

BEFORE THE INDEPENDENT HEARINGS PANEL

UNDER

the Resource Management Act 1991

AND

IN THE MATTER OF

the submissions of B & A Stokes on
the Waimakariri Proposed District
Plan (#214) and Variation 1 (#29)

**PRIMARY EVIDENCE OF DAVID
JOHN ROBOTHAM
ON BEHALF OF B AND A STOKES
(Contamination)**

4 March 2024

GREENWOOD ROCHE
LAWYERS
CHRISTCHURCH
Solicitor: R Murdoch
(rmurdoch@greenwoodroche.com)

Kettlewell House
Level 3, 680 Colombo Street
P O Box 139
Christchurch
Phone: 03 353 0574

1 EXECUTIVE SUMMARY

- 1.1 ENGEО Limited (**ENGEО**) undertook a Preliminary Site Investigation (**PSI**) of the site at 81 Gressons and 1375 Main North Road, Woodend, Waikuku (the **Site**) in November 2021 (**Appendix 1**). The purpose of the PSI was to inform an assessment of the Site's suitability to be rezoned from a mixture of Large Lot Residential Zone (**LLRZ**), Rural Lifestyle Zone (**RLZ**) and Large Lot Residential Zone Overlay (**LLRZO**) (as notified) to General Residential / Medium Density Residential Zoning (**the Proposal**). Development of the Site in accordance with that zoning would occur in accordance with an Outline Development Plan attached to Mr Clease's evidence.
- 1.2 Historically and currently, the Site has been used for agricultural purposes alongside some existing dwellings.
- 1.3 Based on the information reviewed and our Site walkover observations, it is highly unlikely that the majority of the Site has been used for an activity included on the Hazardous Activities and Industries List (HAIL – Ministry for the Environment Hazardous Activities and Industries List 2012) (**HAIL**). Therefore the majority of the Site is considered suitable for residential development and/or continued used for agriculture.
- 1.4 However, a number of activities and potential activities included on the HAIL were identified during the Site inspection along the eastern, north-western and southern boundaries.
- 1.5 These areas have the potential to have caused localised contamination and further investigation of that potential contamination will therefore be required prior to soil disturbance activities. This can be managed via the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (**NES-CS**) and should not preclude the Proposal.

2 QUALIFICATIONS AND EXPERTISE

- 2.1 My name is David Robotham. I am a Principal Environmental Consultant at ENGEО, a firm which provides specialist geotechnical, environmental, water resources engineering and construction services. I have been with ENGEО since 2012.

- 2.2 I hold a Bachelor of Science in Environmental Control from the University of Greenwich, London, UK. I am a Certified Environmental Practitioner (**CEnvP**) #516 with Site Contamination Specialist #CL40021, certified by the Environmental Institute of Australia and New Zealand. I also have international qualifications with the British Occupation Hygiene Society for the Assessment of Asbestos in Buildings (IP402) and Management of Asbestos in Buildings (IP405) and I am a Worksafe approved Asbestos Assessor (AA22050015).
- 2.3 I have over 29 years' experience in environmental sciences and consultancy including experience in contaminated land for both residential and commercial developments.
- 2.4 I have particular expertise with environmental soil assessments and characterisation, remedial options, site management, consenting and environmental due diligence. Relevant projects that I have project managed or provided technical reviews on include:
- (a) Multiple site soil and building assessments for Government organisations including the Ministry of Education, Land Information New Zealand, New Zealand Defence Force, New Zealand Fire and Emergency, New Zealand Police, Christchurch City Council, Environment Canterbury (**ECan**) and Heritage New Zealand.
 - (b) Management and remediation of asbestos in buildings and in soils for numerous buildings for Southern Response throughout the Christchurch City area.
 - (c) Assessment and management of chemical and asbestos impacted soils for the new retail development on Langdons Road, Christchurch.
 - (d) Management of other residential subdivision projects both north and south of Christchurch that assessed large areas previously used for agricultural purposes. One such example is Ravenswood.
- 2.5 I was asked to provide a land contamination assessment in respect of the Proposal.
- 2.6 Together with my colleagues at ENGEO, I completed a PSI in November 2021 to identify potential land contamination hazards associated with

the current and former uses of the Site for the purposes of informing an assessment as to the suitability of the Site for its proposed rezoning to General Residential / Medium Density Residential.

3 CODE OF CONDUCT

- 3.1 While this is not an Environment Court proceeding, I confirm that I have read the Code of Conduct for Expert Witnesses set out in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and will continue to comply with it while giving oral evidence. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

4 SCOPE OF EVIDENCE

- 4.1 This evidence addresses:
- (a) the Site and the existing environment;
 - (b) previous environmental/contamination investigations; and
 - (c) the findings of the PSI we have undertaken in respect of the Site.
- 4.2 In preparing this evidence, I have reviewed:
- (a) Ground Contamination Assessment 81 Gressons Road and 1375 Main North Road, Waikuku (Eliot Sinclair 350494 27/11/20); and
 - (b) Preliminary Environmental Site Investigation Gressons and Main North Road, Woodend, Waikuku (ENGE0 19640 23/11/21).

5 THE SITE AND SURROUNDS

- 5.1 The Site is approximately 144ha and is located between Ravenswood to the south and Waikuku to the north. The current primary activity on the Site is agricultural in nature. As described further below, our investigations identified the following localised features of the Site which are relevant to our assessment: burn pads, disused onsite wells, farming activities, storage of agrichemicals, fuel storage, outdoor storage of treated wood, use of potential asbestos containing materials and use of

the area as transport depot. The surrounding area is generally agricultural to the north, east and west and residential/commercial to the south.

6 2020 ELIOT SINCLAIR ENVIRONMENTAL INVESTIGATION

- 6.1 Eliot Sinclair (**ES**) undertook a ground contamination assessment for the northern portion of the Site in November 2020 (**ES Assessment**). That ES Assessment is included as **Appendix 2** to my evidence.
- 6.2 The scope of the ES Assessment comprised:
- (a) A Site walkover and interview with the Site owner in September 2013 and November 2020.
 - (b) Investigation of high-resolution aerial photographs from 1942, 1963, 1976, 1980, 1984 and 2000 and satellite images from 2005 and 2013 to 2019.
 - (c) A search of Waimakariri District Council's property file.
 - (d) A search of ECan's Listed Land Use Register (**LLUR**) and Resource Consent Database.

Environment Canterbury Listed Land Use Register

- 6.3 The ES Assessment notes that neither the Site nor any of the surrounding land is recorded on the ECan LLUR. As noted below, we have since reviewed the LLUR and can confirm that that remains the case.

Environment Canterbury resource consent database

- 6.4 ECan's resource consent database identified two resource consents granted in respect of the Site, being the historical installation of a well and a surface water take. ES reported that the well ceased operation a long time ago and that the consent for the surface water take expired in 1997.
- 6.5 No discharge consents or consents for above or below ground storage of hazardous substances are recorded for the Site.

Waimakariri District Council records (property file)

- 6.6 The property file was reviewed by ES in September 2013. Discussions with the landowner confirm no further consent applications have been made for the Site since the 2013 review but this was not rechecked by ES in the 2020 report.
- 6.7 The property files did not raise any concerns about contamination of the Site.

Site inspection and landowner interview

- 6.8 The ES Assessment details its inspection of the Site on 26 September 2013 and on 10 November 2020. An interview with the existing owners (Mr & Mrs Stokes) was undertaken during the 2013 Site visit where it was indicated that the Site was used to graze dairy cattle. Sampling of the milk indicated there was no Organochlorine Pesticides (**OCPs**) identified. It was also reported that there were no excavations or contaminating activities undertaken on the Site since they had owned it. Visual assessment identified a shed containing a well and a hay shed with no other structures.
- 6.9 Mr. Stokes was also interviewed in 2020 and it was reported that irrigation lines had been installed in 2015. Stockpiled wood and vegetation was observed on the Site as well as a number of burn pads.
- 6.10 Other than the small burn pads, the Site inspection and landowner interview did not raise other concerns about persistent ground contamination of the Site. The ES Assessment recommends that the burn pads should be removed or remediated before subdivision of the Site occurs. ES considered it highly unlikely that across the majority of the Site ground contamination from past or current activities will exceed the NES-CS soil contaminant standards for a proposed rural residential end use. ENGEO agree with the recommendation and consider that it is unlikely this should prevent the rezoning of the Site to General Residential/Medium Density Residential.

Historical aerial photographs and satellite images

- 6.11 The historical aerial photo from 1963 confirms that no buildings or structures were established on the Site apart from the well shed near

Gressons Road and the hay storage shed at Wards Road along the southern boundary. No excavation or fill or other land use is visible that raises concerns about persistent ground contamination.

Arsenic in groundwater

- 6.12 The property file held by the Waimakariri District Council reviewed by ES identifies that elevated arsenic levels can be present in the groundwater of coastal and near coastal areas of the Canterbury Plains.
- 6.13 Groundwater containing naturally occurring concentrations of arsenic above the threshold within the Drinking-Water Standards for New Zealand (1996) (**NZ Drinking Water Standards**) should not be used for potable water.

Conclusions

- 6.14 The ES Assessment concludes that, on the balance of probabilities, it is unlikely that HAIL activities have taken place, or are taking place on the Site. It accepts that there are two burn pads that contain concentrations of Arsenic, with results that exceed the NES-CS threshold for residential land. The ES Assessment concludes that these areas are small and should be removed or remediated before subdivision. It is also unlikely that the small burn pad impacted areas would have an influence on the groundwater conditions and, additionally, that the elevated concentrations in groundwater are likely naturally occurring concentrations.
- 6.15 On this basis, it is considered highly unlikely that ground contamination from past or current activities across the majority of the Site will exceed the NES-CS standards for the Proposal.

7 ENGEO PRELIMINARY ENVIRONMENTAL SITE INVESTIGATION NOVEMBER 2021

- 7.1 Given the ES Assessment did not cover the entire Site, ENGEO was commissioned to undertake a PSI on the remainder of the Site and determine if the findings of the ES Assessment had changed. The scope of the ENGEO PSI comprised:

(a) a review and assessment of relevant reports on file for the Site;

- (b) a review of historical and current aerial photographs;
- (c) a review of ECan's LLUR statement and Waimakariri District Council's property files to determine if significant contaminating activities have occurred on Site;
- (d) a site walkover to view current activities, structures and ground conditions;
- (e) a review of publicly available information on the geology and hydrology of the Site, including sensitive water bodies;
- (f) developing a conceptual site model for the Site to assess potential exposure pathways of hazardous activities to Site users; and
- (g) providing recommendation for further detailed site investigation (**DSI**) if required.

Site history

- 7.2 No HAIL sites of interest were identified in respect of the Site on the LLUR.
- 7.3 ECan undertook groundwater testing from five wells across the Site from 19 December 2020. Arsenic was detected in four out of five wells at concentrations that exceeded the NZ Drinking Water Standards and was therefore not considered suitable as a drinking water supply (for humans).
- 7.4 The results showed arsenic below the guideline values for livestock water and was therefore deemed suitable for livestock and irrigation consumption only.

Historical aerial photograph review

- 7.5 Aerial photographs dating from 1940 to present were reviewed. All photos portrayed historical pastoral and agricultural activities over time, with the addition of irrigation and residential dwellings throughout the 1990s. No other significant activities were identified.

Potential HAIL activities

7.6 During the Site walkover (12 November 2021) the following activities included on the HAIL were noted:

- (a) A1: Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application.
- (b) A6: Fertiliser manufacture or bulk storage.
- (c) A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.
- (d) A17: Storage tanks or drums for fuel, chemicals or liquid waste.
- (e) A18: Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside.
- (f) E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition.
- (g) F8: Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances.

Conceptual Site model

7.7 The following potential sources of contamination and contaminants of concern were noted in localised areas on the Site (indicated on figures 2.1, 2.2 and 2.3 from the ENGEO PSI attached as Appendix 1):

- (a) Treated timber out door storage, historical pesticide use, bulk storage of pesticides leading to potential heavy metals, OCPs and boron impacts.
- (b) Historic pesticide use, bulk storage of pesticides, leading to potential heavy metals and OCP impacts.
- (c) Farm equipment storage, vehicle depot, above ground fuel tanks, burn pits for waste, tyre storage, leading to potential heavy

metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons and asbestos impacts.

(d) Bulk fertiliser storage leading to potential nitrates and cadmium impacts in soil and groundwater.

7.8 These activities and contaminants have the potential to affect on-site redevelopment workers, the surrounding environment and long-term users of the Site through dermal contact with impacted soil, inhalation of dust/fibres and incidental ingestion during earthworks and long-term use of the Site.

7.9 Additionally, there were building materials in a degraded condition at various locations on the Site. These materials have the potential to release asbestos fibres, which pose a risk to on-site redevelopment workers and long-term users of the Site through inhalation of fibres.

Analysis

7.10 Further intrusive investigations of these potential contaminated areas/activities will be required to determine the nature and extent of any contamination and the risk it may pose to human health and to the environment. Those investigations will be required under the NES-CS prior to any soil disturbance, change in land use or subdivision taking place. In my opinion, the provisions of the NES-CS will ensure that any contamination found through these investigations can be appropriately addressed and remediated, if required.

8 CONCLUSION

8.1 The Site is not identified on the LLUR for accommodating any HAIL activities. From our Site inspection, we were able to confirm that it is highly unlikely that those activities would have occurred or are currently occurring on the majority of the Site. A number of discrete activities and potential activities included on the HAIL were identified during the Site inspection along the eastern, north-western and southern boundaries.

8.2 These areas have the potential to have caused localised contamination effects and an intrusive investigation (DSI) is therefore required to confirm the extent of any contamination and whether remediation is required. In our opinion, this can be appropriately managed through

the NES-CS, and therefore should not preclude rezoning of the Site to General Residential / Medium Density Residential.

David John Robotham

4 March 2024

Appendix 1

The background of the entire page is a photograph of two construction workers, a man and a woman, standing on a dirt path at a construction site. They are both wearing white hard hats and high-visibility orange safety vests over dark clothing. The man is on the left, looking towards the woman on the right, who is holding a tablet. Behind them is a large, steep, brown earthen embankment with some sparse vegetation. The sky is clear and blue. On the right side of the page, there is a vertical blue and white graphic element consisting of several parallel lines.

