



## Work Instruction

7-15 Church Street, Ashburton

Prepared for

Kāinga Ora Homes and Communities

Prepared by

Tonkin & Taylor Ltd

Date

October 2023

Job Number

1018898.2000 v3



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# 1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Kāinga Ora Homes and Communities (Kāinga Ora) to prepare a Work Instruction (WI) for 7-15 Church Street, Ashburton ('the site' - refer Figure 1). This report has been prepared in accordance with our Housing Delivery System (HDS) Christchurch contract initiated 8 November 2022.

The site measures 4,038 m<sup>2</sup> in area and presently contains three standalone dwellings and a duplex (semi-detached) dwelling (specifically 11 and 13 Church Street) with ancillary structures at the side and rear of each dwelling (e.g., shed, concrete driveway and footpaths).

Kāinga Ora plans to re-develop the site for a high-density residential land use, and that it will undergo a site scrape to 0.3 m below existing ground level (bgl) as part of its redevelopment for geotechnical/constructability reasons.

The HDS Christchurch geotechnical engineers have indicated that a TC1 waffle slab is the preferred foundation for the site's redevelopment<sup>1</sup>, and provided the following foundation excavation requirements:

House number*	Approximate existing ground level (m RL) **	RL for base of gravel pad/excavation	Excavation required <i>after</i> 0.3 m site scrape to pad/excavation RL (m)
House 1	90.05	89.4	0.35
House 2	90.13		0.43
House 3	90.06		0.36
House 4	90.00		0.30
House 5	90.13		0.43
House 6	89.97		0.27
House 7	90.08		0.38
House 8	90.17		0.47
House 9	89.87		0.17
Houses 10 & 11	89.92		0.22
Houses 12 & 13	89.85		0.15

\* See Figure 2 (Appendix B).

\*\* Note the conservative/upper estimate of ground levels has been used to calculate soil disturbance/disposal volumes.

In summary, between 0.1 and 0.5 m (rounded) of additional excavation is required for the proposed new house foundations *after* the 0.3 m site scrape.

The installation of civil services may require localised deeper excavation to >0.5 m bgl.

This WI sets out the minimum earthwork related requirements to enable the appropriate management and disposal of the excavated soil.

## 1.1 Previous investigation

T+T has completed a PSI/DSI<sup>2</sup> on the site, which reported the following:

- Asbestos in soil was not detected in the surficial soil samples analysed.

<sup>1</sup> BECA Limited (7 August 2023). 7-15 Church Street (Ashburton) - Geotechnical Design Report, prepared for Kāinga Ora.

<sup>2</sup> T+T reference 1018898.2000 (August 2023). Preliminary and Detailed Site Investigation, 7-15 Church Street, Ashburton. Prepared for Kāinga Ora Homes and Communities. Updated October 2023.



- At investigation location 15 Church Street, cell HA5 at 0.1 m bgl (representing soils from 0 to 0.3 m bgl), arsenic was recorded above its high-density residential and commercial/industrial (human health based) land use criterion.
- Except for the following, based on the data collected to date, soils on site are suitable for reuse from a ground contamination perspective under the proposed high-density residential land use scenario. The exception to this is:
  - 15 Church Street, cell HA5 0 to 0.3 m bgl.
- Soils displaced from earthwork across the site require disposal to managed fill (e.g., Burwood Landfill, Wheatsheaf, Leggett Road) depending on location and depth across the site (refer Figures 2-6 (Appendix B)). **Soils are not suitable for offsite disposal as cleanfill.**
- In surface soil samples (0 to 0.3 m bgl) collected from across the site, one or more concentration of the metals analysed were recorded above their respective published background concentration.
- In accordance with the Kāinga Ora's SAP<sup>3</sup> and CSM<sup>4</sup>, and in the absence of further information for soil within the footprint of the existing structures, the same contamination conditions as found in their respective halos are assumed to be present, until further analysis proves otherwise.
- **Soils underneath the footprints of the current dwellings and/or ancillary structures should be inspected and cleared by a competent person<sup>5</sup> under the Asbestos Regulations<sup>6</sup> prior to soil disturbance in these areas and their disposal offsite. Kāinga Ora may complete additional sampling and analysis of soils within the current building and ancillary structure footprints after their demolition to refine soil disposal options in these areas.**

A summary of the results and laboratory reports containing the soil testing results from the PSI/DSI are presented in Appendix A to assist contractor negotiations with consented off-site disposal facilities regarding disposal of excavated soil. The T+T PSI/DSI sample locations are illustrated on Figure 1, Appendix B.

## 2 Work instruction- work programme

The intent of this WI is to assist the Contractor with waste classification and disposal of in-situ soils generated from the site's redevelopment.

Based on the investigation results, widespread ground contamination related remediation of the site is *not* required. The planned site scrape to 0.3 m bgl will see the removal of soils where arsenic was recorded above its high-density residential and commercial/industrial land use criterion.

Across the site and in the samples analysed, asbestos was not detected, and metals were recorded below criteria for the protection of outdoor worker H&S (outside 15 Church Street, cell HA5), and so standard earthworks health and safety controls are suitable for workers involved in soil disturbance outside of the specific areas described above. At 15 Church Street, cell HA5, 0 to 0.3 m bgl (due to the arsenic concentration recorded, earthwork good practice controls will manage the potential risk to construction workers, including:

- Minimise direct contact with the contaminated materials.
- Use of disposable gloves when direct contact soil contact is necessary.
- Implement dust control during soil disturbance.

<sup>3</sup> Kāinga Ora, July 2022. Residential Property – Soil Sampling and Analysis Plan (SAP). Version 7.

<sup>4</sup> Kāinga Ora, July 2022. Conceptual Site Model- Residential Properties. Version 4.

<sup>5</sup> Competent person as defined in the Asbestos Regulations 2016, Regulation 41(3).

<sup>6</sup> Health and Safety at Work (Asbestos) Regulations 2016.

- No smoking, eating, drinking on site where soil disturbance is taking place.
- Washing hands before eating and drinking, hand to face contact etc.

The Contractor undertaking soil disturbance should be vigilant and alert for the presence of any indicators of contamination such as asbestos containing materials (ACM) during the earthwork, particularly within the footprints of the existing dwellings and their ancillary structures.

Soil from beneath the dwellings and/or their ancillary structures may contain asbestos, common building practices during the construction and/or maintenance of these structures could have resulted in ACM, asbestos in soil to have been discarded in these areas.

If ACM and/or asbestos in soil is present, removal of these soils may require asbestos-specific work controls as above, or further controls depending on the conditions and quantities encountered. This will be undertaken in accordance with the Asbestos in Soil Guidelines<sup>7</sup> and Asbestos Regulations.

**If ACM is discovered, the contractor shall immediately cease excavation in that area and contact the Contaminated Land Specialist to discuss/confirm handling and disposal requirements.**

The above soil excavation and disposal work needs to be undertaken in accordance with this WI as well as other consents applicable to the overall development of the site. Any modifications/ variations to the WI must be discussed with T+T prior to performing the modifications/variations.

The personnel and contracting organisations listed below in Table 2.1 will have the following roles in the soil excavation work.

**Table 2.1: Roles and responsibilities**

Company name	Project personnel	Role	Contact details
Kāinga Ora	TBC	Project Manager	TBC
T+T	Mark Morley	Contaminated Land Specialist	MMorley@tonkintaylor.co.nz 021 114 3395
Environment Canterbury and Ashburton District Council	TBC	Regulatory environmental agencies	TBC
Contractor(s)	TBC	Review and implementation of the WI	TBC

Kāinga Ora plans for the soil removal to be undertaken by two Contractors, as follows:

**Table 2.2: Earthwork staging**

Stage of removal	Task	Contractor
Stage 1	Demolition of site structures, excavation of soils within dwelling halo and footprint to 0.3 m bgl.	Demolition contractor
Stage 2	Site scrape 0.0 to 0.3 m bgl, including arsenic contaminated soils at 15 Church Street, cell HA5.	

<sup>7</sup> New Zealand Guidelines for Assessing and Managing Asbestos in Soil- BRANZ, November 2017.

Stage of removal	Task	Contractor
Stage 3	Preparation and excavation of foundations, for civil services etc.	Earthwork contractor

Upon completion of **each** stage of earthworks, the site foreman/manager is to inspect the earthworks undertaken and confirm that soil excavation has been completed in the correct areas, to the required depth and disposed of appropriately, by completing the Site Earthworks Completion Checklist (see Appendix E).

The completed checklist should be provided to T+T within two weeks of completion of the earthworks.

## 2.1 Soil disposal

Soils requiring offsite disposal will need to be disposed to managed fill, depending on their location and depth. Disposal options for the site are provided below and in Figures 2-6 in Appendix B, with further detail on excavation areas and volumes in Appendix D.

Note that the below options are based on the inferred lowest cost disposal option (gate fee) for the different areas/cells onsite, and not necessarily the optimal practicality of excavation/transport or costs associated with transport to a disposal facility. It should be noted that all offsite disposal is subject to the prior written approval from a disposal facility operator.

This WI should be provided to a disposal facility operator for their prior consideration and written approval before movement of material from the site. A copy of the written approval shall be forwarded to Kāinga Ora's project manager before commencing the movement of soils offsite.

Actual soil excavation volumes and subsequent removal costs could change based on site specific redevelopment plans, particularly in areas under existing paving and structures. Unexpected contamination discoveries during site clearance and/or earthwork may also result in additional quantities of material requiring disposal to higher cost facilities.

Additional sampling in the dwelling and/or ancillary structure footprints could be undertaken following their demolition to assess actual soil contamination conditions and whether material at these footprints could be disposed to a lower cost facility (e.g., Wheatsheaf or cleanfill). However, there is no guarantee that actual contaminant concentrations (and subsequent soil disposal options) are lower than those currently assumed. **Kāinga Ora may complete further sampling and analysis in these areas, following their demolition and clearance.**

Soil disposal options across the site are as follows:

**Table 2.3: Soil disposal options across the site**

Soil disposal area	Depth (m bgl)	Disposal facility (subject to operator acceptance)
Soil disposal within dwelling footprints at 7 and 15 Church Street	0.0 to 0.3	<p><b>TBC- Further testing may be undertaken.</b></p> <p><i>In the absence of current information from the dwelling and/or ancillary structure footprints, disposal to <b>Burwood Landfill</b> managed fill is assumed based on data collected from the dwelling halo <u>AND</u> following post</i></p>

Soil disposal area	Depth (m bgl)	Disposal facility (subject to operator acceptance)
		<i>demolition asbestos clearance by a Competent Person.</i>
Soil disposal within dwelling footprints at 9 and 11/13 Church Street	0.0 to 0.3	<b>TBC- Further testing may be undertaken.</b> <i>In the absence of current information from the dwelling and/or ancillary structure footprints, disposal to <b>Wheatsheaf</b> managed fill is assumed based on data collected from the dwelling halo AND following post demolition asbestos clearance by a Competent Person.</i>
Soil disposal within all dwelling footprints (7, 9, 11/13 and 15 Church Street)	0.3 to 0.5	<b>TBC- Further testing may be undertaken.</b> <i>In the absence of current information from the dwelling and/or ancillary structure footprints, disposal to <b>Burwood Landfill</b> managed fill is assumed based on the site wide average (noting Wheatsheaf managed fill does not accept material based on average concentrations) AND following post demolition asbestos clearance by a Competent Person.</i>
	0.5 to 0.7	
	0.7 to 1.0	
	>1.0	
Soil disposal within the dwelling halo at 7 and 15 Church Street	0.0 to 0.3	<b>Burwood Landfill</b> managed fill.
Soil disposal within the dwelling halo at 9 and 11/13 Church Street	0.0 to 0.3	<b>Wheatsheaf</b> managed fill.
7 Church Street, cells HA3 and HA4 9 Church Street, cell HA5 13 Church Street, cell HA2 15 Church Street, cells HA5 and HA6	0.0 to 0.3	<b>Burwood Landfill</b> managed fill.
9 Church Street, cells HA1 and HA4 15 Church Street, cell HA1	0.0 to 0.3	<b>Leggett Road</b> managed (controlled) fill.
All other cells (see Figure 2)	0.0 to 0.3	<b>Wheatsheaf</b> managed fill.
7 Church Street, cell HA4	0.3 to 0.5	<b>Burwood Landfill</b> managed fill.
9 Church Street, cells HA2 and HA6 15 Church Street, cell HA5	0.0 to 0.3	<b>Leggett Road</b> managed (controlled) fill.
All other cells (see Figure 3)	0.3 to 0.5	<b>Wheatsheaf</b> managed fill.
7 Church Street, cells HA1 and HA5 9 Church Street, cells HA1, HA2, HA4 and HA6 11 Church Street, cell HA1	0.5 to 0.7	<b>Leggett Road</b> managed (controlled) fill.

Soil disposal area	Depth (m bgl)	Disposal facility (subject to operator acceptance)
13 Church Street, cell HA2		
All other cells (see Figure 4)	0.5 to 0.7	Wheatsheaf managed fill.
7 Church Street, cells HA1 and HA4, HA5 9 Church Street, cells HA1-HA2 and HA5 11 Church Street, cell HA3 13 Church Street, cell HA3	0.7 to 1.0	Leggett Road managed (controlled) fill.
All other cells (see Figure 5)	0.7 to 1.0	Wheatsheaf managed fill.
7 Church Street, cells HA1, HA3, HA4 and HA5 9 Church Street, HA1-HA5 (inclusive) 11 Church Street, cell HA3 13 Church Street, cell HA3 15 Church Street, cell HA2	>1.0	Leggett Rd managed (controlled) fill.
All other cells (see Figure 6)	>1.0	Wheatsheaf managed fill

Soil disposal options split across the various known stages of earthwork are as follows:

Table 2.4: Soil disposal options across earthwork stages

Area of site/sample cell	Depth (m bgl)	Contamination condition	Disposal option (subject to operator approval)	Approx soil volume (+/- 20%) (m <sup>3</sup> )
<b>STAGE 1 – Clearance of dwelling and halo to 0.3 m bgl</b>				
<b>Demolition contractor</b>				
<b>Dwelling footprints at 7 and 15 Church Street</b>	0.0 – 0.3	Based on the dwelling halo, metals detected above acceptance criteria for Wheatsheaf but below Burwood Landfill respective managed fill acceptance criteria. Asbestos not detected.	Based on data collected within these current dwelling halos, disposal to <b>Burwood Landfill managed fill</b> is currently presumed following post demolition clearance of the area by a competent person. <i>Further post demolition sampling and analysis may refine options for soil disposal in these areas.</i>	55 – 80
<b>Dwelling footprints at 9 and 11/13 Church Street</b>	0.0 – 0.3	Metals detected above published background concentrations for the site but below Wheatsheaf managed fill's acceptance criteria. Asbestos not detected.	Based on data collected within these current dwelling halos, disposal to <b>Wheatsheaf managed fill</b> is currently presumed following post demolition clearance of the area by a competent person. <i>Further post demolition sampling and analysis may refine options for soil disposal in these areas.</i>	55 – 85
<b>Dwelling halos at 7 and 15 Church Street</b>	0.0 – 0.3	Metals detected above acceptance criteria for Wheatsheaf but below Burwood Landfill respective managed fill acceptance criteria. Asbestos not detected.	<b>Burwood Landfill managed fill.</b>	65 – 95
<b>Dwelling halos at 9 and 11/13 Church Street</b>	0.0 – 0.3	Metals detected above published background concentrations for the site but below Wheatsheaf managed fill's acceptance criteria. Asbestos not detected.	<b>Wheatsheaf managed fill.</b>	70 – 105

Area of site/sample cell	Depth (m bgl)	Contamination condition	Disposal option (subject to operator approval)	Approx soil volume (+/- 20%) (m <sup>3</sup> )
<b>STAGE 2 – Site scrape to 0.3 m bgl</b>				
<b>Demolition contractor</b>				
<b>7 Church Street, cells HA3 and HA4</b> <b>9 Church Street, cell HA5</b> <b>13 Church Street, cell HA2</b> <b>15 Church Street, cells HA5 and HA6</b>	0.0 – 0.3	Metals detected above Wheatsheaf managed fill's acceptance criteria, but below criteria for Burwood landfill. Asbestos not detected.	<b>Burwood Landfill.</b>	175 – 260
<b>9 Church Street, cells HA1 and HA4</b> <b>15 Church Street, cell HA1</b>	0.0 – 0.3	Average concentrations of metals across the site are above published background concentrations, but below acceptance criteria for Leggett Road managed (controlled) fill. Asbestos not detected.	<b>Leggett Road controlled fill.</b>	80 – 120
<b>All other cells (see Figure 2)</b>	0.0 – 0.3	Metals detected above published background concentrations for the site but below Wheatsheaf managed fill's acceptance criteria. Asbestos not detected.	<b>Wheatsheaf managed fill.</b>	475 – 710



Area of site/sample cell	Depth (m bgl)	Contamination condition	Disposal option (subject to operator approval)	Approx soil volume (+/- 20%) (m <sup>3</sup> )
<b>STAGE 3 – Excavations for foundations (earthwork contractor)</b>				
<b>House 1</b>	0.3 – 0.65	Metals detected above published background concentrations for the site but below Wheatsheaf managed fill's acceptance criteria. Asbestos not detected.	<b>Wheatsheaf managed fill*.</b>	35 – 55
<b>House 2</b>	0.3 – 0.73	Metals detected above Wheatsheaf managed fill's acceptance criteria, but below criteria for Burwood Landfill. Asbestos not detected.	<b>Burwood Landfill*.</b>	55 – 85
<b>House 3</b>	0.3 – 0.66	Average concentrations of metals across the site are above published background concentrations, but below acceptance criteria for Leggett Road managed (controlled) fill. Asbestos not detected.	<b>Leggett Road controlled fill*.</b>	30 – 40
<b>House 4</b>	0.3 – 0.6	Metals detected above published background concentrations for the site but below Wheatsheaf managed fill's acceptance criteria. Asbestos not detected.	<b>Wheatsheaf managed fill*.</b>	30 – 45
<b>House 5</b>	0.3 – 0.73			45 – 65
<b>House 6</b>	0.3 – 0.57			25 – 35
<b>House 7</b>	0.3 – 0.38			40 – 55
<b>House 8</b>	0.3 – 0.77			45 – 70
<b>House 9</b>	0.3 – 0.47			15 – 20
<b>Houses 10 &amp; 11</b>	0.3 – 0.52			25 – 35
<b>Houses 12 &amp; 13</b>	0.3 – 0.45			15 – 25

Area of site/sample cell	Depth (m bgl)	Contamination condition	Disposal option (subject to operator approval)	Approx soil volume (+/- 20%) (m <sup>3</sup> )
<b><i>FUTURE STAGES – (e.g., civil earthworks, etc.)</i></b>				
<b>All of site</b>	Soil disposal as per Figures 2-6.			

**Notes:**

Approximate values have been rounded to nearest whole 5 m<sup>3</sup>.

Estimates are based on visual estimate of site areas, analytical laboratory results and information provided by the HDS MBU5 geotechnical, civil engineers and architects.

\* More conservative disposal option selected when more than one option available across the new footprint.

Additional quantities may require disposal to managed fill/landfill if approval is not obtained, and/or if unexpected contamination is encountered.

Assumes that soils below current structure footprints can be disposed in line with those outside (i.e., the halo) and do not require disposal as asbestos waste.

Soil volumes have been estimated by multiplying the approximate removal area by the understood depth of removal at the time of reporting (see Appendix D).

All offsite soil disposal is subject to the prior written approval of the facility operator. The WI, sample plan and laboratory results should be provided to the operator to confirm written acceptance of the material.

Volumes for civil earthworks/service installations such as drainage/utilities are not included.

A site plan showing the soil sample locations of the site (Figure 1, Appendix B), results, and laboratory reports are attached to assist with offsite soil disposal negotiations with facility operators. The Contractor must ensure the disposal facility operator is provided with the soil testing results and receives written confirmation from them confirming acceptance of the material prior to commencement of the site excavation work.

## 2.2 Soil management

The Kāinga Ora 2021 General Contaminated Site Management Plan (CSMP<sup>8</sup>) and Contaminated Soil Discovery Guidelines (attached in the CSMP's Appendix B) should also be read and adhered to in conjunction with this WI. Listed below are the key controls the Contractor shall adopt, over and above this and industry good practise for soil excavation and disposal, in order to manage the environmental and health and safety risks during the site clearance and/or earthworks:

- The contractor shall notify the relevant council of the impending earthworks meeting the required consent conditions including erosion and sediment control plan implementation etc.
- Arsenic has been recorded above its commercial/industrial land use criterion at:
  - 15 Church Street, cell HA5, 0 to 0.3 m bgl. Controls and procedures to protect workers disturbing these soils are described at the beginning of Section 2.
- Standard hygiene measures (e.g., washing hands after soil disturbance/excavation activities and prior to eating, drinking or smoking) should be employed across all other areas of the site during earthwork.
- Erosion and sediment controls need to be installed in accordance with industry good practise (i.e., ECan's Erosion and Sediment Control Toolbox) and/or earthwork related consent conditions prior to clearance and/or earthwork commencement and adhered to during their duration.
- **Following demolition of the dwellings and ancillary structures on site, a hold point should occur prior to soil disturbance at these footprints, for a competent person to inspect that ACM/asbestos material is not present in these areas.**
- Should an unexpected discovery of potentially contaminated material, including ACM, be encountered during site work, cordon off the area immediately and contact T+T for further guidance.
- Trucks removing excavated soil from the site shall be sheeted/covered and the wheels washed (or similar) if they have had contact with site soils before leaving site to avoid tracking soil debris on to neighbouring roadways. Should the roadway be impacted site soil, the Contractor shall be responsible for its immediate clean up, including of the surrounding street if necessary.

## 2.3 Site completion reporting/information

- On completion, the Contractor will inform T+T that the excavation and removal of soils has met with the requirements of this WI, and email digital photographs of the work to mmorley@tonkintaylor.co.nz and/or the Kāinga Ora Project Manager. Photographs must be of the excavated area and a separate photograph must be included showing a close up of a tape measure and the excavation bottom to verify the excavation depth. Post soil removal photographs shall be included in the site verification report as evidence the site works were undertaken in accordance with this WI. Soil validation sampling is not required and will not be

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<sup>8</sup> Kāinga Ora (December 2021) Generic Contaminated Site Management & Contaminated Soil Discovery Guideline. 13 December 2021.

undertaken unless specifically requested by Kāinga Ora as the underlying soils have been assessed to be below human health criteria for the proposed high-density residential land use.

- Waste disposal dockets, fill site material acceptance letters, ground contamination-related complaints, regulatory infringement notices and/or any health and safety incident reports must be supplied to T+T and Kāinga Ora on completion of the work.

### 3 Applicability

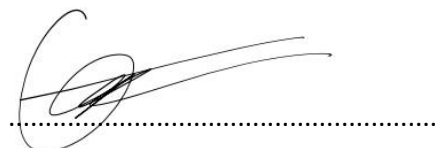
This report has been prepared for the exclusive use of our client Kāinga Ora Homes and Communities, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on discrete sampling data. The nature and continuity of subsoil away from the sampling points are inferred and it must be appreciated that actual conditions could vary from the assumed model.

