

Appendix B

Contamination Reports



***DETAILED SITE INVESTIGATION
REMEDIATION ACTION PLAN
&
ASSESSMENT OF ENVIRONMENTAL EFFECTS
160 BREMNER ROAD
DRURY
AUCKLAND***

For the Attention of:

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Detailed Site Investigation

Karaka & Drury Consultant Limited - 160 Bremner Road, Drury

August 2016



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Detailed Site Investigation



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Executive Summary

Focus Environmental Services Limited was contracted by Karaka & Drury Consultant Limited to carry out a detailed site investigation at 160 Bremner Road, Drury, Auckland. The legal description of the site is Pt Lot 9 DP 12364 with an area of 94,249 m².

This environmental investigation was carried out in general accordance with the Contaminated Land Management Guidelines No. 1 and No.5 (MfE, 2011).

The report titled '*Preliminary Site Investigation, Oranga Bay Development, Auckland*' dated October 2015 and prepared by Focus Environmental Services Limited, identified a number of areas of potential contamination across the site and recommended a Detailed Site Investigation to determine the contamination status of the site.

Focus Environmental Services Limited personnel carried out the site inspection and intrusive investigation on 15th of October 2015 where four discrete surface samples (0.15 m) were taken from the area of the identified printing workshop (160 SS01 – 160 SS04), one discrete surface sample (0.0-0.15 m) was taken from the area of burning identified (160 BP01), and four surface samples (0.0-0.15 m) were taken from the area of potential spray race operations (160 SR01 – 160 SR04) identified on the site. The samples were sent under full chain of custody documentation to an IANZ accredited laboratory and analysed for a combination of arsenic, cadmium, chromium, copper, lead, nickel, zinc, organo-chlorine pesticides, poly-aromatic hydrocarbons and semi-volatile organic compounds.

The concentrations of arsenic detected at sampling locations 160 SS01, 160 SS02, 160 SS03, 160 SR01, 160 SR02, 160 SR03 and 160 SR04 and cadmium detected in sampling location 160 BP01 were elevated above the Soil Contaminant Standards for health (SCS_(health)) for residential land use (10% produce consumption) as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

The concentrations of cadmium, copper and zinc detected in sample 160 BP01 were also detected at levels above the discharge criteria of the Auckland Council Regional Plan: Air, Land and Water (ACRP:ALW) and the Proposed Auckland Unitary Plan (PAUP).

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

The site at 160 Bremner Road, Drury will require remediation of the affected soils prior to being redeveloped. It will be necessary to cut up to a depth of 0.25 m below the existing ground level to complete the required remedial works. The estimated volume of heavy metal contaminated soil requiring remediation is 89 m³, it should be noted that these volumes may change during the remedial process.

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

In order to undertake the remediation of the site a controlled activity short-term discharge consent under rule 5.5.44 of the ACRP:ALW will likely be required as the concentrations of contaminants detected at the site are elevated above the discharge criteria as outlined in Schedule 10 of the ACRP:ALW and as the proposed remediation works will not meet the requirements of the permitted activity rule 5.5.40.

In addition, a controlled activity consent under the PAUP will also likely be required under Rule H.4.5.2.2.2 as the concentrations of contaminants detected at the site exceed the discharge criteria as outlined in Table 1 of Chapter 4.5 of the PAUP and as the proposed remediation works will not meet the requirements of the permitted activity rule H.4.5.2.1.

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

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

Submitted By,



David O'Reilly
Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

- 1.1 This report has been prepared at the request of Karaka & Drury Consultant Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").
- 1.2 The following report is based on:
 - *Information provided by the client;*
 - *A review of the site's history;*
 - *The report titled 'Preliminary Site Investigation, Oranga Bay Development, Drury, Auckland' dated October 2015 and prepared by Focus Environmental Services Limited;*
 - *A site inspection; and*
 - *Site investigation and soil sampling.*
- 1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.
- 1.4 No warranties are given, intended or implied.
- 1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.
- 1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.
- 1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.
- 1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

2.0 Site Identification

The property is located at 160 Bremner Road, Drury, Auckland as shown in Figure 1 attached. The legal description of the site is Pt Lot 9 DP 12364 with an area of 94,249 m². The site is located at national grid reference 1772332mE and 5891880mN.

3.0 Geology and Hydrology

Published geological maps¹ indicate the site is typically underlain with alluvial deposits of the Puketoka Formation. A description of the underlying geologies is presented in Table1 below.

Table 1: Geology: 160 Bremner Road, Drury

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

No groundwater investigation was carried out as part of this investigation and groundwater was not encountered at any of the sampling locations.

¹ Geology of the Auckland Area (Institute of Geological & Nuclear Sciences 1:25,000 geological map 3, 2011)

4.0 Background

The history of the site has been described in detail in the report titled '*Preliminary Site Investigation, Oranga Bay Development, Drury, Auckland*' dated October 2015 and prepared by Focus Environmental Services Limited.

The preliminary site investigation for the site recommended a detailed site investigation to characterise the potential contamination associated with the former printing workshop, the evidence of burning and potential spray race operations identified at the site.

This document is intended to confirm the contamination status of the site at 160 Bremner Road.

5.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No.5 (MfE, 2011).

Four discrete surface samples (0.0-0.15 m) were taken from the area of the identified former printing workshop (160 SS01 - 160 SS04), one discrete surface sample (0.0-0.15 m) was taken from the area of burning identified (160 BP01), and four surface samples (0.0-0.15 m) were taken from the area of potential spray race operations (160 SR01 - 160 SR04)

The four surface samples 160 SS01 - 160 SS04 were sent under full chain of custody documentation to an IANZ accredited laboratory and analysed for:

- Total recoverable arsenic, cadmium, chromium, copper, lead, nickel and zinc;
- Semi-volatile organic compounds.

In addition, the discrete sample 160 BP01 was analysed for:

- Total recoverable arsenic, cadmium, chromium, copper, lead, nickel and zinc;
- poly-aromatic hydrocarbons; and
- benzo[a]pyrene toxic equivalence

And the discrete samples 160 SR01 - 160 SR04 were analysed for:

- Total recoverable arsenic, cadmium, chromium, copper, lead, nickel and zinc;
- organo-chlorine pesticides.

The sample location plan is provided as Figure 2.

6.0 Field Sampling Quality Assurance

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

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

7.0 Laboratory Quality Assurance

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

- Total Recoverable Metals - Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.
- Organo-chlorine pesticides - sonication extraction - OCP Screen method, air dry, grind, sonication extraction GC-ECD.
- Semivolatile Organic Compounds Screening in Soil by GC-MS - Sonication extraction, GPC cleanup (if required), GC-MS FS analysis. Tested on as received sample
- Poly-Aromatic Hydrocarbons - Sonication in DCM extraction, SPE cleanup, GC-FID & GC-MS analysis. Tested on as received sample. US EPA 8015B/MfE Petroleum Industry Guidelines.

8.0 Basis for Guideline Values

It is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of both the Auckland Council Regional Plan: Air, Land and Water and (ACRP:ALW) and the Proposed Auckland Unitary Plan (PAUP) are considered relevant and have been adopted as the site assessment criteria. In addition, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland² (TP153). The relevant values of the above guidelines have been reproduced in Table 2 below.

Table 2: Site assessment criteria for 160 Bremner Road, Drury (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	ACRP:ALW/ PAUP	TP153
Arsenic	20	100	12
Cadmium	3	7.5	0.65
Chromium	460	400	55
Copper	NL	325	45
Lead	210	250	65
Nickel	400 ¹	105	35
Zinc	7400 ¹	400	180
Total DDT	70	12/0.7 ²	-
Dieldrin	2.6	-	-
BaP eq.	10	2.15	-

Note: NL = Not Limited. 1. = No Soil Contaminant Standards for health ($SCSs_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 - Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for Low Density Residential land use; 2. = Denotes the two values specified for total DDT under the Auckland Council Regional Plan: Air, Land and Water, displayed as the guideline value for land not being redeveloped/guideline value for land undergoing development.

Furthermore, the natural background levels of organo-chlorine pesticides and poly-aromatic hydrocarbons are considered to be below the analytical levels of detection and hence the detection of these analytes would restrict material from being classified as cleanfill material.

² Auckland Regional Council Technical Publication No.153, Oct 2001 Reprinted April 2002 ISSN 1175 205X

9.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 3 to 6 below. Laboratory transcripts are provided in Appendix A.

9.1 Heavy Metals

Table 3: Heavy Metals Results for 160 Bremner Road (mg/kg).

Sample	As	Cd	Cr	Cu	Pb	Ni	Zn
160 SS01	59	0.86	22	49	134	24	128
160 SS02	64	1.39	18	40	105	16	160
160 SS03	51	0.73	52	68	101	11	169
160 SS04	9	0.28	15	27	52	11	144
160 BP01	19	11.8	33	4,700	128	45	1,670
160 SR01	22	1.16	23	179	28	7	330
160 SR02	68	0.61	45	73	24	8	177
160 SR03	21	0.53	21	29	23	8	129
160 SR04	31	0.56	22	32	23	9	120

Note: Results in **red** exceed the Soil Contaminant Standards for health (SCS_(health)) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Council Regional Plan: Air, Land and Water and the Proposed Auckland Unitary Plan. Results in *Italics* exceed the maximum Auckland background concentrations for volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

With the exception of sample 160 SS04, the concentrations of arsenic detected at all sampling locations were elevated above the maximum Auckland background concentrations for non-volcanic soils. With the exception of samples 160 SS04 and 160 BP01, the concentrations of arsenic detected at all sampling locations were elevated above the SCS_(health) for residential land use (10% produce consumption), as outlined in the NES. The concentration of arsenic detected in all samples were below the discharge criteria as outlined in ACRP:ALW and the PAUP.

With the exception of samples 160 SS04, 160 SR02, 160 SR03 & 160 SR04, the concentrations of cadmium detected at all sampling locations were elevated above the maximum Auckland background concentrations for non-volcanic soils. With the exception of sample 160 BP01, the concentrations of cadmium detected at all sampling locations were below the SCS_(health) for residential land use (10% produce consumption), as outlined in the NES and the discharge criteria, as outlined in ACRP:ALW and the PAUP.

The concentrations of chromium detected at all sampling locations were below the maximum Auckland background concentrations for non-volcanic soils, the SCS_(health) for residential land use (10% produce consumption), as outlined in the NES and the discharge criteria, as outlined in ACRP:ALW and the PAUP.

The concentrations of copper detected at sampling locations 160 SS03, 160 BP01, 160 SR01 and 160 SR02 were elevated above the maximum Auckland background concentrations for non-volcanic soils. The concentrations of copper detected at all sampling locations were below the SCS_(health) for residential land use (10% produce consumption), as outlined in the NES. The concentration of copper detected in sample

160 BP01 was elevated above the discharge criteria as outlined in ACRP:ALW and the PAUP.

The concentrations of lead detected at sampling locations 160 SS01 - 160 SS03 & 160 BP01 were elevated above the maximum Auckland background concentrations for non-volcanic soils. The concentrations of lead detected at all sampling locations were below the $SCS_{S(health)}$ for residential land use (10% produce consumption), as outlined in the NES and the discharge criteria, as outlined in ACRP:ALW and the PAUP.

The concentrations of nickel detected at all sampling locations were below the maximum Auckland background concentrations for non-volcanic soils, the $SCS_{S(health)}$ for residential land use (10% produce consumption), as outlined in the NES and the discharge criteria, as outlined in ACRP:ALW and the PAUP.

The concentrations of zinc detected at sampling locations 160 BP01 & 160 SR01 were elevated above the maximum Auckland background concentrations for non-volcanic soils. The concentration of zinc detected in sample 160 BP01 was also elevated above the discharge criteria as outlined in ACRP:ALW and the PAUP. The concentrations of zinc detected at all sampling locations were below the $SCS_{S(health)}$ for residential land use (10% produce consumption), as outlined in the NES.

9.2 Organo-Chlorine Pesticides

Table 4: Organo-chlorine Pesticides Results for 160 Bremner Road (mg/kg).

Sample	Total DDT	Dieldrin
160 SS01	-	-
160 SS02	-	-
160 SS03	-	-
160 SS04	-	-
160 BP01	-	-
160 SR01	< 0.06	< 0.010
160 SR02	< 0.06	< 0.010
160 SR03	< 0.06	< 0.010
160 SR04	< 0.06	< 0.010

Note: Results in **red** exceed the Soil Contaminant Standards for health ($SCS_{S(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Council Regional Plan: Air, Land and Water and the Proposed Auckland Unitary Plan. Results in *Italics* exceed the cleanfill criteria.

The concentration of organo-chlorine pesticides in the soils at all sampling locations were below the analytical limits of detection and the cleanfill criteria.

The organo-chlorine pesticide concentrations of all samples collected were below the $SCS_{S(health)}$ for residential land use outlined in the NES and the discharge criteria of the ACRP:ALW and PAUP.

9.3 Poly-Aromatic Hydrocarbons

Table 5: Polycyclic Aromatic Hydrocarbon Results for 160 Bremner Road (mg/kg).

Sample	BaP eq.
160 BP01	< 0.1

Note: Results in **red** exceed the Soil Contaminant Standards for health (SCS_(health)) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Council Regional Plan: Air, Land and Water and the Proposed Auckland Unitary Plan. Results in *Italics* exceed the cleanfill criteria.

The concentration of polycyclic aromatic hydrocarbons at all sampling locations were below the analytical limits of detection and the cleanfill criteria.

The benzo[a]pyrene concentrations of all samples collected were below the SCS_(health) for residential land use outlined in the NES and the discharge criteria of the ACRP:ALW and PAUP.

9.4 Semi-Volatile Organic Compounds

Table 6: Semi-Volatile Organic Compound Results for 160 Bremner Road (mg/kg).

Sample	sVOCs
160 SS01	ND
160 SS02	ND
160 SS03	ND
160 SS04	ND

Note: ND = Non-Detect. Results in **red** exceed the Soil Contaminant Standards for health (SCS_(health)) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Council Regional Plan: Air, Land and Water and the Proposed Auckland Unitary Plan. Results in *Italics* exceed the cleanfill criteria.

The concentration of Semi-Volatile Organic Compounds at all sampling locations were below the analytical limits of detection and the cleanfill criteria.

10.0 Extent of Contamination

The results of the sample analysis indicate that the site soils in specific locations at 160 Bremner Road contain concentrations of contaminants elevated above the $SCS_{(health)}$ for residential land use as outlined in the NES and/or the discharge criteria of the ACRP:ALW and PAUP.

The estimated volume required to remove the contaminated soils from the site is presented in Table 7 below.

Table 7: Estimated Excavation Volumes at 160 Bremner Road, Drury.

	Area (m ²)	Depth (m)	Quantity (m ³)
Area 1	124	0.25	31
Area 2	4	0.25	1
Area 3	229	0.25	57
Total Volume			89
Total Tonnes (m ³ x 1.5)			133.5 t

The inferred extent of the contaminated soils at the site is presented in Figure 3. This estimate is based on the sampling and results available following the site investigation and it should be noted that the volume may increase or decrease following inspection, XRF screening and validation sampling.

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

Furthermore, due to the low level contamination identified across the area of sampling at the site, the site soils in this area are not suitable for classification as cleanfill and any topsoil removed from this area will require disposal at a suitably licensed disposal facility.

11.0 Regulatory Requirements

11.1 The National Environmental Standard

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

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

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

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is changing the use of a piece of land under regulation 5(6) 'means changing it to a use that, because the land is described in subclause (7), is reasonably likely to harm human health'.

- The activity is subdividing land under regulation 5(5)(c) 'means subdividing land that has part of the piece of land within its boundaries'.
- The activity of changing use and subdividing does not comply with regulation 8(4).
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity does not comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m³ per 500m²'.
- A detailed site investigation for the piece of land does exist.

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

11.2 Auckland Council Regional Plan: Air, Land and Water

Consent will likely be required under the Auckland Council Regional Plan: Air, Land and Water (ACRP:ALW) as the concentrations of contaminants detected at the sites are above the discharge criteria as outlined in Schedule 10 of the ACRP:ALW.

Rule 5.5.44 of the ACRP:ALW covers the discharge of contaminants to land or water from land containing elevated levels of contaminants that is undergoing remediation or land disturbance that does not meet the standards, terms and conditions of the permitted activity rule 5.5.40.

The proposal will not meet the definition of rule 5.5.40 because the works are not considered to be trenching or small-scale disturbance as allowed by rule 5.5.40.

In order to undertake the remediation of the site a controlled activity consent will likely be required under rule 5.5.44 of the ACRP:ALW.

11.3 Proposed Auckland Unitary Plan

The contaminated land rules of the Proposed Auckland Unitary Plan (PAUP) have immediate legal effect following its notification. As the PAUP was notified on the 30th of September 2013 the contaminated land rules of the PAUP must be considered.

Consent will likely be required under the PAUP as the concentrations of contaminants detected at the site are above the discharge criteria as outlined in Table 1 of Chapter 4.5 of the PAUP.

A controlled activity consent will likely be required under Rule H.4.5.2.2.2 of the PAUP as the proposed remediation works will not meet the requirements of the permitted activity rule H.4.5.2.1

12.0 Remediation Action Plan

12.1 Remediation Criteria

The objectives for the remediation of the site are to remediate the affected soils to levels below the applicable guideline values (as specified in Table 2) to address the immediate human health and environmental concerns at the site. Remediation of the site in the areas shown in Figure 3 will be necessary to achieve compliance with the above guidelines.

The remediation strategy for the site will involve the machine excavation and loading of the affected site soils prior to transport and disposal. The site will then be subject to a process of validation whereby the remaining soils will be sampled to confirm that the objectives of the remediation for the site have been achieved. The remediation criteria for the site are presented in Tables 8 - 10 below.

Table 8: Remediation criteria for Area 1 - 160 Bremner Road (mg/kg).

Parameter	Value
Arsenic	20

Table 9: Remediation criteria for Area 2 - 160 Bremner Road (mg/kg).

Parameter	Value
Cadmium	7.5
Copper	325
Zinc	400

Table 10: Remediation criteria for Area 3 - 160 Bremner Road (mg/kg).

Parameter	Value
Arsenic	20

12.2 Work Programme

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

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

- Install facilities on site which include a clean area for staff, a decontamination area and washing facilities.
- Connect a water source and/or misting system to control any dusts that may be generated as a result of the works. This misting system must be capable of reaching all areas of the site during the ground breaking works.

- Install sediment and erosion controls for the development works in accordance with the Auckland Regional Councils Guidelines for Land Disturbing Activities in the Auckland Region, Technical Publication No. 90.
- Machine excavate the contaminated soils from the site and load the materials onto waiting trucks.
- Ensure that the trucks leaving the site are fitted with close fitting tarpaulins and have sealed tailgates.
- Once the trucks have been inspected to ensure that the tarpaulins are properly fitted and the tires are free from any contaminated materials, transport the contaminated soils to a suitable disposal location and retain any weighbridge dockets obtained.
- Carry out the validation process and undertake any further remedial works required to achieve the remediation goals.
- Once all contaminated soil has been removed and the remediation goals achieved then the site will be reinstated with clean fill materials if required and the site stabilized.

12.3 Establishment and Site Preparation

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

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

12.4 Excavation, Haulage and Disposal of Materials

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

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

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

All materials leaving the site will be tracked by way of weighbridge dockets which include the disposal location and the weight of the load.

12.5 Validation Sampling

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

Site validation sampling will be completed at a frequency sufficient to meet the requirements of the Contaminated Land Management Guidelines No.5 (MfE, 2011).

12.6 Imported Fill Validation (If Required)

Any materials imported onto the site if required to reinstate the ground will have to be tested to ensure their suitability as clean fill materials. Any soil material imported to the site shall comply with the definition of 'cleanfill', as per Ministry for the Environment MfE document 'A Guide to the Management of Cleanfills (2002)'.

All imported materials shall be tested at a rate of no less than 1 sample per 500m³ by a suitably qualified and experienced contaminated land professional.

