminants of concern exceeded NES-CS health-based soil contaminant standards for high-density residential nor outdoor worker (unpaved) land use scenarios.
- Sample SSP-19 adjacent to the shed on 73 Ratanui Rd identified an arsenic concentration which exceeds the NES-CS soil contaminant standard for residential (10% produce) land use. This isolated area will require delineation, removal and validation.
- No other compounds of concern were detected at concentrations exceeding the NES-CS health-based soil contaminant standards for residential (10% produce) land use.
- Asbestos testing around the shed's periphery was undertaken for surface samples showing no asbestos detections.
- Cadmium exceeding adopted background concentrations is present in surficial soils across both sites, as are other heavy metals/metalloids on a more localised basis. These background exceedances do not present any health risks and soils may be safely re-used on-site for the intended subdivision.
- Before demolishing the existing structures on-site, a WorkSafe-licensed asbestos assessor should conduct a thorough survey for asbestos-containing materials (ACM) and lead paint. This assessment will determine compliance requirements under WorkSafe's Health and Safety at Work (Asbestos) Regulations 2016 to ensuring safe demolition practices and to reduce the likelihood of soil contamination caused by the demolition. After demolition of the

[11] Manaaki Whenua - Landcare Research for the Cadmium Management Group. Managing cadmium in grazing farm systems in New Zealand, 2020.

existing structures, surficial soil validation sampling is required to confirm that no asbestos or lead concentrations exceeding relevant health guidelines remain.

- Due to the arsenic exceedance adjacent to the existing shed on 73 Ratanui Rd, widespread background cadmium exceedances, and localised background exceedances of other heavy metals, PAH and OCP, a restricted discretionary activity resource consent under the NES-CS is required from KCDC.
- If the isolated arsenic hotspot at 73 Ratanui Road is delineated, remediated and validated, the remaining soil contamination on site will require a controlled activity Resource Consent under the NES-CS.

## 10.0 Limitation

This report has been prepared solely for the benefit of Welhom Developments Ltd as our client with respect to the brief given to us, and to KCDC in processing the Resource Consent. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

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

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

# Appendix A

## Historic Aerial Photographs

# Historical Aerial Photographs

Footnote for all relevant pages[1]

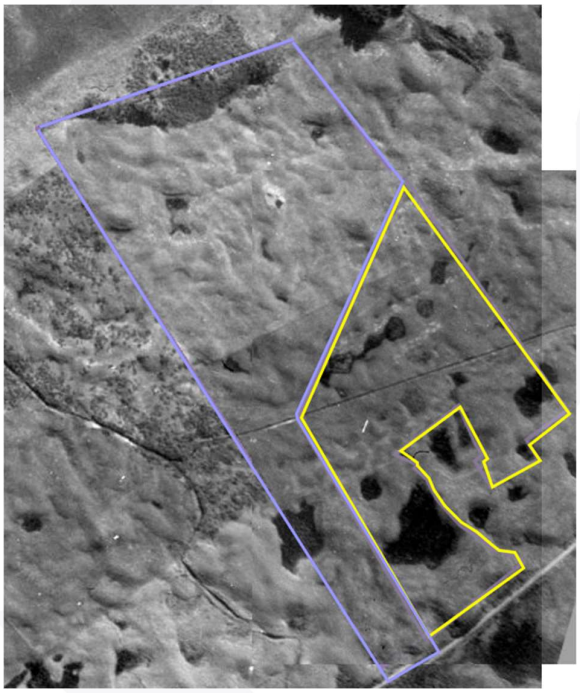


Photo 1: 1940 KCDC GIS Image
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 2: 1952 Retrolens image.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

[1] Retrolens. Historical image resource. https://retrolens.co.nz/
Kapiti Coast District Council GIS. https://maps.kapiticoast.govt.nz/

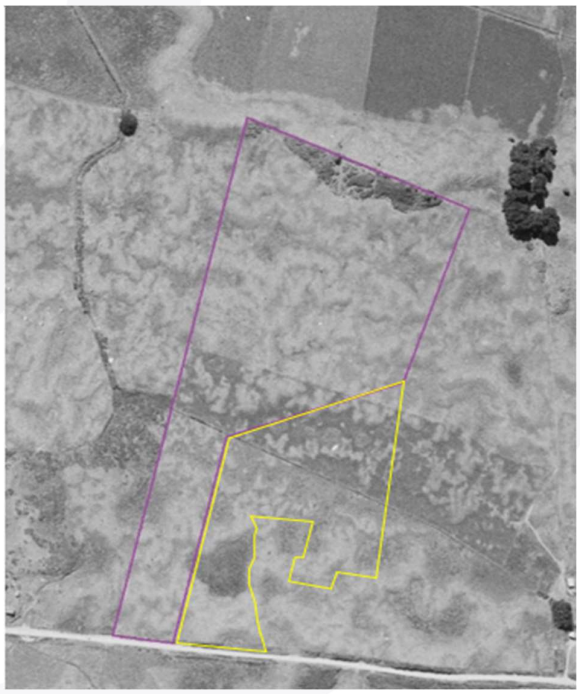


Photo 3: 1957, Retrolens image.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

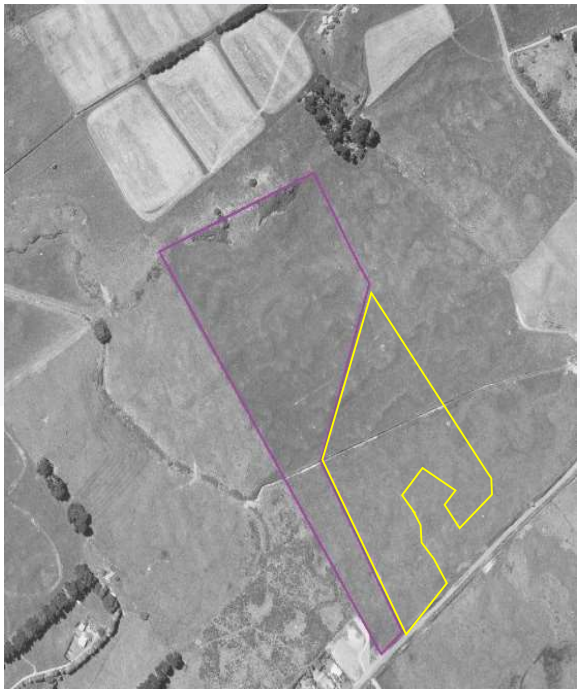


Photo 4: 1973 Retrolens image
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 5: 1987 Retrolens image
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

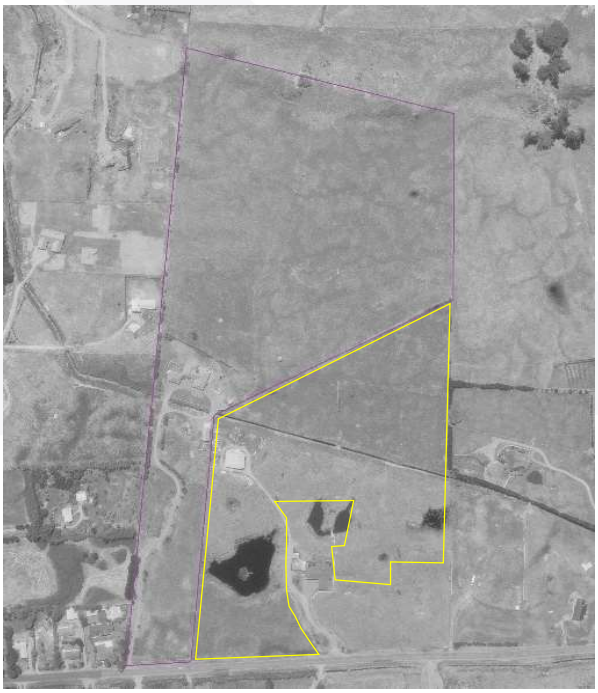


Photo 6: 1991 Retrolens Image.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

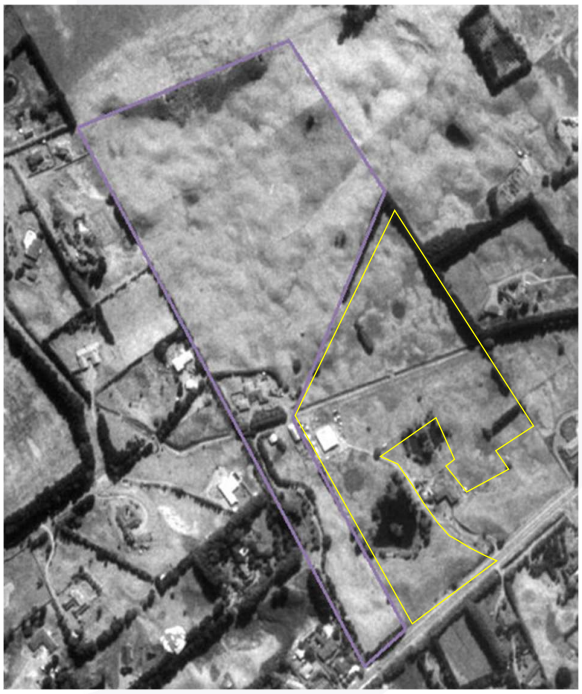


Photo 7: 1998 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 8: 2001 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 9:  2007 KCDC GIS.
(Purple:  Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 10:  2010. KCDC GIS.
(Purple:  Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 11: 2013 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