Tonkin & Taylor Ltd  
Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:




Colter Carson  
Environmental Consultant



Michael Mechaelis  
Project Director

Report technically reviewed by a SQEP as prescribed by the NESCS:



Mark Morley  
Environmental Geologist

COCA

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## **Appendix A      Laboratory results summary table and laboratory certificates**

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- **Table 5.2: Analytical results summary table.**
- **Laboratory certificates.**

Table 5.2: Soil analytical results summary: 7-15 Church Street, Hampstead, Ashburton

				Asbestos <sup>1</sup>			Heavy Metals - Screen						
				Asbestos Containing Material (ACM) (Presence / absence and type)	Asbestos Containing Material (ACM) (%) w/w	Fibrous asbestos (FA) / Asbestos fines (AF) (%) w/w	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
				% w/w	% w/w	% w/w	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Laboratory Limit of Reporting				0.01	0.01	0.001	0.1	0.01	0.1	0.1	0.1	0.1	5
Background (YGE Regional) <sup>2</sup>				NAD	NAD	NAD	4.9	0.13	16.9	12.4	21.3	13.1	69.6
NESCS - Commercial / Industrial <sup>3</sup>				-	0.05	0.001	70	1,300	6,300	>10,000	3,300	6,000 <sup>4</sup>	400,000 <sup>4</sup>
NESCS - High Density Residential <sup>3</sup>				-	0.04	0.001	45	230	1,500	>10,000	500	1,200 <sup>4</sup>	60,000 <sup>4</sup>
Waste acceptance criteria - Leggett Road Cleanfill and Controlled Fill Facility <sup>5</sup>				-	5	0.1	12.58	0.19	22.7	20.3	40.96	20.7	93.94
Waste Acceptance Criteria - Wheatheaf Managed Fill <sup>6</sup>				NAD	NAD	NAD	17	0.8	290	>10,000	160	400 <sup>4</sup>	7,400 <sup>4</sup>
Waste Acceptance Criteria- Canterbury Enviro Solutions Temuka <sup>8</sup>				NAD	NAD	NAD	70	1,300	6,000	>10000	3,300	6,000	400,000
Waste Acceptance Criteria - Burwood Landfill <sup>7</sup>				NAD	NAD	NAD	80	400	2,700	>10,000	880	6,000	14,000
Property Address	Sample ID	Sample depth (m bgl)	Material Type										
7 Church St	HA1	0.1	Soil	NAD	-	-	7.1	0.14	23	16	65	17	110
		0.3		-	-	-	6	0.06	25	16	21	19	86
		0.5		-	-	-	5.1	-	21	14	-	16	71
		0.7		-	-	-	5.6	-	20	16	-	15	61
	HA2	0.1	Soil	NAD	-	-	9.4	0.17	25	19	84	19	120
		0.3		-	-	-	5.6	0.08	23	15	24	17	84
		0.5		-	-	-	5.9	-	24	18	22	18	78
		0.7		-	-	-	5.6	-	23	16	19	17	71
	HA3	1.0		-	-	-	-	-	26	-	-	-	-
		0.1	Soil	NAD	-	-	8.9	0.27	22	21	180	15	180
		0.3		-	-	-	5.9	0.14	22	16	57	17	110
		0.5		-	-	-	5.6	0.06	24	15	21	18	77
		0.7		-	-	-	5.7	0.07	24	15	25	17	90
	HA4	1.0		-	-	-	-	-	21	-	-	-	-
		0.1	Soil	NAD	-	-	13	0.26	25	27	350	16	230
		0.3		-	-	-	11	0.23	26	21	200	15	180
		0.5		-	-	-	6.8	0.18	25	22	66	18	200
		0.7		-	-	-	4.1	0.07	20	13	13	15	87
	HA5	0.1	Soil	NAD	-	-	6.1	0.33	23	25	93	15	210
		0.3		-	-	-	5.2	0.09	22	15	25	17	96
		0.5		-	-	-	4.7	-	22	14	15	16	64
		0.7		-	-	-	4.1	-	20	13	14	15	59
	HA6	0.1	Soil	NAD	-	-	5	0.15	22	17	28	17	100
		0.3		-	-	-	5.5	0.25	23	20	58	16	140
		0.5		-	-	-	5	0.08	22	15	22	17	83
		0.7		-	-	-	5.4	0.06	24	16	21	17	78
	Composite Halo A-D 0.1	1.0		-	-	-	-	-	25	-	-	-	-
		0.1	Topsoil	-	-	-	8	0.35	25	81	300	15	230
		0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
		0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
9 Church St	HA1	0.1	Soil	NAD	-	-	3.2	0.03	20	9.3	12	13	49
		0.3		-	-	-	9.7	0.17	29	34	51	22	130
		0.5		-	-	-	5.9	0.1	22	20	39	16	88
		0.7		-	-	-	5.2	0.06	21	15	17	16	69
	HA2	0.1	Soil	NAD	-	-	7.6	0.25	21	43	75	15	150
		0.3		-	-	-	5	0.1	20	16	29	15	88
		0.5		-	-	-	4.4	-	21	14	18	16	72
		0.7		-	-	-	4.8	-	23	15	18	17	67
	HA3	0.1	Soil	NAD	-	-	9.6	0.35	23	50	92	16	160
		0.3		-	-	-	7.1	0.31	23	78	81	17	160
		0.5		-	-	-	6.2	0.08	24	23	20	18	110
		0.7		-	-	-	6.2	0.06	25	21	21	18	92
	HA4	1.0		-	-	-	-	-	20	14	-	-	-
		0.1	Soil	NAD	-	-	5.5	0.19	20	15	32	12	91
		0.3		-	-	-	19	0.36	30	55	140	19	230
		0.5		-	-	-	10	0.12	27	28	38	19	120
		0.7		-	-	-	9.7	0.16	23	28	84	15	110
	HA5	1.0		-	-	-	-	-	19	14	15	-	56
		0.1	Soil	NAD	-	-	24	0.44	33	130	190	26	260
		0.3		-	-	-	7.6	0.09	22	16	24	17	120
		0.5		-	-	-	7.1	-	21	17	28	16	120
		0.7		-	-	-	4.4	-	20	14	17	14	69
	HA6	0.1	Soil	NAD	-	-	14	0.28	22	29	88	16	700
		0.3		-	-	-	5.3	0.06	20	13	17	16	75
		0.5		-	-	-	3.9	-	18	11	11	14	58
		0.7		-	-	-	18	-	17	11	16	13	79
	Composite Halo A-D 0.1	1.0		-	-	-	34	-	19	9.9	11	14	49
		0.1	Topsoil	-	-	-	13	0.4	25	61	140	16	180
		0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
		0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
	HA1	0.1	Soil	NAD	-	-	6.8	0.14	26	18	36	19	100
		0.3		-	-	-	6.3	0.12	26	17	30	19	96
		0.5		-	-	-	4.9	-	20	13	20	15	70
		0.7		-	-	-	5.9	-	25	16	24	18	84
	HA2	1.0		-	-	-	-	-	24	-	-	-	-
		0.1	Soil	NAD	-	-	7.4	0.1	25	14	29	13	84
		0.3		-	-	-	8.3	0.13	26	24	42	20	110
		0.5		-	-	-	9.5	-	32	26	44	22	120



11 Church St		0.7		-	-	-	6.4	-	24	19	44	17	99
		1.0		-	-	-	-	-	22	-	-	-	-
	HA3	0.1	Soil	NAD	-	-	8.2	0.25	23	26	81	14	210
		0.3		-	-	-	8.3	0.22	28	27	150	19	200
		0.5		-	-	-	5.3	0.1	25	21	95	16	130
		0.7		-	-	-	4.1	0.08	21	14	37	14	84
	HA4	0.1	Soil	NAD	-	-	10	0.34	24	33	80	15	190
		0.3		-	-	-	14	0.34	26	38	86	17	190
		0.5		-	-	-	7.8	0.09	23	19	25	17	88
		0.7		-	-	-	8.7	0.14	25	24	42	19	110
		1.0		-	-	-	-	-	22	-	-	-	-
	Composite Halo A-D 0.1	0.1	Topsoil	-	-	-	9.8	0.28	25	43	120	16	220
	Halo A 0.1	0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
13 Church St	HA1	0.1	Soil	NAD	-	-	17	0.27	27	35	62	17	150
		0.3		-	-	-	14	0.15	26	73	52	19	110
		0.5		-	-	-	8.9	0.13	26	22	36	18	100
		0.7		-	-	-	5.7	0.06	24	16	19	18	77
		1.0		-	-	-	-	-	24	-	-	-	-
	HA2	0.1	Soil	NAD	-	-	17	0.34	30	49	230	17	250
		0.3		-	-	-	10	0.25	26	28	83	18	180
		0.5		-	-	-	5.5	0.07	21	15	21	16	90
		0.7		-	-	-	6.4	0.09	25	18	27	18	100
		1.0		-	-	-	-	-	23	-	-	-	78
	HA3	0.1	Soil	NAD	-	-	8.7	0.46	26	35	84	17	240
		0.3		-	-	-	6.1	0.23	23	24	44	17	140
		0.5		-	-	-	5.4	0.14	23	20	33	16	110
		0.7		-	-	-	4.3	0.09	19	14	19	14	73
15 Church St	HA1	0.1	Soil	NAD	-	-	11	0.08	20	13	28	14	88
		0.3		-	-	-	8.1	0.07	25	19	27	18	96
		0.5		-	-	-	8.1	0.06	26	19	25	19	90
		0.7		-	-	-	4.8	0.05	24	15	20	16	71
		1.0		-	-	-	-	-	24	-	-	-	-
	HA2	0.1	Soil	NAD	-	-	9.6	0.15	28	23	69	20	130
		0.3		-	-	-	6.4	0.1	24	18	34	18	90
		0.5		-	-	-	5.8	-	25	16	28	19	86
		0.7		-	-	-	6.5	-	27	18	21	20	80
		1.0		-	-	-	-	-	19	-	-	-	-
	HA3	0.1	Soil	NAD	-	-	7.5	0.25	24	130	70	17	230
		0.3		-	-	-	5.2	0.09	19	14	15	14	150
		0.5		-	-	-	3	-	20	12	16	15	190
		0.7		-	-	-	5.6	-	23	15	20	15	110
		1.0		-	-	-	-	-	27	-	-	-	88
	HA4	0.1	Soil	NAD	-	-	6.5	0.16	19	20	40	12	150
		0.3		-	-	-	8.5	0.41	22	21	100	14	320
		0.5		-	-	-	4.1	0.06	23	14	17	16	70
		0.7		-	-	-	7.1	0.05	32	17	29	19	100
		1.0		-	-	-	-	-	25	-	-	-	89
	HA5	0.1	Soil	NAD	-	-	71	0.39	69	77	120	13	220
		0.3		-	-	-	9.2	0.09	18	15	32	13	86
		0.5		-	-	-	8.6	-	23	17	21	15	85
		0.7		-	-	-	21	-	31	31	68	18	150
		1.0		-	-	-	7.9	-	23	14	19	-	68
	HA6	0.1	Soil	NAD	-	-	11	0.31	21	35	320	16	270
		0.3		-	-	-	6.9	0.18	19	17	160	14	160
		0.5		-	-	-	4.6	0.09	22	13	26	15	100
		0.7		-	-	-	4.3	0.08	23	12	16	16	77
		1.0		-	-	-	-	-	23	-	-	-	-
	Composite Halo A-D 0.1	0.1	Topsoil	-	-	-	29	0.27	39	81	160	16	180
	Halo A 0.1	0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
	Halo B 0.1	0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
	Halo C 0.1	0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
	Halo D 0.1	0.1	Topsoil	NAD	-	-	-	-	-	-	-	-	-
Average all soils at 0.1 m bgl							12.2	0.2	25.6	36.4	101.5	16.0	186.9
Average all soils at 0.3 m bgl							8.2	0.2	23.7	26.0	63.3	17.1	137.1
Average all soils at 0.5 m bgl							6.1	0.1	23.2	17.5	29.5	16.8	98.8
Average all soils at 0.7 m bgl							6.8	0.1	23.3	16.9	27.1	16.4	85.9
Average all soils at 1.0 m bgl							13.0	-	22.6	13.3	16.7	13.0	76.3

**Key:**

NAD = No Asbestos Detected.

NGV = no guideline value.

<LoR = below laboratory Limit of Reporting.

'-' Denotes not analysed or not applicable.

m bgl = metres below ground level.

<b>BOLD</b>	exceeds published background concentrations at the site
	exceeds NES:CS SCS commercial/industrial criteria
	exceeds NES:CS SCS high density residential
	exceeds landfill screening acceptance criteria for Leggett Road
<u>Underlined</u>	exceeds landfill screening acceptance criteria for Wheatsheaf Quarries
	exceeds landfill screening acceptance criteria for Canterbury Enviro Solutions Temuka
	exceeds landfill screening acceptance criteria for Burwood Landfill

**References:**

Results are in milligrams per kilogram (mg/kg) unless specified.

1. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, BRANZ 2017. Soil guideline values for ACM and AF/FA based on relevant land use.

2. Environment Canterbury GIS, Trace Elements Level 2. Background concentrations at the site, from "Background concentrations of selected trace elements in Canterbury soils" prepared for Environment Canterbury by Tonkin & Taylor Ltd, July 2006.

3. MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Commercial/Industrial land use criteria as a conservative proxy for construction worker health and safety, and high-density residential land use criteria.

4. In the absence of available NESCS criterion for nickel and zinc, the criterion has been adopted from Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – <http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox>.
5. Backfill Management Plan- 81 Leggett Road, Templeton (September 2019). Prepared for Protranz Earthmoving Ltd by Tonkin & Taylor Ltd.
6. Selwyn Quarries Limited resource consent CRC145183, Condition 24 (2014). Values based on NES Soil SCS for Rural residential/lifestyle block 25% produce.
7. Christchurch City Council (CCC) Burwood Landfill acceptance criteria, based on NESCS SCS for recreational land use.
8. Canterbury Enviro Solutions Ltd, Temuka. 45 Wilmshurst Road, Temuka facility, CRC212189, cleanfill levels and maximum limits.

Kainga Ora – Homes and Communities  
107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023



All tests reported herein  
have been performed in  
accordance with the  
laboratory's scope of  
accreditation

**Attention:** **Colter Carson**

**Report** **1007302-S**  
Project name **11 CHURCH STREET ASHBURTON**  
Project ID **1018898.2000**  
Received Date **Jul 13, 2023**

Client Sample ID			11 HA1 0.1	11 HA1 0.3	11 HA2 0.1	11 HA2 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024007	Z23-JI0024008	Z23-JI0024009	Z23-JI0024010
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	6.8	6.3	7.4	8.3
Cadmium	0.01	mg/kg	0.14	0.12	0.10	0.13
Chromium	0.1	mg/kg	26	26	25	26
Copper	0.1	mg/kg	18	17	14	24
Lead	0.1	mg/kg	36	30	29	42
Nickel	0.1	mg/kg	19	19	13	20
Zinc	5	mg/kg	100	96	84	110
<b>Sample Properties</b>						
% Moisture	1	%	32	24	14	20

Client Sample ID			11 HA3 0.1	11 HA3 0.3	11 HA4 0.1	11 HA4 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024011	Z23-JI0024012	Z23-JI0024013	Z23-JI0024014
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	8.2	8.3	10	14
Cadmium	0.01	mg/kg	0.25	0.22	0.34	0.34
Chromium	0.1	mg/kg	23	28	24	26
Copper	0.1	mg/kg	26	27	33	38
Lead	0.1	mg/kg	81	150	80	86
Nickel	0.1	mg/kg	14	19	15	17
Zinc	5	mg/kg	210	200	190	190
<b>Sample Properties</b>						
% Moisture	1	%	18	23	31	24

<b>Client Sample ID</b>			<b>COMPOSITE OF 11 HALO A-D</b>	<b>11 HA1 0.5</b>	<b>11 HA1 0.7</b>	<b>11 HA1 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0024019</b>	<b>Z23-JI0024020</b>	<b>Z23-JI0024021</b>	<b>Z23-JI0024022</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	9.8	-	-	-
Cadmium	0.01	mg/kg	0.28	-	-	-
Chromium	0.1	mg/kg	25	-	-	-
Copper	0.1	mg/kg	43	-	-	-
Lead	0.1	mg/kg	120	-	-	-
Nickel	0.1	mg/kg	16	-	-	-
Zinc	5	mg/kg	220	-	-	-
<b>Sample Properties</b>						
% Moisture	1	%	19	25	22	20
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	20	25	24
Copper	0.1	mg/kg	-	13	16	-
Nickel	0.1	mg/kg	-	15	18	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	4.9	5.9	-
Lead	0.1	mg/kg	-	20	24	-
Zinc	5	mg/kg	-	70	84	-

<b>Client Sample ID</b>			<b>11 HA2 0.5</b>	<b>11 HA2 0.7</b>	<b>11 HA2 1.0</b>	<b>11 HA3 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0024023</b>	<b>Z23-JI0024024</b>	<b>Z23-JI0024025</b>	<b>Z23-JI0024026</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	-	5.3
Cadmium	0.01	mg/kg	-	-	-	0.10
Chromium	0.1	mg/kg	-	-	-	25
Copper	0.1	mg/kg	-	-	-	21
Lead	0.1	mg/kg	-	-	-	95
Nickel	0.1	mg/kg	-	-	-	16
Zinc	5	mg/kg	-	-	-	130
<b>Sample Properties</b>						
% Moisture	1	%	19	21	17	18
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	32	24	22	-
Copper	0.1	mg/kg	26	19	-	-
Nickel	0.1	mg/kg	22	17	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	9.5	6.4	-	-
Lead	0.1	mg/kg	44	44	-	-
Zinc	5	mg/kg	120	99	-	-

Client Sample ID			11 HA3 0.7	11 HA4 0.5	11 HA4 0.7	11 HA4 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024027	Z23-JI0024029	Z23-JI0024030	Z23-JI0024031
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	4.1	7.8	8.7	-
Cadmium	0.01	mg/kg	0.08	0.09	0.14	-
Chromium	0.1	mg/kg	21	23	25	-
Copper	0.1	mg/kg	14	19	24	-
Lead	0.1	mg/kg	37	25	42	-
Nickel	0.1	mg/kg	14	17	19	-
Zinc	5	mg/kg	84	88	110	-
<b>Sample Properties</b>						
% Moisture	1	%	17	19	18	18
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	-	-	22

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M7 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS	Auckland	Jul 21, 2023	6 Months
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 04, 2023	28 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Jul 21, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Aug 03, 2023	14 Days

<b>Company Name:</b>	Kainga Ora – Homes and Communities - SI	<b>Order No.:</b>	6181830 11 CHURCH STREET	<b>Received:</b>	Jul 13, 2023 8:00 AM
<b>Address:</b>	107 Carlton Gore Road Newmarket, Auckland NZ 1023	<b>Report #:</b>	1007302	<b>Due:</b>	Aug 11, 2023
		<b>Phone:</b>	(021) 537 696	<b>Priority:</b>	20 Day
		<b>Fax:</b>		<b>Contact Name:</b>	Colter Carson
<b>Project Name:</b>	11 CHURCH STREET ASHBURTON				
<b>Project ID:</b>	1018898.2000				

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	11 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0024007		X							X	X
2	11 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0024008									X	X
3	11 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0024009		X							X	X
4	11 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0024010									X	X
5	11 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0024011		X							X	X
6	11 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0024012									X	X
7	11 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0024013		X							X	X
8	11 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0024014									X	X
9	11 HALO A	Jul 12, 2023		Soil	Z23-JI0024015		X								
10	11 HALO B	Jul 12, 2023		Soil	Z23-JI0024016		X								
11	11 HALO C	Jul 12, 2023		Soil	Z23-JI0024017		X								



**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023  
  
**Project Name:** 11 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 11 CHURCH STREET  
**Report #:** 1007302  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Aug 11, 2023  
**Priority:** 20 Day  
**Contact Name:** Colter Carson

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
12	11 HALO D	Jul 12, 2023		Soil	Z23-JI0024018		X								
13	COMPOSITE OF 11 HALO A-D	Jul 12, 2023		Soil	Z23-JI0024019									X	X
14	11 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0024020	X		X	X		X	X	X	X	
15	11 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0024021	X		X	X		X	X	X	X	
16	11 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0024022			X						X	
17	11 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0024023	X		X	X		X	X	X	X	
18	11 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0024024	X		X	X		X	X	X	X	
19	11 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0024025			X						X	
20	11 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0024026									X	X
21	11 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0024027									X	X
22	11 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0024028					X					
23	11 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0024029									X	X

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 11 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 11 CHURCH STREET <b>Report #:</b> 1007302 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MfE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
24	11 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0024030									X	X
25	11 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0024031			X						X	
Test Counts						4	8	7	4	1	4	4	4	20	13

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

## Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			mg/kg	< 0.1		0.1	Pass	
Cadmium			mg/kg	< 0.01		0.01	Pass	
Chromium			mg/kg	< 0.1		0.1	Pass	
Copper			mg/kg	< 0.1		0.1	Pass	
Lead			mg/kg	< 0.1		0.1	Pass	
Nickel			mg/kg	< 0.1		0.1	Pass	
Zinc			mg/kg	< 5		5	Pass	
<b>Method Blank</b>								
<b>Heavy Metals</b>								
Chromium			mg/kg	< 0.1		0.1	Pass	
Copper			mg/kg	< 0.1		0.1	Pass	
Nickel			mg/kg	< 0.1		0.1	Pass	
<b>Method Blank</b>								
<b>Metals M8 (NZ MfE)</b>								
Arsenic			mg/kg	< 0.1		0.1	Pass	
Lead			mg/kg	< 0.1		0.1	Pass	
Zinc			mg/kg	< 5		5	Pass	
<b>LCS - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			%	103		80-120	Pass	
Cadmium			%	103		80-120	Pass	
Chromium			%	107		80-120	Pass	
Copper			%	106		80-120	Pass	
Lead			%	103		80-120	Pass	
Nickel			%	102		80-120	Pass	
Zinc			%	108		80-120	Pass	
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Chromium			%	105		80-120	Pass	
Copper			%	106		80-120	Pass	
Nickel			%	104		80-120	Pass	
<b>LCS - % Recovery</b>								
<b>Metals M8 (NZ MfE)</b>								
Arsenic			%	108		80-120	Pass	
Lead			%	110		80-120	Pass	
Zinc			%	110		80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0024008	CP	%	111		75-125	Pass	
Cadmium	Z23-JI0024008	CP	%	112		75-125	Pass	
Chromium	Z23-JI0024008	CP	%	114		75-125	Pass	
Copper	Z23-JI0024008	CP	%	111		75-125	Pass	
Lead	Z23-JI0024008	CP	%	110		75-125	Pass	
Nickel	Z23-JI0024008	CP	%	105		75-125	Pass	
Zinc	Z23-JI0024008	CP	%	97		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0024023	CP	%	101		75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Cadmium	Z23-JI0024023	CP	%	101			75-125	Pass	
Chromium	Z23-JI0024023	CP	%	104			75-125	Pass	
Copper	Z23-JI0024023	CP	%	101			75-125	Pass	
Lead	Z23-JI0024023	CP	%	93			75-125	Pass	
Nickel	Z23-JI0024023	CP	%	92			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1					
Arsenic	Z23-JI0024025	CP	%	98			75-125	Pass	
Cadmium	Z23-JI0024025	CP	%	91			75-125	Pass	
Chromium	Z23-JI0024025	CP	%	97			75-125	Pass	
Copper	Z23-JI0024025	CP	%	94			75-125	Pass	
Lead	Z23-JI0024025	CP	%	92			75-125	Pass	
Nickel	Z23-JI0024025	CP	%	94			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023979	NCP	mg/kg	19	16	20	30%	Pass	
Cadmium	Z23-JI0023979	NCP	mg/kg	0.36	0.30	18	30%	Pass	
Chromium	Z23-JI0023979	NCP	mg/kg	30	26	14	30%	Pass	
Copper	Z23-JI0023979	NCP	mg/kg	55	46	18	30%	Pass	
Lead	Z23-JI0023979	NCP	mg/kg	140	96	37	30%	Fail	Q02
Nickel	Z23-JI0023979	NCP	mg/kg	19	17	10	30%	Pass	
Zinc	Z23-JI0023979	NCP	mg/kg	230	180	29	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0024007	CP	%	32	32	<1	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0024021	CP	mg/kg	5.9	5.9	<1	30%	Pass	
Cadmium	Z23-JI0024021	CP	mg/kg	0.08	0.07	6.5	30%	Pass	
Chromium	Z23-JI0024021	CP	mg/kg	25	24	2.4	30%	Pass	
Copper	Z23-JI0024021	CP	mg/kg	16	17	1.4	30%	Pass	
Lead	Z23-JI0024021	CP	mg/kg	24	23	4.2	30%	Pass	
Nickel	Z23-JI0024021	CP	mg/kg	18	18	2.6	30%	Pass	
Zinc	Z23-JI0024021	CP	mg/kg	84	81	2.7	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0024021	CP	%	22	22	2.7	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0024022	CP	mg/kg	5.2	5.4	4.7	30%	Pass	
Cadmium	Z23-JI0024022	CP	mg/kg	0.04	0.05	10.0	30%	Pass	
Chromium	Z23-JI0024022	CP	mg/kg	24	25	3.0	30%	Pass	
Copper	Z23-JI0024022	CP	mg/kg	16	16	3.5	30%	Pass	
Lead	Z23-JI0024022	CP	mg/kg	18	20	9.6	30%	Pass	
Nickel	Z23-JI0024022	CP	mg/kg	17	17	2.6	30%	Pass	
Zinc	Z23-JI0024022	CP	mg/kg	67	71	5.6	30%	Pass	

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

## Authorised by:

Katyana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Sophie Bush	Senior Analyst-Asbestos



**Raymond Siu**  
**Senior Instrument Chemist (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

**Kainga Ora – Homes and Communities**  
**107 Carlton Gore Road**  
**Newmarket, Auckland**  
**NZ 1023**



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** Colter Carson  
**Report** 1007303-AID  
**Project Name** 13 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Received Date** Jul 13, 2023  
**Date Reported** Aug 11, 2023

### Methodology:

Asbestos Fibre Identification	<p>Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.</p> <p><i>NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.</i></p>
Unknown Mineral Fibres	<p>Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.</p> <p><i>NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.</i></p>
Subsampling Soil Samples	<p>The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.</p> <p><i>NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.</i></p>
Bonded asbestos-containing material (ACM)	<p>The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.</p> <p><i>NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.</i></p>
Limit of Reporting	<p>The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).</p> <p>The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).</p> <p><i>NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.</i></p>

**Project Name** 13 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Date Sampled** Jul 12, 2023  
**Report** 1007303-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
13 HA1 0.1	23-JI0024032	Jul 12, 2023	Approximate Sample 206g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
13 HA2 0.1	23-JI0024034	Jul 12, 2023	Approximate Sample 175g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
13 HA3 0.1	23-JI0024036	Jul 12, 2023	Approximate Sample 176g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.



