DETAILED SITE INVESTIGATION
LOT 1 DP5548 COSGRAVE ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.011 December 2023 (R5)

Company Information

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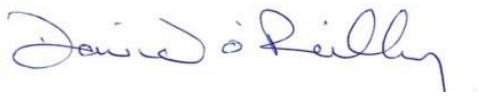

David O'Reilly
Principal Environmental Consultant

Distribution List

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Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Lot 1 DP 55480 Cosgrave Road, Ardmore, Auckland. The legal description of the site is Lot 1 DP 55480 with an area of 5.80 ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property of Lot 1 DP 55480 Cosgrave Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

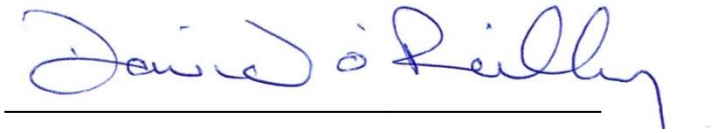
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client;*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP 55480, Cosgrave Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at Lot 1 DP 55480 Cosgrave Road, Ardmore as shown in Figure 1 attached. The legal description of the site is Lot 1 DP 55480 with an area of 5.80 ha. The site is located at national grid reference 1774088mE and 5898124mN.

The site is irregular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Lot 1 DP 55480, Cosgrave Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled *'Cosgrave Road Plan Change: Baseline Ecology'* and dated April 2023, is an artificial drainage channel which runs through the western boundary of the plan change area.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP 55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the HAIL was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Lot 1 DP 55480, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Lot 1 DP 55480, Cosgrave Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Lot 1 DP 55480, Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, revised 2021).

Twelve discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form three composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 5 below.

Table 4: Sample Analysis Information: Lot 1 DP 55480, Cosgrave Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01-COMP03	0 - 0.15m	3	Historical Horticulture/Pesticide Use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153).

The relevant values of the above guidelines have been reproduced in Table 5 below:

Table 5: Site Assessment Criteria: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg;

It is considered that the natural background levels of organo-chlorine pesticides are below the analytical levels of detection, hence if analysis shows any concentrations above the limit of detection, this would restrict material from being classified as cleanfill.

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 & 7 below and laboratory transcripts are provided in Appendix A.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	3	26	30
COMP02	<4	22	16.6
COMP03	<4	25	18.6

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.09	<0.014
COMP02	<0.09	<0.015
COMP03	<0.09	<0.015

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 8 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 8: Revised Conceptual Site Model: Lot 1 DP 55480, Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

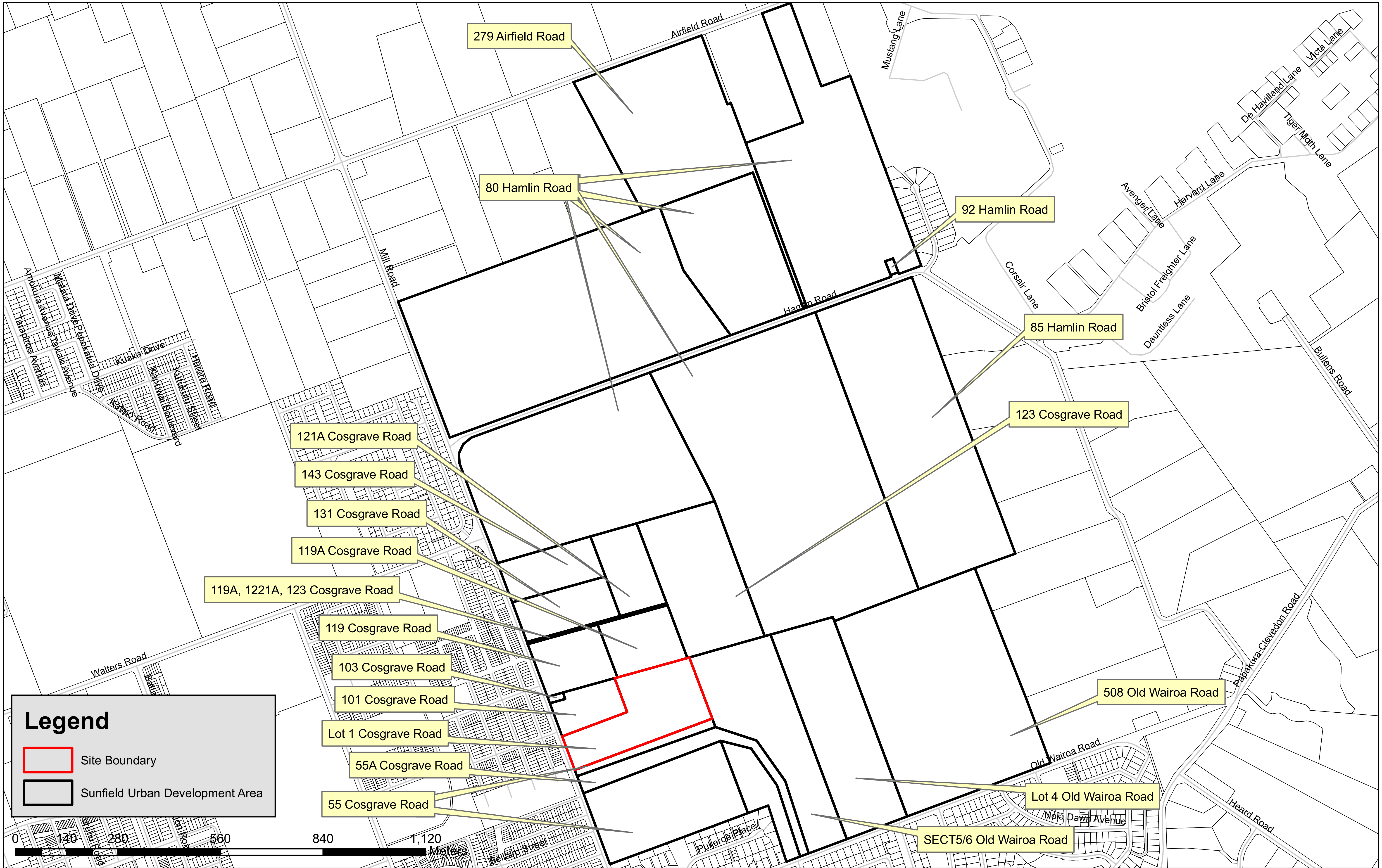
Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures



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Winton Land Limited

Lot 1 DP55480 Cosgrave Road
Sunfield Urban Development Area
Papakura
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Figure 1: Site Location Plan

Detailed Site Investigation

N

1443.011 R5

Drawing Number: 1443.011.01

Drawn By: MT

Checked By: DO'R

Date: 19/12/2023

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Figure 2: Sample Location Plan
Detailed Site Investigation

1443.011 R5

Drawing Number: 1443.011.02
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

Appendix C – Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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W www.hill-laboratories.com

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566804	SPv1
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021	
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021	
	PO Box 11455	**Quote No:**	80876	
	Ellerslie	**Order No:**		
	Auckland 1542	**Client Reference:**	1443.011	
		Submitted By:	Elliot Dillon-Herzog	

Sample Type: Soil

		Sample Name:	Composite of COMP01 A, COMP01 B, COMP01 C and COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C and COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C and COMP03 D		
		Lab Number:	2566804.13	2566804.14	2566804.15		
Individual Tests							
Dry Matter	g/100g as rcvd		70	67	67	-	-
Total Recoverable Arsenic	mg/kg dry wt		3	< 4	< 4	-	-
Total Recoverable Copper	mg/kg dry wt		26	22	25	-	-
Total Recoverable Lead	mg/kg dry wt		30	16.6	18.6	-	-
Organochlorine Pesticides Screening in Soil							
Aldrin	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
alpha-BHC	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
beta-BHC	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
delta-BHC	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
gamma-BHC (Lindane)	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
cis-Chlordane	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
trans-Chlordane	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
2,4'-DDD	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
4,4'-DDD	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
2,4'-DDE	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
4,4'-DDE	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
2,4'-DDT	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
4,4'-DDT	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Total DDT Isomers	mg/kg dry wt		< 0.09	< 0.09	< 0.09	-	-
Dieldrin	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endosulfan I	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endosulfan II	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endosulfan sulphate	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endrin	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endrin aldehyde	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Endrin ketone	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Heptachlor	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Heptachlor epoxide	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Hexachlorobenzene	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-
Methoxychlor	mg/kg dry wt		< 0.014	< 0.015	< 0.015	-	-

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	13-15
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	13-15
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	13-15
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	13-15
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	13-15
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	13-15

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

Testing was completed between 26-Mar-2021 and 30-Mar-2021. For completion dates of individual analyses please contact the laboratory.

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental

DETAILED SITE INVESTIGATION
LOT 4 DP 55480
OLD WAIROA ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.012 December 2023 (R5)

Company Information

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Quality Information

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Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Lot 4 DP 55480, Ardmore, Auckland. The legal description of the site is Lot 4 DP 55480 with an area of 10.35 ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property of Lot 4 DP 55480 Old Wairoa Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

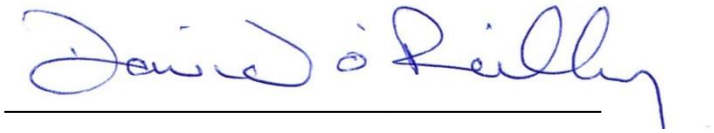
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client;*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018by SGS New Zealand.

2.0 Site Identification

The property is located at Lot 4 DP 55480 Old Wairoa Road, Ardmore as shown in Figure 1 attached. The legal description of the site is Lot 4 DP 55480 with an area of 10.35 ha. The site is located at national grid reference 1774602mE and 5898062mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled '*Cosgrave Road Plan Change: Baseline Ecology*' and dated April 2023, is an artificial drainage channel which runs through the western boundary of the plan change area.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is presented as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the HAIL was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Lot 4 DP 55480, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021).

Twelve discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form three composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 4 below.

Table 4: Sample Analysis Information: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01 - COMP03	0 - 0.15m	3	Historical Horticulture/Pesticide use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides.

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153). The relevant values of the above guidelines have been reproduced in Table 5 below:

Table 5: Site Assessment Criteria: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg;

It is considered that the natural background levels of organo-chlorine pesticides are to be below the analytical levels of detection and if analysis shows any concentrations above the limit of detection would restrict material from being classified as cleanfill.

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 & 7 below and laboratory transcripts are provided in Appendix A.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	<2	20	21
COMP02	<5	21	26
COMP03	2	20	15.5

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.02	<0.05
COMP02	<0.02	<0.05
COMP03	<0.02	<0.05

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 8 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 8: Revised Conceptual Site Model: Lot 4 DP 55480, Old Wairoa Road, Ardmore.