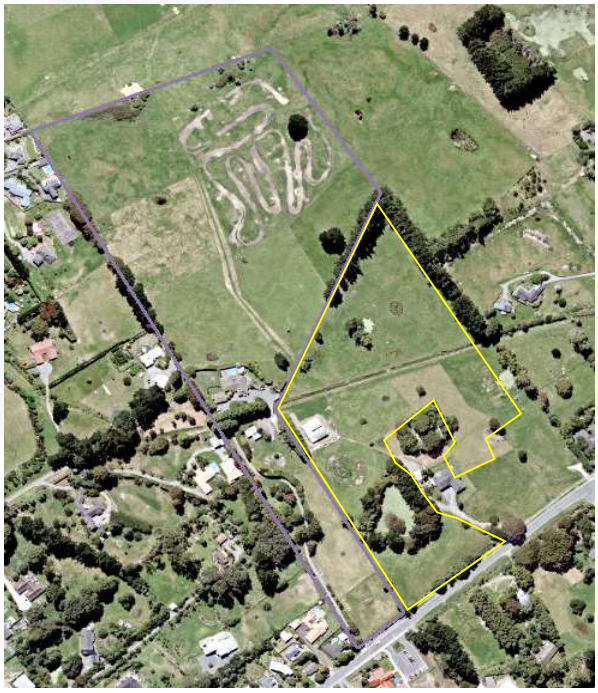


Photo 12: 2017 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)



Photo 13: 2021 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

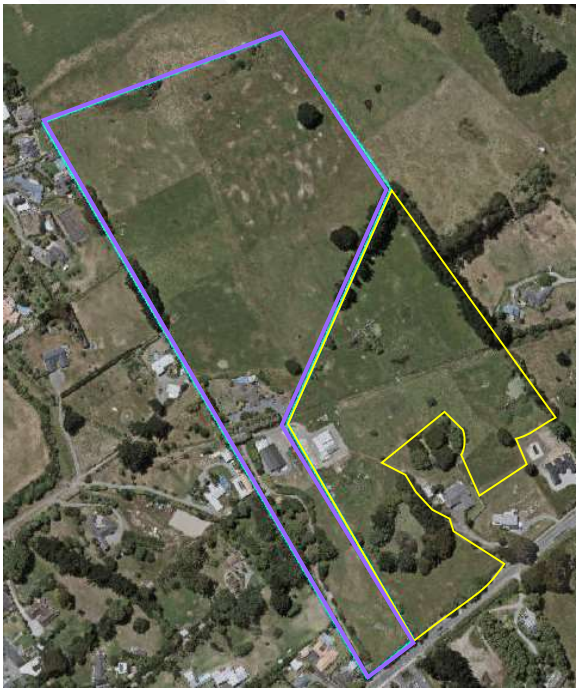


Photo 14. 2022 KCDC GIS.
Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

# Appendix B

## Site Walkover Photographic Record

# Appendix A: Site Photographs – 1 to 9



Photo 1: Site entrance



Photo 2: General view of site (from south to north)



Photo 3: View of the pond area



Photo 4: Stockpile of soil, branches and timber adjacent to pond



Photo 5: Detailed view of vegetable garden area



Photo 6: View of materials placed to the west of the garden area



Photo 7: General view of shed area



Photo 8: Containers stored at an auxiliary shed



Photo 9: Presence of bricks and debris

# Appendix C

## SLUR Site Contamination Enquiry

## Nicolas Franco

**From:** Slur <Slur@gw.govt.nz>
**Sent:** Monday, 20 February 2023 11:46 am
**To:** Nicolas Franco
**Subject:** [External] RE: Contaminated Site enquire- LOT 4 DP 58017

CAUTION: This email originated from outside of Riley. Do not open links or attachments unless you know the content is safe.

Hi Nicolas,

I have checked the SLUR data base as well as the internal files to inform you that the property you identified as 65 Ratanui Rd, Paraparumu, does not appear on Greater Wellington Regional Council's Selected Land Use Register (SLUR).

The SLUR is a database of sites that have, or may have, been used for activities and industries from the Hazardous Activities and Industries List (HAIL) established by the Ministry for the Environment.
Greater Wellington registers a HAIL or contaminated site on SLUR if we have received appropriate information and there may be several reasons that a property is not registered on SLUR.

We have made the above information available to you under the Local Government Official Information and Meetings Act 1987. This information reflects Greater Wellington's current understanding of this site.
Please be aware that Greater Wellington and its officers, employees and agents accept no liability for any inaccuracy in, or omission from, this information or liability for any loss or damage suffered by any person which may directly or indirectly result from any person acting or refraining from acting on this information.

Once you have finalised the PSI, please send it through for our records

Kind regards

**Nicole Blackie (MSc)**
Analyst- Contaminated Land
Land, Ecology and Climate, Environmental Science Department
**Greater Wellington Te Pane Matua Taiao**
**M +64 28 8511 2359**
100 Cuba St, Te Aro, Wellington 6011
**Follow us online: Facebook | Twitter | gw.govt.nz**

"Te toto o te tangata he kai, te oranga o te tangata, he whenua, he oneone –
While food provides the blood in our veins, our health is drawn from the land and soils"

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immediately. Unless otherwise stated, any views or opinions expressed are solely those of the author, and do not represent those of the organisation.

---

**From:** Nicolas Franco <nfranco@riley.co.nz>
**Sent:** Monday, 20 February 2023 11:38 am
**To:** Slur <Slur@gw.govt.nz>
**Subject:** Contaminated Site enquire- LOT 4 DP 58017

Hello everyone

We are undertaking a PSI for the Lot 4 DP 58017 (65 Ratanui Rd, Paraparumu) to assess environmental conditions for a potential residential development.

Could you please provide contamination information from legacy council for the following property?

Kindest Regards


Nicolas Franco

**Senior Environmental Scientist – Site Contamination**



021535102 / nfranco@riley.co.nz
4 Fred Thomas Drive, Auckland 0622, PO Box 100253, North Shore 0745