**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 13, 2023	Indefinite

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

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Auckland Laboratory - IANZ# 1327							X		X	X	X
Christchurch Laboratory - IANZ# 1290						X		X			
Tauranga Laboratory - IANZ# 1402											
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	13 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0024032	X				X	X
2	13 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0024033					X	X
3	13 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0024034	X				X	X
4	13 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0024035					X	X
5	13 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0024036	X				X	X
6	13 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0024037					X	X
7	13 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0024038					X	X
8	13 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0024039					X	X
9	13 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0024040		X			X	
10	13 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0024041					X	X
11	13 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0024042					X	X

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	Chromium	HOLD	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327							X		X	X	X
Christchurch Laboratory - IANZ# 1290						X		X			
Tauranga Laboratory - IANZ# 1402											
12	13 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0024043		X		X	X	
13	13 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0024044					X	X
14	13 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0024045					X	X
15	13 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0024046			X			
Test Counts						3	2	1	1	14	12

## Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

## Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

## Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples ( <b>% w/w</b> )
F/fld	Airborne fibre filter loading as Fibres ( <b>N</b> ) per Fields counted ( <b>n</b> )
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane ( <b>C</b> )
g, kg	Mass, e.g. of whole sample ( <b>M</b> ) or asbestos-containing find within the sample ( <b>m</b> )
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM ( <b>V = r x t</b> )
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane ( <b>r</b> )
min	Time ( <b>t</b> ), e.g. of air sample collection period

## Calculations

Airborne Fibre Concentration:  $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$

Asbestos Content (as asbestos):  $\% w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos):  $\%_{WA} = \sum \frac{(m \times P_A) \times x}{x}$

## Terms

<b>%asbestos</b>	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
<b>AF</b>	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>AFM</b>	Airborne Fibre Monitoring, e.g. by the MFM.
<b>Amosite</b>	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
<b>AS</b>	Australian Standard.
<b>Asbestos Content (as asbestos)</b>	Total % w/w asbestos content in asbestos-containing finds in a soil sample ( <b>% w/w</b> ).
<b>Chrysotile</b>	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
<b>COC</b>	Chain of Custody.
<b>Crocidolite</b>	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
<b>Dry</b>	Sample is dried by heating prior to analysis.
<b>DS</b>	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
<b>FA</b>	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
<b>Fibre Count</b>	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
<b>Fibre ID</b>	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>HSG248</b>	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
<b>HSG264</b>	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
<b>ISO (also ISO/IEC)</b>	International Organization for Standardization / International Electrotechnical Commission.
<b>K Factor</b>	Microscope constant ( <b>K</b> ) as derived from the effective filter area of the given AFM membrane used for collecting the sample ( <b>A</b> ) and the projected eyepiece graticule area of the specific microscope used for the analysis ( <b>a</b> ).
<b>LOR</b>	Limit of Reporting.
<b>MFM (also NOHSC:3003)</b>	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
<b>NEPM (also ASC NEPM)</b>	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
<b>Organic</b>	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
<b>PCM</b>	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
<b>PLM</b>	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
<b>Sampling</b>	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
<b>SMF</b>	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
<b>SRA</b>	Sample Receipt Advice.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
<b>UK HSE HSG</b>	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
<b>UMF</b>	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according to the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
<b>Weighted Average</b>	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample ( <b>%<sub>WA</sub></b> ).

**Comments****Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Asbestos Counter/Identifier:**

Kate Stuart                      Senior Analyst-Asbestos

**Authorised by:**

Sophie Bush                      Senior Analyst-Asbestos

**Sophie Bush****Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Kainga Ora – Homes and Communities  
107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023



All tests reported herein  
have been performed in  
accordance with the  
laboratory's scope of  
accreditation

**Attention:** **Colter Carson**

**Report** **1007303-S**  
Project name **13 CHURCH STREET ASHBURTON**  
Project ID **1018898.2000**  
Received Date **Jul 13, 2023**

Client Sample ID			13 HA1 0.1	13 HA1 0.3	13 HA2 0.1	13 HA2 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024032	Z23-JI0024033	Z23-JI0024034	Z23-JI0024035
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	17	14	17	10
Cadmium	0.01	mg/kg	0.27	0.15	0.34	0.25
Chromium	0.1	mg/kg	27	26	30	26
Copper	0.1	mg/kg	35	73	49	28
Lead	0.1	mg/kg	62	52	230	83
Nickel	0.1	mg/kg	17	19	17	18
Zinc	5	mg/kg	150	110	250	180
<b>Sample Properties</b>						
% Moisture	1	%	30	22	30	24

Client Sample ID			13 HA3 0.1	13 HA3 0.3	13 HA1 0.5	13 HA1 0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024036	Z23-JI0024037	Z23-JI0024038	Z23-JI0024039
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	8.7	6.1	8.9	5.7
Cadmium	0.01	mg/kg	0.46	0.23	0.13	0.06
Chromium	0.1	mg/kg	26	23	26	24
Copper	0.1	mg/kg	35	24	22	16
Lead	0.1	mg/kg	84	44	36	19
Nickel	0.1	mg/kg	17	17	18	18
Zinc	5	mg/kg	240	140	100	77
<b>Sample Properties</b>						
% Moisture	1	%	33	22	22	20

<b>Client Sample ID</b>			<b>13 HA1 1.0</b>	<b>13 HA2 0.5</b>	<b>13 HA2 0.7</b>	<b>13 HA2 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0024040</b>	<b>Z23-JI0024041</b>	<b>Z23-JI0024042</b>	<b>Z23-JI0024043</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	5.5	6.4	-
Cadmium	0.01	mg/kg	-	0.07	0.09	-
Chromium	0.1	mg/kg	-	21	25	-
Copper	0.1	mg/kg	-	15	18	-
Lead	0.1	mg/kg	-	21	27	-
Nickel	0.1	mg/kg	-	16	18	-
Zinc	5	mg/kg	-	90	100	-
<b>Sample Properties</b>						
% Moisture	1	%	20	21	21	12
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	24	-	-	23
<b>Metals M8 (NZ MfE)</b>						
Zinc	5	mg/kg	-	-	-	78

<b>Client Sample ID</b>			<b>13 HA3 0.5</b>	<b>13 HA3 0.7</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0024044</b>	<b>Z23-JI0024045</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit		
<b>Metals M7 (NZ MfE)</b>				
Arsenic	0.1	mg/kg	5.4	4.3
Cadmium	0.01	mg/kg	0.14	0.09
Chromium	0.1	mg/kg	23	19
Copper	0.1	mg/kg	20	14
Lead	0.1	mg/kg	33	19
Nickel	0.1	mg/kg	16	14
Zinc	5	mg/kg	110	73
<b>Sample Properties</b>				
% Moisture	1	%	19	18

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M7 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS	Auckland	Jul 21, 2023	6 Months
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Aug 03, 2023	14 Days



**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 13 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 13 CHURCH STREET  
**Report #:** 1007303  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Jul 18, 2023  
**Priority:** 2 Day  
**Contact Name:** Colter Carson

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327								X	X
Christchurch Laboratory - IANZ# 1290						X	X		
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	13 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0024032	X		X	X
2	13 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0024033			X	X
3	13 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0024034	X		X	X
4	13 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0024035			X	X
5	13 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0024036	X		X	X
6	13 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0024037			X	X
7	13 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0024038		X		
8	13 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0024039		X		
9	13 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0024040		X		
10	13 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0024041		X		
11	13 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0024042		X		
12	13 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0024043		X		

**Company Name:** Kainga Ora – Homes and Communities - SI  
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327								X	X
Christchurch Laboratory - IANZ# 1290						X	X		
External Laboratory									
13	13 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0024044		X		
14	13 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0024045		X		
15	13 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0024046		X		
Test Counts						3	9	6	6

## Internal Quality Control Review and Glossary

### General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

## Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>										
<b>Metals M7 (NZ MfE)</b>										
Arsenic				mg/kg	< 0.1			0.1	Pass	
Cadmium				mg/kg	< 0.01			0.01	Pass	
Chromium				mg/kg	< 0.1			0.1	Pass	
Copper				mg/kg	< 0.1			0.1	Pass	
Lead				mg/kg	< 0.1			0.1	Pass	
Nickel				mg/kg	< 0.1			0.1	Pass	
Zinc				mg/kg	< 5			5	Pass	
<b>LCS - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>										
Arsenic				%	103			80-120	Pass	
Cadmium				%	103			80-120	Pass	
Chromium				%	107			80-120	Pass	
Copper				%	106			80-120	Pass	
Lead				%	103			80-120	Pass	
Nickel				%	102			80-120	Pass	
Zinc				%	108			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0024008	NCP		%	111			75-125	Pass	
Cadmium	Z23-JI0024008	NCP		%	112			75-125	Pass	
Chromium	Z23-JI0024008	NCP		%	114			75-125	Pass	
Copper	Z23-JI0024008	NCP		%	111			75-125	Pass	
Lead	Z23-JI0024008	NCP		%	110			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Nickel	Z23-JI0024034	CP		%	120			75-125	Pass	
Zinc	Z23-JI0024034	CP		%	89			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0024044	CP		%	119			75-125	Pass	
Cadmium	Z23-JI0024044	CP		%	115			75-125	Pass	
Nickel	Z23-JI0024044	CP		%	113			75-125	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1	Result 2	RPD			
Arsenic	Z23-JI0024033	CP		mg/kg	14	14	1.1	30%	Pass	
Cadmium	Z23-JI0024033	CP		mg/kg	0.15	0.17	15	30%	Pass	
Chromium	Z23-JI0024033	CP		mg/kg	26	27	3.5	30%	Pass	
Copper	Z23-JI0024033	CP		mg/kg	73	40	58	30%	Fail	Q02
Lead	Z23-JI0024033	CP		mg/kg	52	49	6.5	30%	Pass	
Nickel	Z23-JI0024033	CP		mg/kg	19	20	2.1	30%	Pass	
Zinc	Z23-JI0024033	CP		mg/kg	110	120	8.8	30%	Pass	
<b>Duplicate</b>										
<b>Sample Properties</b>					Result 1	Result 2	RPD			
% Moisture	Z23-JI0024033	CP		%	22	23	1.7	30%	Pass	

Duplicate								
Metals M7 (NZ MfE)				Result 1	Result 2	RPD		
Arsenic	Z23-JI0024042	CP	mg/kg	6.4	5.9	8.5	30%	Pass
Cadmium	Z23-JI0024042	CP	mg/kg	0.09	0.08	10	30%	Pass
Chromium	Z23-JI0024042	CP	mg/kg	25	23	7.6	30%	Pass
Copper	Z23-JI0024042	CP	mg/kg	18	16	8.5	30%	Pass
Lead	Z23-JI0024042	CP	mg/kg	27	24	9.6	30%	Pass
Nickel	Z23-JI0024042	CP	mg/kg	18	17	8.2	30%	Pass
Zinc	Z23-JI0024042	CP	mg/kg	100	95	7.7	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	Z23-JI0024042	CP	%	21	21	2.8	30%	Pass
Duplicate								
Metals M7 (NZ MfE)				Result 1	Result 2	RPD		
Arsenic	Z23-JI0024043	CP	mg/kg	5.6	5.6	<1	30%	Pass
Cadmium	Z23-JI0024043	CP	mg/kg	0.07	0.06	6.4	30%	Pass
Chromium	Z23-JI0024043	CP	mg/kg	23	23	<1	30%	Pass
Copper	Z23-JI0024043	CP	mg/kg	16	16	<1	30%	Pass
Lead	Z23-JI0024043	CP	mg/kg	22	22	2.4	30%	Pass
Nickel	Z23-JI0024043	CP	mg/kg	17	17	1.4	30%	Pass
Zinc	Z23-JI0024043	CP	mg/kg	78	78	<1	30%	Pass

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

## Authorised by:

Katjana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Sophie Bush	Senior Analyst-Asbestos



**Raymond Siu**  
**Senior Instrument Chemist (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**Kainga Ora – Homes and Communities**  
**107 Carlton Gore Road**  
**Newmarket, Auckland**  
**NZ 1023**



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** Colter Carson  
**Report** 1007299-AID  
**Project Name** 15 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Received Date** Jul 13, 2023  
**Date Reported** Aug 11, 2023

### Methodology:

Asbestos Fibre Identification	<p>Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.</p> <p><i>NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.</i></p>
Unknown Mineral Fibres	<p>Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.</p> <p><i>NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.</i></p>
Subsampling Soil Samples	<p>The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.</p> <p><i>NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.</i></p>
Bonded asbestos-containing material (ACM)	<p>The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.</p> <p><i>NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.</i></p>
Limit of Reporting	<p>The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).</p> <p>The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).</p> <p><i>NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.</i></p>

**Project Name** 15 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Date Sampled** Jul 12, 2023  
**Report** 1007299-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
15 HA1 0.1	23-JI0023902	Jul 12, 2023	Approximate Sample 271g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HA2 0.1	23-JI0023904	Jul 12, 2023	Approximate Sample 112g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HA3 0.1	23-JI0023906	Jul 12, 2023	Approximate Sample 203g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HA4 0.1	23-JI0023908	Jul 12, 2023	Approximate Sample 108g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HA5 0.1	23-JI0023910	Jul 12, 2023	Approximate Sample 177g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HA6 0.1	23-JI0023912	Jul 12, 2023	Approximate Sample 127g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HALO A	23-JI0023914	Jul 12, 2023	Approximate Sample 76g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HALO B	23-JI0023915	Jul 12, 2023	Approximate Sample 169g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.



Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
15 HALO C	23-JI0023916	Jul 12, 2023	Approximate Sample 121g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
15 HALO D	23-JI0023917	Jul 12, 2023	Approximate Sample 143g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 13, 2023	Indefinite

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 15 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 15 CHURCH STREET <b>Report #:</b> 1007299 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X							
Tauranga Laboratory - IANZ# 1402														
External Laboratory														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID									
1	15 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023902		X						X	X
2	15 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023903								X	X
3	15 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023904		X						X	X
4	15 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023905								X	X
5	15 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023906		X						X	X
6	15 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023907								X	X
7	15 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023908		X						X	X
8	15 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023909								X	X
9	15 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023910		X						X	X
10	15 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023911								X	X
11	15 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023912		X						X	X

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 15 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 15 CHURCH STREET <b>Report #:</b> 1007299 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X							
Tauranga Laboratory - IANZ# 1402														
12	15 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023913								X	X
13	15 HALO A	Jul 12, 2023		Soil	Z23-JI0023914		X							
14	15 HALO B	Jul 12, 2023		Soil	Z23-JI0023915		X							
15	15 HALO C	Jul 12, 2023		Soil	Z23-JI0023916		X							
16	15 HALO D	Jul 12, 2023		Soil	Z23-JI0023917		X							
17	COMPOSITE OF 15 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023918								X	X
18	15 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023919								X	X
19	15 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023920								X	X
20	15 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023921			X					X	
21	15 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023922	X		X	X	X	X	X	X	
22	15 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023923	X		X	X	X	X	X	X	
23	15 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023924			X					X	

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 15 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 15 CHURCH STREET <b>Report #:</b> 1007299 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X							
Tauranga Laboratory - IANZ# 1402														
24	15 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023925	X		X	X	X	X	X	X	
25	15 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023926	X		X	X	X	X	X	X	
26	15 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023927			X				X	X	
27	15 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023928								X	X
28	15 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023929								X	X
29	15 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0023930			X				X	X	
30	15 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0023931	X		X	X	X	X	X	X	
31	15 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0023932	X		X	X	X	X	X	X	
32	15 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0023933	X		X	X	X		X	X	
33	15 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0023934								X	X
34	15 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0023935								X	X
35	15 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0023936			X					X	
Test Counts						7	10	12	7	7	6	9	31	19

## Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

## Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

## Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples ( <b>% w/w</b> )
F/fld	Airborne fibre filter loading as Fibres ( <b>N</b> ) per Fields counted ( <b>n</b> )
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane ( <b>C</b> )
g, kg	Mass, e.g. of whole sample ( <b>M</b> ) or asbestos-containing find within the sample ( <b>m</b> )
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM ( <b>V = r x t</b> )
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane ( <b>r</b> )
min	Time ( <b>t</b> ), e.g. of air sample collection period

## Calculations

Airborne Fibre Concentration: 
$$C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$$

Asbestos Content (as asbestos): 
$$\% w/w = \frac{(m \times P_A)}{M}$$

Weighted Average (of asbestos): 
$$\%_{WA} = \sum \frac{(m \times P_A) \times x}{x}$$

## Terms

<b>%asbestos</b>	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
<b>AF</b>	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>AFM</b>	Airborne Fibre Monitoring, e.g. by the MFM.
<b>Amosite</b>	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
<b>AS</b>	Australian Standard.
<b>Asbestos Content (as asbestos)</b>	Total % w/w asbestos content in asbestos-containing finds in a soil sample ( <b>% w/w</b> ).
<b>Chrysotile</b>	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
<b>COC</b>	Chain of Custody.
<b>Crocidolite</b>	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
<b>Dry</b>	Sample is dried by heating prior to analysis.
<b>DS</b>	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
<b>FA</b>	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
<b>Fibre Count</b>	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
<b>Fibre ID</b>	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>HSG248</b>	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
<b>HSG264</b>	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
<b>ISO (also ISO/IEC)</b>	International Organization for Standardization / International Electrotechnical Commission.
<b>K Factor</b>	Microscope constant ( <b>K</b> ) as derived from the effective filter area of the given AFM membrane used for collecting the sample ( <b>A</b> ) and the projected eyepiece graticule area of the specific microscope used for the analysis ( <b>a</b> ).
<b>LOR</b>	Limit of Reporting.
<b>MFM (also NOHSC:3003)</b>	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
<b>NEPM (also ASC NEPM)</b>	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
<b>Organic</b>	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
<b>PCM</b>	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
<b>PLM</b>	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
<b>Sampling</b>	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
<b>SMF</b>	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
<b>SRA</b>	Sample Receipt Advice.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
<b>UK HSE HSG</b>	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
<b>UMF</b>	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
<b>Weighted Average</b>	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample ( <b>%<sub>WA</sub></b> ).

**Comments****Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Asbestos Counter/Identifier:**

Kate Stuart                      Senior Analyst-Asbestos

**Authorised by:**

Sophie Bush                      Senior Analyst-Asbestos

**Sophie Bush****Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Kainga Ora – Homes and Communities  
107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023



All tests reported herein  
have been performed in  
accordance with the  
laboratory's scope of  
accreditation

**Attention:** **Colter Carson**

**Report** **1007299-S**  
Project name **15 CHURCH STREET ASHBURTON**  
Project ID **1018898.2000**  
Received Date **Jul 13, 2023**

Client Sample ID			15 HA1 0.1	15 HA1 0.3	15 HA2 0.1	15 HA2 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023902	Z23-JI0023903	Z23-JI0023904	Z23-JI0023905
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	11	8.1	9.6	6.4
Cadmium	0.01	mg/kg	0.08	0.07	0.15	0.10
Chromium	0.1	mg/kg	20	25	28	24
Copper	0.1	mg/kg	13	19	23	18
Lead	0.1	mg/kg	28	27	69	34
Nickel	0.1	mg/kg	14	18	20	18
Zinc	5	mg/kg	88	96	130	90
<b>Sample Properties</b>						
% Moisture	1	%	18	15	29	21

Client Sample ID			15 HA3 0.1	15 HA3 0.3	15 HA4 0.1	15 HA4 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023906	Z23-JI0023907	Z23-JI0023908	Z23-JI0023909
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	7.5	5.2	6.5	8.5
Cadmium	0.01	mg/kg	0.25	0.09	0.16	0.41
Chromium	0.1	mg/kg	24	19	19	22
Copper	0.1	mg/kg	130	14	20	21
Lead	0.1	mg/kg	70	15	40	100
Nickel	0.1	mg/kg	17	14	12	14
Zinc	5	mg/kg	230	150	150	320
<b>Sample Properties</b>						
% Moisture	1	%	25	14	32	32



<b>Client Sample ID</b>			<b>15 HA5 0.1</b>	<b>15 HA5 0.3</b>	<b>15 HA6 0.1</b>	<b>15 HA6 0.3</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023910</b>	<b>Z23-JI0023911</b>	<b>Z23-JI0023912</b>	<b>Z23-JI0023913</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	71	9.2	11	6.9
Cadmium	0.01	mg/kg	0.39	0.09	0.31	0.18
Chromium	0.1	mg/kg	69	18	21	19
Copper	0.1	mg/kg	77	15	35	17
Lead	0.1	mg/kg	120	32	320	160
Nickel	0.1	mg/kg	13	13	16	14
Zinc	5	mg/kg	220	86	270	160
<b>Sample Properties</b>						
% Moisture	1	%	34	19	26	14

<b>Client Sample ID</b>			<b>COMPOSITE OF 15 HALO A-D</b>	<b>15 HA1 0.5</b>	<b>15 HA1 0.7</b>	<b>15 HA1 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023918</b>	<b>Z23-JI0023919</b>	<b>Z23-JI0023920</b>	<b>Z23-JI0023921</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	29	8.1	4.8	-
Cadmium	0.01	mg/kg	0.27	0.06	0.05	-
Chromium	0.1	mg/kg	39	26	24	-
Copper	0.1	mg/kg	81	19	15	-
Lead	0.1	mg/kg	160	25	20	-
Nickel	0.1	mg/kg	16	19	16	-
Zinc	5	mg/kg	180	90	71	-
<b>Sample Properties</b>						
% Moisture	1	%	28	19	17	20
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	-	-	24

<b>Client Sample ID</b>			<b>15 HA2 0.5</b>	<b>15 HA2 0.7</b>	<b>15 HA2 1.0</b>	<b>15 HA3 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023922</b>	<b>Z23-JI0023923</b>	<b>Z23-JI0023924</b>	<b>Z23-JI0023925</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Sample Properties</b>						
% Moisture	1	%	18	18	13	9.0
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	25	27	19	20
Copper	0.1	mg/kg	16	18	-	12
Nickel	0.1	mg/kg	19	20	-	15
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	5.8	6.5	-	3.0
Lead	0.1	mg/kg	28	21	-	16
Zinc	5	mg/kg	86	80	-	190

<b>Client Sample ID</b>			<b>15 HA3 0.7</b>	<b>15 HA3 1.0</b>	<b>15 HA4 0.5</b>	<b>15 HA4 0.7</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023926</b>	<b>Z23-JI0023927</b>	<b>Z23-JI0023928</b>	<b>Z23-JI0023929</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	4.1	7.1
Cadmium	0.01	mg/kg	-	-	0.06	0.05
Chromium	0.1	mg/kg	-	-	23	32
Copper	0.1	mg/kg	-	-	14	17
Lead	0.1	mg/kg	-	-	17	29
Nickel	0.1	mg/kg	-	-	16	19
Zinc	5	mg/kg	-	-	70	100
<b>Sample Properties</b>						
% Moisture	1	%	16	19	17	23
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	23	27	-	-
Copper	0.1	mg/kg	15	-	-	-
Nickel	0.1	mg/kg	15	-	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	5.6	-	-	-
Lead	0.1	mg/kg	20	-	-	-
Zinc	5	mg/kg	110	88	-	-

<b>Client Sample ID</b>			<b>15 HA4 1.0</b>	<b>15 HA5 0.5</b>	<b>15 HA5 0.7</b>	<b>15 HA5 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023930</b>	<b>Z23-JI0023931</b>	<b>Z23-JI0023932</b>	<b>Z23-JI0023933</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Sample Properties</b>						
% Moisture	1	%	21	20	23	17
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	25	23	31	23
Copper	0.1	mg/kg	-	17	31	14
Nickel	0.1	mg/kg	-	15	18	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	8.6	21	7.9
Lead	0.1	mg/kg	-	21	68	19
Zinc	5	mg/kg	89	85	150	68

<b>Client Sample ID</b>			<b>15 HA6 0.5</b>	<b>15 HA6 0.7</b>	<b>15 HA6 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023934</b>	<b>Z23-JI0023935</b>	<b>Z23-JI0023936</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit			
<b>Metals M7 (NZ MfE)</b>					
Arsenic	0.1	mg/kg	4.6	4.3	-
Cadmium	0.01	mg/kg	0.09	0.08	-
Chromium	0.1	mg/kg	22	23	-
Copper	0.1	mg/kg	13	12	-
Lead	0.1	mg/kg	26	16	-
Nickel	0.1	mg/kg	15	16	-
Zinc	5	mg/kg	100	77	-

<b>Client Sample ID</b>			<b>15 HA6 0.5</b>	<b>15 HA6 0.7</b>	<b>15 HA6 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023934</b>	<b>Z23-JI0023935</b>	<b>Z23-JI0023936</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit			
<b>Sample Properties</b>					
% Moisture	1	%	19	19	16
<b>Heavy Metals</b>					
Chromium	0.1	mg/kg	-	-	23

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M7 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS	Auckland	Jul 21, 2023	6 Months
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Aug 03, 2023	14 Days

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Order No.:** 6181830 15 CHURCH STREET  
**Report #:** 1007299  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Jul 18, 2023  
**Priority:** 2 Day  
**Contact Name:** Colter Carson

**Project Name:** 15 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327								X	X
Christchurch Laboratory - IANZ# 1290						X	X		
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	15 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023902	X		X	X
2	15 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023903			X	X
3	15 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023904	X		X	X
4	15 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023905			X	X
5	15 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023906	X		X	X
6	15 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023907			X	X
7	15 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023908	X		X	X
8	15 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023909			X	X
9	15 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023910	X		X	X
10	15 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023911			X	X
11	15 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023912	X		X	X
12	15 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023913			X	X

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Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327								X	X
Christchurch Laboratory - IANZ# 1290						X	X		
External Laboratory									
13	15 HALO A	Jul 12, 2023		Soil	Z23-JI0023914	X			
14	15 HALO B	Jul 12, 2023		Soil	Z23-JI0023915	X			
15	15 HALO C	Jul 12, 2023		Soil	Z23-JI0023916	X			
16	15 HALO D	Jul 12, 2023		Soil	Z23-JI0023917	X			
17	COMPOSITE OF 15 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023918			X	X
18	15 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023919		X		
19	15 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023920		X		
20	15 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023921		X		
21	15 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023922		X		
22	15 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023923		X		
23	15 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023924		X		
24	15 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023925		X		

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Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327								X	X
Christchurch Laboratory - IANZ# 1290						X	X		
External Laboratory									
25	15 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023926		X		
26	15 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023927		X		
27	15 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023928		X		
28	15 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023929		X		
29	15 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0023930		X		
30	15 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0023931		X		
31	15 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0023932		X		
32	15 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0023933		X		
33	15 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0023934		X		
34	15 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0023935		X		
35	15 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0023936		X		
Test Counts						10	18	13	13

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.



## Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>										
<b>Metals M7 (NZ MfE)</b>										
Arsenic				mg/kg	< 0.1			0.1	Pass	
Cadmium				mg/kg	< 0.01			0.01	Pass	
Chromium				mg/kg	< 0.1			0.1	Pass	
Copper				mg/kg	< 0.1			0.1	Pass	
Lead				mg/kg	< 0.1			0.1	Pass	
Nickel				mg/kg	< 0.1			0.1	Pass	
Zinc				mg/kg	< 5			5	Pass	
<b>LCS - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>										
Arsenic				%	97			80-120	Pass	
Cadmium				%	95			80-120	Pass	
Chromium				%	101			80-120	Pass	
Copper				%	106			80-120	Pass	
Lead				%	80			80-120	Pass	
Nickel				%	96			80-120	Pass	
Zinc				%	80			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0023904	CP	%		97			75-125	Pass	
Cadmium	Z23-JI0023904	CP	%		94			75-125	Pass	
Chromium	Z23-JI0023904	CP	%		112			75-125	Pass	
Copper	Z23-JI0023904	CP	%		108			75-125	Pass	
Lead	Z23-JI0023904	CP	%		110			75-125	Pass	
Nickel	Z23-JI0023904	CP	%		94			75-125	Pass	
Zinc	Z23-JI0023904	CP	%		94			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0023918	CP	%		112			75-125	Pass	
Cadmium	Z23-JI0023918	CP	%		109			75-125	Pass	
Nickel	Z23-JI0023918	CP	%		113			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0023920	CP	%		117			75-125	Pass	
Cadmium	Z23-JI0023920	CP	%		113			75-125	Pass	
Nickel	Z23-JI0023920	CP	%		118			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0023924	CP	%		117			75-125	Pass	
Cadmium	Z23-JI0023924	CP	%		115			75-125	Pass	
Chromium	Z23-JI0023924	CP	%		116			75-125	Pass	
Copper	Z23-JI0023924	CP	%		114			75-125	Pass	
Lead	Z23-JI0023924	CP	%		119			75-125	Pass	
Nickel	Z23-JI0023924	CP	%		114			75-125	Pass	
Zinc	Z23-JI0023924	CP	%		111			75-125	Pass	
<b>Spike - % Recovery</b>										
<b>Metals M7 (NZ MfE)</b>					Result 1					
Arsenic	Z23-JI0023929	CP	%		117			75-125	Pass	
Cadmium	Z23-JI0023929	CP	%		117			75-125	Pass	
Nickel	Z23-JI0023929	CP	%		113			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023903	CP	mg/kg	8.1	5.8	32	30%	Fail	Q02
Cadmium	Z23-JI0023903	CP	mg/kg	0.07	0.07	6.4	30%	Pass	
Chromium	Z23-JI0023903	CP	mg/kg	25	22	15	30%	Pass	
Copper	Z23-JI0023903	CP	mg/kg	19	15	25	30%	Pass	
Lead	Z23-JI0023903	CP	mg/kg	27	22	22	30%	Pass	
Nickel	Z23-JI0023903	CP	mg/kg	18	16	13	30%	Pass	
Zinc	Z23-JI0023903	CP	mg/kg	96	84	14	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023908	CP	%	32	34	5.6	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023913	CP	mg/kg	6.9	6.7	3.4	30%	Pass	
Cadmium	Z23-JI0023913	CP	mg/kg	0.18	0.17	3.9	30%	Pass	
Chromium	Z23-JI0023913	CP	mg/kg	19	19	<1	30%	Pass	
Copper	Z23-JI0023913	CP	mg/kg	17	17	1.6	30%	Pass	
Lead	Z23-JI0023913	CP	mg/kg	160	170	3.7	30%	Pass	
Nickel	Z23-JI0023913	CP	mg/kg	14	14	1.1	30%	Pass	
Zinc	Z23-JI0023913	CP	mg/kg	160	160	3.3	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023919	CP	mg/kg	8.1	9.1	11	30%	Pass	
Cadmium	Z23-JI0023919	CP	mg/kg	0.06	0.07	15	30%	Pass	
Chromium	Z23-JI0023919	CP	mg/kg	26	28	7.6	30%	Pass	
Copper	Z23-JI0023919	CP	mg/kg	19	20	7.6	30%	Pass	
Lead	Z23-JI0023919	CP	mg/kg	25	29	15	30%	Pass	
Nickel	Z23-JI0023919	CP	mg/kg	19	21	8.0	30%	Pass	
Zinc	Z23-JI0023919	CP	mg/kg	90	100	11	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023919	CP	%	19	19	1.0	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023921	CP	mg/kg	5.2	5.5	5.8	30%	Pass	
Cadmium	Z23-JI0023921	CP	mg/kg	0.05	0.06	11	30%	Pass	
Chromium	Z23-JI0023921	CP	mg/kg	24	27	13	30%	Pass	
Copper	Z23-JI0023921	CP	mg/kg	15	17	11	30%	Pass	
Lead	Z23-JI0023921	CP	mg/kg	19	21	8.6	30%	Pass	
Nickel	Z23-JI0023921	CP	mg/kg	18	20	11	30%	Pass	
Zinc	Z23-JI0023921	CP	mg/kg	79	84	6.2	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023921	CP	%	20	20	<1	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023928	CP	mg/kg	4.1	3.9	4.0	30%	Pass	
Cadmium	Z23-JI0023928	CP	mg/kg	0.06	0.06	5.9	30%	Pass	
Chromium	Z23-JI0023928	CP	mg/kg	23	22	3.9	30%	Pass	
Copper	Z23-JI0023928	CP	mg/kg	14	12	13	30%	Pass	
Lead	Z23-JI0023928	CP	mg/kg	17	14	19	30%	Pass	
Nickel	Z23-JI0023928	CP	mg/kg	16	16	1.8	30%	Pass	
Zinc	Z23-JI0023928	CP	mg/kg	70	67	4.5	30%	Pass	

Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023934	CP	%	19	19	2.9	30%	Pass	

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

## Authorised by:

Katyana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Sophie Bush	Senior Analyst-Asbestos



**Raymond Siu**  
**Senior Instrument Chemist (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**Kainga Ora – Homes and Communities**  
**107 Carlton Gore Road**  
**Newmarket, Auckland**  
**NZ 1023**



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** Colter Carson  
**Report** 1007300-AID  
**Project Name** 7 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Received Date** Jul 13, 2023  
**Date Reported** Aug 11, 2023

### Methodology:

Asbestos Fibre Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

*NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*

Unknown Mineral Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

*NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*

Subsampling Soil Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

*NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*

Bonded asbestos-containing material (ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

*NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*

Limit of Reporting

The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).

*NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

**Project Name** 7 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Date Sampled** Jul 12, 2023  
**Report** 1007300-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
7 HA1 0.1	23-JI0023937	Jul 12, 2023	Approximate Sample 264g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HA2 0.1	23-JI0023939	Jul 12, 2023	Approximate Sample 158g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HA3 0.1	23-JI0023941	Jul 12, 2023	Approximate Sample 175g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HA4 0.1	23-JI0023943	Jul 12, 2023	Approximate Sample 138g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HA5 0.1	23-JI0023945	Jul 12, 2023	Approximate Sample 153g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HA6 0.1	23-JI0023947	Jul 12, 2023	Approximate Sample 339g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HALO A	23-JI0023949	Jul 12, 2023	Approximate Sample 347g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HALO B	23-JI0023950	Jul 12, 2023	Approximate Sample 277g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
7 HALO C	23-JI0023951	Jul 12, 2023	Approximate Sample 283g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
7 HALO D	23-JI0023952	Jul 12, 2023	Approximate Sample 135g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 13, 2023	Indefinite



<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 7 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 7 CHURCH STREET <b>Report #:</b> 1007300 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	7 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023937		X							X	X
2	7 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023938									X	X
3	7 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023939		X							X	X
4	7 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023940									X	X
5	7 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023941		X							X	X
6	7 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023942									X	X
7	7 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023943		X							X	X
8	7 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023944									X	X
9	7 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023945		X							X	X
10	7 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023946									X	X
11	7 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023947		X							X	X

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 7 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 7 CHURCH STREET <b>Report #:</b> 1007300 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
12	7 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023948									X	X
13	7 HALO A	Jul 12, 2023		Soil	Z23-JI0023949		X								
14	7 HALO B	Jul 12, 2023		Soil	Z23-JI0023950		X								
15	7 HALO C	Jul 12, 2023		Soil	Z23-JI0023951		X								
16	7 HALO D	Jul 12, 2023		Soil	Z23-JI0023952		X								
17	COMPOSITE OF 7 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023953									X	X
18	7 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023954	X		X	X			X	X	X	
19	7 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023955	X		X	X			X	X	X	
20	7 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023956					X					
21	7 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023957	X		X	X		X	X	X	X	
22	7 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023958	X		X	X		X	X	X	X	
23	7 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023959			X						X	

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 7 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 7 CHURCH STREET  
**Report #:** 1007300  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Aug 11, 2023  
**Priority:** 20 Day  
**Contact Name:** Colter Carson

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
24	7 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023960									X	X
25	7 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023961									X	X
26	7 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023962			X						X	
27	7 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023963									X	X
28	7 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023964									X	X
29	7 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0023965					X					
30	7 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0023966	X		X	X		X	X	X	X	
31	7 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0023967	X		X	X		X	X	X	X	
32	7 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0023968					X					
33	7 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0023969									X	X
34	7 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0023970									X	X
35	7 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0023971			X						X	
Test Counts						6	10	9	6	3	4	6	6	28	19

## Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour blue indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

## Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

## Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (% w/w)
F/fld	Airborne fibre filter loading as Fibres (N) per Fields counted (n)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (C)
g, kg	Mass, e.g. of whole sample (M) or asbestos-containing find within the sample (m)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (V = r x t)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (r)
min	Time (t), e.g. of air sample collection period

## Calculations

Airborne Fibre Concentration:  $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$

Asbestos Content (as asbestos):  $\% w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos):  $\%_{WA} = \sum \frac{(m \times P_A) \times x}{x}$

## Terms

<b>%asbestos</b>	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
<b>AF</b>	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>AFM</b>	Airborne Fibre Monitoring, e.g. by the MFM.
<b>Amosite</b>	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
<b>AS</b>	Australian Standard.
<b>Asbestos Content (as asbestos)</b>	Total % w/w asbestos content in asbestos-containing finds in a soil sample (% w/w).
<b>Chrysotile</b>	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
<b>COC</b>	Chain of Custody.
<b>Crocidolite</b>	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
<b>Dry</b>	Sample is dried by heating prior to analysis.
<b>DS</b>	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
<b>FA</b>	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
<b>Fibre Count</b>	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
<b>Fibre ID</b>	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>HSG248</b>	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
<b>HSG264</b>	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
<b>ISO (also ISO/IEC)</b>	International Organization for Standardization / International Electrotechnical Commission.
<b>K Factor</b>	Microscope constant (K) as derived from the effective filter area of the given AFM membrane used for collecting the sample (A) and the projected eyepiece graticule area of the specific microscope used for the analysis (a).
<b>LOR</b>	Limit of Reporting.
<b>MFM (also NOHSC:3003)</b>	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
<b>NEPM (also ASC NEPM)</b>	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
<b>Organic</b>	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
<b>PCM</b>	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
<b>PLM</b>	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
<b>Sampling</b>	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
<b>SMF</b>	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
<b>SRA</b>	Sample Receipt Advice.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
<b>UK HSE HSG</b>	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
<b>UMF</b>	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
<b>Weighted Average</b>	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (% <sub>WA</sub> ).

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Asbestos Counter/Identifier:

Kate Stuart                      Senior Analyst-Asbestos

### Authorised by:

Sophie Bush                      Senior Analyst-Asbestos



**Sophie Bush**

**Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Kainga Ora – Homes and Communities  
107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023



All tests reported herein  
have been performed in  
accordance with the  
laboratory's scope of  
accreditation

**Attention:** **Colter Carson**

**Report** **1007300-S**  
Project name **7 CHURCH STREET ASHBURTON**  
Project ID **1018898.2000**  
Received Date **Jul 13, 2023**

Client Sample ID			7 HA1 0.1	7 HA1 0.3	7 HA2 0.1	7 HA2 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023937	Z23-JI0023938	Z23-JI0023939	Z23-JI0023940
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	7.1	6.0	9.4	5.6
Cadmium	0.01	mg/kg	0.14	0.06	0.17	0.08
Chromium	0.1	mg/kg	23	25	25	23
Copper	0.1	mg/kg	16	16	19	15
Lead	0.1	mg/kg	65	21	84	24
Nickel	0.1	mg/kg	17	19	19	17
Zinc	5	mg/kg	110	86	120	84
<b>Sample Properties</b>						
% Moisture	1	%	19	18	24	19

Client Sample ID			7 HA3 0.1	7 HA3 0.3	7 HA4 0.1	7 HA4 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023941	Z23-JI0023942	Z23-JI0023943	Z23-JI0023944
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	8.9	5.9	13	11
Cadmium	0.01	mg/kg	0.27	0.14	0.26	0.23
Chromium	0.1	mg/kg	22	22	25	26
Copper	0.1	mg/kg	21	16	27	21
Lead	0.1	mg/kg	180	57	350	200
Nickel	0.1	mg/kg	15	17	16	15
Zinc	5	mg/kg	180	110	230	180
<b>Sample Properties</b>						
% Moisture	1	%	26	21	16	33

<b>Client Sample ID</b>			<b>7 HA5 0.1</b>	<b>7 HA5 0.3</b>	<b>7 HA6 0.1</b>	<b>7 HA6 0.3</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023945</b>	<b>Z23-JI0023946</b>	<b>Z23-JI0023947</b>	<b>Z23-JI0023948</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	6.1	5.2	5.0	5.5
Cadmium	0.01	mg/kg	0.33	0.09	0.15	0.25
Chromium	0.1	mg/kg	23	22	22	23
Copper	0.1	mg/kg	25	15	17	20
Lead	0.1	mg/kg	93	25	28	58
Nickel	0.1	mg/kg	15	17	17	16
Zinc	5	mg/kg	210	96	100	140
<b>Sample Properties</b>						
% Moisture	1	%	27	21	21	27

<b>Client Sample ID</b>			<b>COMPOSITE OF 7 HALO A-D</b>	<b>7 HA1 0.5</b>	<b>7 HA1 0.7</b>	<b>7 HA2 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023953</b>	<b>Z23-JI0023954</b>	<b>Z23-JI0023955</b>	<b>Z23-JI0023957</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	8.0	-	-	-
Cadmium	0.01	mg/kg	0.35	-	-	-
Chromium	0.1	mg/kg	25	-	-	-
Copper	0.1	mg/kg	81	-	-	-
Lead	0.1	mg/kg	300	-	-	-
Nickel	0.1	mg/kg	15	-	-	-
Zinc	5	mg/kg	230	-	-	-
<b>Sample Properties</b>						
% Moisture	1	%	22	18	17	19
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	21	20	24
Copper	0.1	mg/kg	-	14	16	18
Nickel	0.1	mg/kg	-	16	15	18
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	5.1	5.6	5.9
Zinc	5	mg/kg	-	71	61	78
Lead	0.1	mg/kg	-	-	-	22

<b>Client Sample ID</b>			<b>7 HA2 0.7</b>	<b>7 HA2 1.0</b>	<b>7 HA3 0.5</b>	<b>7 HA3 0.7</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023958</b>	<b>Z23-JI0023959</b>	<b>Z23-JI0023960</b>	<b>Z23-JI0023961</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	5.6	5.7
Cadmium	0.01	mg/kg	-	-	0.06	0.07
Chromium	0.1	mg/kg	-	-	24	24
Copper	0.1	mg/kg	-	-	15	15
Lead	0.1	mg/kg	-	-	21	25

<b>Client Sample ID</b>			<b>7 HA2 0.7</b>	<b>7 HA2 1.0</b>	<b>7 HA3 0.5</b>	<b>7 HA3 0.7</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023958</b>	<b>Z23-JI0023959</b>	<b>Z23-JI0023960</b>	<b>Z23-JI0023961</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Nickel	0.1	mg/kg	-	-	18	17
Zinc	5	mg/kg	-	-	77	90
<b>Sample Properties</b>						
% Moisture	1	%	19	20	18	18
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	23	26	-	-
Copper	0.1	mg/kg	16	-	-	-
Nickel	0.1	mg/kg	17	-	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	5.6	-	-	-
Zinc	5	mg/kg	71	-	-	-
Lead	0.1	mg/kg	19	-	-	-

<b>Client Sample ID</b>			<b>7 HA3 1.0</b>	<b>7 HA4 0.5</b>	<b>7 HA4 0.7</b>	<b>7 HA5 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023962</b>	<b>Z23-JI0023963</b>	<b>Z23-JI0023964</b>	<b>Z23-JI0023966</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	6.8	4.1	-
Cadmium	0.01	mg/kg	-	0.18	0.07	-
Chromium	0.1	mg/kg	-	25	20	-
Copper	0.1	mg/kg	-	22	13	-
Lead	0.1	mg/kg	-	66	13	-
Nickel	0.1	mg/kg	-	18	15	-
Zinc	5	mg/kg	-	200	87	-
<b>Sample Properties</b>						
% Moisture	1	%	14	21	8.1	16
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	21	-	-	22
Copper	0.1	mg/kg	-	-	-	14
Nickel	0.1	mg/kg	-	-	-	16
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	-	4.7
Zinc	5	mg/kg	-	-	-	64
Lead	0.1	mg/kg	-	-	-	15



Client Sample ID			7 HA5 0.7	7 HA6 0.5	7 HA6 0.7	7 HA6 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023967	Z23-JI0023969	Z23-JI0023970	Z23-JI0023971
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	5.0	5.4	-
Cadmium	0.01	mg/kg	-	0.08	0.06	-
Chromium	0.1	mg/kg	-	22	24	-
Copper	0.1	mg/kg	-	15	16	-
Lead	0.1	mg/kg	-	22	21	-
Nickel	0.1	mg/kg	-	17	17	-
Zinc	5	mg/kg	-	83	78	-
<b>Sample Properties</b>						
% Moisture	1	%	12	19	18	18
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	20	-	-	25
Copper	0.1	mg/kg	13	-	-	-
Nickel	0.1	mg/kg	15	-	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	4.1	-	-	-
Zinc	5	mg/kg	59	-	-	-
Lead	0.1	mg/kg	14	-	-	-

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M7 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS	Auckland	Jul 20, 2023	6 Months
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 04, 2023	28 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Jul 20, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Aug 03, 2023	14 Days

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 7 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 7 CHURCH STREET  
**Report #:** 1007300  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Jul 21, 2023  
**Priority:** 5 Day  
**Contact Name:** Colter Carson

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	7 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023937		X							X	X
2	7 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023938									X	X
3	7 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023939		X							X	X
4	7 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023940									X	X
5	7 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023941		X							X	X
6	7 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023942									X	X
7	7 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023943		X							X	X
8	7 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023944									X	X
9	7 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023945		X							X	X
10	7 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023946									X	X
11	7 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023947		X							X	X
12	7 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023948									X	X

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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
<b>Auckland Laboratory - IANZ# 1327</b>						X		X	X		X	X	X	X	X
<b>Christchurch Laboratory - IANZ# 1290</b>							X			X					
<b>External Laboratory</b>															
13	7 HALO A	Jul 12, 2023		Soil	Z23-JI0023949		X								
14	7 HALO B	Jul 12, 2023		Soil	Z23-JI0023950		X								
15	7 HALO C	Jul 12, 2023		Soil	Z23-JI0023951		X								
16	7 HALO D	Jul 12, 2023		Soil	Z23-JI0023952		X								
17	COMPOSITE OF 7 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023953									X	X
18	7 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023954	X		X	X			X	X	X	
19	7 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023955	X		X	X			X	X	X	
20	7 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023956					X					
21	7 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023957	X		X	X		X	X	X	X	
22	7 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023958	X		X	X		X	X	X	X	
23	7 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023959					X					
24	7 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023960									X	X

**Company Name:** Kainga Ora – Homes and Communities - SI  
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
External Laboratory															
25	7 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023961									X	X
26	7 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023962					X					
27	7 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023963									X	X
28	7 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023964									X	X
29	7 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0023965					X					
30	7 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0023966	X		X	X		X	X	X	X	
31	7 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0023967	X		X	X		X	X	X	X	
32	7 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0023968					X					
33	7 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0023969									X	X
34	7 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0023970									X	X
35	7 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0023971					X					
Test Counts						6	10	6	6	6	4	6	6	25	19