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

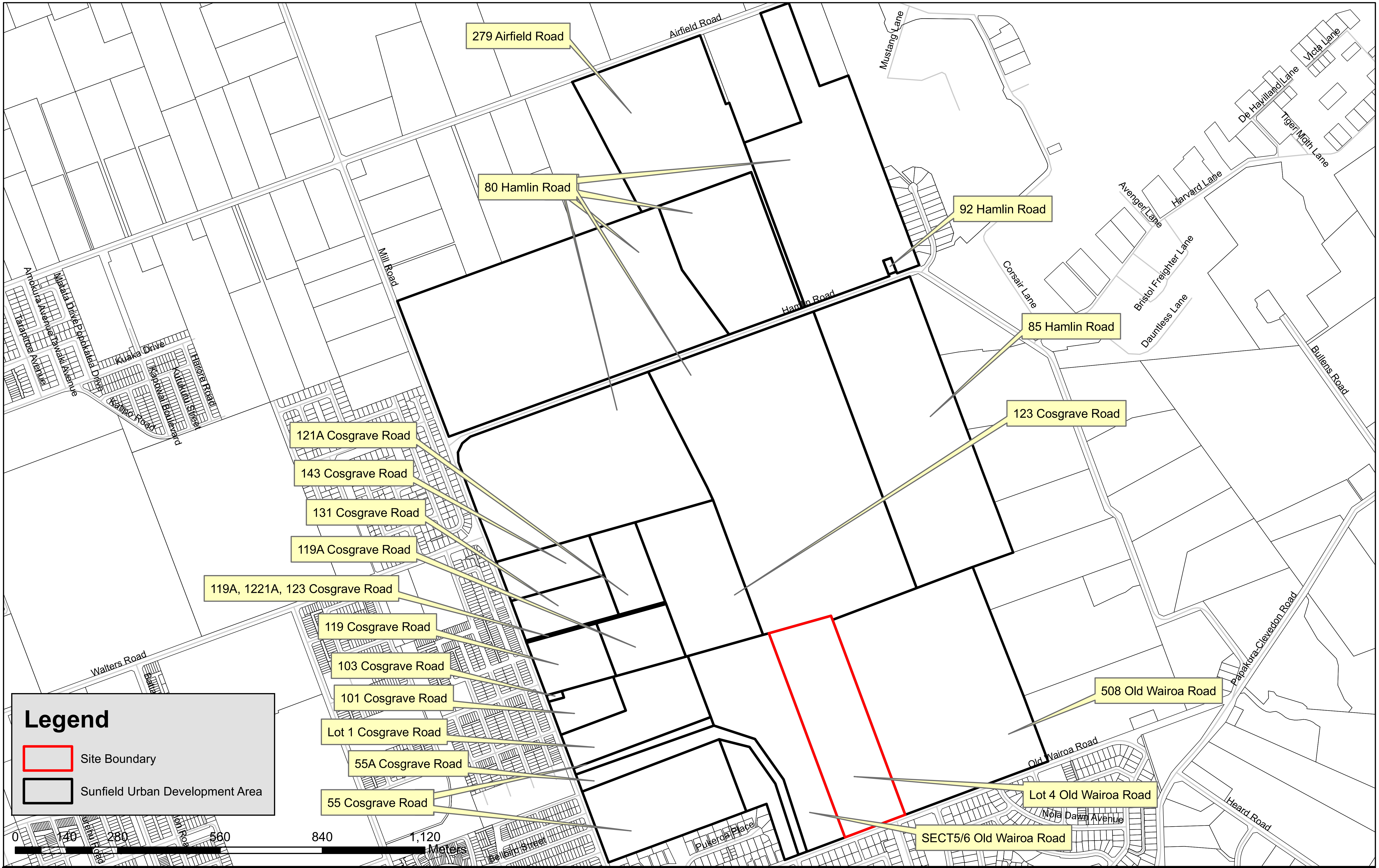
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures



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www.focusenvironmental.co.nz

Winton Land Limited
Lot 4 DP55480 Old Wairoa Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan
Detailed Site Investigation

1443.012 (R5)

Drawing Number: 1443.012.01
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

FOCUS ENVIRONMENTAL SERVICES LTD Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** Lot 4 DP 55480 Old Wairoa Road Sunfield Urban Development Area Papakura Auckland	**Figure 2: Sample Location Plan** Detailed Site Investigation	N 1443.012 R5	Drawing Number: 1443.012.03 Drawn By: MT Checked By: DO'R Date: 19/12/2023

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

Appendix C – Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566806	SPv1
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021	
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021	
	PO Box 11455	**Quote No:**	80876	
	Ellerslie	**Order No:**		
	Auckland 1542	**Client Reference:**	1443.012	
		Submitted By:	Elliot Dillon-Herzog	

Sample Type: Soil

Sample Name:		Composite of COMP01 A, COMP01 B, COMP01 C and COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C and COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C and COMP03 D		
Lab Number:		2566806.13	2566806.14	2566806.15		
Individual Tests						
Dry Matter	g/100g as rcvd	77	72	76	-	-
Total Recoverable Arsenic	mg/kg dry wt	< 2	< 5	2	-	-
Total Recoverable Copper	mg/kg dry wt	20	21	20	-	-
Total Recoverable Lead	mg/kg dry wt	21	26	15.5	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
alpha-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
beta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
delta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
cis-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
trans-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
2,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
4,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
2,4'-DDE	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
4,4'-DDE	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
2,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
4,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.09	< 0.08	-	-
Dieldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endosulfan I	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endosulfan II	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endrin	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endrin aldehyde	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Endrin ketone	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Heptachlor	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-
Methoxychlor	mg/kg dry wt	< 0.014	< 0.014	< 0.013	-	-

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	13-15
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	13-15
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	13-15
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	13-15
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	13-15
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	13-15

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

Testing was completed between 29-Mar-2021 and 30-Mar-2021. For completion dates of individual analyses please contact the laboratory.

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

Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

DETAILED SITE INVESTIGATION
SECT 5 SO 495342, SECT 6 SO 495342
OLD WAIROA ROAD &
55A COSGRAVE ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.013 December 2023 (R5)

Company Information

Focus Environmental Services Limited

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Ellerslie

Auckland 1542

Telephone: +64 9 579 4155

Email: mail@focusenvironmental.co.nz

Quality Information

Project Name	Detailed Site Investigation Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore
Project Number	1443.013 (R5)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\Sect 5 Old Wairoa Road\R5\1443.013_DSI_MT (R5).docx
Date Issued	April 2021
Date Revised	December 2023

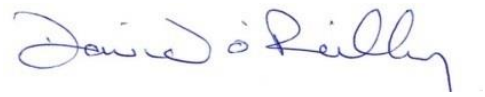
Author

Megan Thomas
Environmental Scientist

Reviewed

Claire Johnson
Environmental Scientist

Authorised



David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern portion of 55A Cosgrave Road, Ardmore, Auckland. The legal description of the sites are Sect 5 SO 495342, Sect 6 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 with an area of 11.81 and 1.13 ha respectively.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the properties of Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern portion of 55A Cosgrave Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, a single discrete surface soil sample was taken from the area of the historical building identified at the site, and twenty discrete samples were composited at the laboratory (4:1) to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.

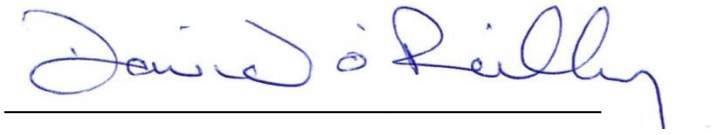
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern area of 55A Cosgrave Road, Ardmore, Auckland as shown in Figure 1 attached. The legal description of the sites are Sect 5 SO 495342, Sect 6 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 (henceforth referred to as the site) with an area of 11.81 and 1.13 ha respectively. The site is located at national grid reference 1774320mE and 5898108mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled '*Cosgrave Road Plan Change: Baseline Ecology*' and dated April 2023, is an artificial drainage channel which runs through the western boundary of the site.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10
Maintenance and Use of Lead Based Paint	I
Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils	E1

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021).

Twenty discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form five composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite.

Furthermore, one discrete surface soil sample was collected from the area of the historical building on site. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 4 below.

Table 4: Sample Analysis Information: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01 - COMP05	0 - 0.15m	5	Historical Horticulture/Pesticide Use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides
HB01	0 - 0.15m	1	Potential ACM Demolition Debris	• Semi-quantitative Asbestos in Soil (NZ Guidelines).
			Application of Lead Based Paint	• Total recoverable Lead

It should be noted that no visual evidence of asbestos containing materials was observed within the vicinity of the historical building.

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars or laboratory supplied 500ml plastic containers and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.
- Semi–quantitative Asbestos in Soil - Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with AS4964-2004 Method for the qualitative identification of asbestos in soil samples.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

In addition, as the NES does not contain a reference value for asbestos in soil, in accordance with the hierarchy described in the Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), the soil guideline value for asbestos in New Zealand for residential land use, taken from the New Zealand Guidelines for Assessing and Manging Asbestos in Soil (BRANZ Limited, 2017) of 0.001% combined fibrous asbestos and asbestos fines (FA/AF) and/or 0.01% asbestos containing material (ACM) has been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153).

The relevant values of the above guidelines have been reproduced in Table 5 below:

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

Table 5: Site Assessment Criteria: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg)

Parameter	NES ($SCS_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-
Asbestos (AF/FA)	0.001%[1]/0.01%[2]	-	-
Visual ACM	No Visual Evidence of ACM[3]	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg; 1 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 2 = Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 3 = No visual evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

It is considered that the natural background levels of organo-chlorine pesticides and asbestos in soils are below the analytical levels of detection, and hence the detection of these analytes would restrict material from being classified as cleanfill.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 - 8 below and laboratory transcripts are provided in Appendix C.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	3	27	19.8
COMP02	3	21	16.2
COMP03	3	24	17.4
COMP04	6	28	46
COMP05	<4	20	20
HB01	-	-	29

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.02	<0.05
COMP02	<0.02	<0.05
COMP03	<0.02	<0.05
COMP04	<0.02	<0.05
COMP05	<0.02	<0.05

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

13.3 Asbestos

Table 8: Asbestos in Soil Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (Semi-quantitative, %)

Sample	Asbestos Type	Asbestos (FA/AF %)	Asbestos (% ACM)
HB01	Asbestos Not Detected	<0.001	<0.001

Note: * - denotes residual concentrations detected. Results in red exceed the adopted human health criteria. Results in *Italics* exceed the cleanfill criteria.

The concentration of asbestos fibres detected in the single sample collected was below the analytical levels of detection, therefore below the cleanfill criteria, and the adopted human health criteria.

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 9 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 9: Revised Conceptual Site Model: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore.

