



**Soil Contamination Risk  
Detailed Site Investigation Report**

**586 Weedons Ross Road,  
West Melton, Canterbury**

July 2022



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## Quality Control and Certification Sheet

**Client:** Your Section Ltd

**Date of Issue:** 19 July 2022

**Report written by:**

**Hollie Griffith, Environmental Scientist, BEMP, CEnvP**  
(6 years contaminated land experience)

**Signed:**



**Email:** [hollie@momentumenviro.co.nz](mailto:hollie@momentumenviro.co.nz)

**Phone:** 027 513 4057

**Report reviewed and certified as a Suitably Qualified and Experienced Practitioner by:**

**Nicola Peacock, Principal Environmental Engineer, NZCE, CEnvP**  
(13 years contaminated land experience within 29 years environmental experience)

**Signed:**



**Email:** [nicola@momentumenviro.co.nz](mailto:nicola@momentumenviro.co.nz)

**Phone:** 021 1320 321

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## 1 Executive Summary

The subject of this investigation is located at 586 Weedons Ross Road in West Melton, Canterbury, from herein referred to as 'the site'. It is proposed to subdivide the site for residential use and therefore an assessment under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESC) is required. It is also noted that Momentum Environmental Ltd is obligated to consider the requirements of Section 10 (4) of the Health and Safety at Work (Asbestos) Regulations 2016. This report details the work undertaken to assess the risks.

A Preliminary Site Investigation undertaken by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in November 2020 determined that there was a potential risk of contamination in soils surrounding two poultry sheds at the site. The risk was associated with poultry feeds that could potentially have had Roxarsone added (an arsenic-based feed additive), feed grains that could have been exposed to DDT or similar sprays and persistent pesticides that may have been used within the sheds to control insect pests. There was also considered to be a potential risk of asbestos contamination around the residential dwelling that has been roofed with decramastic tiles and shows signs of deterioration.

Based on the investigation undertaken, the following activities as per the Hazardous Activities and Industries List (HAIL) were identified for the site:

- *HAIL A10 – persistent pesticide use*: poultry sheds.
- *HAIL E1 – asbestos products*: decramastic tiles in a deteriorated condition on the roof of the residential dwelling

Soil sampling undertaken as part of this Detailed Site Investigation showed no exceedances of the 'residential 10% produce' soil guideline values. Five sample locations contained concentrations of cadmium and/or zinc above expected background values. Of those five sample locations, one contained concentrations of zinc marginally above the ecological guideline value. There was no asbestos detected in soils surrounding the residential dwelling.

Based on the sampling results, soils at the site are not considered to pose a risk to human health in a residential use. The marginal exceedance of the ecological guideline value is not considered to pose a risk to the surrounding environment due to the separation distance between the nearest sensitive receptor and as the exceedance is minor and restricted to one sample location. There is no recommendation for remediation or on-site management at this time.

In terms of planning status, at the time of writing of this report, resource consent for the proposed subdivision is required under the NESC as a 'controlled' activity due to the presence of soil contamination above expected background values.

## 2 Objectives of the Investigation

This report has been written in general accordance with the Ministry for the Environment's (MfE) "Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand, revised 2021" (CLMG) and the "New Zealand Guidelines for Assessing and Managing Asbestos in Soils" (NZ GAMAS). The report includes all requirements for a Detailed Site Investigation Report.

The objective of this investigation is to:

- Collect and assess information from multiple sources to understand previous and current land uses.
- Describe the site's physical and environmental features to understand potential pathways and receptors.
- Collect and analyse site information, including soil sampling and testing, to determine the extent of any contamination present to inform remediation or site management options.
- Provide remediation or site management recommendations to the client based on identified human health and/or environmental risks.

## 3 Scope of Work Undertaken

The scope of the work undertaken has included:

- Review of previous investigations undertaken on the site.
- Designing a sampling and analysis plan based on the identified contaminant risks.
- On site soil sampling and laboratory testing for contaminants of concern.
- Analysis of results against applicable soil guidelines values (SGVs).
- Preparation of this report in accordance with MfE guidelines.

#### 4 Site Identification

The subject of this investigation is located at 586 Weedons Ross Road in West Melton, Canterbury, from herein referred to as 'the site'. The site is legally described as RS 10802 and is 10.52ha, as shown in **Figure 1** below.