ENGEO

ENGEO Limited

124 Montreal Street, Sydenham
Christchurch 8023

PO Box 373, Christchurch 8140, New Zealand

T: +64 3 328 9012 F: +64 3 328 9013

www.engeo.co.nz

Project Number #19640.000.001

**Preliminary Environmental Site
Investigation**

Gressons and Main North Road, Woodend,
Waikuku

Submitted to:
Westside Country Limited
250 Oxford Terrace
Christchurch Central
Christchurch 8011

Contents

1	Introduction	1
1.1	Background	1
1.2	Objectives of the Assessment.....	2
1.3	Scope of Works.....	2
2	Environmental Setting.....	2
2.1	Site and Surrounding Land Uses	3
2.2	Groundwater Sensitivity	5
3	Site History.....	5
3.1	Listed Land Use Register (LLUR)	6
3.2	Waimakariri District Council Property Files.....	6
3.3	Previous Environmental Investigations	6
3.4	Historical Aerial Photographs Review	6
4	Current Site Conditions.....	10
4.1	Site Walkover	10
4.2	Site Walkover Photographs.....	14
5	Potential HAIL Activities.....	18
6	Conceptual Site Model.....	18
7	Conclusions	19
8	Sustainability	20
9	References.....	21
10	Limitations.....	22

Tables

Table 1:	Site Information
Table 2:	Site Setting
Table 3:	Groundwater Sensitivity
Table 4:	Historical Aerials Review
Table 5:	Current Site Conditions
Table 6:	Conceptual Site Model

Figures

Figure 1:	Site Location Plan
Figure 2:	Site Walkover Overview
Figure 2.1:	Areas of Concern North-Western
Figure 2.2:	Aras of Concern Eastern
Figure 2.3:	Areas of Concern Southern

Appendices

Appendix 1:	LLUR Enquiry
-------------	--------------

ENGEO Document Control:

Report Title	Preliminary Environmental Site Investigation - Gressons and Main North Road, Woodend			
Project No.	19640.000.000	Doc ID	01	
Client	Westside Country Limited	Client Contact	Brian Stokes	
Distribution (PDF)	Westside Country Limited			
Date	Revision Details / Status	Author	Reviewer	WP
23/11/2021	Issued to Client	HE	DR	DF

1 Introduction

ENGEО Ltd was commissioned by Westside Country Limited to conduct a preliminary environmental site investigation (PSI) of the property at Gressons and Main North Road, Woodend, Waikuku (herein referred to as ‘the site’). It is proposed to apply for a plan change from rural to residential for the area. This work has been carried out in accordance with our signed agreement reference P2021.005.919_01 dated 2 November 2021.

This PSI was completed to identify potential land contamination hazards associated with the former uses of the site and to satisfy the Waimakariri District Council (WDC) requirements under the *Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES)*.

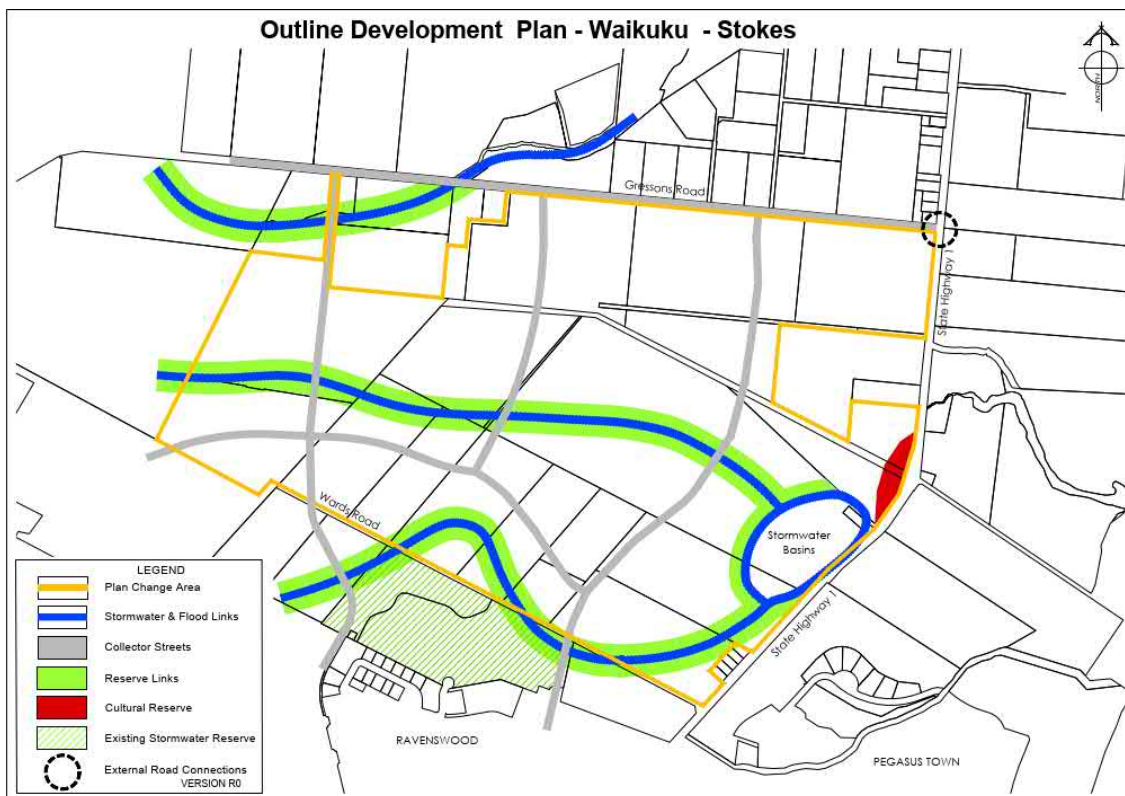
This PSI was undertaken in general accordance with the MfE 2021, *Guidelines for Site Investigation and Analysis of Soils* (CLMG No. 5) and reported in-line with the MfE 2021 *Guidelines for Reporting on Contaminated Sites in New Zealand* (CLMG No.1).

The fieldwork and reporting has been managed and reviewed by a Suitably Qualified and Experienced Practitioner (SQEP), as required by the NES.

1.1 Background

It is understood that a change of zoning for the land to the north of Ravenswood up to Gressons Road from rural to residential is to be applied for. Information is therefore required on the environmental conditions of the area. The current development plan is shown in Exhibit A.

Exhibit A - Development Plan



1.2 Objectives of the Assessment

To satisfy requirements of the Waimakariri District Council (WDC), this PSI aimed to:

- Evaluate and identify conditions indicative of releases and threatened releases of hazardous substances on, at, in or to the 'piece of land';
- Evaluate the presence and extent of identified contaminants of potential concern at the site; and
- Assess whether the contaminants of potential concern (if any) pose an unacceptable risk to human health or the environment for the proposed end land use.

1.3 Scope of Works

To fulfil the above objectives, the following scope of works was undertaken by ENGEO:

- Review and assess relevant reports on file for the site; including the properties adjoining or located near the subject property, certificates of title and previous investigations (if any);
- Review historical and current aerial photographs for information related to activities at the site;
- Review Environment Canterbury's (ECan) Listed Land Use Register (LLUR) Statement for the site and Waimakariri District Council's property files to determine significant potentially contaminating activities and relevant resource consents (if any);
- Conduct a site walkover to view current activities, structures and ground conditions;
- Review publicly available information on the geology and hydrogeology of the site, including sensitive water bodies;
- Develop a conceptual site model (CSM) to assess potential exposure pathways of hazardous activities (if identified) to site users during redevelopment; and
- Provide recommendations for further intrusive Detailed Site Investigation (DSI) (if required).

2 Environmental Setting

The site location is presented in Figure 1. The site identification, history, conditions and surrounding environment information are presented in Section 2.1 below:

Figure 1: Site Location Plan



2.1 Site and Surrounding Land Uses

Site information is summarised in Table 1.

Table 1 - Site Information

Item	Description
Location	Gresson and Main North Road, Woodend
Legal Descriptions	Lots 2-3 DP 62186, Lot 2 DP 303387, Lots 1-2 DP 428676, Lot 1 DP 455971, Lot 6 DP 923, Part RS 3101, 3093, 3129, 3141-3144, 3169, 3170, Section 1 16798, Part Lot 4 DP 923, Lot 1 DP 46765, Lot 1 DP 43146, Lot 8 DP 923, Part RS 3919, 4719, Lot 1 DP 470921, Lot 2 DP 46765, Lot 5 DP 923.
Records of Title	Mr & Mrs B J & A L Stokes
Current Land Use	Rural / Pastoral
Proposed Land Use	Residential Development

Item	Description
Parcel Area	Approximately 135 hectares across all parcels within the site boundary.
Recent Resource Consents	<ul style="list-style-type: none"> • CRC090885: To discharge contaminants onto land and to air (dairy shed) (Active, 15 July 2009 to 15 July 2044). Address: 1332 Main North Road, Waikuku • CRC084939: To discharge contaminants to land (domestic wastewater from single dwelling) (Active 29 August 2008 to 17 August 2043). Address: 1295 Main North Road, Waikuku • CRC091594: To store contaminants (dairy shed effluent) (Active 15 July 2009 to 15 July 2044). Address: 1332 Main North Road, Waikuku
Territorial Authority	Waimakariri District Council

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	Relatively flat with minor marshland features.
Local Setting	Rural and rural residential, with generally flat land leading to the surrounding hills to the west and reclaimed swampland to the east.
Nearest Surface Water & Use	Waikuku Stream to north approximately 100 meters and Stokes Drain catchment – used for irrigation purposes.
Geology	Flaxton <i>f</i> deep silt loam, poorly drained on Canterbury alluvium deposits and sandy gravels.
Hydrogeology	Ground water zones related to site area: Ashley Estuary (Te Aka Aka) and Coastal Protection Zone, and Cust. Groundwater flow is expected to be in a general easterly direction but may be locally influenced.
Groundwater Abstractions	<ul style="list-style-type: none"> • CRC143176: To take and use surface water (for irrigation at Stokes Drain) (Active 20 February 2014 to 24 September 2032). Address: Main North Road, Waikuku • CRC143175: To take groundwater (for irrigation) (Active 20 February 2014 to 11 November 2033). Address: Main North Road, Waikuku

2.2 Groundwater Sensitivity

As assessment to establish whether the groundwater below the site is a ‘sensitive aquifer’ as defined by the Ministry for the Environment (MfE) Guidelines (2011) has been undertaken. It is noted that the aquifer is considered sensitive when either all of the first three criteria set out below are met, or the fourth criterion is met in accordance with the Module 5.2.3 of the MfE Guidelines.

The assessment is provided in Table 3 below.

Table 3: Groundwater Sensitivity

Criteria	Assessment
1. The aquifer is not artesian or confined;	Yes. The coastal confined gravel aquifer system predominantly sits along the south-east of the site, whereas the northwest is primarily characterised by an unconfined or semiconfined aquifer.
2. The aquifer is expected to be less than 10 m below the potential suspected source of impact;	Yes. Groundwater has been recorded up to 2 meters below ground surface (m bgs).
3. The aquifer is of quality appropriate for use, can yield water at a useful rate, and is an area where abstraction and use of groundwater may be reasonably foreseen; OR	Yes. Several ground water and surface water abstractions are on-going for this site.
4. The source is less than 100 m of a sensitive surface water body (i.e. a surface water body where limited dilution is available to mitigate the impact of contaminated groundwater discharging into the surface water body).	Yes. Several small streams feed the area from the Ashley River to the North.
Sensitivity Assessment	Yes. The groundwater for the site is considered to be SENSITIVE.

Groundwater for the site is considered to be sensitive in relation to the MfE sensitive aquifer assessment.

3 Site History

A number of sources were used to investigate the past uses of the site. The findings of these information searches have been summarised in this section.

3.1 Listed Land Use Register (LLUR)

Potentially hazardous activities are defined on the Hazardous Activities and Industries List (HAIL). Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury region which have potentially had an activity included on the HAIL undertaken on them. The CRC LLUR property statement was requested by ENGEO on 15 November 2021 for the site and is presented in Appendix 1. According to the LLUR, no sites of interest were identified.

3.2 Waimakariri District Council Property Files

Property files were requested from the Waimakariri District Council on 18 November 2021. Most of the files associated within the site boundaries include consent application documents, building consents (for dairy sheds, milk rooms, etc.) inspection reports for buildings, approvals granted by Christchurch City Council, resource consents for effluent discharge associated with dairy farming (currently active: CRC091594) and a report from a groundwater testing programme undertaken by Environment Canterbury from 19 December 2000 for five wells across the site.

ECan's testing results for four out of five wells showed that arsenic was detected in the groundwater samples for wells M35/8110, M35/1160, M35/4227, and M35/8759 that exceeded the Drinking-Water Standards for New Zealand (1996) and was therefore not considered suitable as a drinking water supply (for humans). However, the guideline value for arsenic in livestock water was 0.5 mg/L at the time of testing and was therefore not an issue as water use on the property was for livestock and irrigation only.

3.3 Previous Environmental Investigations




In November 2020, Elliott Sinclair undertook a ground contamination assessment for the site at 81 Gressons and 1375 Main North Road in Waikuku for a land-use change of rural to residential. Their investigation concluded that the site was "highly unlikely" to contain ground contamination that exceeds NES soil contaminant standards for residential land use. Apart from 3 burn pads recommended to be removed after site-walkover observations and portable XRF testing, no historical or current HAIL activities were identified.





3.4 Historical Aerial Photographs Review

Aerial photographs dating from 1940 to 2019 have been reviewed. Historical use of the land includes cattle raising, sheep grazing and barley cropping. The relevant visible features are summarised in Table 4, with a red box indicating the location of the site.

Table 4 - Historical Aerials Review

Date	Source	Description	Photo
1940-1944	Canterbury Maps Waimakariri District Council	The site is bound by Main North road to the east, Wards road to the south and Gressons road to the north. Land parcels contain fields with livestock, potential hay bales and several small structures along the eastern boundary. A single family residence exists towards the south.	
1960-1964	Canterbury Maps Waimakariri District Council	Surrounding land has remained similar, but the addition of what appears to be an irrigation system / catchment along Main North Road has been widened. Fields and potential agricultural activity appear more predominant across the site.	
1965-1969	Canterbury Maps Waimakariri District Council	The land appears to remain largely unchanged from the previous photo. Resolution is poor.	
1970-1974	Canterbury Maps Waimakariri District Council	The land appears to remain largely unchanged, however, the addition of more structures are observed along the southeast corner boundary near the family residence. Diverted streams are more predominant for irrigation purposes.	

Date	Source	Description	Photo
1975-1979	Canterbury Maps Waimakariri District Council	The land appears to remain largely unchanged. Potential crop farming along the northwest boundary at the adjacent property has taken place.	
1980-1984	Canterbury Maps Waimakariri District Council	The land appears to remain largely unchanged within and outside the site boundary. Residences adjacent to the south are more predominant.	
1985-1989	Canterbury Maps Waimakariri District Council	Resolution is poor, but it looks like crops has been rotated through different parcels.	
1990-1994	Canterbury Maps Waimakariri District Council	Land appears to be largely unchanged from previous photos. The potential irrigation catchment has been slightly altered along the north-east boundary.	

