Annexure F

Detailed Site Investigation

Prepared by Kirk Roberts

KIRK ROBERTS CONSULTING

Structural | Geotechnical | Civil | Environmental | Fire

ENGINEERING SERVICES

45- 47 Beach Road, Tāhunanui, Nelson 7011

Prepared For: Cameo Projects

Job No.: 2410250

Date: 19 December 2024

Revision: A

Detailed Site Investigation

find better ways.

Executive Summary

Site address	45- 47 Beach Road, Tāhunanui, Nelson 7011
Legal description	45 Beach Road - DP 530 Lot 1 57 Beach Road - DP 530 Lot 2
Local authority	Nelson City Council
Proposed activity	Land use change Soil disturbance/removal
Records reviewed	▪ **Property file**: No HAIL[1] identified ▪ **Regional Council Records (HAIL map, Consents, Bores):** No HAIL identified ▪ **Historical aerials**: Potential HAIL I ▪ **LINZ orchard layer:** No HAIL identified
Adopted standards	NES-CS contaminant standards for commercial/industrial land use (proposed land use)
HAIL Activities	HAIL I: "Any land that has been subject to the intentional or accidental release of a hazardous substance.."
Contaminants of Concern	Heavy metals, asbestos.
Conclusion	▪ Potential HAIL I has been identified associated with two historical residential dwellings and outbuildings. ▪ The soil investigation has confirmed that arsenic and heavy metal concentrations are in exceedance of the NES-CS standard for residential land use, with arsenic concentrations in one location (HP101) also exceeding the NES-CS standard for commercial/industrial outdoor worker. ▪ Asbestos was detected in shallow soils in one location (HP105), but below human health guideline values (<0.001% w/w AF/FA). ▪ Soil remediation and/or management is required as part of the future development works.
Resource consent	Resource consent is required for a restricted-discretionary under the NES-CS
Recommendations	▪ Further sampling be undertaken following removal of existing site structrues/hardstand to provide site-wide soil disposal advice. ▪ A Remedial Action Plan (RAP) and/or Site Management Plan (SMP) be prepared. . ▪ The report is provided to consenting authority as part of a consent application for the proposed land use change and soil disturbance/removal.

[1] Ministry for the Environment 2011. Hazardous Activities and Industries List (HAIL).

Quality Control Certificate

Title	45- 47 Beach Road, Tāhunanui, Nelson 7011	
Client	Cameo Projects	
Filename	2410250 ENVO REP001 2024-11-20 51-53 Beach Road DSI RevA.docx	
Revision	A	
Status	FINAL	
Date	19 December 2024	
Project Number	2410250	
Author	Name: Morgan Thomson *Environmental Consultant, BSc, PgDip*	Signature: 
Approved for Release	Name: James Jackson Environmental Manager	Signature: 

This report has been prepared in general accordance with the Ministry for the Environment's (MfE's) Contaminated Land Management Guidelines No. 1. Wellington, Ministry for the Environment 2021.

The persons undertaking and/or reviewing the report are suitably qualified and experienced practitioners (SQEP) in accordance with MfE's *Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, Wellington, Ministry for the Environment. 2012*. Refer to the statement in Section 14.

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1 Introduction

Kirk Roberts Consulting Engineers Ltd (Kirk Roberts) has been engaged by Cameo Projects (the client) to provide a Detailed Site Investigation (DSI) for land at 45- 47 Beach Road, Tāhunanui, Nelson 7011 (the site).

It is understood the client proposes to demolish the existing two dwellings and redevelop the site into a hotel. This proposed development will comprise a change in land and involve soil disturbance/removal works.

This DSI has been undertaken to assess whether the provisions of the Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (referred to as the NES-CS) apply to the land on which the activity is proposed.

1.1 Purpose

The purpose of the DSI is to determine the presence of contamination in soils at the site in order to establish potential options for soil disposal or reuse, and to assess the risk to human health and the environment. This DSI has been prepared in general accordance with the Ministry for the Environments' (MfE's) *Contaminated Land Management Guidelines* (CLMG) No. 1 and 5[2].

1.2 Scope

The scope of the investigation comprises:

- A desk-based assessment to identify potential sources of contamination at the site that included a review of:
  - Reviewing relevant Regional Council databases
  - Reviewing District Council records
  - Searching Land Information New Zealand's (LINZ's) orchard database
  - Reviewing available historical aerial photographs
  - Review of previous ground contamination investigation reports (if available)
- An intrusive ground contamination investigation at the site including:
  - A site walkover to identify visible areas of surficial contamination.
  - Collection of soil samples from test locations
  - Laboratory analysis of soil samples for key contaminants of concern
  - Interpretation of the soil laboratory results and assessment against applicable soil contaminant standards and guideline values.

[2] Ministry for the Environment (MfE) 2021. Contaminated Land Management Guidelines No. 1. *Reporting on Contaminated Sites in New Zealand* and No. 5: *Site Investigation and Analysis of Soils* (Revised 2021).

2 Site Identification and Environmental Setting

The site is currently occupied by two standalone residential dwellings with associated gardens and driveways.

Refer to the site location and layout plan in Appendix A. The site identification and environmental setting is summarised in Table 1.

Table 1: Site identification and environmental setting.

Site Addresses	45- 47 Beach Road, Tāhunanui, Nelson 7011	
Legal Description	45 Beach Road - DP 530 Lot 1 57 Beach Road - DP 530 Lot 2	
Territorial Authority	Nelson City Council, NCC	
Current land use (Site)	Residential	
Neighbouring land-use	North	Recreational - Tāhunanui Recreation Reserve
	East	Commercial
	South	Residential
	West	Residential
Topography	The site is generally flat and level without abrupt changes in topography.	
Regional Geology[3]	The sites underlying geology comprises *Holocene Sediments described as 'Sand Dunes'.*	
Surface water	*Tāhunanui beach (Tasman Bay) is located approximately 500 m directly north of the site.*	
Groundwater[4]	Groundwater is anticipated at approximately 1.0-1.2 m below ground level (bgl) based on previous logged information on NZGD for the site.	

[3] https://data.gns.cri.nz/geology/

[4] https://www.nzgd.org.nz/default.aspx

3 Proposed Development

Kirk Roberts has been provided with a proposed development plan[5] showing the development of a six-storey hotel. The existing dwelling and ancillary buildings will be demolished and removed from site. The proposed development plan is included in Appendix B.

4 Site History Review

4.1 District Council Records

The property file for the site was provided to Kirk Roberts, the following was noted:

- 1982 Permit No. A52192 - Application for a building permit – alterations to house, 47 Beach Road
- 1986 Permit No. D019425 - Application for a building permit – Garage + Carport, 47 Beach Road
- 1986 Application for dispensation/controlled uses - Garage + Carport denied, 47 Beach Road
- 1994 Consent No. 25684 – Application for a building consent – Extension to existing building, 47 Beach Road
- 2009 Consent No. 092284 – Application for installation of a space heater – Wood burner, 47 Beach Road

The property file for 45 Beach Road pertained to a 'General Property Information' (GPI) Report, which contained no information of note.