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, a single discrete surface soil sample was taken from the area of the historical building identified at the site, and twenty discrete samples were composited at the laboratory (4:1) to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Appendix C – Laboratory Transcripts

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

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Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566801 SPv2
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021
	PO Box 11455	**Quote No:**	80876
	Ellerslie	**Order No:**	
	Auckland 1542	**Client Reference:**	1443.013
		Submitted By:	Elliot Dillon-Herzog

Sample Type: Soil

Sample Name:		HB01 24-Mar-2021	Composite of COMP01 A, COMP01 B, COMP01 C & COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C & COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C & COMP03 D	Composite of COMP04 A, COMP04 B, COMP04 C & COMP04 D
Lab Number:		2566801.21	2566801.22	2566801.23	2566801.24	2566801.25
Individual Tests						
Dry Matter	g/100g as rcvd	-	68	59	60	58
Total Recoverable Arsenic	mg/kg dry wt	-	3	3	3	6
Total Recoverable Copper	mg/kg dry wt	-	27	21	24	28
Total Recoverable Lead	mg/kg dry wt	29	19.8	16.2	17.4	46
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
alpha-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
beta-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
delta-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
cis-Chlordane	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
trans-Chlordane	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDD	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDD	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDE	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDE	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDT	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDT	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Total DDT Isomers	mg/kg dry wt	-	< 0.09	< 0.11	< 0.10	< 0.11
Dieldrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan I	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan II	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan sulphate	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin aldehyde	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin ketone	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Heptachlor	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Heptachlor epoxide	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Hexachlorobenzene	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Methoxychlor	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018

Sample Type: Soil						
Sample Name:		Composite of COMP05 A, COMP05 B, COMP05 C & COMP05 D				
Lab Number:		2566801.26				
Individual Tests						
Dry Matter	g/100g as rcvd	71	-	-	-	-
Total Recoverable Arsenic	mg/kg dry wt	< 4	-	-	-	-
Total Recoverable Copper	mg/kg dry wt	20	-	-	-	-
Total Recoverable Lead	mg/kg dry wt	20	-	-	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.014	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.014	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.014	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.014	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.09	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	-	-	-	-
Endrin	mg/kg dry wt	< 0.014	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.014	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.014	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.014	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.014	-	-	-	-

Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	21-26
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	21-26
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	22-26
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	22-26
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	21-26
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	22-26
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	22-26

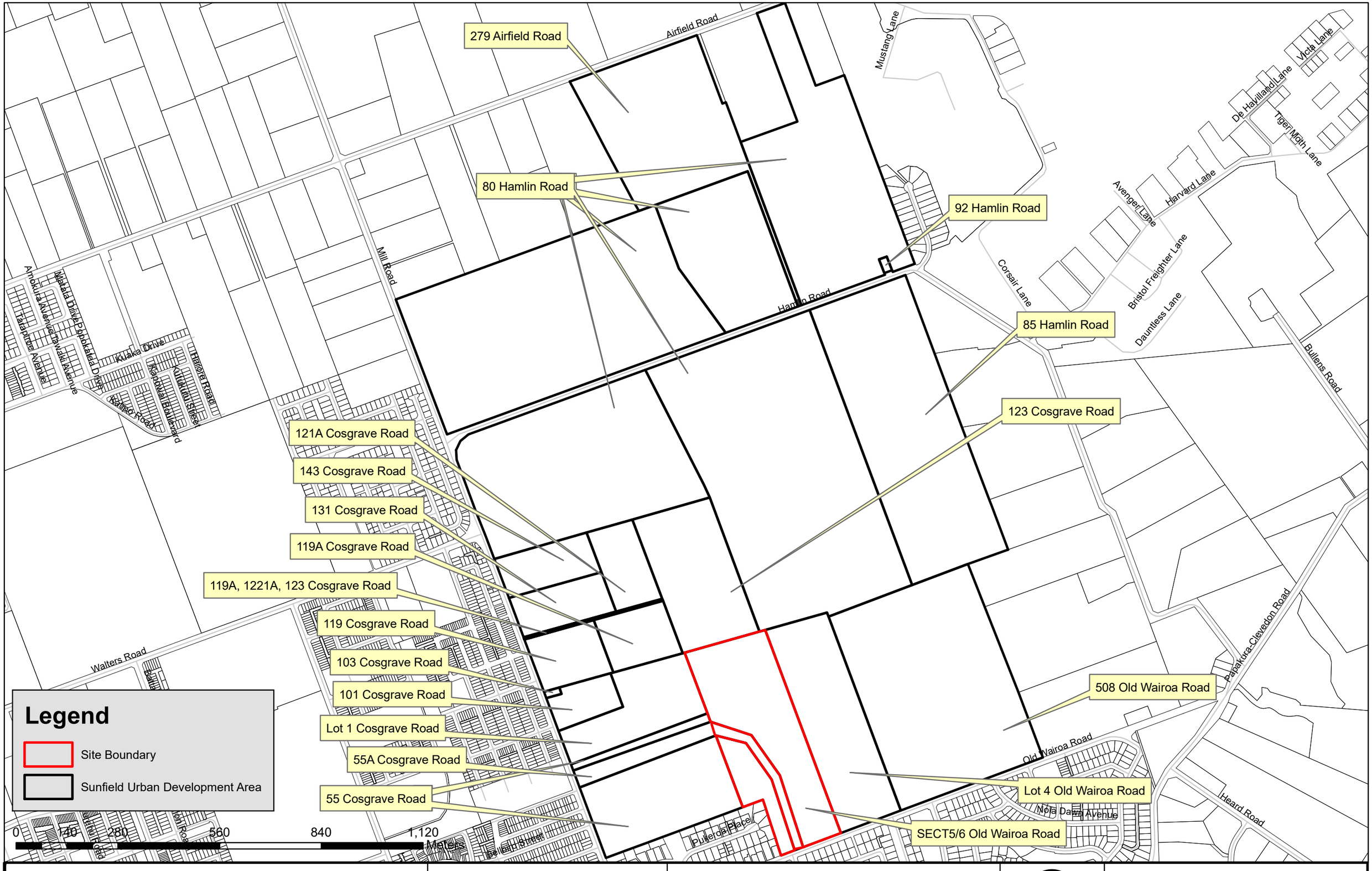
Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	21-26

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

Testing was completed between 26-Mar-2021 and 30-Mar-2021. For completion dates of individual analyses please contact the laboratory.

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

Martin Cowell - BSc
Client Services Manager - Environmental



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Winton Land Limited

Sect 5 SO 495342, Sect 6 SO 495342
Old Wairoa Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan

Detailed Site Investigation

1443.008 R5

Drawing Number: 1443.008.01
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road Sunfield Urban Development Area Papakura Auckland	**Figure 3: Sample Location Plan** Detailed Site Investigation	1443.013 R5	Drawing Number: 1443.013.02 Drawn By: MT Checked By: DO'R Date: 19/12/2023

DETAILED SITE INVESTIGATION
REMEDIATION ACTION PLAN
&
ASSESSMENT OF ENVIRONMENTAL EFFECTS
279 AIRFIELD ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1686.001 December 2023 (R1)

Company Information

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Quality Information

Project Name	DSI, RAP & AEE 279 Airfield Road, Ardmore, Auckland
Project Number	1686.001 (R1)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\279 Airfield Road, Ardmore - PSI\01 Report\R1\1686.001_DSI_RAP_AEE_MT (R1).docx
Date Issued	September 2022
Date Revised	December 2023

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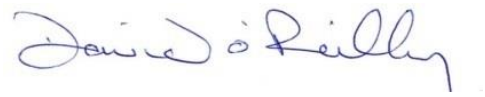

David O'Reilly
Principal Environmental Consultant

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Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation, Remediation Action Plan and Assessment of Environmental Effects (DSI, RAP & AEE) at 279 Airfield Road, Ardmore, Auckland. The legal description of the site is Lot 2 BLK XV DP 199521 with an area of 14.42 ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property at 279 Airfield Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI, RAP & AEE has been prepared in accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

It is proposed that the site will be subdivided into residential lots. As part of the redevelopment, the site will undergo a change of land use, subdivision and disturbance of soils, therefore the rules of the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health apply. The guideline values of the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use (10% produce consumption) as outlined in the NES are considered relevant. Additionally, in order to accurately perform a risk assessment and to assess whether any discharges from contaminated land will result in significant adverse effects on the environment, the contaminated land rules as outlined in Chapter E30 of the Auckland Unitary Plan: Operative in Part (AUP: OP) also require consideration.

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a search of the Auckland Council property file, a contaminated sites enquiry to Auckland Council and a review of the historical certificate of tile.

During the review of the available information, it was noted that due to the age of the current and former site buildings there was potential for ground contamination from the historic use of lead-based paints and potentially asbestos containing building materials. In addition, historical horticulture land use was noted on neighbouring properties, therefore contamination associated with spray-drift may have occurred at the site.

The site was visited and a site inspection and walk over was carried out by Focus Environmental Services Limited personnel on 15th of August 2022. During the site inspection, potential spray race operations, two areas of refuse burning and three areas of potential asbestos containing materials in a degraded condition were noted.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the site inspection and walkover, the intrusive investigation was carried out by Focus Environmental Services Limited personnel where a total of twenty-one discrete surface soil samples were taken from the potential sources of contamination identified.

In addition, twelve samples were taken from the areas of horticultural activity and composited at the laboratory to form three composite samples (4:1). Furthermore, three bulk asbestos samples were collected from areas of potentially asbestos containing materials observed in a degraded condition.

The samples were analysed for contaminants that could be present due to the potentially hazardous activities carried out at the site. The results of the site investigation have indicated that the activities carried out at the site have impacted the site soils.

Elevated concentrations of arsenic, cadmium, lead and zinc were detected in the site soils in the locations of the two burn piles. In addition, elevated concentrations of arsenic were detected in the spray race/stock loading area (2). Elevated concentrations of lead were detected in the areas around the stables (2), HB05 and the dwelling (1). Furthermore, elevated concentrations of asbestos fibres and visual evidence of asbestos were identified in the area of the outdoor toilet, and visual evidence of asbestos was observed in contact with the soils on the northern side of the stables (2).

Concentrations of arsenic, cadmium, lead and zinc were detected in the site soils in two locations at levels elevated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and/or the discharge criteria as outlined in the AUP: OP.

Concentrations of arsenic were detected in another location at levels elevated above the $SCSs_{(health)}$ for residential land use as outlined in the NES.

In addition, concentrations of lead were detected in the site soils in two areas at levels elevated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and/or the discharge criteria as outlined in the AUP: OP.

Furthermore, visual evidence of asbestos containing material was observed in contact with the site soils in two locations, and concentrations of asbestos fibres was detected in one of these areas at levels above the adopted human health criteria.

Due to the elevated levels of arsenic, cadmium, lead, zinc and asbestos fibres detected, the site at 279 Airfield Road, Ardmore will require remediation of the affected soils prior to being redeveloped. The estimated volume of soil requiring remediation is 58.4m^3. It should be noted that this volume may change during the remedial process.

A restricted discretionary consent is required under Regulation 10 of the NES as the proposed subdivision, change of use and disturbance of soils do not meet the requirements of a permitted activity under Regulation 8 of the NES, and as this detailed site investigation for the piece of land has shown that the soil contamination does exceed the applicable standard for residential land use.

Due to the estimated volume of material containing concentrations of contaminants elevated above those values specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP being 35.94m^3, which is below 200 m^3, it is considered that the proposed remediation will likely meet the permitted activity requirements under rule E30.6.1.2 of the AUP: OP and therefore resource consent under the AUP: OP may not be required.

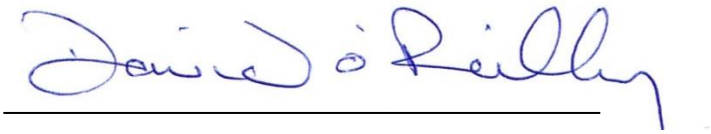
In addition, due to low-level concentrations of lead and residual concentrations of organochlorine pesticides detected above natural background concentrations in localised areas of the site, the soils in these areas will require management during development works, and if removed from site, will require disposal to a suitably licensed managed fill facility.

The objective of this Remediation Action Plan is to ensure that the soils contaminated above the adopted site assessment criteria and the materials contaminated above natural

background concentrations in the management areas of the site, are handled, removed, or managed in a controlled manner, and disposed of to a suitable disposal location. All earthworks required as part of the remedial works should be carried out in accordance with this Remediation Action Plan.