**riley.co.nz**



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# Appendix D

## Results Table

## Soil Analytical Results

| | Sample IDs | Sample Depth (m) | Units | Analytes | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metals | | | | | | | Organochlorine Pesticides | | Polycyclic Aromatic Hydrocarbons | | | | | | | Asbestos in soil Presence/Absence |
| | | | | Arsenic | Cadmium | Chromium | Copper | Lead | Nickel | Zinc | (Total DDT)[6] | Dieldrin[6] | Anthracene | B[a]Pyrene | B[a]P Potency Equivalency Factor[7] | Fluoranthene | Naphthalene | Phenanthene | Pyrene | AF/FA[5] |
| 65 Ratanui Rd (Lot 4 DP 58017) | S1 | 0.1 | mg/kg | 6 | **0.18** | 10 | 7 | 4.3 | 5 | 31 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 3.8 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S2 | 0.1 | mg/kg | 5 | **0.12** | 9 | 8 | 4.3 | 6 | 32 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 3 | 3.6 | 4 | 15 | - | - | - | - | - | - | - | - | - | - |
| | S3 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 3.9 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 4 | 3.6 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S4 | 0.1 | mg/kg | 4 | **0.13** | 7 | 4 | 4.3 | 6 | 30 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 4 | 4.3 | 6 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S5 | 0.1 | mg/kg | 3 | **0.15** | 7 | 4 | 5.7 | 4 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | <2 | < 0.10 | 5 | 2 | 3.2 | 3 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S6 | 0.1 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.8 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.6 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | S7 | 0.1 | mg/kg | 5 | **0.21** | 10 | 7 | 4.3 | 5 | 34 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.2 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S8 | 0.1 | mg/kg | 4 | **0.13** | 8 | 5 | 4.5 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.8 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S9 | 0.2 | mg/kg | 4 | **0.22** | 8 | 6 | 4.5 | 6 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.9 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S10 | 0.1 | mg/kg | 4 | **0.21** | 8 | 6 | 5.9 | 5 | 33 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 3 | 4.1 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | S11 | 0.1 | mg/kg | 4 | **0.15** | 7 | 5 | 4.3 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.8 | 6 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S12 | 0.1 | mg/kg | 4 | **0.17** | 7 | 5 | 4.5 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.9 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S13 | 0.1 | mg/kg | 3 | **0.24** | 8 | 7 | 5.2 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.9 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S14 | 0.1 | mg/kg | 4 | **0.17** | 7 | 5 | 4.5 | 5 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.3 | mg/kg | 4 | < 0.10 | 6 | 4 | 3.8 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S15 | 0.1 | mg/kg | 4 | **0.22** | 7 | 6 | 4.8 | 5 | 29 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.5 | 6 | 28 | - | - | - | - | - | - | - | - | - | - |
| | S16 | 0.1 | mg/kg | 4 | **0.13** | 6 | 6 | 4.3 | 5 | 28 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.3 | 5 | 21 | - | - | - | - | - | - | - | - | - | - |
| | S17 | 0.1 | mg/kg | 5 | **0.21** | 8 | 6 | 4.3 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 6 | 4 | 4 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S18 | 0.1 | mg/kg | 4 | **0.16** | 7 | 5 | 5 | 4 | 33 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 6 | < 0.10 | 6 | 4 | 4 | 5 | 32 | - | - | - | - | - | - | - | - | - | - |
| | S19 | 0.1 | mg/kg | 4 | **0.14** | 7 | 5 | 4.8 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 3 | < 0.10 | 6 | 4 | 4.1 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S20 | 0.1 | mg/kg | 4 | < 0.10 | 6 | 5 | 4.9 | 5 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 0.2 | mg/kg | 4 | < 0.10 | 6 | 5 | 4.1 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S21 | 0.1 | mg/kg | 4 | **0.15** | 7 | 5 | 5 | 5 | 30 | - | - | - | - | - | - | - | - | - | - |
| | | 0.6 | mg/kg | 4 | < 0.10 | 7 | 4 | 3.7 | 6 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S22 | 0.1 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 5 | 23 | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.4 | 5 | 21 | - | - | - | - | - | - | - | - | - | - |
| | S23 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 5.1 | 4 | 28 | - | - | <0.013 | <0.013 | < 0.031 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.9 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | S24 | 0.1 | mg/kg | 6 | < 0.10 | **17** | **13** | 13.4 | **12** | 55 | - | - | <0.012 | <0.012 | < 0.028 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.5 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S25 | 0.1 | mg/kg | 6 | < 0.10 | **19** | **17** | 20 | **16** | 68 | - | - | < 0.011 | < 0.011 | < 0.026 | < 0.011 | <0.06 | < 0.011 | < 0.011 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 5 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | S26 | 0.1 | mg/kg | 6 | < 0.10 | 10 | 6 | 7.2 | 5 | **190** | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 6 | 3 | 4.3 | 4 | 71 | - | - | - | - | - | - | - | - | - | - |
| | S27 | 0.1 | mg/kg | 4 | **0.16** | 7 | 5 | 5.5 | 6 | 30 | - | - | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 7 | 5 | 3.9 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S28 | 0.1 | mg/kg | 7 | < 0.10 | 9 | 7 | 11.1 | 6 | 30 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 4 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | S29 | 0.1 | mg/kg | 6 | **0.11** | 9 | 7 | 4.7 | 5 | 29 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 6 | 5 | 3.6 | 6 | 24 | - | - | - | - | - | - | - | - | - | - |
| | S30 | 0.1 | mg/kg | 7 | < 0.10 | 11 | **12** | 12.4 | 7 | 42 | - | - | <0.012 | 0.021 | 0.029 | 0.017 | <0.06 | <0.012 | <0.012 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 5 | 4 | 3.4 | 5 | 22 | - | - | - | - | - | - | - | - | - | - |
| | S31 | 0.1 | mg/kg | 4 | **0.13** | 7 | 5 | 4.4 | 5 | 27 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 2 | < 0.10 | 6 | 5 | 3.7 | 4 | 23 | - | - | - | - | - | - | - | - | - | - |
| | | 1.0 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 5 | 26 | - | - | <0.012 | <0.012 | < 0.028 | <0.012 | <0.06 | <0.012 | <0.012 | not detected |
| 73 Ratanui Rd (Lot 3 DP 497389) | SSP-1 | 0.1 | mg/kg | 4 | **0.17** | 7 | 4 | 5.2 | 5 | 24 | - | - | - | - | - | - | - | - | - | - |
| | SSP1A | 0.1 | mg/kg | 3 | **0.17** | 7 | 6 | 6 | 5 | 38 | | - | - | - | - | - | - | - | - | - |
| | SSP-2 | 0.1 | mg/kg | 4 | **0.18** | 8 | 4 | 4.4 | 5 | 27 | | - | - | - | - | - | - | - | - | - |
| | SSP-3 | 0.1 | mg/kg | 3 | **0.2** | 9 | 9 | 6.6 | 6 | 35 | < 0.015 | < 0.015 | - | - | - | - | - | - | - | - |
| | SSP-4 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 5 | 3.8 | 5 | 24 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| | SSP-5 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 4 | 3.6 | 5 | 23 | - | - | - | - | - | - | - | - | - | - |
| | SSP-6 | 0.1 | mg/kg | 3 | **0.2** | 8 | 4 | 4.3 | 5 | 25 | - | - | - | - | - | - | - | - | - | - |
| | | 0.5 | mg/kg | 3 | < 0.10 | 7 | 4 | 4.4 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | | 1.0 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.1 | 6 | 26 | - | - | - | - | - | - | - | - | - | - |
| | SSP-7 | 0.1 | mg/kg | 2 | < 0.10 | 5 | 5 | 4 | 4 | 28 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| | SSP-8 | 0.1 | mg/kg | 4 | **0.18** | 9 | 5 | 4.4 | 5 | 27 | **0.015** | - | - | - | - | - | - | - | - | - | - |
| | SSP-9 | 0.1 | mg/kg | 4 | < 0.10 | 6 | **21** | 3.3 | 3 | 25 | < 0.03 | < 0.03 | <0.03 | <0.03 | < 0.068 | <0.03 | <0.14 | <0.03 | <0.03 | - |
| | | 0.5 | mg/kg | 6 | < 0.10 | 10 | **39** | 5.4 | 4 | 37 | < 0.03 | < 0.03 | <0.03 | <0.03 | < 0.071 | <0.03 | <0.15 | <0.03 | <0.03 | - |
| | SSP-10 | 0.1 | mg/kg | 5 | < 0.10 | 8 | 5 | 8.4 | 4 | 30 | < 0.013 | < 0.013 | <0.013 | <0.013 | < 0.030 | <0.013 | <0.07 | <0.013 | <0.013 | not detected |
| | SSP-11 | 0.1 | mg/kg | **11** | **0.14** | **17** | **23** | 28 | **16** | **167** | < 0.015 | < 0.015 | - | - | - | - | - | - | - | not detected |
| | SSP-12 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 4 | 4.4 | 5 | 23 | - | - | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | SSP-14 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 4.6 | 6 | 27 | - | - | - | - | - | - | - | - | - | - |
| | SSP-15 | 0.1 | mg/kg | 3 | < 0.10 | 6 | 6 | 5 | 4 | 29 | < 0.011 | < 0.011 | - | - | - | - | - | - | - | - |
| | SSP-16 | 0.1 | mg/kg | 6 | < 0.10 | 8 | 8 | 8.5 | 6 | **86** | - | - | - | - | - | - | - | - | - | not detected |
| | SSP-17 | 0.1 | mg/kg | 4 | < 0.10 | 10 | 9 | 5.9 | 4 | 38 | - | - | < 0.03 | < 0.03 | < 0.052 | < 0.03 | <0.11 | < 0.03 | < 0.03 | not detected |
| | SSP-19 | 0.1 | mg/kg | **26** | **0.12** | **16** | **24** | 21 | 8 | 70 | < 0.012 | < 0.012 | <0.012 | <0.012 | < 0.029 | <0.012 | <0.06 | <0.012 | <0.012 | - |
| | SSP-20 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 4 | 6 | 27 | < 0.012 | < 0.012 | - | - | - | - | - | - | - | - |
| Criteria | **Background Concentrations[1]** | | mg/kg | 7 | 0.1 | 12 | 10 | 180 | 9 | 79 | - | - | 0.01 [8] | 0.08 [8] | - | 0.14 [8] | 0.01 [8] | 0.07 [8] | 0.12 [8] | - |
| | **95%UCL (Cadmium only)** | | mg/kg | - | 0.18 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | **NES-CS Rural Residential/lifestyle block 25% produce[2]** | | mg/kg | 17 | 0.85 | 290 (Cr VI) | 10,000 | 160 | 1200 [4] | 60,000 [4] | 45 | 1.1 | - | - | 6 | - | - | - | - | - |
| | **NES-CS Residential 10% produce[2]** | | mg/kg | 20 | 3 | 460 (Cr VI) | 10,000 | 210 | 1200 [4] | 60,000 [4] | 70 | 2.6 | - | - | 10 | - | - | - | - | - |
| | **NES-CS High-Density Residential[2]** | | mg/kg | 45 | 230 | 1500 (Cr VI) | 10,000 | 500 | 1200 [4] | 60,000 [4] | 240 | 45 | - | - | 24 | - | - | - | - | - |
| | **NES-CS Outdoor Worker[3]** | | mg/kg | 70 | 1,300 | 6300 (Cr VI) | 10,000 | 3,300 | 6,000 [4] | 400,000 [4] | 1,000 | 160 | - | - | 35 | - | - | - | - | - |
| | **Health Protection Criteria [5]** | | mg/kg | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | >0.001 |

Notes

**B** Bolded results exceed predicted background concentrations.

Purple shaded results exceed background[1], and NES-CS for residential 10% produce land use[2].