No further council records were provided to Kirk Roberts at the time of writing.

4.2 Regional Council Records

4.2.1 HAIL Register

A search of the Nelson City Council (NCC) HAIL Map has been undertaken. The HAIL Map is a database containing records of contaminated, potentially contaminated, and remediated (previously contaminated) sites. It is not an exhaustive database and is continually being updated, i.e., an unregistered site does not confirm that there have never been any HAIL activities undertaken on the site in the past.

A summary of the site's registered HAIL status along with neighbouring properties is provided in Table 2 below.

Table 2: Site and surrounding properties – HAIL Register Status.

Location	HAIL activity	Summary of HAIL status
45-47 Beach Road	N/A	▪ The Site is not listed on the NCC HAIL Map
Adjacent Address	A17	▪ There is one identified site on the HAIL Map within 50m of the site to the south/southeast pertaining to the bulk storage of fuels, confirmed by NCC via email correspondence[6]

4.3 Historical Aerial Images

Publicly available historical aerial photographs for the site have been sourced from the Retrolens - Historical Image Resource[7] and Google Earth[6]. A review of the aerial photographs was undertaken to identify any changes in land use

[5] Hotel Development for Cameo Projects – Arthouse Architects, dated 15/11/24

[6] Correspondence with NCC, dated 2-08-24, confirmation of nearby HAIL activity.

[7] Retrolens https://retrolens.co.nz/

[6] Google Earth https://earth.google.com/web

activities on the site and surrounding properties. A summary of observations is presented in Table 3 below. Copies of the historical aerials are attached in Appendix D.

Table 3: Summary of reviewed available aerial images.

Aerial Photo	Summary	
1940-1949	The site is occupied by two standalone buildings with associated gardens and sheds. The dwellings and site appears generally reflective of the present day development.	The surrounding area is occupied by recreational land use to the north (Tāhunanui Recreation Reserve) and residential land use in all other directions.
1964	No significant changes.	There is a stockpile located north-west of the site on the recreational land, no other significant changes noted.
1969		The previously identified stockpile appears to have been removed.
1974		Residential dwellings located to the south-east and east of the site have been demolished and a large building (potentially a hotel) has been constructed in their place.
1983		No significant changes.
2003		A bike track has been constructed to the north-west of the site, and further residential to commercial conversions have taken place to the south-east and east of the site.
2006		No significant changes.
2020		The neighbouring land directly to the east of the site has been cleared and foundational work has begun for a new building (hotel). No other significant changes are noted.
2022		The foundational work from the previous historic image has finished and the neighbouring land directly to the east of the site has been developed with a large scale hotel, with associated hardstand and swimming pool.
2024 (latest)		No significant changes.
Summary	The site has been occupied by two standalone dwellings with surrounding sheds and private garden areas since circa 1940.	The surrounding area of the site has mostly been unchanged throughout it's history, with the only major changes to note being the hotels, one which was developed in circa 1974, and the larger more modern hotel that was developed circa 2020.

4.4 LINZ Orchard Layer

The LINZ orchard layer records no orchards on the site or on surrounding land.

5 Site Condition

5.1 Site Inspection

A thorough and systematic site inspection and was undertaken on 14 November 2024. A summary of the site inspection is provided below, with reference photos taken during the site inspection included in Appendix E.

45 Beach Road:

- The site is generally flat, was noted to be generally tidy and well kept, and covered with a standalone dwelling, sheds, gardens and hardstand.
- The dwelling was noted to be of timber/weatherboard construction, founded on timber piled foundations. The dwelling was in modest condition, with no visible paint peeling/flaking or potential asbestos containing materials (ACMs).
- A concrete driveway is present to the east of the dwelling, with surrounding private garden areas.
- The front garden area adjacent to Beach Road comprises grassed topsoil, while the rear garden is predominantly hard-sealed with brick paving and limited areas of exposed soil/planter boxes.
- The garage in the rear of the property was noted to be timber construction, painted (peeling), and in generally poor condition.
- No visible evidence of soil contamination was noted.
- Please refer to Photograph 1, Photograph 2 and Photograph 3 for overview of the site.

47 Beach Road:

- The site is generally flat, and covered with a standalone dwelling, sheds, gardens and hardstand.
- Dwelling was of timber and weatherboard construction, with potential asbestos containing material (ACM), and featured visible paint deterioration. The dwelling was generally noted to be in poor condition.
- All sheds in the rear garden area were also noted to be poor condition, typically comprising timber construction, painted and deteriorated.
- The front and rear garden areas typically comprised brick paving, with limited exposed soil. The gardens were generally overgrown and stored miscellaneous items, including bikes, canoes, and general household refuse.
- Please refer to Photograph 5, Photograph 6 and Photograph 7 for overview of the site.

6 Summary of Potential Site Contamination

Table 4 below provides a summary of any potential and/or confirmed HAIL-activities identified during the desktop assessment and site inspection as well as potential contaminants of concern associated with these activities.

Table 4: Summary of identified HAIL activities and potential for contamination

HAIL Activities and Potential Contamination			Contaminants of concern
Location	Actual/Potential HAIL	Description	
On site	HAIL I – any other land subject to the intentional or accidental release of hazardous substances	A review of historical aerial imagery indicates that the site has been occupied by two standalone dwellings and multiple shed/garage structures since c.1940. The site inspection confirmed these structures are generally in poor condition, with potential ACM noted at 47 Beach Road. Potential sources of contamination relate to lead-based paints and asbestos in the historical construction materials (potential HAIL I).	Heavy metals and asbestos

HAIL Activities and Potential Contamination			Contaminants of concern
Location	Actual/Potential HAIL	Description	
Off site	HAIL A17 – Storage tanks, drums for fuels	The adjacent hotel site constructed circa 1974 is listed on the NCC HAIL map relating to HAIL A17 (fuel storage tanks). Due to the separation distance of this nearby fuel storage to the subject site, it is considered highly unlikely to represent a risk to the proposed development. Kirk Roberts consider that no investigation is required on site.	N/A

7 Preliminary Conceptual Site Model

Based on the identified HAIL activity and associated contaminants of concern, a preliminary conceptual site model (CSM) has been devised (Table 5 below). This model outlines the relationship between potential sources of contamination on site, the human and environmental receptors that may be exposed to those contaminants, and the pathways through which exposure might occur.

Table 5 - Summary of source – pathway – receptor linkages.