An assessment of the effects which may occur as a result of the proposed works has been made in order to mitigate any potential adverse environmental and/or human health effects. If the controls outlined in this Remediation Action Plan are implemented during the development works it is considered that the effects on the environment and human health are likely to be effectively mitigated.

This report is certified by David O'Reilly, Suitability Qualified and Experienced Practitioner (SQEP):



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client*
- *A review of historical aerial photographs available for the site;*
- *A search of the Auckland Council Property File;*
- *A search of the Auckland Council Contaminated Sites Database;*
- *A review of the Historical Certificate of Title;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Knight Investment Limited Ltd or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at 279 Airfield Road, Ardmore, Auckland as shown in Figure 1 attached. The legal description of the site is Lot 2 BLK XV DP 199521 with an area of 14.42 ha. The site is located at national grid reference 1774133mE and 5899713mN.

The site is irregular in shape and is zoned 'Rural – Mixed Rural Zone' under the Auckland Unitary Plan: Operative in Part.

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Site Topography

The property at 279 Airfield Road, Ardmore had a relatively flat, level landscape.

The site contour plan is presented in Appendix B.

5.0 Geology and Hydrology

Published geological maps[1] indicate the site is typically underlain with non-volcanic turbidite deposits of the Puketoka Formation. A description of the underlying geology is presented in Table 1 below.

Table 1: Geology: 279 Airfield Road, Ardmore

Key name	Late Pliocene to Middle Pleistocene pumiceous river deposits
Simple name	Neogene sedimentary rocks
Main rock name	Sand
Description	Pumiceous mud, sand and gravel with muddy peat and lignite: rhyolite pumice, including non-welded ignimbrite, tephra and alluvia
Subsidiary rocks	Mud gravel peat lignite tephra pumice
Key group	Late Pliocene to Middle Pleistocene sediments
Stratigraphic lexicon name	Puketoka Formation
Absolute age (min)	0.071 million years
Absolute age (max)	3.6 million years
Rock group	Sandstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body is an unnamed tributary of the Papakura Stream which lies approximately 715m north east of the subject site.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

6.0 Regulatory Framework

6.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix C.

6.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

7.0 Site History

The history of the site was researched by Focus Environmental Services Limited personnel, which involved a review of the available historical aerial photographs of the site, a search of the Auckland Council property file, a contaminated sites enquiry to Auckland Council and a review of the historical certificate of title.

7.1 Historical Aerial Photographs

Descriptions of the historical aerial photographs for the subject site are presented in Table 2 below. The historical aerial photographs are presented in Appendix D.

Table 2: Historical Photographs: 279 Airfield Road, Ardmore

Date	Description
1939	The 1939 historical photograph shows the subject site potentially forming a larger parcel of land, in use for rural purposes. A shed (HB01) can be seen along the southern boundary of site, in the central southern portion, in addition to anther shed (HB02) slightly north of this. Dwelling (1) can be seen in the south eastern quadrant of the site, adjacent to the eastern boundary, with what appears to be a small garage (HB05) directly to the north of the dwelling. A larger shed (stables 1) can be seen slightly further north of this again. Airfield Road can be seen directly to the north of the subject site The neighbouring property to the north east is in use for horticultural purposes, while the remaining properties appear to be in use for rural purposes.
1959 & 1960	The 1959 and 1960 historical photographs show that two further sheds (HB03 & HB04) have now been constructed in the central southern portion of the site. An access road can be seen running from Airfield Road along the western boundary for the site, and into the southern central portion of the site, leading to HB01. An additional access road can be seen running along the eastern boundary of the site to the dwelling (1) in the central portion of the site. Directly opposite the dwelling a large garage (1) has been constructed along the eastern boundary. A small shed (HB06) can be seen in the central eastern portion of the site, adjacent to a hedge-row which runs east to west through the centre of the site. The site continues to be in use for rural purposes, as does the surrounding environment. Ardmore Airport can be seen to the east of the subject site and a horse training track on the property to the north.
1975, 1981 & 1988	The 1975 historical photograph shows an access road has been constructed leading from Airfield Road to a turning area in the northern portion of the site, adjacent to a shed (3). Historical buildings HB02, HB03 & HB04 have now all been removed. The 1981 historical photograph shows the addition of two further sheds (1 & 2) in the northern portion of the site adjacent to the access road. Historical buildings HB05 & HB06 have now been removed. The 1988 historical photograph, shows the subject site much the same as the 1981 photograph, however HB01 has now also been removed. The subject site and surrounding environment continue to be in use for rural purposes.
2001, 2006, 2010, 2015 & 2017	The 2001 historical photograph shows the addition of a large shed (stables 2) north of stables (1), and the addition of a dwelling (2) and garage (2) in the south eastern corner of the site. No significant changes can be seen throughout the 2006 -2017 historical photographs. The site continues to be in use for rural purposes, while the neighbouring property to the west is in use for horticultural purposes. The wider surrounding environment is in use for a mix of rural/residential purposes.

Due to the age of the current and former site buildings (pre-2001) there is the potential for lead-based paint and asbestos containing materials (ACM) to have been used on the

external building materials, and therefore there is the potential for lead and asbestos contamination to be present in the soils surrounding the site buildings.

The site features plan is shown in Figures 2, 2-1 & 2-2 attached.

7.2 Previous Investigations

There are no previous environmental investigations relating to soil or groundwater contamination associated with the site at 279 Airfield Road, Ardmore on file with Auckland Council.

7.3 Auckland Council Property File Search

The results of the council search showed one resource consent for 279 Airfield Road, Ardmore. The relevant details of the property file search are presented in Table 3 below.

Table 3: Relevant Property File Information: 279 Airfield Road, Ardmore.

Proposed Activity	Applicant	Reference	Date
Right of Way Easement	Michael Drennan	LUC 7222 16/03/087	03/12/2003

7.4 Historical Certificate of Title Review

The historical certificate of title review was completed for the property at 279 Airfield Road, Ardmore.

Following the review of the historical certificate of title no companies/entities were listed that would suggest that the site has been utilised for an activity described in the HAIL.

The historical certificate of title is presented in full as Appendix E.

7.5 Auckland Council Site Contamination Enquiry

An enquiry with Auckland Councils Contamination, Air & Noise Team of the Resource Consent Department did not reveal any contamination issues in relation to the site at 279 Airfield Road, Ardmore. However foul animal manure odours were reported from the neighbouring property at 323 Airfield Road, Ardmore.

The Auckland Council Site Contamination Enquiry is presented in full as Appendix F.

8.0 Site Walkover and Inspection

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 15th of August 2022. The site inspection was carried out during a period of fine weather.

The site was accessed from Airfield Road in the northern area of the site via a gravel driveway leading to a turning area.

An excavated pit containing concrete and minor potentially asbestos containing material (PACM) fragments was located to the east of the driveway.

To the south of the excavated pit, a corrugated metal shed (1) was located. A portion of the wall on the northern side was painted. It was in use for the storage of hay on exposed ground.

Directly adjacent to shed (1), a carport and painted corrugated metal shed (2) was located. It was in use for the storage of hay and farming equipment on exposed ground.

To the south of the sheds, a concrete lined livestock loading area (1) was located with attached livestock shed. The livestock shed was constructed of unpainted concrete and cinderblock. The base was concrete lined.

A toilet constructed of unpainted plywood and PACM cladding was located to the south of the livestock shed. Minor damage was observed to the PACM cladding with fragments visible on the ground both on the exterior and interior of the toilet.

To the east of the toilet a livestock spray race/loading area (2) was present.

In the centre of the turning area a burn/refuse pit was located. It was comprised of vegetation, hay, tyres, brick, plastics and general rubbish.

The stables (1) were constructed of unpainted corrugated metal and concrete lined, and were located in the eastern portion of the site.

To the south of the stables (1) was a second stable building (2) constructed of painted PACM and metal cladding. A horse arena was located to the west of the stables.

A concrete driveway extended from the northern portion of the site to the central portion along the eastern boundary. A shipping container was located at the end of the concrete driveway.

A garage (1) constructed of painted corrugated metal with a concrete lining was located close to the eastern boundary of the site. A raised single storey dwelling (1) constructed of PACM baseboards and soffits with painted wooden cladding was located in the same area of the site.

A small burn barrel was located in the yard area of the dwelling (1), with burnt wood and aluminium cans observed.

In the south-eastern area of the site a painted metal clad garage (2) was located.

A raised single storey dwelling (2) constructed of painted PACM baseboards and metal cladding was located to the west of the garage (2). In the south-western portion of the yard area a septic tank vent was located.

The remainder of the site was comprised of paddocks and farm tracks.

Site inspection photographs are presented in Appendix G.

9.0 Surrounding Environment

The surrounding environment appeared to be rural residential in use. The neighbouring property to the west appeared to be in use for horticultural purposes.

The surrounding environment is presented in Figure 3.

10.0 Asbestos Management

External PACM products of the site structures are likely restricted to the exterior toilet cladding, the exterior cladding of the stables (2), the baseboards and soffits of dwelling (1), and the baseboards of dwelling (2). With the exception of the exterior toilet cladding, and exterior cladding of the stables (2), these materials appeared painted and in relatively good condition, and are considered unlikely to present as a source of ground contamination in their current state.

Any removal of asbestos materials from the site will need to be conducted in accordance with the Health and Safety at Work (Asbestos) Regulations (MBIE, 2016) and the Approved Code of Practice for the Management and Removal of Asbestos (WorkSafe New Zealand, 2016) by a licensed asbestos removals specialist under an approved asbestos removal control plan.

It should be noted that ACM, other than that described, may also be present at the site and a thorough inspection should be carried out by a suitably qualified and competent asbestos surveyor prior to any demolition activities at the site.

11.0 Potentially Contaminating Activities or Land Uses

Following a review of the history and the available information relating to the subject site, potentially contaminating activities were identified and are outlined in Table 4 below.

Table 4: Potentially Contaminating Activities and/or Land Uses: 279 Airfield Road, Ardmore.

Activity Description	HAIL Category
Spray Drift from Neighbouring Historic Horticultural Activities	A10
Livestock Dip or Spray Race Operations	A8
Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils	E1
Maintenance and Use of Lead-based Paint	I
Burning of Refuse	

It is recommended that the septic tank present onsite is to be removed by a trained operator in accordance with industry best practice. Additionally, the contaminants of concern associated with domestic tanks are primarily microbiological (E.Coli and Faecal Coliforms) and, if present in the soils surrounding the tank, are likely to naturally attenuate following the removal of the septic tank, and therefore pose no long term risk to human health or the environment.

12.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 5 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 5: Preliminary Conceptual Site Model: 279 Airfield Road, Ardmore.

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Surface Water Run-off	Ecological Receptors - Unnamed Tributary of Papakura Stream	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Unnamed Tributary of Papakura Stream	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

13.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, revised 2021).

A total of twenty-one discrete samples, three (4:1) laboratory composite samples and three bulk asbestos samples were collected from across the site and were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 6 below.

Table 6: Discrete Sample Analysis Information: 279 Airfield Road, Ardmore.