Orange shaded results exceed background[1], and NES-CS for high density residential land use[2].

Pink shaded results exceed background[1], NES-CS for high density residential land use[2] and NES-CS for outdoor worker (unpaved) landuse[3].

[1] Resource Investigations Department . Greater Wellington Regional Council. Soil quality monitoring technical report 2006. Table 5 Soil Type 1.

[2] MfE, 2011. NES-CS Users' Guide: Soil contaminant standards for high-density/10%/25% residential landuse.

[3] MfE, 2011. NES-CS Users' Guide: Soil contaminant standards for commercial/industrial outdoor worker (unpaved) landuse.

[4] National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM). Schedule B1: Guideline on Investigation Levels for Soil and Groundwater.

[5] BRANZ, 2012. New Zealand Guidelines for Assessing and Manafing Asbestos in Soil.

[6] Entire suite of OCPs were analysed - only reporting compounds with human health based guidelines.

[7] The carcinogenic suite of PAHs is represented by benzo(a)pyrene potency equivalency factor (B[a]Peq). The equivalent concentration of benzo(a)pyrene is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-cd)pyrene), multiplied by their respective potency equivalency factors.

[8] Greater Wellington Regional Council. URS, 2003. Determination of Common Pollutant Background Soil Concentrations for the Wellington Region, Table ES-1 Main Soil Type 1 (sand).

# Appendix E

## Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Private Bag 3205
Hamilton 3240 New Zealand

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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

# Certificate of Analysis



| | | | |
|---|---|---|---|
| **Client:** | Riley Consultants Limited | **Lab No:** | 3177147 SPv1 |
| **Contact:** | Nicolas Franco | **Date Received:** | 18-Feb-2023 |
| | C/- Riley Consultants Limited | **Date Reported:** | 22-Feb-2023 |
| | PO Box 100253 | **Quote No:** | 122403 |
| | North Shore Mail Centre | **Order No:** | |
| | Auckland 0745 | **Client Reference:** | 220306 - SS Paraparaumu |
| | | **Submitted By:** | Nicolas Franco |

**Sample Type: Soil**

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample Name:** | S01 (0.1m) 16-Feb-2023 | S01 (0.5m) 16-Feb-2023 | S02 (0.1m) 16-Feb-2023 | S02 (0.5m) 16-Feb-2023 | S03 (0.1m) 16-Feb-2023 |
| | **Lab Number:** | 3177147.1 | 3177147.2 | 3177147.3 | 3177147.4 | 3177147.5 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 6 | 3 | 5 | 3 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.18 | < 0.10 | 0.12 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 10 | 7 | 9 | 7 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 7 | 4 | 8 | 3 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 4.3 | 3.8 | 4.3 | 3.6 | 3.9 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 6 | 4 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 31 | 25 | 32 | 15 | 27 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample Name:** | S03 (0.5m) 16-Feb-2023 | S04 (0.1m) 16-Feb-2023 | S04 (0.5m) 16-Feb-2023 | S05 (0.1m) 16-Feb-2023 | S05 (0.5m) 16-Feb-2023 |
| | **Lab Number:** | 3177147.6 | 3177147.7 | 3177147.8 | 3177147.9 | 3177147.10 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 4 | 4 | 3 | < 2 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.13 | < 0.10 | 0.15 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 7 | 7 | 7 | 5 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 4 | 4 | 4 | 2 |
| Total Recoverable Lead | mg/kg dry wt | 3.6 | 4.3 | 4.3 | 5.7 | 3.2 |
| Total Recoverable Nickel | mg/kg dry wt | 6 | 6 | 6 | 4 | 3 |
| Total Recoverable Zinc | mg/kg dry wt | 24 | 30 | 28 | 29 | 26 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample Name:** | S06 (0.1m) 16-Feb-2023 | S06 (0.5m) 16-Feb-2023 | S07 (0.1m) 16-Feb-2023 | S07 (0.5m) 16-Feb-2023 | S08 (0.1m) 16-Feb-2023 |
| | **Lab Number:** | 3177147.11 | 3177147.12 | 3177147.13 | 3177147.14 | 3177147.15 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 3 | 5 | 3 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | < 0.10 | 0.21 | < 0.10 | 0.13 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 6 | 10 | 7 | 8 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 4 | 7 | 4 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 3.8 | 3.6 | 4.3 | 4.2 | 4.5 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 5 | 5 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 26 | 23 | 34 | 28 | 28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample Name:** | S08 (0.5m) 16-Feb-2023 | S09 (0.1m) 16-Feb-2023 | S09 (0.5m) 16-Feb-2023 | S10 (0.1m) 16-Feb-2023 | S10 (0.5m) 16-Feb-2023 |
| | **Lab Number:** | 3177147.16 | 3177147.17 | 3177147.18 | 3177147.19 | 3177147.20 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 3 | 4 | 4 | 4 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.22 | < 0.10 | 0.21 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 8 | 6 | 8 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 6 | 4 | 6 | 3 |
| Total Recoverable Lead | mg/kg dry wt | 3.8 | 4.5 | 3.9 | 5.9 | 4.1 |

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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S08 (0.5m) 16-Feb-2023 | S09 (0.1m) 16-Feb-2023 | S09 (0.5m) 16-Feb-2023 | S10 (0.1m) 16-Feb-2023 | S10 (0.5m) 16-Feb-2023 |
| **Lab Number:** | | 3177147.16 | 3177147.17 | 3177147.18 | 3177147.19 | 3177147.20 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 6 | 6 | 5 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 24 | 29 | 24 | 33 | 32 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S11 (0.1m) 16-Feb-2023 | S11 (0.5m) 16-Feb-2023 | S12 (0.1m) 16-Feb-2023 | S12 (0.5m) 16-Feb-2023 | S13 (0.1m) 16-Feb-2023 |
| **Lab Number:** | | 3177147.21 | 3177147.22 | 3177147.23 | 3177147.24 | 3177147.25 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 4 | 4 | 4 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.15 | < 0.10 | 0.17 | < 0.10 | 0.24 |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 6 | 7 | 6 | 8 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 5 | 5 | 5 | 7 |
| Total Recoverable Lead | mg/kg dry wt | 4.3 | 3.8 | 4.5 | 3.9 | 5.2 |
| Total Recoverable Nickel | mg/kg dry wt | 6 | 6 | 5 | 5 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 27 | 25 | 27 | 24 | 32 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S13 (0.5m) 16-Feb-2023 | S14 (0.1m) 16-Feb-2023 | S14 (0.5m) 16-Feb-2023 | S15 (0.1m) 16-Feb-2023 | S15 (0.5m) 16-Feb-2023 |
| **Lab Number:** | | 3177147.26 | 3177147.27 | 3177147.28 | 3177147.29 | 3177147.30 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 3 | 4 | 4 | 4 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.17 | < 0.10 | 0.22 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 7 | 6 | 7 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 5 | 4 | 6 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 3.9 | 4.5 | 3.8 | 4.8 | 4.5 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 5 | 5 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 26 | 29 | 22 | 29 | 28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S16 (0.1m) 16-Feb-2023 | S16 (0.5m) 16-Feb-2023 | S17 (0.1m) 16-Feb-2023 | S17 (0.5m) 16-Feb-2023 | S18 (0.1m) 16-Feb-2023 |
| **Lab Number:** | | 3177147.31 | 3177147.32 | 3177147.33 | 3177147.34 | 3177147.35 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 3 | 5 | 4 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.13 | < 0.10 | 0.21 | < 0.10 | 0.16 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 6 | 8 | 6 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 6 | 4 | 6 | 4 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 4.3 | 3.3 | 4.3 | 4.0 | 5.0 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 5 | 5 | 4 |
| Total Recoverable Zinc | mg/kg dry wt | 28 | 21 | 27 | 24 | 33 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S18 (0.5m) 16-Feb-2023 | S19 (0.1m) 16-Feb-2023 | S19 (0.5m) 16-Feb-2023 | S20 (0.1m) 16-Feb-2023 | S20 (0.5m) 16-Feb-2023 |
| **Lab Number:** | | 3177147.36 | 3177147.37 | 3177147.38 | 3177147.39 | 3177147.40 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 6 | 4 | 3 | 4 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.14 | < 0.10 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 7 | 6 | 6 | 6 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 5 | 4 | 5 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 4.0 | 4.8 | 4.1 | 4.9 | 4.1 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 5 | 5 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 32 | 25 | 22 | 26 | 26 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S21 (0.1m) 17-Feb-2023 | S21 (0.5m) 17-Feb-2023 | S22 (0.1m) 17-Feb-2023 | S22 (0.5m) 17-Feb-2023 | S23 (0.1m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.41 | 3177147.42 | 3177147.43 | 3177147.44 | 3177147.45 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | - | - | 80 | - | 77 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 4 | 3 | 3 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.15 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S21 (0.1m) 17-Feb-2023 | S21 (0.5m) 17-Feb-2023 | S22 (0.1m) 17-Feb-2023 | S22 (0.5m) 17-Feb-2023 | S23 (0.1m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.41 | 3177147.42 | 3177147.43 | 3177147.44 | 3177147.45 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 7 | 7 | 6 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 4 | 4 | 5 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 5.0 | 3.7 | 4.4 | 3.4 | 5.1 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 6 | 5 | 5 | 4 |
| Total Recoverable Zinc | mg/kg dry wt | 30 | 25 | 23 | 21 | 28 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | - | < 0.3 | - | < 0.4 |
| 1-Methylnaphthalene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| 2-Methylnaphthalene | mg/kg dry wt | - | - | < 0.019 | - | < 0.019 |
| Acenaphthylene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Acenaphthene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Anthracene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[a]anthracene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | - | < 0.030 | - | < 0.031 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | - | < 0.030 | - | < 0.031 |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[e]pyrene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Benzo[k]fluoranthene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Chrysene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Fluoranthene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Fluorene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Naphthalene | mg/kg dry wt | - | - | < 0.07 | - | < 0.07 |
| Perylene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Phenanthrene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |
| Pyrene | mg/kg dry wt | - | - | < 0.013 | - | < 0.013 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S23 (0.5m) 17-Feb-2023 | S24 (0.1m) 17-Feb-2023 | S24 (0.5m) 17-Feb-2023 | S25 (0.1m) 17-Feb-2023 | S25 (0.5m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.46 | 3177147.47 | 3177147.48 | 3177147.49 | 3177147.50 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | - | 87 | - | 93 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 6 | 3 | 6 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 17 | 6 | 19 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 13 | 5 | 17 | 4 |
| Total Recoverable Lead | mg/kg dry wt | 3.9 | 13.4 | 3.5 | 20 | 5.0 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 12 | 5 | 16 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 23 | 55 | 22 | 68 | 26 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | < 0.3 | - | < 0.3 | - |
| 1-Methylnaphthalene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| 2-Methylnaphthalene | mg/kg dry wt | - | < 0.017 | - | < 0.016 | - |
| Acenaphthylene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Acenaphthene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Anthracene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[a]anthracene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | < 0.028 | - | < 0.026 | - |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S23 (0.5m) 17-Feb-2023 | S24 (0.1m) 17-Feb-2023 | S24 (0.5m) 17-Feb-2023 | S25 (0.1m) 17-Feb-2023 | S25 (0.5m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.46 | 3177147.47 | 3177147.48 | 3177147.49 | 3177147.50 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | < 0.028 | - | < 0.026 | - |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[e]pyrene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Benzo[k]fluoranthene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Chrysene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Fluoranthene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Fluorene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Naphthalene | mg/kg dry wt | - | < 0.06 | - | < 0.06 | - |
| Perylene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Phenanthrene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |
| Pyrene | mg/kg dry wt | - | < 0.012 | - | < 0.011 | - |

