# Preliminary Site Investigation

# Private Plan Change

## 65 and 73 Ratanui Road, Paraparaumu

RILEY

# Preliminary Site Investigation
# Private Plan Change
# 65 and 73 Ratanui Road, Paraparaumu

| | |
|---|---|
| Report prepared for: | Welhom Developments Ltd |
| Report prepared by: | Nicolas Franco, Senior Environmental Scientist |
| Report reviewed by: | Marcus Herrmann, Technical Director Site Contamination |
| Report approved for issue by: | Brett Black, Project Director, CPEng |

| | | |
|---|---|---|
| Report reference: | 220306-D (Issue 2.0) | |
| Date: | 29 November 2024 | |
| Copies to: | Welhom Developments Ltd | Electronic copy |
| | Riley Consultants Ltd | Electronic copy |

| Issue | Details | Date |
|---|---|---|
| 1.0 | Preliminary Site Investigation | 25 November 2024 |
| 2.0 | Preliminary Site Investigation | 29 November 2024 |
| | | |

# Contents



# Appendices

## Executive Summary

This Preliminary Site Investigation (PSI) report (to be read in its entirety) is intended to support a private plan change application to Kāpiti Coast District Council (KCDC) for the site situated at 65 and 73 Ratanui Road.

The PSI was undertaken in 2023 and 2024 and comprised a desktop review followed by an intrusive soil investigation to assess whether soil contaminants were present that could pose a health or environmental risk, and to identify surplus soil management options for future residential development at the site.

Desktop review included the review of available historic aerial photographs, assessment of KCDC and Greater Wellington Regional Council (GWRC) site contamination records to identify potential Ministry for the Environment Hazardous Activities and Industries List (MfE HAIL) activities on the site. No site contamination activities were identified from review of council records, however historic aerial photographs showed that unknown fill material may have been used for construction of dwellings and internal roads indicating that MfE HAIL Category I had potentially occurred on-site.

To assess soil quality across the site and to identify potential presence of contaminants related to placement of fill materials on-site, an intrusive soil quality investigation was undertaken including a site walkover and advancement of 54 hand-augered bores, with collection of 66 soil samples from depths varying from 0.1m bgl to 1.0m bgl. All samples were sent to an IANZ-accredited laboratory for analysis of heavy metals/metalloids for all samples; and selected samples were analysed for polycyclic aromatic hydrocarbons/PAH, organochlorine pesticides/OCP and asbestos (presence/absence). Soil testing outcomes identified no asbestos present in any of the soil samples analysed, and no contaminants were identified that exceeded health-based NES-CS[1] soil contaminant standards for high-density residential or outdoor worker (unpaved) land use scenarios. One arsenic sample (SSP-19, 73 Ratanui Road) exceeded the NES-CS residential soil contaminant standard; further testing in this area will be conducted to determine the extent of contamination in this area. This localised soil volume will be removed and validated prior to development.

Across the site, concentrations of cadmium, localised heavy metals/metalloids and OCP exceeding background concentrations were detected in the soil. These exceedances present no health or environmental risks and do not preclude re-use of soils on-site. However, if surplus soils are required to be removed from the site, they are likely to require disposal as managed fill rather than cleanfill due to these background exceedances.

Overall, the findings of this PSI confirm that the identified low-level soil contamination at the site can be readily managed at the development stage, ensuring compliance with regulatory requirements. There are no contamination-related reasons to prevent the private plan change from proceeding.

[1] Ministry for the Environment. Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

# Preliminary Site Investigation
# Private Plan Change
# 65 and 73 Ratanui Road, Paraparaumu

## 1.0 Introduction

The following Preliminary Site Investigation (PSI) report has been prepared by Riley Consultants Ltd (Riley) at the request of Welhom Developments Ltd (Welhom). The report details the findings of a desktop review and soil quality testing results in support of a private plan change request for the re-zoning of a greenfield/rural site, situated to the north of Paraparaumu in Kāpiti Coast.

The site is bounded to the west by residential properties, to the north and east by farmland and to the south by Ratanui Road; see the lot highlighted yellow in Figure 1.

**Figure 1: Locality Map (Kapiti Coast District Council GIS)**

This report summarizes the findings of the PSI. It has been prepared in accordance with MfE CLMG #1[2] and the NES-CS[3].

The report has been reviewed by a suitably qualified and experienced practitioner in contaminated land (SQEP), as required by the NES-CS.

[2] Ministry for the Environment, revised 2021: Contaminated Land Management Guidelines #1 – Reporting on Contaminated Sites in New Zealand.

[3] Ministry for the Environment. Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

## 2.0 Site Description

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 below; 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.