Source	Pathway	Receptor	Investigation required / Comments
Historical buildings on site (HAIL I)	Dermal contact, ingestion, dust	Contractors and future site residents	*Potentially complete pathway – Investigation required* Based on the age of existing site developments and observations made during the site inspection, there is considered potential for soil contamination to be present on site with respect to historical lead-based paints and potential asbestos. Potential subsurface contamination cannot be dismissed, and as such a targeted soil assessment is recommended to confirm or rule out lead and asbestos presence,

8 Soil Investigation

8.1 Investigation Methodology

The investigation and sampling design for this Kirk Roberts DSI was based on the following rationale and considerations:

- Six sample locations were advanced across the site to give a representative overview of potential soil contamination in potential HAIL areas, while focussing on the 'halo' of the existing structures where accessible (i.e., widespread hardstand limited access to underlying soils).
- Soil sampling was undertaken in general accordance with the MfE Contaminated Land Management Guidelines No.5– Site Investigation and Analysis (2011) and New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

8.2 Soil Sampling and Fieldwork Summary

Table 6 below provides details of the Kirk Roberts soil investigation. A Soil Testing Location Plan is provided as Figure 2 of Appendix A.

Table 6: Summary of site investigation

Investigation	Comments
Date(s)	14 November 2024
Methodology	▪ Six hand dug test pits (HP101 – HP107, excluding HP103) were advanced across the site. HP101-HP104 were advanced across 47 Beach Road, whereas HP105-HP107 were advanced across 45 Beach Road. ▪ Locations were advanced adjacent to existing structures (dwelling, sheds) where feasible. ▪ Soil samples were collected from a range of depths between 0.1 m to 0.5 m bgl. Multiple soil samples were collected from each test location at variable depths based on proposed earthworks, the targeted contaminants, and observations made on site. ▪ All soil samples were analysed for heavy metals and asbestos semi/quantitative analysis. ▪ Note: HP103 was not advanced due to hardstand cover on site.
Quality Assurance and Quality Control (QA/QC)	▪ Soil samples were collected under the supervision of an experienced environmental practitioner. ▪ Soil samples were collected with a new pair of disposable nitrile gloves and were placed directly into laboratory supplied containers. ▪ All sampling equipment was decontaminated between each sampling location. ▪ No field sampling errors of decontamination issues were noted during the site investigation. ▪ No duplicate sampling was undertaken due to the small number of targeted samples. ▪ Samples were delivered under standard sample handling and chain of custody protocol to Analytica Laboratories in Christchurch. ▪ Analytica are accredited to the international ISO17025 standard by IANZ (International Accreditation of New Zealand).
Observations	Based on the observations during the investigation, the site was noted to have a consistent soil profile of topsoil overlying sand in the tested areas, with the exception of HP102 which was noted to only consist of sand. The majority of the site was covered with either existing structures or hardstand, therefore limiting access and observations of soil conditions.
Groundwater	Groundwater was not encountered.

8.3 Soil Assessment Criteria

Based on the environmental setting and the proposed land use, the following soil contaminant standards and guideline values are considered suitable for soil disposal and human health risk assessment purposes:

- NES-CS soil contaminant standards (SCSs) for commercial / industrial land use, and the standard for residential land use[8]
- BRANZ Asbestos in Soil Guideline[9]

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

[9] BRANZ/ALGA 2017. New Zealand Guidelines for Assessing and Managing Asbestos in Soil. 96pp.

- Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts[10]
- York Valley Acceptance Criteria[11]

8.4 Soil Analytical Results

A summary of the soil sample analytical results above the laboratory detection limits and comparison to applicable guidelines is provided in Appendix D. A copy of the analytical laboratory report and the chain of custody is attached in Appendix E. The soil analytical results indicate:

Heavy Metals

- A total of 11 soil samples taken at variable depths were analysed for heavy metals (five from surficial topsoil, six from underlying sands).
- All samples generally recorded multiple heavy metal results above the published background concentrations for the region, primarily arsenic, cadmium, lead and mercury.
- Arsenic was detected in exceedance of the NES-CS standard for commercial / industrial outdoor worker (considered protective of construction workers) within topsoil at HP104 (0.2 m bgl) at a concentration of 101 mg/kg.
- Elevated concentrations of lead and mercury were recored in six locations, with concentrations exceeding residential (10% produce) SCSs, and generally in exceedance of the York Valley landfill waste acceptance criteria.

Asbestos

- Amosite, Chrysotile and Crocidolite asbestos were detected at in topsoil at a depth of 0.2 m bgl in HP105, at a concentration of <0.001% w/w asbestos fines (AF) / fibrous asbestos (FA).
- No asbestos was detected in the remaining samples.

8.5 Soil Disposal

It is anticipated that as part of site redeveloped works all shallow organic topsoil and fill materials will be stripped and removed for civil and/or geotechnical design requirements. The following sections provide preliminary soil disposal guidance for any surplus soils requiring off-site removal. On the basis that minimal areas of the site feature exposed soil for observation and testing (i.e., the majority of the site surface comprises hardstanding (brick, concrete etc) or buildings), the disposal advice provided in this section is limited to the tested locations (refer to the Soil Sampling Plan for specific test locations). This section does not provide site-wide disposal guidance, and additional assessment of site soils are required following removal of existing structures and hardstand.

8.5.1 Cleanfill

While two of the eleven tested samples recorded heavy metals concentrations generally at or below published background levels (i.e., adopted cleanfill acceptance criteria), elevated concentrations of arsenic, lead and mercury were recorded across the remaining site areas. Additionally, the soil analytical results also confirm that the elevated heavy metals are not only present in surficial topsoil, but have also been recorded in the underlying sands at 0.4 m bgl.

Based on the findings of this investigation, it is considered that no soil on site will be suitable for disposal as cleanfill. Further soil testing may confirm that the underlying sands meet cleanfill acceptance criteria in localised areas of the site; however in the absence of any further investigations, Kirk Roberts consider all topsoil and underlying sands will require disposal to managed landfill.

8.5.2 Managed Fill

Based on the soil analytical results, all tested materials (topsoil and sands) will require disposal to an appropriately consented managed fill facility, subject to formal review and accepted. While the total concentrations recorded in this

[10] Background concentrations are adopted from J. Cavenagh (Landcare Research) 2015. Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts

[11] York Valley Acceptance Criteria – file on record from Aug 2021

investigation exceed the York Valley Landfill WAC, TCLP testing general confirms compliance with York Valley WAC. Lead leachate concentrations in HP101 of 5.3g/m^3 marginally exceed the 5g/m^3 acceptance criteria; however consultation should be undertaken with York Valley to confirm whether all results, on balance, can be accepted for bulk disposal. TCLP results are appended.