Figure 1 – Location Plan



## 5 Site Description

### 5.1 Environmental Setting

**Table 1 – Environmental Setting**

<b>Topography</b>	The site is generally flat land, with some small knolls.
<b>Geology</b>	The ECan GIS database describes the predominant soils at the site as the Templeton moderately deep silt. Wells in the area indicate that topsoils are underlain by layers of gravels, claybound gravels, silty gravels and sandy gravels.
<b>Soil Trace Elements</b>	According to the ECan GIS database, natural concentrations of trace elements for the site are predominantly those within the 'Regional, Recent' soil group.
<b>Groundwater</b>	The site lies over the unconfined and semi-confined gravel aquifer system. Groundwater levels recorded on nearby bore logs are between 20.00m and 30.90m deep. The direction of groundwater flow is generally in a south-easterly direction.
<b>Surface Water</b>	A water race runs along the southern boundary of the site, parallel with Weedons Ross Road.

### 5.2 Site Layout and Current Site Uses

The site is used for rural residential purposes. A residential dwelling, carport, shed and swimming pool are located in the south-western corner of the site. Two large poultry sheds, two smaller sheds and stables are located to the rear of the residential area. The remainder of the site is in pasture and used for horse grazing.

### 5.3 Surrounding Land Uses

The site is surrounded on all sides by rural residential/lifestyle properties.

## 6 Proposed Site Use

The site is the subject of a residential subdivision which will involve the change of use of the land, soil disturbance and possible disposal of soils off-site.

## 7 Summary of Preliminary Site Investigation

A Preliminary Site Investigation (PSI) was undertaken by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in November 2020. The PSI was undertaken for a larger area of land which included properties to the north and west of the site. The PSI determined that there was a potential risk of contamination in soils surrounding the poultry sheds as poultry feeds could potentially have had Roxarsone added (an arsenic-based feed additive), feed grains could have been exposed to DDT or similar sprays and persistent pesticides may have been used within the sheds to control insect pests. Regular washing out is typical of poultry sheds. Most of the contaminants would have been washed into the sumps at the end of the sheds, which likely drain to soakpits, and some may have been washed out onto soils. Contaminants of concern included heavy metals and organochlorine pesticides (OCPs).

There was also considered to be a potential risk of asbestos contamination around the residential dwelling that has been roofed with decramastic tiles. Aerial photographs showed the coating is in a deteriorated condition which indicates the tiles may have been cleaned by abrasive methods.

Based on the investigation undertaken, the following activities as per the Hazardous Activities and Industries List (HAIL) were identified for the site:

- *HAIL A10 – persistent pesticide use*: poultry sheds.
- *HAIL E1 – asbestos products*: decramastic tiles in a deteriorated condition on the roof of the residential dwelling

Based on the potential risk to human health it was recommended that a Detailed Site Investigation be undertaken on the risk areas at the site prior to any residential development occurring.

## 8 Sampling and Analysis Plan

### 8.1 Sampling Design

**Figure 2** below outlines the potential risk areas which will form the basis of the sampling methodology. Each risk area has different historical land uses, with differing modes of contamination and contaminants of concern. Except for the south-eastern corner of the site each identified risk area has the same proposed use, residential. For the purpose of sampling design, the risk areas have been separated into two exposure areas as detailed in **Tables 2-3** below and outlined dashed red on **Figure 2**.



**Figure 2 – Risk Areas Plan**



**Table 2 – Sampling Design in Residential Area**

<b>Contaminants of concern</b>	Asbestos.
<b>Number of sample locations</b>	Four sample locations directly surrounding the dwelling and four additional sample locations placed approximately 3m from the dwelling for delineation purposes, only to be analysed if the asbestos is identified in the locations closest to the dwelling.
<b>Depth of samples</b>	Due to the likely mode of contamination, if present, asbestos is likely to be present in the surface soils. Samples will also be collected from shallow soils (250mm), only to be analysed if asbestos is identified in surface soils.
<b>Testing methodology</b>	All surface samples will be submitted for individual asbestos presence/absence analysis with semi-quantitative analysis to follow any positive results. Additional samples will be selected for analysis should asbestos be identified in the surface soils directly surrounding the dwelling.
<b>Field Sampling Technique</b>	Samples to be taken by hand using a stainless-steel spade, trowel or fresh disposable nitrile gloves.

**Table 3 – Sampling Design in Poultry Area**

<b>Contaminants of concern</b>	Heavy metals and OCPs.
<b>Number of sample locations</b>	Ten sample locations directly surrounding the poultry sheds.
<b>Depth of samples</b>	Due to the likely mode of contamination, if present, contamination is likely to be present in the surface soils. Samples will also be collected from shallow soils (250mm), only to be analysed if elevated concentrations of contaminants are identified in surface soils.
<b>Testing methodology</b>	All surface samples will be submitted for individual heavy metal analysis, with the remainder of the samples to be held cold. The ten surface samples will initially be analysed for OCP's as three composite samples. Individual analysis will be undertaken if the composite samples results indicate potential concentrations of concern.
<b>Field Sampling Technique</b>	Samples to be taken by hand using a stainless-steel spade, trowel or fresh disposable nitrile gloves.