Date	Source	Description	Photo
1995-1999	Canterbury Maps Waimakariri District Council	Additional buildings appear along the eastern boundary adjacent to Main North Road.	
2000-2004	Canterbury Maps Waimakariri District Council	Land appears to remain largely unchanged from previous photo. Irrigation streams are more predominant. What appear to be watering troughs are visible throughout the fields. Residential properties adjacent to the east of the site are more developed.	
2010-2014	Canterbury Maps Waimakariri District Council	Additional structures have been added along the eastern Main North Road boundary. As well as a residential dwelling. Surrounding land has become more developed with residential properties.	
2015-2019	Canterbury Maps Waimakariri District Council	Similar land-use as previous photo, with slightly more activity along the eastern Main North Road boundary.	

4 Current Site Conditions

4.1 Site Walkover

An ENEGO representative visited the site on Friday 12 November 2021 to undertake a site walkover.

Site walkover observations are presented in Figures 2, 2.1, 2.2 and 2.3.

Figure 2: Site Walkover Overview



The information gathered from the site walkover is summarised in Table 5.

Table 5 - Current Site Conditions

Current Site Conditions	Comments
Visible signs of significant land contamination at the subject site	Above ground fuel tanks, bulk chemical storage, treated timber, asbestos on buildings in a degraded condition on the milking shed along the eastern side of the site.
Surface water appearance	None observed.
Local sensitive environments	Irrigation streams throughout the site are considered sensitive environments.
Current surrounding land use	Rural residential
Visible signs of plant stress	None observed.
Potential for on or off-site migrations of contaminants (if any)	The potential for on or off-site migration of contaminants is considered to be possible, due to the proximity of the water irrigation channels.
Ground cover	Mostly vegetated with livestock grazing.
Buildings Present	Outbuildings, storage sheds, dairy sheds, chemical and fertiliser storage, residential dwellings.
Potential HAIL IDs	A1, A6, A10, A17, A18, E1, F8 indicated in the figures below

Potential areas of concern are highlighted by yellow, identified activities included on the HAIL are portrayed by red in the figures below:

Figure 2.1: Areas of Concern South-East

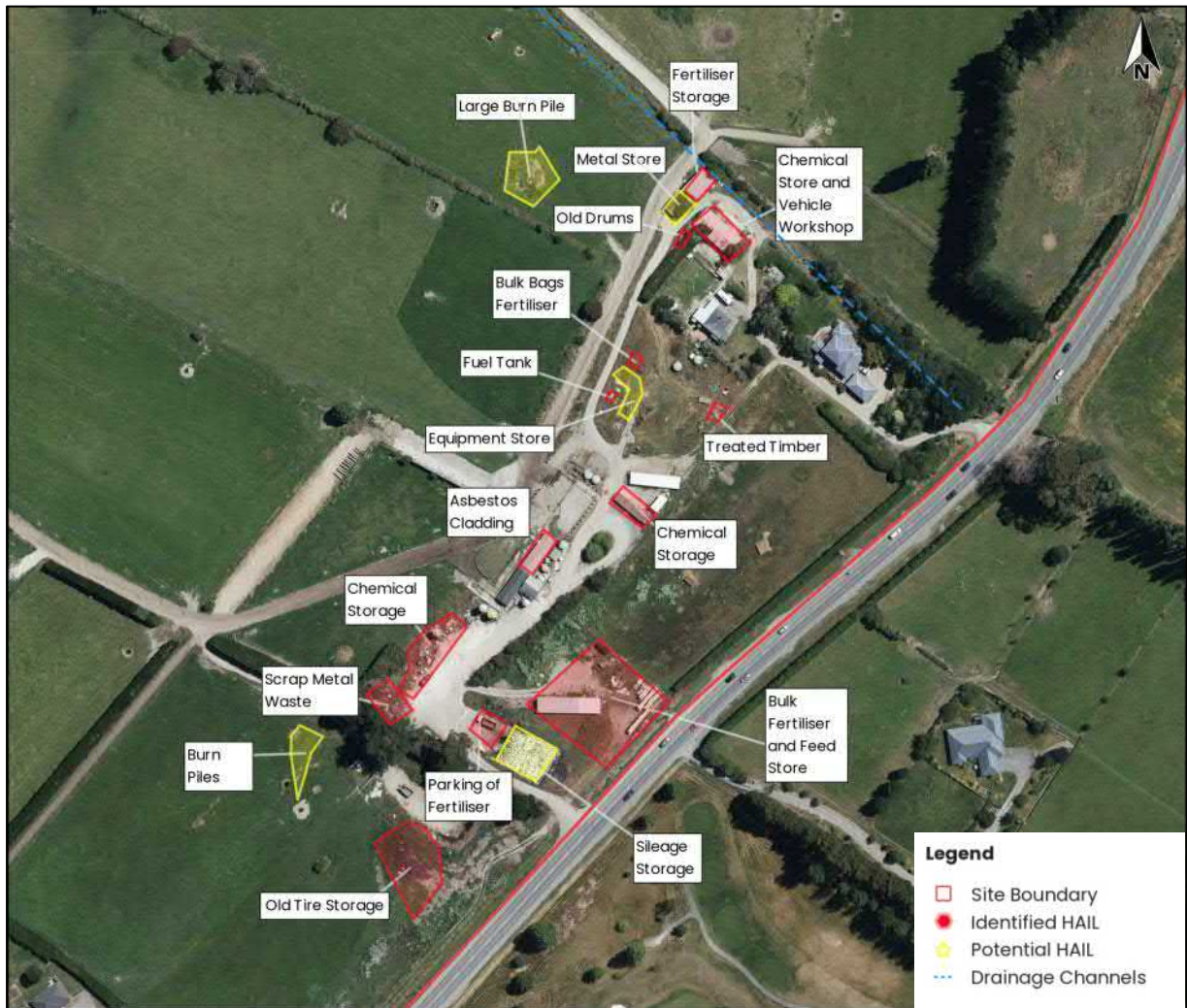


Figure 2.2 identifies potential areas of concern in the northwest portion of the site, shown below.

Figure 2.2: Areas of Concern Northwest

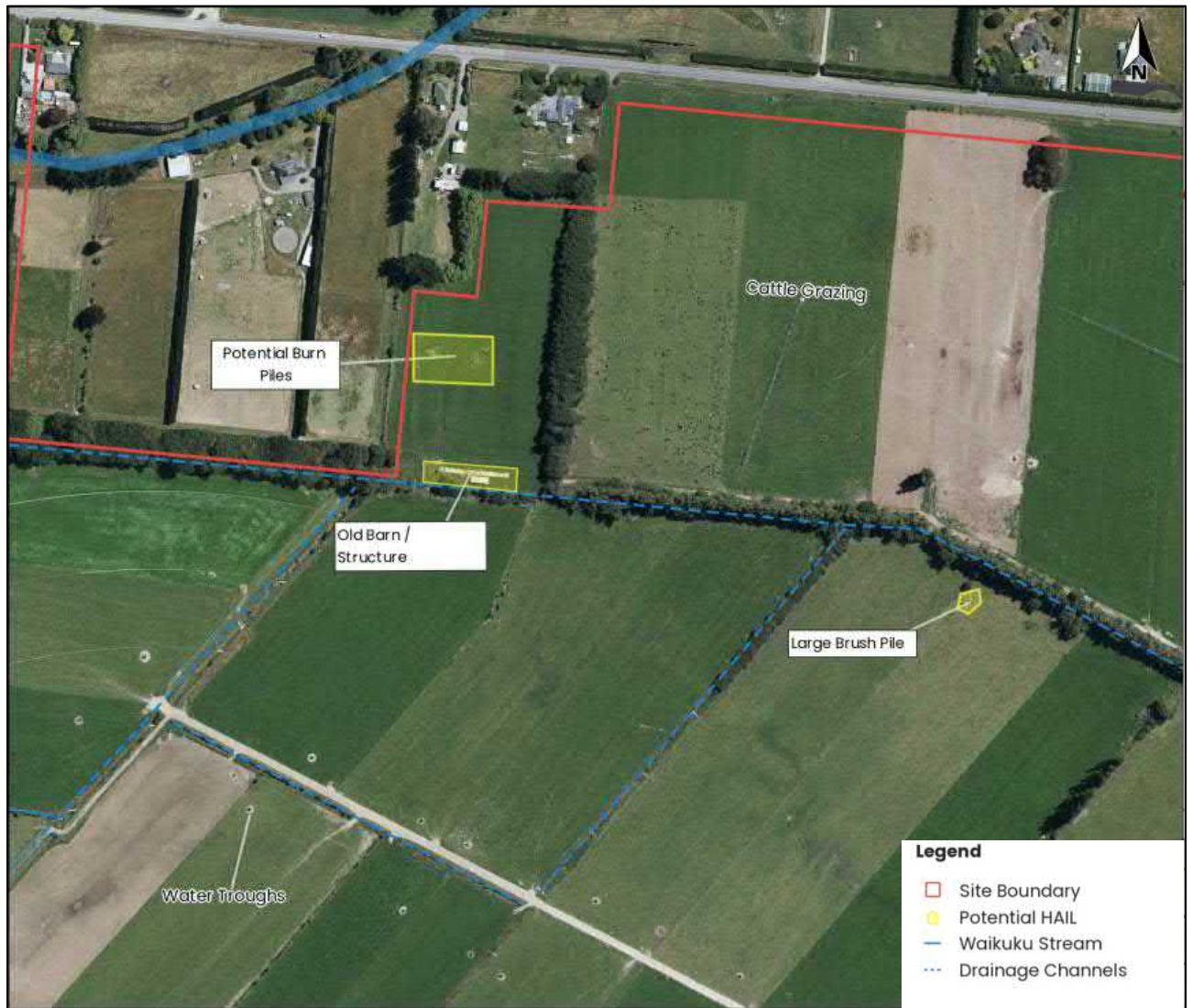


Figure 2.3 identifies potential areas of concern in the southern portion of the site, shown below.

Figure 3: Areas of Concern South



4.2 Site Walkover Photographs

During the site walkover, an ENGEO representative took photographs of these observations. They are presented below.



Photo 1: Bulk chemical storage at the eastern boundary of site.



Photo 2: Bulk fertiliser, agrichemical and equipment storage at the eastern boundary of site. Chemicals noted included: Nitro humus 323, Teat X Humic acid, NPK 8.3.6 liquid fish fertilizer, and Castrol antifreeze.



Photo 3: Bulk fertiliser storage, motor vehicle storage and agrichemical storage at eastern boundary of site. Chemicals noted were: Calcium supplements, Rock phosphate Magnesium oxide, and Vitophos for fertiliser.



Photo 4: Used drum storage along shed at eastern boundary of site. Chemical labels included: Acid Teat spray, and Roundup Organophosphates.



Photo 5: Bulk fertiliser storage along eastern side of site.



Photo 6: Above ground fuel tank towards along eastern side of site.



Photo 7: Farm equipment and machinery stored, drums also observed.



Photo 8: Old fertiliser bulk storage outside along eastern side of site.



Photo 9: Outside tire storage along eastern side of site.



Photo 10: Potentially treated timber on open grass along eastern side of site.



Photo 11: Asbestos in a degraded condition was observed on a milking shed along the eastern boundary of the site.



Photo 12: Two brush burn piles along the north-western side of the site.



Photo 13: Marshland runs east-west along the centre of the site.



Photo 14: Remnants of an old barn / structure along the north-western side of the site.



Photo 15: Scrap metal storage along the eastern side of the site.



Photo 16: Storage on concrete block along eastern side of the site.

5 Potential HAIL Activities

If an activity on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) has occurred on the site, this triggers the requirement for a contaminated land investigation prior to site disturbance or redevelopment.

The majority of the site was open paddocks used for grazing and are not considered to have had an activity included on the HAIL undertaken on them. During the on-site walkover the following activities included on the HAIL were noted:

- A1: Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application;
- A6: Fertiliser manufacture or bulk storage;
- A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds;
- A17: Storage tanks or drums for fuel, chemicals or liquid waste;
- A18: Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside;
- E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition; and
- F8: Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances.

6 Conceptual Site Model

A conceptual site model consists of four primary components. For a contaminant to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptors and contaminants come into contact (e.g. ingestion, inhalation, dermal contact, etc).

The potential source, pathway, and receptor linkages at this subject site are provided in Table 6.

Table 6 - Conceptual Site Model

Potential Sources	Contaminants of Concern	Potential Exposure Route or Pathways	Receptors	Acceptable Risk?
Treated timber, historical pesticide use, bulk storage of pesticides	Heavy Metals and boron.	Dermal contact with impacted soil, inhalation of dust and incidental ingestion during earthworks and long-term use of the site.	On-site redevelopment workers, surrounding environment and long-term users of the site.	Unknown. Further intrusive investigation is required.
Historical pesticide use and bulk storage of pesticides	Heavy metals, Organochlorine Pesticides (OCPs)			
Farm equipment storage, vehicle depot, above ground fuel tanks, burn pits for waste, tyre storage	Heavy metals, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), Asbestos			
Bulk fertiliser storage	Nitrates in soil and groundwater			
Building materials in a degraded condition	Asbestos	Inhalation of fibres		

7 Conclusions

Our review of the available desktop information indicates that while the site is not flagged on the Listed Land Use Register, site walkover observations have indicated that further investigation may be required in isolated areas prior to residential land development along the eastern, north-western and southern boundaries of the site.

Property files were requested from the Waimakariri District Council on 18 November 2021. A report from a groundwater testing programme undertaken by Environment Canterbury from 19 December 2000 for five wells across the site showed that arsenic was detected in the groundwater samples for wells exceeding the Drinking-Water Standards for New Zealand (1996) and was therefore not considered suitable as a drinking water supply (for humans). However, the guideline value for arsenic in livestock water was 0.5 mg/L at the time of testing and was therefore not an issue as water use on the property was for livestock and irrigation purposes only.

Aerial photographs were assessed to see general land-use and any major changes undertaken (if any) from the 1940s to present. All photos portrayed historical pastoral and agricultural activities over time, with irrigation and the addition of residential dwellings in the 1990s. No other significant activities were identified.

During the site walkover, it was noted that various storage containers of agrichemicals, fuel tanks, burn pits, empty drums, vehicle parts, old farm equipment, treated timber and scrap metal existed primarily along the eastern boundary of the site as denoted in Figure 2.1. Additionally, two burn pits and a demolished structure exist in the north-western area of the site as shown in Figure 2.2. There is also a potential burn pit at the residential dwelling towards the southern end of the site as shown in Figure 2.3.

A number of chemicals identified on-site are considered unlikely to be persistent in the environment and large scale impacts are also considered unlikely. A number of the fertiliser products assessed were nitrogen based. Impact from nitrates has not been identified in groundwater in the area as highlighted in the Environment Canterbury publication “Risk maps of nitrates in Canterbury Groundwater, ECan June 2015”.

Based on the information reviewed and our site walkover observations, it is highly unlikely that the majority of the site has been used for an activity included on the HAIL. Therefore these areas are considered suitable for residential development and / or continued used for agriculture. As the soils in these areas are considered unlikely to have been impacted, the potential presence of contaminated soils is not likely to have an effect on the proposed plan change.