The term 'site' herein refers to 73 Ratanui Road and the rear portion of 65 Ratanui Road (north of the existing dwelling situated on that lot) subject to the proposed private plan change. The site excludes the southern relatively narrow portion of 65 containing the existing dwelling and farm sheds, with the northern portion of 65 intended to be subdivided into a separate lot to then become part of the site. The site is displayed in the Riley Site Plan (Riley Dwg: 220306-10).

It is proposed to change the zoning of the site from the current Rural Lifestyle Zone to General Residential Zone in contemplation of residential development. The intention of this assessment is to support the suitability of the site for rezoning by providing certainty regarding key requirements for any future residential activity on the site.

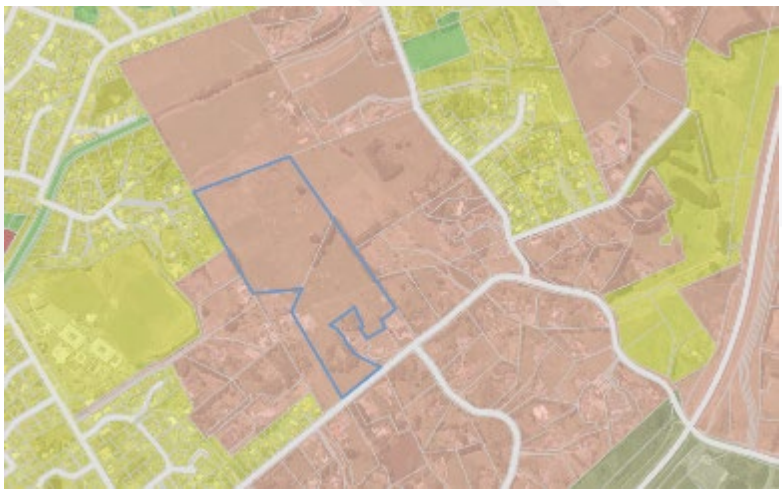


**Figure 2: Residential Private Plan Change – Site Area (Kāpiti Coast District Council, GIS Maps, Operative District Plan 2021).**

(Blue line polygon: Plan change site boundary; Light pink: Rural Lifestyle Zone; Yellow: General Residential Zone; Green: Natural Open Space Zone)

## 2.1 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 is/was underlain by alluvium materials.

Groundwater monitoring during February 2023 and May 2024 geotechnical investigations indicate the groundwater table to be approximately 2.1m to 5.0m below ground level (bgl).

# 3.0 Preliminary Site Investigation

Riley has undertaken a PSI that included a desktop assessment and soil quality sampling regime to assess the potential for soil contamination across the site.

## 3.1 Desk Study Information

### 3.1.1 Historical Aerial Photographs

A review of the available historic aerial photographs of the site dated 1940 to 2022 (included as Appendix A) is presented in Table 1.

**Table 1: Review of Available Historic Photographs**

| Date | Description | |
|---|---|---|
| | Lot 4 DP 58017 - 65 Ratanui Road | Lot 3 DP 497389 – 73 Ratanui Road |
| 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. |

| Date | Description | |
|---|---|---|
| | Lot 4 DP 58017 - 65 Ratanui Road | Lot 3 DP 497389 – 73 Ratanui Road |
| 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. |
| 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. |

| Date | Description | |
|---|---|---|
| | Lot 4 DP 58017 - 65 Ratanui Road | Lot 3 DP 497389 – 73 Ratanui Road |
| 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. |
| 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. |

| Date | Description | |
|---|---|---|
| | Lot 4 DP 58017 - 65 Ratanui Road | Lot 3 DP 497389 – 73 Ratanui Road |
| 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.

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

Greater Wellington Regional Council (GWRC) maintains a site contamination database called 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 for having any current or historic MfE HAIL activities. No historic Resource Consents have been applied for in relation to these lots.

Riley contacted 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 B.


**Figure 3: SLUR sites in Paraparaumu from GWRC GIS in relation to the Private Plan Change site.**
**(Yellow: site; blue: SLUR site)**

### 3.1.3 Desktop Study Conclusions

The review of property files and the SLUR database has not identified potential MfE HAIL activities on-site. However, the review of historic aerial photographs identifies that unknown fill may have been used for construction of dwellings and internal roads. Therefore, 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 3.4.

## 3.2 Soil Quality Investigation

An intrusive site investigation was carried out to assess soil quality[4] to identify off-site disposal and sustainable on-site reuse options and to assess potential health risks from soils on-site from identified past activities including placement of filling material for construction and cattle grazing.

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 54 sampling locations (35 locations at 65 Ratanui Road and 19 locations at 73 Ratanui Road), with 44 samples having been collected from 65 Ratanui Road and 22 samples collected from 73 Ratanui Road.