13.0 Assessment of Environmental Effects

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

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

13.1 Dust Control

If conditions are dry during the remedial works dust deposition could occur. Dust will be controlled in accordance with the Good Practice Guidelines for Assessing and Managing the Environmental Effects of Dust Emissions, Ministry for the Environment (2001). In order to mitigate against the effects of dust regular damping down of soil with a misting system may be required if excavation is undertaken during periods of dry weather.

13.2 Health and Safety Measures

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

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

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

13.3 Stormwater, Erosion & Sediment Control

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

Erosion and sediment control measures will be carried out in accordance with the Auckland Regional Councils Guidelines for Land Disturbing Activities in the Auckland Region, Technical Publication No. 90³.

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

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

13.4 Odour Control

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

13.5 Contingency Measures

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

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

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

³ Auckland Regional Council, Erosion & Sediment Control, Guidelines for Land Disturbing Activities in the Auckland Region, March 1999, Technical Publication No. 90

14.0 Conclusions and Recommendations

The report titled '*Preliminary Site Investigation, Oranga Bay Development, Auckland*' dated October 2015 and prepared by Focus Environmental Services Limited, identified a number of areas of potential contamination across the site and recommended a Detailed Site Investigation to determine the contamination status of the site.

Focus Environmental Services Limited personnel carried out the site inspection and intrusive investigation on 15th of October 2015 where four discrete surface samples (0.15 m) were taken from the area of the identified printing workshop (160 SS01 – 160 SS04), one discrete surface sample (0.0-0.15 m) was taken from the area of burning identified (160 BP01), and four surface samples (0.0-0.15 m) were taken from the area of potential spray race operations (160 SR01 – 160 SR04) identified on the site. The samples were sent under full chain of custody documentation to an IANZ accredited laboratory and analysed for a combination of arsenic, cadmium, chromium, copper, lead, nickel, zinc, organo-chlorine pesticides, poly-aromatic hydrocarbons and semi-volatile organic compounds.

The concentrations of arsenic detected at sampling locations 160 SS01, 160 SS02, 160 SS03, 160 SR01, 160 SR02, 160 SR03 and 160 SR04 and cadmium detected in sampling location 160 BP01 were elevated above the Soil Contaminant Standards for health (SCS_(health)) for residential land use (10% produce consumption) as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

The concentrations of cadmium, copper and zinc detected in sample 160 BP01 were also detected at levels above the discharge criteria of the Auckland Council Regional Plan: Air, Land and Water (ACRP:ALW) and the Proposed Auckland Unitary Plan (PAUP).

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

The site at 160 Bremner Road, Drury will require remediation of the affected soils prior to being redeveloped. It will be necessary to cut up to a depth of 0.25 m below the existing ground level to complete the required remedial works. The estimated volume of heavy metal contaminated soil requiring remediation is 89 m³, it should be noted that these volumes may change during the remedial process.

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

In order to undertake the remediation of the site a controlled activity short-term discharge consent under rule 5.5.44 of the ACRP:ALW will likely be required as the concentrations of contaminants detected at the site are elevated above the discharge criteria as outlined in Schedule 10 of the ACRP:ALW and as the proposed remediation works will not meet the requirements of the permitted activity rule 5.5.40.

In addition, a controlled activity consent under the PAUP will also likely be required under Rule H.4.5.2.2.2 as the concentrations of contaminants detected at the site exceed the discharge criteria as outlined in Table 1 of Chapter 4.5 of the PAUP and as the proposed remediation works will not meet the requirements of the permitted activity rule H.4.5.2.1.

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

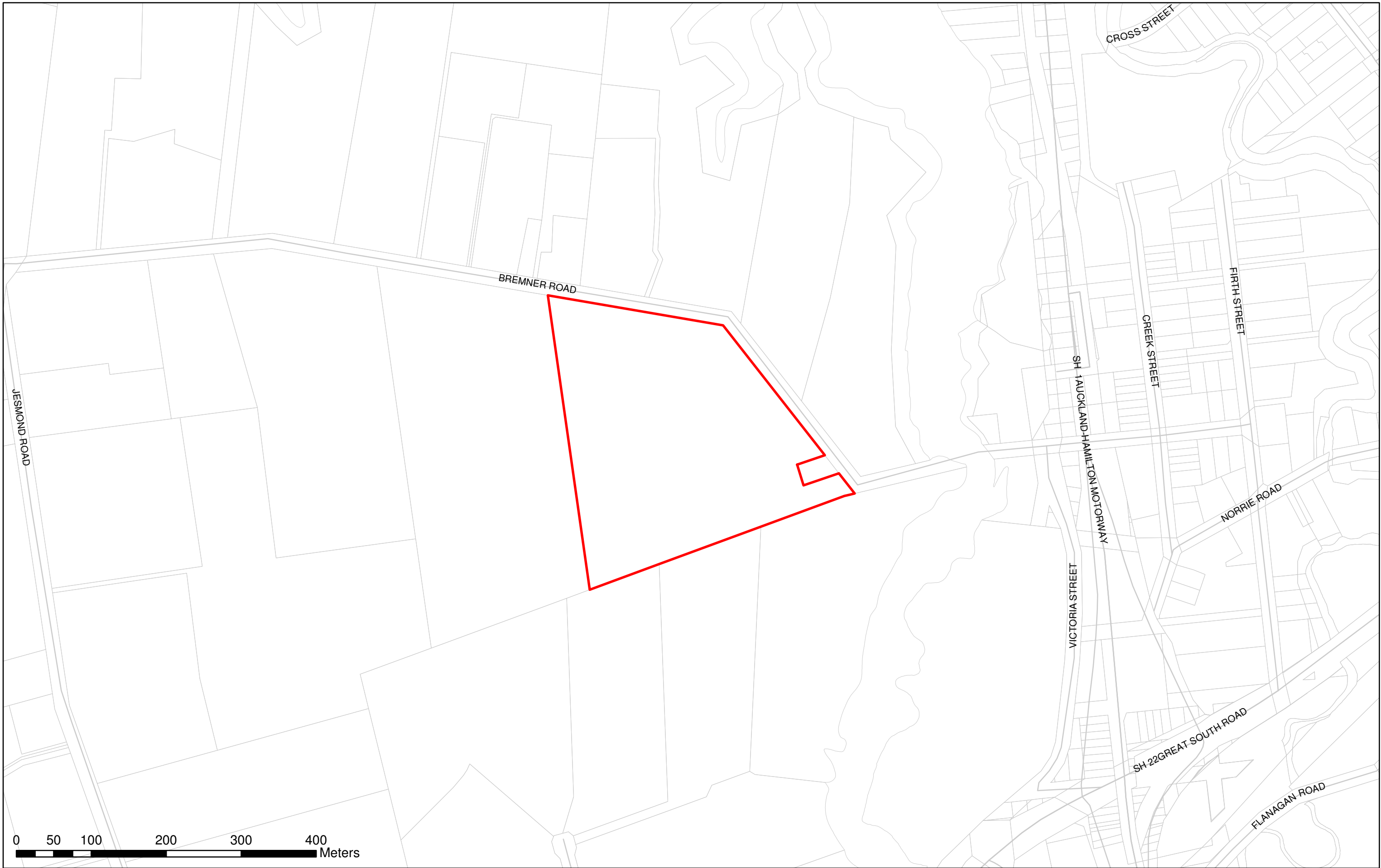
An assessment of the effects which may occur as a result of the proposed works has been made in order to mitigate any potential adverse environmental and/or human health effects. If the controls outlined in this Remediation Action Plan are implemented during the development works it is considered that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

Figures

Figure 1 - Site Location Plan

Figure 2 - Sample Location Plan


Figure 3 - Inferred Area and Depth of Contamination




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 Auckland

Figure 1: Site Location Plan
 DSI, RAP & AEE


 0447.002.03

Drawing Number: 0447.002.03.01
 Drawn By: SW
 Checked By: DO'R
 Date: 11/08/2016



Legend


- Sample Location
- Site Boundary



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Figure 2: Sample Location Plan
 DSI, RAP & AEE



0447.002.03

Drawing Number: 0447.002.03.02
Drawn By: SW
Checked By: DO'R
Date: 11/08/2016



Legend

- Sample Location
- Remediation Area
- Site Boundary


	Area (m ²)	Depth (m)	Quantity (m ³)
Area 1	124	0.25	31
Area 2	4	0.25	1
Area 3	229	0.25	57
Total Volume			89
Total Tonnes (m ³ x 1.5)			133.5 t



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Figure 3: Inferred Area of Contamination
 DSI, RAP & AEE



0447.002.03

Drawing Number: 0447.002.03.03
 Drawn By: SW
 Checked By: DO'R
 Date: 09/08/2016

Appendices

Appendix A - Laboratory Transcripts

ANALYSIS REPORT

Page 1 of 4

Client:	Focus Environmental Services Limited	Lab No:	1489991	SPV4
Contact:	Sam Woolley C/- Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542	Date Received:	17-Oct-2015	
		Date Reported:	29-Jul-2016	
		Quote No:		
		Order No:		
		Client Reference:	0447.002	
		Submitted By:	Sam Woolley	

Sample Type: Soil						
Sample Name:		160 BP01 15-Oct-2015	160 SR01 15-Oct-2015	160 SR02 15-Oct-2015	160 SR03 15-Oct-2015	160 SR04 15-Oct-2015
Lab Number:		1489991.12	1489991.13	1489991.14	1489991.15	1489991.16
Individual Tests						
Dry Matter	g/100g as rcvd	55	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg dry wt	< 0.10	-	-	-	-
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	19	22	68	21	31
Total Recoverable Cadmium	mg/kg dry wt	11.8	1.16	0.61	0.53	0.56
Total Recoverable Chromium	mg/kg dry wt	33	23	45	21	22
Total Recoverable Copper	mg/kg dry wt	4,700	179	73	29	32
Total Recoverable Lead	mg/kg dry wt	128	28	24	23	23
Total Recoverable Nickel	mg/kg dry wt	45	7	8	8	9
Total Recoverable Zinc	mg/kg dry wt	1,670	330	177	129	120
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
alpha-BHC	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
beta-BHC	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
delta-BHC	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
cis-Chlordane	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
trans-Chlordane	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	< 0.04	< 0.04	< 0.04	< 0.04
2,4'-DDD	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
4,4'-DDD	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
2,4'-DDE	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
4,4'-DDE	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
2,4'-DDT	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
4,4'-DDT	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Total DDT Isomers	mg/kg dry wt	-	< 0.06	< 0.06	< 0.06	< 0.06
Dieldrin	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endosulfan I	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endosulfan II	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endosulfan sulphate	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endrin	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endrin aldehyde	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Endrin ketone	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Heptachlor	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Heptachlor epoxide	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Hexachlorobenzene	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010

Sample Type: Soil						
Sample Name:	160 BP01 15-Oct-2015	160 SR01 15-Oct-2015	160 SR02 15-Oct-2015	160 SR03 15-Oct-2015	160 SR04 15-Oct-2015	
Lab Number:	1489991.12	1489991.13	1489991.14	1489991.15	1489991.16	
Organochlorine Pesticides Screening in Soil						
Methoxychlor	mg/kg dry wt	-	< 0.010	< 0.010	< 0.010	< 0.010
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	< 0.04	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.04	-	-	-	-
Anthracene	mg/kg dry wt	< 0.04	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.04	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.04	-	-	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.04	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.04	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.04	-	-	-	-
Chrysene	mg/kg dry wt	< 0.04	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.04	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.04	-	-	-	-
Fluorene	mg/kg dry wt	< 0.04	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.04	-	-	-	-
Naphthalene	mg/kg dry wt	0.2	-	-	-	-
Phenanthrene	mg/kg dry wt	0.16	-	-	-	-
Pyrene	mg/kg dry wt	0.05	-	-	-	-
Sample Name:	160 SS01 15-Oct-2015	160 SS02 15-Oct-2015	160 SS03 15-Oct-2015	160 SS04 15-Oct-2015		
Lab Number:	1489991.17	1489991.18	1489991.19	1489991.20		
Individual Tests						
Dry Matter	g/100g as rcvd	83	72	64	68	-
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	59	64	51	9	-
Total Recoverable Cadmium	mg/kg dry wt	0.86	1.39	0.73	0.28	-
Total Recoverable Chromium	mg/kg dry wt	22	18	52	15	-
Total Recoverable Copper	mg/kg dry wt	49	40	68	27	-
Total Recoverable Lead	mg/kg dry wt	134	105	101	52	-
Total Recoverable Nickel	mg/kg dry wt	24	16	11	11	-
Total Recoverable Zinc	mg/kg dry wt	128	160	169	144	-
Haloethers in SVOC Soil Samples by GC-MS						
Bis(2-chloroethoxy) methane	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Bis(2-chloroethyl)ether	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Bis(2-chloroisopropyl)ether	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
4-Bromophenyl phenyl ether	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
4-Chlorophenyl phenyl ether	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Nitrogen containing compounds in SVOC Soil Samples by GC-MS						
2,4-Dinitrotoluene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
2,6-Dinitrotoluene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Nitrobenzene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
N-Nitrosodi-n-propylamine	mg/kg dry wt	< 3	< 3	< 4	< 4	-
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Aldrin	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
alpha-BHC	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
beta-BHC	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
delta-BHC	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
gamma-BHC (Lindane)	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
4,4'-DDD	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
4,4'-DDE	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
4,4'-DDT	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Dieldrin	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-

Sample Type: Soil						
Sample Name:	160 SS01 15-Oct-2015	160 SS02 15-Oct-2015	160 SS03 15-Oct-2015	160 SS04 15-Oct-2015		
Lab Number:	1489991.17	1489991.18	1489991.19	1489991.20		
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Endosulfan I	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Endosulfan II	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Endosulfan sulphate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Endrin	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Endrin ketone	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Heptachlor	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Heptachlor epoxide	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Hexachlorobenzene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS						
Acenaphthene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Acenaphthylene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Anthracene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Benzo[a]anthracene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Benzo[k]fluoranthene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
1&2-Chloronaphthalene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Chrysene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Fluoranthene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Fluorene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
2-Methylnaphthalene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Naphthalene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Phenanthrene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Pyrene	mg/kg dry wt	< 0.7	< 0.8	< 0.9	< 0.8	-
Phenols in SVOC Soil Samples by GC-MS						
4-Chloro-3-methylphenol	mg/kg dry wt	< 5	< 5	< 5	< 5	-
2-Chlorophenol	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
2,4-Dichlorophenol	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
2,4-Dimethylphenol	mg/kg dry wt	< 3	< 3	< 3	< 3	-
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	< 3	< 3	< 4	< 4	-
2-Methylphenol (o-Cresol)	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
2-Nitrophenol	mg/kg dry wt	< 5	< 5	< 5	< 5	-
Pentachlorophenol (PCP)	mg/kg dry wt	< 30	< 30	< 40	< 40	-
Phenol	mg/kg dry wt	< 3	< 3	< 4	< 4	-
2,4,5-Trichlorophenol	mg/kg dry wt	< 3	< 3	< 4	< 4	-
2,4,6-Trichlorophenol	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Plasticisers in SVOC Soil Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	< 6	< 6	< 7	< 7	-
Butylbenzylphthalate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Di(2-ethylhexyl)adipate	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Diethylphthalate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Dimethylphthalate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Di-n-butylphthalate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Di-n-octylphthalate	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Other Halogenated compounds in SVOC Soil Samples by GC-MS						
1,2-Dichlorobenzene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
1,3-Dichlorobenzene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
1,4-Dichlorobenzene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Hexachlorobutadiene	mg/kg dry wt	< 3	< 3	< 4	< 4	-
Hexachloroethane	mg/kg dry wt	< 3	< 3	< 4	< 4	-

Sample Type: Soil						
Sample Name:		160 SS01 15-Oct-2015	160 SS02 15-Oct-2015	160 SS03 15-Oct-2015	160 SS04 15-Oct-2015	
Lab Number:		1489991.17	1489991.18	1489991.19	1489991.20	
Other Halogenated compounds in SVOC Soil Samples by GC-MS						
1,2,4-Trichlorobenzene	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Other compounds in SVOC Soil Samples by GC-MS						
Benzyl alcohol	mg/kg dry wt	< 13	< 15	< 17	< 16	-
Carbazole	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Dibenzofuran	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-
Isophorone	mg/kg dry wt	< 1.3	< 1.5	< 1.7	< 1.6	-

Analyst's Comments

Supplement to test report 1489991v1 issued on the 3/11/15.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	12-20
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	12-20
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).. Tested on dried sample	0.010 - 0.06 mg/kg dry wt	13-16
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	12
Semivolatle Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GPC cleanup (if required), GC-MS FS analysis. Tested on as received sample	0.3 - 30 mg/kg dry wt	17-20
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	12, 17-20
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	12-20
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	BaP Potency Equivalence calculated from Benz(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1 + Chrysene x 0.01 + Dibenz(a,h)anthracene x 1 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	12

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

***PRELIMINARY SITE INVESTIGATION
AURANGA DEVELOPMENT
STAGE B1 SITES
AUCKLAND***

For the Attention of:

Karaka and Dury Limited



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Appendices

Appendix A – Site Contour Plans

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Appendix C (1) – Historical Site Photographs

Appendix C (2) – Historical Site Photographs

Appendix D – Site Contamination Enquiry

Appendix E – Historic Certificate of Title

Appendix F – Site Inspection Photographs

Executive Summary

Focus Environmental Services Limited was contracted by Karaka & Drury Consultant Limited to carry out a Preliminary Site Investigation of the 21 properties located at Bremner Road, Jesmond Road and Burberry Road, Drury, Auckland forming the Auranga Development.

This investigation was completed to provide information on potential contamination at the sites as a result of historical and/or current land uses, and may be used to support an application to develop the site.

This Preliminary Site Investigation has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No.5 (Ministry for the Environment, 2011).

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a review of the Auckland Council property file, a review of the historical certificate of title and a contaminated sites enquiry to Auckland Council. During the review of the available information any potentially contaminating activities or land uses were identified.

Following the desk top assessment, the sites were visited and a site inspection and walk over was carried out. The sites were inspected by Focus Environmental Services Limited personnel on dates between the 24th of January 2017 and the 3rd of February 2017. During the site inspection, any potentially contaminating activities or land uses were identified.


In summary, following the desk top assessment and site inspection and walkover, evidence of burning, potential spray race operations and storage of potentially treated timber were noted for 321 Bremner Road; evidence of hydrocarbon contamination, evidence of microbiological contamination and burning of potentially treat timber furniture were noted for 325 Bremner Road; evidence of burning, suspected uncertified fill material and a mechanical workshop were noted for 329 Bremner Road; potentially uncertified fill material, evidence of burning, storage of potentially treated timber, and evidence of fuel storage was noted for 333 Bremner Road; potential spray race operations and potential hydrocarbon contamination were noted for 389 Bremner Road; a single area of burning was noted for 403 Bremner Road; potential spray race operation were noted for 415 Bremner Road; storage of potentially treated timber was noted at 420-417 Bremner Road; evidence of horticultural activities were noted at 421 Bremner Road; evidence of microbiological contamination and evidence of potential ACM ground contamination were noted for the Esplanade Reserve; evidence of former horticultural activities, evidence of microbiological contamination, burning and potentially uncertified fill materials were noted for 221 Jesmond Road; evidence of rubber shaving on the base of the training arena were noted for 235 Jesmond Road; evidence of burning, evidence of potentially uncertified fill material, suspected spray race operations and potential ACM ground contamination were noted for 281 Jesmond Road; evidence of horticultural activities and potentially uncertified fill material were noted for 341 Jesmond Road; evidence of horticultural activities were noted for 401 Jesmond Road; evidence of horticultural activities and fuel storage were noted for 451 Jesmond Road. No potentially contaminating land uses and/or activities were identified at the site at 389 Bremner Road, 393 Bremner Road, 385 Bremner Road, 30 Burberry Road and 41 Burberry Road Drury.

The information obtained of the sites history and from the site inspection and walk over was assessed to determine if any potential hazardous activities listed on the Hazardous Activities and Industries List (HAIL) had occurred on site as a result of past or current land use.