However, a number of activities and potential activities included on the HAIL were identified during the site walk along the eastern, north-western and southern boundaries. These areas have the potential to have caused localised impact and further investigation is therefore required. This can be managed via the Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations 2011 and should also not have an impact on the proposed zone change.

8 Sustainability

We encourage you to consider sustainability when assessing the options available for your project. Where suitable for the project, we recommend prioritising the sustainable use of resources, using locally sourced materials where available, and installing in an environmentally friendly way (e.g., reduced carbon emissions and minimal contamination). If you would like to discuss these options further, ENGEО staff are available to offer suggestions.

9 References

MfE. (2011b). Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand. Wellington: Ministry for the Environment.

MfE. (2011c). Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011). Wellington: Ministry for the Environment.

MfE. (2012). Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment

MfE Oct (2011a) Ministry for the Environment Hazardous Activities and Industries List. Wellington, Ministry for the Environment.

MfE (2011d). Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils.

ECan (2015). Risk Maps of Nitrate in Canterbury Groundwater.

10 Limitations

- i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Westside Country Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.
- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.
- v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by



Holly Eeg

Environmental Scientist

Report reviewed by



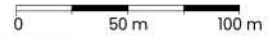
Dave Robotham, CEnvP SC

Principal Environmental Consultant

FIGURES



- Legend**
- Site Boundary
 - Potential HAIL



LINZ CC BY 4.0 © Imagery Basemap contributors



Produced by [Datanest.earth](https://www.datanest.com)

Title: Areas of Concern		
Client: Westside Country Ltd.		
Project: Gresson and Main North Road	Drawn: HE	Figure No: 2.2 Size: A4
Date: 03-11-2021	Checked: DR	
Proj No: P2021.005.919	Scale: 1:4637	Version: draft



- Legend**
- Site Boundary
 - Identified HAIL
 - Potential HAIL
 - Drainage Channels



LINZ CC BY 4.0 © Imagery Basemap contributors



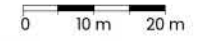
Produced by Datanest.earth

Title: Areas of Concern		
Client: Westside Country Ltd.		
Project: Gresson and Main North Road	Drawn: HE	Figure No: 2.2 Size: A4
Date: 03-11-2021	Checked: DR	
Proj No: P2021.005.919	Scale: 1:2913	Version: draft



Legend

- Site Boundary
- Potential HAIL



LINZ CC BY 4.0 © Imagery Basemap contributors



Produced by Datanest.earth

Title: Areas of Concern		
Client: Westside Country Ltd.		
Project: Gresson and Main North Road	Drawn: HE	Figure No: 2.2 Size: A4
Date: 03-11-2021	Checked: DR	
Proj No: P2021.005.919	Scale: 1:1456	Version: draft



APPENDIX 1:
LLUR Enquiry



Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry from our Listed Land Use Register (LLUR). The LLUR holds information about sites that have been used or are currently used for activities which have the potential to cause contamination.

The LLUR statement shows the land parcel(s) you enquired about and provides information regarding any potential LLUR sites within a specified radius.

Please note that if a property is not currently registered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR database is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; additional relevant information may be held in other files (for example consent and enforcement files).

Please contact Environment Canterbury if you wish to discuss the contents of this property statement.





Yours sincerely

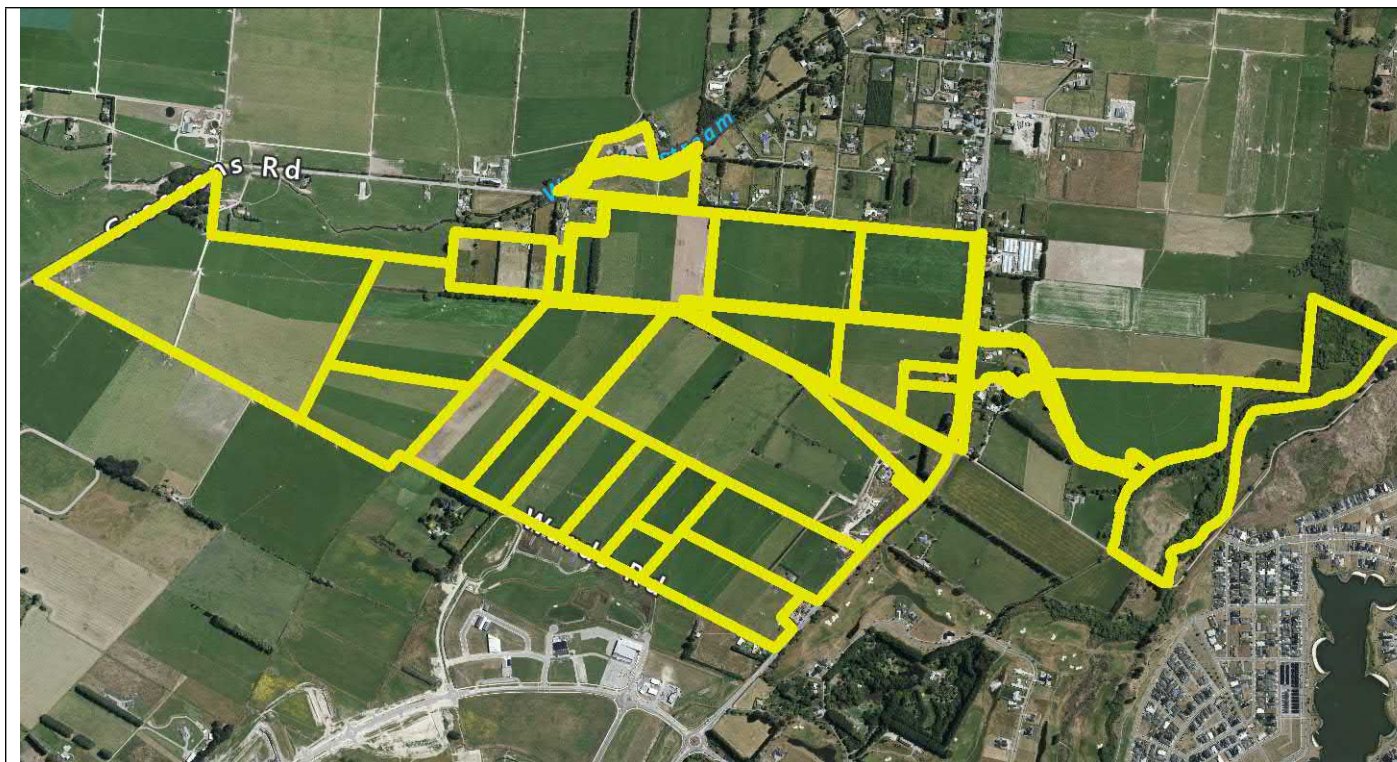
Contaminated Sites Team

Property Statement from the Listed Land Use Register

Visit ecan.govt.nz/HAIL for more information or
contact Customer Services at ecan.govt.nz/contact/ and quote ENQ300527

Date generated: 15 November 2021
Land parcels: Lot 1 DP 455971
Lot 2 DP 428676
Part RS 3101
Lot 1 DP 46765
Lot 2 DP 303387
Lot 2 DP 61069
Part RS 3093,3129,3141-3144,3169,3170
Part RS 3093,3129,3141-3144,3169,3170
Part RS 3946
Lot 1 DP 428676
Lot 5 DP 923
Lot 2 DP 46765
CL SO 17137
Lot 6 DP 923
Part RS 3101
Part Lot 4 DP 923
Part RS 3919,4719
Part RS 3101
Lot 1 DP 470921
Part Lot 1 DP 18739
Part RS 3093,3129,3141-3144,3169,3170
Part Lot 4 DP 923
Section 1 SO 16798
RS 41401
Lot 1 DP 9769
Part RS 1485
Part RS 3093,3129,3141-3144,3169,3170
Lot 2 DP 62186
Part RS 3093,3129,3141-3144,3169,3170
Lot 1 DP 43146
Lot 8 DP 923
Lot 3 DP 62186
Part RS 3093,3129,3141-3144,3169,3170

	Area of Enquiry		Sites intersecting area of enquiry	
			Investigations intersecting area of enquiry	



The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Sites at a glance

 Sites within enquiry area

There are no sites associated with the area of enquiry.

More detail about the sites

There are no sites associated with the area of enquiry.

Disclaimer

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987.

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Listed Land Use Register

What you need to know



What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)¹. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

¹The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.



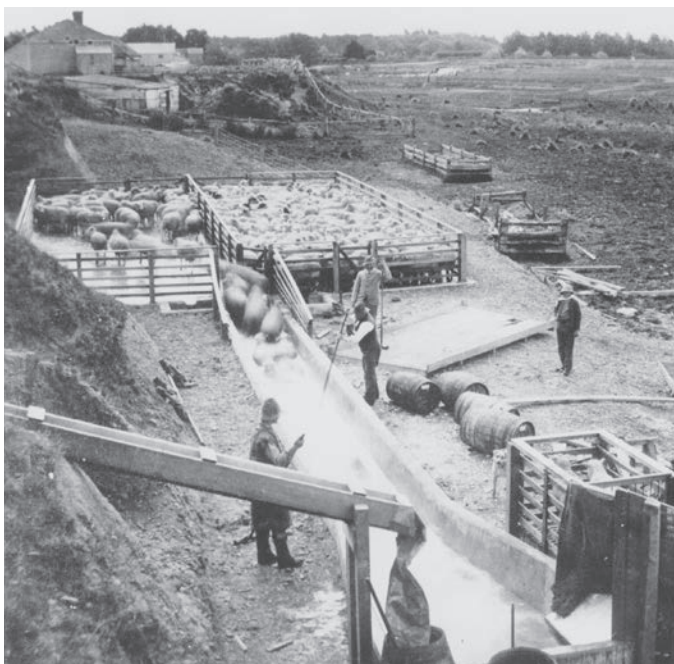
I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:

Calling from Christchurch: (03) 353 9007

Calling from any other area: 0800 EC INFO (32 4636)



Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz

E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

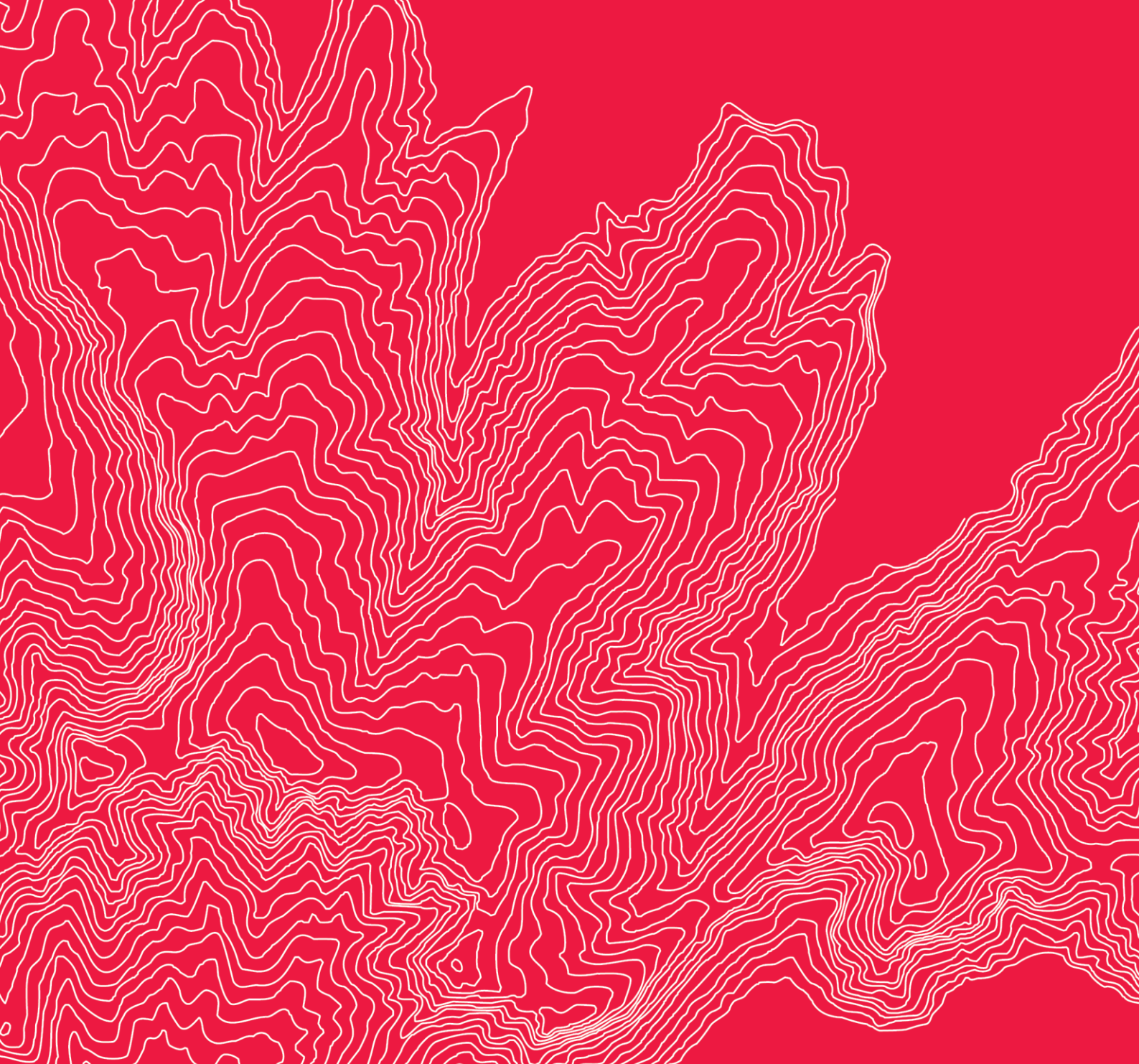
Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Appendix 2



Ground Contamination Assessment

**eliot
sinclair**

**81 Gressons Road and 1375 Main North
Road, Waikuku**

Prepared for Northside Country Limited

350494

Ground Contamination Assessment

81 Gressons Road and 1375 Main North Road, Waikuku

Prepared for Northside Country Limited

350494

Quality Control Certificate

Eliot Sinclair & Partners Limited

eliotsinclair.co.nz

Action	Name	Signature	Date
Prepared by:	Jeffrey Fleming Geotechnical Engineering Technician NZDE Civil		27 November 2020
Reviewed by:	Kristel Franklin Engineering Geologist BSc MSc (HAZM) CMEngNZ PEngGeol (1163943)		27 November 2020
Directed and approved for release by:	John Aramowicz Geotechnical Engineer Director BEng(Hons) Mining CMEngNZ IntPE(NZ) CPEng (1008112)		27 November 2020
Status:	Final		
Release date:	27 November 2020		
Reference no:	350494		
Distributed to:	Northside Country Limited		

Limitations

This report has been prepared for Northside Country Limited according to their instructions and for the particular objectives described in this report. The information contained in this report should not be used by anyone else or for any other purposes.