Samples were collected from surface soils (0.1m) as well as some representative 0.5/0.6 metres below ground level (m bgl) deeper samples across the site. Deeper samples (1.0m) within the dwelling footprint at 65 Ratanui Road were collected and one sample at 73 Ratanui Road was collected due to the presence of fill material.

A total of sixty-six (66) samples were scheduled for heavy metals analysis, ten (10) samples for polycyclic aromatic hydrocarbons (PAH) analysis, eleven (11) samples for organochlorine pesticides (OCP) analysis, and four (4) samples for asbestos (presence/absence) analysis.

The tabulated laboratory comparative results and full laboratory analysis transcripts are included as Appendix C and Appendix D, respectively. Soil sampling locations are shown on Riley Dwg: 220306-60 (included as Appendix E).

[4] Heavy metals and metalloids, polycyclic aromatic hydrocarbons and organochlorine pesticides were assessed as they form the basis of most landfills' acceptance criteria.

### 3.2.1 Soil Sampling Procedures

Samples were collected in accordance with MfE Contaminated Land Management Guidelines No. 5[5], as follows:

- The soil at each sampling location was logged in accordance with the New Zealand Geotechnical Society guideline for the field classification and description of soil and rock for engineering purposes.
- Freshly gloved hands were used to collect the samples, which were placed immediately into the appropriate laboratory supplied sample containers.
- Sampling equipment was wiped down and cleaned with Decon-90 and freshwater between each sampling location.
- Samples were couriered in chilled containers to IANZ-certified Hill Laboratories Ltd (Hill) under chain of custody documentation.

### 3.2.2 Observations

Topsoil was encountered in all testing across the site. Topsoil thickness is likely between 0.15m and 0.50m across the site as indicated in the geotechnical investigation. Environmental soil sampling records and logs available from the New Zealand Geotechnical Database in the vicinity of the site or within the lots were also assessed.

## 3.3 Evaluation Criteria

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

It is important to note that there are no published soil background levels for the Kāpiti Coast District Council (KCDC) area to use as a comparison for concentrations recorded on-site. Therefore, Riley has contacted the Contaminated Land Team within Greater Wellinton Regional Council (GWRC), who have recommended reference to the GWRC's Resource Investigation Department's Soil Quality Monitoring Technical Report[6].

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

- Resource Investigations Department. Greater Wellington Regional Council - Soil Quality Monitoring Technical Report, 2006.

[5] Ministry for the Environment, revised 2021: Contaminated Land Management Guidelines #5 – Site investigation and Analysis of Soils. New Zealand.
[6] Bruce Croucher, 2005. Soil quality monitoring technical report. Resource Investigations Department, Greater Wellington Regional Council.

- 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.

## 3.4 Soil Sampling Results

### 3.4.1 65 Ratanui Road[7]

- No soil parameters tested exceeded NES-CS health-based soil contaminant standards for high-density residential, for residential (10% produce[8]), nor for outdoor worker (unpaved) land use scenarios.
- Eighteen (18) surficial samples identified cadmium[9] exceeding adopted background concentrations.
- Sample S30 (0.1m) identified copper exceeding adopted background concentrations.
- PAHs were detected in sample SS30 (0.1m) in concentrations below NES-CS health relevant criterion.

### 3.4.2 73 Ratanui Road[10]

- 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 (while this concentration meets the high-density residential land use criterion, this area will require delineation and removal to an appropriate off-site facility). No other compounds of concern were detected at concentrations above 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.

---

[7] Note: soil sampling undertaken on 16 and 17 February 2023.

[8] 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.

[9] 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[9] as has been identified across the site through review of historic aerial images.

[10] Note: soil sampling undertaken on 7 May 2024.

- 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 polycyclic aromatic hydrocarbons (PAH) exceedances against background concentrations, in the form of perylene.
- Sample SSP-11 (0.1m) identified zinc exceeding predicted background concentrations.
- Sample SSP-8 identified low-level organochlorine pesticide concentrations of 4,4'-DDE and 4,4'-DDT exceeding predicted background concentrations.
- Samples SSP-10 (0.1m) and SSP-9 (0.5m) identified low-level PAH exceedances, in the form of perylene.

Based on 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 organochlorine pesticides (OCP), future disturbance of soils will require a controlled activity Resource Consent under the NES-CS from KCDC.

## 3.5 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.

## 3.6 NES-CS

A PSI and soil quality testing regime was undertaken to support the proposed private plan change in order to identify potential MfE HAIL activities, on-site/off-site soil reuse/disposal options, and any potential health and environmental risks associated with contaminants of interest in soils that might affect the future intended use of the site for residential development. It is understood that a Detailed Site Investigation (DSI) report will be provided at a later stage in support of a Land Use Consent application to KCDC under the NES-CS.