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

## Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			mg/kg	< 0.1		0.1	Pass	
Cadmium			mg/kg	< 0.01		0.01	Pass	
Chromium			mg/kg	< 0.1		0.1	Pass	
Copper			mg/kg	< 0.1		0.1	Pass	
Lead			mg/kg	< 0.1		0.1	Pass	
Nickel			mg/kg	< 0.1		0.1	Pass	
Zinc			mg/kg	< 5		5	Pass	
<b>LCS - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			%	102		80-120	Pass	
Cadmium			%	103		80-120	Pass	
Chromium			%	97		80-120	Pass	
Copper			%	99		80-120	Pass	
Lead			%	100		80-120	Pass	
Nickel			%	99		80-120	Pass	
Zinc			%	104		80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0023938	CP	%	113		75-125	Pass	
Cadmium	Z23-JI0023938	CP	%	113		75-125	Pass	
Chromium	Z23-JI0023938	CP	%	118		75-125	Pass	
Copper	Z23-JI0023938	CP	%	114		75-125	Pass	
Lead	Z23-JI0023938	CP	%	113		75-125	Pass	
Nickel	Z23-JI0023938	CP	%	107		75-125	Pass	
Zinc	Z23-JI0023938	CP	%	108		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0023948	CP	%	108		75-125	Pass	
Cadmium	Z23-JI0023948	CP	%	108		75-125	Pass	
Chromium	Z23-JI0023948	CP	%	112		75-125	Pass	
Copper	Z23-JI0023948	CP	%	105		75-125	Pass	
Lead	Z23-JI0023948	CP	%	107		75-125	Pass	
Nickel	Z23-JI0023948	CP	%	102		75-125	Pass	
Zinc	Z23-JI0023948	CP	%	109		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0023959	CP	%	110		75-125	Pass	
Cadmium	Z23-JI0023959	CP	%	104		75-125	Pass	
Chromium	Z23-JI0023959	CP	%	110		75-125	Pass	
Copper	Z23-JI0023959	CP	%	107		75-125	Pass	
Lead	Z23-JI0023959	CP	%	113		75-125	Pass	
Nickel	Z23-JI0023959	CP	%	108		75-125	Pass	
Zinc	Z23-JI0023959	CP	%	105		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0023961	CP	%	113		75-125	Pass	
Cadmium	Z23-JI0023961	CP	%	109		75-125	Pass	
Copper	Z23-JI0023961	CP	%	118		75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead	Z23-JI0023961	CP	%	120			75-125	Pass	
Nickel	Z23-JI0023961	CP	%	108			75-125	Pass	
Zinc	Z23-JI0023961	CP	%	118			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023937	CP	mg/kg	7.1	6.4	10	30%	Pass	
Cadmium	Z23-JI0023937	CP	mg/kg	0.14	0.12	12	30%	Pass	
Chromium	Z23-JI0023937	CP	mg/kg	23	22	6.6	30%	Pass	
Copper	Z23-JI0023937	CP	mg/kg	16	15	6.9	30%	Pass	
Lead	Z23-JI0023937	CP	mg/kg	65	50	26	30%	Pass	
Nickel	Z23-JI0023937	CP	mg/kg	17	16	4.9	30%	Pass	
Zinc	Z23-JI0023937	CP	mg/kg	110	97	14	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023940	CP	%	19	19	1.1	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023947	CP	mg/kg	5.0	5.0	<1	30%	Pass	
Cadmium	Z23-JI0023947	CP	mg/kg	0.15	0.15	4.2	30%	Pass	
Chromium	Z23-JI0023947	CP	mg/kg	22	22	<1	30%	Pass	
Copper	Z23-JI0023947	CP	mg/kg	17	17	<1	30%	Pass	
Lead	Z23-JI0023947	CP	mg/kg	28	31	11	30%	Pass	
Nickel	Z23-JI0023947	CP	mg/kg	17	17	1.2	30%	Pass	
Zinc	Z23-JI0023947	CP	mg/kg	100	110	5.0	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023959	CP	%	20	20	1.5	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023960	CP	mg/kg	5.6	6.0	6.8	30%	Pass	
Cadmium	Z23-JI0023960	CP	mg/kg	0.06	0.08	27	30%	Pass	
Chromium	Z23-JI0023960	CP	mg/kg	24	26	8.0	30%	Pass	
Copper	Z23-JI0023960	CP	mg/kg	15	16	1.2	30%	Pass	
Lead	Z23-JI0023960	CP	mg/kg	21	30	37	30%	Fail	Q02
Nickel	Z23-JI0023960	CP	mg/kg	18	19	8.1	30%	Pass	
Zinc	Z23-JI0023960	CP	mg/kg	77	100	27	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023967	CP	%	12	13	9.7	30%	Pass	



## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

## Authorised by:

Katjana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Sophie Bush	Senior Analyst-Asbestos



**Raymond Siu**  
**Senior Instrument Chemist (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**Kainga Ora – Homes and Communities**  
**107 Carlton Gore Road**  
**Newmarket, Auckland**  
**NZ 1023**



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** Colter Carson  
**Report** 1007301-AID  
**Project Name** 9 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Received Date** Jul 13, 2023  
**Date Reported** Aug 11, 2023

### Methodology:

Asbestos Fibre Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

*NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*

Unknown Mineral Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

*NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*

Subsampling Soil Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

*NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*

Bonded asbestos-containing material (ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

*NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*

Limit of Reporting

The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).

*NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

**Project Name** 9 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Date Sampled** Jul 12, 2023  
**Report** 1007301-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
9 HA1 0.1	23-JI0023972	Jul 12, 2023	Approximate Sample 583g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HA2 0.1	23-JI0023974	Jul 12, 2023	Approximate Sample 396g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HA3 0.1	23-JI0023976	Jul 12, 2023	Approximate Sample 439g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HA4 0.1	23-JI0023978	Jul 12, 2023	Approximate Sample 577g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HA5 0.1	23-JI0023980	Jul 12, 2023	Approximate Sample 328g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HA6 0.1	23-JI0023982	Jul 12, 2023	Approximate Sample 681g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HALO A	23-JI0023984	Jul 12, 2023	Approximate Sample 376g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HALO B	23-JI0023985	Jul 12, 2023	Approximate Sample 299g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
9 HALO C	23-JI0023986	Jul 12, 2023	Approximate Sample 590g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
9 HALO D	23-JI0023987	Jul 12, 2023	Approximate Sample 442g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 13, 2023	Indefinite

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 9 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 9 CHURCH STREET <b>Report #:</b> 1007301 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	9 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023972		X							X	X
2	9 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023973									X	X
3	9 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023974		X							X	X
4	9 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023975									X	X
5	9 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023976		X							X	X
6	9 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023977									X	X
7	9 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023978		X							X	X
8	9 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023979									X	X
9	9 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023980		X							X	X
10	9 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023981									X	X
11	9 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023982		X							X	X

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 9 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 9 CHURCH STREET <b>Report #:</b> 1007301 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
12	9 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023983									X	X
13	9 HALO A	Jul 12, 2023		Soil	Z23-JI0023984		X								
14	9 HALO B	Jul 12, 2023		Soil	Z23-JI0023985		X								
15	9 HALO C	Jul 12, 2023		Soil	Z23-JI0023986		X								
16	9 HALO D	Jul 12, 2023		Soil	Z23-JI0023987		X								
17	COMPOSITE OF 9 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023988									X	X
18	9 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023989									X	X
19	9 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023990									X	X
20	9 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023991					X					
21	9 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023992	X		X	X		X	X	X	X	
22	9 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023993	X		X	X		X	X	X	X	
23	9 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023994					X					

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 9 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 9 CHURCH STREET  
**Report #:** 1007301  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Aug 11, 2023  
**Priority:** 20 Day  
**Contact Name:** Colter Carson

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
24	9 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023995									X	X
25	9 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023996									X	X
26	9 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023997			X	X					X	
27	9 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023998									X	X
28	9 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023999									X	X
29	9 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0024000			X	X		X		X	X	
30	9 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0024001	X		X	X		X	X	X	X	
31	9 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0024002	X		X	X		X	X	X	X	
32	9 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0024003					X					
33	9 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0024004	X		X	X		X	X	X	X	
34	9 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0024005	X		X	X		X	X	X	X	
35	9 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0024006	X		X	X		X	X	X	X	
Test Counts						7	10	9	9	3	8	7	8	28	19



## Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

## Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

## Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples ( <b>% w/w</b> )
F/fld	Airborne fibre filter loading as Fibres ( <b>N</b> ) per Fields counted ( <b>n</b> )
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane ( <b>C</b> )
g, kg	Mass, e.g. of whole sample ( <b>M</b> ) or asbestos-containing find within the sample ( <b>m</b> )
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM ( <b>V = r x t</b> )
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane ( <b>r</b> )
min	Time ( <b>t</b> ), e.g. of air sample collection period

## Calculations

Airborne Fibre Concentration:  $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$

Asbestos Content (as asbestos):  $\% w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos):  $\%_{WA} = \sum \frac{(m \times P_A) \times x}{x}$

## Terms

<b>%asbestos</b>	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
<b>AF</b>	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>AFM</b>	Airborne Fibre Monitoring, e.g. by the MFM.
<b>Amosite</b>	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
<b>AS</b>	Australian Standard.
<b>Asbestos Content (as asbestos)</b>	Total % w/w asbestos content in asbestos-containing finds in a soil sample ( <b>% w/w</b> ).
<b>Chrysotile</b>	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
<b>COC</b>	Chain of Custody.
<b>Crocidolite</b>	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
<b>Dry</b>	Sample is dried by heating prior to analysis.
<b>DS</b>	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
<b>FA</b>	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
<b>Fibre Count</b>	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
<b>Fibre ID</b>	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>HSG248</b>	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
<b>HSG264</b>	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
<b>ISO (also ISO/IEC)</b>	International Organization for Standardization / International Electrotechnical Commission.
<b>K Factor</b>	Microscope constant ( <b>K</b> ) as derived from the effective filter area of the given AFM membrane used for collecting the sample ( <b>A</b> ) and the projected eyepiece graticule area of the specific microscope used for the analysis ( <b>a</b> ).
<b>LOR</b>	Limit of Reporting.
<b>MFM (also NOHSC:3003)</b>	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
<b>NEPM (also ASC NEPM)</b>	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
<b>Organic</b>	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
<b>PCM</b>	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
<b>PLM</b>	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
<b>Sampling</b>	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
<b>SMF</b>	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
<b>SRA</b>	Sample Receipt Advice.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
<b>UK HSE HSG</b>	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
<b>UMF</b>	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according to the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
<b>Weighted Average</b>	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample ( <b>%<sub>WA</sub></b> ).

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Asbestos Counter/Identifier:

Kate Stuart                      Senior Analyst-Asbestos

### Authorised by:

Sophie Bush                      Senior Analyst-Asbestos



**Sophie Bush**

**Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Kainga Ora – Homes and Communities  
107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023



All tests reported herein  
have been performed in  
accordance with the  
laboratory's scope of  
accreditation

**Attention:** **Colter Carson**

**Report** **1007301-S**  
Project name **9 CHURCH STREET ASHBURTON**  
Project ID **1018898.2000**  
Received Date **Jul 13, 2023**

Client Sample ID			9 HA1 0.1	9 HA1 0.3	9 HA2 0.1	9 HA2 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023972	Z23-JI0023973	Z23-JI0023974	Z23-JI0023975
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	3.2	9.7	7.6	5.0
Cadmium	0.01	mg/kg	0.03	0.17	0.25	0.10
Chromium	0.1	mg/kg	20	29	21	20
Copper	0.1	mg/kg	9.3	34	43	16
Lead	0.1	mg/kg	12	51	75	29
Nickel	0.1	mg/kg	13	22	15	15
Zinc	5	mg/kg	49	130	150	88
<b>Sample Properties</b>						
% Moisture	1	%	4.6	21	18	18

Client Sample ID			9 HA3 0.1	9 HA3 0.3	9 HA4 0.1	9 HA4 0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0023976	Z23-JI0023977	Z23-JI0023978	Z23-JI0023979
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	9.6	7.1	5.5	19
Cadmium	0.01	mg/kg	0.35	0.31	0.19	0.36
Chromium	0.1	mg/kg	23	23	20	30
Copper	0.1	mg/kg	50	78	15	55
Lead	0.1	mg/kg	92	81	32	140
Nickel	0.1	mg/kg	16	17	12	19
Zinc	5	mg/kg	160	160	91	230
<b>Sample Properties</b>						
% Moisture	1	%	25	18	23	24

<b>Client Sample ID</b>			<b>9 HA5 0.1</b>	<b>9 HA5 0.3</b>	<b>9 HA6 0.1</b>	<b>9 HA6 0.3</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023980</b>	<b>Z23-JI0023981</b>	<b>Z23-JI0023982</b>	<b>Z23-JI0023983</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	24	7.6	14	5.3
Cadmium	0.01	mg/kg	0.44	0.09	0.28	0.06
Chromium	0.1	mg/kg	33	22	22	20
Copper	0.1	mg/kg	130	16	29	13
Lead	0.1	mg/kg	190	24	88	17
Nickel	0.1	mg/kg	26	17	16	16
Zinc	5	mg/kg	260	120	700	75
<b>Sample Properties</b>						
% Moisture	1	%	33	16	22	17

<b>Client Sample ID</b>			<b>COMPOSITE OF 9 HALO A-D</b>	<b>9 HA1 0.5</b>	<b>9 HA1 0.7</b>	<b>9 HA2 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023988</b>	<b>Z23-JI0023989</b>	<b>Z23-JI0023990</b>	<b>Z23-JI0023992</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	13	5.9	5.2	-
Cadmium	0.01	mg/kg	0.40	0.10	0.06	-
Chromium	0.1	mg/kg	25	22	21	-
Copper	0.1	mg/kg	61	20	15	-
Lead	0.1	mg/kg	140	39	17	-
Nickel	0.1	mg/kg	16	16	16	-
Zinc	5	mg/kg	180	88	69	-
<b>Sample Properties</b>						
% Moisture	1	%	21	20	15	18
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	-	-	21
Copper	0.1	mg/kg	-	-	-	14
Nickel	0.1	mg/kg	-	-	-	16
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	-	4.4
Lead	0.1	mg/kg	-	-	-	18
Zinc	5	mg/kg	-	-	-	72

<b>Client Sample ID</b>			<b>9 HA2 0.7</b>	<b>9 HA3 0.5</b>	<b>9 HA3 0.7</b>	<b>9 HA3 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023993</b>	<b>Z23-JI0023995</b>	<b>Z23-JI0023996</b>	<b>Z23-JI0023997</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	6.2	6.2	-
Cadmium	0.01	mg/kg	-	0.08	0.06	-
Chromium	0.1	mg/kg	-	24	25	-
Copper	0.1	mg/kg	-	23	21	-
Lead	0.1	mg/kg	-	20	21	-

<b>Client Sample ID</b>			<b>9 HA2 0.7</b>	<b>9 HA3 0.5</b>	<b>9 HA3 0.7</b>	<b>9 HA3 1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023993</b>	<b>Z23-JI0023995</b>	<b>Z23-JI0023996</b>	<b>Z23-JI0023997</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Nickel	0.1	mg/kg	-	18	18	-
Zinc	5	mg/kg	-	110	92	-
<b>Sample Properties</b>						
% Moisture	1	%	18	17	19	17
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	23	-	-	20
Copper	0.1	mg/kg	15	-	-	14
Nickel	0.1	mg/kg	17	-	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	4.8	-	-	-
Lead	0.1	mg/kg	18	-	-	-
Zinc	5	mg/kg	67	-	-	-

<b>Client Sample ID</b>			<b>9 HA4 0.5</b>	<b>9 HA4 0.7</b>	<b>9 HA4 1.0</b>	<b>9 HA5 0.5</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>Z23-JI0023998</b>	<b>Z23-JI0023999</b>	<b>Z23-JI0024000</b>	<b>Z23-JI0024001</b>
<b>Date Sampled</b>			<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>	<b>Jul 12, 2023</b>
Test/Reference	LOR	Unit				
<b>Metals M7 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	10	9.7	-	-
Cadmium	0.01	mg/kg	0.12	0.16	-	-
Chromium	0.1	mg/kg	27	23	-	-
Copper	0.1	mg/kg	28	28	-	-
Lead	0.1	mg/kg	38	84	-	-
Nickel	0.1	mg/kg	19	15	-	-
Zinc	5	mg/kg	120	110	-	-
<b>Sample Properties</b>						
% Moisture	1	%	22	20	17	17
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	-	-	19	21
Copper	0.1	mg/kg	-	-	14	17
Nickel	0.1	mg/kg	-	-	-	16
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	-	-	-	7.1
Lead	0.1	mg/kg	-	-	15	28
Zinc	5	mg/kg	-	-	56	120

Client Sample ID			9 HA5 0.7	9 HA6 0.5	9 HA6 0.7	9 HA6 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			Z23-JI0024002	Z23-JI0024004	Z23-JI0024005	Z23-JI0024006
Date Sampled			Jul 12, 2023	Jul 12, 2023	Jul 12, 2023	Jul 12, 2023
Test/Reference	LOR	Unit				
<b>Sample Properties</b>						
% Moisture	1	%	16	14	14	11
<b>Heavy Metals</b>						
Chromium	0.1	mg/kg	20	18	17	19
Copper	0.1	mg/kg	14	11	11	9.9
Nickel	0.1	mg/kg	14	14	13	14
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	4.4	3.9	18	34
Lead	0.1	mg/kg	17	11	16	11
Zinc	5	mg/kg	69	58	79	49

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M7 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS	Auckland	Jul 21, 2023	6 Months
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Aug 03, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Aug 03, 2023	14 Days

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 9 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 9 CHURCH STREET  
**Report #:** 1007301  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Aug 4, 2023  
**Priority:** 15 Day  
**Contact Name:** Colter Carson

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	9 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0023972		X							X	X
2	9 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0023973									X	X
3	9 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0023974		X							X	X
4	9 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0023975									X	X
5	9 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0023976		X							X	X
6	9 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0023977									X	X
7	9 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0023978		X							X	X
8	9 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0023979									X	X
9	9 HA5 0.1	Jul 12, 2023		Soil	Z23-JI0023980		X							X	X
10	9 HA5 0.3	Jul 12, 2023		Soil	Z23-JI0023981									X	X
11	9 HA6 0.1	Jul 12, 2023		Soil	Z23-JI0023982		X							X	X
12	9 HA6 0.3	Jul 12, 2023		Soil	Z23-JI0023983									X	X



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Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
<b>Auckland Laboratory - IANZ# 1327</b>						X		X	X		X	X	X	X	X
<b>Christchurch Laboratory - IANZ# 1290</b>							X			X					
<b>External Laboratory</b>															
13	9 HALO A	Jul 12, 2023		Soil	Z23-JI0023984		X								
14	9 HALO B	Jul 12, 2023		Soil	Z23-JI0023985		X								
15	9 HALO C	Jul 12, 2023		Soil	Z23-JI0023986		X								
16	9 HALO D	Jul 12, 2023		Soil	Z23-JI0023987		X								
17	COMPOSITE OF 9 HALO A-D	Jul 12, 2023		Soil	Z23-JI0023988									X	X
18	9 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0023989									X	X
19	9 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0023990									X	X
20	9 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0023991					X					
21	9 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0023992	X		X	X		X	X	X	X	
22	9 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0023993	X		X	X		X	X	X	X	
23	9 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0023994					X					
24	9 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0023995									X	X

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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
External Laboratory															
25	9 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0023996									X	X
26	9 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0023997			X	X					X	
27	9 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0023998									X	X
28	9 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0023999									X	X
29	9 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0024000			X	X		X		X	X	
30	9 HA5 0.5	Jul 12, 2023		Soil	Z23-JI0024001	X		X	X		X	X	X	X	
31	9 HA5 0.7	Jul 12, 2023		Soil	Z23-JI0024002	X		X	X		X	X	X	X	
32	9 HA5 1.0	Jul 12, 2023		Soil	Z23-JI0024003					X					
33	9 HA6 0.5	Jul 12, 2023		Soil	Z23-JI0024004	X		X	X		X	X	X	X	
34	9 HA6 0.7	Jul 12, 2023		Soil	Z23-JI0024005	X		X	X		X	X	X	X	
35	9 HA6 1.0	Jul 12, 2023		Soil	Z23-JI0024006	X		X	X		X	X	X	X	
Test Counts						7	10	9	9	3	8	7	8	28	19

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

## Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			mg/kg	< 0.1		0.1	Pass	
Cadmium			mg/kg	< 0.01		0.01	Pass	
Chromium			mg/kg	< 0.1		0.1	Pass	
Copper			mg/kg	< 0.1		0.1	Pass	
Lead			mg/kg	< 0.1		0.1	Pass	
Nickel			mg/kg	< 0.1		0.1	Pass	
Zinc			mg/kg	< 5		5	Pass	
<b>Method Blank</b>								
<b>Heavy Metals</b>								
Chromium			mg/kg	< 0.1		0.1	Pass	
Copper			mg/kg	< 0.1		0.1	Pass	
Nickel			mg/kg	< 0.1		0.1	Pass	
<b>Method Blank</b>								
<b>Metals M8 (NZ MfE)</b>								
Arsenic			mg/kg	< 0.1		0.1	Pass	
Lead			mg/kg	< 0.1		0.1	Pass	
Zinc			mg/kg	< 5		5	Pass	
<b>LCS - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>								
Arsenic			%	95		80-120	Pass	
Cadmium			%	96		80-120	Pass	
Chromium			%	91		80-120	Pass	
Copper			%	94		80-120	Pass	
Lead			%	93		80-120	Pass	
Nickel			%	93		80-120	Pass	
Zinc			%	97		80-120	Pass	
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Chromium			%	90		80-120	Pass	
Copper			%	91		80-120	Pass	
Nickel			%	90		80-120	Pass	
<b>LCS - % Recovery</b>								
<b>Metals M8 (NZ MfE)</b>								
Arsenic			%	96		80-120	Pass	
Lead			%	92		80-120	Pass	
Zinc			%	81		80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Copper	Z23-JI0023948	NCP	%	105		75-125	Pass	
Lead	Z23-JI0023948	NCP	%	107		75-125	Pass	
Zinc	Z23-JI0023948	NCP	%	109		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Metals M7 (NZ MfE)</b>				Result 1				
Arsenic	Z23-JI0023980	CP	%	84		75-125	Pass	
Cadmium	Z23-JI0023980	CP	%	88		75-125	Pass	
Chromium	Z23-JI0023980	CP	%	84		75-125	Pass	
Nickel	Z23-JI0023980	CP	%	82		75-125	Pass	
<b>Spike - % Recovery</b>								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Metals M7 (NZ MfE)</b>				Result 1					
Arsenic	Z23-JI0023993	CP	%	112			75-125	Pass	
Cadmium	Z23-JI0023993	CP	%	108			75-125	Pass	
Chromium	Z23-JI0023993	CP	%	115			75-125	Pass	
Copper	Z23-JI0023993	CP	%	114			75-125	Pass	
Lead	Z23-JI0023993	CP	%	113			75-125	Pass	
Nickel	Z23-JI0023993	CP	%	102			75-125	Pass	
Zinc	Z23-JI0023993	CP	%	104			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023973	CP	%	21	21	<1	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023979	CP	mg/kg	19	16	20	30%	Pass	
Cadmium	Z23-JI0023979	CP	mg/kg	0.36	0.30	18	30%	Pass	
Chromium	Z23-JI0023979	CP	mg/kg	30	26	14	30%	Pass	
Copper	Z23-JI0023979	CP	mg/kg	55	46	18	30%	Pass	
Lead	Z23-JI0023979	CP	mg/kg	140	96	37	30%	Fail	Q02
Nickel	Z23-JI0023979	CP	mg/kg	19	17	10	30%	Pass	
Zinc	Z23-JI0023979	CP	mg/kg	230	180	29	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023983	CP	%	17	17	<1	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0023992	CP	mg/kg	4.4	4.3	2.6	30%	Pass	
Cadmium	Z23-JI0023992	CP	mg/kg	0.09	0.08	8.8	30%	Pass	
Chromium	Z23-JI0023992	CP	mg/kg	21	20	2.5	30%	Pass	
Copper	Z23-JI0023992	CP	mg/kg	14	13	4.9	30%	Pass	
Lead	Z23-JI0023992	CP	mg/kg	18	17	3.7	30%	Pass	
Nickel	Z23-JI0023992	CP	mg/kg	16	16	2.1	30%	Pass	
Zinc	Z23-JI0023992	CP	mg/kg	72	68	5.4	30%	Pass	
<b>Duplicate</b>									
<b>Sample Properties</b>				Result 1	Result 2	RPD			
% Moisture	Z23-JI0023992	CP	%	18	18	2.4	30%	Pass	
<b>Duplicate</b>									
<b>Metals M7 (NZ MfE)</b>				Result 1	Result 2	RPD			
Arsenic	Z23-JI0024005	CP	mg/kg	18	17	4.4	30%	Pass	
Cadmium	Z23-JI0024005	CP	mg/kg	0.10	0.09	13	30%	Pass	
Chromium	Z23-JI0024005	CP	mg/kg	17	22	24	30%	Pass	
Copper	Z23-JI0024005	CP	mg/kg	11	14	20	30%	Pass	
Lead	Z23-JI0024005	CP	mg/kg	16	19	20	30%	Pass	
Nickel	Z23-JI0024005	CP	mg/kg	13	16	23	30%	Pass	
Zinc	Z23-JI0024005	CP	mg/kg	79	97	19	30%	Pass	

## Comments

### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

### Qualifier Codes/Comments

Code	Description
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

## Authorised by:

Katyana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Sophie Bush	Senior Analyst-Asbestos



**Raymond Siu**  
**Senior Instrument Chemist (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**Kainga Ora – Homes and Communities**  
**107 Carlton Gore Road**  
**Newmarket, Auckland**  
**NZ 1023**



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** Colter Carson  
**Report** 1007302-AID  
**Project Name** 11 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Received Date** Jul 13, 2023  
**Date Reported** Aug 11, 2023

### Methodology:

Asbestos Fibre Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

*NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*

Unknown Mineral Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

*NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*

Subsampling Soil Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

*NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*

Bonded asbestos-containing material (ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

*NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*

Limit of Reporting

The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).

*NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

**Project Name** 11 CHURCH STREET ASHBURTON  
**Project ID** 1018898.2000  
**Date Sampled** Jul 12, 2023  
**Report** 1007302-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
11 HA1 0.1	23-JI0024007	Jul 12, 2023	Approximate Sample 143g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HA2 0.1	23-JI0024009	Jul 12, 2023	Approximate Sample 247g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HA3 0.1	23-JI0024011	Jul 12, 2023	Approximate Sample 136g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HA4 0.1	23-JI0024013	Jul 12, 2023	Approximate Sample 176g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HALO A	23-JI0024015	Jul 12, 2023	Approximate Sample 175g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HALO B	23-JI0024016	Jul 12, 2023	Approximate Sample 306g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HALO C	23-JI0024017	Jul 12, 2023	Approximate Sample 216g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
11 HALO D	23-JI0024018	Jul 12, 2023	Approximate Sample 217g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.



**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 13, 2023	Indefinite

<b>Company Name:</b>	Kainga Ora – Homes and Communities - SI	<b>Order No.:</b>	6181830 11 CHURCH STREET	<b>Received:</b>	Jul 13, 2023 8:00 AM
<b>Address:</b>	107 Carlton Gore Road Newmarket, Auckland NZ 1023	<b>Report #:</b>	1007302	<b>Due:</b>	Aug 11, 2023
		<b>Phone:</b>	(021) 537 696	<b>Priority:</b>	20 Day
		<b>Fax:</b>		<b>Contact Name:</b>	Colter Carson
<b>Project Name:</b>	11 CHURCH STREET ASHBURTON				
<b>Project ID:</b>	1018898.2000				

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	11 HA1 0.1	Jul 12, 2023		Soil	Z23-JI0024007		X							X	X
2	11 HA1 0.3	Jul 12, 2023		Soil	Z23-JI0024008									X	X
3	11 HA2 0.1	Jul 12, 2023		Soil	Z23-JI0024009		X							X	X
4	11 HA2 0.3	Jul 12, 2023		Soil	Z23-JI0024010									X	X
5	11 HA3 0.1	Jul 12, 2023		Soil	Z23-JI0024011		X							X	X
6	11 HA3 0.3	Jul 12, 2023		Soil	Z23-JI0024012									X	X
7	11 HA4 0.1	Jul 12, 2023		Soil	Z23-JI0024013		X							X	X
8	11 HA4 0.3	Jul 12, 2023		Soil	Z23-JI0024014									X	X
9	11 HALO A	Jul 12, 2023		Soil	Z23-JI0024015		X								
10	11 HALO B	Jul 12, 2023		Soil	Z23-JI0024016		X								
11	11 HALO C	Jul 12, 2023		Soil	Z23-JI0024017		X								

<b>Company Name:</b> Kainga Ora – Homes and Communities - SI <b>Address:</b> 107 Carlton Gore Road Newmarket, Auckland NZ 1023  <b>Project Name:</b> 11 CHURCH STREET ASHBURTON <b>Project ID:</b> 1018898.2000	<b>Order No.:</b> 6181830 11 CHURCH STREET <b>Report #:</b> 1007302 <b>Phone:</b> (021) 537 696 <b>Fax:</b>	<b>Received:</b> Jul 13, 2023 8:00 AM <b>Due:</b> Aug 11, 2023 <b>Priority:</b> 20 Day <b>Contact Name:</b> Colter Carson
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**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MFE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
12	11 HALO D	Jul 12, 2023		Soil	Z23-JI0024018		X								
13	COMPOSITE OF 11 HALO A-D	Jul 12, 2023		Soil	Z23-JI0024019									X	X
14	11 HA1 0.5	Jul 12, 2023		Soil	Z23-JI0024020	X		X	X		X	X	X	X	
15	11 HA1 0.7	Jul 12, 2023		Soil	Z23-JI0024021	X		X	X		X	X	X	X	
16	11 HA1 1.0	Jul 12, 2023		Soil	Z23-JI0024022			X						X	
17	11 HA2 0.5	Jul 12, 2023		Soil	Z23-JI0024023	X		X	X		X	X	X	X	
18	11 HA2 0.7	Jul 12, 2023		Soil	Z23-JI0024024	X		X	X		X	X	X	X	
19	11 HA2 1.0	Jul 12, 2023		Soil	Z23-JI0024025			X						X	
20	11 HA3 0.5	Jul 12, 2023		Soil	Z23-JI0024026									X	X
21	11 HA3 0.7	Jul 12, 2023		Soil	Z23-JI0024027									X	X
22	11 HA3 1.0	Jul 12, 2023		Soil	Z23-JI0024028					X					
23	11 HA4 0.5	Jul 12, 2023		Soil	Z23-JI0024029									X	X

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Company Name:** Kainga Ora – Homes and Communities - SI  
**Address:** 107 Carlton Gore Road  
Newmarket, Auckland  
NZ 1023

**Project Name:** 11 CHURCH STREET ASHBURTON  
**Project ID:** 1018898.2000

**Order No.:** 6181830 11 CHURCH STREET  
**Report #:** 1007302  
**Phone:** (021) 537 696  
**Fax:**

**Received:** Jul 13, 2023 8:00 AM  
**Due:** Aug 11, 2023  
**Priority:** 20 Day  
**Contact Name:** Colter Carson

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Arsenic	Asbestos - AS4964	Chromium	Copper	HOLD	Lead	Nickel	Zinc	Moisture Set	Metals M7 (NZ MfE)
Auckland Laboratory - IANZ# 1327						X		X	X		X	X	X	X	X
Christchurch Laboratory - IANZ# 1290							X			X					
Tauranga Laboratory - IANZ# 1402															
24	11 HA4 0.7	Jul 12, 2023		Soil	Z23-JI0024030									X	X
25	11 HA4 1.0	Jul 12, 2023		Soil	Z23-JI0024031			X						X	
Test Counts						4	8	7	4	1	4	4	4	20	13

## Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour blue indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

## Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

## Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (% w/w)
F/fld	Airborne fibre filter loading as Fibres (N) per Fields counted (n)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (C)
g, kg	Mass, e.g. of whole sample (M) or asbestos-containing find within the sample (m)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (V = r x t)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (r)
min	Time (t), e.g. of air sample collection period

## Calculations

Airborne Fibre Concentration: 
$$C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$$

Asbestos Content (as asbestos): 
$$\% w/w = \frac{(m \times P_A)}{M}$$

Weighted Average (of asbestos): 
$$\%_{WA} = \sum \frac{(m \times P_A) \times x}{x}$$

## Terms

<b>%asbestos</b>	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
<b>AF</b>	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>AFM</b>	Airborne Fibre Monitoring, e.g. by the MFM.
<b>Amosite</b>	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
<b>AS</b>	Australian Standard.
<b>Asbestos Content (as asbestos)</b>	Total % w/w asbestos content in asbestos-containing finds in a soil sample (% w/w).
<b>Chrysotile</b>	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
<b>COC</b>	Chain of Custody.
<b>Crocidolite</b>	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
<b>Dry</b>	Sample is dried by heating prior to analysis.
<b>DS</b>	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
<b>FA</b>	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
<b>Fibre Count</b>	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
<b>Fibre ID</b>	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>HSG248</b>	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
<b>HSG264</b>	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
<b>ISO (also ISO/IEC)</b>	International Organization for Standardization / International Electrotechnical Commission.
<b>K Factor</b>	Microscope constant (K) as derived from the effective filter area of the given AFM membrane used for collecting the sample (A) and the projected eyepiece graticule area of the specific microscope used for the analysis (a).
<b>LOR</b>	Limit of Reporting.
<b>MFM (also NOHSC:3003)</b>	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
<b>NEPM (also ASC NEPM)</b>	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
<b>Organic</b>	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
<b>PCM</b>	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
<b>PLM</b>	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
<b>Sampling</b>	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
<b>SMF</b>	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
<b>SRA</b>	Sample Receipt Advice.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
<b>UK HSE HSG</b>	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
<b>UMF</b>	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according to the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
<b>Weighted Average</b>	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (% <sub>WA</sub> ).

**Comments****Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Asbestos Counter/Identifier:**

Kate Stuart                      Senior Analyst-Asbestos

**Authorised by:**

Sophie Bush                      Senior Analyst-Asbestos

**Sophie Bush****Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

## **Appendix B      Sampling location plan and disposal figures**

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- **Figure 1: Sampling location plan.**
- **Figure 2: Soil disposal plan 0.0 – 0.3 m bgl.**
- **Figure 3: Soil disposal plan 0.3 – 0.5 m bgl.**
- **Figure 4: Soil disposal plan 0.5 – 0.7 m bgl.**
- **Figure 5: Soil disposal plan 0.7 – 1.0 m bgl.**
- **Figure 6: Soil disposal plan  $\geq 1.0$  m bgl.**

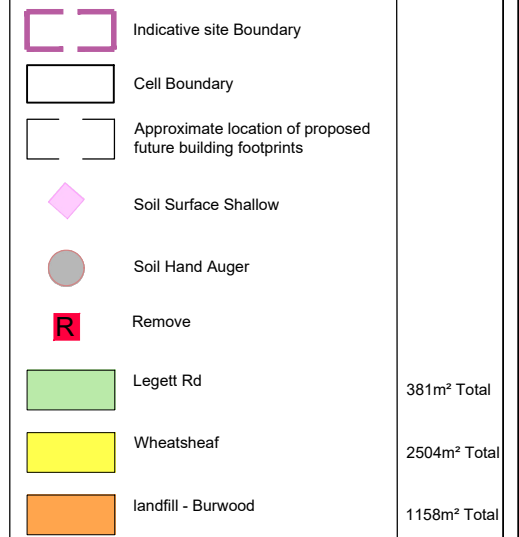






1. All offsite soil disposal is subject to approval from the facility operator.
2. All dimensions are approximate in metres (m)
3. Cleanfill disposal assumes soils from site are excavated and mixed in bulk. Following visual inspection and removal of ACM post-demolition.

### LEGEND



Dwelling Halo defined as 2.0m from building edge.

Dwelling Halo defined as 2.0m from building edge.

Dwelling Halo defined as 2.0m from building edge.

Dwelling Halo defined as 2.0m from building edge.



							Original Scale (A1)	Design	C. Carson	22.08.2023
							1:150	Drawn	H. Patel	23.08.2023
							Reduced Scale (A3)	Dwg Verifier	M. Morley	22.08.2023
								Dwg Check	L. Black	23.08.2023
No.	Revision						1:300	* Refer to Revision 1 for Original Signature		
						By	Chk	Appd	Date	

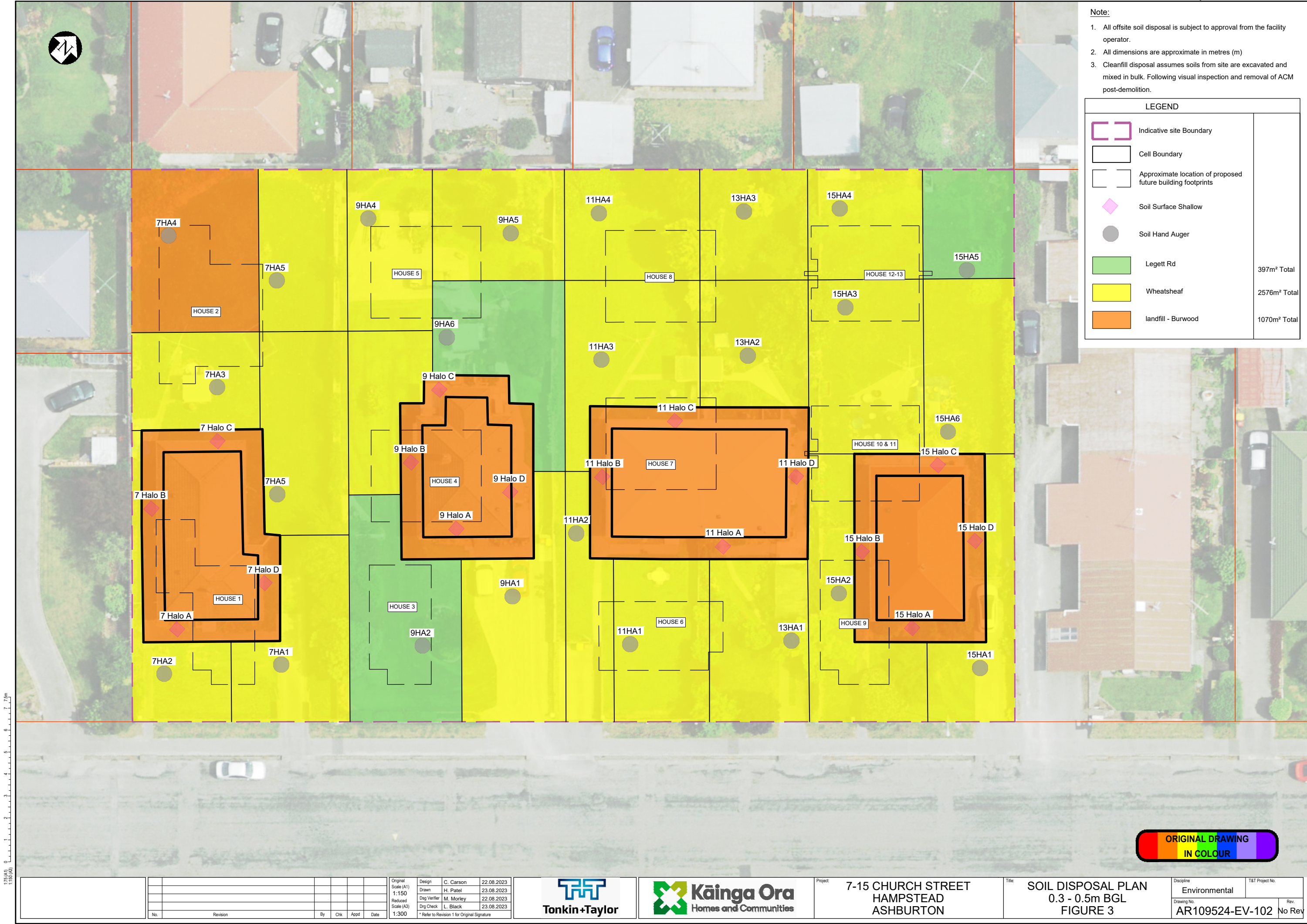


Project:	7-15 CHURCH STREET HAMPSTEAD ASHBURTON
----------	--

Title:	SOIL DISPOSAL PLAN 0.0 - 0.3m BGL FIGURE 2
--------	--

Discipline <b>Environmental</b>	T&T Project No.
Drawing No. <b>AR109524-EV-101</b>	Rev. <b>No Rev</b>





DO NOT SCALE FOR SET OUT DIMENSIONS

No.	Revision	By	Chk	Appd	Date

Original Scale (A1)	Design	C. Carson	22.08.2023
1:150	Drawn	H. Patel	23.08.2023
Reduced Scale (A3)	Dwg Verifier	M. Morley	22.08.2023
1:300	Dwg Check	L. Black	23.08.2023
* Refer to Revision 1 for Original Signature			



Project: 7-15 CHURCH STREET  
HAMPSTEAD  
ASHBURTON

Title: SOIL DISPOSAL PLAN  
0.3 - 0.5m BGL  
FIGURE 3

Discipline	T&T Project No.
Environmental	
Drawing No.	Rev.
AR109524-EV-102	No Rev

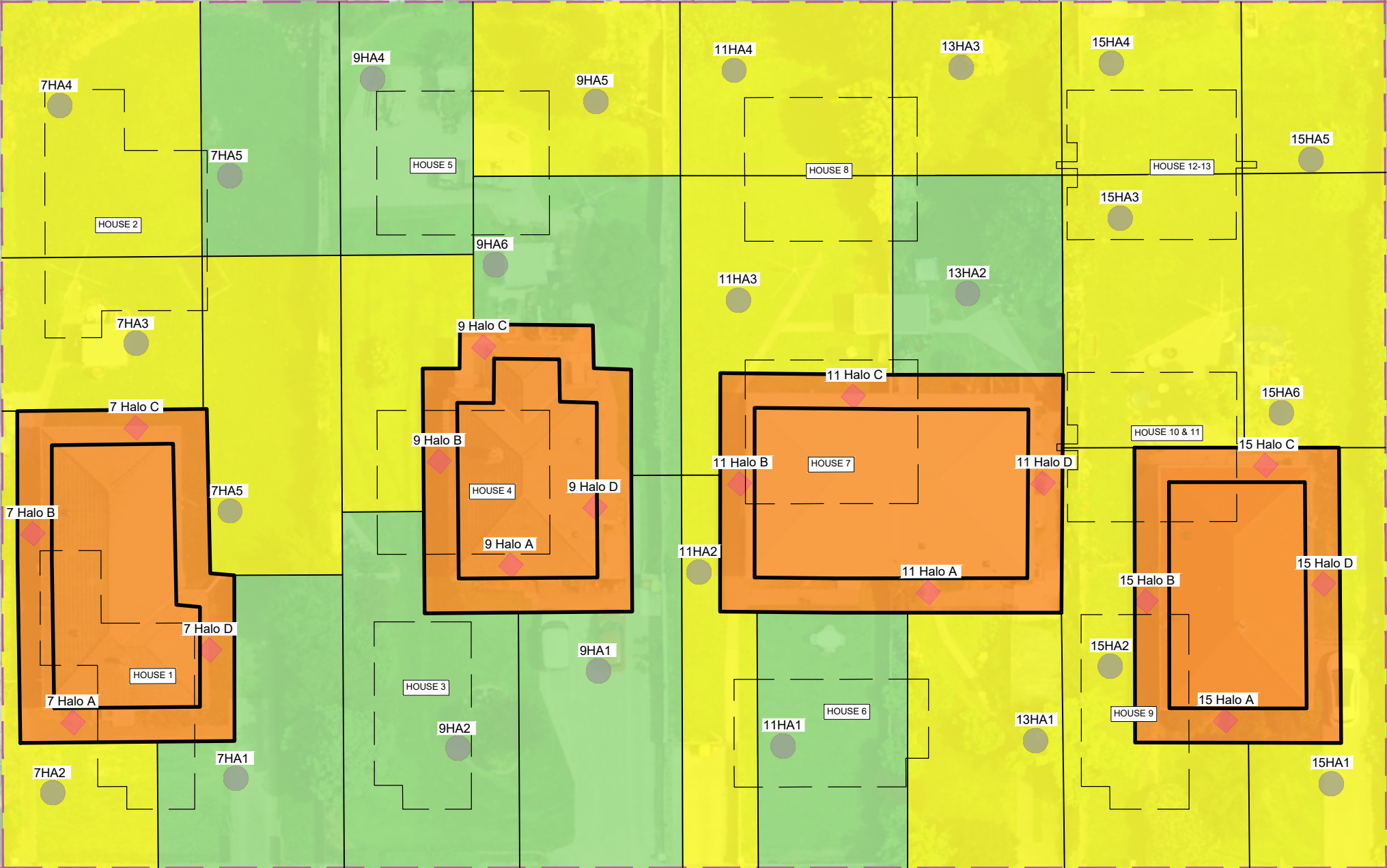




- Note:**
- 1. All offsite soil disposal is subject to approval from the facility operator.
  - 2. All dimensions are approximate in metres (m)
  - 3. Cleanfill disposal assumes soils from site are excavated and mixed in bulk. Following visual inspection and removal of ACM post-demolition.

LEGEND	
	Indicative site Boundary
	Cell Boundary
	Approximate location of proposed future building footprints
	Soil Surface Shallow
	Soil Hand Auger
	Legett Rd
	Wheatsheaf
	landfill - Burwood
	1095m² Total
	2050m² Total
	898m² Total

175(A1) 0 1 2 3 4 5 6 7 7.5m  
1:150(A3)

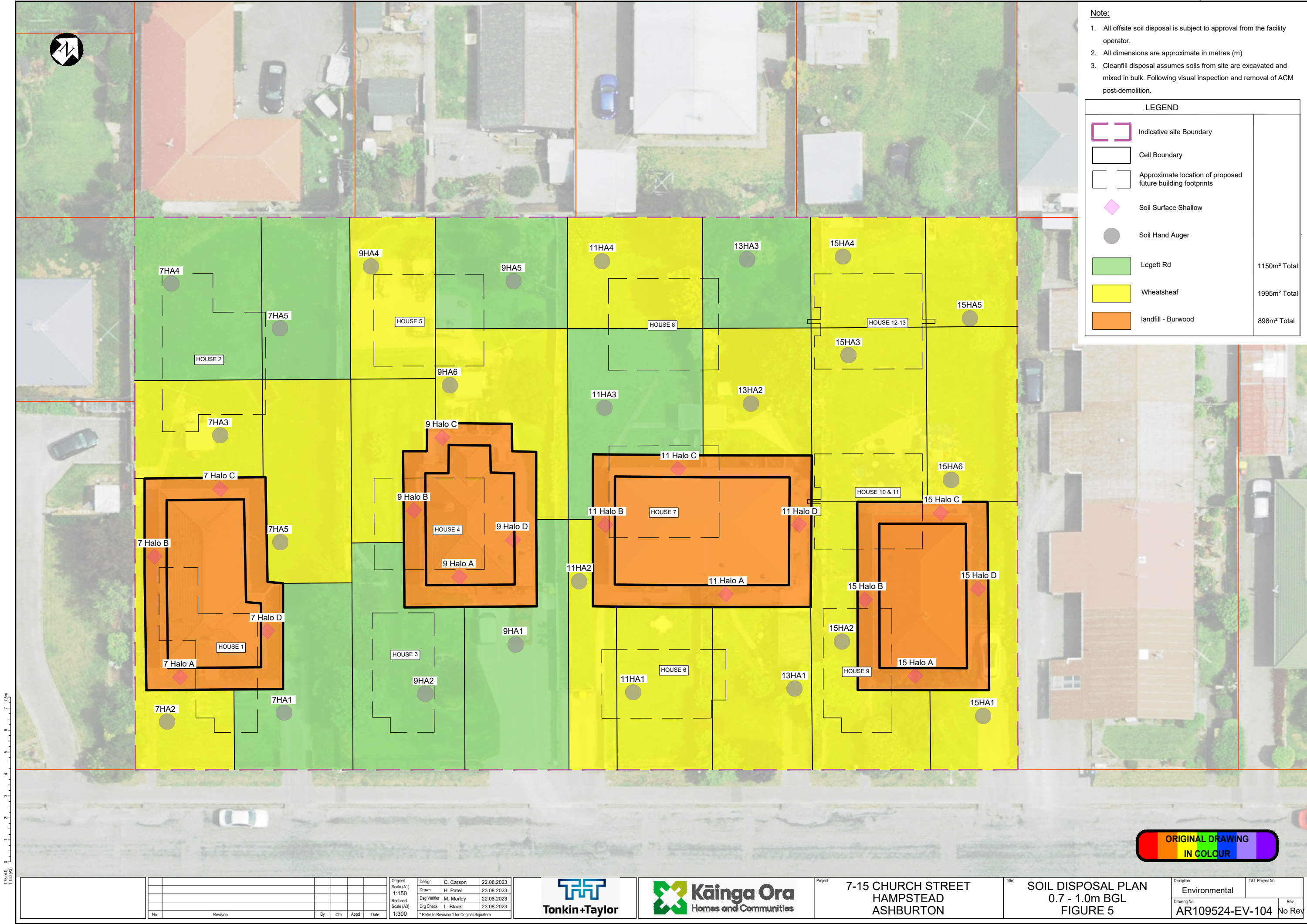


										Original Scale (A1) 1:150 Reduced Scale (A3) 1:300				<div>Design C. Carson 22.08.2023 Drawn H. Patel 23.08.2023 Dig Verifier M. Morley 22.08.2023 Dig Check L. Black 23.08.2023 * Refer to Revision 1 for Original Signature</div>				<div> Tonkin+Taylor</div>				<div>Project: 7-15 CHURCH STREET HAMPSTEAD ASHBURTON</div>										<div>Title: SOIL DISPOSAL PLAN 0.5 - 0.7m BGL FIGURE 4</div>										<div>Discipline Environmental Drawing No. AR109524-EV-103</div>				<div>T&amp;T Project No. Rev. No Rev</div>			
No. Revision										By Chk Appd Date																																							



- Note:**
- 1. All offsite soil disposal is subject to approval from the facility operator.
  - 2. All dimensions are approximate in metres (m)
  - 3. Cleanfill disposal assumes soils from site are excavated and mixed in bulk. Following visual inspection and removal of ACM post-demolition.