Contents

1. Executive Summary	3
2. Introduction	4
3. Site Description	5
4. Site History	7
4.1. Environment Canterbury Listed Land Use Register (LLUR)	7
4.2. Environment Canterbury Resource Consent Database	7
4.3. Waimakariri District Council Records (Property File)	8
4.4. Site Inspection and Landowner Interview	8
4.5. Historical Aerial Photographs and Satellite Images	10
5. Arsenic in Groundwater	11
6. Conclusion and Recommendation	11
7. Accidental Discovery Protocol	12
8. Limitations	12

Appendix A. Site Plan

Appendix B. Site Photographs

Appendix C. Listed Land Use Register (LLUR)

Appendix D. Historical Aerial Photographs and Satellite Images

Appendix E. Environment Canterbury Resource Consents

The National Environmental Standard for and Managing Contaminants in Soil to Protect Human Health (MfE 2011), and associated contaminated land management guidelines make abundant use of acronyms. Some commonly used abbreviations are:

ACM	Asbestos containing material
AST	Above ground storage tank
BAP	Benzo-alpha-pyrene
bgl	Below ground level
CCC	Christchurch City Council
CoC	Chain of Custody (Transport and Laboratory Quality Assurance), or
CoC	Contaminants of Concern
CSM	Conceptual Site Model
DSI	Detailed Site Investigation (often referred to as Phase 2)
DQO	Data Quality Objectives
ECan	Environment Canterbury Regional Council
HMs	Heavy metals screen; GC scan for Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc
LLUR	Listed Land Use Register (ECan database of land with known or suspected contamination)
LWRP	Proposed Canterbury Land and Water Regional Plan (ECan 2012)
MfE	Ministry for the Environment
MMP	Monitoring and Management Plan (Phase 5)
NES(soil)	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Regulations 2011.
NRRP	Natural Resources Regional Plan (Environment Canterbury 2011)
OCP	Organochlorine Pesticides
ONOP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PEF	Potency Equivalent Factors, synonym with TEQ
PCP	Pentachlorophenol
PSI	Preliminary Site Investigation (often referred to as Phase 1)
QC/QA	Quality Control/Quality Assurance
RAP	Remedial Action Plan, often joint with a Health and Safety Plan (HSP) (Phase 3)
SCS(health)	Soil Contaminant Standard for health for inorganic substances
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	Semi Volatile organic Compounds
SVR	Site Validation Report (Phase 4)

TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin, persistent carcinogenic pollutant of 2,4,5-T; was widely used in forestry as defoliant (herbicide) in the 1950s-1960s.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalent
TLB	True left bank (of a river, as seen in the direction of flow)
TRB	True right bank (opposite the TLB)
UST	Underground storage tank

1. Executive Summary

This report comprises a ground contamination assessment for land at 81 Gressons and 1375 Main North Road in Waikuku, North Canterbury, and has been prepared to inform a proposed zone change from rural to residential land use.

This report is a Preliminary Site Investigation (PSI), prepared in accordance with the National Environmental Standard (NES), which ensures that potential contamination from recent or historical HAIL¹ activities is identified and assessed at the time of development and, if necessary, remediated to make the land safe for the intended use. Eliot Sinclair carried out an initial assessment and reporting for the site in December 2013 and have subsequently carried out a further site visit and desk study in November 2020.

The PSI is based on:

- A site walkover and interview with the site owner in September 2013 and November 2020,
- Investigation of a high-resolution aerial photograph from 1942, 1963, 1976, 1980, 1984, 2000 and satellite images from 2005 and 2013 to 2019,
- A search of Waimakariri District Council's property file,
- A search of Environment Canterbury's Listed Land Use Register (LLUR), and Resource Consent Database.

Most of the land has been in the ownership of Mr and Mrs Stokes since 1991 with other areas acquired between 2002 and 2003. The historical land use comprised cattle and sheep grazing, and barley cropping. The current land use is pastoral; i.e. Mr and Mrs Stokes currently use the land to graze dairy cattle (presently 400 cows/140 ha; i.e. approx. 3 cows/ha).

Farm chemicals are stored and formulated off-site, and site investigations did not reveal any farm pits, livestock dips or spray race operations, change in the natural contour of the land from excavation or fill, discoloured soils, or stressed vegetation. Apart from a historical disused well shed at 81 Gressons Road with an electric well and a historical hay shed at the southern boundary, there are no other buildings or structures are on the land or, according to the owner, have been on the land.

Other than three small burn pads, no other historical or current activities have been identified during the site investigation and interview with the owner, the investigation of aerial photographs, the search of the property file, LLUR and Resource Consent Database that might have led to intentional or accidental release of hazardous substances. Consequently, acknowledging the three burn pads will need to be removed or remediated before subdivision, this preliminary site investigation concludes that it is unlikely that HAIL activities have taken place or are taking place on the land. On this basis, it is considered that it is "highly unlikely" that ground contamination is present that exceeds the NES soil contaminant standards for residential land use.

¹ Hazardous Activities and Industries List, published by the Ministry for the Environment (MfE, 2011).

A tabular summary of the ground contamination assessment is provided in Table 1.

Table 1. Summary of Ground Contamination Assessment.

Site Addresses	81 Gressons Road, 1375 Main North Road and three parcels in between without associated street address in Waikuku, North Canterbury
Local Authority	Waimakariri District Council
Resource consents	Two expired water take consents, no discharge consents, no hazardous storage consents
Legal Description	Lot 2 DP 428676, Lot 2 DP 62186, Lot 2 DP 303387, Lot 3 DP 62186, Lot 1 DP 470921; all on certificate of title 512583; Pt RS 3101 (paper road, 0.7852 ha)
Area	34.0768 hectares
Owner/occupier	Brian & Anne Stokes, and unknown (paper road)
Current land use	Pastoral (dairy cattle grazing), shelterbelts
Proposed land use	Residential
LLUR ID	None
HAIL	None

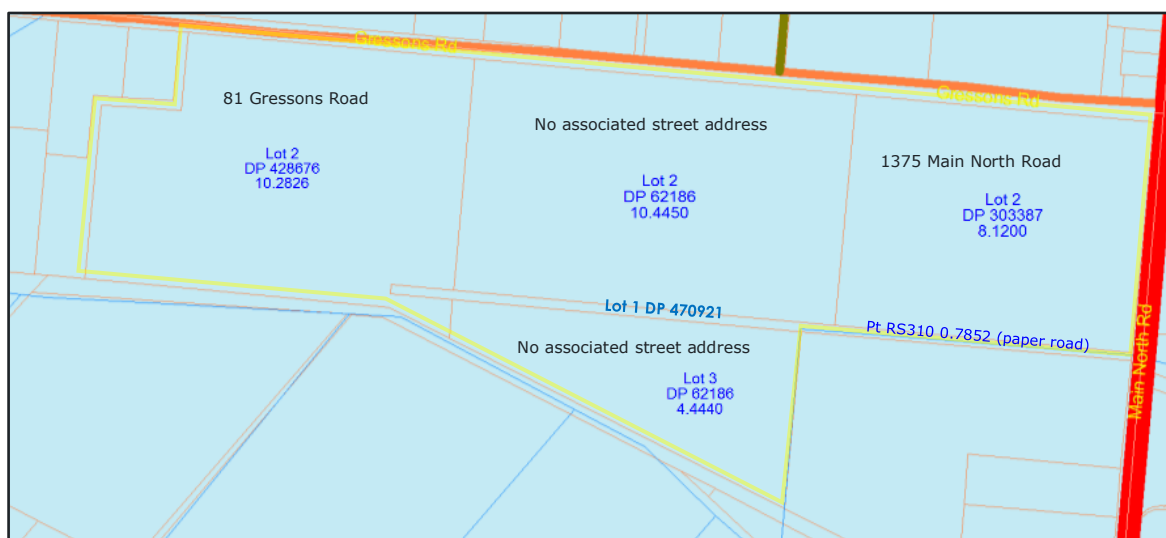


Figure 1 Site plan with Legal Description, source Qmap.

2. Introduction

Mr and Mrs Stokes have engaged Eliot Sinclair to undertake a ground contamination assessment of 34.0768 hectares at 1375 Main North Road (SH1) and 83 Gressons Road in Waikuku, North Canterbury. The investigation has been carried out to inform a proposed zone change from rural to residential land use.

The report has been prepared in accordance with the National Environmental Standard (NESSoil²) and MfE's Contaminated Land Management Guidelines 1-5³. This ensures that potential contamination from recent or historical HAIL⁴ activities is identified and assessed at the time of development and, if necessary, remediated to make the land safe for human use.

² Resource Management; National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health; Regulations 2011/361.

³ Ministry for the Environment (2004, 2006, 2011) Contaminated Land Management Guidelines Vol. 1-5.

⁴ Hazardous Activities and Industries List, published by the Ministry for the Environment (MfE, 2011).

The scope of this report comprises:

- A description of the site and its surrounding environment to support a conceptual site model,
- Review of the Listed Land Use Register and Resource Consent Database from Environment Canterbury,
- Review of available information from the property file from the Waimakariri District Council,
- Review of a historical aerial photograph and a recent satellite images,
- A Site investigation and interview with the site owner,
- Conclusion and recommendations.

3. Site Description

The site is bordered by State Highway 1 at the southern fringes of the Waikuku settlement and Gressons Road. The site comprises five land parcels at 81 Gressons Road and 1375 Main North Road (SH1), and three parcels between without street addresses. Site plans are appended in Appendix A.

Legal Description: The legal description, associated street address, area and owner of the land area summarised in **Table 2**.

Table 2. Legal description of the site.

Lot	Title	Owner	Street Address	Area [ha]
Lot 2 DP 428676	512583	B&A Stokes	81 Gressons Rd	10.2826
Lot 2 DP 62186	512583	B&A Stokes	No street address associated	10.4450
Lot 2 DP 303387	512583	B&A Stokes	1375 Main North Road (SH1)	8.1200
Lot 3 DP 62186	512583	B&A Stokes	No street address associated	4.4440
Lot 1 DP 470921	512583	B&A Stokes	No street address associated	0.6410
Pt RS 3101	-	-	(paper road)	0.7852
			Total	34.7178

Topography: The land is classified as 'flat'⁵ and has no significant topographical features. The lowest elevation of the site is approximately 5m asl (metres above sea level) in the north-eastern corner near SH1 (Main North Road). From there the land gently rises to approximately 10m asl towards the western boundary. This results in an average gradient of 1:240.

Surface Water: The nearest surface water is located in an open drain along the southern boundary of the site, which are part of the Stokes Drain catchment. No water quality management unit has been allocated to the drains in the proposed Land and Water Regional Plan. Waikuku Stream flows approximately 100m north of the site in a north-to east direction.

⁵ LandCare Research soil classification / slope classes

Land Use: Most of the area is currently held in pasture (i.e. irrigated and fertilised) and grazed by cattle. Several shelterbelts (mostly poplars and eucalypts) which previously separated the four principal land parcels have been removed since our 2012/13 site inspection. A poplar shelter belt still remains at the western end of Lot 2 DP 428676. A small area near the southern boundary was previously a pine plantation but was felled during 2015/2016.

Soils and Underlying Geology: The soil of the three blocks closest to Gressons Road is described as Wakanui Deep Silt Loam⁶. Landcare Research classifies the soil as 'imperfectly drained' (drainage class 3 out of 5⁷). The triangular shaped parcel along the southern boundary (Lot 3 DP 62186) has poorly drained Temuka Deep Silt Loam (drainage class 4 out of 5).

The underlying geology comprises alluvial deposits of silts and sandy gravels over sandy gravels.

Groundwater: Groundwater under the southwestern portion of the site is within the Coastal Confined Gravel Aquifer System. Groundwater under the north-eastern part of the site is assumed to be unconfined or semiconfined (Figure 2).

Seven piezometers were placed evenly across the site by Eliot Sinclair staff in July 2013 and monitored monthly until October 2017. Results indicate that groundwater can increase to around 1m to 2m below ground level seasonally around 1m to 2m below ground level and at or near the existing ground level and in winter and spring conditions.

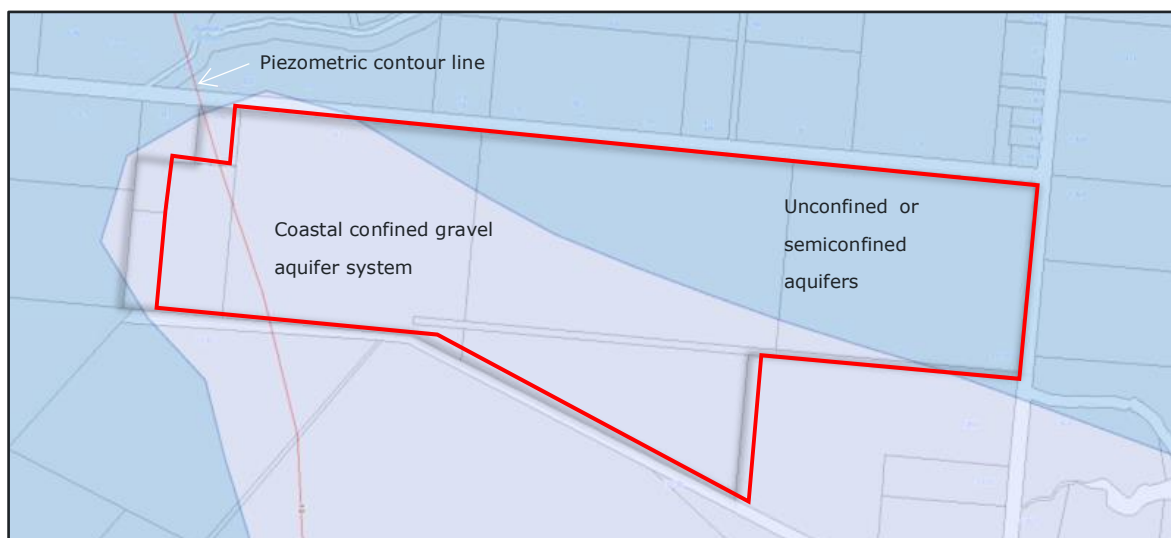


Figure 2 Approximate extent of groundwater systems under the site.

Waimakariri District Plan Zoning: The current zoning of the site is 'Rural'. The zoning of the adjacent land north of Gressons Road is zoned 'Residential'. The adjacent land to the west, south and east is zoned 'Rural' (Figure 3). The proposed zoning for the site is for residential land use.

⁶ ECan GIS

⁷ LandCare Research Soil Drainage Classes

Class 1: well drained, Class 2: moderately well drained, Class 3: imperfectly drained, Class 4: poorly drained, Class 5: very poorly drained.