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

## 3.7 NES-CS Activity Status

The investigation did not identify any activity or industry included in the HAIL to have occurred on-site. However, extensive soil testing carried out to identify potential soil contamination sources and to categorise off-site disposal/on-site reuse options identified heavy metals and metalloids at concentrations exceeding the adopted background levels, but not exceeding the NES-CS health-based soil contaminant standards.

As such, any future development of the site for residential land use is not considered to be a permitted activity and will require Resource Consent from KCDC under the NES-CS as a controlled activity.

For any future residential development of the Site, a Site Management Plan (SMP) will be required to be developed prior to earthworks commencing, and a Site Validation Report (SVR) or Works Completion Report (WCR) will be required following completion of earthworks. A DSI and a draft SMP may be required to be submitted to KCDC to support a future NES-CS Resource Consent application, in conjunction with this PSI.

## 3.8 WorkSafe Health and Safety at Work (Asbestos) Regulations 2016

Prior to initiating demolition works for any future residential development on the site, a WorkSafe-licensed asbestos assessor should undertake an asbestos survey for the existing dwellings to confirm or deny the presence of Asbestos Containing Materials (ACM) and/or lead paint. In the event asbestos is found to be present on the site, the WorkSafe Health & Safety at Work (Asbestos) Regulations 2016 will need to be addressed via contractor notification, the production of an Asbestos Removal Control Plan (ARCP), independent air monitoring and a clearance certificate issuance post-demolition.

# 4.0 Conclusions and Implications

The findings of the desktop review and soil testing described in the previous sections indicate:

- No activities or industries included on the MfE HAIL have occurred on-site based on the findings of the desktop review and the outcomes from the soil quality testing regime. Testing results of fill material from the footprint of constructed areas (dwellings and sheds) did not show any exceedances of applicable NES-CS soil contaminant standards.
- No asbestos has been detected in any of the soil samples analysed.
- No contaminants of concern were identified that exceeded the applicable health-based NES-CS soil contaminant standards for high-density residential or outdoor worker (unpaved) land use scenarios.
- With one exception, no contaminants of concern exceeded the NES-CS soil contaminant standard for residential (10% produce) land use. Sample SSP-19 on 73 Ratanui Road, adjacent to the shed identified an arsenic concentration exceeding the NES-CS residential (10% produce) soil contaminant standard. Further soil testing in the vicinity of this sampling location will be undertaken to delineate the extent of arsenic contamination, prior to its removal from site and subsequent validation.

- Cadmium exceeding adopted background concentrations is present in surficial soils across the site, as are other heavy metals/metalloids and OCP on a more localised basis. These background exceedances do not present any health risks and soils may be safely re-used on the site during future soil disturbance works. However, if off-site disposal is intended it is likely that these soils will meet managed fill rather than cleanfill criteria according to Class 5 Clean Fill Waste Acceptance Criteria (WAC) established in the Technical Guidelines for Disposal to Land Revision 3, WasteMINZ, October 2022.
- Based on background exceedances of cadmium across the site and other more localised heavy metals/metalloids and OCP, future disturbance of soils will require a controlled activity Land Use Consent under the NES-CS from KCDC.
- Prior to demolition of the existing structures on-site, a survey of potential asbestos containing materials (ACM) and lead paint should be undertaken by a WorkSafe-licensed asbestos assessor to determine requirements under WorkSafe's Health and Safety at Work (Asbestos) Regulations 2016.
- The identified low-level soil contamination at the site can be readily managed at the development stage, ensuring compliance with regulatory requirements. There are no contamination-related reasons to prevent the private plan change from proceeding.

## 5.0 Limitation

This report has been prepared solely for the benefit of Welhom Developments Limited with respect to the brief given to us, and to assist KCDC in processing the private plan change request. 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.

Riley Consultants Ltd has performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

The recommendations and opinions expressed are based on data from limited test positions chosen based on the former locations of dwellings and sheds. The nature and continuity of subsoil conditions away from the positions are inferred, and it must be appreciated that actual conditions could vary considerably from the assumed model.