## 8.2 Soil Guideline Values

Human health soil contaminant standards for a group of 12 priority contaminants were derived under a set of five land-use scenarios and are legally binding under The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Health) Regulations 2011 (NES). These standards have been applied where applicable. The regulations describe these as Soil Contaminant Standards. For contaminants other than the 12 priority contaminants, the hierarchy as set out in the Ministry for the Environment Contaminated Land Management Guidelines No 2 has been followed. These are generally described as Soil Guideline Values. For simplicity, this report uses the terminology Soil Guideline Values (SGV) when referring to the appropriate soil contaminant standard or other derived value from the hierarchy. For soil, guideline values are predominantly risk based, in that they are typically derived using designated exposure scenarios that relate to different land uses. For each exposure scenario, selected pathways of exposure are used to derive guideline values. These pathways

typically include soil ingestion, inhalation and dermal adsorption. The guideline values for the appropriate land use scenario relate to the most critical pathway.

The land-use scenarios applicable for the proposed residential development of the site would be 'residential 10% produce'. The 'commercial/industrial' land use scenario is used as a proxy for workers involved in disturbing soils.

The adopted trigger value used to determine need for assessment of ecological receptors (including stormwater disposal areas) also referred to as Ecological Guideline Values (EGVs) is the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (online) – Sediment GV-high (ANZWQ).

For comparison of site concentrations against expected background levels the following published concentrations will be used:

- Heavy metal concentrations will be assessed against the expected background levels as published in *Background Concentrations in Canterbury soils*, Tonkin and Taylor, July 2007.
- Organochlorine pesticide concentrations will be assessed against the concentrations published in *Ambient Concentrations of Selected Organochlorine in Soils*, Buckland, Ellis and Salter, 1998.

### 8.3 Quality Assurance and Quality Control

Field quality assurance measures as described in Section 4.3.1 of the "Contaminated Land Management Guidelines No 5: Site Investigation and Analysis of Soils, revised 2021" (CLMG) are to be followed. These include using trained staff, choosing appropriate sample containers, accurate and individual labelling and recording of locations, completing appropriate laboratory chain of custody forms, chilling of samples as appropriate and timely delivery to laboratories. All non-disposable sampling equipment should be decontaminated between samples using Decon 90 and rinsed with tap water. All samples are to be submitted to IANZ accredited laboratories. Quality control to ensure freedom from sample cross-contamination is to be measured by the appropriate use of duplicate and rinsate blank samples.

## 9 Sampling Results

### 9.1 Summary of Works/Field Observations

Soil sampling was undertaken on 27 June 2022 in general accordance with the proposed sampling plan. There are no significant changes to the site since the Preliminary Site Investigation was undertaken in November 2020.

The residential dwelling was surrounded by gravel driveway, a patio and decking area, garden beds and a grassed area. Based on the presence of the gravel driveway, patio and decking area, soil samples were collected from three locations directly surrounding the dwelling and an additional three locations approximately 3m from the dwelling. There was no evidence of asbestos contamination within the sampled soils. Soils surrounding the dwelling generally consisted of topsoil and sand.



Photo 1 – Western face of the dwelling



Photo 2 – Northern face of the dwelling



Photo 3 – Eastern face of the dwelling



Photo 4 – Southern face of the dwelling

The two poultry sheds are constructed from iron with concrete floors. There is a concrete pad and a sump at the northern end of each of the poultry sheds. No evidence of asbestos containing materials were seen on the exterior of the sheds. Soil samples were collected from ten sample locations surrounding the outside of the poultry sheds. Soils at the northern and southern ends of the sheds consisted of hardpacked gravel underlain by sand. Soils at the eastern and western sides of the poultry sheds consisted of topsoil underlain by sand.



Photo 5 & 6 – Poultry sheds

A series of Sample Location Plans are included in **Appendix A**.

## 9.2 Evaluation of Results

The laboratory sample results showed no exceedances of the 'residential 10% produce' soil guideline values (SGV).

Zinc concentrations marginally exceeded the ecological guideline value (EGV) of 410mg/kg at sample location SS7.1, with a result of 426mg/kg. There were no other exceedances of the EGV.