9 Conceptual Site Model

Based on the site investigation findings presented above, an updated conceptual site model (CSM) is presented below (Table 7).

Table 7 - Summary of source – pathway – receptor linkages.

Source	Pathway	Receptor	Investigation required / Comments
Historical buildings on site (HAIL I)	Dermal contact, ingestion, dust	Existing residential users	*Complete Linkage* Based on the recorded arsenic, cadmium, mercury and lead concentrations in surficial topsoil across the site, there is considered a risk to existing residential site users. While it is unlikely that the elevated concentrations of these contaminants can be linked directly to historical structures on site, their source of contamination still constitutes the definition of 'HAIL I'. It is understood the site is being redeveloped for commercial land use, and as such, the ongoing risk to existing occupants is limited. It is recommended existing occupants do not grow/consume any home-grown produce, and limit exposure to shallow site soils. Should the site stay residential (i.e., should future development not occur), it is recommended that soil remedial works be undertaken to manage long-term risk to residential users. On the basis that commercial redevelopment of the site is imminent, it is considered that no immediate action is required to be undertaken as the duration of any on-going exposure is limited.
		Contractors and future site residents	*Complete Linkage* Based on the elevated arsenic concentration of 101 mg/kg in shallow topsoil in HP105 exceeding commercial SCS, there is considered a risk to future construction workers undertaken earthworks. The risk to construction works can be safely managed through the implementation of a Site Management Plan (SMP), which shall be prepared prior to the commencement of works to ensure safe soil management and working practices are undertaken. The risk to future site occupants will be managed via the undertaking of soil remedial works, which shall be documented in a Remedial Action Plan (RAP) prepared prior to the commencement of works.

10 Discussion

Based on the information reviewed in this DSI, potential sources of soil contamination were identified on site relating to historical site structures (potential HAIL I), with the subsequent investigations confirming elevated concentrations of heavy metals in shallow soils across the site (primarily arsenic, lead and mercury). It is unclear if these elevated contaminant concentrations can be directly attributed to the historical site structures, but their concentrations have been recorded in surficial soils regardless.

While elevated concentrations of heavy metals were widespread across the site, only one location (HP104) recorded concentrations of contaminants (arsenic) in exceedance of the applicable human health standard in the context of the proposed development (commercial land use). Additionally, asbestos was recorded in shallow soil in one location (HP105).

On the basis of these soil analytical results, a risk to future site users and construction workers is considered to exist. Soil remediation works (or on-going management) shall be required, with appropriate soil management measures installed for the works.

Based on the Conceptual Site Model (CSM) and the findings outlined above, a Remedial Action Plan (RAP) and/or a Site Management Plan (SMP) are required under the Contaminated Land Management Guidelines (CLMG) and NES-CS regulations. Consultation with the client will be undertaken prior to construction to finalise the approach.

11 Conclusions and Recommendations

11.1 Conclusions

Kirk Roberts has undertaken a review of historical property information and a site inspection and interview to determine any historical and/or existing potentially contaminating land use activities listed on the MfE HAIL. In summary the reviewed information indicated that:

- Potential HAIL I has been identified associated with two historical residential dwellings and outbuildings.
- The soil investigation has confirmed that arsenic and heavy metal concentrations are in exceedance of the NES-CS standard for residential land use (the current land use of the site), with arsenic concentrations in one location (HP101) also exceeding the NES-CS standard for commercial/industrial outdoor worker.
- Asbestos was detected in shallow soils in one location (HP105), but below human health guideline values (<0.001% w/w AF/FA).
- Based on the above, soil remediation and/or management is required as part of the future development works.

At the time of writing this DSI, it is understood that the project is still in preliminary design stages, with final foundation solutions yet to be finalised. As such, consultation with the client will be undertaken to confirm the most appropriate remedial options.

Based on the analytical results and the reviewed information, Kirk Roberts considers the potential **HAIL I** activities to be confirmed, with a risk identified to current site occupants and earth workers.

11.2 Planning Requirements

Due to the presence of contaminants in soil at concentrations that exceed the NES-CS standards, in accordance with Regulation 10(3) of the NES-CS, resource consent for a restricted-discretionary activity is required for the proposed soil disturbance and land use change.

11.3 Recommendations

It is recommended that:

- A Remedial Action Plan (RAP) and Site Management Plan (SMP) be prepared to provide soil remedial and management measured for future soil disturbance works.
- Further sampling be undertaken following removal of site structures and hardstand to provide site-wide disposal advice.
- The report is provided to the consenting authority as part of a consent application for the proposed land use change and soil disturbance activities.

12 Unexpected Discovery Protocol

No investigation is thorough enough to preclude the presence of materials at the site, which presently, or in the future may be considered hazardous. Consequently, there is a risk to encounter contamination that was not known or obvious to us at the time of writing this report. If any of the following materials are encountered during any future development:

- Stained or odorous soil (e.g., black, green, grey; or smells of rotting organic material, petroleum hydrocarbons or solvents)
- Slag, ash, charcoal
- Rubbish comprising putrescible waste
- Potential asbestos containing-material (for example fragments from cement fibre sheets, or loose fibres from insulation, etc.)

then we recommend:

1. Excavation and earthworks cease in the area of interest, the area secured to stop people entering where potential contamination was encountered, and then:
2. Contact a contaminated land specialist for further advice. If required, Kirk Roberts (03) 379 8600 can inspect the area, assess the material to determine if it is contaminated or hazardous, and then provide on-going soil handling and disposal advice.

Note that this report is not intended to relieve contractors and landowners of their responsibilities under the Health and Safety at Work Act 2015.

13 Limitations

Kirk Roberts Consulting Engineers Ltd (Kirk Roberts) has prepared this Detailed Site Investigation for Client in relation to the proposed soil disturbance/removal at 45-47 Beach Road.

No liability is accepted by this company or any employee of this company with respect to its intended use by any other person or persons.

This report provides a qualitative assessment of the likely contamination status of the ground below the site based on the available desktop information and a site inspection. Kirk Roberts' opinions, conclusions and recommendations are based upon this information. It is possible these may not provide a complete or accurate assessment of the entire site.

All reasonable effort has been made to ensure the conclusions drawn in this report are correct at the time of reporting. However, Kirk Roberts does not warrant the accuracy of the information provided and will not be responsible for any opinions which Kirk Roberts has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

Where sampling and analysis (or similar) is recommended in this report, it should not be inferred that the site is contaminated or presents a risk to human health or the environment. Analogously, when no additional action is recommended, it should not be inferred that the site is free of contamination. Kirk Roberts does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions.

This report is intended to meet statutory requirements in the context of the proposed development and does not purport to provide soil disposal guidance information. Any information, guidance or recommendations made during this report regarding these matters are for informative use only and are intended for benefit of the client only.