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
Pb01-Pb10	0 - 0.15m	10	Application of Lead Based Paint	• Total recoverable lead
HB01-HB05	0 – 0.15m	5	Application of Lead Based Paint	• Total recoverable lead
			Demolition of Historical Structures Potentially Containing Asbestos	• Semi-quantitative asbestos in soil (BRANZ)
BP01 & BP02	0 - 0.15m	2	Burning of Refuse	• Total recoverable arsenic, cadmium, chromium, copper, lead, nickel, zinc; and • Polycyclic aromatic hydrocarbons
SR01	0 - 0.15m	1	Potential Spray Race Operations	• Total recoverable arsenic; and • Organochlorine pesticides.
ASB01-ASB03	0 - 0.15m	3	Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils	• Semi-quantitative asbestos in soil (BRANZ)
PACM01-PACM03	-	3		• Asbestos in bulk materials - presence/absence
COMP01 A-D, COMP02 A-D, COMP03 A-D	0 - 0.15	3	Spray Drift from Historical Horticulture	• Total recoverable arsenic, copper, lead; and • Organochlorine pesticides.

In addition, two samples (Pb01 & Pb10) were selected at random and duplicated for quality control purposes. This is discussed further in Section 17.

The sample location plans are presented as Figures 4, 4-1, 4-2 & 4-3.

14.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars or laboratory supplied 500ml plastic containers and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

15.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2 Complies with NES Regulations. ICP -MS Screen level, interference removed by Kinetic Energy Discrimination if required.
- Polycyclic Aromatic Hydrocarbons - Sonic extraction, GC-MS analysis. Tested on as received sample. In house based on US EPA 8270.
- Organochlorine Pesticides – Sonic extraction, GC-ECD analysis. Tested on as received sample. In house based on US EPA 8081.
- Asbestos Presence/Absence – AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.
- Asbestos Semi-Quantitative – Calculated from weight of fibrous asbestos plus asbestos fines, weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.

16.0 Basis for Guideline Values

It is proposed that the site will be developed for residential purposes, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption) as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

Furthermore, due to the underlying non-volcanic geology at the site, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153). The relevant values of the above guidelines have been reproduced in Table 7 below.

Table 7: Site Assessment Criteria: 279 Airfield Road, Ardmore (mg/kg).

Parameter	NES $SCSs_{(health)}$	AUP: OP	TP153 (Non-volcanic)
Arsenic	20	100	12
Cadmium	3	7.5	0.65
Chromium	460	400	55
Copper	NL	325	45
Lead	210	250	65
Nickel	400[1]	105	35
Zinc	7,400[1]	400	180
BaP eq.	10	20	-
Total DDT	70	12	-
Dieldrin	2.6	0.5[2]	-
Asbestos (FA/AF)	0.001%[3] / 0.01%[4]	-	-
Visual ACM	No Visual Evidence of ACM[5]	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg; 1. = No $SCSs_{(health)}$ given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for Residential land use; 2 = Soil Guideline Values to protect on-site ecological receptors taken from Ministry for the Environment Guidelines for identifying, investigating and managing risks associated with former sheep dip sites, November 2016; 3 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 4= Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 5 = No visual Evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

Furthermore, the natural background levels of polycyclic aromatic hydrocarbons, organochlorine pesticides, and asbestos fibres are considered to be below the analytical

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

levels of detection and hence the detection of these analytes would restrict material from being classified as cleanfill material.

17.0 Quality Control

17.1 Laboratory Verification

Two samples (Pb01 & Pb10) were selected at random for duplicate analysis and Relative Percentage Difference (RPD) calculations. It is considered that an RPD value of less than 30-50% is generally considered acceptable. If the results were below the laboratory detection limits the RPD was not calculated.

The results of the RPD analysis are presented in Table 8 below.

Table 8: RPD Summary: 279 Airfield Road, Ardmore.

Parameter	Pb01 (RPD %)	Pb10 (RPD %)
Lead	3.21	10.99

Note: Results in *Italics* exceed 30% RPD. Results in red exceed 50% RPD.

The RPD value calculated for lead in samples Pb01 and Pb10 were less than the acceptable range. Therefore, based on the results of the RPD analysis, the sample results are likely to be relatively consistent and repeatable.

The RPD calculations are presented as Appendix H.

18.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 9 - 13 below and laboratory transcripts are provided in Appendix I.

18.1 Heavy Metals

Table 9: Heavy Metals Results: 279 Airfield Road, Ardmore (mg/kg).

Sample	As	Cd	Cr	Cu	Pb	Ni	Zn
Pb01	-	-	-	-	*95*	-	-
Pb02	-	-	-	-	25	-	-
Pb03	-	-	-	-	*81*	-	-
Pb04	-	-	-	-	*470*	-	-
Pb05	-	-	-	-	*116*	-	-
Pb06	-	-	-	-	***1,420***	-	-
Pb07	-	-	-	-	***1,730***	-	-
Pb08	-	-	-	-	33	-	-
Pb09	-	-	-	-	*113*	-	-
Pb10	-	-	-	-	*96*	-	-
HB01	-	-	-	-	61	-	-
HB02	-	-	-	-	34	-	-
HB03	-	-	-	-	32	-	-
HB04	-	-	-	-	23	-	-
HB05	-	-	-	-	***480***	-	-
BP01	*58*	*3.3*	*57*	*83*	*240*	10	***480***
BP02	*68*	*3.3*	54	*104*	***1,040***	33	***840***
SR01	*43*	-	-	-	-	-	-
Composite of COMP01A-D	5	-	-	19	22	-	-
Composite of COMP02A-D	4	-	-	16	23	-	-
Composite of COMP03A-D	5	-	-	29	28	-	-

Note: Results in red exceed the $SCS_{(health)}$ for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic detected in samples BP01, BP02 and SR01 were elevated above the Auckland background concentrations for non-volcanic soils and the $SCS_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES.

The concentrations of cadmium detected in samples BP01 & BP02 were elevated above the Auckland background concentrations for non-volcanic soils and the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES.

The concentration of chromium detected in sample BP01 was elevated above the Auckland background concentrations for non-volcanic soils.

The concentrations of copper detected in samples BP01 & BP02 were elevated above the Auckland background concentrations for non-volcanic soils.

The concentrations of lead detected in Pb01, Pb03, Pb04, Pb05, Pb06, Pb07, Pb09, Pb10, HB05, BP01 and BP02 were all elevated above the Auckland background concentrations for non-volcanic soils. In addition, the concentrations of lead detected in samples Pb04, Pb06, Pb07, HB05, BP01 and BP02 were elevated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES. Furthermore, the concentrations of lead detected in samples Pb06, Pb07, HB05 and BP02 were elevated above the discharge criteria as outlined in the AUP: OP.

The concentrations of zinc detected in samples BP01 & BP02 were elevated above the Auckland background concentrations for non-volcanic soils and the discharge criteria as outlined in the AUP: OP.

The concentrations of all other heavy metals in all other samples were below the Auckland background concentrations for non-volcanic soils, the $SCSs_{(health)}$ residential land use (10% produce consumption) as outlined in the NES, and the discharge criteria as outlined in the AUP: OP.

18.2 Polycyclic Aromatic Hydrocarbons

Table 10: Polycyclic Aromatic Hydrocarbon Results: 279 Airfield Road, Ardmore (mg/kg).

Sample	BaP eq.
BP01	*<0.05**
BP02	*0.08*

Note: * = Residual levels of contaminants detected. Results in red exceed the $SCSs_{(health)}$ for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the cleanfill criteria.

Low-level concentrations of polycyclic aromatic hydrocarbons were detected in sample BP02, in addition to residual concentrations detected in sample BP01, both of which are above the analytical levels of detection.

The concentrations of polycyclic aromatic hydrocarbons detected in both samples were below the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and the discharge criteria of the AUP: OP.

18.3 Organochlorine Pesticides

Table 11: Organochlorine Pesticides Results: 279 Airfield Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
SR01	*<0.13**	*<0.03**
Composite of COMP01A-D	<0.10	<0.016
Composite of COMP02A-D	<0.10	<0.016
Composite of COMP03A-D	*<0.11**	*<0.019**

Note: * = Residual levels of contaminants detected. Results in red exceed $SCSs_{(health)}$ for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the cleanfill criteria.

Residual concentrations of organochlorine pesticides were detected in samples SR01 and COMP03 A-D above the analytical levels of detection.

The concentrations of organochlorine pesticides detected in both samples were below the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and the discharge criteria of the AUP: OP.

18.4 Asbestos

Table 12: Asbestos in Bulk Material Results: 279 Airfield Road, Ardmore.

Sample	Asbestos Type
PACM01	Asbestos Not Detected
PACM02	*Chrysotile (White Asbestos) Detected*
PACM03	*Chrysotile (White Asbestos) Detected*

Note: Results in red exceed the adopted human health criteria.

Asbestos was identified in both PACM02 & PACM03.

Table 13: Semi-quantitative Asbestos in Soil Results: 279 Airfield Road, Ardmore.

Sample	Asbestos Type	Asbestos (FA/AF %)	Asbestos (% ACM)
ASB01	Asbestos Not Detected	-	-
ASB02	*Chrysotile (White Asbestos) Detected*	*0.022*	*<0.001*
ASB03	Asbestos Not Detected	-	-
HB01	Asbestos Not Detected	-	-
HB02	Asbestos Not Detected	-	-
HB03	Asbestos Not Detected	-	-
HB04	Asbestos Not Detected	-	-
HB05	Asbestos Not Detected	-	-

Note: * = Residual levels of contaminants detected. Results in red exceed the adopted human health criteria. Results in *Italics* exceed the cleanfill criteria.

Elevated concentrations of asbestos fibres were detected in sample ASB02, above the adopted human health criteria, and therefore above the cleanfill criteria.

19.0 Extent of Contamination

The results of the sample analysis indicate that the site soils in the areas of the burn piles (BP01 & BP02) are contaminated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES for arsenic, cadmium and lead. In addition, the site soils in these areas are also contaminated above the discharge criteria of the AUP: OP for lead and zinc, therefore remediation of these areas are required (Areas 1 & 6).

The site soils in the area of the spray race/stock loading activities (2) (SR01) are contaminated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES for arsenic, and therefore this area requires remediation (Area 3).

Furthermore, the site soils in the areas of the stables (2) (Pb04), HB05, and the dwelling (Pb06 & Pb07), are contaminated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES for lead (Areas 5 & 7). In addition, the soils in the areas of HB05, Pb06 & Pb07 are also contaminated above the discharge criteria of the AUP: OP for lead (Area 7).

In addition, the site soils in the area of the outdoor toilet (ASB02) are contaminated above the adopted human health criteria for asbestos fibres, therefore remediation of this area is required (Area 2). Furthermore, visual evidence of asbestos containing material in the area of PACM03, will also require remediation (Area 4).

The estimated volume required to remove the contaminated soils from the site is presented in Table 14 below.

Table 14: Extent of Contamination: 279 Airfield Road, Ardmore.