Zinc concentrations in surface soils at sample locations SS4 and SS7-SS10 were above expected background values. The zinc concentrations at these locations ranged from 118-426mg/kg, compared to a background concentration of 93.94mg/kg. Cadmium concentrations also exceeded above expected background values at sample location SS7. The cadmium concentration at SS7 was 0.22mg/kg, compared to the expected background value of 0.19mg/kg.

OCP analysis of the three composite samples collected from surrounding the poultry sheds showed total DDT concentrations below the laboratory limit of detection.

No asbestos was detected in the soil samples collected from directly surrounding the residential dwelling.

Tables of Laboratory Results are included in **Appendix B** and copies of the Laboratory Reports are included in **Appendix C**.

### 9.3 Results of Field & Laboratory Quality Assurance and Quality Control

No quality control issues were identified during sampling. The Relative Percentage Differences (RPD) for the duplicate samples were all acceptable, ranging from 0-15%.

All laboratory tested samples were submitted to Analytica Laboratories for analysis. Analytica Laboratory hold IANZ accreditation. As part of holding accreditation the laboratory follows appropriate testing and quality control procedures. No quality control issues were identified.

## 10 Risk Assessment

Based on the soil sampling results above, soils at the site are not considered to pose a risk to human health in a residential use. The marginal exceedance of the EGV is not considered to pose a risk to the surrounding environment due to the separation distance between the nearest sensitive receptor and as the exceedance is minor and restricted to one sample location as opposed to widespread across the site.

Based on the above, there is no recommendation for remediation or on-site management at this time.

## 11 Regulatory Requirements

In terms of the NESCS soil sampling has shown contamination levels below the applicable standards in Regulation 7. However, contaminant levels are above expected background values and therefore any activities that trigger the NESCS may require resource consent.

It is recommended that a planner fully assess all proposed activities associated with the development against the Land and Water Regional Plan to determine whether consents from ECan are necessary due to the identification of contaminated land i.e. land with contaminant concentrations above expected background values.



## 12 Conclusions

A previous Preliminary Site Investigation undertaken in November 2020 identified risks at the site associated with previous poultry farming and decramastic tiles on the roof of the residential dwelling. Soil sampling undertaken as part of this Detailed Site Investigation showed no exceedances of the 'residential 10% produce' SGV. Five sample locations contained concentrations of cadmium and/or zinc above expected background values. Of those five sample locations, one contained concentrations of zinc above the EGV. There was no asbestos detected in soils surrounding the residential dwelling.

Based on the sampling results, soils at the site are not considered to pose a risk to human health or the environment in a residential use. There is no recommendation for remediation or on-site management at this time.

Resource consent for the proposed subdivision is required under the NESCS as a 'controlled' activity due to the presence of soil contamination above expected background values.

## 13 Limitations

Momentum Environmental Limited has performed services for this project in accordance with current professional standards for environmental site assessments, and in terms of the client's financial and technical brief for the work. Any reliance on this report by other parties shall be at such party's own risk. It does not purport to completely describe all the site characteristics and properties. Where data is supplied by the client or any third party, it has been assumed that the information is correct, unless otherwise stated. Momentum Environmental Limited accepts no responsibility for errors or omissions in the information provided. Should further information become available regarding the conditions at the site, Momentum Environmental Limited reserves the right to review the report in the context of the additional information.