Should anyone wish to discuss the content of this report with Kirk Roberts Consulting Engineers Ltd, they are welcome to contact us on 03 379 8600 and www.kirkroberts.co.nz.

14 Detailed Site Investigation Statement

I (James Jackson) of Kirk Roberts Consulting Ltd certify that:

1. This Detailed site investigation meets the requirements of the Resource Management (National Environmental Standard for assessing and managing contaminants in soil to protect human health) Regulations 2011 because it has been:

   a. done or supervised by a suitably qualified and experienced practitioner, and

   b. reported on in general accordance with the current edition of Contaminated land management guidelines No 1 Reporting on contaminated sites in New Zealand, and

   c. the report is certified by a suitably qualified and experienced practitioner.

Due to the presence of contaminants in soil at concentrations that exceed the applicable soil contaminant standard, in accordance with Regulation 10(3) of the NES-CS, resource consent for a restricted-discretionary activity is required for the proposed soil disturbance and land use change.

The activity to be undertaken as defined in Regulation 5(5) and Regulation 5(6) is described:

a. on page(~~s~~) ……three (3)…… of this Detailed Site Investigation~~; or~~

~~b. in the document ……~~

Signed: James Jackson

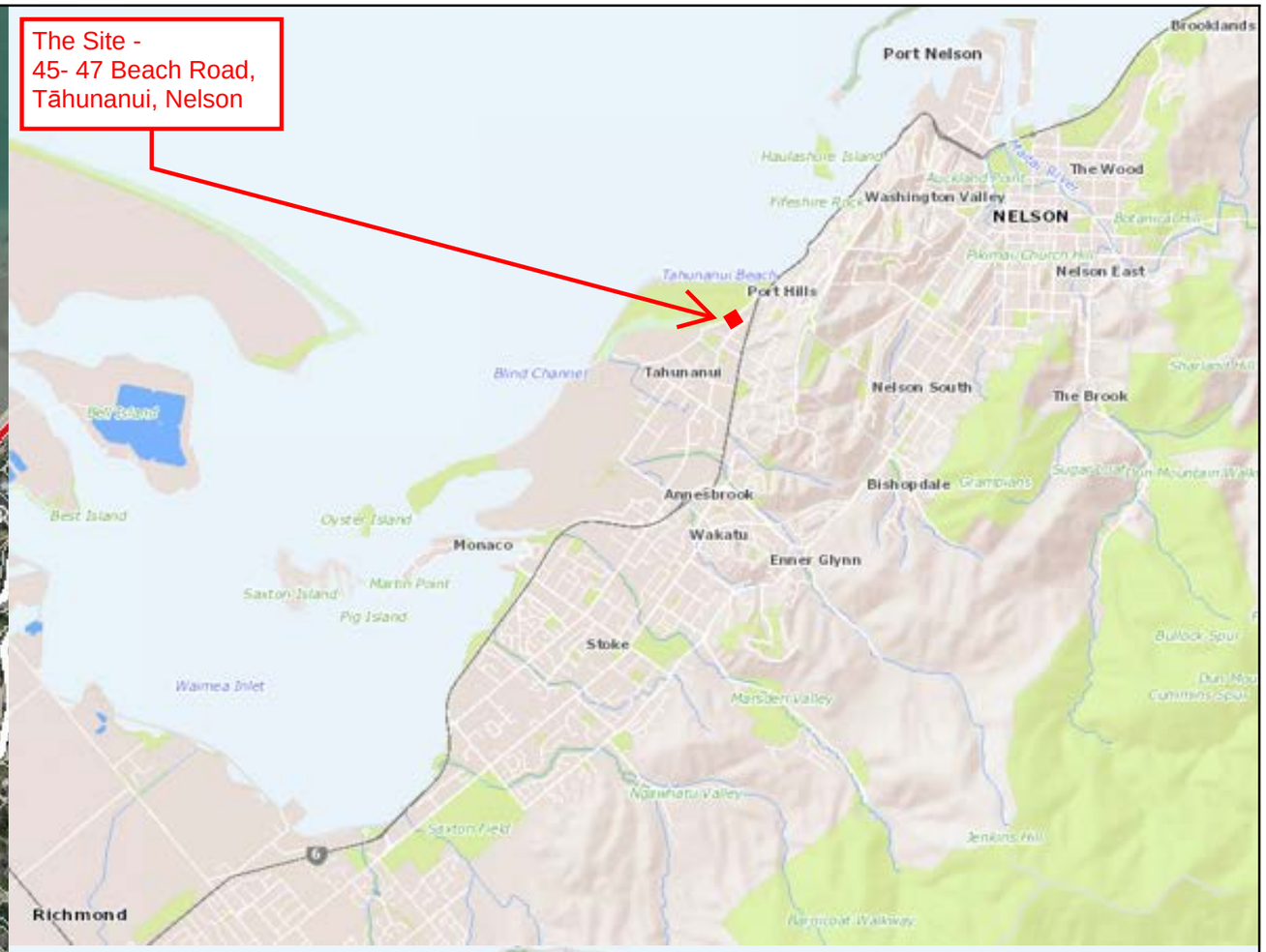
Environmental Manager

Signature: 