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Area 1	19	0.3	As, Cd, Pb, Zn	5.7
Area 2	8.4	0.3	Asbestos (Visual ACM & FA/AF)	2.52
Area 3	11.5	0.3	As	3.45
Area 4	10.8	SUR	Visual ACM	-
Area 5	54.9	0.3	Pb	16.47
Area 6	3.1	0.3	As, Cd, Pb, Zn	0.93
Area 7	97.7	0.3	Pb	29.31
Total Volume				58.38
Total Tonnes (m^3 x 1.5)				**87.6 t**

The inferred extent of the contaminated soil at the site is presented in Figures 5 & 5-1. This estimate is based on the sampling and results available following the site investigation and it should be noted that the volume may increase or decrease following inspection and validation sampling.

All contaminated materials removed from site will require disposal at a suitably licensed landfill facility.

19.1 Management Areas

Low-level contamination was detected in five areas of the site. Concentrations of lead were detected in four areas in exceedance of natural background concentrations, and one area contained residual organochlorine pesticides, therefore exceeding the clean fill criteria.

Any topsoil removed from these areas will require disposal to a suitably licensed managed fill facility, unless further sampling and analysis demonstrate otherwise.

The approximate areas of management are shown in Table 15 below.

Table 15: Management Areas – 279 Airfield Road, Ardmore (mg/kg).

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Management Area 1	17.2	0.3	Pb	5.2
Management Area 2	5,284.4	0.3	OCP's	1,585.26
Management Area 3	20	0.3	Pb	6
Management Area 4	43.4	0.3	Pb	13.0
Management Area 5	52.2	0.3	Pb	15.6
Total Volume				1,625.1
Total Tonnes (m^3 x 1.5)				**2,437.6 t**

The inferred areas and depths requiring management are shown in Figures 6 & 6-1.

20.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 16 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 16: Revised Conceptual Site Model: 279 Airfield Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Complete: Remediation or management of the contaminated area required.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No exceedances of Commercial/Industrial Outdoor Worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Complete: Remediation or management of the contaminated area required.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No exceedances of Commercial/Industrial Outdoor Worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Complete: Remediation or management of the contaminated area required.
		Human Health – Commercial/Industrial Outdoor Worker	Complete: Remediation or management of the contaminated area required.
	Surface Water Run-off	Ecological Receptors - Unnamed Tributary of Papakura Stream	Complete: Remediation or management of the contaminated area required.
	Migration of Groundwater	Ecological Receptors - Unnamed Tributary of Papakura Stream	Complete: Remediation or management of the contaminated area required.

21.0 Regulatory Requirements

21.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is changing the use of a piece of land under regulation 5(6) 'means changing it to a use that, because the land is described in subclause (7), is reasonably likely to harm human health'.
- The activity is subdividing land under regulation 5(5)(c) 'means subdividing land that has part if the piece of land within its boundaries'.
- The activity of changing use and subdivision does not comply with regulation 8(4).
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity is unlikely to comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

A restricted discretionary consent is required under Regulation 10 of the NES as the proposed subdivision, change of use and disturbance of soil do not meet the requirements of a permitted activity under Regulation 8 of the NES, and as this detailed site investigation for the piece of land has shown that the soil contamination does exceed the applicable standard for residential land use.

21.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

Due to the estimated volume of material containing concentrations of contaminants elevated above those values specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP being 35.94m^3, which is below 200 m^3, it is considered that the proposed remediation will likely meet the permitted activity requirements under rule E30.6.1.2 of the AUP: OP and therefore resource consent under the AUP: OP may not be required.

22.0 Remediation Action Plan

This Remediation Action Plan & Assessment of Environmental Effects (RAP & AEE) provides the soil specific management controls to be implemented at the site to ensure that any adverse effects on human health, as a result of the removal of asbestos and the heavy metal contaminated soils identified at the site, will be effectively mitigated.

It is therefore considered that this RAP & AEE meets the requirements of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

Due to the concentration of asbestos fibres identified in the site soils and the presence of visual evidence of asbestos, in accordance with the New Zealand Guidelines for Assessing and Manging Asbestos in Soil (BRANZ Limited, 2017), the soils within Remediation Areas 2 & 4 will require removal by a Class B licensed asbestos removalist.

In order to meet the requirements of the Health and Safety at Work (Asbestos) Regulations (MBIE, 2016), it is recommended that the selected contractor incorporates the procedures set out in this RAP & AEE into site-specific asbestos removal control plan and that the works are carried out in accordance with the Approved Code of Practice for the Management, Removal of Asbestos (WorkSafe New Zealand, 2016).

Following the removal of any asbestos contaminated soils or ACM, a certificate of clearance is to be produced by a suitably licensed asbestos assessor.

Should any ACM be discovered during any future works, its removal from the site shall be conducted in accordance with the Health and Safety at Work (Asbestos) Regulations (MBIE, 2016) and the Approved Code of Practice for the Management and Removal of Asbestos (WorkSafe New Zealand, 2016).

22.1 Remediation Criteria

The objectives for the remediation of the site are to remediate the affected soils to levels below the applicable guideline values (as specified in Table 7) to address the immediate human health and environmental concerns at the site. Remediation of the site in the areas shown in Figures 5 & 5-1 will be necessary to achieve compliance with the above guidelines.

The remediation strategy for the site will involve the machine excavation and loading of the affected site soils prior to transport and disposal. The site will then be subject to a process of validation whereby the remaining soils will be sampled to confirm that the objectives of the remediation for the site have been achieved.

The remediation criteria for the site are presented in Tables 17 - 21 below.

Table 17: Remediation criteria for Area 1 & Area 6: 279 Airfield Road, Ardmore (mg/kg).

Parameter	Value
Arsenic	20
Cadmium	3
Lead	210
Zinc	400

Table 18: Remediation criteria for Area 2: 279 Airfield Road, Ardmore (%w/w).

Parameter	Value
Asbestos	0.001%[1]/0.01%[2]
	No visible evidence of asbestos on surface soil[3]

Note: 1 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 2 = Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 3 = No visual Evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

Table 19: Remediation criteria for Area 3: 279 Airfield Road, Ardmore (mg/kg).

Parameter	Value
Arsenic	20

Table 20: Remediation criteria for Area 4: 279 Airfield Road, Ardmore (%w/w).

Parameter	Value
Asbestos	No visible evidence of asbestos on surface soil[1]

Note: 1 = No visual Evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

Table 21: Remediation criteria for Area 5 & Area 7: 279 Airfield Road, Ardmore (mg/kg).

Parameter	Value
Lead	210

As stated above, the remediation of the asbestos contaminated soils in Areas 2 & 4 are to be undertaken under the supervision of a Class B licensed asbestos removalist. It is recommended that a licensed asbestos removalist is present for the duration of the removal works to ensure that the procedures outlined in this plan and the ARCP are adhered to in order to mitigate the potential effects on human health.

Following the removal of any visual evidence of asbestos containing material (Area 2 & 4), a third-party clearance certificate will be obtained by a licensed asbestos assessor.

22.2 Work Programme

It is considered that the health & safety and environmental controls, as detailed below, will be sufficient to ensure that any adverse human health and/or environmental effects, as a result of the contaminated soils identified at the site, will be effectively mitigated.

A contractor experienced in remediation of contaminated sites will undertake the earthworks, excavation & disposal of contaminated soils at the site. The contractor will:

- Prior to works occurring, install a 3.0m fenced buffer surrounding each inferred area of contamination.
- Prepare a site-specific Asbestos Removal Control Plan and notify WorkSafe of the remediation of the asbestos contaminated soils.
- Provide adequate Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE) to all staff involved in the removal works.
- Install facilities on site which include a clean area for staff, a decontamination unit and washing facilities.
- Connect a water source and/or misting system to control any dusts that may be generated as a result of the works. This misting system must be capable of reaching all areas of the site during the ground-breaking works.
- It is recommended that the client engages a third-party asbestos assessor to complete representative asbestos fibre monitoring during the remedial works in Area 2.
- Install sediment and erosion controls for the development works in accordance with industry best practice (Auckland Council's Erosion and Sediment Control Guide for Land Disturbing Activities [3].
- Ensure that the soils within Area 2 are sufficiently wet prior to starting works.
- Machine excavate the contaminated soils from the site and load the materials onto waiting trucks.
- Asbestos contaminated soils will be loaded into trucks lined with 200µm heavy-gauge polythene and wrapped.
- Ensure that the trucks leaving the site have their contents wrapped, are fitted with close fitting tarpaulins and have sealed tailgates.
- Once the trucks have been inspected to ensure that the tarpaulins are properly fitted and the tires are free from any soil materials, transport contaminated soils to a suitable disposal location and retain any weighbridge dockets obtained.
- Obtain certificate of clearance by a suitably licensed asbestos assessor or a competent person for the areas of asbestos contamination (Areas 2 & 4).
- Carry out the validation process and undertake any further remedial works required to achieve the remediation goals.
- Prior to plant being removed from the asbestos removal area, a visual assessment for the presence of asbestos, visible debris and soil shall be carried out by a qualified asbestos assessor and a clearance certificate issued.

[3] Auckland Council, Erosion & Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Guideline Document 2016/005.

- Once all contaminated soil has been removed, clearance certificate obtained and the remediation goals achieved then the site will be reinstated with clean fill materials if required and the site stabilized.

22.3 Establishment and Site Preparation

Prior to works commencing the contractor should be familiar with this remediation action plan (RAP) which outlines all environmental and health & safety controls to be implemented when dealing with the contaminated soils.

No unauthorised access to the remedial area will be allowed during the removal of the contaminated soils. Access to the site and the contaminated materials will be restricted during the project.

In addition, the asbestos contaminated area of the site will be fenced off to enclose the work areas. No unauthorised access to the asbestos works areas (Areas 2 & 4), will be allowed during the entirety of the works. Access to the site and the contaminated materials will be restricted during the project.

Appropriate warning signage shall be posted in visible locations during the works and surrounding the stockpile material. All visitors and contractors will sign in and out of the site each day during the removal of the asbestos containing soils.

22.4 Asbestos Fibre Monitoring

In order to confirm that the mitigation controls are sufficient in the areas of asbestos remediation (Area 2) asbestos fibre monitoring is required to confirm that asbestos in air is below trace level (0.01 f/ml).

It is recommended that the client engages a third-party asbestos assessor to complete representative asbestos fibre monitoring during the remedial works in Area 2.

In the event that trace levels are exceeded, cease works, dampen, cover and fence off (barrier tape) the area of works and contact the Contaminated Land Specialist.

22.5 Excavation, Haulage and Disposal of Materials

Excavation works will not commence at the site until all the environmental controls have been put in place. The exposed excavated areas will be kept to a minimum to minimise the risk of erosion due to storm water runoff. Where possible, the excavated materials will be loaded directly onto the removal trucks.

All trucks carting asbestos contaminated soils should be lined with 200µm heavy-gauge polythene. All trucks with asbestos contaminated soils (Area 2) will have their contents wrapped.

All trucks will be fitted with close fitting tarpaulins and have sealed tailgates. All trucks will be inspected prior to leaving the loading area, to ensure that no loose contaminated materials leave the site. During loading wheel covers will be used where possible and any loose materials will be collected for later disposal.

In addition, due to the low-level contamination identified in the areas of Management Areas 1-5, these site soils are not suitable for classification as cleanfill and any topsoil removed from these areas of the site will require disposed at a suitably licensed managed fill facility.

All materials leaving the site will be disposed of to a suitably licensed disposal facility and will be tracked by way of weighbridge dockets which include the disposal location and the weight of the load.