Due to the potential sources of contamination identified at the above sites it is considered that there is evidence to suggest that an activity outlined in the HAIL list has been, or is currently being, carried out on the following sites; 321 Bremner Road, 325 Bremner Road, 329 Bremner Road, 333 Bremner Road, 403 Bremner Road, 415 Bremner Road, 420-417 Bremner Road, 421 Bremner Road, 221 Jesmond Road, 235 Jesmond Road, 281 Jesmond Road, 341 Jesmond Road, 401 Jesmond Road, 451 Jesmond Road and 38 Burberry Road.

Prior to the development of the areas of the site where potentially contaminating land uses and/or activities have taken place, a detailed site investigation is recommended. The detailed site investigation would confirm if the identified land uses and/or activities have affected the site soils and will confirm the consenting requirements for these areas of the site.

Submitted by,



David O'Reilly
Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

- 1.1 This report has been prepared at the request of Karaka & Drury Consultant Limited ("the Client") in terms of the Focus Environmental Services Agreement ("Agreement").
- 1.2 The following report is based on:
 - *Information provided by the client;*
 - *A review of historical aerial photographs available for the site;*
 - *A review of the historical Certificate of Title;*
 - *A search of the Auckland Council Property File;*
 - *A search of the Auckland Council Contaminated Sites Database; and*
 - *A site walkover and inspection.*
- 1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.
- 1.4 No warranties are given, intended or implied.
- 1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.
- 1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.
- 1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services.
- 1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services.

2.0 Site Identification

The site consists of 21 properties located at Bremner Road, Jesmond Road and Burberry Road, Drury, Auckland as shown in Figure 1 attached. The site is located at national grid references 1771429mE & 5892088mN.

The site identification details are provided in Table 1 below.

Table 1: Site Identification Details: Auranga Development, Drury, Auckland.

Physical Address	Legal Description	Area (m ²)
321 Bremner Road, Drury	Lot 1 DP 333158	7,588
325 Bremner Road, Drury	Lot 8 DP 108332	20,207
329 Bremner Road, Drury	Lot 2 DP 110747	36,340
333 Bremner Road, Drury	Lot 1 DP 110747	45,500
385 Bremner Road, Drury	Lot 2 DP 123902	38,156
389 Bremner Road, Drury	Lot 2 DP 123093	26,114
393 Bremner Road, Drury	Lot 2 DP 123093	42,791
403 Bremner Road, Drury	Lot 1 DP 123093	20,245
415 Bremner Road, Drury	Lot 2 DP 103283	124,370
420-417 Bremner Road, Drury	Lot 2 DP 333158	93,154
421 Bremner Road, Drury	Lot 1 DP 333158	6,911
Esplanade Reserve	Lot 3 DP 103283	-
	Lot 4 DP 106762	-
	Lot 9 DP 108332	-
221 Jesmond Road, Drury	Lot 2 DP 170365	61,050
235 Jesmond Road, Drury	Lot 1 DP 170365	41,030
281 Jesmond Road, Drury	Lot 1 DP 89570	44,185
341 Jesmond Road, Drury	Lot 2 DP 164625	85,860
401 Jesmond Road, Drury	Lot 1 DP 139636	41,000
451 Jesmond Road, Drury	Lot 2 DP 371107	15,070
30 Burberry Road, Drury	Lot 6 DP 193594	39,190
38 Burberry Road, Drury	Lot 15 DP 193594	59,840
41 Burberry Road, Drury	Lot 7 DP 166291	40,005

3.0 Site Topography

The properties of the Auranga Development contain undulating landscapes with numerous gullies and surface water bodies. Descriptions of the topographies of the individual sites are provided below.

The site contour plans are presented in Appendix A.

3.1 321 Bremner Road

The property at 321 Bremner Road is predominantly flat with a gentle slope towards a gully system which runs through the central portion of the site.

An unnamed tributary of the Drury Creek extends through the central portion of the site.

3.2 325 Bremner Road

The property at 325 Bremner Road is undulating with a gradual slope towards gully system running through the central portion of the site.

An unnamed tributary of the Drury Creek extends through the central portion of the site.

3.3 329 Bremner Road

The property at 329 Bremner Road is predominantly flat which the highest point of the site occurring where the residential area is located.

The Drury Creek which is located approximately 40m to the north of the site.

3.4 333 Bremner Road

The property at 333 Bremner Road is predominantly flat which the highest point of the site occurring where the residential area is located.

The Drury Creek which is located approximately 35m to the north of the site.

3.5 385 Bremner Road

The property at 385 Bremner Road is predominantly flat with a gradual slope northwards from the southern portion of the site.

The Drury Creek which is located approximately 190m to the north of the site.

3.6 389 Bremner Road

The property at 389 Bremner Road is predominantly flat with a gentle slope on the northern boundary towards the Esplanade Reserve.

The Drury Creek which is located approximately 35m to the north of the site.

3.7 393 Bremner Road

The property at 393 Bremner Road is predominantly flat with a gradual slope northwards from the south-western corner of the site.

The Drury Creek which is located approximately 160m to the north east of the site.

3.8 403 Bremner Road

The property at 389 Bremner Road is predominantly flat.

The Drury Creek which is located approximately 45m to the north east of the site.

3.9 415 Bremner Road

The property at 415 Bremner Road is predominantly flat with a gradual slope northwards from the south-eastern corner of the site. The northern section of the site slopes towards the Drury Creek.

The Drury Creek which is located approximately 30m to the north and east of the site.

3.10 420-417 Bremner Road

The property at 420-417 Bremner Road is predominantly flat, with a general slope towards the Esplanade Reserve on the southern boundary of the property.

The Drury Creek is situated approximately 27m from the north-western boundary of the site.

3.11 421 Bremner Road

The property at 421 Bremner Road is predominantly flat.

The Drury Creek is situated approximately 35m from the western boundary of the site.

3.12 Esplanade Reserve

Lot 3 DP 103283 is undulating with a sloping ridge towards the Drury Creek.

The Drury Creek extends along the boundary of the site.

3.13 221 Jesmond Road

The property at 221 Jesmond Road is undulating with the highest point occurring in the central portion of the site.

An unnamed tributary of the Drury Creek extends through the south-eastern portion of the site

3.14 235 Jesmond Road

The property at 235 Jesmond Road is undulating with the highest point of the site occurring where the residential area is located.

An unnamed tributary to the Drury Creek is located approximately 50m south east of the site.

3.15 281 Jesmond Road

The property at 281 Jesmond Road is undulating with a gradual slope running from the south west portion of the site to the north east.

An unnamed tributary to the Drury Creek is located approximately 150m north of the site.

3.16 341 Jesmond Road

The property at 341 Jesmond Road is undulating with the highest point of the site occurring where the residential area is located.

An unnamed tributary to the Drury Creek is located approximately 20m north of the site.

3.17 401 Jesmond Road

The property at 401 Jesmond Road is predominantly flat with a gradual slope towards the north-eastern corner of the site.

An unnamed tributary of the Drury Creek extends through the north-western portion of the site.

3.18 451 Jesmond Road

The property at 451 Jesmond Road is predominantly flat.

An unnamed tributary of the Drury Creek extends through the south-eastern portion of the site.

3.19 30 Burberry Road

The property at 30 Burberry Road is undulating with the highest point of the site occurring where the residential area is located.

An unnamed tributary of the Drury Creek extended through the north-western corner of the site.

3.20 38 Burberry Road

The property at 38 Burberry Road is undulating with a gradual slope towards a pond area in the central portion of the site.

An unnamed tributary of the Drury Creek extends through the central portion of the site

3.21 41 Burberry Road

The property at 41 Burberry Road is predominantly flat.

An unnamed tributary of the Drury Creek is located approximately 130m west of the site.

4.0 Geology and Hydrology

Published geological maps¹ indicate the sites of the Auranga Development are typically underlain by alluvial deposits of the Puketoka Formation. A description of the underlying geologies is presented in Table 2 below.

Table 2: Geology: Auranga Development, Drury.

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

No groundwater investigation has been undertaken as part of this investigation and the nearest surface water in each case is presented in Section 3 above.

¹ Geology of the Auckland Area (Institute of Geological & Nuclear Sciences 1:25,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

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

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

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

The Ministry for the Environment HAIL is presented as Appendix B.

5.2 Auckland Unitary Plan (Operative in Part)

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

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

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

6.0 Site History

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

6.1 Historical Aerial Photographs

Descriptions of the historical aerial photographs for the subject sites are presented in Tables 3-23 below. The historical site photographs are presented in Appendix C.

Table 3: Historical Photographs: 321 Bremner Road.

Date	Description
1960, 1980 & 1981	The 1960, 1980 & 1981 historical photograph show the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The Drury Creek can be seen to the north of the subject site while Bremner Road can be seen to the south of the site. The surrounding properties are predominantly rural in use.
1988	The 1988 historical photographs show the construction of a dwelling in the southern portion of the site. The remaining areas to the north are undeveloped and in use as grazing paddocks. The surrounding land is predominantly rural residential in use.
1996, 2006, 2008, 2012 & 2016	The 1996 - 2016 historical photographs show the subject site generally as it appeared during the site walk over and inspection. From the 1996 a second garage can be in the south-eastern corner of the residential area. The surrounding land is unchanged from rural residential in use.

See Appendix C (1)

Table 4: Historical Photographs: 325 Bremner Road.

Date	Description
1960	The 1960 historical photograph shows what appears to be two agricultural buildings in the south-eastern portion of the site. A milking parlour and cow shed are located on the northern boundary of the site. The surrounding properties are predominantly rural in use.
1980 & 1981	The 1980 & 1988 historical photographs show the subject site relatively unchanged from the 1960 historical photograph with the exception of the construction of a residential dwelling in the south-eastern portion of the site. The surrounding land uses are predominantly rural in use.
1988, 1996, 2001, 2006, 2008, 2012 & 2016	The 1988 - 2016 historical photographs are relatively unchanged from the 1981 historical photograph with the exception of lunging ring which was be seen from the 1988 historical photograph. The lunging ring is located on the western boundary of the north-eastern paddock. The surrounding properties are unchanged for rural residential in use.

See Appendix C (1)

Table 5: Historical Photographs: 329 Bremner Road.

Date	Description
1960, 1980, 1981 & 1988	The 1960 - 1988 historical photograph show the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The Drury Creek can be seen to the north of the subject site. The surrounding properties are predominantly rural in use.
1996 & 2001	The 1996 & 2001 historical photograph is of relatively poor resolution however it shows the residential dwelling located and associated buildings in the northern section of the site. The remaining areas to the south are predominantly in use for rural purposes. The surrounding land use are in use for rural residential purposes.
2006, 2008 & 2012	The 2006, 2008 & 2012 historical photographs show a large extension constructed on the eastern side of the dwelling. A large mechanic workshop has been constructed in the south-western corner of the site.
2016	The 2016 aerial photograph shows the subject site largely as it appeared during the site walk over and inspection. A swimming pool has been constructed to the rear of the dwelling. The surrounding land use is unchanged from rural residential.

See Appendix C (1)

Table 6: Historical Photographs: 333 Bremner Road.

Date	Description
1960, 1980 & 1981	The 1960 - 1981 historical photograph show the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The Drury Creek can be seen to the north of the subject site while Bremner Road is visible to the south. The surrounding properties are predominantly rural in use.
1988	The 1988 historical photograph shows the subject site relatively as it appeared in the 1981 historical photograph. However, what appears to be the construction of a new dwelling can be seen in the north-eastern portion of the site. The surrounding properties appear to be largely rural residential in use.
1996, 2001 & 2006	The 1996 - 2006 historical photograph shows the new site access road now on the western boundary of the sites. The dwelling appears to have undergone some alteration since 1988. A shed and adjoining livestock holding pen have also been constructed in the north-eastern section of the site.
2008	The 2008 historical photograph is relatively unchanged from the 2006 historical photograph. A number of mature trees have been removed adjacent to the dwelling to allow for landscape purposes. Areas of disturbed soil are visible in the north-eastern paddock of the site.
2012 & 2016	The 2012 & 2016 historical photographs are largely as the site appeared during the site walk over and inspection with the residential area on the western boundary and the storage yard, shed and adjoining livestock holding pen located along the eastern boundary. The surrounding land use is unchanged from rural residential.

See Appendix C (1)

Table 7: Historical Photographs: 385 Bremner Road.

Date	Description
1960, 1980 & 1981	The 1960 historical photograph shows a residential dwelling and associated building on the southern boundary of the site. The remaining area to the north appears to be in use for rural purposes. Bremner Road can be seen to the south of the site. The surrounding properties appear largely rural in use.
1988	The 1988 historical photographs show the subject site largely as it appeared in the 1981 historical photograph. The residential area on the southern boundary of the site appears to have had several alterations carried out to develop the property. The previous laneway to the paddocks in the northern section of the site has been closed off to allow for the construction of a new access way on the western boundary of the site. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph is of relatively poor resolution however it shows the construction of a swimming pool to the rear of the dwelling. A hay barn and adjoining stock holding yard has been erected in the north-western corner of the site.
2001, 2006, 2008, 2012 & 2016	The 2001 - 2016 historical photographs are generally as they appeared during the site walkover and inspection. The residential area is located in the south-eastern portion of the site while the remaining land to the north is predominantly utilised for grazing purposes. The surrounding land use is unchanged from rural residential.

See Appendix C (1)

Table 8: Historical Photographs: 389 Bremner Road.

Date	Description
1960	The 1960 historical photograph shows the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The Drury Creek can be seen to the north of the property. The surrounding properties are predominantly rural in use.
1980, 1981 & 1988	The 1980 - 1988 historical photographs show the subject site relatively unchanged from the 1960 aerial photograph with the exception of the storage shed constructed on the western boundary of the site. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph is of relatively poor resolution however it appears to show the construction of a new dwelling in the north-eastern portion of the site. The surrounding properties appear largely rural residential in use.
2001	The 2001 historical photograph shows the subject site relatively unchanged from the 1996 historical photograph with the exception of a small utility shed on the eastern portion of the site and a stock holding yard in the central portion of the site. The surrounding land use is unchanged from rural residential in use.
2006, 2008, 2012 & 2016	The 2006 - 2016 historical photograph shows the site generally as it appeared during the site walk over and inspection. The utility shed on the eastern portion of the site has now been removed. The surrounding land use is unchanged from rural residential in use.

See Appendix C (1)

Table 9: Historical Photographs: 393 Bremner Road.

Date	Description
1960	The 1960 historical photograph show the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The surrounding properties are predominantly rural in use.
1980 & 1981	The 1980 & 1981 historical photographs show the subject site relatively unchanged from the 1960 aerial photograph with the exception of the cow shed which has been constructed in the central portion of the site. The surrounding properties are predominantly rural in use.
1988 & 1996	The 1988 historical photographs show the subject site relatively unchanged from the 1980 & 1981 historical photographs with the exception of a residential dwelling that has been constructed in the south-eastern portion of the site. The surrounding properties appear largely rural in use.
2001, 2006, 2008, 2012 & 2016	The 2001 - 2016 historical photographs are relatively unchanged from the 1996 historical photograph with the exception of the stock holding pen which has been constructed on the eastern boundary of the site adjacent to the lane way. The surrounding land use is unchanged from rural residential in use.

See Appendix C (1)

Table 10: Historical Photographs: 403 Bremner Road.

Date	Description
1960, 1980, 1981 & 1988	The 1960 - 1988 historical photograph show the subject site undeveloped and in use for rural purposes. No structure can be observed across the site. The surrounding properties are predominantly rural in use.
1996	The 1996 historical photograph is of relatively poor resolution however what appear to be the residential dwelling and shed have been constructed in the central portion of the site. The surrounding properties are predominantly rural residential in use.
2001	The 2001 historical photograph shows the subject site relatively unchanged from the 1996 historical photograph. A small utility shed has been erected on the western boundary of the of the site.
2006, 2008 & 2012	The 2006 - 2012 historical photograph shows the residential area extending north to the property boundary. A putting green has been constructed in the north-western corner of the property. A second access route to the dwelling has been created which extends around the north of the shed in the central portion of the site.
2016	The 2016 historical photograph shows the subject site generally as it appeared during the site walk over and inspection. A swimming pool has been constructed to the rear of the dwelling. The surrounding land use is unchanged from rural residential in use.

See Appendix C (1)

Table 11: Historical Photographs: 415 Bremner Road.

Date	Description
1960	The 1960 historical photograph shows a residential dwelling and associated buildings in the south-eastern portion of the site. The remaining areas to the north a rural in use. Bremner Road can be seen to the south of the site with the Drury Creek adjacent to the north-western boundary of the site. The surrounding properties are predominantly rural in use.
1980 & 1981	The 1980 (what about 1981) historical photograph shows the construction of shed in the central portion of the site and a stable in the south-western portion of the site. The surrounding properties are largely rural in use.
1988, 1996 & 2001	The 1988 - 2001 historical photograph shows the subject site relatively as it appeared during the 1981 historical photograph, however a sand arena can be observed adjacent to the stables. The surrounding properties appear largely rural residential in use.
2006, 2008, 2012 & 2016	The 2006 - 2016 historical photographs are relatively unchanged from the 2001 historical photograph and largely as the site appeared during the site walk over and investigation. The garage on the southern boundary of the site appears to have renovated with the construction of a new roof. The surrounding land use is unchanged from rural residential purposes.

See Appendix C (1)

Table 12: Historical Photographs: 420-417 Bremner Road.

Date	Description
1960, 1980, & 1981	The 1960 - 1981 (1981??) historical photographs show the subject site relatively undeveloped and in use for rural purposes. No structures can be observed across the site. The Drury Creek can be seen to the north west of the site. The surrounding properties are predominantly rural in use.
1988, 1996, 2001, 2006, 2008, 2012 & 2016	The 1988 - 2016 historical photograph shows the site generally as it appeared during the site walk over and inspection with the construction of a number of structures across the site. A new stable has been erected in the south-eastern corner of the site as well as a livestock shelter on the eastern boundary and a hay barn in the north-eastern corner of the property. The surrounding properties are predominantly rural residential in use.

See Appendix C (1)

Table 13: Historical Photographs: 421 Bremner Road.

Date	Description
1960, 1980 & 1981	The 1960 - 1981 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The Drury Creek can be seen to the west of the site. The surrounding properties are predominantly rural in use.
1988 & 1996	The 1988 - 1996??? historical photographs shows the construction of the residential dwelling in the north-western portion of the site. The remaining areas of the site are predominantly in use for rural purposes. The surrounding land use is predominantly rural land use with the construction of residential dwellings to the east of the subject site.
2001	The 2001 historical photograph shows the site relatively unchanged from the 1996 historical photograph with the exception of what appears to be the erection of three greenhouses in the north-western corner of the site. The surrounding land use is unchanged from rural residential.
2006, 2008, 2012 & 2016	The 2006 - 2016 historical photograph shows the site generally as it appeared during the site walk over and inspection. with the addition of an attached garage to the dwelling and a workshop to the residential area. Two of the green houses appear to have been removed from the north-western corner of the site. The surrounding land use is unchanged from rural residential.

See Appendix C (1)

Table 14: Esplanade Reserve.

Date	Description
1960	The 1960 historical photograph show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The Drury Creek is located adjacent to the northern boundary of the site. The surrounding land is predominantly rural in use.
1980, 1981 & 1988	The 1980 - 1988 historical photographs are relatively unchanged from the 1960 historical photograph with the exception two sheds which were located in close proximity on the western boundary of 420-417 Bremner Road. A further structure can be seen located adjacent to the northern boundary of 389 Bremner Road. The surrounding land is predominantly rural residential in use.
1996 & 2001	The 1996 & 2001 historical photographs show the site relatively unchanged from the 1988 historical photograph with the exception of the removal of the structure which was located adjacent to the northern boundary of 389 Bremner Road.
2006	The 2006 historical photograph shows a utility shed located adjacent to the north-eastern section of 421 Bremner Road. The two sheds located on the western boundary of 420-417 Bremner Road have been removed.
2008, 2012 & 2016	The 2008 - 2016 historical photograph shows the subject site relatively unchanged from the 2006 historical photograph and largely as it appeared during the site walk over and inspection. A storage shed has been constructed adjacent to the gravel driveway of 421 Bremner Road. The surrounding land is unchanged from rural residential in use.