| **Sample Name:** | | S26 (0.1m) 17-Feb-2023 | S26 (0.5m) 17-Feb-2023 | S27 (0.1m) 17-Feb-2023 | S27 (0.5m) 17-Feb-2023 | S28 (0.1m) 17-Feb-2023 |
|---|---|---|---|---|---|---|
| **Lab Number:** | | 3177147.51 | 3177147.52 | 3177147.53 | 3177147.54 | 3177147.55 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | 79 | - | 80 | - | 83 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 6 | 3 | 4 | 4 | 7 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | < 0.10 | 0.16 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 10 | 6 | 7 | 7 | 9 |
| Total Recoverable Copper | mg/kg dry wt | 6 | 3 | 5 | 5 | 7 |
| Total Recoverable Lead | mg/kg dry wt | 7.2 | 4.3 | 5.5 | 3.9 | 11.1 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 4 | 6 | 5 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 190 | 71 | 30 | 24 | 30 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | < 0.4 | - | < 0.3 | - | < 0.3 |
| 1-Methylnaphthalene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| 2-Methylnaphthalene | mg/kg dry wt | < 0.019 | - | < 0.019 | - | < 0.018 |
| Acenaphthylene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Acenaphthene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Anthracene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[a]anthracene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | < 0.030 | - | < 0.030 | - | < 0.029 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | < 0.030 | - | < 0.030 | - | < 0.028 |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[e]pyrene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[g,h,i]perylene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Benzo[k]fluoranthene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Chrysene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Dibenzo[a,h]anthracene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Fluoranthene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Fluorene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Naphthalene | mg/kg dry wt | < 0.07 | - | < 0.07 | - | < 0.06 |
| Perylene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Phenanthrene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |
| Pyrene | mg/kg dry wt | < 0.013 | - | < 0.013 | - | < 0.012 |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | S28 (0.5m) 17-Feb-2023 | S29 (0.1m) 17-Feb-2023 | S29 (0.5m) 17-Feb-2023 | S30 (0.1m) 17-Feb-2023 | S30 (0.5m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.56 | 3177147.57 | 3177147.58 | 3177147.59 | 3177147.60 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | - | 82 | - | 86 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 6 | 4 | 7 | 4 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.11 | < 0.10 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 6 | 9 | 6 | 11 | 5 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 7 | 5 | 12 | 4 |
| Total Recoverable Lead | mg/kg dry wt | 4.0 | 4.7 | 3.6 | 12.4 | 3.4 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 6 | 7 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 25 | 29 | 24 | 42 | 22 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | < 0.3 | - | < 0.3 | - |
| 1-Methylnaphthalene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| 2-Methylnaphthalene | mg/kg dry wt | - | < 0.018 | - | < 0.018 | - |
| Acenaphthylene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Acenaphthene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Anthracene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Benzo[a]anthracene | mg/kg dry wt | - | < 0.012 | - | 0.017 | - |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | < 0.012 | - | 0.021 | - |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | < 0.029 | - | 0.029 | - |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | < 0.029 | - | 0.029 | - |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | < 0.012 | - | 0.029 | - |
| Benzo[e]pyrene | mg/kg dry wt | - | < 0.012 | - | 0.018 | - |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | < 0.012 | - | 0.021 | - |
| Benzo[k]fluoranthene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Chrysene | mg/kg dry wt | - | < 0.012 | - | 0.015 | - |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Fluoranthene | mg/kg dry wt | - | < 0.012 | - | 0.017 | - |
| Fluorene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | < 0.012 | - | 0.020 | - |
| Naphthalene | mg/kg dry wt | - | < 0.06 | - | < 0.06 | - |
| Perylene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Phenanthrene | mg/kg dry wt | - | < 0.012 | - | < 0.012 | - |
| Pyrene | mg/kg dry wt | - | < 0.012 | - | 0.017 | - |

| **Sample Name:** | | S31 (0.1m) 17-Feb-2023 | S31 (0.5m) 17-Feb-2023 | S31 (1.0m) 17-Feb-2023 |
|---|---|---|---|---|
| **Lab Number:** | | 3177147.61 | 3177147.62 | 3177147.63 |
| Individual Tests | | | | |
| Dry Matter | g/100g as rcvd | - | - | 89 |
| Heavy Metals, Screen Level | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 2 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.13 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 6 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 5 | 4 |
| Total Recoverable Lead | mg/kg dry wt | 4.4 | 3.7 | 4.4 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 4 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 27 | 23 | 26 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | - | < 0.3 |
| 1-Methylnaphthalene | mg/kg dry wt | - | - | < 0.012 |
| 2-Methylnaphthalene | mg/kg dry wt | - | - | < 0.017 |
| Acenaphthylene | mg/kg dry wt | - | - | < 0.012 |
| Acenaphthene | mg/kg dry wt | - | - | < 0.012 |
| Anthracene | mg/kg dry wt | - | - | < 0.012 |

| Sample Type: Soil | | | | |
|---|---|---|---|---|
| **Sample Name:** | | S31 (0.1m) 17-Feb-2023 | S31 (0.5m) 17-Feb-2023 | S31 (1.0m) 17-Feb-2023 |
| **Lab Number:** | | 3177147.61 | 3177147.62 | 3177147.63 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | |
| Benzo[a]anthracene | mg/kg dry wt | - | - | < 0.012 |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | - | < 0.012 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | - | < 0.028 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | - | < 0.028 |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | - | < 0.012 |
| Benzo[e]pyrene | mg/kg dry wt | - | - | < 0.012 |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | - | < 0.012 |
| Benzo[k]fluoranthene | mg/kg dry wt | - | - | < 0.012 |
| Chrysene | mg/kg dry wt | - | - | < 0.012 |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | - | < 0.012 |
| Fluoranthene | mg/kg dry wt | - | - | < 0.012 |
| Fluorene | mg/kg dry wt | - | - | < 0.012 |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | - | < 0.012 |
| Naphthalene | mg/kg dry wt | - | - | < 0.06 |
| Perylene | mg/kg dry wt | - | - | < 0.012 |
| Phenanthrene | mg/kg dry wt | - | - | < 0.012 |
| Pyrene | mg/kg dry wt | - | - | < 0.012 |