LEGEND	
	Indicative site Boundary
	Cell Boundary
	Approximate location of proposed future building footprints
	Soil Surface Shallow
	Soil Hand Auger
	Legett Rd
	Wheatsheaf
	landfill - Burwood
	1150m² Total
	1995m² Total
	898m² Total



DO NOT SCALE FOR SET OUT DIMENSIONS

No.	Revision	By	Chk	Appd	Date

Original Scale (A1)	Design	C. Carson	22.08.2023
1:150	Drawn	H. Patel	23.08.2023
Reduced Scale (A3)	Dwg Verifier	M. Morley	22.08.2023
1:300	Dwg Check	L. Black	23.08.2023
* Refer to Revision 1 for Original Signature			



Project: 7-15 CHURCH STREET  
HAMPSTEAD  
ASHBURTON






Title: SOIL DISPOSAL PLAN  
0.7 - 1.0m BGL  
FIGURE 5

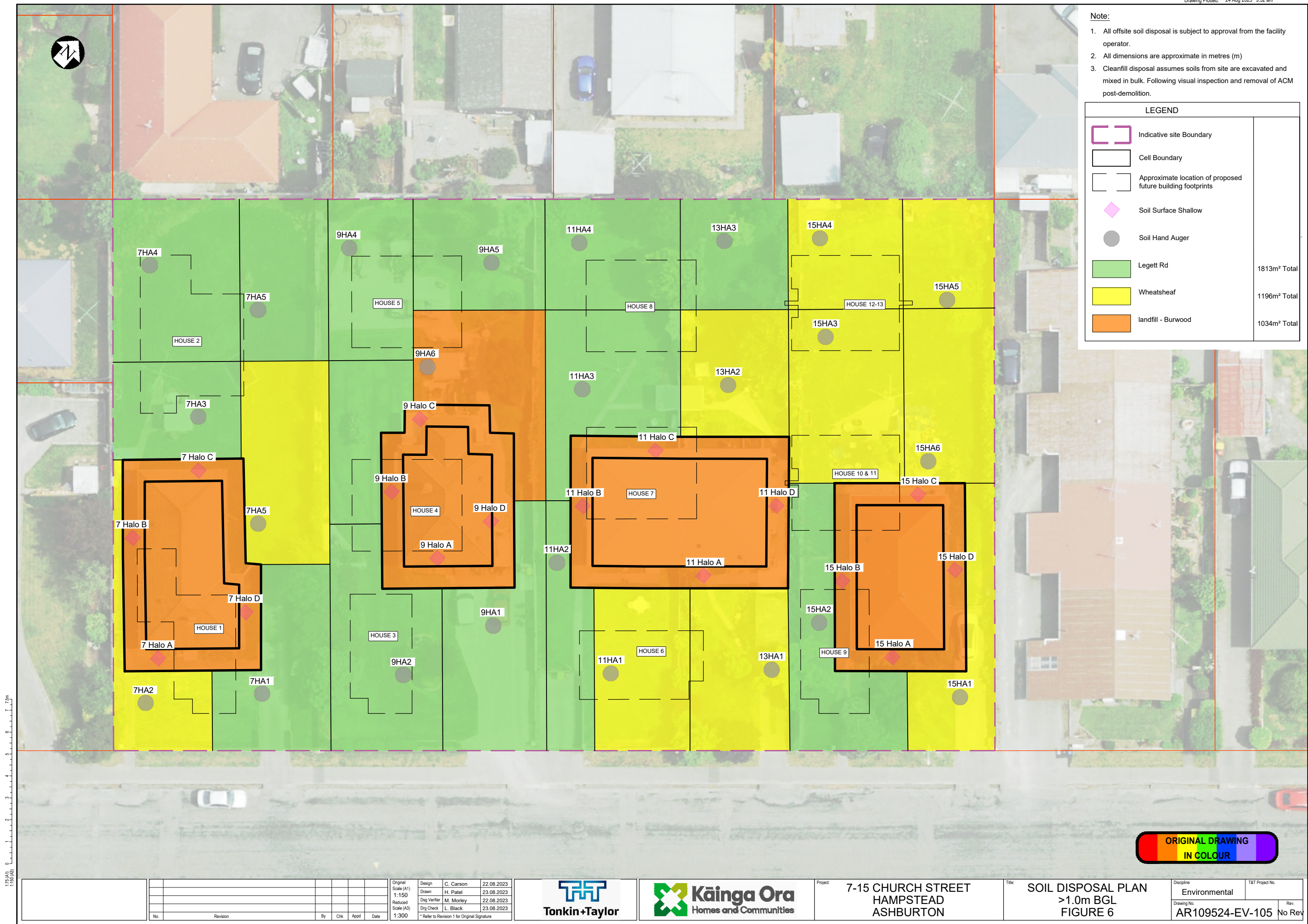
Discipline	Environmental	T&T Project No.
Drawing No.	AR109524-EV-104	Rev.
		No Rev



1. All offsite soil disposal is subject to approval from the facility operator.
2. All dimensions are approximate in metres (m)
3. Cleanfill disposal assumes soils from site are excavated and mixed in bulk. Following visual inspection and removal of ACM post-demolition.

## LEGEND

	Indicative site Boundary	
	Cell Boundary	
	Approximate location of proposed future building footprints	
	Soil Surface Shallow	
	Soil Hand Auger	
	Legett Rd	1813m <sup>2</sup> Total
	Wheatsheaf	1196m <sup>2</sup> Total
	landfill - Burwood	1034m <sup>2</sup> Total





## **Appendix C      Kāinga Ora CSMP**

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# Generic Contaminated Site Management & Contaminated Soil Discovery Guideline

Date – 13 December, 2021



## Document Control

Revision Number	Date	KOHC Owner	Council Approval	Council Specialist
1	15/12/2021	Andrew Rose	Auckland	Paul Crimmins



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# Generic Contaminated Site Management Plan Version 1

Issued 13 December 2021

Approved by Andrew Rose  
Decontamination Innovation Lead  
Infrastructure and Civil Construction  
Urban Development and Delivery

---

## 1. INTRODUCTION

Kāinga Ora Homes and Communities (Kāinga Ora) is one of New Zealand's largest land holders, providing public housing across a significant asset base. As part of its commitment to be a world-class public housing landlord, this entails progressive maintenance, management and redevelopment of its asset base as buildings and assets reach the end of their design life.

Many of the houses within the Kāinga Ora portfolio were constructed at a time where use of lead-based paints and asbestos containing materials (ACM) were routinely used in structure construction and coatings. In addition, some properties have been used for hāngi and umu activities or had household refuse dumped in rear yards. These activities impact soils to differing levels, and sometimes trigger inclusion within the Ministry for the Environment's Hazardous Activities and Industries List (HAIL) category I.

During site redevelopment work, soil disturbance activities become one of the initial tasks undertaken so potential site contamination must be addressed to meet the requirements of *the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) Regulations* (MfE, 2012) and other local authority plan requirements such as Chapter E30 of the Auckland Unitary Plan (Operative in Part).

Given the requirements of the above regulations, the Kāinga Ora Contaminated Land Policy Framework and the implications of the scope and scale of Kāinga Ora's portfolio, this Contaminated Site Management Plan (CSMP) has been prepared to provide a set of practices and procedures to be implemented on standard Kāinga Ora residential redevelopment sites. This document should be used in conjunction with the Kāinga Ora contaminated land consultant Work Instruction or Remedial Action Plans and/or regulatory consent requirements.

## 2. KĀINGA ORA DEVELOPMENT PROCEDURES

Typically, Kāinga Ora are replacing the housing stock and increasing house density on given sites to offer an improved urban development configuration. The scope and scale of the task means redevelopments are happening frequently, ranging from numerous properties in a cluster of sites to single lot redevelopments. That frequency has enabled Kāinga Ora to evolve a well-established set of protocols for development as follows:

- Undertake Preliminary Risk Assessment to identify any fatal flaws and develop yield study cases.
- Commission technical expert investigations as necessary including but not limited to geotechnical assessment, survey, flood hazard, traffic, landscape, surveying, contaminated land investigations and planning;
- Commission Hazardous Building Material Surveys to inform demolition requirements;
- Engage qualified asbestos removalists and assessors as necessary to remove Hazardous Materials following building surveys;
- Engage demolition and remedial contractors to clear parcels of land; and
- Engage civil contractors as required to complete development work.

Key to the contaminated land studies is understanding and reporting/communicating to the remedial contractor designation of soil being removed from site meeting receiving facility acceptance criteria.

Where Preliminary Risk Assessments identify specific HAIL activities or significant extents of impacted soils that do not fit within the general residential development expectations, Kāinga Ora will commission full detailed site investigation (DSI) in accordance with the MfE Contaminated Land Management Guidelines. The outcome of investigation will determine any requirement for a specific Site Management Plan, Remediation Action Plan and / or Site Validation Reporting.

Therefore, any significant contamination issues identified on Kāinga Ora sites will be addressed through site specific processes and are not covered further by this CSMP.

### 2.1 POTENTIAL CONTAMINANTS FOR STANDARD RESIDENTIAL ISSUES

The predominant contaminant scenarios that Kāinga Ora are faced with within standard residential redevelopments are:

- Elevated lead in surface soils from maintenance and degradation of buildings which have historically utilised lead-based paint;
- Elevated heavy metals in surface soils from building material discharges (treated timber, galvanised materials etc);
- Refuse piles from tenants;
- Burn pits from hangi, umu and other such activities of tenants; and
- Isolated damage to asbestos containing materials from building products utilised on site structures.

These primary activities generally result in surficial contamination of the topsoil horizon and localised issues associated with residential occupation of the site for an extended duration time.

### 3. STATUTORY REQUIREMENTS

As a result of undertaking soil disturbance on pieces of land with elevated concentrations of priority contaminants in excess of the expected naturally occurring background ranges, controls are required to be in place to effectively mitigate risks associated with potential mobilisation of contaminants during soil disturbance activities.

This CSMP has been prepared to address the requirements of the Kāinga Ora contaminated land strategy with respect to localised soil disturbance activities on residential properties.

### 4. SITE MANAGEMENT PLAN

This site CSMP provides procedures for the handling of actually and potentially contaminated soils that may be disturbed during general development activities undertaken on Kāinga Ora sites. The practices and procedures in this plan are intended to ensure that health, safety and environmental risks associated with general development activities are managed to an acceptably low level.

It is not intended that this CSMP should replace any contractor's site-specific health and safety plan or earthwork and sediment control plan but should be enacted in conjunction with these documents.

#### 4.1 RESPONSIBILITIES AND SITE MANAGEMENT

Kāinga Ora will appoint an internal Development Manager to all redevelopment activities who will hold the overarching responsibility of co-ordinating the project development. Generally speaking, the proposed development will be put out to tender to a number of preferred contractors to assess cost, from which the Development Manager will appoint a primary contractor responsible for undertaking the specialist work required.

The appointed primary contractor for each phase of work required for a given site will assign a 'site manager' to the project that will be responsible for the implementation of this CSMP, and all other practices and procedures required by Kāinga Ora.

#### 4.2 ENGAGEMENT OF CONTAMINATED LAND ADVISOR

Given the frequency of development activities, Kāinga Ora utilise a number of contaminated land consultancies for investigation, remediation and assessment of contaminated land.

The Development Manager will ensure that a Suitably Qualified & Experienced Practitioner/Consultant (SQEP/Consultant) is familiar with the development site and available to provide on-call direction in relation to contamination / disposal issues for the project. The SQEP/Consultant will be a professional advisor, suitably qualified and experienced in the investigation, reporting, remediation, and validation of contaminated land.

The main functions of the SQEP/Consultant are to:

- Assist in inspecting / screening potentially contaminated material;
- Assess the effectiveness of environmental control measures;
- Manage the collection and analysis of any soil samples (if required) in accordance with the

- Ministry for the Environment's (MfE) Contaminated Land Management Guidelines (No 1, and 5 2021);
- Provide assessments of the investigation;
- Make recommendations based on findings; and
- Maintain regular liaison with local council when necessary.

#### 4.3 INFORMATION & BRIEFING SESSIONS

Prior to commencement of work, the Development Manager will ensure that the Site Manager has been provided with copies of all relevant information pertaining to the development. The Site Manager shall ensure they are familiar with those documents prior to commencing work.

Where impacted soils have been identified, the site manager will be responsible for commissioning a briefing session for relevant staff and subcontractors prior to the commencement of work. The briefing session will include as a minimum:

- Review of known impacted soil material on the site;
- Appropriate safety measures required to protect site staff from impacted material;
- Familiarisation with the requirements of this CSMP and or SQEP/Consultant provided Work Instructions or Remedial Action Plans;
- Guidance for identifying contaminated material as work progress (Appendix A); and
- Procedures to be followed should contaminated material be encountered (Appendix A).

#### 4.4 HEALTH AND SAFETY PROCEDURES

Generally, identified concentrations of priority contaminants in soil within isolated residential developments do not exceed the Soil Contaminant Standard (SCS) for Commercial/Industrial workers on an unpaved site. Consequently, contractor's standard health and safety requirements are generally sufficient to manage any risks to site workers associated with disturbance of such soils, subject to appropriate erosion, sediment and dust controls being in place and effective for the duration of work.

Erosion, sediment and dust controls are the primary mechanism to mitigate inhalation as the most important exposure risk related to airborne contaminants in dust. While direct contact with skin or eyes is the secondary route of entry in this case, it is up to the primary contractors have mechanisms to ensure that appropriate hygiene facilities are available for all staff.

The Health and Safety Guidelines on the Clean-up of Contaminated Sites developed by Occupational Safety and Health Services (OSH) provides reference to appropriate H&S measures that can be adopted for contaminated sites.

#### 4.5 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) which should be available on-site will be in accordance with the contractor's specific health and safety plan. Additional PPE that may be required include:

- Protective leather or rubber gloves;
- Safety glasses;

- Dust masks;

The site manager will use discretion with regard to the use of the additional PPE. The contractors Health and Safety personnel should be advised of PPE upgrades required during the work and consult with the SQEP/Consultant to ensure the site workers are protected.

#### 4.6 GENERAL EARTHWORK PROCEDURES

Development activities on Kāinga Ora properties involve the following aspects:

- Demolition and removal of buildings, sheds, garages and impervious surfaces. Work typically involve a 2m wide by 0.2m deep surface scrape in the halo of these areas to remove residual building materials with material disposed of at landfill as 'landfill category waste';
- Surface scrape of residual topsoil not disturbed during demolition with stockpiling of useable topsoil and offsite disposal of all material that cannot be utilised in the development; and
- Localised subgrade excavations of clays for establishment of building foundations, utility trenches, vehicle crossings, and accessways as required.

The following practices and procedures form the typical controls utilised during development:

- Prior to earthwork commencing, the contractor will arrange for the disposal of excavated material at appropriately licensed facilities depending on its assessed quality and landfill acceptance criteria;
- excavated soils are loaded directly into trucks and taken directly to a facility the material has been profiled to and authorise to receive;
- An area on site will be prepared for temporarily stockpiling should material of suspicious nature be encountered during the earthwork;
- Should temporary stockpiles be required, they will be managed (kept damp) to ensure that there is no excess dust generated from the stockpiles, all stockpiles will be removed from site or covered prior to the end of the work shift;
- Erosion and sediment controls will be installed in direct accordance with local sediment and erosion control technical manuals and include localised controls (such as silt fencing around temporary stockpiles) to control discharges from site; The site manager will be responsible for ensuring dust suppressant activities are undertaken in accordance with the MfE Good Practice Guide for Assessing and Managing Dust (2016);
- The SQEP/Consultant will be notified of suspicious or noxious material outside the known site contaminates that are encountered during the earthwork. If necessary, soil samples of suspected contaminated material will be taken and analysed for suspected contaminants of concern. The SQEP/Consultant will provide advice on handling and disposal of unexpected discoveries.

Upon completion of the excavation the site manager shall ensure that plant and equipment are cleaned and decontaminated appropriately; and

A landfill manifest or weigh bridge dockets of all material disposed of at a managed fill or landfill facilities will be provided to the SQEP/Consultant along with photograph evidence of excavation parameters including depth.

## 5. CONTINGENCES

In the event that unexpected contamination is encountered on the site during the work, the site manager, in consultation with the SQEP/Consultant, will either:

- Identify the material in situ if possible (staining, odour, visible fibres or refuse etc.); or
- Excavate the material to a suitable lined stockpile area, leak proof and covered skip-bin or truck and take representative samples for analysis, placing the material on hold for appropriate disposal;
- or
- Halt excavations in the immediate vicinity of the discovery while the material is sampled insitu, and removal / disposal options explored once the analytical results are returned.

An appropriate log will be kept by the site manager of any unidentified contamination encountered during the excavations.

Please see Appendix A to assist with identification of contaminated soil discovery that outlines the signs, risks, and remedial actions required for contamination scenarios that may be encountered during remedial earthwork.

Suspicious material will be investigated under the guidance of the SQEP/Consultant and laboratory analysed if deemed necessary.

The SQEP/Consultant will advise on the disposal options of any uncertain materials. Disposal options can include:

- remove to an appropriate temporary stockpile area or sealed container for further testing and analysis; or
- disposal at a cleanfill, managed fill or landfill facility.

The appointed contractor might have their own discovery procedures based upon their specific experiences in working with contaminated land of various natures (urban to rural). Contractor specific documents may be used alongside or in conjunction with this CSMP. If any staff, contractors, or consultants discover contamination, they should notify the site manager immediately, who should enact the provisions of the plan.

### 5.1 FIBROUS MATERIAL

Site work requiring removal of ACM must be performed at a minimum to meet the class of removal set for the site by asbestos removal control plans and/or the SQEP/Consultant based on the New Zealand Health and Safety at Work (Asbestos) Regulations, 2016, the Asbestos Approved Code of Practice (ACOP) and BRANZ (BRANZ, 2017)

Contractors performing soil excavation at any site are required to have at a minimum, one person on site who is trained to recognise ACM should an unexpected discovery become evident during the work.

Should an unexpected discovery of ACM be encountered in soil, all work in the affected site area shall cease, an exclusion zone setup around the impacted area and the SQEP/Consultant notified immediately following the discovery for advice on how to proceed with further excavation work.

## 6. VERIFICATION, REPORTING AND RECORD KEEPING

The site manager will be responsible for maintaining the following records during site development activities and will provide the records to the SQEP/Consultant upon completion of the project excavation work.

The records will include the following:

- Volume and nature of any material removed from site and all managed-fill/landfill disposal dockets;
- A log of any unknown or suspicious materials encountered during earthwork;
- Laboratory reports, if any;
- Any complaints or incidents; and
- Site photographs of all excavations.

Upon completion of excavation development work, a site completion report (SCR) will be completed and provided to the SQEP/Consultant for compilation and delivery to Kāinga Ora .

The SCR will include:

- The quantity of soil material removed from site, including copies of the disposal manifests;
- A description of any unforeseen contaminated soil material encountered during the remedial work;
- Laboratory analytical results from any soil testing undertaken during the remedial work;
- and
- Records of incidences or complaints from the neighbours or the public that occurred during the remedial earthwork.

The SQEP/Consultant will assemble the final report and deliver it to the Kāinga Ora project sponsor for filing with other site related work information.



## **APPENDIX A:**

### **CONTAMINATED SOIL DISCOVERY GUIDELINE**





# Contaminated Soil Discovery Guideline



December 2021



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## **1 INTRODUCTION**

Contaminated land can be defined as, 'any land that has been adversely affected through the impact of human activity that has resulted in a significant alteration to the chemical, inorganic or organic characteristics of the naturally occurring soil material of the land'.

Such a definition leaves a broad spectrum of potential physico-chemical characteristics which may apply. It is not the purpose of these guidelines to attempt to define all of the possible activities, characteristics, processes, or chemical compounds which may have an adverse impact upon naturally occurring soil material.

However, in the current field of contaminated soil investigation, disturbance, remediation and validation, and within the context of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) there are situations that may be uncovered, or may present themselves in other ways, where the impact of man-made activities are both hazardous, in terms of human risk, and significant, in terms of environmental risk.

It should be noted that not all hazardous and significant contamination sources can be discerned by the eye, the ear or the nose and that any suspected occurrence of soil contamination should be scientifically investigated through the most appropriate means available.

It is hoped that this document can provide some additional guidance, examples, and discussion points around the investigation and assessment of particularly 'gross' or visually, olfactory and auditory significant contamination events, sources or plumes. It should not be taken that this document can replace suitable qualifications and experience, but rather can be used as general guide to the field practical methods used to immediately assess, prepare, and undertake the safe handling and immediate containment or excavation of contaminated soil materials.

## **2 PURPOSE**

The practices and procedures in this report are intended to provide a field-practical process for the identification, assessment and management of grossly contaminated soil that may be encountered during earth breaking activities or other sub surface soil disturbance. These processes are intended to provide guidance on health, safety and environmental risks and risk management associated with earth breaking activities when gross evidence of contamination is encountered.

The practices and procedures outlined provide for first layer risk control and are one of many stages in the applicable health, safety and environmental risk management process. It is not intended to replace site specific health and safety plans, nor can it provide for every possible eventuality encountered in the field and cannot be reasonably expected to replace significant relevant on-the-job experience.

The Health and Safety Guidelines on the Clean-up of Contaminated Sites developed by Occupational Safety and Health Services (OSH) provides reference to appropriate H&S measures that can be adopted for contaminated sites and this is a key reference document when dealing with contaminated materials. These guidelines do not intend to replace the guidance provided in that document and, if in doubt, it is the more preferable guidance document on provisions for Health and Safety when operating on contaminated soil sites.

### **3 INADVERTENT DISCOVERY OF CONTAMINATION**

It is assumed that a site which has already been identified as 'contaminated' has been assessed with respect of the inorganic or organic characteristics which exceed the applicable criteria or threshold values as defined by the relevant legislation, rules, or plans. Identified contaminated sites will therefore already have appropriate protocols in place for the ongoing assessment, investigation, remediation and validation of the areas that have been defined as contaminated and have plans and procedures in place to protect both human health and the environment.

It still remains possible however, that unknown, unidentified or even identified but underestimated, contamination may exist on such a site, or on a supposed 'non-contaminated' site. Such unknown contamination may be encountered as underground lenses (conglomerates of contamination in a localised zone), layers (widespread zone of contamination occurring along a stratified zone), hotspots (individual occurrences in a single location not otherwise connected), columns (vertical bands of contamination) or a plume (a zone of contamination moving along or through an aquifer / underground flow path and usually associated with seasonal or permanent groundwater flow).

In the event that 'unknown contamination' is encountered then it is advisable to have available some form of reference documentation that can provide insight to the frontline staff on the immediate signs, symptoms and actions that should be identified, assessed or considered while further advice is sought.

In all events encountering unknown soil contamination, a suitably qualified and experienced practitioner (SQEP) should be contacted for further advice, assessment and investigation.