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 that 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]

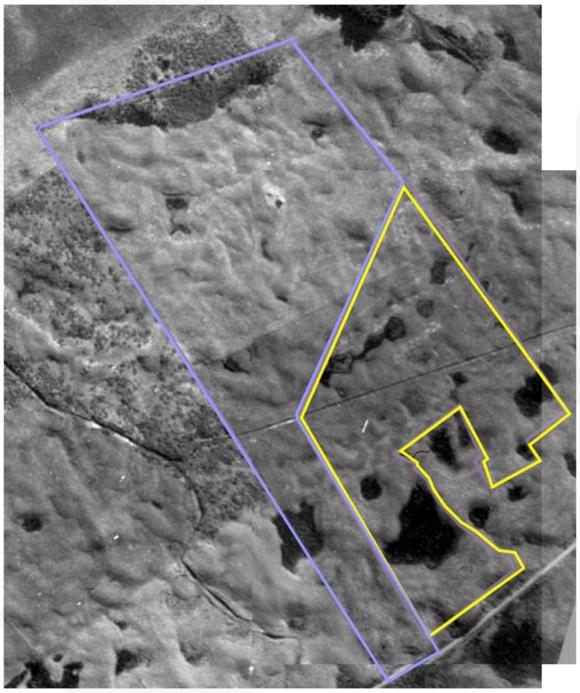


Photo 1: 1940 KCDC GIS Image
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

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/

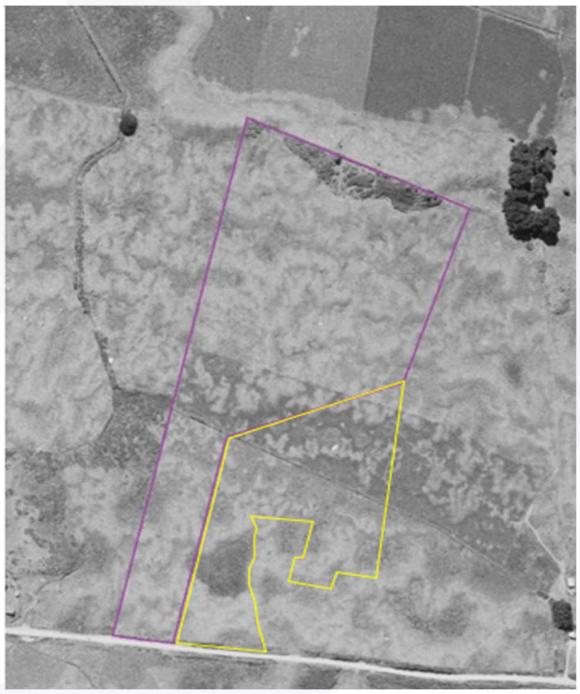


Photo 3: 1957, Retrolens image.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

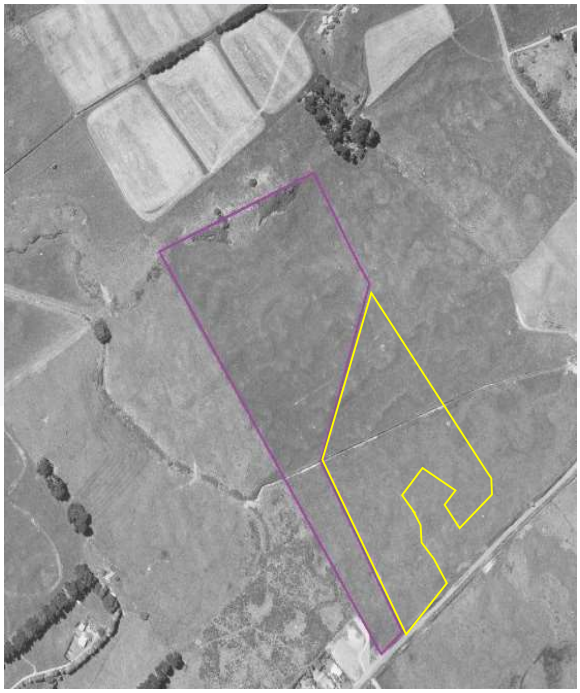


Photo 4: 1973 Retrolens image
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

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

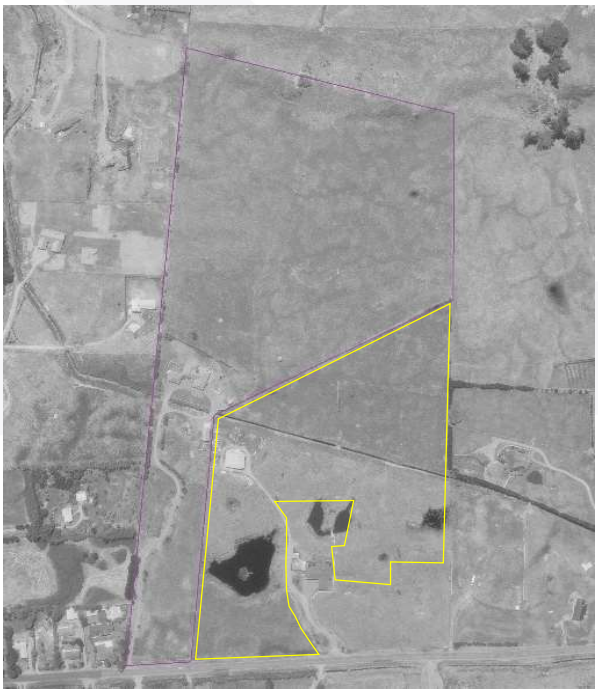


Photo 6: 1991 Retrolens Image.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