See Appendix C (1)

Table 15: Historical Photographs: 221 Jesmond Road.

Date	Description
1960, 1980, 1981 & 1988	The 1960 - 1996 historical photographs show the subject site forming part of a larger plot of land. The site appears to be developed for rural purposes with several structures identified in the central and western portions of the site. A drainage gully can be seen running through the south-eastern corner of the site. The surrounding land use is predominantly for rural residential land use.
1996	The 1996 historical photograph is of relatively poor resolution however it appears is largely unchanged from the previous historical photographs, however, what appears to be a large area of disturbed soil can be seen in the central portion of the site adjacent to the southern boundary. What appears to be a dam structure has been constructed to create a large pond on the neighbouring property to the north east.
2001	The 2001 historical photograph shows a large structure, most likely utilised for market garden purposes in the central portion of the site adjacent to the southern boundary. Only one of the previous structures identified from the earlier historical photographs remain on site. A line of mature trees on the northern boundary have been removed. A series of water pond and land bridges can now be seen to the north of the site. These water ponds appear to be a result of the dam structure present further upstream. It is suspected that the material used to construct the land bridges may potentially be uncertified fill. The surrounding properties have seen the development of more residential dwellings.
2006, 2008 & 2012	The 2006 - 2012 historical photographs are largely unchanged from the 2001 historical photograph. The market garden located in the central portion of the site adjacent to the southern boundary appears to be gradually down sized from the area depicted in the 2001 historical photograph.
2016	The 2016 historical photograph shows the subject site largely as it appeared during the site walk over and inspection. The market garden has now been fully decommissioned and the area has seen a regrowth of vegetation. The surrounding land use is unchanged from rural residential purposes.

See Appendix C (2)

Table 16: Historical Photographs: 235 Jesmond Road.

Date	Description
1960, 1980, 1981, 1988 & 1996	The 1960 - 1996 historical photographs show the subject site forming part of a larger plot of land. The site is undeveloped and in use for rural purposes. Jesmond Road can be seen running adjacent to the western boundary of the site. The surrounding properties are largely rural residential in use.
2001	The 2001 historical photograph shows the site developed for rural residential purposes. A dwelling and storage shed can be seen in the central portion of the site. The remainder of the site is in pasture.
2006, 2008, 2012 & 2016	The 2006 - 2016 show the subject site largely as it appeared during the site walk over and inspection. A large sand training arena and lunging ring can be along the southern boundary of the site. The surrounding properties are largely unchanged from rural residential in use.

See Appendix C (2)

Table 17: Historical Photographs: 281 Jesmond Road.

Date	Description
1960	The 1960 historical photograph shows the subjects site in use for rural purposes. Jesmond Road can be seen adjacent to the western boundary of the site. A dwelling is located south-western boundary of the site. Several site buildings can be observed in the central and north western portion of the site. The surrounding properties are largely rural in use with the exception of the eastern portion of 401 Jesmond Road which is located adjacent to the north-eastern corner of the site.
1980, 1981, 1988 & 1996	The 1980- - 1996 historical photographs show the subject site relatively unchanged from the 1960 historical photograph. The structure adjacent to the western boundary has been extended to form an elongated building. The surrounding properties are largely rural residential in use with the exception of the eastern portion of 401 Jesmond Road which is located adjacent to the north-eastern corner of the site.
2001 & 2006	The 2001 & 2006 historical photographs show a stables and adjoining livestock holding pen located in the central portion of the site. A livestock holding pen and loading ramp can be seen in the north-western corner of the site. The remaining areas of the site consist of grazing paddocks.
2008 & 2012	The 2008 & 2012 historical photographs show the subject site relatively unchanged from the 2001 & 2006 historical photograph, however, what appears to be a large sand training arena is visible adjacent to the northern of the site.
2016	The 2016 historical photograph shows the subject site largely as it appeared during the site walk over and inspection. The large sand training arena located on the northern boundary of the site appears to no longer be in use and thin layer of vegetation now overlays the area. The surrounding properties are largely unchanged from rural residential in use with the exception of the eastern portion of 401 Jesmond Road which is located adjacent to the north-eastern corner of the site.

See Appendix C (2)

Table 18: Historical Photographs: 341 Jesmond Road.

Date	Description
1960, 1980 & 1981	The 1960 - 1981 historical photographs show the subject site in use for rural purposes. A single barn structure can be seen in the northern portion of the site adjacent to the property boundary. The surrounding properties are largely rural in use.
1988	The 1988 historical photograph shows the northern section of the site now being utilised for horticultural purposes. The remaining area to the south is undeveloped and in use for rural purposes. What appears to be a horse training ring is located adjacent to the north-eastern boundary of the site. The surrounding properties are largely rural residential in use with the exception 401 Jesmond Road which is adjacent to the north-western boundary of the site.
1996	The 1996 historical photograph is of relatively poor resolution however it shows the subject site generally unchanged from the 1988 historical photograph with the exception of the residential dwelling which is now located in the south-western portion of the site.
2001	The 2001 historical photograph shows the northern portion of the site no longer being utilised for horticultural purposes. A livestock holding pen can be seen in the central portion of the site adjacent to the driveway. A drainage pond is also visible in the central paddock of the site.
2006	The 2006 historical photograph shows the subject site relatively unchanged from the 2001 historical photograph with the exception of a large shed which is located adjacent to the north-western boundary of the site.
2008, 2012 & 2016	The 2008 - 2016 show the subject site largely as it appeared during the site walk over and inspection. A small orchard can be seen adjacent to the large shed on the north-western boundary of the site. The surrounding land uses are unchanged from rural residential with the exception of the eastern portion of 401 Jesmond Road which is being utilised for horticultural purposes.

See Appendix C (2)

Table 19: Historical Photographs: 401 Jesmond Road.

Date	Description
1960, 1980 & 1981	The 1960 - 1981 historical photographs show the subject site undeveloped and in use for rural purposes. Jesmond Road can be adjacent to the western boundary of the site. The surrounding properties are predominantly rural in use.
1988	The 1988 historical photograph shows the subject site being utilised for horticultural purposes. The site is can be seen divided into several sections which are bordered by shelter belts. A residential dwelling can be seen in the south-western corner of the site adjacent to Jesmond Road. The surrounding land use if predominantly rural residential with the exception of the properties located to the north west and south west which are utilised for horticultural purposes.
1996	The 1996 historical photograph shows the subject site relatively unchanged from the 1988 historical photograph. Some alterations have been made to the eastern portion of the site with the removal of some of the shelter belts in order to increase the paddocks size. The surrounding land is predominantly rural residential in use.
2001, 2006, 2008, 2012 & 2016	The 2001 - 2016 historical photographs shows the site largely as it appeared during the site walk over and inspection. The site can be seen divided into two sections. The western portions of the site in predominantly in pasture with what appears to be a market garden located in the central portion of the site. A storage shed can be seen located in the south-eastern corner of the site. The eastern section of the site is predominantly in use as an orchard. The surrounding land is unchanged from rural residential in use.

See Appendix C (2)

Table 20: Historical Photographs: 451 Jesmond Road.

Date	Description
1960, 1980 & 1981	The 1960 - 1981 historical photographs show the subject site forming part of a larger plot of land. The site is undeveloped and in use for rural purposes. Bremner Road is located to the north while Jesmond Road is located adjacent to the western boundary of the site. The surrounding properties are predominantly rural in use.
1988 & 1996	The 1988 & 1996 historical photographs are relatively unchanged from the 1980 & 1981 historical photographs. The properties to the south and west of the subject site are now in use for horticultural purposes. The remaining properties surrounding the site are in use for rural residential purposes.
2001, 2006 & 2008	The 2001 - 2008 historical photographs show the subject site relatively unchanged from the 1988 & 1966 historical photographs, however, what appears to be a market garden and small orchard are located on the eastern portion of the site. A large glass house can be seen on the property to the west of the site.
2012	The 2012 historical photograph shows a residential dwelling and garage located in the central portion of the site. The surrounding areas are predominantly rural residential in use with the exception of the properties to the south and west of the site which is utilised for horticultural purposes.
2016	The 2016 historical photograph shows the subject site largely as it appeared during the site walkover and inspection. The site curtilage has been landscaped to leave domestic gardens around the dwelling. A number of hedgerows can be seen on the eastern boundary of the site. The surrounding properties are unchanged from rural residential in use with the exception of the properties to the south and west of the site which is utilised for horticultural purposes.

See Appendix C (2)

Table 21: Historical Photographs: 30 Burberry Road.

Date	Description
1960, 1980, 1981, 1988 & 1996	The 1960 - 1996 historical photographs show the subject site forming part of a larger plot of land. The site appears to be developed for rural purposes with no structures identified throughout the site. The surrounding land use is predominantly for rural purposes.
2001	The 2001 historical photograph show a large dwelling and associated curtilage located in the central part of the southern section of the site. A swimming pool and large decking area is located to the north of the dwelling. Adjacent to the decking area which surrounded the pool a shed structure can be observed. Just north of the swimming pool and decking area a tennis court can be seen. A putting green and sand bunkers can be observed in the eastern curtilage of the site adjacent to Burberry Road. The remaining areas of the site to the west and north of the dwelling are utilised for grazing purposes. The surrounding land is predominantly for rural residential in use.
2006, 2008 & 2012	The 2006 - 2012 historical photographs show the site relatively unchanged from the 2001 historical photograph. The recreational golf area on the eastern curtilage has seen the addition of a driving range which extended across into the northern portion of the site. What appears to be a domestic orchard and vegetable garden can be seen to the west of the tennis court and decking area.
2016	The 2016 historical photograph shows the subject site relatively unchanged from the 2012 historical photograph and largely as the site appeared during the site walk over and inspection. The addition of a large garage A large garage can be seen along the southern boundary of the site. The surrounding land use is unchanged from rural residential.

See Appendix C (2)

Table 22: Historical Photographs: 38 Burberry Road.

Date	Description
1960, 1980, 1981 & 1988	The 1960 - 1988 historical photographs show the subject site forming part of a larger plot of land. The site appears to be developed for rural purposes with no structure identified throughout the site. A drainage gully passes through the north-western portion of the site. Burberry Road can be seen to the south east of the site. The surrounding land use is predominantly for rural purposes.
1996	The 1996 historical photograph shows the subject site undeveloped with no structures identified on site. The drainage gully running through the site has been dammed in the central portion of the site to create a pond. It is thought that potential fill material may have been imported on site to create the dam structure and subsequent land bridges.
2001 & 2006,	The 2001 & 2016 historical photographs show a dwelling and swimming pool located in the western portion of the site adjacent to the pond. What appears to be a domestic orchard can be seen to the west of the dwelling. A number of trees have been planted for landscape purposes in the area surrounding the pond. A stables and livestock holding pen can be seen in the central portion of the site. The surrounding land use is predominantly for rural residential purposes.
2008, 2012 & 2016	The 2008 - 2016 historical photographs show the site relatively unchanged from the 2001 & 2006 historical photograph. The domestic orchard to the west of the dwelling has been removed. The surrounding land in unchanged from rural residential in use.

See Appendix C (2)

Table 23: Historical Photographs: 41 Burberry Road.

Date	Description
1960, 1980, 1988 & 1996	The 1960 - 1996 historical photographs show the subject site forming part of a larger plot of land. The site appears to be developed for rural purposes with no structure identified throughout the site. Burberry Road can be seen to the south west of the site. The surrounding land use is predominantly for rural purposes.
2001	The 2001 historical photograph shows the subjects site developed for rural residential purposes. A dwelling and swimming pool has been constructed in the southern portion of the site. Further north of the dwelling a barn/stables can be seen. What appears to be a stockpile of soil can be observed in the north-western corner of the site. The neighbouring properties to the west and east of the site have both been developed for rural residential purposes with dwellings being constructed.
2006	The 2006 historical photograph shows the site relatively unchanged from the 2001 historical photograph. A pool house has been erected adjacent to the swimming pool and extensions to the barn/stables can be observed. The stockpile of soil in the north-western corner of the site has now been removed. What appears to be a market garden can be seen on the neighbouring property to the east adjacent to the site boundary.
2008, 2012 & 2016	The 2008 - 2016 historical photograph shows the subject site relatively unchanged from the 2006 historical photograph with the exception of further alterations being made to the barn/stables. The market garden on the eastern property has been removed to allow for the construction of a residential dwelling. The surrounding properties are unchanged from rural residential in use.

See Appendix C (2)

6.2 Previous Investigations

There are no previous environmental investigations relating to soil or groundwater contamination associated with any of the Auranga Development sites (as described in Table 1) on file with Auckland Council.

Two previous geotechnical investigations were available for the Auranga Development and have been summarised below:

The report titled 'Geotechnical Investigation for the feasibility of development at Van Den Brink Farms LTD property, Being Proposed Subdivision of Part Allotment 36, Parish Of Opaheke' dated January 1994 and prepared by Earthtec Consulting Limited evaluated the suitability of the site for the construction of houses at 41 Burberry Road, Drury. No fill materials were reported in any of the borehole logs and the site was considered suitable for development at the time of writing.

The geotechnical report titled 'Ashton Downs Lot 15 DP 166291' dated June 1996 and prepared by Babbage Consultants evaluated the suitability of the site for the construction of a dwelling located at 38 Burberry Road, Drury. Fill materials were reported in five out of the 13 borehole logs recorded across the site. The report concluded that the site was suitable to construct the proposed light timber framed dwelling, however ground water was to be considered with regards to deep foundations and other below ground structures.

With the exception of the above reports, at the time of writing the results, a geotechnical investigation for each of the sites within the Auranga Development were not available. Therefore, fill material, other than that identified during the site walkover and inspection,

may be present at the site. The identification of uncertified fill material will likely require further investigation and/or chemical analysis if detected.

6.3 Auckland Council Property File Search

The results of the council search showed several consents relating to the properties across the Auranga Development Project. The relevant details of the Property File search are presented in Tables 24-42 below.

Table 24: Relevant Property File Information: 321 Bremner Road, Drury

Proposed Activity	Application number	Date
Erect a Dwelling	J040070	17/09/1979
Drainage & Septic Tank Installation	6877	17/09/1979
Erect a Carport	F63948	03/03/1989
Erect a Garage	90/0428	10/09/1990

Table 25: Relevant Property File Information: 325 Bremner Road, Drury

Proposed Activity	Application number	Date
Erect Dwelling	I002989	11/09/1978
Addition of Carport	E360	28/08/1986

Table 26: Relevant Property File Information: 329 Bremner Road, Drury

Proposed Activity	Application number	Date
Subdivision (333 Bremner Road)	373/157	03/12/1985
Relocating dwelling / farm office/ studio house/ garage & Wastewater and storm water drainage	011238	22/11/1994
Alterations to Existing Dwelling	18403	18/12/2001
Dwelling Alterations	18746	04/06/2002
Storage Shed and Stables	18127	30/09/2004
Amendment to Pool Fencing	B/2013/8039/A	23/02/2015
New Swimming Pool & Earthworks	R/LUC/2014/574	19/05/2015
Erect Three Bay Shed	25473	CANCELLED

Table 27: Relevant Property File Information: 333 Bremner Road, Drury

Proposed Activity	Application number	Date
Construct Shed	1196	19/09/1955
Alterations to Dwelling	5124	12/02/1959
Construct Shed	B076904	18/08/1966
Alterations to Dwelling (carport)	A073193	14/02/1969
Install Septic Tank & Drainage System	1896-97	20/10/1986
Alterations to Dwelling - Garage/Workshop	E711	15/12/1986
Re-Site Dwelling	000E537	20/10/1986
Irrigation System for Market Gardens	AG/8492	07/09/1992

Table 28: Relevant Property File Information: 385 Bremner Road, Drury

Proposed Activity	Application number	Date
Erect Hay Barn	A073363	05/05/1969
Dwelling Alterations	G06253	10/09/1974
Re-Erect Shed	G60132	26/03/1975
2 nd Dwelling Consent	N/A	1982
Alterations to Garage	B74222	28/11/1983
Erect a Dwelling	12703	10/06/1983
Re-site Dwelling	B12710	13/06/1983
Erect 'Skyline' Garage	033850	25/07/1985
Application for Subdivision	6/14/831	02/05/1985
Construct Spa Pool	E32919	09/09/1987
Swimming Pool	E26320	09/11/1987
Construct Garage/Utility Room/ Granny Flat	32429	24/03/1987
Application for Subdivision	6/15/303	April 1987
Erect Farm Building	10087	02/07/1993

Table 29: Relevant Property Information: 389 Bremner Road, Drury

Proposed Activity	Application number	Date
Construct Dwelling and Garage	011827	11/07/1997

Table 30: Relevant Property File Information: 403 Bremner Road, Drury

Proposed Activity	Application number	Date
Erect Dwelling	10506	27/10/1993
Erect Utility Shed	N/A	15/07/1993
Erect Utility Shed/Hay Barn	10363	18/05/1999
Sewage & Wastewater pumping Station	N/A	13/04/2005
Dwelling Additions	21225	26/09/2005
Additions Earthworks for Swimming Pool	R/LUC/2013/4152	23/10/2013
Construct Swimming Pool	R/LUC/2013/4620	28/11/2013

Table 31: Relevant Property File Information: 415 Bremner Road, Drury

Proposed Activity	Application number	Date
Alterations to dwelling	041218	18/09/1960
Plumbing & Drainage	6040/6041	06/12/1977
Erect Dwelling	H74355	06/12/1977
Erect 'pole type' Shed	H74354	06/12/1977
Add to Shed	K000046	22/07/1980
Hay Barn	B13063	10/11/1983
2 nd Dwelling (Discretionary Consent)	LUC7394	30/03/2004
2 nd Dwelling and Garage	20487	22/12/2004

Table 32: Relevant Property File Information: 420-417 Bremner Road, Drury.

Proposed Activity	Application number	Date
417 - Erect Dwelling	B108540	26/10/1984
420 - Erect Dwelling	116271	30/11/1989
420 - Dwelling Relocation from Dannevirke	N/A	24/04/1995
417 - Extension to Dwelling	16330	03/02/2000
420 - Erect Carport/Library/Alterations to Bathroom	17635	25/09/2001
Application for Subdivision	16/03/080	24/02/2004
Application for Subdivision	16/04/057	27/04/2005
420 - Erect Farm Shed	19204	10/10/2006
Application for Subdivision	16/10/109 - LU9992	23/12/2010

Table 33: Relevant Property File Information: 421 Bremner Road, Drury.

Proposed Activity	Reference	Date
Alterations to Dwelling & Boat Shed	21785/1	24/01/2007

Table 34: Relevant Property File Information: 221 Jesmond Road, Drury

Proposed Activity	Application number	Date
Subdivision (Horticulture Use)	309/27	07/03/1995
Erect Dwellings on Subdivided Sites	9354430	09/03/1995

Table 35: Relevant Property File Information: 235 Jesmond Road, Drury

Proposed Activity	Application number	Date
Dwelling	15045	20/05/1998
Erect Hay Barn/Storage Shed	15967	12/10/2000
Construct New Dwelling	15313	12/10/2000
Erect Floodlight Poles around Riding Arena (2)	20733	05/07/2004

Table 36: Relevant Property File Information: 281 Jesmond Road, Drury

Proposed Activity	Application number	Date
Add to existing Dwelling	E73602	12/02/1973
Erect a Garage	N/A	25/07/1995
Dwelling	12359	01/11/1995
Dwelling alterations	003125	15/09/1998

Table 37: Relevant Property File Information: 341 Jesmond Road, Drury

Proposed Activity	Application number	Date
Erect Dwelling & Garage	11565	27/11/1995
Erect New Barn & Stormwater Tank	19461	30/07/2004

Table 38: Relevant Property File Information: 401 Jesmond Road, Drury

Proposed Activity	Application number	Date
Re-site Dwelling	D18472	18/07/1986
Erect Double Garage	F63610	01/11/1988
Erect New Farm Building	15757	07/11/2000
Erect New Packhouse/Garage	19275	01/04/2008

Table 39: Relevant Property File Information: 451 Jesmond Road, Drury

Proposed Activity	Application number	Date
Erect a Dwelling	25130/1	11/05/2010
Installation of Wastewater Treatment System	25130/1	10/03/2011
Storage Shed	26006	05/12/2011

Table 40: Relevant Property File Information: 30 Burberry Road, Drury

Proposed Activity	Application number	Date
Application for Subdivision	1990/101064	26/04/1994
Erect Dwelling & Garage	15717/1	30/07/1999
Erect Swimming Pool	16459	03/04/2003
Erect Garage	2014/7534	10/06/2014
Erect Shed	2014/2273	06/08/2014

Table 41: Relevant Property File Information: 38 Burberry Road, Drury

Proposed Activity	Application number	Date
Building Consent for Dam	11351	18/07/1995
Application for Subdivision	N/A	04/11/1995
Geotechnical Report	N/A	June 1996
Construct New Dwelling, 3 Bridges, Stables & Swimming Pool	12830	07/10/1996

Table 42: Relevant Property File Information: 41 Burberry Road, Drury

Proposed Activity	Application number	Date
Geotech Investigation for Subdivision	1990/101064	27/01/1994
Erect Dwelling	1999/105574	30/07/1999
Construct Swimming Pool	2000/106067	20/03/2000
Erect Barns & Stables	2000/106536	24/10/2000
Alterations to Barn	2002/107858	16/07/2002
Erect Pool Shed	2005/111069	25/10/2005
Extension to Barn	2007/112298	14/06/2007

6.4 Auckland Council Site Contamination Enquiry

The Auckland Council site contamination enquiry contained no records relating to the Auranga Development Sites.