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

| Sample Type: Soil | | | |
|---|---|---|---|
| **Test** | **Method Description** | **Default Detection Limit** | **Sample No** |
| Environmental Solids Sample Drying* | Air dried at 35°C<br>Used for sample preparation.<br>May contain a residual moisture content of 2-5%. | - | 1-63 |
| Total of Reported PAHs in Soil | Sonication extraction, GC-MS analysis. In-house based on US EPA 8270. | 0.03 mg/kg dry wt | 43, 45, 47, 49, 51, 53, 55, 57, 59, 63 |
| Heavy Metals, Screen Level | Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. | 0.10 - 4 mg/kg dry wt | 1-63 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270. | 0.010 - 0.05 mg/kg dry wt | 43, 45, 47, 49, 51, 53, 55, 57, 59, 63 |
| Dry Matter (Env) | Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550. | 0.10 g/100g as rcvd | 43, 45, 47, 49, 51, 53, 55, 57, 59, 63 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment. | 0.024 mg/kg dry wt | 43, 45, 47, 49, 51, 53, 55, 57, 59, 63 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997). | 0.024 mg/kg dry wt | 43, 45, 47, 49, 51, 53, 55, 57, 59, 63 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 20-Feb-2023 and 22-Feb-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Hill Laboratories
TRIED, TESTED AND TRUSTED

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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

# Certificate of Analysis



| | | | |
|---|---|---|---|
| **Client:** | Riley Consultants Limited | **Lab No:** | 3177877 A2Pv1 |
| **Contact:** | Nicolas Franco | **Date Received:** | 20-Feb-2023 |
| | C/- Riley Consultants Limited | **Date Reported:** | 22-Feb-2023 |
| | PO Box 100253 | **Quote No:** | 122403 |
| | North Shore Mail Centre | **Order No:** | |
| | Auckland 0745 | **Client Reference:** | 220306 - SS Paraparaumu |
| | | **Submitted By:** | Nicolas Franco |

**Sample Type: Soil**

| | | |
|---|---|---|
| **Sample Name:** | | S31 (1.0m) 17-Feb-2023 |
| **Lab Number:** | | 3177877.1 |
| **Asbestos Presence / Absence** | | Asbestos NOT detected. |
| Description of Asbestos Form | | - |
| Asbestos in ACM as % of Total Sample* | % w/w | < 0.001 |
| Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* | % w/w | < 0.001 |
| Asbestos as Fibrous Asbestos as % of Total Sample* | % w/w | < 0.001 |
| Asbestos as Asbestos Fines as % of Total Sample* | % w/w | < 0.001 |
| As Received Weight | g | 451.6 |
| Dry Weight | g | 408.7 |
| Moisture | % | 9 |
| | | |
| Sample Fraction >10mm | g dry wt | < 0.1 |
| Sample Fraction <10mm to >2mm | g dry wt | < 0.1 |
| Sample Fraction <2mm | g dry wt | 408.6 |
| <2mm Subsample Weight | g dry wt | 58.1 |
| Weight of Asbestos in ACM (Non-Friable) | g dry wt | < 0.00001 |
| Weight of Asbestos as Fibrous Asbestos (Friable) | g dry wt | < 0.00001 |
| Weight of Asbestos as Asbestos Fines (Friable)* | g dry wt | < 0.00001 |

**Glossary of Terms**

• Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
• Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
• ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
• ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
• Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
• Trace - Trace levels of asbestos, as defined by AS4964-2004.
For further details, please contact the Asbestos Team.

**Please refer to the BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.**
**https://www.branz.co.nz/asbestos**

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

**Sample Type: Soil**

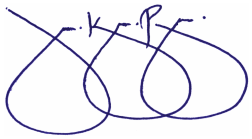
| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| Individual Tests | | | |
| Weight of Asbestos as Asbestos Fines in <10mm >2mm Fraction* | Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.00001 g dry wt | 1 |
| New Zealand Guidelines Semi Quantitative Asbestos in Soil | | | |
| As Received Weight | Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.1 g | 1 |
| Dry Weight | Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.1 g | 1 |
| Moisture | Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100. | 1 % | 1 |
| Sample Fraction >10mm | Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.1 g dry wt | 1 |
| Sample Fraction <10mm to >2mm | Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.1 g dry wt | 1 |
| Sample Fraction <2mm | Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. | 0.1 g dry wt | 1 |
| **Asbestos Presence / Absence** | Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples. | 0.01% | 1 |
| Description of Asbestos Form | Description of asbestos form and/or shape if present. | - | 1 |
| Weight of Asbestos in ACM (Non-Friable) | Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos in ACM as % of Total Sample* | Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Weight of Asbestos as Fibrous Asbestos (Friable) | Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos as Fibrous Asbestos as % of Total Sample* | Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Weight of Asbestos as Asbestos Fines (Friable)* | Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.00001 g dry wt | 1 |
| Asbestos as Asbestos Fines as % of Total Sample* | Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |
| Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* | Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017. | 0.001 % w/w | 1 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed on 22-Feb-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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John Keneth Paglingayen BApSc
Laboratory Technician - Asbestos

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www.hill-labs.co.nz

# Certificate of Analysis



| | | | | |
|---|---|---|---|---|
| **Client:** | Riley Consultants Limited | **Lab No:** | 3573487 | SPv1 |
| **Contact:** | Gareth Jackson<br>C/- Riley Consultants Limited<br>PO Box 100253<br>North Shore Mail Centre<br>Auckland 0745 | **Date Received:** | 08-May-2024 | |
| | | **Date Reported:** | 15-May-2024 | |
| | | **Quote No:** | 94960 | |
| | | **Order No:** | 220306 | |
| | | **Client Reference:** | SS Paraparaumu | |
| | | **Submitted By:** | Gareth Jackson | |

**Sample Type: Soil**

| Sample Name: | | SSP-1<br>07-May-2024 | SSP-2<br>07-May-2024 | SSP-3<br>07-May-2024 | SSP-4<br>07-May-2024 | SSP-5<br>07-May-2024 |
|---|---|---|---|---|---|---|
| **Lab Number:** | | 3573487.1 | 3573487.2 | 3573487.3 | 3573487.4 | 3573487.5 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | - | - | 67 | 86 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 4 | 3 | 3 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.17 | 0.18 | 0.20 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 8 | 9 | 6 | 6 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 4 | 9 | 5 | 4 |
| Total Recoverable Lead | mg/kg dry wt | 5.2 | 4.4 | 6.6 | 3.8 | 3.6 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 5 | 6 | 5 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 24 | 27 | 35 | 24 | 23 |
| Organochlorine Pesticides Screening in Soil | | | | | | |
| Aldrin | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| alpha-BHC | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| beta-BHC | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| delta-BHC | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| gamma-BHC (Lindane) | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| cis-Chlordane | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| trans-Chlordane | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 2,4'-DDD | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 4,4'-DDD | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 2,4'-DDE | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 4,4'-DDE | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 2,4'-DDT | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| 4,4'-DDT | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Total DDT Isomers | mg/kg dry wt | - | - | < 0.09 | < 0.07 | - |
| Dieldrin | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endosulfan I | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endosulfan II | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endosulfan sulphate | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endrin | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endrin aldehyde | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Endrin ketone | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Heptachlor | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Heptachlor epoxide | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Hexachlorobenzene | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |
| Methoxychlor | mg/kg dry wt | - | - | < 0.015 | < 0.012 | - |