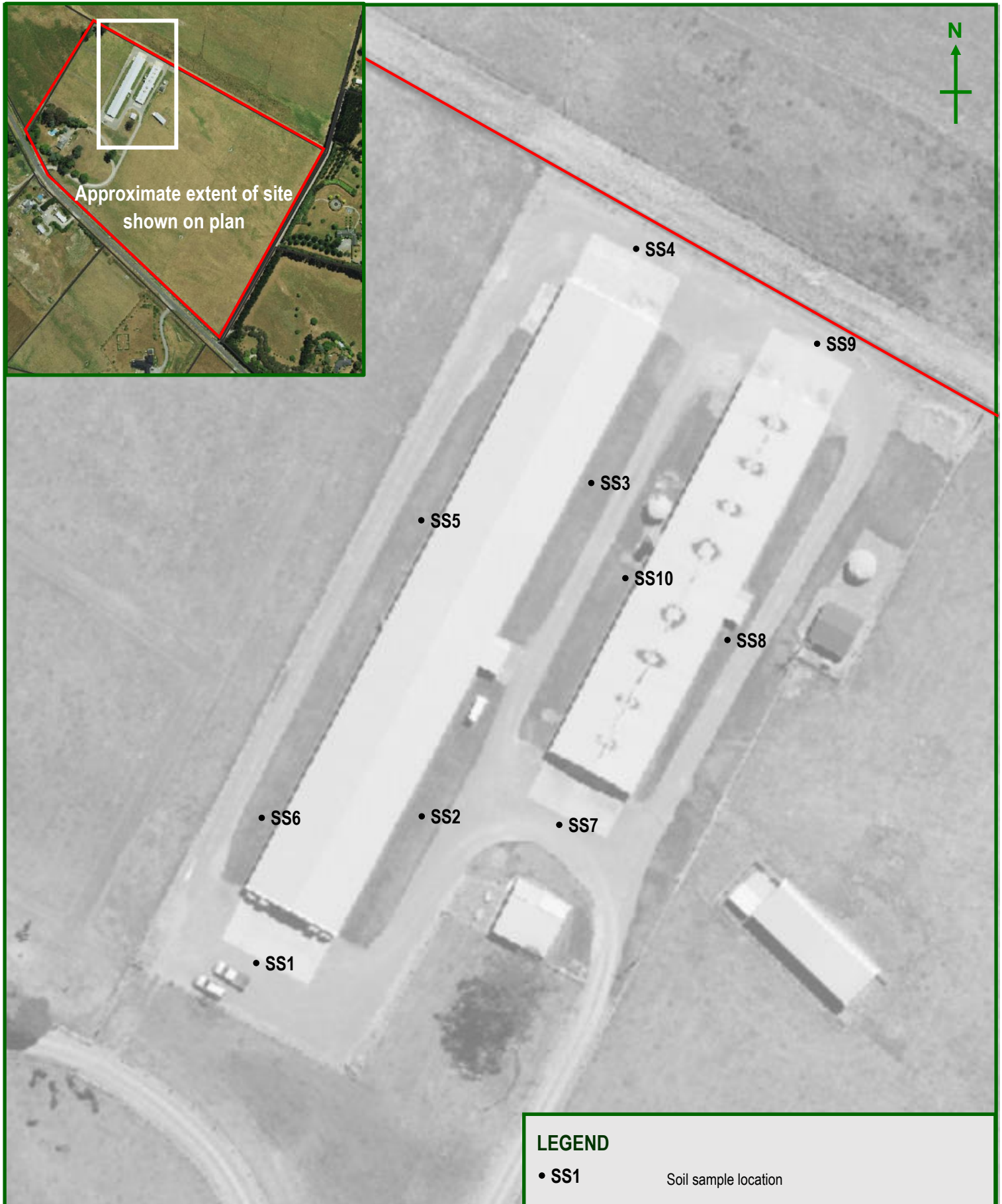
Opinions and judgments expressed in this report are based on an understanding and interpretation of regulatory standards at the time of writing and should not be construed as legal opinions. As regulatory standards are constantly changing, conclusions and recommendations considered to be acceptable at the time of writing, may in the future become subject to different regulatory standards which cause them to become unacceptable. This may require further assessment and/or remediation of the site to be suitable for the existing or proposed land use activities. There is no investigation that is thorough enough to preclude the presence of materials at the site that presently or in the future may be considered hazardous.

This report does not attempt to describe all risks or possible outcomes resulting from carrying out remediation works. Any party carrying out remediation works shall be responsible for all such works, including implementing all health and safety precautions as appropriate. Momentum Environmental Limited disclaims all liability whatsoever for any loss or damages, if any, suffered by any party as a result of any remediation works undertaken.

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## **Appendix A – Sample Location Plans**



#### LEGEND

- SS1 Soil sample location

Graphic scale is approximate only



Sample Location Plan – Poultry Sheds  
586 Weedons Ross Road, West Melton

Date: 06 July 2022

Drawing No: 511/1

#### Notes:

- 1 This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
- 2 Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
- 3 Soil sample locations are approximate only



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## LEGEND

- **ASB1** Soil sample location tested for asbestos
- **ASB1** Soil sample held cold at the laboratory



Approximate extent of site  
shown on plan

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only



Date: 06 July 2022

Drawing No: 511/2

Sample Location Plan – Residential Area  
586 Weedons Ross Road, West Melton

### Notes:

- 1 This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
- 2 Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
- 3 Soil sample locations are approximate only