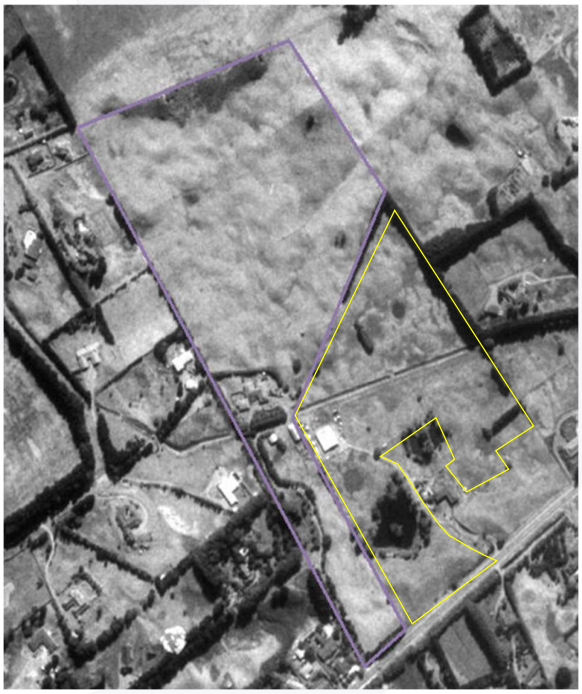


Photo 7: 1998 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

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)

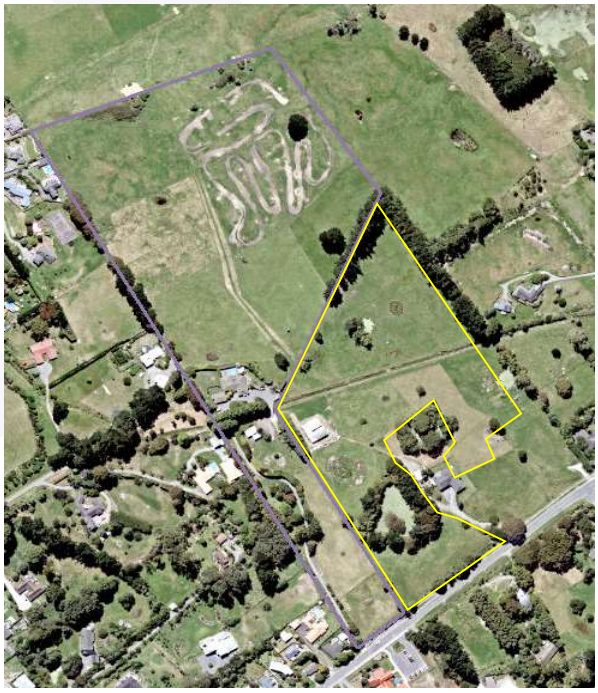


Photo 12: 2017 KCDC GIS.
(Purple: Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

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

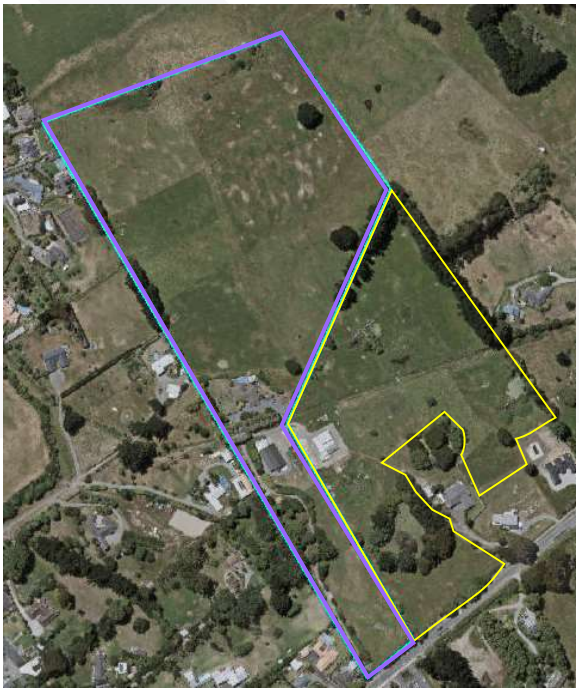


Photo 14.  2022 KCDC GIS.
Purple:  Lot 4 DP 58017, Yellow: Lot 3 DP 497389)

# Appendix B

## 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



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"

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**

## Nicolas Franco

**From:** Slur <Slur@gw.govt.nz>
**Sent:** Wednesday, 22 May 2024 9:49 am
**To:** Nicolas Franco
**Subject:** [External] RE: Contaminated Site enquire- LOT 3 DP 497389



Good Morning Nicolas,

We do not have anything on file for 73 Ratanui Rd, and it does not appear on the slur database.