Date: 19 December 2024

Appendix A Site Location Plan





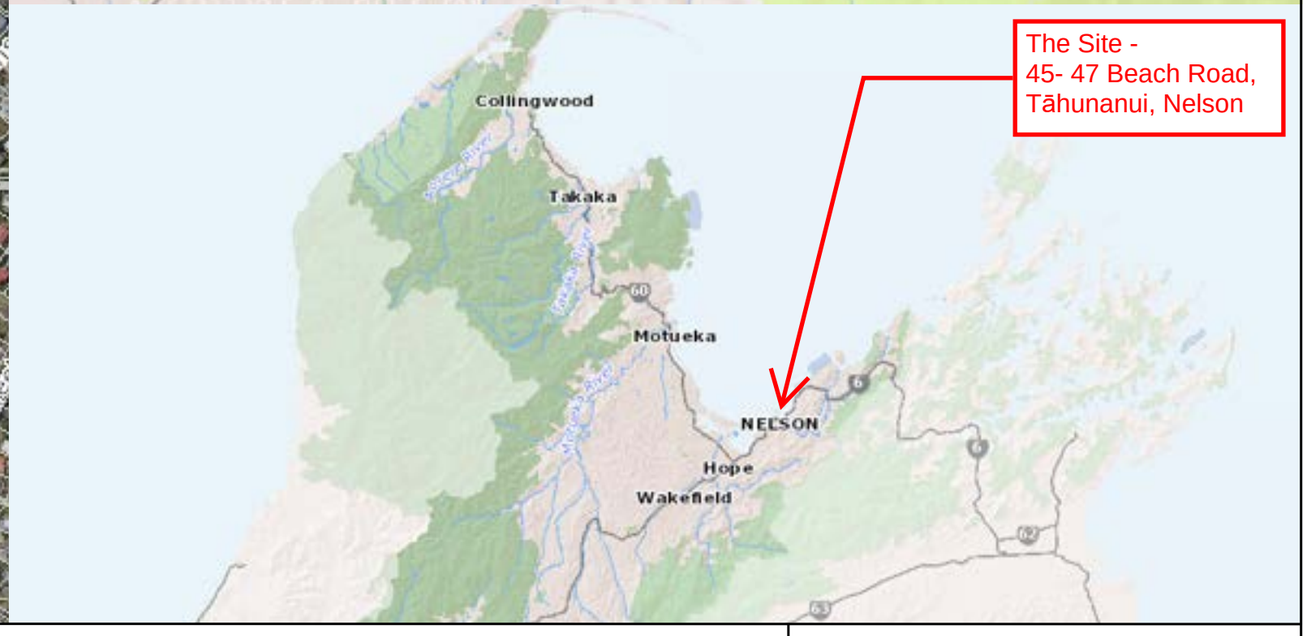


IMAGE SOURCE:
Top of the South Maps 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

SITE LOCATION PLAN

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Top of the South Maps 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

SITE LAYOUT PLAN

KIRK ROBERTS CONSULTING

N

HP105

HP106

HP101

HP102

HP107

HP104

Walkare Street

HP101 Sample Locations

Site boundary

IMAGE SOURCE:
Top of the South Maps 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

SOIL SAMPLING PLAN

KIRK ROBERTS CONSULTING

Appendix B Proposed Development

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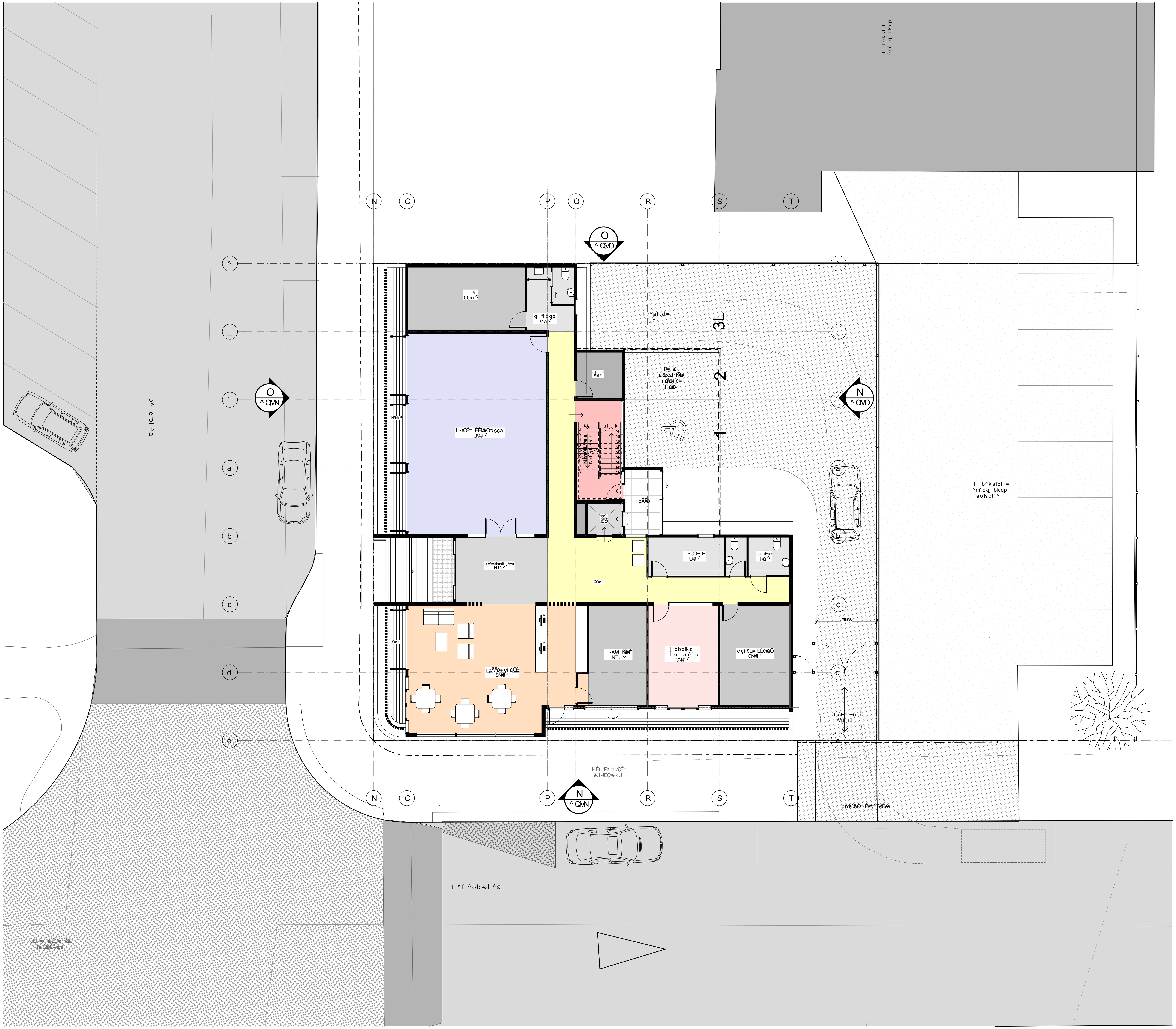
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ARCHITECTS