**Appendix B – Table of Laboratory Results**

# Table of Laboratory Results - 586 Weedons Ross Road, West Melton

Date of sampling: 27 June 2022



Analyte	Sample Name:	SS1.1	SS2.1	SS2.2	SS3.1	SS4.1	RPD	Soil Guideline Values					
Soil Results	Lab Number:	22-23616-1	22-23616-3	22-23616-4	22-23616-6	22-23616-8	SS2.1 & SS2.2	Residential	Commercial/	Reference	Ecological	Reference	Background <sub>1</sub>
	Depth (mm)	0-50	0-50	0-50	0-50	0-50		10% Produce	Industrial		Receptors		
<b>Heavy Metals</b>													
Arsenic	mg/kg dry wt	5.2	7.6	7.2	5.9	4.4	5%	20	70	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.04	0.055	0.064	0.063	0.097	15%	3	1,300	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.4	13.8	13.3	12	16.3	4%	460	6,300	NES	370	ANZWQ	22.70
Copper	mg/kg dry wt	9.7	7.54	7.56	6.5	17.4	0%	>10,000	>10,000	NES	270	ANZWQ	20.30
Lead	mg/kg dry wt	17.1	13.1	12.8	14.2	16.8	2%	210	3,300	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	9.31	9.04	8.93	8.67	11.2	1%	400	6,000	NEPM	52	ANZWQ	20.70
Zinc	mg/kg dry wt	84	70	69.6	76	295	1%	7,400	400,000	NEPM	410	ANZWQ	93.94

Analyte	Sample Name:	SS5.1	SS6.1	SS7.1	SS8.1	SS9.1	SS10.1	Soil Guideline Values					
Soil Results	Lab Number:	22-23616-10	22-23616-12	22-23616-14	22-23616-16	22-23616-18	22-23616-20	Residential	Commercial/	Reference	Ecological	Reference	Background <sub>1</sub>
	Depth (mm)	0-50	0-50	0-50	0-50	0-50	0-50	10% Produce	Industrial		Receptors		
<b>Heavy Metals</b>													
Arsenic	mg/kg dry wt	8.1	4.6	6.2	12	4.2	6.9	20	70	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.06	0.035	0.22	0.069	0.042	0.058	3	1,300	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	13	12	17.9	14.9	14	13.9	460	6,300	NES	370	ANZWQ	22.70
Copper	mg/kg dry wt	6.6	6	12.6	11.8	9.81	10.5	>10,000	>10,000	NES	270	ANZWQ	20.30
Lead	mg/kg dry wt	12.2	11.8	24.9	32.8	15.2	20	210	3,300	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	8.96	9.45	9.3	8.63	9.97	9.41	400	6,000	NEPM	52	ANZWQ	20.70
Zinc	mg/kg dry wt	59	84.1	426	140	130	118	7,400	400,000	NEPM	410	ANZWQ	93.94

Indicates result exceeds 'residential' guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online)- Sediment GV-high
<sub>1</sub> Concentrations for "Regional, Recent" soil group from Background concentrations in Canterbury soils, Tonkin and Taylor, July 2007



## Table of Laboratory Results - 586 Weedons Ross Road, West Melton

Date of sampling: 27 June 2022



Analyte	Sample Name:	Composite 1 (SS1.1, SS2.1, SS6.1)	Composite 2 (SS3.1, SS4.1, SS5.1)	Composite 3 (SS7.1, SS8.1, SS9.1, SS10.1)	Soil Guideline Values			
Soil Results	Lab Number:	22-24367-11	22-24367-12	22-24367-13	Residential 10% Produce	Commercial/ Industrial	Reference	Background
	Depth (mm):	0-50	0-50	0-50				
Organochlorine Pesticides (OCPs)								
2,4'-DDD	mg/kg dry wt	<0.0050	<0.0050	<0.0050	-	-	-	-
2,4'-DDE	mg/kg dry wt	<0.0050	<0.0050	<0.0050	-	-	-	-
2,4'-DDT	mg/kg dry wt	<0.0050	<0.0050	<0.0050	-	-	-	-
4,4'-DDD	mg/kg dry wt	<0.0030	<0.0030	<0.0030	-	-	-	-
4,4'-DDE	mg/kg dry wt	0.008	0.005	0.0065	-	-	-	-
4,4'-DDT	mg/kg dry wt	<0.0050	<0.0050	<0.0050	-	-	-	-
Total DDT	mg/kg dry wt	<0.020	<0.020	<0.020	70	1,000	NES	0.43 <sup>1</sup>
All other Organochlorine pesticide analytes were below the laboratory limit of detection								

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
<sup>1</sup> Ambient Concentrations of selected organochlorine in soils, Buckland, Ellis and Salter 1998

## **Appendix C – Laboratory Reports**



## Certificate of Analysis

Momentum Environmental Ltd  
19 Robertsons Road, Kirwee  
Christchurch 7671  
Attention: Nicola Peacock  
Phone: 027 513 4057  
Email: hollie@momentumenviro.co.nz

Lab Reference: 22-23464  
Submitted by: Hollie Griffith  
Date Received: 27/06/2022  
Testing Initiated: 28/06/2022  
Date Completed: 28/06/2022  
Order Number: N/A  
Reference: 511

Sampling Site: 586 Weedons Ross Road, West Melton  
Description of Work: Combo - 511

### Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.  
Specific testing dates are available on request.