Please note that this database is not a final copy of all HAIL sites within the region, it is an ongoing process. There may be several reasons why a property is not registered on the SLUR. It is important to follow the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) guidelines, if a site is to be redeveloped or if large amounts of soil is to be disturbed.

Please send through the PSI once it is finalised, so I can add the report to our database.

Kind regards

**Nicole Blackie (MSc)**
Analyst- Contaminated Land
Data Team-Environment Group
**Greater Wellington Te Pane Matua Taiao**
**Phone:** 0800 496734
100 Cuba St, Te Aro, Wellington 6011

**From:** Nicolas Franco <nfranco@riley.co.nz>
**Sent:** Tuesday, May 21, 2024 11:37 PM
**To:** Slur <Slur@gw.govt.nz>
**Subject:** Contaminated Site enquire- LOT 3 DP 497389

Hello everyone

We are undertaking a PSI for the LOT 3 DP 497389 (73 Ratanui Rd, Paraparaumu) 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**

# Appendix C

## 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] | B[a]P Potency Equivalency Factor[7] | AF/FA[5] |
| 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 | - | - | - | - |
| | S27 | 0.1 | mg/kg | 4 | **0.16** | 7 | 5 | 5.5 | 6 | 30 | - | - | < 0.030 | - |
| | | 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 | - | - | < 0.029 | - |
| | | 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 | - | - | < 0.029 | - |
| | | 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 | - | - | 0.029 | - |
| | | 0.5 | mg/kg | 4 | < 0.10 | 5 | 4 | 3.4 | 5 | 22 | - | - | - | - |
| 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** | < 0.013 | - | - |
| | SSP-9 | 0.1 | mg/kg | 4 | < 0.10 | 6 | **21** | 3.3 | 3 | 25 | < 0.03 | < 0.03 | < 0.068 | - |
| | | 0.5 | mg/kg | 6 | < 0.10 | 10 | **39** | 5.4 | 4 | 37 | < 0.03 | < 0.03 | < 0.071 | - |
| | SSP-10 | 0.1 | mg/kg | 5 | < 0.10 | 8 | 5 | 8.4 | 4 | 30 | < 0.013 | < 0.013 | < 0.030 | 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 | - | - | < 0.029 | - |
| | 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 | - | - | < 0.052 | not detected |
| | SSP-19 | 0.1 | mg/kg | **26** | **0.12** | **16** | **24** | 21 | 8 | 70 | < 0.012 | < 0.012 | < 0.029 | - |
| | SSP-20 | 0.1 | mg/kg | 4 | < 0.10 | 7 | 5 | 4 | 6 | 27 | < 0.012 | < 0.012 | - | - |
| Criteria | **Background Concentration[1]** | | mg/kg | 7 | 0.1 | 12 | 10 | 180 | 9 | 79 | - | - | 1.05 [6] | - |
| | **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.

RILEY

# Appendix D

## Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

T 0508 HILL LAB (44 555 22)
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 |

| 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.

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

Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
101C Waterloo Road
Hornby
Christchurch 8042 New Zealand

T 0508 HILL LAB (44 555 22)
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.

# 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**

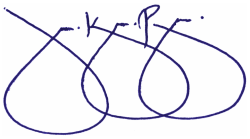
| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| Individual Tests | | | |
| Weight of Asbestos as Asbestos Fines in <10mm >2mm Fraction* | Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, 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.

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



John Keneth Paglingayen BApSc
Laboratory Technician - Asbestos

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:** | 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 | - |

| 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

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:** | 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 |

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.