22.6 Validation Sampling

Following the excavation of the asbestos contaminated soils (Area 2) and the visual evidence of asbestos observed (Areas 2 & 4) a clearance certificate will be produced by a suitably licensed asbestos assessor or a competent person. Following receipt of the clearance certificate for Area 2, the base and side walls of the excavated area will be sampled by a suitably qualified and experienced practitioner and the soils analysed by an accredited laboratory to determine if the remediation works have been successful.

In addition, following the excavation of the heavy metal contaminated materials, the soils from the base and walls of the excavated areas will be sampled and the soils analysed by an accredited laboratory to determine if the remediation works have been successful. The results of all validation sampling and clearance certificates will be included in the site validation report.

Site validation sampling will be completed at a frequency sufficient to meet the requirements of the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021) by a suitably qualified and experienced contaminated land professional.

The clearance certificate/s and the results of all validation sampling will be included in the site validation report.

22.7 Clean Fill Validation (if required)

Any materials imported onto the site if required to reinstate the ground will have to be tested to ensure their suitability as clean fill materials. Any soil material imported to the site shall comply with the definition of 'cleanfill material', as per the Auckland Unitary Plan: Operative in Part.

All imported materials shall be sourced from a site which has been determined by a Suitably Qualified Contaminated Land Professional to have had no known history of potentially contaminating activities, as detailed on the Ministry for the Environment's Hazardous Activities and Industries List (HAIL); or adequately investigated by a

Suitably Qualified Contaminated Land Professional, in accordance with Contaminated Land Management Guidelines (Ministry for the Environment, 2011) to meet the 'Cleanfill material' definition as prescribed in the AUP: OP.

23.0 Assessment of Environmental Effects

The following sections deal with the potential adverse effects which could have a negative impact on the environment and or human health as a result of the remediation project. If the controls outlined in this RAP are implemented during the development works the effects on the environment are likely to be effectively mitigated.

The required site management controls are detailed below and include, but should not be limited to, the following: dust control, health and safety measures, stormwater, erosion and sediment control, odour control and contingency measures.

23.1 Dust Control

During the disturbance process, the area of asbestos contamination (Area 2) should be adequately wet. Soil should have water applied at the point of contact. The excavator or other excavation equipment should handle the material wet.

A continuous water supply should be available at all times. The water source and/or misting system should be capable of applying water or a water mist directly to the materials to minimize dust and prevent fibre emissions. This misting system must be capable of reaching all areas of the remediation area during the ground-breaking works.

For areas of chemical contamination, if conditions are dry during the remedial works dust deposition could occur. Dust will be controlled in accordance with the Good Practice Guidelines for Assessing and Managing the Environmental Effects of Dust Emissions, Ministry for the Environment (2016). In order to mitigate against the effects of dust regular damping down of soil with a misting system will be required.

23.2 Health and Safety Measures

The level of asbestos specific PPE and RPE shall be determined by the asbestos removalist, however, in order to minimise the potential effects or the likelihood of cumulative effects, all personnel likely to come into contact with asbestos contaminated soils and asbestos containing materials (Areas 2 & 4) shall be provided with and wear the following PPE at all times when working in the asbestos contaminated areas of the site:

- Disposable coveralls (Type 5);
- Half-face P3 respirator with particulate filter;
- Steel toe capped gumboots or safety footwear with disposable overshoes;
- Nitrile gloves (if handling any contaminated soils is required);
- Hard Hat (if working around plant and excavators);
- Hearing protection (if required);
- Safety Glasses (to be worn in particularly dry weather conditions); and
- Safety Visibility Vest

All meal breaks are to be taken in designated clean areas following appropriate decontamination.

For the areas of chemical contamination, the level of soil contamination is unlikely to present a short-term risk to site workers. However, in order to minimise the potential effects or the likelihood of cumulative effects, all personnel likely to come into contact with contaminated soils during development works shall be provided with and wear the following PPE at all times when working on the site:

- Tyvek overalls (to be changed immediately if these become highly soiled);
- Dust masks (to be worn in particularly dry weather conditions);
- Approved safety footwear (rubber boots, work boots with toe protection);
- Gloves (if handling any contaminated soils is required);
- Hard Hat (if working around plant and excavators);
- Hearing protection (if required);
- Safety Glasses (to be worn in particularly dry weather conditions); and
- Safety Visibility Vest

All meal breaks are to be taken in designated clean areas or off site, with all personnel washing their hands and mouth area prior to eating, drinking or smoking. Used PPE is to be doffed by all personnel before leaving the site.

23.3 Stormwater, Erosion & Sediment Control

When carrying out any earthworks where soils are disturbed there is a risk of erosion and pollution by sediment being emitted to the receiving water courses. This type of pollution can have a negative effect on the water quality and the ecosystems effecting both plant and fish life.

Install sediment and erosion controls for the development works in accordance with the Auckland Council's Erosion and Sediment Control Guide for Land Disturbing Activities [4].

Earthworks are not to be carried out during periods of significant rainfall. Excavation will be carried out a rate that matches the rate at which soil can be carted off the site. Any contaminated water generated by rainfall impacting on contaminated soils will be retained within the excavation.

It is not anticipated that stockpiling of soils will be required. If required, soil stockpiles will be covered by tarpaulins if left overnight, and when rain is anticipated during the working day. Tarpaulins will be anchored at the edges. As a general management strategy, the size of stockpiles will be kept to a minimum by ensuring that as far as possible, excavation is carried out a rate that matches the rate at which soil is carted off the site.

[4] Auckland Council, Erosion & Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Guideline Document 2016/005.

23.4 Odour Control

It is considered unlikely that nuisance odour will be an issue on site. However, in the event that there may be odorous materials encountered, where possible these will be loaded as soon as possible onto the removal trucks. If this is not possible the odorous material will be covered with non-odorous material prior to being loaded.

23.5 Contingency Measures

The following contingency measures have been developed to support the contractor should the underlying contamination conditions vary significantly from the conditions outlined following the site investigation.

If any unexpected materials are identified during the excavation process, which differ from previous observations, and the site soil assessment (i.e., odorous, unusually coloured), the contractor shall immediately contact the environmental specialist to inspect the material and provide advice for the safe handling and disposal of the material.

Visual and olfactory indicators of contamination include the following:

- Asbestos containing materials (ACM) (board, pipe, free fibres or fragments)
- Demolition debris (polystyrene, steel and timber)
- Refuse materials (other than concrete or brick)
- Odour (petroleum, oil, creosote, solvent, sulphur, landfill gas)
- Discoloured soil (black/green staining is most common)
- Incinerator ash (black coarse sand)
- Gasworks wastes (clinker – black gravel, blue billy, black tar)
- Harmful non Cleanfill materials

If any potential ACM or unexpected materials are identified during site works, the area shall immediately be fenced off (barrier tape) with a 2.0m buffer zone, photographs taken and the Contaminated Land Specialist contacted. The Contaminated Land Specialist will then inspect the material and provide advice for the sampling and analysis, safe handling and disposal of the material.

Following the discovery of any unexpected materials, an environmental investigation is to be carried out in general accordance with the Contaminated Land Management Guidelines No. 1 and No. 5 (MfE, Revised 2021).

In the event that soils are found to contain concentrations of contaminants elevated above the relevant site acceptance criteria, the site soils will require remediation and subsequent validation.

All contaminated materials removed from site will require disposal at a suitably licensed disposal facility and site validation sampling is to be completed at a frequency sufficient to meet the requirements of the Contaminated Land Management Guidelines No.5 (MfE, Revised 2021).

In the event that ACMs are identified at the site, its removal from the site shall be conducted in accordance with the Health and Safety at Work (Asbestos) Regulations (MBIE, 2016) and the Approved Code of Practice for the Management and Removal of Asbestos (WorkSafe New Zealand, 2016).

Following the removal of any ACM, a certificate of clearance is to be produced by a suitably licensed asbestos assessor.

If ground water or surface water collects within the excavation during the works, this water shall be allowed to soak into the ground. Any perched groundwater, groundwater, or surface run-off encountered within the excavation area requiring removal shall be considered as potentially contaminated, and shall either be disposed of by a licensed liquid waste contractor, pumped to sewer, provided relevant permits have been obtained, or discharged to the stormwater system or surface waters provided testing demonstrates compliance with the Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines for Fresh and Marine Water Quality (2000) for the protection of 95 percent of species.

In the event that unexpected materials are encountered at the site, Auckland Council are to be notified of the nature and extent of the contamination along and provided with details of the management procedures undertaken at the site.

23.6 Equipment Decontamination & Clearance

Following remediation of the asbestos contaminated soils (Area 2), remove visible debris and soil from all plant, paying attention to the tracks and bucket of excavators.

Prior to plant being removed from the site, a visual assessment for the presence of asbestos, visible debris and soil shall be carried out by an independent assessor or competent person.

Cleaning procedures should be conducted in such a manner as to ensure that all residual soil and contaminants are safely removed and disposed of.

23.7 Site Validation Report

Following the proposed works, it is recommended that a site validation report is prepared. The site validation report should contain sufficient detail to address the following matters:

- A summary of the works undertaken including volume of soil removed from site;
- A summary of the validation testing undertaken, including tabulated analytical results;
- Copies of the disposal dockets for the material removed from the site;
- A copy of the clearance certificate/s for the asbestos contaminated soils and visual evidence of asbestos removed from site;
- Records of any unexpected contamination encountered during the works, if applicable; and
- A summary of any additional soil sampling undertaken, tabulated analytical results, and interpretation of the results in the context of the current contaminated land regulatory requirements.

24.0 Conclusions and Recommendations

This DSI, RAP & AEE has been prepared in accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

It is proposed that the site will be subdivided into residential lots. As part of the redevelopment, the site will undergo a change of land use, subdivision and disturbance of soils, therefore the rules of the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health apply. The guideline values of the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use (10% produce consumption) as outlined in the NES are considered relevant. Additionally, in order to accurately perform a risk assessment and to assess whether any discharges from contaminated land will result in significant adverse effects on the environment, the contaminated land rules as outlined in Chapter E30 of the Auckland Unitary Plan: Operative in Part (AUP: OP) also require consideration.

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a search of the Auckland Council property file, a contaminated sites enquiry to Auckland Council and a review of the historical certificate of tile.

During the review of the available information, it was noted that due to the age of the current and former site buildings there was potential for ground contamination from the historic use of lead-based paints and potentially asbestos containing building materials. In addition, historical horticulture land use was noted on neighbouring properties, therefore contamination associated with spray-drift may have occurred at the site.

The site was visited and a site inspection and walk over was carried out by Focus Environmental Services Limited personnel on 15th of August 2022. During the site inspection, potential spray race operations, two areas of refuse burning and three areas of potential asbestos containing materials in a degraded condition were noted.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the site inspection and walkover, the intrusive investigation was carried out by Focus Environmental Services Limited personnel where a total of twenty-one discrete surface soil samples were taken from the potential sources of contamination identified. In addition, twelve samples were taken from the areas of horticultural activity and composited at the laboratory to form three composite samples (4:1). Furthermore, three bulk asbestos samples were collected from areas of potentially asbestos containing materials observed in a degraded condition.

The samples were analysed for contaminants that could be present due to the potentially hazardous activities carried out at the site. The results of the site investigation have indicated that the activities carried out at the site have impacted the site soils.