### **4 GENERAL PROCEDURES**

Below is a summarized guide of applicable steps which should be considered if any grossly contaminated material is encountered. The contaminated soil discovery guideline factsheets at the back of the report provide further details on the explicit health, safety and environmental risks associated with particular contamination scenarios, and the procedures to follow, however, in all instances the following general procedures summarized within the headings below should be considered. The steps highlighted below should not be considered exhaustive nor considered solely in step-by-step fashion, it may be necessary to conduct one or more actions at the same time or in differing order as a result of changing circumstances 'on the ground'.

#### **4.1 STOP**

- Stop working immediately and exclude others from working in the immediate area.
- Switch off machinery, generators etc., and establish a safe zone around the area dependent upon the assumed risk.
  - For example, a gas release from an old landfill can be considered potentially toxic and/ or explosive and a zone of approximately 10m may be considered appropriate depending upon the scale of the event.

- A series of dark red, brown or black stains in a pit with no odorous or free liquid discharges is unlikely to be immediately hazardous and the safe zone may extend to only the excavation edges.
- Prevent ingress or egress of stormwater, rainwater or wash water and stop all further activity immediately associated with the area.
- At this stage the extent, type and risk to health as a result of contamination is unknown - proceed with care and caution.

#### **4.2 ADVISE THE SITE MANAGER**

The site manager (or designated person) is the person principally in charge of health and safety on the site. They should also be familiar with these guidelines. The following steps are generally completed by the site manager or completed on the manager's delegation.

#### **4.3 CONTAIN**

If the contamination is leaving the site, or has the potential to leave the work site, then it should be contained. At this stage, the exact nature and risk of the contamination may not be known, so appropriate care and caution should be exercised. Some or all of the following methods may be used to contain the contamination:

- Sediment fences and straw bales;
- drain covers and sandbags;
- absorbent booms, spill mats, 'kitty litter' etc. can all be utilized to protect the environment from further release; and
- If containment is not possible, immediately contact:
  - ***Local Council Pollution Hotline.***

#### **4.4 ASSESS THE RISK**

Not all contaminants, or all instances of contamination, will require special provisions or procedures. Similarly, an instance of contamination may be falsely or incorrectly reported. Not all stains are contamination, or all apparent plumes of oil on a liquid surface, are man-made occurrences.

- Refer to the factsheets at the back of these guidelines.
- Make a note of any or all of the following. It may be necessary to document and record some or all of the findings, for forwarding to the SQEP/Consultant, as odours may dissipate and water may dry up or soak back into the soil:
  - Appearance - staining, trickling, flowing, bubbling (gas escape), thick, sticking to tools and equipment, sliding off tools etc.
  - Odour - sweet, sour, petrol-like, tar-like, sharp etc.
  - Colour or colours

- Miscibility i.e. does it or does it not mix with water. Oil / solvents etc. do not mix with water and creates a coloured sheen on the water surface.
- If gross contamination is confirmed (or strongly suspected) then the appropriate measures should be put in place, dependent upon the risks concerned as defined in the factsheets. A half buried rusted drum of waste batteries will require different safety procedures to the discovery of a buried pile of asbestos cement board, for example.

#### **4.5 CONTACT THE SQEP/CONSULTANT**

Contact the on-call contaminated land advisor - provide digital photographs if safely possible to do so. Talk to the SQEP/Consultant. They may advise additional steps to follow; they may be required to come to site.

#### **4.6 RESTRICT ACCESS**

Following the assessment of the risk, the safety zone can now be better defined.

- With reference to the factsheets, restrict access to the safe zone to only those members of the team that need to be there. It may be necessary in the case of potentially explosive vapour release, to cordon off a significant sized area and prevent working, or vehicular access, within that area.
- Consider the potential flow paths of vapours along trenches, down slopes, through drains etc.
- Access can be restricted through purely visual means, e.g. warning signs, via fencing or by staff management (security guard for example) or a mixture of all three based upon the site manager's assessment and the extent of the contamination.

#### **4.7 ESTABLISH A WORKING TEAM AND PROVIDE WITH APPROPRIATE PPE**

Before continuing, establish a team of competent trained individuals who can deal with the matter and ensure that they have, and are correctly wearing, the appropriate PPE for the situation at hand as defined in the factsheets. Consider the following when establishing the team:

- Experience - have they handled such a situation before?
- Competence - are they familiar with the tools, equipment, PPE and procedures that will be employed?
- Comfort - not all staff are comfortable with unknown situations. Will they be comfortable in this situation?

#### **4.8 EXCAVATE**

At some point, the contamination is likely to be removed. This may not be the case in every instance and the regulations allow for other actions such as in-situ remediation, stabilisation, encapsulation etc. and the SQEP/Consultant will advise on the specific methodologies required. In certain circumstances a more detailed remedial plan may have to be compiled which will document specific goals, validations and disposal actions. The SQEP/Consultant will advise on the requirements of the regulations. In most cases of localised acute instances of gross contamination, they can be safely

managed immediately in the interests of protecting human health and the environment. In this case, some or all of the following processes should be followed:

- Excavation/ Isolation - solid contaminants, soil, drums, refuse etc. can be excavated, by machine or by hand, directly into a covered truck or sealed skip, preventing further potential spread and isolating the contaminants for assessment and disposal;
- Vacuum extraction - contaminated water may be sucked up into a vacuum tanker, provided that there is no risk of reaction or explosion, where it can be isolated for assessment and disposal. DO NOT MIX water/ liquid from more than one event in a vacuum truck;
- Separation - large separate items, such as asbestos sheet fragments, can be collected by hand, separated from the soil matrix and placed in double skinned plastic bags for appropriate disposal; and
- Absorbance - contaminated water, hydrocarbons and chemicals can all be absorbed through the use of contaminated pads, pillows and booms which can then be placed in sealed skips or bags and isolated for appropriate disposal.

#### **4.9 DOCUMENT**

Keep written documents, including digital photographs, of all measures used to contain or cleanup the contamination. This might include some or all of the following:

- Assessment measures used e.g. laboratory analysis, in-situ analysis (e.g. XRF), smell, behaviour in water (miscibility etc.), pH indicator test etc.;
- Staff involved in clean-up and experience;
- Methods used, problems encountered, discussions with SQEP;
- Complaints by third parties (e.g. odours, colour changes to local waterways etc.);
- Excavation or separation methods used, names of contractors etc.;
- Volumes extracted;
- Conditions of cartage, e.g. skip bin, covered truck, closed wheelie bins etc.
- Location of final disposal and disposal documentation e.g. tip dockets, weighbridge receipts etc.

#### **4.10 DISPOSE**

In order to ensure that all material is disposed of correctly, ensure the safe and licensed disposal of the material in accordance with the requirements outlined by the SQEP/Cosultant. In the majority of cases, examples of gross contamination are likely to require disposal at a licensed landfill facility e.g. Redvale Landfill or Hampton Downs Landfill. Other licensed facilities may exist that can handle potentially contaminated material, that may also be able to provide assistance.

- Contaminated liquids will not be received at landfill for disposal and must go to a licensed liquid disposal facility. Sewerage contaminated liquids can probably go directly to the nearest local sewer treatment facility, but chemical contaminated liquid will be required to go to an appropriate liquid treatment plant.



- Drums of unknown or unidentified waste may have to go to a solid / liquid hazardous waste handling plant.
- Contaminated PPE will also require appropriate disposal.
- In all instances, the receiving facility will be unlikely to receive and handle the material without some form of analysis or assessment of the composition of the waste.
- Keep all transport and disposal dockets for the final report.

#### **4.11 REPORT**

Communications and documentation will be kept during the procedures, but a final report should be provided to the project manager detailing all of the steps, communications and records as required.

This report provides assurance to the regulatory authority that all the necessary steps have been followed and the matter has been adequately and professionally dealt with.

## 5 FACTSHEETS

### 5.1 PETROLEUM HYDROCARBONS



#### ACTIVITY

- Petroleum service station
- Vehicle workshop
- Gasworks sites

#### POTENTIAL CONTAMINATION

- Total Petroleum Hydrocarbons (TPHs)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Benzene, Toluene, Ethylxylene, and Xylenes (BTEX)
- Heavy Metals

#### DESCRIPTION

Petroleum-contaminated soils have a brown / black discolouration and an 'oily' consistency. Petroleum products, such as diesel and petrol, are insoluble in water and can form oil slicks in excavated areas such as trenches. Petroleum products in soil can be detected by the characteristic odour of petrol and diesel. BTEX produces a much 'sweeter' odour similar to that of paint-thinners.

#### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Adverse reactions to strong hydrocarbon odours are possible, e.g. headaches, blurred vision, nausea. Contaminants can be absorbed into body via inhalation of dust, contact with skin, or ingestion. Leaked fuels can migrate into groundwater, potentially contaminating drinking water.

#### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical/ oil resistant steel-capped boots; (2) disposable coveralls; (3) chemical-resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face respirator.

#### HANDLING AND DISPOSAL

Pooled hydrocarbon spills can be removed using suitable absorbent materials or collected by a suitably rated vacuum tanker. Spills can also be transferred to a sealed container by an appropriately rated vacuum pump or similar. Hydrocarbon contaminated soil can be placed in a sealed leak proof skip bin or truck for disposal at a facility authorised to receive material of that kind.

## 5.2 HEAVY METALS



### ACTIVITY

- Metal workshop
- Metallisation works
- Electroplating industries
- Timber treatment facilities

### POTENTIAL CONTAMINATION

- Heavy Metals

### DESCRIPTION

Gross contamination of heavy metals in soils can cause bands of discolouration within the soil profile. Pools of discoloured water (yellow, blue, red, orange) in excavated areas, such as trenches, are indicative heavy metal contamination. Solvents used for metal preparation, like BTEX, can form 'sheen' on the surface of water and produce a 'sweet' odour similar to that of paint-thinners.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Contaminants can be absorbed into body via inhalation of dust, contact with skin, or ingestion. Heavy metals have the ability to leach further into soil and eventually into groundwater, potentially contaminating drinking water. A consideration should be given to the potential of pH alteration as metal finishing plants often employ acidic solutions for metal preparation.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical / oil resistant steel-capped boots; (2) disposable coveralls; (3) chemical resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face mask or respirator.

### HANDLING AND DISPOSAL

Heavy metal-contaminated soil can be placed in a truck and covered with tarpaulin for disposal at a facility authorised to receive material of that kind.

### 5.3 DRY CLEANERS



#### ACTIVITY

- Dry-cleaners

#### POTENTIAL CONTAMINATION

- Volatile hydrocarbons (trichloroethylene, tetrachloroethylene, carbon tetrachloride)

#### DESCRIPTION

It is difficult to distinguish soil contamination by solvents used for dry-cleaning. However, the solvents can form a bilayer with water they are less dense than water. The odours associated with dry-cleaning agents are very distinctive and can be described as 'sickly sweet', causing dizziness and nausea.

#### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Contaminants can be absorbed into body via inhalation of vapours, contact with skin, or ingestion. Depending on atmospheric conditions, dry-cleaning agents may readily evaporate. Extended exposure to dry-cleaning agents can affect the central nervous system. Gross contamination of dry-cleaning agents in soil can migrate past the water table, making remediation complex.

#### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical / oil resistant steel-capped boots; (2) disposable coveralls; (3) chemical-resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face respirator.

#### HANDLING AND DISPOSAL

Pooled hydrocarbon spills can be removed using suitable absorbent materials or collected by a suitably rated vacuum tanker. Spills can also be transferred to a sealed container by a suitably rated vacuum pump or similar. Solvent contaminated soil, including drums or containers, can be placed in a sealed leak proof skip bin for disposal at a facility authorised to receive material of that kind.

## 5.4 TANNERY/ LEATHER PROCESSING



### ACTIVITY

- Leather manufacture/ treating facility

### POTENTIAL CONTAMINATION

- Heavy Metals (particularly chromium) Solvents
- Pesticides Bleaching agents

### DESCRIPTION

Gross contamination of chromium in soils, caused in the tanning stage of treating leather, can cause orange and blue bands of discolouration within the soil profile. Pools of discoloured water (orange, blue, green) in excavated areas, such as trenches, are indicative chromium and metal contamination.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Contaminants can be absorbed into body via inhalation of vapours and dust, contact with skin, or ingestion. Wastewater produced from the tanning process can have excessive levels of chromium and sulphides which can cause gross soil contamination if inadequately handled.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical / oil resistant steel-capped boots; (2) disposable coveralls; (3) chemical-resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face mask or respirator.

### HANDLING AND DISPOSAL

Pooled liquid spills can be removed by using tailor-designed absorbent materials and via tanker or pump. Contaminated soil can be placed in a sealed skip bin or covered truck for disposal at a facility authorised to receive material of that kind.



## 5.5 ASBESTOS



### ACTIVITY

- Improper disposal of asbestos-containing building materials

### POTENTIAL CONTAMINATION

- Asbestos (fibres)

### DESCRIPTION

Asbestos in soil is most likely due to burial of building materials. Asbestos fibres are usually entrained in a substrate material, making identification difficult. Broken cement, floor tiles, roof shingles, insulation, heat shields, and textured ceiling tiles manufactured between the 1950s and 1980s are likely to contain asbestos.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Asbestos can be absorbed into the lungs via inhalation of fibres. A significant acute or chronic exposure can lead to mesothelioma, asbestosis and lung cancer. Buried asbestos is relatively stable; however, disturbing asbestos during excavations could lead to the production of harmful fibres.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) disposable coveralls; (2) washable PVC gloves; (4) safety glasses; (5) suitably graded full face or half face P3 respirator.

### HANDLING AND DISPOSAL

KEEP DAMP to suppress fibre generation. Large fragments may be collected by hand and place in double skinned plastic bags. Asbestos-contaminated soil can be placed in a sealed skip bin for disposal at a facility authorised to receive material of that kind. Soil of this kind can also be transported via sealed doubled bags or a sealed skip bin.

## 5.6 REFUSE



### ACTIVITY

- Inorganic/ Organic refuse disposal

### POTENTIAL CONTAMINATION

- Variable, dependant on the type of refuse Contaminants could arise from liquid waste, putrid organic waste, and any material that would normally be sent to a licensed landfill

### DESCRIPTION

Refuse in soil is most likely due to burial of waste materials that should have normally been sent to landfill. Waste could include, but not limited to, paint cans, oil / hydrocarbon containers, and putrid household waste. The odour of buried refuse is likely to be extremely pungent.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Due to the variability of types of refuse and waste, it is difficult to distinguish human health and environmental risks. Individual assessment of the risks will be required.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical-resistant steel-capped boots; (2) disposable coveralls; (3) chemical-resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face mask or respirator.

### HANDLING AND DISPOSAL

Handling and disposal of refuse will be dependent upon the waste material identified.

## 5.7 PESTICIDES



### ACTIVITY

- Horticultural activity Pesticide manufacture

### POTENTIAL CONTAMINATION

- Pesticides, including DDT, dieldrin, and other organochloride pesticides (OCPs)

### DESCRIPTION

Persistent use and storage of pesticides associated with horticultural activities are the main contributors to pesticide-related contamination in soil. Illegal burial of pesticide drums and containers may be encountered on production and agricultural sites. Pesticides are often found as fine, white powders.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Pesticide contaminants can be absorbed into body via inhalation of dust, contact with skin, or ingestion. Extended exposure to organochloride pesticides can disrupt the endocrine system as well as affecting DNA. DDT and its breakdown products, DDD and DDE, are highly persistent and do not breakdown easily in soil. DDT and its isomers have the ability to magnify through the food chain (bioaccumulate).

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical-resistant steel-capped boots; (2) disposable coveralls; (3) chemical-resistant gloves; (4) safety glasses; (5) suitably graded half-face or full face mask or respirator..

### HANDLING AND DISPOSAL

If bulk pesticide storage containers are found, the site manager must be advised. Pesticide-contaminated soil can be placed in a truck and covered with tarpaulin for disposal at a facility authorised to receive material of that kind.



## 5.8 SEWAGE



### ACTIVITY

- Underground sewage tanks/ pipelines

### POTENTIAL CONTAMINATION

- Raw sewage
- Bacteria / pathogens (Escherichia coli, Vibrio cholerae, etc.)

### DESCRIPTION

Sewage in soil is most likely due to leaking underground septic tanks and/ or sewer pipelines. The odour of sewage is likely to be extremely pungent.

### HUMAN HEALTH AND ENVIRONMENTAL RISKS

Pathogens in sewage-contaminated soil can be absorbed into body via contact with skin or ingestion. Exposure to raw sewage can infect a person with an array of harmful pathogens, such as E. coli, which originate from faecal matter in wastewater. Gross contamination of raw sewage can lead to eutrophication of lakes, rivers, and other receiving bodies of water.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required PPE for handling soil of this kind: (1) chemical-resistant steel-capped boots; (2) disposable / liquid repellent coveralls; (3) chemical-resistant / waterproof gloves; (4) safety glasses; (5) suitably full face mask or face shield.

### HANDLING AND DISPOSAL

If raw sewage is encountered, the site manager must be advised. Sewage-contaminated soil can be placed in a truck and covered with tarpaulin for disposal at a facility authorised to receive material of that kind.

## Appendix B

### Work Instruction Minimum Requirements

1. Contaminated soil (soils above human health and environmental protection criteria) excavation work shall be undertaken during dry weather conditions.
2. Hard stand areas will be installed at site entrance providing clean vehicle access/egress.
3. Should it prove necessary for workers to handle or contact the contaminated soil, disposable gloves, overalls and safety glasses will be worn. In addition, a simple decontamination facility will be available for site workers for good hygiene and boot washing.
4. Excavated/stripped soils exceeding managed fill criteria must be direct loaded into trucks or bins for transportation and disposal. If stockpiling is required, material will be placed on and covered with a minimum 20ml plastic sheeting. Stockpile cover will be checked daily and maintained were required to stop sediment and dust emissions.
5. Where practical, the excavator undertaking the work should be located outside of the contaminated soil zones to avoid tracking through the contaminated area. On completion of the work in each zone, the excavator bucket should be washed (decontaminated) by using a low-pressure hose pipe (or similar) into the bed of the truck removing the contaminated soil from site (i.e. last load of contaminated soil removed from site).
6. Trucks removing excavated soil from the site should be sheeted/covered and the wheels washed if they have had contact with site soils (or similar) before leaving site to avoid tracking soil debris on to neighbouring roadways. Should the roadway be impacted by site soil, contractor will be responsible for street sweeping and clean up immediately following material tracking offsite.
7. Diversion bunds should be constructed where practical/necessary on the elevated boundaries of the site to prevent overland storm water flow from entering the site during rainfall events, and to minimise erosion of exposed surface soils.
8. Silt fences and / or super silt fences should be constructed along the boundary(ies) of lowest elevation of the site to prevent the discharge of contaminated sediment to neighbouring properties and the wider receiving environment.
9. Cess pit protection devices and other sediment control devices should be used where possible to prevent the discharge of contaminants to the wider receiving environment.
10. Should an unexpected discovery of potentially contaminated material be encountered during the site work, cordon off the area immediately and contact Consultant for further guidance.
11. On completion of the excavation work, the contractor will inform SQEP/Consultant that the remedial action has met the Remedial Work Instruction controls and email digital photographs of the work to the consultant associated with the work instruction, along with a site plan showing the extent and depth of excavations. Photographs must be of the excavated area and a separate photograph showing a close up of tape measurer and excavation bottom to verify excavation depth.

12. Post soil removal photographs will be included in the site verification report as evidence the site poses no future risk and that material removed from site was delivered to the correct disposal facilities.
13. Waste disposal dockets must be supplied to SQEP/Consultant on completion of the work.

## **Appendix D      Approximate soil disposal volumes**

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1018898.2000

7-15 Church Street, Ashburton: approximate and estimated disposal volumes.

Additional quantities may require disposal to managed fill/landfill if approval is not obtained, and/or if unexpected contamination is encountered.

Assumes that soils below current building footprints will not require disposal as asbestos waste.

	Area of the site	Approx. area (m <sup>2</sup> )	Depth of excavation (m bgl)	Volume estimate (m <sup>3</sup> )	Volume estimate (m <sup>3</sup> ) ± 20%	Disposal site (subject to operator approval)
<b>Stage 1</b> Demolition of structures, excavation of dwelling footprints and halos to 0.3 m bgl	Dwelling footprints	450	0.3	135	110 - 165	Based on the disposal option within the dwelling halo, disposal to <b>Burwood Landfill</b> is assumed, <u>following post demolition asbestos clearance by a Competent Person.</u>
	Dwelling halos	560	0.3	165	135 - 200	<b>Wheatsheaf</b>
<b>Stage 2</b> Site scrape to 0.3 m bgl	7HA4, 7HA3, 9HA5, 13HA2, 15HA5, 15HA6	150	0.3	45	35 - 55	<b>Burwood Landfill</b>
	9HA1, 9HA4, 15HA1	105	0.3	30	25 - 40	<b>Cleanfill</b>
	Rest of site	580	0.3	175	140 - 210	<b>Wheatsheaf</b>
<b>Stage 3</b> Preparation and excavation of foundations	House 1	133.8	0.35	46.83	35 - 55	<b>Wheatsheaf</b>
	House 2	161	0.43	69.23	55 - 85	<b>Burwood</b>
	House 3	96	0.36	34.56	30 - 40	<b>Cleanfill</b>
	House 4	124.5	0.3	37.35	30 - 45	<b>Wheatsheaf</b>
	House 5	124.5	0.43	53.535	45 - 65	<b>Wheatsheaf</b>
	House 6	107.7	0.27	29.079	25 - 35	<b>Wheatsheaf</b>
	House 7	124.5	0.38	47.31	40 - 55	<b>Wheatsheaf</b>
	House 8	125	0.47	58.515	45 - 70	<b>Wheatsheaf</b>
	House 9	108	0.17	18.309	15 - 20	<b>Wheatsheaf</b>
	Houses 10 & 11	131	0.22	28.776	25 - 35	<b>Wheatsheaf</b>
	Houses 12 & 13	130.8	0.15	19.62	15 - 25	<b>Wheatsheaf</b>

**Notes**

For the purpose of estimating disposal/excavation volumes, the upper bound limit of the existing ground level RL at each property (as provided by the Housing Delivery System Christchurch geotechnical engineers) has been adopted for calculating disposal volumes across the site.

All measurements are approximate only. Soil volumes are an in-ground estimate with no bulking factor applied.

All information and estimates are based on information and areas provided by the HDS MBUS geotechnical engineers and architects.

Earthworks and any soil disposal for civil drainage/infrastructure not included- T+T understands these soils are to be retained on site.

Accidental discoveries of ACM/other contamination will result in changes to the above soil disposal options and disposal sites/volumes.

Areas, volumes and excavation depths are subject to changes in the design process, which are TBC at the completion of this report.

## **Appendix E      Site Earthworks Completion Checklist**

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## Site Earthworks Completion Checklist- 7-15 Church Street, Ashburton

Project foreman to complete the following checklist and provide evidence to the project SQEP within two weeks of completion of soil disturbance works.

If multiple phases of soil disturbance are undertaken by different contractors (e.g., demolition contractor and earthworks/ building contractor), each contractor must complete the following checklist and provide to the Project SQEP.

Task	Comments	Initials	Date completed
Confirm the WI was reviewed before, and implemented during soil disturbance works.			
Confirm the Kāinga Ora CSMP was reviewed before and implemented during soil disturbance works.			
Provide photographic evidence to the project SQEP clearly showing all excavations (including depths/extents) as per Section 2.			
Provide evidence (e.g., disposal dockets) for material removed from the site.			
Provide material acceptance letters for material exported from this site.			
Confirm that material imported to the site was certified cleanfill and/or quarry sourced.			
<p>Confirm no unexpected contamination discoveries were encountered during soil disturbance works.</p> <p>If unexpected discoveries were encountered, provide evidence of the material encountered and any remedial works undertaken.</p> <p>NOTE: If unexpected contamination was identified the project SQEP should have been</p>			

Task	Comments	Initials	Date completed
notified immediately and the Kāinga Ora 'contaminated soil discovery guideline' followed.			
Provide any records of ground contamination-related complaints or incidents during soil disturbance.			

I, Site Foreman/Manager (full name) ..... of (Contractor)..... confirm that:

- The soil disturbance and earthworks undertaken at 7-15 Church Street, Ashburton have been carried out in accordance with the WI, Kāinga Ora CSMP and relevant stated guidelines.
- Soils taken offsite were disposed of appropriately to approved facilities as shown through relevant disposal documentation.
- The above tasks have been completed and signed off by the Site Foreman/Manager, and a copy of this checklist sent to the project SQEP on completion.

Professional title: .....

Signed: .....

Dated: .....



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