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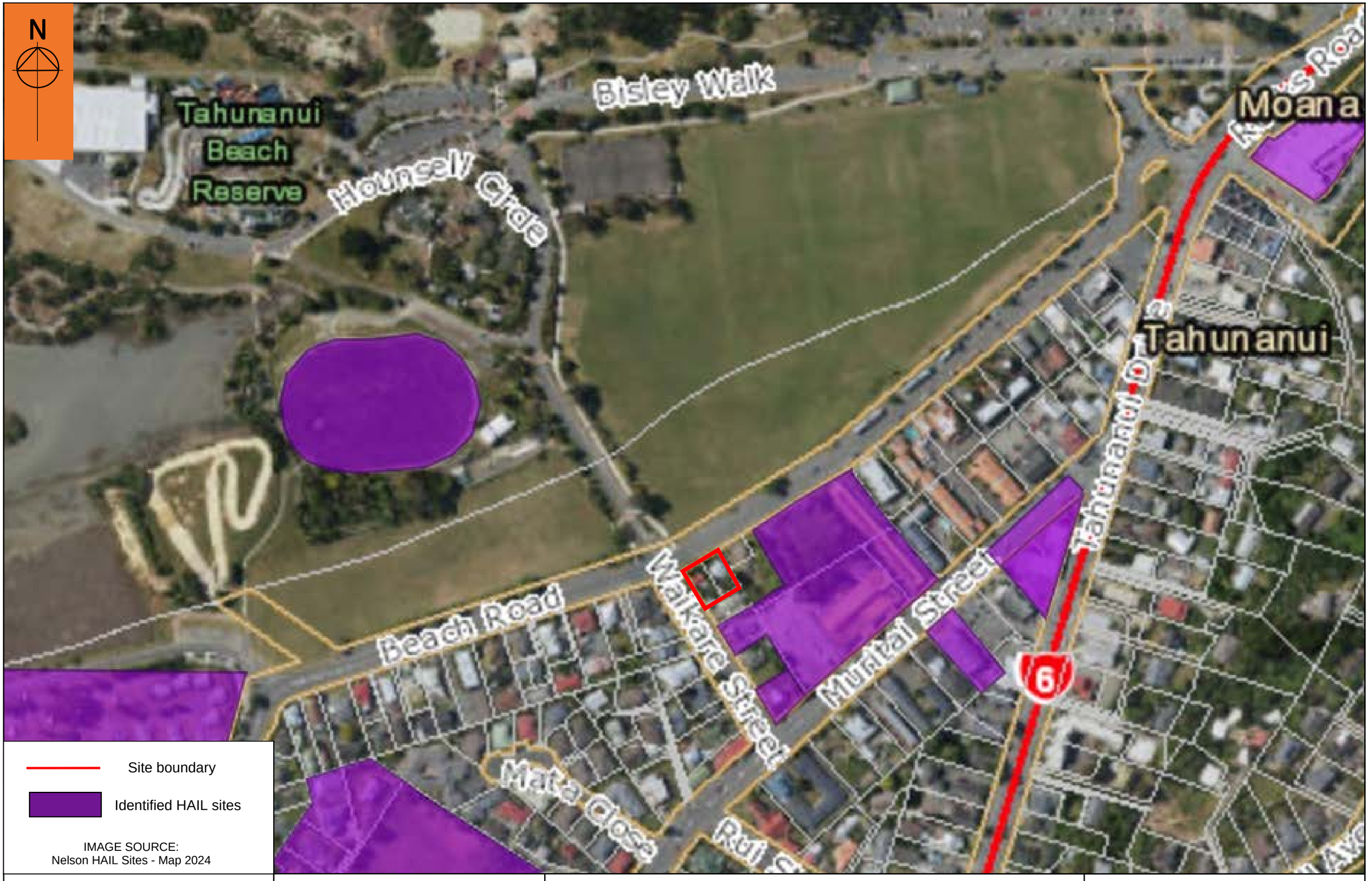
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Appendix C NCC Hail Map



PROJECT:2410250
CREATED BY: MT
DATE: 5 December 2024

45-47 Beach Road, Tāhunanui, Nelson

IDENTIFIED HAIL SITES - NCC HAIL RESOURCE

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Appendix D Aerial Images



Site boundary

IMAGE SOURCE:
Retrolens 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 1940-1949

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Site boundary

IMAGE SOURCE:
Retrolens 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 1964

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Site boundary

IMAGE SOURCE:
Retrolens 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 1969

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Site boundary

IMAGE SOURCE:
Retrolens 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 1974

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N

Site boundary

IMAGE SOURCE:
Retrolens 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 1983

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Google Earth 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 2003

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Google Earth 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 2006

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Google Earth 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 2020

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Google Earth 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - 2022

KIRK ROBERTS CONSULTING



Site boundary

IMAGE SOURCE:
Top of the South Maps 2024

PROJECT:2410250
CREATED BY: MT
DATE: 27 November 2024

45- 47 Beach Road, Tāhunanui, Nelson

Historical Aerials - Latest (2024)

KIRK ROBERTS CONSULTING

Appendix E Photo Log (14 November 2024)



Photograph 1: Overview of the front of 45 Beach Road, looking south-east.



Photograph 2: View of the rear garden at 45 Beach Road, looking south.



Photograph 3: View of the rear of the dwelling at 45 Beach Road, looking north-west.



Photograph 4: View of the damaged cladding at 47 Beach Road, looking south.



Photograph 5: Overview of the front of 47 Beach Road, looking south.



Photograph 6: View of the rear garden at 47 Beach Road, looking south-west.



Photograph 7: View of the rear garden at 47 Beach Road, looking south.

Appendix F Soil Analytical Results

Appendix D: Table 1 - Soil Sample Analytical Results Summary

2410250 - 45-47 Beach Road

Analyte	HP101		HP102	HP104		HP105		HP106		HP107		Assessment Criteria			Disposal Criteria	
Lab Sample ID	3717738.1	3717738.2	3717738.3	3717738.4	3717738.5	3717738.6	3717738.7	3717738.8	3717738.9	3717738.10	3717738.11	Commcerical / Industrial [1]	Residential [1]	*Background (Tasman/Nelson Region) [3]*	Cleanfill [4]	York Valley Landfill (Screening Level) [5]
Soil Depth	0.2	0.4	0.2	0.2	0.6	0.2	0.4	0.1	0.4	0.2	0.4					
Soil Type	Topsoil	Sand	Sand	Topsoil	Sand	Topsoil	Sand	Topsoil	Sand	Topsoil	Sand					
mg/kg																
Arsenic	11	10	8	***101***	11	*26*	4	5	3	9	6	70[1]	45[1]	*12*	12	**100**
Cadmium	*0.82*	*4*	0.48	*2.1*	0.27	0.33	< 0.10	0.67	< 0.10	*0.76*	0.18	1,300[1]	3[1]	*0.75*	0.75	**10**
Chromium (total)	30	28	20	**138**	23	48	21	28	20	31	26	6,300[1]	460[1]	*140*	140	**100**
Copper	37	73	47	*176*	67	41	10	32	10	*99*	32	10,000[1]	10,000[1]	*83*	83	**200**
Lead	***540***	***2600***	***880***	***1060***	***129***	***144***	11.3	***320***	31	***430***	***156***	3,300[1]	210[1]	*86*	86	**100**
Mercury	**840**	**3600**	**750**	**2600**	**290**	**450**	**39**	**310**	**52**	**360**	**230**	4,200[1]	310[1]	-	-	**4**
Nickel	< 0.10	0.44	< 0.10	0.17	< 0.10	< 0.10	< 0.10	0.11	< 0.10	< 0.10	< 0.10	4,000[2]	400[2]	*58*	274	**200**
Zinc	22	33	21	51	26	60	29	32	26	33	27	400,000[2]	8,000[2]	*300*	300	**200**
Asbestos																
Presence / Absence	NAD	NAD	NAD	NAD	NAD	AMO, CHR, CRO	NAD	NAD	NAD	NAD	NAD	-	-	-	-	**Accepts Asbestos**
W/W% Asbestos as ACM	-	-	-	-	-	<0.001	-	-	-	-	-	0.05	0.01	-	-	**-**
W/W% Asbestos as FA / AF	-	-	-	-	-	<0.001	-	-	-	-	-	0.001	0.001	-	-	**-**

Notes

[1] Ministry for the Environment (2011). National Environmental Standard (NES) for assessing and managing contaminants in soil to protect human health (updated 2015).