Elevated concentrations of arsenic, cadmium, lead and zinc were detected in the site soils in the locations of the two burn piles. In addition, elevated concentrations of arsenic were detected in the spray race/stock loading area (2). Elevated concentrations of lead were detected in the areas around the stables (2), HB05 and the dwelling (1). Furthermore, elevated concentrations of asbestos fibres and visual evidence of asbestos were identified in the area of the outdoor toilet, and visual evidence of asbestos was observed in contact with the soils on the northern side of the stables (2).

Concentrations of arsenic, cadmium, lead and zinc were detected in the site soils in two locations at levels elevated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and/or the discharge criteria as outlined in the AUP: OP.

Concentrations of arsenic were detected in another location at levels elevated above the $SCSs_{(health)}$ for residential land use as outlined in the NES.

In addition, concentrations of lead were detected in the site soils in two areas at levels elevated above the $SCSs_{(health)}$ for residential land use (10% produce consumption) as outlined in the NES and/or the discharge criteria as outlined in the AUP: OP.

Furthermore, visual evidence of asbestos containing material was observed in contact with the site soils in two locations, and concentrations of asbestos fibres was detected in one of these areas at levels above the adopted human health criteria.

Due to the elevated levels of arsenic, cadmium, lead, zinc and asbestos fibres detected, the site at 279 Airfield Road, Ardmore will require remediation of the affected soils prior to being redeveloped. The estimated volume of soil requiring remediation is 58.4m^3. It should be noted that this volume may change during the remedial process.

A restricted discretionary consent is required under Regulation 10 of the NES as the proposed subdivision, change of use and disturbance of soils do not meet the requirements of a permitted activity under Regulation 8 of the NES, and as this detailed site investigation for the piece of land has shown that the soil contamination does exceed the applicable standard for residential land use.

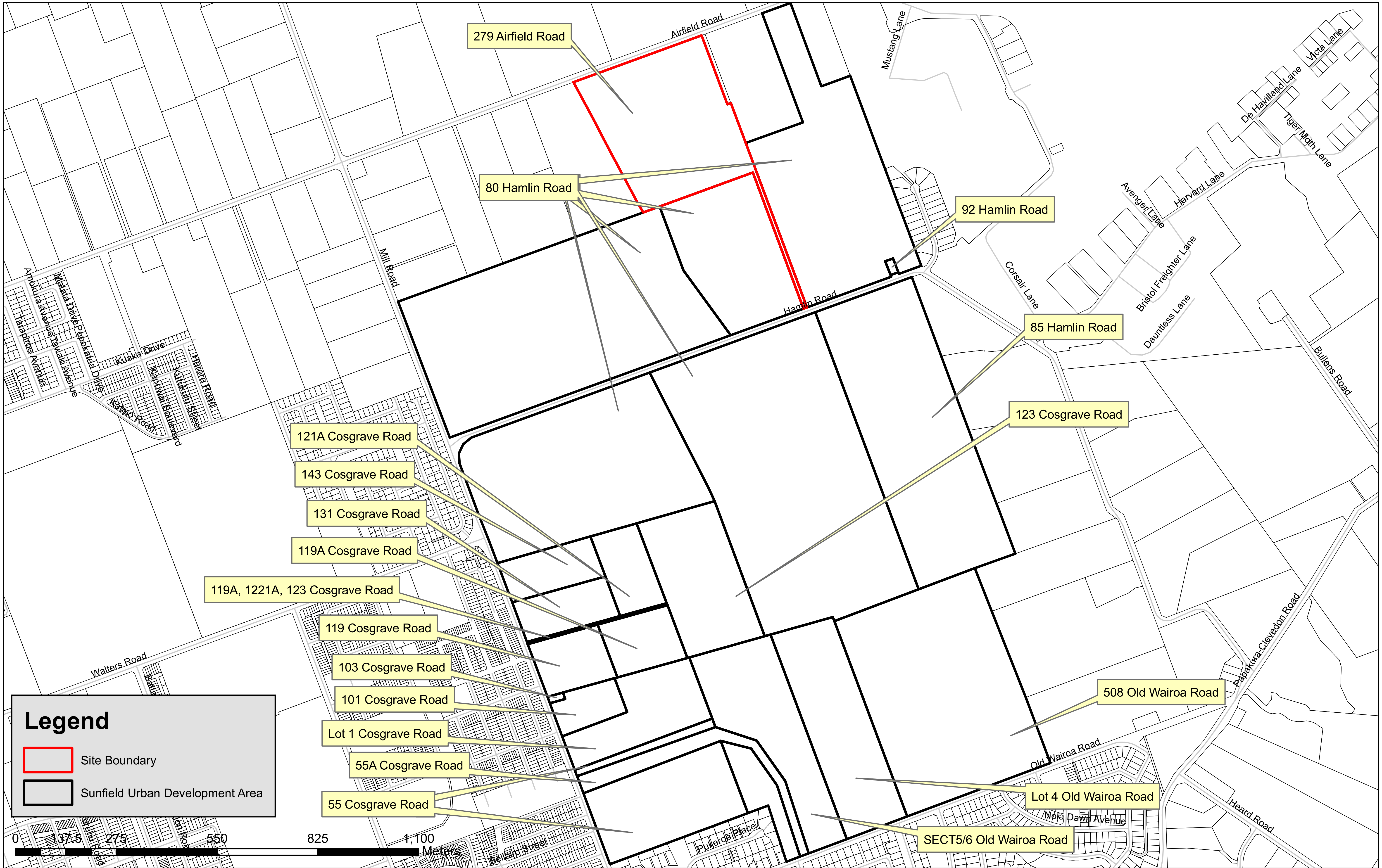
Due to the estimated volume of material containing concentrations of contaminants elevated above those values specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP being 35.94m^3, which is below 200 m^3, it is considered that the proposed remediation will likely meet the permitted activity requirements under rule E30.6.1.2 of the AUP: OP and therefore resource consent under the AUP: OP may not be required.

In addition, due to low-level concentrations of lead and residual concentrations of organochlorine pesticides detected above natural background concentrations in localised areas of the site, the soils in these areas will require management during development works, and if removed from site, will require disposal to a suitably licensed managed fill facility.

The objective of this Remediation Action Plan is to ensure that the soils contaminated above the adopted site assessment criteria and the materials contaminated above natural background concentrations in the management areas of the site, are handled, removed, or managed in a controlled manner, and disposed of to a suitable disposal location. All earthworks required as part of the remedial works should be carried out in accordance with this Remediation Action Plan.

An assessment of the effects which may occur as a result of the proposed works has been made in order to mitigate any potential adverse environmental and/or human health effects. If the controls outlined in this Remediation Action Plan are implemented during the development works it is considered that the effects on the environment and human health are likely to be effectively mitigated.

Figures



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Winton Land Limited
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Papakura
Auckland

Figure 1: Site Location Plan

DSI, RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.01	
Drawn By: MT	
Checked By: DO'R	
Date: 20/12/2023	

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Figure 2: Site Features Overview & Historical Building Plan

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.02
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Site Feature	Description
1	Site Entrance via Gravel Driveway
2	Excavated Pit with Concrete & Minor PACM Fragments
3	Corrugated Painted Metal Hay Shed (1)
4	Carport & Shed 2 - Painted Corrugated Metal Storage of Hay & Farm Equipment
5	Livestock Loading Area - Concrete Lined
6	Shed 3 - Livestock Shed - Unpainted Cinderblock, Concrete Lined.
7	Toilet - Unpainted Plywood & PACM Cladding with Minor Damage
8	Livestock Loading Area
9	Burning of Refuse

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Figure 2-1: Site Features Plan

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.02-1
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Site Feature	Description
10	Stables (1) - Unpainted Corrugated Metal, Concrete Lined
11	Stables (2) - Painted PACM & Metal Cladding
12	Horse Arena
13	Garage (1) - Painted Corrugated Metal, Concrete Lined
14	Dwelling (1) - Raised Single Storey, PACM Baseboards & Soffits, Wooden Cladding
15	Shipping Container
16	Burn Barrell
17	Garage (2) - Painted Metal Cladding
18	Dwelling (2) - Raised Single Storey, PACM baseboards, Painted Metal Cladding
19	Septic Tank Vent

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Figure 2-2: Site Features Plan

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.02-2
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

FOCUS ENVIRONMENTAL SERVICES LTD	Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** 279 Airfield Road Sunfield Urban Development Area Papakura Auckland	**Figure 3: Surrounding Environment** DSI RAP & AEE	N 1686.001 (R1)	Drawing Number: 1686.001.03 Drawn By: MT Checked By: DO'R Date: 20/12/2023

Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** 279 Airfield Road Sunfield Urban Development Area Papakura Auckland	**Figure 4: Sample Location Plan Overview** DSI RAP & AEE	N	Drawing Number: 1686.001.04 Drawn By: MT Checked By: DO'R Date: 20/12/2023
			1686.001 (R1)	

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Figure 4-1: Discrete Sample Location Plan

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1686.001 (R1)

Drawing Number: 1686.001.04-1
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

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Figure 4-2: Discrete Sample Location Plan

DSI RAP & AEE

	Drawing Number: 1686.001.04-2
	Drawn By: MT
1686.001 (R1)	Checked By: DO'R
	Date: 20/12/2023

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Figure 4-3: Composite Sample Location Plan

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.04-3
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Area 1	19	0.3	As, Cd, Pb, Zn	5.7
Area 2	8.4	0.3	Asbestos	2.52
Area 3	11.5	0.3	As	3.45
Total Volume				11.67
Total Tonnes (m^3 x 1.5)				**17.5 t**

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Figure 5: Inferred Area and Depth of Contamination

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.05
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Area 4	10.8	-	Visual ACM	-
Area 5	54.9	0.3	Pb	16.47
Area 6	3.1	0.3	As, Cd, Pb, Zn	0.93
Area 7	97.7	0.3	Pb	29.31
Total Volume				46.71
Total Tonnes (m^3 x 1.5)				**70.1 t**

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Figure 5-1: Inferred Area and Depth of Contamination

DSI RAP & AEE

	Drawing Number: 1686.001.05-1
	Drawn By: MT
1686.001 (R1)	Checked By: DO'R
	Date: 20/12/2023

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Management Area 1	17.2	0.3	Pb	5.16
Management Area 2	5,284.2	0.3	OCP's	1585.26
Total Volume				1,590.42
Total Tonnes (m^3 x 1.5)				**2,385.6 t**

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Figure 6: Inferred Areas Requiring Management

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.06
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Location	Area (m^2)	Depth (m)	Contaminant	Quantity (m^3)
Management Area 3	20	0.3	Pb	6
Management Area 4	43.4	0.3	Pb	13.02
Management Area 5	52.15	0.3	Pb	15.645
Total Volume				34.67
Total Tonnes (m^3 x 1.5)				**52.0 t**

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Figure 6-1: Inferred Areas Requiring Management

DSI RAP & AEE

1686.001 (R1)

Drawing Number: 1686.001.06-1
Drawn By: MT
Checked By: DO'R
Date: 20/12/2023

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Site Contour Plan

Site Contour Plan

0 20 40 60
Meters

Scale @ A3
= 1:2,500

Date Printed:
2/08/2022

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Appendix C – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

Appendix D – Historical Aerial Photographs