The report did however contain information on properties in the vicinity of the Auranga Development catchment; contaminated site discharge located at 269 Bremner Road (consent number 47184) and 31 Burberry Road (consent number 46096). An overview of pollution incidents was also recorded for properties located at 12 Pitt Road; where large volumes of hydrocarbon fuel was discharged to land and 90 Karaka Road; where open burning of refuse was recorded.

A number of borehole consents were noted in the general area, however, none of these were located on the properties within the study area.

The Auckland Council Site Contamination Enquiry is presented in Appendix D.

6.5 Historical Certificate of Title Review

The historical certificate of title review was completed for the properties within the Auranga Development.

Following the review of the historical certificate of title two companies were listed which related to 235 Jesmond Road and 221 Jesmond Road. Both companies, Copplestone Limited and Rejen Trading Limited have since gone into liquidation and no information could be obtained relating to their operations.

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

6.6 Onsite Interview

During the site walkover and inspection of the Auranga Development, it was not possible to interview the landowners/tenants of each site. This was due to properties being vacant at the time of the site walkover and inspection. This is likely due to landowners/tenants being at work considering the site walk over and inspections were carried out between 9am and 3pm Monday - Friday.

Furthermore, a copy of the Hazardous Activities and Industries List was issued to each land owner with the intention of receiving some background information of any potential contaminating land use or activities being currently or historically taken place on site before commencing site walk overs and inspections. No response or information was received relating to this matter.

The only property where an onsite interview was possible was 325 Bremner Road, Drury. The interview with the current owner of the property was conducted by Focus Environmental Services personnel. During the interview the following items were noted:

- The interviewee made reference to an offal pit onsite which was located to the north of the garage.
- The interviewee stated that areas of disturbed soil identified throughout the site were a result of excavated test pits which were carried out on site prior to the site walk over and inspection. It was noted that soil cores were also taken during the at the time of the test pit excavations. This is likely associated with a geotechnical investigation but was not confirmed. We have requested that if fill was identified that the geotechnical report be provided to us for review.

7.0 Site Walkover and Inspection

7.1 321 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 25th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via concrete driveway which lead to the residential area. The residential area consisted of a single storey dwelling, garages, water storage tank and associated curtilage.

Potentially treated timber was stacked to the rear and side of the garage on the eastern boundary.

Septic tank ventilation pipes were identified along the eastern boundary of the site adjacent to the rain water storage tank. On the northern curtilage of the site was a utility shed which was erected on a concrete base. This was being utilised for storage of garden equipment and utensils at the time of the site walk over and inspection. Adjacent to the garden shed was some raised composting containers constructed from timber.

A burn pile mixed with vegetation and refuse was located north of the residential area. The surrounding area consisted of a burn barrel potentially used to burn refuse, two small galvanise huts utilised for firewood storage, a metal boat and transport trailer, a utility shed (2) with timber base used for storage, a stockpile of concrete rubble and a tree house. A stock holding pen and loading ramp was also identified in the vicinity, due to the estimated age of the holding pen it is considered that potential spray race operations were carried out in this area of the site.

A drainage gully was identified in the central portion of the site. The remaining land north of the drainage gully consisted of overgrown paddocks.

The site inspection photographs are presented in Appendix F.

7.2 325 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 25th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a concrete driveway which lead to the residential area. The residential area consisted of a single storey dwelling, a concrete pavement parking area and associated curtilage.

To the rear of the dwelling was an outdoor entertaining area which over looked the southern curtilage. This area extended north to a concrete lined garage which was being utilised for storage of gardening equipment, firewood and other miscellaneous items. To the rear of the garage an offal pit was identified on the northern boundary of the residential area. It is not considered that an offal is a potential source of chemical ground contamination, however, it would be considered a bacteriological source of contamination and therefore a potential human health risk.

Beyond the residential area were a number of paddocks which were being utilised for sheep grazing at the time of the site walk over and inspection. Furthermore, there was no evidence of a sheep dip present on site. A burn pile was located adjacent to the eastern boundary of the site. The burn pile consisted of timber, wooden furniture and vegetation. Due to the risk of potentially treated furniture it would be considered that this would constitute a HAIL activity. No other evidence of refuse was identified with the burn pile.

A drainage gully extended through the central portion of the site. On the northern side of the gully was a small lunging ring which was overgrown and no longer in use. Further north of the lunging ring was a pump house. The pump house was partially lined with concrete with dark staining observed at the base. The staining appeared to be result of an oil spillage, most likely associated with the oil can identified inside the pump house. Due to the small area of staining and quantity of spillage significant ground contamination is not expected.

On the northern boundary of the site was an old milking parlour and attached livestock holding shed. PACM boards were identified on the internal walls of the parlour. The ACM appeared to be in relatively good condition and would be considered unlikely to pose potential for ground contamination in its current state. Adjacent to the milking parlour was a cow shed.

The remaining areas of the site were predominantly paddocks utilised for sheep grazing. During the site walk over and inspection several areas of disturbed soil were identified throughout the paddocks. The current landowner stated that this was a result of a previous site investigation that involved test pits and soil cores carried out on site.

The site inspection photographs are presented in Appendix F.

7.3 329 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 25th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a tarmac driveway which led to the residential area. The residential area of the site consisted of a large residential dwelling, attached garage, swimming pool, outdoor entertaining area and associated curtilage.

A timber frame cabin (1) constructed on a raised platform was identified adjacent to the dwelling. The cabin was being utilised to store firewood at the time of the site walk over and inspection.

A galvanised utility shed was located on the southern boundary of the residential area. The shed contained a compressed gas system which was connected to several 47kg gas cylinders. The use of the compressed gas system was not evident at the time of the site walk over and inspection. A water storage tank and associated pump house was located adjacent to the galvanised utility shed.

Slightly west was a timber frame cabin (2) which was constructed on a raised platform. The cabin was being utilised for storage of a wide range of miscellaneous items. PACM boards were identified on the base of the cabin. It should be noted that PACM board appeared in relatively good condition, and would be considered unlikely to present potential for ground contamination in their current state.

South of the residential area was a paddock which was being utilised as an All-Terrain Vehicles (ATV) race track. The race track contained a stockpile of soil which was utilised as a jump. A second stockpile of soil overlain with vegetation and refuse was located in the central portion of the paddock. On inspection, evidence of burning was observed.

On the south-western portion of the site was a large concrete lined mechanic workshop. The forecourt of the workshop was concrete lined and utilised to store ATV's and associated mechanical parts. A rainwater storage tank, oil barrels and battery storage container were also located in the area.

The site inspection photographs are presented in Appendix F.

7.4 333 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 25th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a gravel driveway which led to the residential area. The residential area of the site consisted of a large dwelling, attached garage, concrete parking area and associated curtilage.

A raised vegetable patch and outdoor entertaining area was identified at the rear of the dwelling adjacent to the western boundary. Several constructed bee hives were identified on the northern portion of the site adjacent to the site boundary. A firewood shelter was observed in front of the dwelling on the eastern boundary of the residential area.

Waste vegetation bags were identified at the access point to the grazing paddock on the eastern boundary of the site. A drainage gully was observed running through the central portion of the paddock. An electrical transformer hut was located adjacent to the drainage gully. A burn pile overlain with vegetation was identified north of the electrical transformer in the north-western portion of the paddock. A potential fill area in the north-western corner of the paddock was identified. The potential fill area was identified due to the irregular contours of the land in the area. A raised fuel storage tank was observed adjacent to the western boundary of the paddock, however no evidence of staining was identified at the time of the site walk over and inspection.

On the eastern portion of the site was a storage yard that contained stockpiles of soil, firewood and potentially treated timber fencing posts. Two bags labelled toxic waste "CISPLATIN CYPOTOXIC" were identified on the eastern boundary on the yard. This

material appeared correctly bagged and sealed using cable ties and therefore would not be considered a potential source of ground contamination. A stock holding pen and loading ramp was identified in the south-eastern corner of the gravel yard.

A large storage shed was identified on the southern portion of the gravel yard. The shed was being utilised for storage and contained a boat, quad bike, farm machinery and other miscellaneous items. From visual inspection, it is not considered that any maintenance/workshop activities were being carried out. Adjacent to the shed was a concrete water trough which was fixed to a raised structure. It is thought that this area may have potentially been used as a wash down area for horses. Two shipping containers were located within the confines of the storage yard. These containers were locked and no indication of the contents was evident, however, there were no visual or olfactory evidence of contamination around the perimeter of the containers.

A pond was identified south of the residential dwelling on the western boundary.

The remaining areas of the site to the south were utilised as grazing pastures for horses at the time of the site walk over and inspection.

The site inspection photographs are presented in Appendix F.

7.5 385 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a tarmac driveway which led to the residential area. The residential area of the site consisted of a large two storey dwelling, attached garages, tarmac parking area and associated curtilage.

There was restricted access on site and as a result it was not possible to access the rear of the property at the time of the site walk over and inspection.

The northern section of the site was divided into paddocks which were utilised for grazing. A concrete lined hay shed was identified in the north-western corner of the site. Adjacent to the shed was a stock holding pen and loading ramp. It is considered unlikely that the stock holding pen has been utilised for spray race operations due to its relatively recent construction.

The site inspection photographs are presented in Appendix F.

7.6 389 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a shared gravel driveway which led to the residential area. The residential area of the site consisted of a dwelling, attached garage, concrete pavement parking area and associated curtilage.

To the south of the dwelling were three small utility sheds that were constructed on a raised timber base. Only two of the garden sheds were being utilised at the time of the site walk over and inspection. Shed 2 contained fuel cans, garden tools and other miscellaneous items while shed 3 contained firewood. Light staining was observed on

the base of shed 2, however, due to the small area of staining significant ground contamination is not expected.

Adjacent to the garage was water tank system and associated water pump which was stored in a locked timber cabinet.

To the rear of the dwelling was an outdoor entertaining area which over looked a timber composter, fruit trees and landscaped garden. Two water storage tanks were identified in the north-western corner of the property.

An overgrown paddock was observed on the western portion of the site. A large shed utilised for storage and maintenance of agricultural machinery was located on the western boundary of the paddock. The shed was built from galvanised steel and constructed on a concrete base. No visual or olfactory evidence of contamination was observed in the area surrounding the shed.

To the south east of the residential area was a livestock holding pen and loading ramp. Due to the age of the holding pen it is likely that spray race operations have occurred. Silage bales were located adjacent to the stockholding pen.

The remainder of the site on the eastern section of the site consisted of overgrown paddocks.

The site inspection photographs are presented in Appendix F.

7.7 393 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24th of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a shared gravel driveway which led to the residential area. The residential area of the site consisted of a dwelling, two garages, concrete parking area and associated curtilage.

A disused Avery was identified on the western boundary of the residential area. An outdoor entertaining area was situated to the front of the dwelling overlooking the paddocks to the north.

The northern areas of the site were predominately paddock. A large cow shed was identified in the central portion of the site. The shed was constructed from galvanize steel, however, no concrete base was identified. No visual or olfactory evidence of contamination was identified it the area surrounding the shed.

The site inspection photographs are presented in Appendix F.

7.8 403 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a shared gravel driveway which led to the residential area. The residential area of the site consisted of a dwelling and attached garage, gravel parking area and associated curtilage.

To the east of the dwelling was a utility shed, however, it was inaccessible at the site of the site walk over and inspection. Adjacent to the garden shed was a swimming pool and outdoor entertaining area. In the north-western corner of the site was a golf recreational area consisting of a putting green, sand bunker and garden pond. Due to the size and fact that the green forms part of the domestic garden it is unlikely that the application of chemical has occurred and therefore it would not be considered to be a potential source of contamination.

Adjacent to the residential area along the western boundary was timber framed outhouse used to store firewood. A burn pile was identified slightly south of the outhouse. Tree cuttings, timber and refuse was observed within the burn pile. Two concrete water tanks and a stockpile of vegetation were identified in close proximity to the burn pile and outhouse on the western portion of the site.

In the central portion of the site a large barn was identified. The barn was being utilised for storage off agricultural machinery and equipment and other miscellaneous items. A small chemical store used for storing sprays, paints and solvents was identified inside the shed.

To the south of the shed was a livestock holding pen and loading ramp. Due to the age the stock loading area it is considered unlikely that spray race operations have occurred in this area of the site.

The remaining areas of the site consisted of grazing paddocks.

The site inspection photographs are presented in Appendix F.

7.9 415 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a gravel driveway which extended through the southern portion of the site and led to the residential area of the site. The residential area of the site consisted of a dwelling, concrete pavement parking area, secondary dwelling with attached garage and associated curtilage.

A livestock run and loading ramp were identified adjacent to the driveway in the south-eastern corner of the site. Adjacent to the race was a livestock holding shed which was utilised for storage at the time of the site walk over and inspection. The shed was concrete lined with wooden pallets overlain. The cladding of this building was identified as potential asbestos containing material (PACM).

A small chemical storage room was identified adjacent to the livestock holding shed. A storage cabinet containing veterinary medicine was fixed to the wall.

Slightly east of this shed there was a stock holding pen identified. Due to the estimated age of this holding pen it is considered that it potentially has been utilised for spray race operations.

A large sand arena used for horse training was identified north of the stock holding shed and spray race. As the bedding material was made up of sand it would not be considered a potential source of contamination. Adjacent to the sand arena there was a large shed utilised as a storage facility and stables. The stable to the rear of the shed was inaccessible as a vet was present at the time of the site walkover and investigation. The storage facility to the front of the shed contained a sand floor which extended from the arena floor. A

horse transport truck, tractor, quad bike and other miscellaneous items were stored in this area.

To the north of the sand arena there were silage bales observed. Slightly west of the silage bale several beehives were identified. A raceway extended north with paddocks present on either side. The paddocks were utilised for grazing for horses and sheep. On inspection no evidence of a sheep dip was identified. The northern portion of the site had a dried gully system which appeared to flow towards the Drury Creek.

The site inspection photographs are presented in Appendix F.

7.10 420-417 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a shared gravel driveway. On entering the site stables were observed adjacent to the driveway.

The stables were built from galvanized steel sheets and constructed on a concrete base. The stables were being utilised for storage of timber and agricultural machinery at the time of the site walk over and inspection. A small chemical store was observed inside the stables. To the rear of the stables was a stockholding pen and race. Due to the age of the stockholding pen it is considered unlikely that spray race operation have occurred in this area of the site. A stockpile of tree branches and potentially treated fencing post were observed to the west of the stables.

A livestock shelter constructed from timber and galvanized steel was located in the north-eastern corner of the central paddock.

A hay barn was located in the north-eastern corner of the property. The barn was built from galvanized steel and constructed on a hardstand base which was overlain by hay.

An area of scorched ground thought to previously be a burn pile was observed in the northern portion of the site. It appeared as though vegetation was the primary item of burning and no evidence of refuse was identified. The vegetation appeared to be generated from hedge trimming activities taken place on the western boundary adjacent to the burn pile.

A raceway was observed running through the central portion of the site. The race extended from the western boundary to the stables which was located in the south-eastern corner of the site.

The remaining areas of the site were predominantly grazing paddocks.

The site inspection photographs are presented as Appendix F.

7.11 421 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 24nd of January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Bremner Road via a shared gravel driveway. The driveway led to the residential area which consisted of a single storey dwelling and attached garage, concrete parking area, carpentry workshop and associated curtilage.

A concrete path extended from the concrete parking area through to the rear of the dwelling where an outdoor entertaining area and garden pond were identified.

A green house was identified in the north-western portion of the site, however, it appeared to be no longer in use and in a state of deterioration. Adjacent to the green house, fruit was observed growing in raised beds.

A domestic garden was observed to the rear of the property, including a second outdoor entertaining area. A rainwater storage tank was identified adjacent to the attached garage.

To the east of the property was a paddock which was being utilised for grazing at the time of the site walkover and inspection. A small concrete outhouse was identified on the northern boundary of the paddock, however, the purpose of this structure was unknown.

On the south-western portion of the property was a domestic garden which overlooked the Esplanade Reserve. The garden contained a restored phone box in the south-western portion.

The site inspection photographs are presented as Appendix F.

7.12 Esplanade Reserve

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 3rd February 2017. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a gravel driveway which provided access to 421 Bremner Road.

The area of the site facing 421 Bremner Road largely consisted of mixed vegetation and domestic gardens. The Drury Creek was observed along the western boundary of the site. A timber framed outhouse utilised for firewood storage was located adjacent to the gravel driveway.

A vegetable patch was located adjacent to the residential area along with a stockpile of vegetation.

A utility shed with a timber base was being utilised for the storage of garden equipment and utensils. A storage area containing oil barrels, paving stones and a burn barrel was identified on the western boundary of the site overlooking the Drury Creek.

The area of the site facing 415 Bremner Road largely consisted of mixed vegetation and pasture land. The Drury Creek was observed on the western and northern boundaries of the site. What appeared to be an offal pit was identified in the north-eastern portion of the site. It is not considered that an offal is a potential source of chemical ground contamination, however, it would be considered a bacteriological source of contamination and therefore a potential human health risk.

The area of the site facing 389 Bremner Road largely consisted of mixed vegetation, production grass and managed grass areas. A settlement pond was identified

The area of the site overlooking 333 Bremner Road was mixed vegetation, domestic gardens and pasture land. Two access laneways leading to the Drury Creek were identified in the western and central portion of the site. What appeared to be an offal pit was identified on the northern boundary of the grazing paddock. Again, this would be considered a bacteriological source of contamination and therefore a potential human health risk.

The area overlooking 329 Bremner Road largely consisted of mixed vegetation and domestic gardens. An area of concrete, brick, roof slate and PACM fragments were identified at the edge of the domestic garden. It would appear that demolition material from nearby structures have been deposited at this location.

The site inspection photographs are presented in Appendix F.

7.13 221 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th of January 2017. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Jesmond Road via a gate directly into the western portion of the site. This area of the site was grassed with small trees scattered throughout. An old livestock holding yard was identified in the south-western corner of the site. Due to the estimated age of this structure and its appearance it is possible that spray race operations were conducted in this area of the site.

The central eastern portion of the site contained a storage shed which was comprised of corrugated iron. Access to the storage shed was restricted. Outside the storage shed there was a number of miscellaneous agricultural plant items observed. Located adjacent the southern aspect of the storage shed there was an offal pit identified, it was covered with meshed box iron material. It is not considered that an offal is a potential source of chemical ground contamination, however, it would be considered a bacteriological source of contamination and therefore a potential human health risk.

Slightly east of the storage shed there was several stockpiles of soil materials identified. The source of these materials was unknown.

Slightly south of these stockpiles there was an area of exposed clay observed. This was within the area of the former horticultural activity identified in the historical review. There was no clear evidence of the former glasshouses or horticultural activity observed in this area of the site.