## Asbestos in Soil (Qualitative)

### Sample Details

Laboratory ID	Client Sample ID	Sample Location	Sample Description	Date Sampled	Date Analysed
22-23464-1	ASB 1.1 PA/SQ 0.50		Soil	27/06/2022	28/06/2022
22-23464-3	ASB 2.1 PA/SQ 0-50		Soil	27/06/2022	28/06/2022
22-23464-5	ASB 3.1 PA/SQ 0-50		Soil	27/06/2022	28/06/2022

Information in the above table supplied by the client: Client Sample ID, Sample Location, Date Sampled.

Laboratory ID	Client Sample ID	Fibre Types	Trace Asbestos (Presence / Absence)	Asbestos (Presence / Absence)
Units				
22-23464-1	ASB 1.1 PA/SQ 0.50	Asbestos NOT Detected. Organic Fibres	Absent	Absent
22-23464-3	ASB 2.1 PA/SQ 0-50	Asbestos NOT Detected. Organic Fibres	Absent	Absent
22-23464-5	ASB 3.1 PA/SQ 0-50	Asbestos NOT Detected. Organic Fibres	Absent	Absent

Information in the above table supplied by the client: Client Sample ID.

### Asbestos in Soil (Qualitative) Approver:

Ashleigh England  
Laboratory Technician

## Method Summary

### Asbestos Fibres in Soil (Qualitative)

Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with AS4964-2004 Method for the qualitative identification of asbestos in bulk samples.

Note 1: The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques.

Note 2: Trace asbestos is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased on site. This is not the sole indicator for the friable nature of the asbestos present.

Note 3: If mineral fibres of unknown type are detected, by PLM and dispersion staining, these may or may not be asbestos fibres. To confirm the identity of this fibre, another independent analytical technique such as XRD analysis is advised.

Note 4: The laboratory does not take responsibility for the sampling procedure or accuracy of sample location description.



## Certificate of Analysis

Momentum Environmental Ltd  
19 Robertsons Road, Kirwee  
Christchurch 7671

Attention: Nicola Peacock  
Phone: 027 513 4057  
Email: hollie@momentumenviro.co.nz

Lab Reference: 22-23616  
Submitted by: Hollie Griffith  
Date Received: 28/06/2022  
Testing Initiated: 28/06/2022  
Date Completed: 30/06/2022  
Order Number:  
Reference: 511

Sampling Site: 586 Weedons Ross Road, Westmelton

### Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.  
Specific testing dates are available on request.

### Heavy Metals in Soil

Client Sample ID			SS1.1 0-50	SS2.1 0-50	SS2.2 0-50	SS3.1 0-50	SS4.1 0-50
Date Sampled			27/06/2022	27/06/2022	27/06/2022	27/06/2022	27/06/2022
Analyte	Unit	Reporting Limit	22-23616-1	22-23616-3	22-23616-4	22-23616-6	22-23616-8
Arsenic	mg/kg dry wt	0.125	5.2	7.6	7.2	5.9	4.4
Cadmium	mg/kg dry wt	0.005	0.040	0.055	0.064	0.063	0.097
Chromium	mg/kg dry wt	0.125	14.4	13.8	13.3	12	16.3
Copper	mg/kg dry wt	0.075	9.70	7.54	7.56	6.5	17.4
Lead	mg/kg dry wt	0.25	17.1	13.1	12.8	14.2	16.8
Nickel	mg/kg dry wt	0.05	9.31	9.04	8.93	8.67	11.2
Zinc	mg/kg dry wt	0.05	83.9	70.4	69.6	76.4	295