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | SSP-6 0m 07-May-2024 | SSP-7 07-May-2024 | SSP-8 07-May-2024 | SSP-9 0m 07-May-2024 | SSP-10 07-May-2024 |
| **Lab Number:** | | 3573487.6 | 3573487.7 | 3573487.8 | 3573487.9 | 3573487.10 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | - | 83 | 79 | 36 | 80 |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 3 | 2 | 4 | 4 | 5 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.20 | < 0.10 | 0.18 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 8 | 5 | 9 | 6 | 8 |
| Total Recoverable Copper | mg/kg dry wt | 4 | 5 | 5 | 21 | 5 |
| Total Recoverable Lead | mg/kg dry wt | 4.3 | 4.0 | 4.4 | 3.3 | 8.4 |
| Total Recoverable Nickel | mg/kg dry wt | 5 | 4 | 5 | 3 | 4 |
| Total Recoverable Zinc | mg/kg dry wt | 25 | 28 | 27 | 25 | 30 |
| Organochlorine Pesticides Screening in Soil | | | | | | |
| Aldrin | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| alpha-BHC | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| beta-BHC | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| delta-BHC | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| gamma-BHC (Lindane) | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| cis-Chlordane | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| trans-Chlordane | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| 2,4'-DDD | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| 4,4'-DDD | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| 2,4'-DDE | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| 4,4'-DDE | mg/kg dry wt | - | < 0.012 | 0.020 | < 0.03 | < 0.013 |
| 2,4'-DDT | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| 4,4'-DDT | mg/kg dry wt | - | < 0.012 | 0.015 | < 0.03 | < 0.013 |
| Total DDT Isomers | mg/kg dry wt | - | < 0.08 | < 0.08 | < 0.17 | < 0.08 |
| Dieldrin | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endosulfan I | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endosulfan II | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endosulfan sulphate | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endrin | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endrin aldehyde | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Endrin ketone | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Heptachlor | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Heptachlor epoxide | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Hexachlorobenzene | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Methoxychlor | mg/kg dry wt | - | < 0.012 | < 0.013 | < 0.03 | < 0.013 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | - | - | < 0.7 | < 0.3 |
| 1-Methylnaphthalene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| 2-Methylnaphthalene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Acenaphthylene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Acenaphthene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Anthracene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[a]anthracene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | - | - | < 0.068 | < 0.030 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | - | - | < 0.068 | < 0.030 |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[e]pyrene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Benzo[k]fluoranthene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Chrysene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | SSP-6 0m 07-May-2024 | SSP-7 07-May-2024 | SSP-8 07-May-2024 | SSP-9 0m 07-May-2024 | SSP-10 07-May-2024 |
| **Lab Number:** | | 3573487.6 | 3573487.7 | 3573487.8 | 3573487.9 | 3573487.10 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Fluoranthene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Fluorene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Naphthalene | mg/kg dry wt | - | - | - | < 0.14 | < 0.07 |
| Perylene | mg/kg dry wt | - | - | - | < 0.03 | 0.034 |
| Phenanthrene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |
| Pyrene | mg/kg dry wt | - | - | - | < 0.03 | < 0.013 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | SSP-11 07-May-2024 | SSP-12 07-May-2024 | SSP-14 07-May-2024 | SSP-15 07-May-2024 | SSP-16 07-May-2024 |
| **Lab Number:** | | 3573487.11 | 3573487.12 | 3573487.13 | 3573487.14 | 3573487.15 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | 67 | 80 | - | 95 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 11 | 3 | 4 | 3 | 6 |
| Total Recoverable Cadmium | mg/kg dry wt | 0.14 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 17 | 6 | 7 | 6 | 8 |
| Total Recoverable Copper | mg/kg dry wt | 23 | 4 | 5 | 6 | 8 |
| Total Recoverable Lead | mg/kg dry wt | 28 | 4.4 | 4.6 | 5.0 | 8.5 |
| Total Recoverable Nickel | mg/kg dry wt | 16 | 5 | 6 | 4 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 167 | 23 | 27 | 29 | 86 |
| Organochlorine Pesticides Screening in Soil | | | | | | |
| Aldrin | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| alpha-BHC | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| beta-BHC | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| delta-BHC | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| gamma-BHC (Lindane) | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| cis-Chlordane | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| trans-Chlordane | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 2,4'-DDD | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 4,4'-DDD | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 2,4'-DDE | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 4,4'-DDE | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 2,4'-DDT | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| 4,4'-DDT | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Total DDT Isomers | mg/kg dry wt | < 0.09 | - | - | < 0.07 | - |
| Dieldrin | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endosulfan I | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endosulfan II | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endosulfan sulphate | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endrin | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endrin aldehyde | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Endrin ketone | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Heptachlor | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Heptachlor epoxide | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Hexachlorobenzene | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Methoxychlor | mg/kg dry wt | < 0.015 | - | - | < 0.011 | - |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | - | < 0.3 | - | - | - |
| 1-Methylnaphthalene | mg/kg dry wt | - | < 0.012 | - | - | - |
| 2-Methylnaphthalene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Acenaphthylene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Acenaphthene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Anthracene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Benzo[a]anthracene | mg/kg dry wt | - | < 0.012 | - | - | - |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | SSP-11<br>07-May-2024 | SSP-12<br>07-May-2024 | SSP-14<br>07-May-2024 | SSP-15<br>07-May-2024 | SSP-16<br>07-May-2024 |
| **Lab Number:** | | 3573487.11 | 3573487.12 | 3573487.13 | 3573487.14 | 3573487.15 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | - | < 0.012 | - | - | - |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | - | < 0.029 | - | - | - |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | - | < 0.029 | - | - | - |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Benzo[e]pyrene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Benzo[g,h,i]perylene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Benzo[k]fluoranthene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Chrysene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Dibenzo[a,h]anthracene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Fluoranthene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Fluorene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Naphthalene | mg/kg dry wt | - | < 0.06 | - | - | - |
| Perylene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Phenanthrene | mg/kg dry wt | - | < 0.012 | - | - | - |
| Pyrene | mg/kg dry wt | - | < 0.012 | - | - | - |

| **Sample Name:** | | SSP-17<br>07-May-2024 | SSP-19<br>07-May-2024 | SSP-20<br>07-May-2024 | SSP9-0.5m<br>07-May-2024 | SSP-6 0.5m<br>07-May-2024 |
|---|---|---|---|---|---|---|
| **Lab Number:** | | 3573487.16 | 3573487.17 | 3573487.18 | 3573487.19 | 3573487.20 |
| Individual Tests | | | | | | |
| Dry Matter | g/100g as rcvd | 45 | 81 | 89 | 34 | - |
| Heavy Metals, Screen Level | | | | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 26 | 4 | 6 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.12 | < 0.10 | < 0.10 | < 0.10 |
| Total Recoverable Chromium | mg/kg dry wt | 10 | 16 | 7 | 10 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 9 | 24 | 5 | 39 | 4 |
| Total Recoverable Lead | mg/kg dry wt | 5.9 | 21 | 4.0 | 5.4 | 4.4 |
| Total Recoverable Nickel | mg/kg dry wt | 4 | 8 | 6 | 4 | 6 |
| Total Recoverable Zinc | mg/kg dry wt | 38 | 70 | 27 | 37 | 26 |
| Organochlorine Pesticides Screening in Soil | | | | | | |
| Aldrin | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| alpha-BHC | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| beta-BHC | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| delta-BHC | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| gamma-BHC (Lindane) | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| cis-Chlordane | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| trans-Chlordane | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 2,4'-DDD | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 4,4'-DDD | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 2,4'-DDE | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 4,4'-DDE | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 2,4'-DDT | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| 4,4'-DDT | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Total DDT Isomers | mg/kg dry wt | - | < 0.08 | < 0.07 | < 0.18 | - |
| Dieldrin | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endosulfan I | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endosulfan II | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endosulfan sulphate | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endrin | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endrin aldehyde | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Endrin ketone | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Heptachlor | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |

| Sample Type: Soil | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Name:** | | SSP-17 07-May-2024 | SSP-19 07-May-2024 | SSP-20 07-May-2024 | SSP9-0.5m 07-May-2024 | SSP-6 0.5m 07-May-2024 |
| **Lab Number:** | | 3573487.16 | 3573487.17 | 3573487.18 | 3573487.19 | 3573487.20 |
| Organochlorine Pesticides Screening in Soil | | | | | | |
| Heptachlor epoxide | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Hexachlorobenzene | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Methoxychlor | mg/kg dry wt | - | < 0.012 | < 0.012 | < 0.03 | - |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | | | | | | |
| Total of Reported PAHs in Soil | mg/kg dry wt | < 0.6 | < 0.3 | - | < 0.8 | - |
| 1-Methylnaphthalene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| 2-Methylnaphthalene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Acenaphthylene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Acenaphthene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Anthracene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[a]anthracene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[a]pyrene (BAP) | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | mg/kg dry wt | < 0.052 | < 0.029 | - | < 0.071 | - |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | mg/kg dry wt | < 0.052 | < 0.029 | - | < 0.071 | - |
| Benzo[b]fluoranthene + Benzo[j] fluoranthene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[e]pyrene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[g,h,i]perylene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Benzo[k]fluoranthene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Chrysene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Dibenzo[a,h]anthracene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Fluoranthene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Fluorene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Indeno(1,2,3-c,d)pyrene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Naphthalene | mg/kg dry wt | < 0.11 | < 0.06 | - | < 0.15 | - |
| Perylene | mg/kg dry wt | < 0.03 | < 0.012 | - | 0.04 | - |
| Phenanthrene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |
| Pyrene | mg/kg dry wt | < 0.03 | < 0.012 | - | < 0.03 | - |

| **Sample Name:** | | SSP-6 1m 07-May-2024 | SSP-1A 07-May-2024 |
|---|---|---|---|
| **Lab Number:** | | 3573487.21 | 3573487.22 |
| Heavy Metals, Screen Level | | | |
| Total Recoverable Arsenic | mg/kg dry wt | 4 | 3 |
| Total Recoverable Cadmium | mg/kg dry wt | < 0.10 | 0.17 |
| Total Recoverable Chromium | mg/kg dry wt | 7 | 7 |
| Total Recoverable Copper | mg/kg dry wt | 5 | 6 |
| Total Recoverable Lead | mg/kg dry wt | 4.1 | 6.0 |
| Total Recoverable Nickel | mg/kg dry wt | 6 | 5 |
| Total Recoverable Zinc | mg/kg dry wt | 26 | 38 |