Along the northern boundary of the site there was a network of pond structures observed, these ponds were separated by land bridges. The land bridges appeared to be constructed with soils materials; potentially uncertified fill materials. Running along the southern aspect of the ponds there was evidence of scorched ground and semi-burned trees, it would appear that the stand of trees in this area of the site identified in the historical review have been dropped and burned in this area of the site. There was no evidence of refuse burning observed.

The remainder of the site was in paddocks for grazing sheep at the time of the site walkover and inspection.

The site inspection photographs are presented as Appendix F.

7.14 235 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th of January 2017. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Jesmond Road via a gravel driveway, which extended through the central portion of the site to the residential area. There were paddocks observed on either side of the driveway. The residential area of the site consisted of a large single storey dwelling with attached carpark, a water tank, old domestic vegetable patch and associated curtilage.

Slightly south of the residential area there was large horse training arena (1) identified. Rubber shavings were observed as the bedding for this arena, which may constitute a potential source of contamination.

A burn pile was identified adjacent the south boundary of horse training arena 1. There was no evidence of any refuse or deleterious material within this burn pile and it appeared as though it was for burning vegetation & possibly stable bedding (hay/straw) only. There was also a stockpile of waste stable bedding observed in this area of the site.

Slightly west of this area there was another horse training arena (2) observed. This arena was much smaller and the bedding was sand and therefore is not considered a potential source of contamination. A portion of this arena was used to store a number of bales of haylage (horse feed).

Slightly west of this area there was a small shed and a child's play house. The small shed had a wooden floor and was used for hay storage, there was no evidence of any potential sources of contamination. In this area of the site there was a large shed utilised as stables and a tack room. At the rear of the stables there was a wash down area, most likely used for washing horses after training sessions. The stables themselves were concrete lined and appeared to be in good condition. The tack room was used for storage of saddles, bridles and other horse riding equipment. There was a farm bike and some shelves with old paint cans present, however there was evidence of staining observed.

The remainder of the site was in paddocks for grazing.

The site inspection photographs are presented as Appendix F.

7.15 281 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Jesmond Road via a gravel driveway which extended along the western boundary of the site to the residential area. The residential area consisted of a dwelling and attached garage, water storage tank, solar panels, concrete lined tool shed and raised vegetable beds. A potential fill area to the north of the dwelling was identified to create a level platform for a domestic lawn.

An incinerator used to burn refuse and timber was identified to the east of the dwelling. Further east of the incinerator silage bales were identified.

In the central portion of the site was a livestock race which led to stables and a stock holding pen. A small outhouse structure was attached to the stables. The stables were concrete lined and utilised for storage at the time of the site walk over and inspection.

PACM cement board was identified on the external facing of the attached outhouse structure. It should be noted that the ACM board had extensive damage and ACM board fragments were identified on the soil surface surrounding the structure.

Silages bales were identified adjacent to the northern boundary of the site. Slightly west of the silage bales was a pump house. The pump house was constructed from ACM Cement Board. It should be noted that PACM board was painted and appeared in relatively good condition, and would be considered unlikely to present ground contamination in its current state.

What appeared to be a former horse training arena was located in the north-western portion of the site. As the base consisted of sand it would not be considered to be a potential source of contamination. The section of the surrounding landscaped had been cut and removed to provide a flat terrain. The arena appeared to no longer be in use during the site walk over and inspection.

In the north-western corner of the site was a stock holding pen and loading ramp. Due to the age of the stockholding pen it is considered that this area may have been utilised for spray race operations.

A secondary dwelling and adjoining shed was located in the north-western paddock of the site. The shed was locked at the time of the site walk over and inspection, therefore, no access was gained to inspect for potential sources of contamination. A rain water storage tank was located to the rear of the shed. PACM board fragments were also identified to the rear of the shed on the ground surface.

The site inspection photographs are presented in Appendix F.

7.16 341 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Jesmond Road via a gravel driveway, which extended through the western portion the site to the residential area. The residential area consisted of a dwelling, attached garage, rain water storage tank, concrete parking area and associated curtilage.

In the northern section of the site adjacent to the driveway was a stock holding pen and loading ramp. It is considered unlikely that the stock holding pen has been utilised for spray race operations due to its relatively recent construction. Adjacent to the stock holding pen was a laneway which extended east across the site. Slightly north was a large shed and rain water storage tank and associated water pump. The shed was locked at the time of the site walk over and inspection and no access was gained to inspect for potential sources of contamination. A lean-to shelter was attached to the shed and was being utilised to store firewood.

Immediately west of the shed was a small orchard. A decaying sheep carcass was identified adjacent to the orchard.

To the east of the shed was a hay barn and stock holding shed. A rain water storage tank was located adjacent to the hay barn. Both structures were empty and no concrete base were identified at the time of the site walk over and inspection.

The remaining area of the site was predominantly paddocks utilised for grazing.

The site inspection photographs are presented in Appendix F.

7.17 401 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Jesmond Road via a concrete driveway which led to the residential dwelling, attached garage and concrete paving area.

To the rear of the dwelling was a domestic garden that contained a rainwater storage tank, vegetable patches, garden pond and some fruit trees. A garden shed utilised as a pump house was located on the northern boundary of the residential area.

Adjacent to the residential area was an overgrown paddock. A machinery storage shed was located in the south-eastern corner of the paddock. In the central portion of the paddock was an overgrown market garden which was fenced off from the surrounding paddock.

On the eastern portion of the site was an orchard which was encased by a shelter belt. On the southern boundary of the orchard was a small galvanize hut which contained a seating bench and cardboard packaging. The use of the hut was unclear at the time of the site walkover and inspection.

In the south-eastern corner of the orchard was rolls of plastic orchards covers.

The site inspection photographs are presented in Appendix F.

7.18 451 Jesmond Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 25th January 2017. The site inspection was carried out during a period of fine weather.

The site was accessed from Jesmond Road via a gravel driveway which extended through the central portion of the site to the residential area. A garden lawn was observed on either side of the driveway.

A turning point area was located in the central portion of the driveway. Adjacent to the driveway were two pergolas which were located on either side of the driveway.

A utility shed utilised as a pump house was located on the northern boundary of the site.

In the central portion of the site was the residential dwelling and attached garage. A sheltered deck extended from the dwelling to form an outdoor entertaining area.

A concrete lined garage was located in close proximity to the dwelling. The garage was being utilised for storage at the time of the site walk over and inspection.

To the rear of the dwelling was a water storage tank, fuel storage tank and associated boiler and sewage treatment system.

In the western portion of the site was a number of wire trellis utilised for growing ornamental flowers. The managed grass area extended out to the western boundary where a number of planted hedge rows were identified.

In the south-eastern corner of the site was a stockpile of soil with vegetation cover. A drainage trench ran along the southern boundary of the site. A small stockpile of firewood underlain by plastic sheeting was located adjacent to the drainage trench.

The site inspection photographs are presented in Appendix F.

7.19 30 Burberry Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 26th of January 2017. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Burberry Road via a tarmac driveway which led to the residential area. Garden lawns were observed on either side of the driveway.

A golf recreational area consisting of a driving range, putting green and sand bunkers were located in the north-eastern corner of the domestic lawn. Due to the size and fact that the green forms part of the domestic garden it is unlikely that the application of chemical has occurred and therefore it would not be considered to be a potential source of contamination.

The residential dwelling was located in the central portion of the site. A swimming pool, spa bath, outdoor entertaining area and tennis court were identified to the north of the dwelling.

A vegetable patch and small area of fruit trees were identified to the rear of the tennis court. A small metal frame garden shed was also located in this area however it was surrounded by dense vegetation, therefore close inspection of the shed was not possible at the time of the site walk over and inspection.

To the rear of the dwelling were two water storage tanks which were partially submerged in the ground. A septic tank and associated ventilation outlets were observed to the east of the water storage tanks. It appeared that the percolation area was located in the paddock to the rear of the dwelling.

A large concrete lined shed was located along the southern boundary of the site. The shed was utilised for car parking and storage of garden equipment and utensils.

The western portion of the site consisted of an area of vegetation stockpiling which was located to the rear of the shed and a drainage gully system which drained to the man-made pond on the neighbouring property to the east. The gully extended along the western boundary of the site and was dry at the time of the site walk over and inspection.

The northern portion of the site consisted of overgrown paddocks. An overgrown gully extended across the paddock to the north-eastern corner of the site. A culvert was observed in the north-eastern corner adjacent to the access point to the paddock.

The site inspection photographs are presented in Appendix F.

7.20 38 Burberry Road

Access to the site was not granted, therefore no site walk over and inspection could be carried out. Any information relating to potential contaminating activities or land uses carried out on site could only be identified using historical photographs or previous site investigations.

7.21 41 Burberry Road

Access to the site was not granted, therefore no site walk over and inspection could be carried out. Any information relating to potential contaminating activities or land uses carried out on site could only be identified using historical photographs or previous site investigations.

8.0 Asbestos Management

Due to the estimated age of some of the dwellings/building structures identified across the investigated sites (pre-2000) it is likely that some of the materials used to construct the dwelling may include asbestos containing materials (ACM). External ACM products are likely restricted to the soffits of the dwellings with the exception of base boards and external cladding materials which were located at 329 Bremner Road, 415 Bremner Road and 281 Jesmond Road.

Based on the visual inspection undertaken during the site walkover and inspection of the 21 sites within the Auranga Development, external ACM products are likely restricted to the soffits of the dwellings.

Following the site inspection and walkover further ACM products identified included internal cement board which was noted at 415, 325 Bremner Road; ACM based board which was noted at 329 Bremner Road; ACM cement board and broken fragments were noted at 281 Jesmond Road.

These potential ACM's appeared in relatively good condition, and are considered unlikely to present ground contamination in their current state.

However, broken ACM fragments were identified at two separate locations at 281 Jesmond Road and the Esplanade Reserve. These areas will require sampling to identify if any ACM ground contamination has occurred.

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

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

All asbestos contaminated materials removed from the above sites will require disposal at a suitably licensed disposal facility.

9.0 Potentially Contaminating Activities or Land Uses

9.1 321 Bremner Road

During the site walkover and inspection evidence of burning, potential spray race operation and storage of potentially treated timber was noted.

Furthermore, following the review of the available historical photographs, the southern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 321 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning;
- Potential spray race operations; and
- Storage of potentially treated timber.

The assessment provided in Table 43 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 43: Conceptual Site Model: 321 Bremner Road, Drury

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

9.2 325 Bremner Road

During the site walkover and inspection burning of potentially treated timber furniture, evidence of hydrocarbon contamination and evidence of microbiological contamination were noted.

Furthermore, following the review of the available historical photographs, the southern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 325 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Burning of potentially treated timber furniture;
- Evidence of hydrocarbon contamination; and
- Evidence of microbiological contamination.

The assessment provided in Table 44 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 44: Conceptual Site Model: 325 Bremner Road, Drury

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

9.3 329 Bremner Road

During the site walkover and inspection evidence uncertified fill material, burning and a mechanic workshop were noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 329 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Suspected uncertified fill material;
- Evidence of burning; and
- Mechanical Workshop.

The assessment provided in Table 45 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 45: Conceptual Site Model: 329 Bremner Road, Drury

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

9.4 333 Bremner Road

During the site walkover and inspection evidence of burning, uncertified fill material, storage of potentially treated timber and potential spray race operations was noted.

Furthermore, following the review of the available historical photographs, the southern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 333 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning;
- Suspected uncertified fill material;
- Evidence of above ground fuel storage;
- Stockpiling of potentially treated timber; and
- Potential spray race operations

The assessment provided in Table 46 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 46: Conceptual Site Model: 333 Bremner Road, Drury

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

9.5 385 Bremner Road

Following the review of the available information relating to the subject site and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the site at 385 Bremner Road, Drury.

The assessment provided in Table 47 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 47: Conceptual Site Model: 385 Bremner Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Migration of Groundwater	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.

9.6 389 Bremner Road

During the site walkover and inspection evidence of potential hydrocarbon contamination and potential spray race operations was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 389 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Potential hydrocarbon contamination; and
- Potential spray race operations

The assessment provided in Table 48 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 48: Conceptual Site Model: 389 Bremner Road, Drury

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

9.7 393 Bremner Road

Following the review of the available information relating to the subject site and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the site at 393 Bremner Road, Drury.

The assessment provided in Table 49 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 49: Conceptual Site Model: 393 Bremner Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Migration of Groundwater	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.

9.8 403 Bremner Road

During the site walkover and inspection evidence burning was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 403 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning.

The assessment provided in Table 50 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 50: Conceptual Site Model: 403 Bremner Road, Drury

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

9.9 415 Bremner Road

During the site walkover and inspection evidence of potential spray race operations were noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 415 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Potential spray race operations.

The assessment provided in Table 51 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 51: Conceptual Site Model: 415 Bremner Road, Drury

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

9.10 420-417 Bremner Road

During the site walkover and inspection evidence of evidence stockpiling of potentially treated timber was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 420-417 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Stockpiling of potentially treated timber.

The assessment provided in Table 52 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 52: Conceptual Site Model: 420-417 Bremner Road, Drury

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

9.11 421 Bremner Road

During the site walkover and inspection evidence of horticultural activities were noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 421 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities.

The assessment provided in Table 53 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 53: Conceptual Site Model: 421 Bremner Road, Drury.

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

9.12 Esplanade Reserve

During the site walkover and inspection evidence of burning, evidence of microbial contamination and evidence of PACM ground contamination was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at Esplanade Reserve the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning;
- Evidence of microbiological contamination; and
- Evidence of PACM Ground Contamination.

The assessment provided in Table 54 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 54: Conceptual Site Model: Esplanade Reserve, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Potentially complete: Potential fibres associated with ACM identified at the site.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: Potential fibres associated with ACM identified at the site.
	Surface Water Run-off	Ecological Receptors - Drury Creek	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Drury Creek	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.13 221 Jesmond Road

During the site walkover and inspection evidence of suspected uncertified fill material and evidence of burning were noted.

Furthermore, following the review of the available historical photographs, the central area of the site adjacent to the southern boundary appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 221 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Suspected uncertified fill material;
- Evidence of burning; and
- Former horticultural activities.

The assessment provided in Table 55 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 55: Conceptual Site Model: 221 Jesmond Road, Drury

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

9.14 235 Jesmond Road

During the site walkover and inspection evidence of rubber shavings were noted on the base of the horse training arena.

Therefore, following the desktop assessment and site inspection and walk over of the site at 235 Jesmond Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Potential for Leaching of Heavy Metal from Training Arena.

The assessment provided in Table 56 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 56: Conceptual Site Model: 235 Jesmond Road, Drury

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

9.15 281 Jesmond Road

During the site walkover and inspection evidence of burning, uncertified fill material, potential spray race operations and asbestos contamination was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 281 Jesmond Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning;
- Potential spray race operations;
- Suspected uncertified fill material; and
- Evidence of PACM ground contamination.

The assessment provided in Table 57 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 57: Conceptual Site Model: 281 Jesmond Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Potentially complete: Potential fibres associated with ACM identified at the site.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: Potential fibres associated with ACM identified at the site.
	Surface Water Run-off	Ecological Receptors - Drury Creek	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Drury Creek	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.16 341 Jesmond Road

During the site walkover and inspection evidence of horticultural activities were noted.

However, following the review of the available historical photographs, the northern area of the site also appears to have been utilised for horticultural purposes.

In addition, following the review of the available historical photographs, a wet land feature can be seen in the central portion of the site. As this was no evident during the site walk over and inspection it is considered that the low-lying area has potentially been subject to reclamation and may contain uncertified filling materials.

Therefore, following the desktop assessment and site inspection and walk over of the site at 341 Jesmond Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities; and
- Suspected uncertified fill material.

The assessment provided in Table 58 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 58: Conceptual Site Model: 341 Jesmond Road, Drury

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

9.17 401 Jesmond Road

During the site walkover and inspection evidence of horticultural activities was noted.

Furthermore, following the review of the available historical photographs, the western area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 401 Jesmond Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities.

The assessment provided in Table 59 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 59: Conceptual Site Model: 401 Jesmond Road, Drury

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

9.18 451 Jesmond Road

During the site walkover and inspection evidence of horticultural activities and above ground fuel storage were noted.

Furthermore, following the review of the available historical photographs, the central and eastern portion of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 451 Jesmond Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities; and
- Evidence of above ground fuel storage.

The assessment provided in Table 60 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 60: Conceptual Site Model: 451 Jesmond Road, Drury

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

9.19 30 Burberry Road

Following the review of the available information relating to the subject and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the site at 30 Burberry Road, Drury.

The assessment provided in Table 61 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 61: Conceptual Site Model: 30 Burberry Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health - Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.
	Migration of Groundwater	Ecological Receptors - Drury Creek	Incomplete: Sampling and analysis is not recommended on site as no potentially contaminating activities or land uses were identified.

9.20 38 Burberry Road

A site walkover and inspection of 38 Burberry Road was not possible due to access restrictions, therefore it was not possible to inspect the site for any potential contaminating activities.

However, following the review of the available historical photographs, suspected uncertified fill material may have been imported on site in order to construct the dam structure and evidence of former horticultural activities were noted.

Therefore, following the desktop assessment of the site at 38 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Potential horticultural activities; and
- Suspected uncertified fill material.

The assessment provided in Table 62 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 62: Conceptual Site Model: 38 Burberry Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Surface Water Run-off	Ecological Receptors - Ngakoroa Stream	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Migration of Groundwater	Ecological Receptors - Ngakoroa Stream	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses..

9.21 41 Burberry Road

A site walkover and inspection of 41 Burberry Road was not possible due to access restrictions, therefore it was not possible to inspect the site for any potential contaminating activities.

Following the review of the available information relating to the subject site no potentially contaminating land uses and/or activities were identified at the site at 41 Burberry Road, Drury.

The assessment provided in Table 63 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the potential change of land use, subdivision and soil disturbance activities on human health and the environment.

Table 63: Conceptual Site Model: 41 Burberry Road, Drury

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Ingestion of Contaminated Soils	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Inhalation of Vapours/Fibres	Human Health - Residential Land Use	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
		Human Health - Commercial/Industrial Outdoor Worker	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Surface Water Run-off	Ecological Receptors - Ngakoroa Stream	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.
	Migration of Groundwater	Ecological Receptors - Ngakoroa Stream	Potentially complete: A site inspection is recommended to identify any potentially contaminating activities or land uses.

10.0 Conclusions and Recommendations

The Preliminary Site Investigation for the Auranga Development has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No.5 (Ministry for the Environment, 2011).

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a review of the historical certificate of title, a review of the Auckland Council property file and a contaminated sites enquiry to Auckland Council. During the review of the available information any potentially contaminating activities or land uses were identified.

Following the desk top assessment, the site was visited and a site inspection and walk over was carried out. The site was inspected by Focus Environmental Services Limited personnel on dates between the 24th of January 2017 and the 3rd of February 2017. During the site inspection, any potentially contaminating activities or land uses were identified.

In summary, following the desk top assessment and site inspection and walkover, evidence of burning, potential spray race operations and storage of potentially treated timber were noted for 321 Bremner Road; evidence of hydrocarbon contamination, evidence of microbiological contamination and burning of potentially treated timber furniture were noted for 325 Bremner Road; evidence of burning, suspected uncertified fill material and a mechanical workshop were noted for 329 Bremner Road; potentially uncertified fill material, evidence of burning, storage of potentially treated timber, and evidence of fuel storage was noted for 333 Bremner Road; potential spray race operations and potential hydrocarbon contamination were noted for 389 Bremner Road; a single area of burning was noted for 403 Bremner Road; potential spray race operation were noted for 415 Bremner Road; storage of potentially treated timber was noted at 420-417 Bremner Road; evidence of horticultural activities were noted at 421 Bremner Road; evidence of microbiological contamination and evidence of potential ACM ground contamination were noted for the Esplanade Reserve; evidence of former horticultural activities, evidence of microbiological contamination, burning and potentially uncertified fill materials were noted for 221 Jesmond Road; evidence of rubber shaving on the base of the training arena were noted for 235 Jesmond Road; evidence of burning, evidence of potentially uncertified fill material, suspected spray race operations and potential ACM ground contamination were noted for 281 Jesmond Road; evidence of horticultural activities and potentially uncertified fill material were noted for 341 Jesmond Road; evidence of horticultural activities were noted for 401 Jesmond Road; evidence of horticultural activities and fuel storage were noted for 451 Jesmond Road. No potentially contaminating land uses and/or activities were identified at the site at 389 Bremner Road, 393 Bremner Road, 385 Bremner Road, 30 Burberry Road and 41 Burberry Road Drury.