### Heavy Metals in Soil

Client Sample ID			SS5.1 0-50	SS6.1 0-50	SS7.1 0-50	SS8.1 0-50	SS9.1 0-50
Date Sampled			27/06/2022	27/06/2022	27/06/2022	27/06/2022	27/06/2022
Analyte	Unit	Reporting Limit	22-23616-10	22-23616-12	22-23616-14	22-23616-16	22-23616-18
Arsenic	mg/kg dry wt	0.125	8.1	4.6	6.2	12	4.2
Cadmium	mg/kg dry wt	0.005	0.060	0.035	0.22	0.069	0.042
Chromium	mg/kg dry wt	0.125	13.0	12	17.9	14.9	14.0
Copper	mg/kg dry wt	0.075	6.6	6.0	12.6	11.8	9.81
Lead	mg/kg dry wt	0.25	12.2	11.8	24.9	32.8	15.2
Nickel	mg/kg dry wt	0.05	8.96	9.45	9.30	8.63	9.97
Zinc	mg/kg dry wt	0.05	58.5	84.1	426	140	130

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked \*, which are not accredited.  
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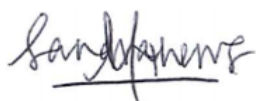
## Heavy Metals in Soil

Client Sample ID			SS10.1 0-50
Date Sampled			27/06/2022
Analyte	Unit	Reporting Limit	22-23616-20
Arsenic	mg/kg dry wt	0.125	6.9
Cadmium	mg/kg dry wt	0.005	0.058
Chromium	mg/kg dry wt	0.125	13.9
Copper	mg/kg dry wt	0.075	10.5
Lead	mg/kg dry wt	0.25	20.0
Nickel	mg/kg dry wt	0.05	9.41
Zinc	mg/kg dry wt	0.05	118

## Method Summary

### Elements in Soil

Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.



Sandra Mathews, B.Eng.  
Laboratory Technician



## Certificate of Analysis

Momentum Environmental Ltd  
19 Robertsons Road, Kirwee  
Christchurch 7671

Attention: Nicola Peacock  
Phone: 027 513 4057  
Email: hollie@momentumenviro.co.nz

Lab Reference: 22-24367  
Submitted by: Hollie Griffith  
Date Received: 04/07/2022  
Testing Initiated: 4/07/2022  
Date Completed: 7/07/2022  
Order Number:  
Reference: 511

Sampling Site: 586 Weedons Ross Road, West melton

### Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.  
Specific testing dates are available on request.

### Organochlorine Pesticides - Soil

Client Sample ID			Composite 1 (SS1.1, SS2.1, SS6.1)	Composite 2 (SS3.1, SS4.1, SS5.1)	Composite 3 (SS7.1, SS8.1, SS9.1, SS10.1)
Date Sampled					
Analyte	Unit	Reporting Limit	22-24367-11	22-24367-12	22-24367-13
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	0.0080	0.0050	0.0065
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050

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## Organochlorine Pesticides - Soil

Client Sample ID			Composite 1 (SS1.1, SS2.1, SS6.1)	Composite 2 (SS3.1, SS4.1, SS5.1)	Composite 3 (SS7.1, SS8.1, SS9.1, SS10.1)
Date Sampled					
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	97	99	110

## Soil Composite

Client Sample ID			SS1.1 0-50	SS2.1 0-50	SS3.1 0-50	SS4.1 0-50	SS5.1 0-50
Date Sampled			27/06/2022	27/06/2022	27/06/2022	27/06/2022	27/06/2022
Analyte	Unit	Reporting Limit	22-24367-1	22-24367-2	22-24367-3	22-24367-4	22-24367-5
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

## Soil Composite

Client Sample ID			SS6.1 0-50	SS7.1 0-50	SS8.1 0-50	SS9.1 0-50	SS10.1 0-50
Date Sampled			27/06/2022	27/06/2022	27/06/2022	27/06/2022	27/06/2022
Analyte	Unit	Reporting Limit	22-24367-6	22-24367-7	22-24367-8	22-24367-9	22-24367-10
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

## Method Summary

### OCP in Soil

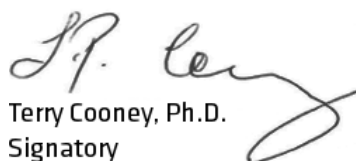
Samples are extracted with hexane, pre-concentrated then analysed by GC-MSMS. (Chlordane (sum) is calculated from the main actives in technical Chlordane: Chlordane, Nonachlor and Heptachlor). (In accordance with in-house procedure).

### Total DDT

Sum of DDT, DDD and DDE (4,4' and 2,4 isomers)

### Soil Composite\*

Analytica Laboratories is not accredited for the preparation of composite samples; however, the chemical analysis does hold IANZ accreditation. As composite analysis is conducted when requested by the sampler if they deem fit as per the NES guideline, the results of the chemical analyses still hold proper accreditation based on Analytica's methods.

  
Terry Cooney, Ph.D.  
Signatory