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

| Sample Type: Soil | | | |
|---|---|---|---|
| **Test** | **Method Description** | **Default Detection Limit** | **Sample No** |
| Environmental Solids Sample Drying* | Air dried at 35°C<br>Used for sample preparation.<br>May contain a residual moisture content of 2-5%.<br>(Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). | - | 1-22 |
| Total of Reported PAHs in Soil | Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270. | 0.03 mg/kg dry wt | 9-10, 12, 16-17, 19 |
| Heavy Metals, Screen Level | Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. | 0.10 - 4 mg/kg dry wt | 1-22 |

| Sample Type: Soil | | | |
|---|---|---|---|
| **Test** | **Method Description** | **Default Detection Limit** | **Sample No** |
| Organochlorine Pesticides Screening in Soil | Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081. | 0.010 - 0.06 mg/kg dry wt | 3-4, 7-11, 14, 17-19 |
| Polycyclic Aromatic Hydrocarbons Screening in Soil* | Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270. | 0.010 - 0.05 mg/kg dry wt | 9-10, 12, 16-17, 19 |
| Dry Matter | Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550. | 0.10 g/100g as rcvd | 3-4, 7-12, 14, 16-19 |
| Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* | BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment. | 0.024 mg/kg dry wt | 9-10, 12, 16-17, 19 |
| Benzo[a]pyrene Toxic Equivalence (TEF)* | Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997). | 0.024 mg/kg dry wt | 9-10, 12, 16-17, 19 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 10-May-2024 and 15-May-2024. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Kim Harrison MSc
Client Services Manager - Environmental

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# Certificate of Analysis



| | | | | |
|---|---|---|---|---|
| **Client:** | Riley Consultants Limited | **Lab No:** | 3574428 | A2Pv1 |
| **Contact:** | Gareth Jackson | **Date Received:** | 08-May-2024 | |
| | C/- Riley Consultants Limited | **Date Reported:** | 13-May-2024 | |
| | PO Box 100253 | **Quote No:** | 94960 | |
| | North Shore Mail Centre | **Order No:** | 220306 | |
| | Auckland 0745 | **Client Reference:** | SS Paraparaumu | |
| | | **Submitted By:** | Gareth Jackson | |

**Sample Type: Soil**

| Sample Name | Lab Number | As Received Weight Presence / Absence Testing (g) | Dry Weight Presence / Absence Testing (g) | <2mm Subsample Weight Presence / Absence Testing (g dry wt) | Asbestos Presence / Absence from Presence / Absence Testing | Description of Asbestos Form Presence / Absence Testing |
|---|---|---|---|---|---|---|
| SSP-10 | 3574428.1 | 123.6 | 101.8 | 51.9 | Asbestos NOT detected. | - |
| SSP-11 | 3574428.2 | 101.4 | 81.4 | 9.2 | Asbestos NOT detected. | - |
| SSP-16 | 3574428.3 | 104.5 | 95.0 | 55.5 | Asbestos NOT detected. | - |
| SSP-19 | 3574428.4 | 118.6 | 101.9 | 52.6 | Asbestos NOT detected. | - |

**Glossary of Terms**

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

**Sample Type: Soil**

| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| Asbestos in Soil | | | |
| As Received Weight Presence / Absence Testing | Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g | 1-4 |
| Dry Weight Presence / Absence Testing | Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | 0.1 g | 1-4 |
| <2mm Subsample Weight Presence / Absence Testing | Sample dried at 100 to 105°C, weight of <2mm sample fraction taken for asbestos identification if less than entire fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. | - | 1-4 |
| Asbestos Presence / Absence from Presence / Absence Testing | Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples. | 0.01% | 1-4 |
| Description of Asbestos Form Presence / Absence Testing | Description of asbestos form and/or shape if present. | - | 1-4 |

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 11-May-2024 and 13-May-2024. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

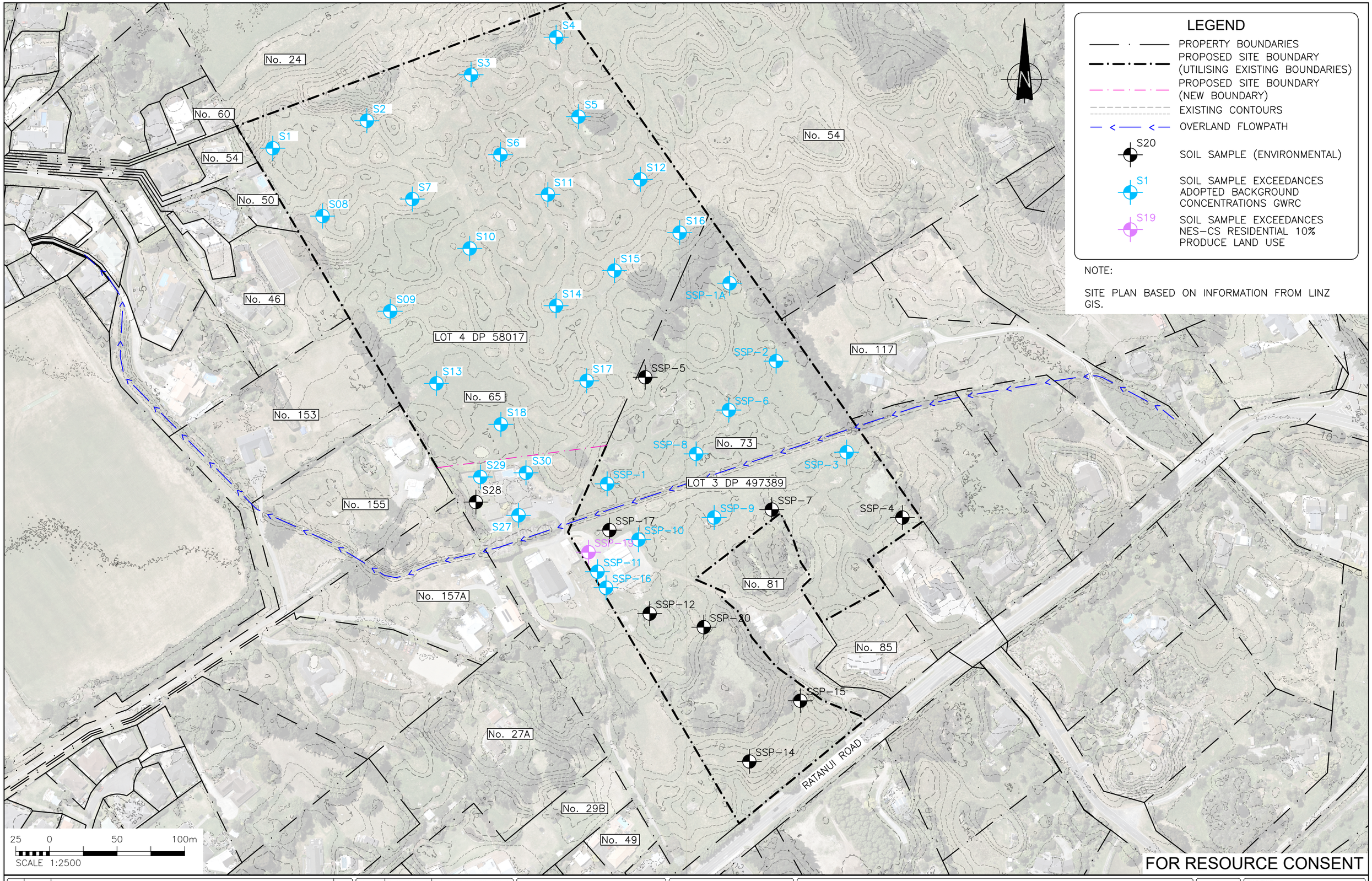
This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Rhodri Williams BSc (Hons)
Technical Manager - Asbestos

# Appendix F

**Riley Drawing: 220306-60**




| REV | DATE | ISSUE | BY |
|---|---|---|---|
| 2 | 27.02.25 | FOR RESOURCE CONSENT | FY |
| 1 | 29.11.24 | PLAN CHANGE | ZL |

| DESIGN | DES CHECK | APPROVED FOR ISSUE |
|---|---|---|
| MH | BB | B. BLACK |
| DRAWN | CAD CHECK | |
| ZL | ZL | |
| DATE DRAWN | | ISSUE DATE |
| OCT 2024 | | 27 / 02 / 25 |

RILEY
www.riley.co.nz

| | |
|---|---|
| CLIENT | WELHOM DEVELOPMENTS LTD. |
| ADDRESS | 65 & 73 RATANUI ROAD, PARAPARAUMU |
| PROJECT | SUBDIVISION |
| SHEET TITLE | DSI SOIL TESTING LOCATIONS |

ACENZ
ISO 9001 CERTIFIED GCS

| | |
|---|---|
| CADFILE | 220306–60.dwg |
| SCALE (A3) | 1:2500 |
| ORIG. SHEET SIZE | A3 |
| DRAWING No. | 220306-60 |
| REV. | 2 |

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