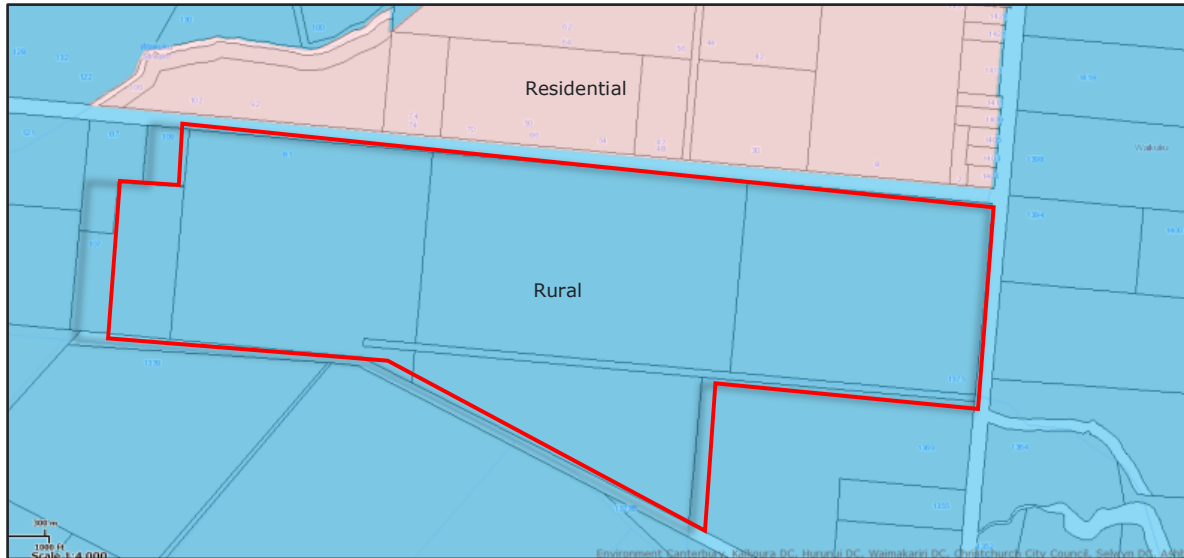


Figure 3 Waimakariri District Plan zoning of the site.

4. Site History

4.1. Environment Canterbury Listed Land Use Register (LLUR)

A search of Environment Canterbury's Listed Land Use Register (LLUR) has been undertaken. The LLUR is a database containing all known contaminated and potentially contaminated sites in Canterbury.

Environment Canterbury states that there are currently no known or anticipated HAIL activities on the site or within the area of enquiry. This does not necessarily mean that contamination has never occurred, or is not currently occurring. However, it confirms that no past or present sources of contamination are known and recorded.

The LLUR statements are appended in Appendix C.

Conclusion: Neither the site nor any of the surrounding land is recorded on Environment Canterbury's Listed Land Use Register.

4.2. Environment Canterbury Resource Consent Database

Environment Canterbury's resource consent database indicates two resource consents on the site, referring to the historical installation of a well and a surface water take. The well has been disused long time ago, and the consent for the surface water take expired in 1997.

No discharge consents, or consents for above or below ground storage of hazardous substances are recorded on Environment Canterbury's resource consent database.

Further details of the two expired resource consents on the site is appended in Appendix E.

Conclusion: Environment Canterbury's Resource Consent Database does not raise any specific concern about potential contamination from current or past consented activities.

4.3. Waimakariri District Council Records (Property File)

The property files held in the Waimakariri District Council were inspected on 26 September 2013. The files relate to several parcels that are not part of the site and include consent applications documents and approvals granted by the Council under the Building Act, and other information such as:

- Application forms,
- Construction details of a dairy shed and milk room,
- Project information memorandums (PIMs),
- Groundwater testing undertaken by Environment Canterbury. Wells M35/8110 (near the southern boundary of the site), M35/8759 (1.7km NE), M35/1160 (570m S of the site) and M35/4227 (1.7km E of the site) were found to have arsenic levels that are above NZ Drinking Water Standards; however, the water is considered safe for stockwater use.
- Most of the information contained in the property files relates to buildings that are on other land beyond the site.
- Our discussions with the landowner confirm no further consent applications have been made for the site since our review of the property file in 2013.

Conclusion: The property files do not raise any concerns about contamination of the site.

4.4. Site Inspection and Landowner Interview

- The site was inspected on 26 September 2013 and 10 November 2020 with the objective of identifying potential contaminants listed on MfE's Hazardous Activities and Industries List (HAIL⁸) such as:
 - Above ground storage tanks/underground storage tanks (AST/UST) for fuel, chemicals or liquid waste,
 - Storage, formulation and disposal of herbicides/pesticides,
 - Sheep dips or spray races including remnants of it,
 - Fibrous material potentially containing asbestos in deteriorated condition,
 - Soils that are discoloured (stained e.g. with hydrocarbons or bleached),
 - Soil mounds or excavations; change in natural contours of the land,
 - Deposits of refuse, drums, canisters etc., historical landfills,
 - Vegetation that is disturbed, stressed or discoloured,
 - Any other activity that might have led to intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

Photographs taken during the site investigations in September 2013 and November 2020 are in Appendix B.

An interview with the existing landowners, Mr and Mrs Stokes, was conducted during Eliot Sinclair's site inspection on 26 September 2013.

The information from the site inspection and interview is summarised as follows:

- Mr and Mrs Stokes have owned parts of the site since 1991 and further acquired the remainder in 2002/2003.
- The land is used to graze dairy cattle.
- Fonterra's milk screening programme did not detect organochlorine pesticides in the milk.

⁸ Ministry for the Environment 2011. Hazardous Activities and Industries List (HAIL).

- A derelict well shed near Gressons Road (constructed of timber and corrugated iron) contains remnants of an electric well. The shed and well are disused. A hay storage shed was located near the paper road along the paper road/southern boundary of the site. According to the owner, no other structures have been erected on the site.
- No soil mounds, or excavations, or change in the natural contours of the land were identified.
- No other activity that might have led to contamination has been identified.

A follow up interview with Mr Stokes was conducted on the 9 November 2020.

The information from the interview is summarised as follows:

- Irrigation lines were installed on site for the centre pivot irrigation systems in 2015.
- Further irrigation trenches were excavated in 2020 to the Centre Pivot Irrigator at the east end of the site on Lot 2 DP303387.
- Wood and vegetation was stock piled at the southeast corner of Lot 2 DP 428676.
- Evidence of burn pads was observed during our site inspection. These were located at the east and western end of Lot 2 DP 428676 and are in the areas where some of the shelter belts were removed. Soil has been mounded up over the burn pads and further timber and vegetation has been placed over these areas including partially burnt logs and stumps. Soil sample were taken from each burn pad and analysed with an XRF (X-ray Fluorescence) to determine the elemental composition of the soil.

The soil sample taken from the burn pad at the eastern end of Lot 2 DP428676 was found to have concentrations of Arsenic between 22 to 40 mg/kg and is above the NESCS (2011) rural residential standard of 17mg/kg. The area of the burn pad is around 5m x 5m.

Soil samples taken from the burn pad at the western end of Lot 2 DP 428676 were found to have concentrations of Arsenic below 17mg/kg.

The wood and vegetation stock piled at the southeast corner of Lot 2 DP 428676 may also be covering a burn pad, however, no evidence of burnt wood was located in this area during our inspection.

These areas should be remediated as a condition of subdivision.

Conclusion: Other than the small burn pads, the site investigation did not raise any other concerns about persistent ground contamination of the site. The burn pads should be removed or remediated before subdivision of the site, however, this should not prevent the rezoning of the site to rural-residential.

4.5. Historical Aerial Photographs and Satellite Images

A historical aerial photograph from 15 May 1963 has been obtained from New Zealand Aerial Mapping Ltd. Historical aerial photography has also been obtained from Retrolens for 1942, 1976, 1980, 1984, 2000, as summarised in Table 3. In addition, recent satellite images from 2005 and 2013 to 2019 have been analysed.

Key features are identified on the 2005, 2013 and 2019 satellite images in Attachment D.

The analysis of the historical photos and recent satellite images are summarised in Table 3.

Conclusion: The historical aerial photo from 1963 confirms that no buildings or structures were established on the site apart from the well shed near Gressons Road and the hay storage shed at the paper road along the southern boundary. No excavation or fill or other land use is visible that raises concerns about persistent ground contamination.

Table 3. Summary of information from historical aerial photographs and recent satellite images.

Date (source)	Scale	Description
<ul style="list-style-type: none"> ■ 6/06/1942 (Retrolens) 	1:16000	<ul style="list-style-type: none"> ■ The entire site is either cropped or grazed (sheep/cattle). ■ Farming activity can be seen on Lot 2 DP 62186 and Lot 2 DP 303387.
<ul style="list-style-type: none"> ■ 15/05/1963 (NZAM) 	1:16,000	<ul style="list-style-type: none"> ■ The entire site is either cropped or grazed (sheep/cattle). ■ No excavation or fill is visible. ■ Watering troughs are located at the northern boundary along Gressons Road. ■ A hay shed is located near the paper road at the southern boundary. The shed is shown in Photo 3 in Attachment D. An electric well shed is located at 81 Gressons Road. ■ No further structures or land uses are visible.
<ul style="list-style-type: none"> ■ 1/10/1976 (Retrolens) 	1:50,000	<ul style="list-style-type: none"> ■ The hay shed located near the paper road at the southern boundary is no longer there. ■ No further significant changes in land use are visible.
<ul style="list-style-type: none"> ■ 1/02/1980 (Retrolens) 	1:25,000	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.
<ul style="list-style-type: none"> ■ 28/09/1984 (Retrolens) 	1:25,000	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.
<ul style="list-style-type: none"> ■ 5/12/2000 (Retrolens) 	1:50,000	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.
<ul style="list-style-type: none"> ■ 22/04/2005 (Google) 	n/a	<ul style="list-style-type: none"> ■ Several watering troughs are established throughout the site. ■ The block at 1375 Main North Road is newly sown; the remaining area is grazed. ■ The disused power pole and pump shed remains at 81 Gressons Road. ■ No further built structures or earthworks are visible.
<ul style="list-style-type: none"> ■ 17/02/2013 	n/a	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.

(Google)		
■ 1/11/2015	n/a	<ul style="list-style-type: none"> ■ Centre Pivot irrigation system starting to be installed. ■ Trees removed west end of Lot 2 DP 428676.
■ 23/7/2016	n/a	<ul style="list-style-type: none"> ■ Centre Pivot irrigation system visible ■ Trees removed at southeast end and east end of Lot 2 DP 428676.
■ 2/2/2017	n/a	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.
■ 16/1/2018	n/a	<ul style="list-style-type: none"> ■ No further significant changes in land use are visible.
■ 19/1/2019	n/a	<ul style="list-style-type: none"> ■ Three Centre Pivot irrigation systems visible on site. ■ Two burn pads visible, plus stock pile of wood. ■ No further significant changes in land use are visible.

5. Arsenic in Groundwater

The property file held by the Waimakariri District Council identifies that elevated arsenic levels can be present in the groundwater of coastal and near coastal areas of the Canterbury Plains. While the concentration of Arsenic is generally low, in some cases the concentration exceeds the maximum allowable value (MAV) of 0.01mg As/l. The highest concentrations of arsenic are generally found in groundwater from the first confined aquifer (Riccarton Gravels) at a depth of approximately 20m, but groundwater from some wells screened in the second aquifer (Linwood Gravels) at a depth of approximately 40m has also shown elevated arsenic levels.

The arsenic is associated with buried swamp deposits and is derived from the degradation of organic matter. This consumes dissolved oxygen and leads to anoxic (reduced) conditions in groundwater, which can lead to naturally elevated concentrations of iron, manganese, arsenic and/or hydrogen sulphide.

Groundwater containing naturally occurring concentrations of arsenic that are above NZ Drinking Water Standards should not be used for potable water.

6. Conclusion and Recommendation

The investigations undertaken in this report have not raised any concerns about ground contamination sources and/or indicators such as farm chemicals (they are stored and formulated off-site), farm pits, livestock dip or spray races, changes in the natural contour of the land from excavation or filling, discoloured soils, or stressed vegetation. Apart from a historical hay shed that was removed before 1976, and a well shed at 81 Gressons Road with a disused electric well, no buildings or other structures have been, or are, on the site.

This Preliminary Site Investigation concludes that on the balance of probabilities, it is unlikely that HAIL activities have taken place, or are taking place on the site⁹. It is accepted that there are two burn pads that contain concentrations of Arsenic, with results that exceed the NES threshold for rural residential land. These areas are small and will be removed or remediated before subdivision. On this basis, it is considered highly unlikely that ground contamination from past or current activities will exceed the NES soil contaminant standards for the proposed rural residential land use.

⁹ Including the migration and intentional or accidental release of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment.

7. Accidental Discovery Protocol

If any of the following materials are encountered during any future earthworks, such as:

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

Then we recommend:

- i) Excavation and earthworks cease, the site secured to stop people entering the area where potential contamination was encountered, and then:
- ii) Contact a contaminated land specialist for further advice. If required, **Eliot Sinclair (03) 379 4014** can inspect the area, assess the material determine if it is contaminated or hazardous, and then determine a practical course of action.

This report does not relieve contractors and landowners of their responsibilities under the Health and Safety at Work Act 2015.

8. Limitations

The comments made in this report are based on a desktop review and site walkover inspections on 26 October 2013 and 10 November 2020. It is possible these may not provide a complete or accurate assessment of the entire site. As a result, Eliot Sinclair provides this information on the basis that it does not guarantee that the information is complete or without error and accepts no liability for any inaccuracy in, or omission from, this information.