The information obtained of the sites history and from the site inspection and walk over was assessed to determine if any potential hazardous activities listed on the Hazardous Activities and Industries List (HAIL) had occurred on site as a result of past or current land use.

Due to the potential source of contamination identified at the above sites it is considered that there is evidence to suggest that an activity outlined in the HAIL list has been, or is currently being, carried out on the pieces of land.

Prior to the development of the areas of the site where potentially contaminating land uses and/or activities have taken place, a detailed site investigation is recommended.

The detailed site investigation would confirm if the identified land uses and/or activities have affected the site soils and will confirm the consenting requirements for this area of the site.

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***PRELIMINARY SITE INVESTIGATION
AURANGA DEVELOPMENT
AUCKLAND***

For the Attention of:

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Figure 3 – Neighbouring Environment



Appendices

Appendix A - Service Contract Agreement

Appendix B - HAIL List

Appendix C - Historical Photographs

Appendix D - Site Contour Plan

Appendix E - Auckland Council Contaminated Site Enquiry Letter

Appendix F - Site Inspection Photographs

Executive Summary

Focus Environmental Services Limited was contracted by Karaka & Drury Consultant Limited to carry out a Preliminary Site Investigation of 23 properties located at Bremner Road and Burberry Road, Drury, Auckland forming the Auranga Development.

This investigation was completed to provide information on potential contamination at the site as a result of historical and/or current land uses, and may be used support an application to develop the site.

This Preliminary Site Investigation has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No.5 (MfE, 2011).

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a review of the Auckland Council Property file and a contaminated sites enquiry to Auckland Council. During the review of the available information any potentially contaminating activities or land uses were identified.

Following the desk top assessment the site was visited and a site inspection and walk over was carried out. The site was inspected by Focus Environmental Services Limited personnel on the 16th of July 2015, the 19th of January 2016 and the 31st of May 2016. During the site inspection any potentially contaminating activities or land uses were identified.

In summary, following the desk top assessment and site inspection and walkover, storage of potentially treated timber posts, potential spray race operation, chemical storage associated with horticultural activities and potentially uncertified fill materials were noted for 121 Bremner Road; a single area of burning was noted for 138 Bremner Road; a printing workshop, evidence of burning and potential spray race operations were noted for 160 Bremner Road; horticultural activities, storage of treated timber posts, chemical storage, workshop activities and evidence of burning were noted for 169 Bremner Road; evidence of burning, storage of potentially treated timber and potential spray race operations were noted for 207 Bremner Road; horticultural activities, chemical storage and potentially uncertified fill materials were noted for 245 Bremner Road; horticultural activities were noted for 249, 251 and 253 Bremner Road; horticultural activities, evidence of burning and potentially uncertified fill materials were noted for 259 Bremner Road; evidence of burning was noted in two areas for 260 Bremner Road; evidence of burning and potential spray race operations were noted for 263 Bremner Road; potentially uncertified fill materials were noted for 269 Bremner Road; presence of asbestos containing materials, potential spray race operations, evidence of burning and potentially uncertified fill materials were noted for 312 Bremner Road; evidence of burning and potentially uncertified fill materials were noted for 322 Bremner Road; horticultural activities were noted for 330 Bremner Road; horticultural activities were noted for 37 Burberry Road; potentially uncertified fill materials, horticultural activities, evidence of a historical farm dump, evidence of potentially treated timber storage and evidence of the disposal of horticultural soils to land was at Esplanade Reserve, 109 Bremner Road and potentially uncertified fill materials were noted for Bremner Road. No potentially contaminating land uses and/or activities were identified at the site at 132 & 213 Bremner Road, Drury, 31 Burberry Road, Drury and the road Burberry Road.

No potentially contaminating land uses and/or activities were identified at the site at 132 & 213 Bremner Road, Drury, 31 Burberry Road, Drury and the road Burberry Road.

The information obtained of the sites history and from the site inspection and walk over was assessed to determine if any potential hazardous activities listed on the Hazardous Activities and Industries List (HAIL) had occurred on site as a result of past or current land use.

Due to the potential sources of contamination identified at the above sites it is considered that there is evidence to suggest that an activity outlined in the HAIL list has been, or is currently being, carried out on the pieces of land.

Prior to the development of the areas of the site where potentially contaminating land uses and/or activities have taken place, a detailed site investigation is recommended. The detailed site investigation would confirm if the identified land uses and/or activities have affected the site soils and will confirm the consenting requirements for these areas of the site.

Submitted by,



David O'Reilly
Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

- 1.1 This report has been prepared at the request of Karaka & Drury Consultant Limited (“the Client”) in terms of the Focus Environmental Services Agreement (“Agreement”) attached as Appendix A of this report.
- 1.2 The following report is based on:
 - *Information provided by the client;*
 - *A review of historical aerial photographs available for the site;*
 - *A search of Auckland Council Property Files;*
 - *A review of previous investigations in the area;*
 - *A search of the Auckland Council Contaminated Sites Database; and*
 - *A site walkover and inspection.*
- 1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.
- 1.4 No warranties are given, intended or implied.
- 1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.
- 1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.
- 1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services.
- 1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services.

2.0 Site Identification

The site consists of 23 properties located at Bremner Road and Burberry Road, Drury, Auckland as shown in Figure 1 attached. The site is located at national grid reference 1772015mE & 5892085mN.

The site identification details are provided in Table 1 below.

Table 1: Site Identification Details: Auranga Development, Drury

Physical Address	Legal Description	Area (m ²)
121 Bremner Road, Drury	Lot 2 DP 119463	40,031
132 Bremner Road, Drury	Lot 9 DP 166291	59,830
138 Bremner Road, Drury	Lot 1 DP 376355	15,836
160 Bremner Road, Drury	Pt Lot 9 DP 12364	94,249
169 Bremner Road, Drury	Lot 1 DP 119463	42,317
207 Bremner Road, Drury	Lots 2 & 3 DP 113113	106,276
213 Bremner Road, Drury	Lot 1 DP 113113	6,783
245 Bremner Road, Drury	Lot 1 DP 198792	15,245
249 Bremner Road, Drury	Lot 4 DP 102261	10,830
251 Bremner Road, Drury	Lot 5 DP 102261	10,540
253 Bremner Road, Drury	Lot 1 DP 102261	10,269
259 Bremner Road, Drury	Lot 2 DP 99330	40,090
260 Bremner Road, Drury	Lot 8 DP 12364	100,385
263 Bremner Road, Drury	Lot 1 DP 132199	40,000
269 Bremner Road, Drury	Lot 2 DP 132199	47,200
312 Bremner Road, Drury	Lot 1 DP 94117	76,189
322 Bremner Road, Drury	Lot 1 DP 164625	21,680
330 Bremner Road, Drury	Lot 1 DP 371107	26,469
31 Burberry Road, Drury	Lot 10 DP 166291	44,140
37 Burberry Road, Drury	Lot 2 DP 376355	25,769
Esplanade Reserve, 109 Bremner Road, Drury	LOT 3 DP 99330 LOT 4 DP 113113 LOT 3 DP 119463 LOT 3 DP 132199 - SUBJ TO KAPUNI GAS PIPELINE ESMT-BLK IV DRURY SD - REC & ESP RES	58,350
Bremner Road, Karaka	-	-
Burberry Road, Karaka	-	-

3.0 Site Topography

The properties of the Auranga Development are generally sloping and contain numerous gullies and surface water bodies. Descriptions of the topographies of the individual sites are provided below and the site contour plans are presented in Appendix D.

3.1 121 Bremner Road

The property at 121 Bremner Road is generally flat with the eastern area of the site sloping towards the neighbouring tidal inlet. A sloping bank leading to a lowered area was also noted in the northern area of the site.

The Ngakoroa Stream, a tidal inlet of the Manukau Harbour, is situated adjacent to the eastern boundary of the site.

3.2 132 Bremner Road

The property at 132 Bremner Road is generally undulating. A relatively steep easterly sloping ridge runs through the centre of the site before sloping more gently towards the neighbouring tidal inlet.

The Ngakoroa Stream, a tidal inlet of the Manukau Harbour, is situated adjacent to the eastern boundary of the site.

3.3 138 Bremner Road

The property at 138 Bremner Road is generally sloping towards the north eastern corner of the site. A small low-lying planted area was observed in the far north eastern corner of the site.

The Ngakoroa Stream, a tidal inlet of the Manukau Harbour, is situated approximately 200 m from the eastern boundary of the site.

3.4 160 Bremner Road

The property at 160 Bremner Road is undulating, with a general slope towards the north eastern corner of the site.

An unnamed tributary of the Drury Creek extends through the northern area of the site.

3.5 169 Bremner Road

The property at 169 Bremner Road is generally flat. A sloping bank leading to a lowered area was also noted in the northern area of the site.

The Drury Creek is situated adjacent to the northern boundary of the site.

3.6 207 Bremner Road

The property at 207 Bremner Road is generally undulating.

The Drury Creek is situated adjacent to the northern and north eastern boundaries of the site and continues through the south eastern area of the site.

3.7 213 Bremner Road

The property at 213 Bremner Road is generally sloping towards the north eastern corner of the site.

An unnamed tidal inlet of the Drury Creek is situated approximately 50m east of the site.

3.8 245 Bremner Road

The property at 245 Bremner Road is generally flat.

An unnamed tributary of the Drury Creek extends through the site, although this appears to have been channelized and/or culverted.

3.9 249 Bremner Road

The property at 249 Bremner Road is generally flat.

3.10 251 Bremner Road

The property at 251 Bremner Road is generally flat.

3.11 253 Bremner Road

The property at 253 Bremner Road is generally flat.

An unnamed tributary of the Drury Creek extends through the site, although this appears to have been channelized and/or culverted.

3.12 259 Bremner Road

The property at 259 Bremner Road is generally flat with the northern area of the site sloping towards the neighbouring tidal inlet.

The Drury Creek is situated adjacent to the northern boundary of the site.

3.13 260 Bremner Road

The property at 260 Bremner Road is generally undulating, with slopes leading towards the gully system in the southern area of the site.

An unnamed tributary of the Drury Creek extends through the southern area of the site.

3.14 263 Bremner Road

The property at 263 Bremner Road is generally flat.

An unnamed tributary of the Drury Creek extends through the site, although this appears to have been channelized and/or culverted.

3.15 269 Bremner Road

The property at 269 Bremner Road is generally sloping towards the central tidal inlet and gully system.

An unnamed tributary of the Drury extends through the site.

3.16 312 Bremner Road

The property at 312 Bremner Road is generally undulating. A relatively steep ridge runs along the eastern boundary of the site and the southern area of the site is relatively flat.

3.17 322 Bremner Road

The property at 322 Bremner Road is generally flat.

An unnamed tributary of the Drury Creek extends through the site, although this appears to have been channelized and/or culverted.

3.18 330 Bremner Road

The property at 330 Bremner Road is generally sloping towards the north eastern corner of the site.

An unnamed tributary of the Drury Creek extends through the site, although this appears to have been dammed to create the existing pond structure.

3.19 31 Burberry Road

The property at 31 Burberry Road is generally flat with the eastern area of the site sloping towards the neighbouring tidal inlet/stream.

An unnamed tributary of the Drury Creek extends along the eastern boundary of the site.

3.20 37 Burberry Road

The property at 37 Burberry Road is generally flat with the eastern area of the site sloping slightly towards the neighbouring property.

The Ngakoroa Stream, a tidal inlet of the Manukau Harbour, is situated approximately 200 m from the eastern boundary of the site.

3.21 Esplanade Reserve, 109 Bremner Road, Drury

The Esplanade Reserve, 109 Bremner Road is generally undulating and typically slopes towards the neighbouring water body.

The Drury Creek and the Ngakoroa Stream, tidal inlets of the Manukau Harbour, run along the boundary of the site.

3.22 Bremner Road

Bremner Road is generally flat. The Drury Creek and the Ngakoroa Stream, a tidal inlet of the Manukau Harbour, and two of its unnamed tributaries, extend beneath the road at three locations

3.23 Burberry Road

Burberry Road is generally flat. An unnamed tributary of the Ngakoroa Stream, a tidal inlet of the Manukau Harbour, extends beneath the road at the junction between Burberry Road and Karaka Road.

4.0 Geology and Hydrology

Published geological maps¹ indicate the site is typically underlain with alluvial deposits of the Puketoka Formation. A description of the underlying geologies is presented in Table 2 below.

Table 2: Geology: Auranga Development, Drury

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

¹ Geology of the Auckland Area (Institute of Geological & Nuclear Sciences 1:25,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

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

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

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

5.2 Auckland Council Regional Plan: Air, Land and Water

The contaminated land rules of the Auckland Council Regional Plan: Air, Land and Water (ACRP:ALW) provide a framework for the management or remediation of contaminated land for the protection of the environment.

In brief, the objectives of the ACRP:ALW are to: promote and facilitate the identification and management of land containing elevated levels of contaminants, to ensure that land containing elevated levels of contaminants is managed and/or remediated to protect the environment, and to recognise and support the sustainable use of land containing elevated levels of contaminants.

The contaminated land rules of the ACRP:ALW apply when the land contains contaminants above those levels specified in Schedule 10 of the ACRP:ALW.

5.3 Proposed Auckland Unitary Plan

The contaminated land rules of the Proposed Auckland Unitary Plan (PAUP) have immediate legal effect following its notification. As the PAUP was notified on the 30th of September 2013 the contaminated land rules of the PAUP must be considered.

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

The contaminated land rules of the PAUP apply when the land contains contaminants above those levels specified in Table 1, Chapter 4.5 of the PAUP.

6.0 Site Condition and Surrounding Environment

The properties of the Auranga Development are generally in pasture and utilised for grazing with the surrounding properties being predominantly rural residential, with properties to the far east being either residential or commercial/industrial. Descriptions of the individual sites are provided below and the neighbouring environment is shown in Figure 3.

6.1 121 Bremner Road

The site at 121 Bremner Road was predominantly in pasture and was utilised for the grazing of horses at the time of the site inspection and walkover.

An animal shed and stables building were observed in the south western corner of the site and the dwelling and associated buildings were observed in the southern corner of the site.

6.2 132 Bremner Road

The site at 132 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

No buildings or structures were observed across the site.

6.3 138 Bremner Road

The site at 138 Bremner Road was largely in pasture. Two dwellings were observed in the central area of the site and the site stock loading yards were observed in the north eastern corner of the site.

6.4 160 Bremner Road

The site at 160 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The site buildings were located in the eastern area of the site and consisted of a hay barn, a workshop building, three aviary buildings and a large stock holding/loading yard. A small pump shed was located in the south eastern corner of the site.

6.5 169 Bremner Road

The site at 169 Bremner Road was predominantly in pasture and was utilised for the production of lawn at the time of the site inspection and walkover.

A workshop and shed were observed along the eastern boundary of the site with the residential buildings being located in the southern area of the site.

6.6 207 Bremner Road

The site at 207 Bremner Road was predominantly in pasture and was utilised for the grazing at the time of the site inspection and walkover.

A residential dwelling, a number of auxiliary sheds, the site stock loading yards and a barn were located in the southern area of the site.

6.7 213 Bremner Road

The site at 213 Bremner Road was largely in pasture and was utilised for the grazing at the time of the site inspection and walkover.

A residential dwelling and associated parking area, an auxiliary shed and the site stock loading yards were observed in the northern area of the site.

6.8 245 Bremner Road

The northern area of the site at 245 Bremner Road was utilised for horticultural purposes with the southern area being utilised for grazing cattle.

Several shipping containers and a greenhouse were located in the northern area of the site. A hay barn and utility sheds were located in the south eastern corner of the site, a large water tank was observed near the central area of the site and the commercial buildings were located in the central area of the site.

6.9 249 Bremner Road

The site at 249 Bremner Road was utilised for horticultural purposes.

A large greenhouse was observed along the eastern boundary of the site with the mixing shed and water tanks located immediately to the west of the greenhouse building.

6.10 251 Bremner Road

The site at 251 Bremner Road was utilised for horticultural purposes.

A greenhouse was observed along the south western boundary of the site. No other structures were identified across the site.

6.11 253 Bremner Road

The northern area of the site at 253 Bremner Road was utilised for horticultural purposes with the southern area being utilised for both residential purposes and for grazing cattle.

A large greenhouse was observed in the northern area of the site with the mixing shed and water tanks located immediately to the south of the greenhouse building. The stock loading yards and residential buildings were located along the southern boundary of the site.

6.12 259 Bremner Road

The northern area of the site at 259 Bremner Road was utilised for grazing purposes with the southern area being utilised for horticultural purposes.

A greenhouse was observed in the south western area of the site with the mixing shed, water tanks and pack house located immediately to the west of the greenhouse building. An additional greenhouse, along with auxiliary sheds, was located in the south eastern corner of the site.

6.13 260 Bremner Road

The site at 260 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings were located in the north western area of the site, with a shed and hay barn located to the west and south west of the residential buildings respectively.

6.14 263 Bremner Road

The site at 263 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings were located in the far north eastern corner of the site, with the site sheds being located in the central area of the site.

6.15 269 Bremner Road

The site at 269 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings, along with a number of auxiliary buildings, were located in the southern area of the site with a pond/dam structure being observed immediately to the north east of the residential area.

6.16 312 Bremner Road

The site at 312 Bremner Road was predominantly in pasture and was overgrown at the time of the site inspection and walkover.

The residential buildings, along with a number of auxiliary buildings and demolished buildings, were located in the north western area of the site. A horse track was observed across the southern area of the site.

6.17 322 Bremner Road

The site at 322 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings and associated shed was observed in the north eastern corner of the site. No other structures were observed across the site.

6.18 330 Bremner Road

The site at 330 Bremner Road was largely in pasture and was utilised for residential purposes at the time of the site inspection and walkover.

The residential buildings, along with a number of auxiliary buildings, a pool and a tennis court, were located in the central area of the site with a pond/dam structure being observed immediately to the north east of the residential area.

6.19 31 Burberry Road

The site at 31 Burberry Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings were located in the central area of the site. No other structures were observed across the site.

6.20 37 Burberry Road

The site at 37 Burberry Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover.

The residential buildings and an auxiliary shed were located in the central and central western area of the site respectively. No other structures were observed across the site.

6.21 Esplanade Reserve, 109 Bremner Road, Drury

The Esplanade Reserve, 109 Bremner Road was predominantly in pasture and was utilised for grazing at the time of the site inspection and walkover. The area adjacent to 169 Bremner Road was utilised for the production of lawn and the area adjacent to 259 Bremner Road was utilised for the spreading of horticultural soils. With the exception of a single pylon no structures were observed across the site.

6.22 Bremner Road

Bremner Road was utilised as a rural road.

Grassed verges were present on both sides of the road with culverts providing access to the adjacent properties.

6.23 Burberry Road

Burberry Road was utilised as a rural road.

Grassed verges were present on both sides of the road with culverts providing access to the adjacent properties.

7.0 Site History

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

7.1 Historical Aerial Photographs

Descriptions of the historical aerial photographs for the subject sites are presented in Tables 3-16 below. The historical site photographs are presented in Appendix C.

Table 3: Historical Photographs: 121 Bremner Road

Date	Description
1980	The 1980 historical photograph shows the subject site in use for rural purposes. The site buildings can be observed in the southern area of the site. A number of buildings can be observed along the south western boundary of the site. The tidal inlet can be observed along the eastern boundary of the site. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the subject site in use for rural purposes. With the exception of the western neighbouring property which appears to be utilised for horticultural purposes, the surrounding properties appear largely rural in use.
1996	The 1996 historical photograph shows the subject site in use for rural purposes. With the exception of the animal shelter, the site buildings along the south western boundary have now been removed.
2008, 2010 & 2015	The 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The stables building, in the southern area of the site, and second pylon structure, in the northern area of the site, have now been constructed.