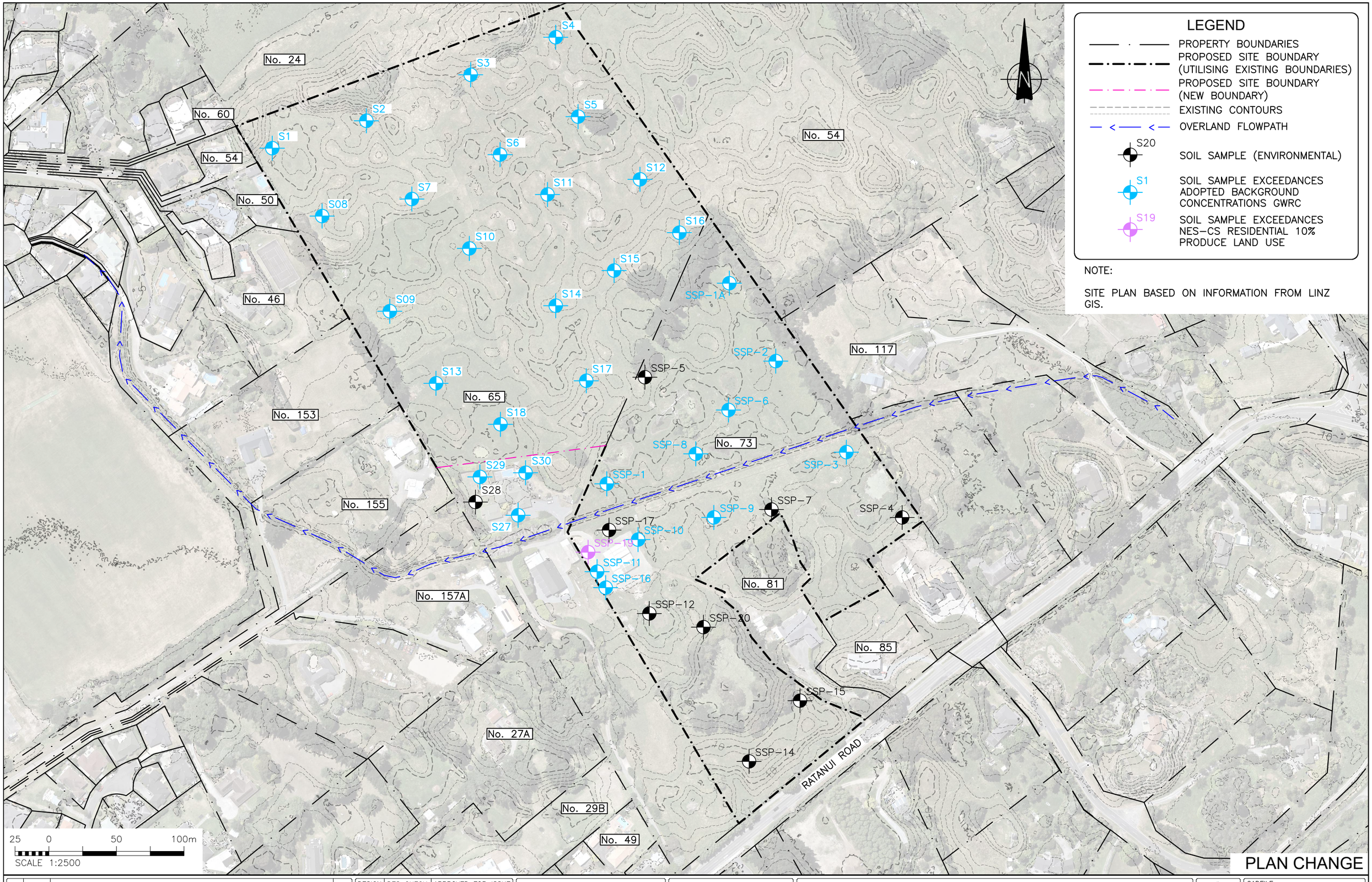
Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the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



Rhodri Williams BSc (Hons)
Technical Manager - Asbestos

# Appendix E

**Riley Dwg: 220306-60**




## LEGEND

- PROPERTY BOUNDARIES
- PROPOSED SITE BOUNDARY (UTILISING EXISTING BOUNDARIES)
- PROPOSED SITE BOUNDARY (NEW BOUNDARY)
- EXISTING CONTOURS
- OVERLAND FLOWPATH
- S20 — SOIL SAMPLE (ENVIRONMENTAL)
- S1 — SOIL SAMPLE EXCEEDANCES ADOPTED BACKGROUND CONCENTRATIONS GWRC
- S19 — SOIL SAMPLE EXCEEDANCES NES–CS RESIDENTIAL 10% PRODUCE LAND USE

NOTE:

SITE PLAN BASED ON INFORMATION FROM LINZ GIS.

# PLAN CHANGE

| REV | DATE | ISSUE | BY |
|---|---|---|---|
| 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 | | 29 / 11 / 24 |

RILEY
www.riley.co.nz

| | |
|---|---|
| CLIENT | WELHOM DEVELOPMENTS LTD. |
| ADDRESS | 65 & 73 RATANUI ROAD, PARAPARAUMU |
| PROJECT | PLAN CHANGE |
| SHEET TITLE | SITE CONTAMINATION TESTING LOCATIONS |

ACENZ
ISO 9001 CERTIFIED GCS

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

**AUCKLAND**
4 Fred Thomas Drive, Takapuna
riley@riley.co.nz

**CHRISTCHURCH**
22 Moorhouse Avenue, Addington
rileychch@riley.co.nz

riley.co.nz