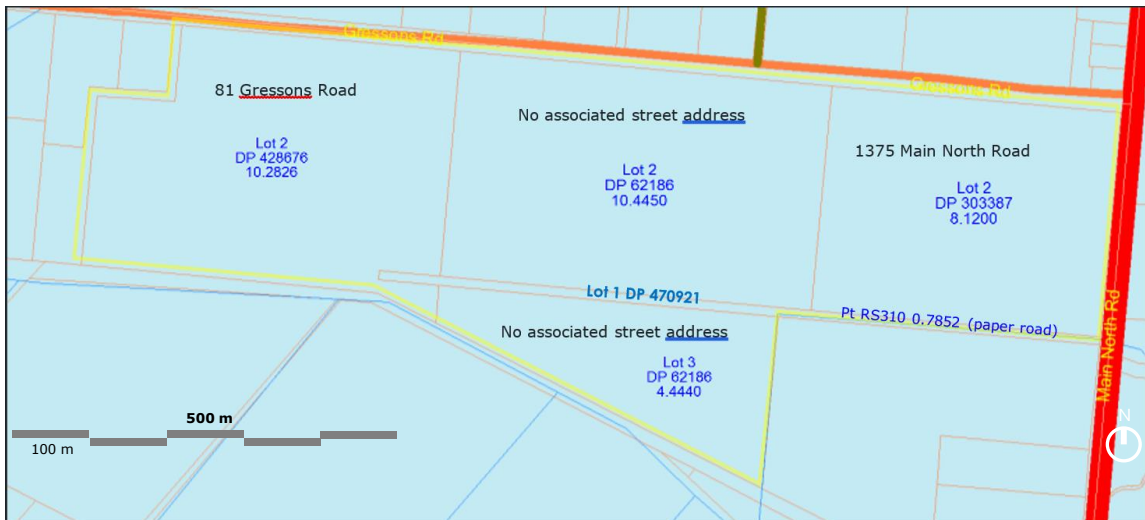
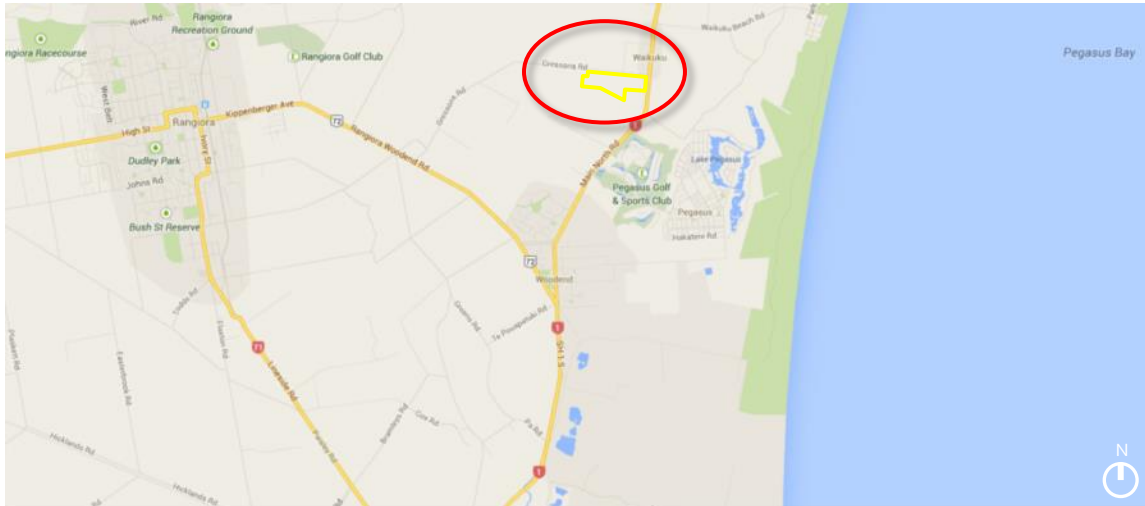
All reasonable effort has been made to ensure that the conclusions drawn in this report are correct at the time of reporting. However, the activities described on the HAIL may change in the future as knowledge about potentially hazardous activities develops over time.

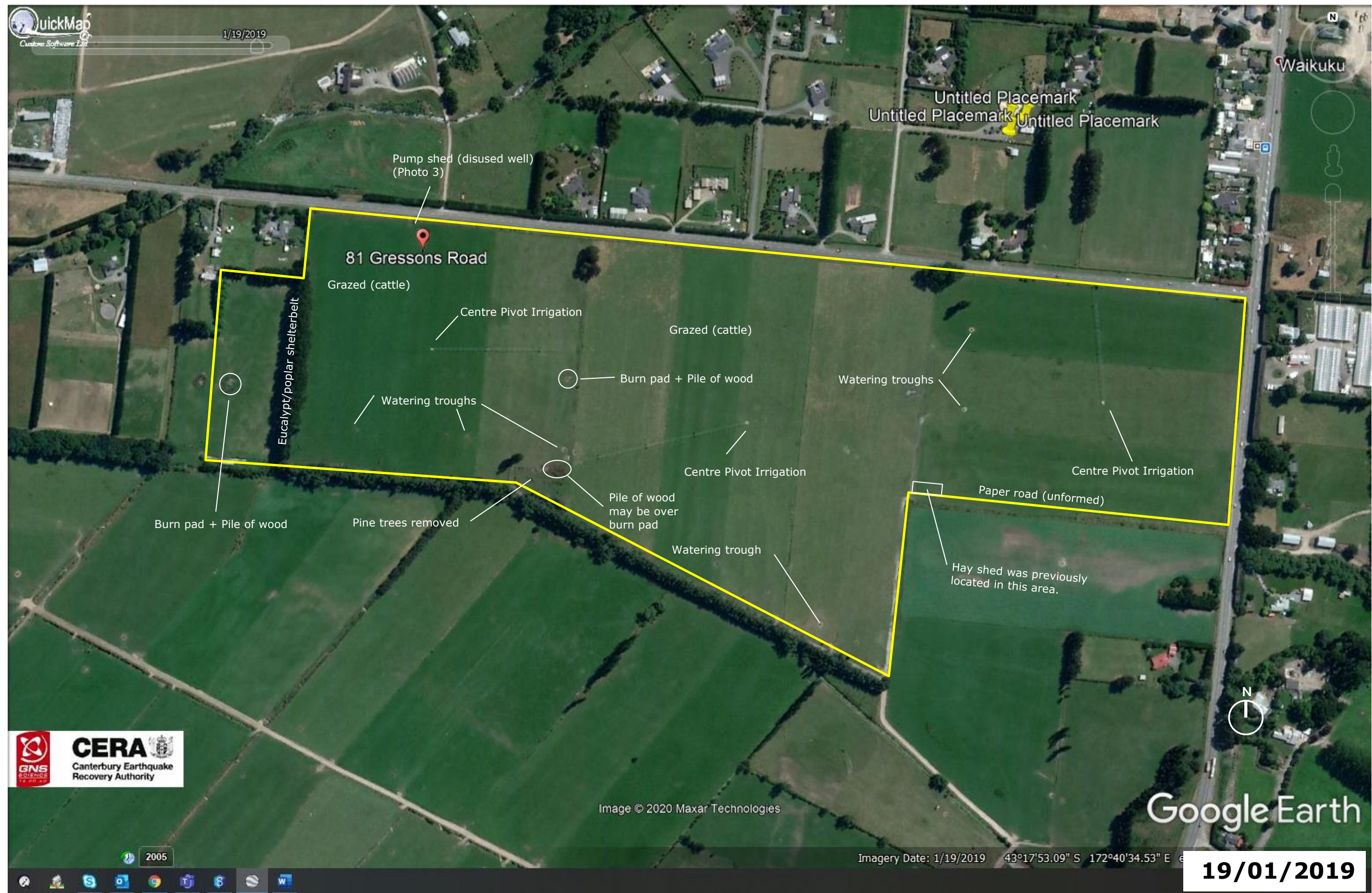
It is possible there may be unidentified subsoil conditions that are not obvious from the information obtained by our investigations and site inspection, and that differ from the conclusions of this report. Should unusual geotechnical conditions be encountered during future earthworks such as historical uncontrolled fill materials, then Eliot Sinclair should be advised. They can review any new information and to advise if the recommendations of this report are still valid.

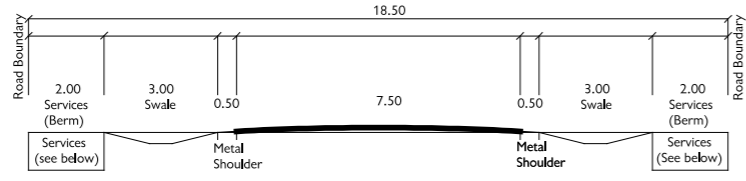
This report has been prepared for the benefit of Waimakariri District Council. No liability is accepted by this company or any employee of this company with respect to the use of this report by any other party or for any other purpose other than what is stated in our scope of work.

This report does not relieve contractors of their responsibilities under the Health and Safety at Work Act 2015. Site conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided.

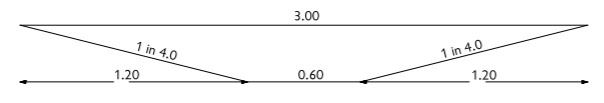
Appendix A: Site Plan



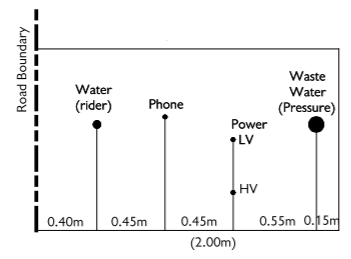




TYPICAL ROAD CROSS SECTION
Scale 1:100



TYPICAL SWALE CROSS SECTION
Scale 1:20



SERVICES LOCATION
Scale 1:5

NOTES
All roads are 18.50 metres wide.
Piped Stormwater Easements are 2 metres wide unless shown otherwise

no.	amendment	initial	date	designed	Bob Greening	surveyed	origin of levels	Projection NZGD 2000	Scale: 1:2000 (A1) 1:4000(A3)	Drawing Set	Sheet
	A	Lot 61 added - pedestrian access, swale moved across, note re land in LT 470921	25.5.14	manager	Bruce Sinclair	Roger Claessens	JA 87	Circuit Mount Pleasant 2000	1:2000 (A1) 1:4000(A3)	350494 C4	1 of 1
	B	Road widened to 18.5m and revised Road Cross Section added	24.7.14	drawn	Bob Greening	surv. date	Pt R S 3101		Date: 20/3/2014	140313.DWG	rev D
	C	Stormwater amended - two ponds - Lot 26 and Gressons. Lot 38 removed	18.8.14	checked		Feb 2014	1:2000 (A1) 1:4000(A3)				
D	Possible Future Road added to Lot 27	18.8.14					datum: Lyttelton 1937 post Dec 2013				

Eliot Sinclair
surveyors | engineers | planners

www.eliot-sinclair.co.nz

Proposed Subdivision of
81 Gressons Road and 1375 Main North Road (SH1), Waikuku
(Lot 1 LT 470921, Lots 1 and 2 DP 428676, Lots 2 and 3 DP 62186 and Lot 2 DP 303387
for Northside Country

Appendix B: Site Photographs (taken on 26/09/2013)



Photo 1. View across the site looking west.



Photo 2. View across the site looking southeast towards Main North Road (SH1).



Photo 3. Power pole and disused well shed at 81 Gressons Road (looking south).

Site Photographs (taken on 10/11/2020)

Photo 4. Power pole and disused well shed at 81 Gressons Road (looking east).





Photo 5. 81 Gressons Road (looking west).



Photo 6. 1375 Main Road and 81 Gressons Road (looking west)

Appendix C: Listed Land Use Register (LLUR)

Search of Listed Land Use Register 18 September 2013

81 Gressons Road



Customer Services
P. 03 353 9007 or 0800 324 636
PO Box 345
Christchurch 8140
P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz
www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information. For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

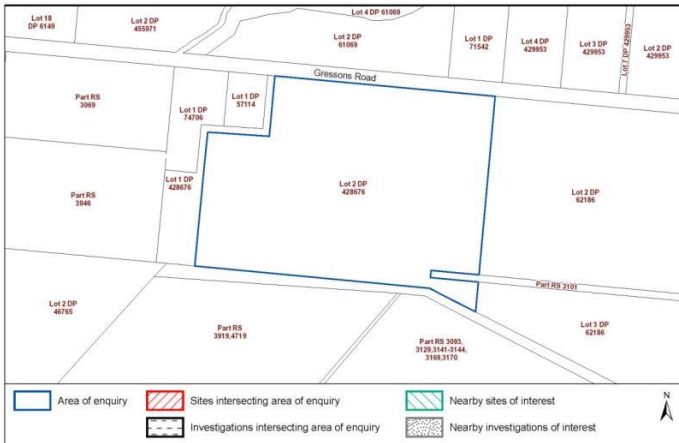
Contaminated Sites Team

Statement from the Listed Land Use Register



PO Box 345, Christchurch
 General enquiries: 03 365 3828
 Fax: 03 365 3194
 Email: ecinfo@ecan.govt.nz
 Customer services: 03 365 9007
 or: 0800 EC INFO (0800 324 636)
 Website: www.ecan.govt.nz

Date: 18 September 2013
Land Parcels: Lot 2 DP 428676 Valuation No(s):



Summary of sites:
 There are no sites associated with the area of enquiry.
 Please note that the above table represents a summary of sites intersecting the area of enquiry within a 50m buffer.

For further information from Environment Canterbury, contact the Contaminated Sites Officer and refer to enquiry number 20647.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

This information reflects Environment Canterbury's current understanding of this site, which is based only on the information thus far obtained by it and held on record concerning this site. It is released only as a copy of those records and is not intended to provide a full, complete or totally accurate assessment of the site. As a result, Environment Canterbury is not in a position to warrant that the information is complete or without error and accepts no liability for any inaccuracy in, or omission from, this information.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

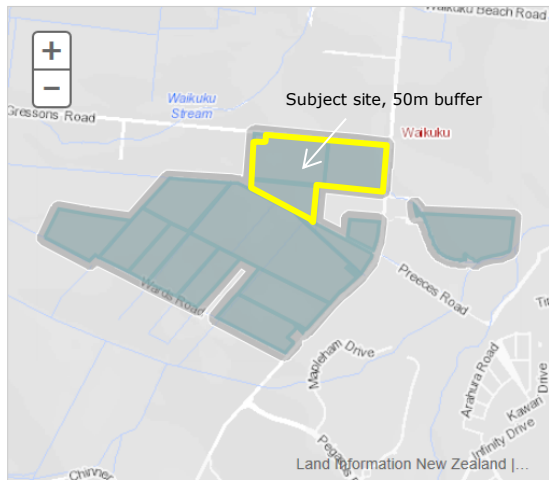
1375 Main North Road and Parcels without Street Address

Multiple parcels (including subject site); none of the parcels is recorded on LLUR.

Listed Land Use Register



- Home
- Advice & Info
- Services
- Our Responsibilities
- News & Notices
- Get Involved
- About Us



- Overview
- FAQs

What is the Listed Land Use Register (LLUR)?

The LLUR is a land use database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

We need the LLUR to help us manage information about sites that have had hazardous activities or industries on them. By managing this information, we can then help you to manage any potential risks to your health or the environment that the site may pose from exposure to contaminants.



[View LLUR Brochure](#)

We need the LLUR to help us manage the risk posed by hazardous sites to your health and the environment.

Section 30 of the Resource Management Act (RMA) requires Environment Canterbury to collect and manage information about potentially contaminated sites. To do this, we follow guidelines from the Ministry for the Environment (MfE). The information we collect

Type your Street Address or Legal Description

(having trouble finding your address? [more info here](#) ..)

Search of Listed Land Use Register 10 November 2020

Listed Land Use Register (LLUR)

Search

Lot 2 DP 428676

(Having trouble finding your address?)



[OVERVIEW](#) [FINDING YOUR ADDRESS](#) [SEARCH SUMMARY](#)

Thank you for your enquiry.
The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel.
If you would like a property statement, please fill in your details below.

Records Found

No records found.

Property Search Results

	Legal Description	Titles	Valuation No	x
1323 Main North Road (Sh1) (Wnd-Amb)				
1	Lot 2 DP 428676	512583	2159170000	x

Listed Land Use Register (LLUR)

Search

Lot 2 DP 62186

(Having trouble finding your address?)