[2] Australian National Environmental Protection (Assessment of Site Contamination) (2011).Guideline on the Investigation Levels for Soil and Groundwater. Schedule B1.

[3] Cleanfill trace element concentrations are from private correspondence V. Matschke, Principlal Development Adviser, Nelson City Council 18 September 2024, 9:49 am

[4] Background concentrations are adopted from J. Cavenagh (Landcare Research) 2015. Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts

[5] York Valley Acceptance Criteria - Aug 2021

Shade	exceeds commercial / industrial criteria
Shade	exceeds Residential criteria
Italics	exceeds Tasman/Nelson natural background concentrations
Underlined	exceeds Tasman/Nelson Cleanfill criteria
Bold	exceeds York Valley Landfill criteria (screening level)

Appendix G Laboratory Certificates

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:	Kirk Roberts Consulting Engineers	**Lab No:**	3717738	SPv2
Contact:	James Jackson	**Date Received:**	16-Nov-2024	
	C/- Kirk Roberts Consulting Engineers	**Date Reported:**	16-Dec-2024	**(Amended)**
	PO Box 35320	**Quote No:**	107032	
	Christchurch 8640	**Order No:**	2410250 - Beach	
		Client Reference:	2410250	
		Submitted By:	Morgan Thomson	

Sample Type: Soil

Sample Name:		HP101 - 0.2 14-Nov-2024	HP101 - 0.4 14-Nov-2024	HP102 - 0.2 14-Nov-2024	HP104 - 0.2 14-Nov-2024	HP104 - 0.6 14-Nov-2024
Lab Number:		3717738.1	3717738.2	3717738.3	3717738.4	3717738.5
Individual Tests						
TCLP Weight of Sample Taken	g	-	50	50	50	-
TCLP Initial Sample pH	pH Units	-	7.2	6.7	7.5	-
TCLP Acid Adjusted Sample pH	pH Units	-	1.6	1.5	1.8	-
TCLP Extractant Type*		-	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	-
TCLP Extraction Fluid pH	pH Units	-	5.0	5.0	5.0	-
TCLP Post Extraction Sample pH	pH Units	-	5.0	5.0	5.4	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	11	10	8	101	11
Total Recoverable Cadmium	mg/kg dry wt	0.82	4.0	0.48	2.1	0.27
Total Recoverable Chromium	mg/kg dry wt	30	28	20	138	23
Total Recoverable Copper	mg/kg dry wt	37	73	47	176	67
Total Recoverable Lead	mg/kg dry wt	540	2,600	880	1,060	129
Total Recoverable Mercury	mg/kg dry wt	< 0.10	0.44	< 0.10	0.17	< 0.10
Total Recoverable Nickel	mg/kg dry wt	22	33	21	51	26
Total Recoverable Zinc	mg/kg dry wt	840	3,600	750	2,600	290

Sample Name:		HP105 - 0.2 14-Nov-2024	HP105 - 0.4 14-Nov-2024	HP106 - 0.1 14-Nov-2024	HP106 - 0.4 14-Nov-2024	HP107 - 0.2 14-Nov-2024
Lab Number:		3717738.6	3717738.7	3717738.8	3717738.9	3717738.10
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	26	4	5	3	9
Total Recoverable Cadmium	mg/kg dry wt	0.33	< 0.10	0.67	< 0.10	0.76
Total Recoverable Chromium	mg/kg dry wt	48	21	28	20	31
Total Recoverable Copper	mg/kg dry wt	41	10	32	10	99
Total Recoverable Lead	mg/kg dry wt	144	11.3	320	31	430
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	0.11	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	60	29	32	26	33
Total Recoverable Zinc	mg/kg dry wt	450	39	310	52	360

Sample Name:		HP107 - 0.4 14-Nov-2024
Lab Number:		3717738.11
Heavy Metals with Mercury, Screen Level		
Total Recoverable Arsenic	mg/kg dry wt	6
Total Recoverable Cadmium	mg/kg dry wt	0.18
Total Recoverable Chromium	mg/kg dry wt	26
Total Recoverable Copper	mg/kg dry wt	32
Total Recoverable Lead	mg/kg dry wt	156
Total Recoverable Mercury	mg/kg dry wt	< 0.10

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

Sample Type: Soil		
Sample Name:		HP107 - 0.4 14-Nov-2024
Lab Number:		3717738.11
Heavy Metals with Mercury, Screen Level		
Total Recoverable Nickel	mg/kg dry wt	27
Total Recoverable Zinc	mg/kg dry wt	230

Sample Type: Aqueous				
Sample Name:		HP101 - 0.4 [TCLP Extract]	HP102 - 0.2 [TCLP Extract]	HP104 - 0.2 [TCLP Extract]
Lab Number:		3717738.12	3717738.13	3717738.14
Individual Tests				
Total Arsenic	g/m^3	-	-	0.50
Total Chromium	g/m^3	-	-	< 0.011
Total Lead	g/m^3	5.3	0.99	0.102
Total Mercury	g/m^3	< 0.0021	< 0.0021	< 0.0021

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3717738-SPv1' issued on 21-Nov-2024 at 8:07 am.
Reason for amendment: TCLP metals added to 3 samples.

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**
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-11
Heavy Metals with Mercury, 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	1-11
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	2-4
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	2-4
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2-4
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2-4
TCLP Extractant Type*	US EPA 1311.	-	2-4
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	2-4
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2-4

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Total Digestion with HCl	Nitric/hydrochloric acid digestion. APHA 3030 E (modified) : Online Edition.	-	12-14
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	12-14
Total Arsenic	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.021 g/m^3	14
Total Chromium	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.011 g/m^3	14
Total Lead	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.0021 g/m^3	12-14
Total Mercury	Acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.0021 g/m^3	12-14

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

Testing was completed between 19-Nov-2024 and 16-Dec-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.



Ara Heron BSc (Tech)
Client Services Manager - Environmental

Kirk Roberts Consulting

Engineering (Environmental/Contaminated Land, Geotechnical, Civil, Structural, Fire), Architecture, Building Information Modelling

Auckland, Hamilton, Tauranga, **Christchurch**, Dunedin, Queenstown

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03 379 8600

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