[OVERVIEW](#) [FINDING YOUR ADDRESS](#) [SEARCH SUMMARY](#)

Thank you for your enquiry.
The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel.
If you would like a property statement, please fill in your details below.

Records Found

No records found.

Property Search Results

	Legal Description	Titles	Valuation No	x
1323 Main North Road (Sh1) (Wnd-Amb)				
1	Lot 2 DP 62186	512583	2159170000	x

Search of Listed Land Use Register 10 November 2020

Listed Land Use Register (LLUR)

Search

Lot 2 DP 303387

(Having trouble finding your address?)



OVERVIEW FINDING YOUR ADDRESS SEARCH SUMMARY

Thank you for your enquiry.

The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel.

If you would like a property statement, please fill in your details below.

Records Found

No records found.

Property Search Results

	Legal Description	Titles	Valuation No	
1323 Main North Road (Sh1) (Wnd-Amb)				
1	Lot 2 DP 303387	512583	2159170000	*

Listed Land Use Register (LLUR)

Search

Lot 3 DP 62186

(Having trouble finding your address?)



[OVERVIEW](#) [FINDING YOUR ADDRESS](#) [SEARCH SUMMARY](#)

Thank you for your enquiry.
The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel.
If you would like a property statement, please fill in your details below.

Records Found

No records found.

Property Search Results

	Legal Description	Titles	Valuation No	
1323 Main North Road (Sh1) (Wnd-Amb)				
1	Lot 3 DP 62186	512583	2159170000	✕

Listed Land Use Register (LLUR)

Search

(Having trouble finding your address?)



[OVERVIEW](#) [FINDING YOUR ADDRESS](#) [SEARCH SUMMARY](#)

Thank you for your enquiry.
The Listed Land Use Register does not currently have any information about a Hazardous Activities and Industries List site on this land parcel.
If you would like a property statement, please fill in your details below.

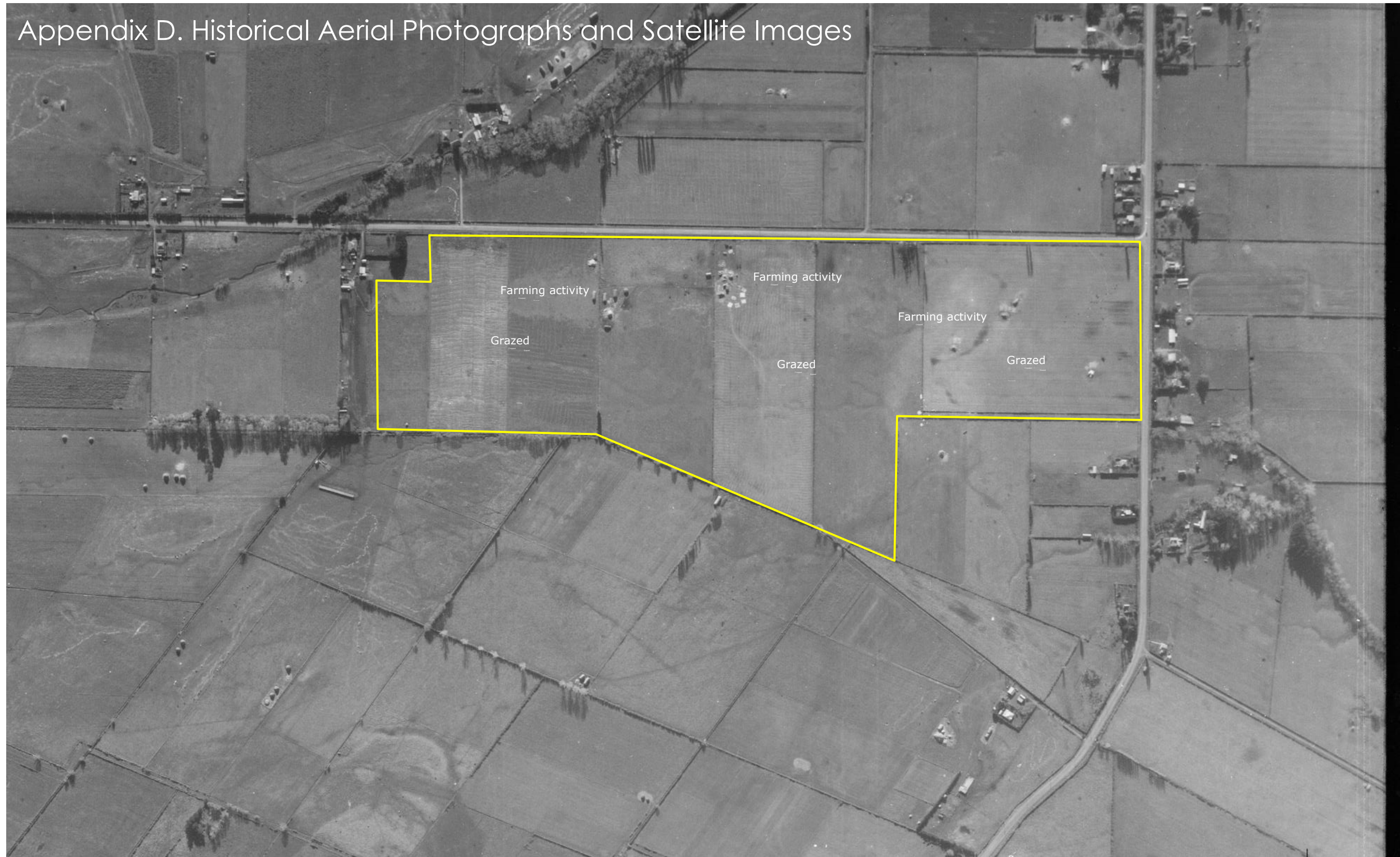
Records Found

No records found.

Property Search Results

	Legal Description	Titles	Valuation No	
1323 Main North Road (Sh1) (Wnd-Amb)				
1	Lot 1 DP 470921	637372	2159170000	✕

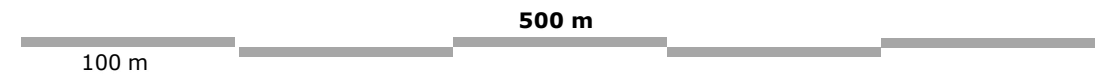
Appendix D. Historical Aerial Photographs and Satellite Images



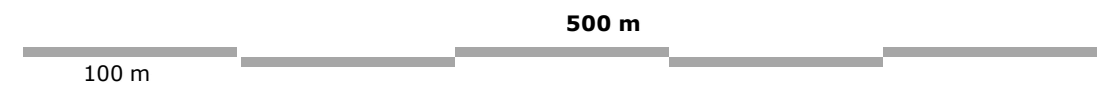
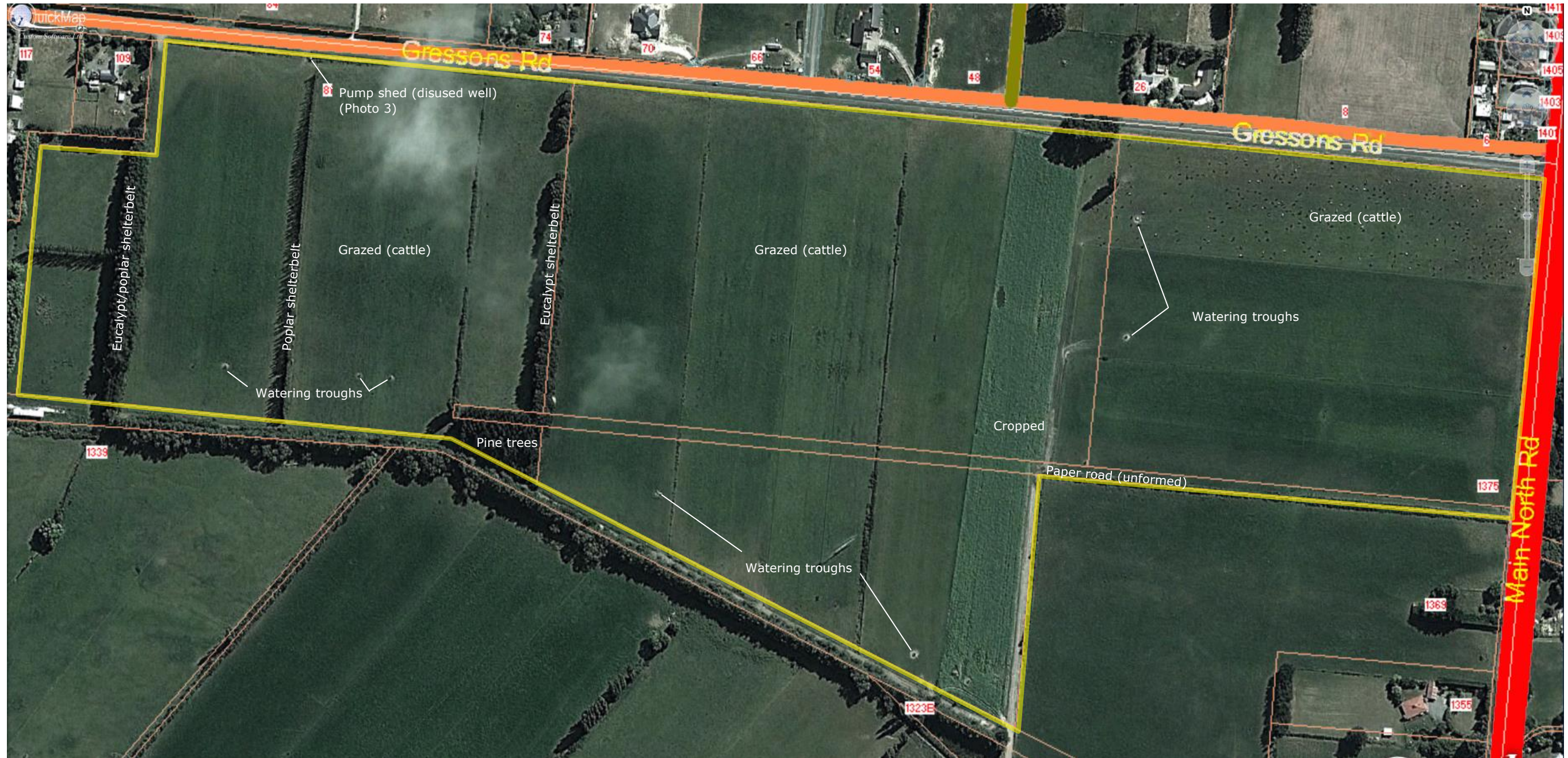
6/06/1942



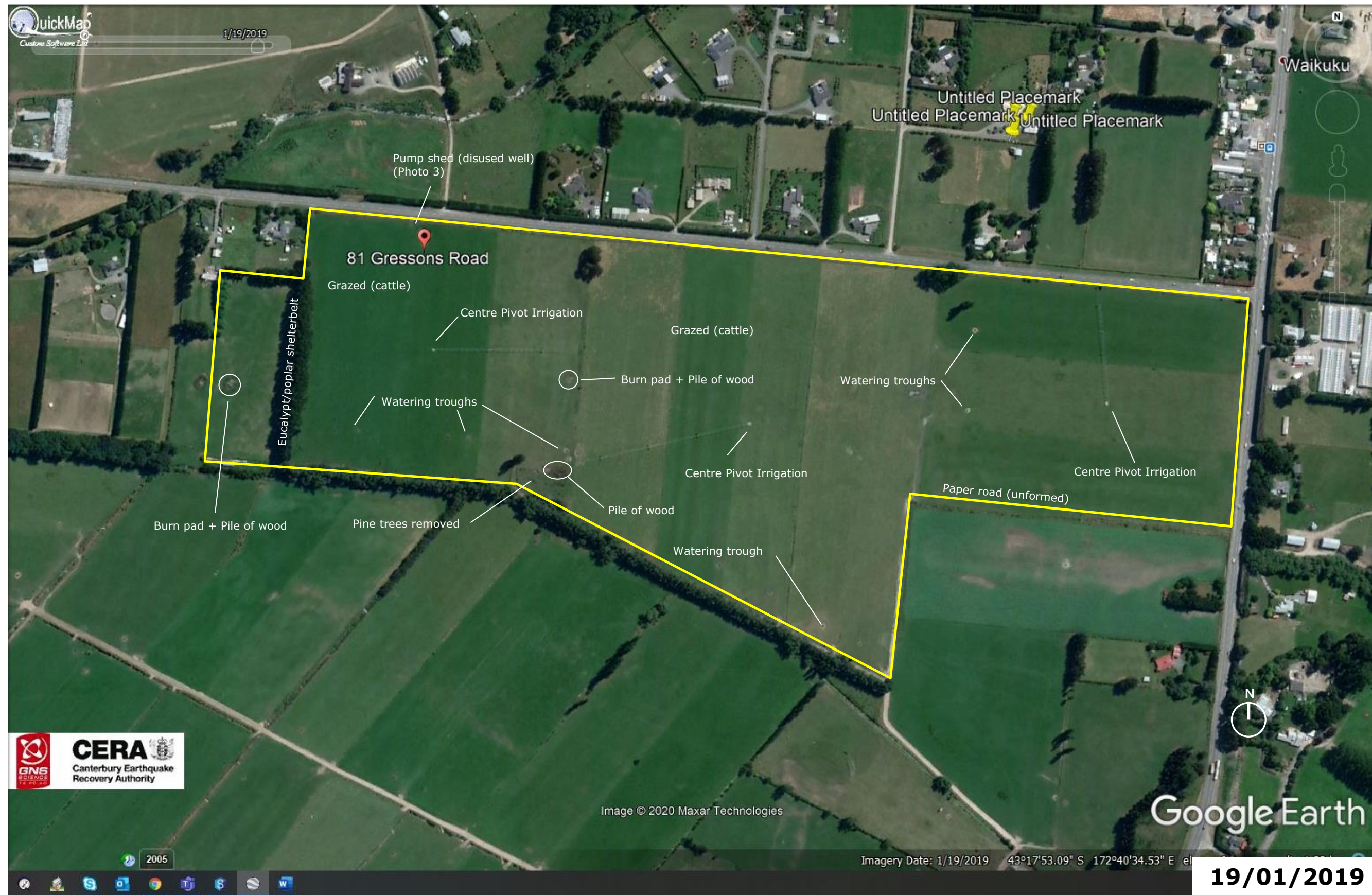
15/05/1963



22/04/2005



17/02/2013



Appendix E: Environment Canterbury Resource Consents



On the subject site:

- 1) Well M35/4266: 51mm well in pump shed. Well card status: 'Not used', updated in May 2016. No associated water permit. No dates in wellcard.
- 2) NCY880160: Surface water take. Expired in 1997.

Notes:

- 1) No discharge consents, above ground or below ground of hazardous storage consented.