Table 4: Historical Photographs: 132 Bremner Road

Date	Description
1980	The 1980 historical photograph shows the subject site undeveloped and in use for rural purposes. A single track can be observed running through the centre of the property. Site structures can be seen in the far south western corner of the site. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the subject site in use for rural purposes. The site buildings remain in the south western corner of the site and an area of clearance can be observed in the south eastern corner. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph shows the subject site in use for rural purposes. The site buildings in the south western corner of the site now appear to have been removed. An additional structure may be present in the south eastern corner. The property immediately to the north west of the site has now been developed for rural residential purposes, with the access way being observed along the northern boundary of the site. The surrounding properties appear largely rural residential in use.
2006 & 2008	The 2006 & 2008 historical photographs show the subject site in use for rural purposes. No site buildings can be observed across the site. The surrounding properties appear largely rural residential in use.
2010	The 2010 historical photograph shows the subject site likely in use for horticultural activities. A small carpark and pack house can be observed along the northern boundary of the site.
2015	The 2015 historical photograph shows the subject site largely as it appeared during the site walkover and inspection. The pack house building has since been removed along with the horticultural activities at the site. No site structures can be observed across the site and the surrounding properties appear largely rural residential in use.

Table 5: Historical Photographs: 138 Bremner Road

Date	Description
1980 and 1988	The 1980 & 1988 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site.
1996	The 1996 historical photograph is of poor resolution however it shows the construction of the dwellings in the central area of the site along with a small pond area in the north eastern corner of the site.
1996, 2006, 2008, 2010 & 2015	The 2006, 2008, 2010 & 2015 historical photographs show the subject site largely as it appeared during the site walkover and inspection. The construction of both dwellings is now complete and the stock loading yard can be observed in the north eastern corner of the site.

Table 6: Historical Photographs: 160 Bremner Road

Date	Description
1980	The 1980 & 1988 historical photographs show the subject site undeveloped and in use for rural purposes. The site buildings can be observed along the eastern boundary of the site with the remainder of the site in pasture. The surrounding properties appear largely rural in use.
1996, 2008, 2010 & 2015	The 1996, 2008, 2010 & 2015 historical photographs show the subject site generally unchanged from the 1988 historical photograph and as it appeared during the site walkover and inspection.

Table 7: Historical Photographs: 169 Bremner Road

Date	Description
1980	The 1980 historical photograph shows the northern area of the subject site in use for rural purposes, with the southern area being potentially utilised for horticultural purposes. With the exception of the pylon, no structures can be observed across the site. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the northern area of the subject site in use for rural purposes, with the southern area being utilised for horticultural purposes. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph shows the subject site in use for rural purposes. A single barn structure can now be observed along the north eastern boundary of the site. The surrounding properties appear largely rural residential in use.
2008, 2010 & 2015	The 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The dwelling can be observed in the southern corner of the site and the barn and auxiliary buildings can be observed along the north eastern boundary. The surrounding properties appear largely rural residential in use.

Table 8: Historical Photographs: 207 Bremner Road

Date	Description
1980, 1988, 1996, 2008, 2010 & 2015	The 1980, 1988, 1996, 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. With the exception to a number of trees and hedge rows, very little appears to have changed at the site over the period of the available historical photographs. With the exception to the property immediately to the west of the site, which is utilised for horticultural purposes, the surrounding properties appear largely rural residential in use.

Table 9: Historical Photographs: 213 Bremner Road

Date	Description
1980, 1988, 1996 & 2008	The 1980, 1988, 1996 & 2008 historical photographs show the subject site likely forming part of a larger rural property. A single dwelling and associated curtilage area can be observed. With the exception to the property immediately to the west of the site, which is utilised for horticultural purposes, the surrounding properties appear largely rural/rural residential in use.
2010 & 2015	The 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The auxiliary building can now be observed adjacent to the residential dwelling and the hedge row surrounding the residential dwelling has now been removed. With the exception to the property immediately to the west of the site, which is utilised for horticultural purposes, the surrounding properties remain largely rural/rural residential in use.

Table 10: Historical Photographs: 245, 249, 251, 253 & 259 Bremner Road

Date	Description
1980	The 1980 historical photograph show the subject site undeveloped and in use for rural purposes. The site buildings can be observed along the eastern boundary of 245 Bremner Road. A former gully/low lying area can be seen traversing the properties at 245 and 253 Bremner Road. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the subject site has been developed for horticultural use. The four main greenhouses can now be observed across the site, along with the site buildings through the centre of the property at 245 Bremner Road. The dwelling at 253 Bremner Road can now be observed. The surrounding properties appear largely rural in use.
1996, 2006, 2008, 2010 & 2015	The 1996, 2006, 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The site is operating for horticultural purposes with several areas appearing to be utilised for market garden purposes. The surrounding properties appear largely rural residential in use.

Table 11: Historical Photographs: 260 Bremner Road

Date	Description
1980	The 1980 historical photograph show the subject site undeveloped and in use for rural purposes. With the exception of the shed, located in the central eastern area of the site, no site structures can be observed. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the subject site in use for rural purposes. The dwelling and barn can now be observed in the central western and southern areas of the site respectively. The surrounding properties appear largely rural in use.
1996, 2006, 2008, 2010 & 2015	The 1996, 2006, 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 12: Historical Photographs: 263 Bremner Road

Date	Description
1980 & 1988	The 1980 & 1988 historical photographs show the subject site in use for rural purposes. The dwelling can be observed in the far north eastern corner of the site and the site buildings near the centre of the site. The surrounding properties appear largely rural in use.
1996, 2006, 2008, 2010 & 2015	The 1996, 2006, 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 13: Historical Photographs: 269 Bremner Road

Date	Description
1980 & 1988	The 1980 & 1988 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The surrounding properties appear largely rural in use.
1996 & 2006	The 1996 and 2006 historical photographs show the subject site largely in use for rural purposes. The dwelling can now be observed in the southern area of the site. The surrounding properties appear largely rural residential in use.
2008, 2010 & 2015	The 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The pool/dam structure has now been created and several additional site buildings can be observed in the southern area of the site. The surrounding properties appear largely rural residential in use.

Table 14: Historical Photographs: 312 Bremner Road

Date	Description
1980	The 1980 historical photograph shows the subject site in use for rural purposes. The site buildings can be observed in the north eastern area of the site. The surrounding properties appear largely rural in use.
1988	The 1988 historical photograph shows the subject site in use for rural purposes. The horse track can now be observed in the southern area of the site and a large stables building can be observed along the north eastern boundary of the site. The surrounding properties appear largely rural in use.
1996, 2006, 2008, 2010 & 2015	The 1996, 2006, 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 15: Historical Photographs: 322 Bremner Road

Date	Description
1980 & 1988	The 1980 & 1988 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The surrounding properties appear largely rural in use.
1996, 2006 & 2008	The 1996, 2006 & 2008 historical photograph shows the subject site in use for rural purposes. The dwelling can now be observed in the north western area of the site and a distinctive low-lying area can be observed through the southern area of the site. The surrounding properties appear largely rural in use.
2010	The 2010 historical photograph shows the subject site in use as a “cleanfill” site. An additional access way has been created along the eastern boundary of the site.
2015	The 2015 historical photograph shows the subject site largely as it appeared during the site walkover and inspection. The filling operation appears to have been completed and the southern area of the site appears to be in use for rural purposes.

Table 16: Historical Photographs: 330 Bremner Road

Date	Description
1980 & 1988	The 1980 & 1988 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph shows the subject site in use for rural purposes. The dwelling can now be observed in the central area of the site and the pond appears to have been created to the north east of the dwelling. The surrounding properties appear largely rural in use.
2006	The 2006 historical photograph shows the subject site developed for rural residential purposes. The swimming pool, parking area and garages appear to have now been constructed. A small area in the south eastern corner of the site appears in use for horticultural activities.
2008, 2010 & 2015	The 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 17: Historical Photographs: 31 Burberry Road

Date	Description
1980, 1988 & 1996	The 1980, 1988 & 1996 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The surrounding properties appear largely rural in use.
2006	The 2006 historical photograph shows the subject site undergoing development for rural residential purposes. The dwelling can be observed in the central area of the site.
2008, 2010 & 2015	The 2008, 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 18: Historical Photographs: 37 Burberry Road

Date	Description
1980, 1988 & 1996	The 1980, 1988 & 1996 historical photographs show the subject site undeveloped and in use for rural purposes. No structures can be observed across the site. The surrounding properties appear largely rural in use.
2006 & 2008	The 2006 & 2008 historical photograph shows a small area along the western boundary of the subject site likely being utilised for horticultural purposes. The property remains undeveloped.
2010 & 2015	The 2010 & 2015 historical photographs show the subject site generally as it appeared during the site walkover and inspection. The residential dwelling and auxiliary building have now been constructed and the animal pen can be observed in the central area of the site. The surrounding properties appear largely rural residential in use.

Table 19: Historical Photographs: Bremner Road

Date	Description
1980	The 1980 historical photograph shows Bremner Road potentially being gravel and utilised as a rural road. The surrounding properties appear largely rural in use.
1988, 1996, 2006, 2008, 2010 & 2015	The 1988, 1996, 2006, 2008, 2010 & 2015 historical photographs show Bremner Road being sealed and generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

Table 20: Historical Photographs: Burberry Road

Date	Description
1980 & 1988	The 1980 & 1988 historical photographs show Burberry Road had not been formed. The surrounding properties appear largely rural in use.
1996	The 1996 historical photograph shows Burberry Road potentially being gravel and utilised as a rural road. The surrounding properties appear largely rural in use.
2006, 2008, 2010 & 2015	The 2006, 2008, 2010 & 2015 historical photographs show Bremner Road being sealed and generally as it appeared during the site walkover and inspection. The surrounding properties appear largely rural residential in use.

7.2 Previous Investigations

There are no previous environmental investigations relating to soil or groundwater contamination associated with any of the Auranga Development sites (as described in Section 2) on file with Auckland Council.

Two previous geotechnical investigations were available for the site and have been summarised below:

The report titled 'Geotechnical Investigation for the feasibility of development at Van Den Brink Farms LTD property, Being Proposed Subdivision of Part Allotment 36, Parish Of Opaheke' dated January 1994 and prepared by Earthtec Consulting LTD evaluated the suitability of the site for the construction of houses at 132 Bremner Road, Drury. No fill materials were reported in any of the borelogs and the site was considered suitable for development at the time of writing.

The report titled 'Proposed Building Development at 31 Burberry Road' dated September 2005 and prepared by Geotek Consultants Limited evaluated the suitability of the site for the construction of a dwelling. During the investigation four boreholes were extended to depths of up to 3.2 m below ground level. With the exception of a small area of fill (0.1 m depth at BH01) all materials were identified as being natural.

With the exception of the above reports, at the time of writing, the results of the geotechnical investigation for the site were not available. Therefore, fill material, other than that identified during the site walkover and inspection, may be present at the site. The identification of uncertified fill material will likely require further investigation and/or chemical analysis if detected.

7.3 Auckland Council Property File Search

The results of the council search showed a number of consents for the properties across the Auranga Development Project. The relevant details of the Property File search are presented in Tables 17-31 below:

Table 21: Relevant Information: 121 Bremner Road

Proposed Activity	Application number	Date
Erect Hay barn	397	11/01/1962
Erect Implement Shed	J040797	08/07/1980
New Bathroom	7323	25/08/1980
Remove Existing Dwelling	K000500	05/02/1981
New Barn/Stables	E32448	30/03/1987
Replace Existing Fireplace	594575	17/06/2003

Table 22: Relevant Information: 132 Bremner Road

Proposed Activity	Application number	Date
Erect Dwelling	146710	23/04/1965
Bathroom Installation	21135	23/04/1965
Geotech Investigation for Subdivision	NA	27/01/1994
Remove Existing Dwelling	B/1994/100976	23/06/1994
Application for Subdivision	935443	1994

Table 23: Relevant Information: 138 Bremner Road

Proposed Activity	Application number	Date
Subdivision Consent	16/94/09	03/08/1995
Construct Two Storey Dwelling	11906	Nov 1995
Construct Barn/Workshop and sleep out	11970	24/04/1997
Subdivision Certificate	LU6925	02/03/2007

Table 24: Relevant Information: 160 Bremner Road

Proposed Activity	Application number	Date
Erect an Implement Shed	I003178	28/11/1978
Erect a Dwelling	I079341	07/08/1979
Erect an Open Hat Barn	K000009	11/07/1980
Erect Swimming Pool	K000050	05/09/1980
Erect an Implement Shed	K000674	14/04/1981
Erect a Plant Shed	B12643	12/05/1983

Table 25: Relevant Information: 169 Bremner Road

Proposed Activity	Application number	Date
Erect Farm Building – Storage	594577	1995
Erect Residential Dwelling	B/1998/104572	06/12/2001
Erect Three Bay Farm Building	B/2003/108923	24/06/2003

Table 26: Relevant Information: 207 Bremner Road

Proposed Activity	Application number	Date
Demolition of Dwelling	-	1975
Subdivision Consent	373/160	14/06/1982
Defective Disposal of Effluent - Fresh Stream Contamination - Remedial Work Undertaken	-	25/07/2001
Solid Fuel Heater	BC 21287	25/02/2005

Table 27: Relevant Information: 213 Bremner Road

Proposed Activity	Application number	Date
Implement Garage/Shed	25080/	20/04/2010

Table 28: Relevant Information: 245 Bremner Road

Proposed Activity	Application number	Date
Erect a Farm Building	B12816	05/08/1983
Plumbing to Utilities Building	9205	02/12/1983
Erect a Farm Building (services)	B108415	13/09/1984
Erect Covered Crop Support Frame	B108416	13/09/1984
Erect Farm Office	C33128	14/12/1984
Construct General Farm Building	C33264	11/02/1985
Erect Crop Support Structure	C33785	11/02/1985
Addition to Existing Pack house	594579	July 2002
Land Use Consent - Concrete Platform & Cool Store	R/LUC/2002/106173	05/08/2002
Resource Consent - Replacement Groundwater Take	R/REG/2013/3144	16/09/2013

Table 29: Relevant Information: 251 Bremner Road

Proposed Activity	Application number	Date
ADS Crop Support Structure	B/2014/8600	24/08/1984
Subdivision (4 lots for general horticulture)	6/15/258	08/08/1984
Greenhouse Completed	B/1993/100048	03/10/1996

Table 30: Relevant Information: 253 Bremner Road

Proposed Activity	Application number	Date
ADS Crop Support Structure	B108351	24/08/1984
Transportable Dwelling	B108580	06/11/1984
Erect Garage	C33834	18/07/1985
Extensions to Crop Support Structure	D17666	23/10/1985
Erect a Farm Building	D17964	17/02/1986

Table 31: Relevant Information: 259 Bremner Road

Proposed Activity	Application number	Date
Erect Drainage and Packing Shed	8824	13/05/1983
Erect a Packing House	BJ2648	13/05/1983
Two ADS Crop Support Structures	B74569	11/04/1984

Table 32: Relevant Information: 260 Bremner Road

Proposed Activity	Application number	Date
Erect a Garage	K023542	17/06/1981
Erect a Barn	K023807	12/10/1981
Erect a Dwelling	B74442	28/02/1984

Table 33: Relevant Information: 263 Bremner Road

Proposed Activity	Application number	Date
Erect Farm Shed	I079283	11/06/1979
New Soakage form Existing Septic Tank	BC 20507	19/04/2002

Table 34: Relevant Information: 269 Bremner Road

Proposed Activity	Application number	Date
Subdivision	6/15/446	1988
Swimming Pool	-	2004
Consent for Tourist Accommodation	Withdrawn	2004
Erect Pergola/Garage & Farm shed	LU9954	2010

Table 35: Consents: 312 Bremner Road

Proposed Activity	Application number	Date
Stables & Hayshed – Race Horse Training	-	1960 to 1986
Subdivision Consent	Withdrawn	22/09/2010

Table 36: Relevant Information: 322 Bremner Road

Proposed Activity	Application number	Date
Jesmond Construction – Clean Fill Operation 312-324 Bremner Road	R/LUC/2011/108832 formally LU7319	09/02/2009
Resource Consent – Earthworks 29,000m3	LU10386	04/08/2011

Table 37: Relevant Information: 330 Bremner Road

Proposed Activity	Application number	Date
Subdivision	-	-

Table 38: Relevant Information: 31 Burberry Road

Proposed Activity	Application number	Date
Geotech Investigation	-	03/08/2005

Table 39: Relevant Information: 37 Burberry Road

Proposed Activity	Application number	Date
Geotech Report – Earthtech Consulting	PS/1299/clm	27/06/1994
Geotech Investigation	-	03/08/2005
Resource Consent for Horticultural Subdivision (palms)	-	2005
Earthworks Consent 360 m ² Material	9494	11/02/2005
Implement Shed & Farm Building	25280	12/10/2009
Five Bedroom Dwelling & Double Internal Garage	24342/1	2009

7.4 Auckland Council Site Contamination Enquiry

The Auckland Council Site Contamination Enquiry revealed two pollution incidents relating to the Auranga Development sites. Details of these incidents are detailed in Table 32 below. In addition, the Site Contamination Enquiry has shown a number bore construction consents within the area of the Auranga Development. The Auckland Council Site Contamination Enquiry is attached in full as Appendix E.

Table 40: Pollution Incidents: Auranga Development, Drury

Activity	Reference number	Date
Mixing soil with polystyrene & polystyrene in stormwater - 245 Bremner Road	07/2507	06/07/07
Polystyrene to stormwater	07/3076	08/10/07

8.0 Site Walkover and Inspection

8.1 121 Bremner Road, Drury

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the residential area. A barn, main dwelling and secondary dwelling were located in this area.

A stables building, animal pen and the site stock loading yards were present to the north west of the dwelling. An area utilised for the storage of potentially treated timber was observed adjacent to the animal pen.

The stock loading yard consisted of a small holding pen and a loading ramp. It is considered that this area has the potential to have been utilised for spray race operations.

Pylons were observed in the central and northern areas of the site and the remainder of the site was in pasture.

The site inspection photographs have been presented in Appendix F.

8.2 132 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via an overgrown hardstand driveway. The tidal inlet was observed along the eastern boundary of the site and the former track could be identified through the centre of the site.

No buildings or structures were observed across the site and the remainder of the site was in pasture.

The site inspection photographs have been presented in Appendix F.

8.3 138 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 19th of January 2016. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the area of two residential dwellings and associated parking areas. The western residential area consisted of a two storey dwelling and associated parking area, a chicken coop and numerous dog kennels. The southern residential area consisted of a single storey dwelling and associated parking area, a double attached garage, the site water tanks and a grassed curtilage area.

Evidence of burning was observed in the paddock immediately to the north of the two storey dwelling, a grassed raceway was observed in the area immediately to the south of the single storey dwelling and a stock loading area was observed in the far north eastern corner of the site. Due to the age of the stock loading area it is considered unlikely that potential spray race operations to have occurred in this area of the site. The remainder of the site was in pasture.

The site inspection photographs have been presented in Appendix F.

8.4 160 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a tar sealed driveway to the area of the residential dwelling and workshop building.

An incinerator potentially utilised for the burning of refuse was identified along the western boundary of the residential area and three aviary buildings were identified to the west of the residential area. The cladding on the aviary buildings has the potential to contain asbestos containing materials, but was relatively intact at the time of the site inspection and walkover.

If these materials are to be removed from the site for disposal, they should be done so in accordance with the New Zealand Guidelines for the Management and Removal of Asbestos (3rd Edition), New Zealand Demolition and Asbestos Association, 2011 to avoid causing any ground contamination.

A large stock holding/loading yard was located to the south west of the residential area and consisted of a covered area, holding pens and loading ramp. It is considered that this area has likely been utilised for spray race operations.

A culverted crossing was located to the east of the stock loading yards however, it is considered that the crossings was likely formed from surrounding materials and are unlikely to contain imported soils.

A large barn was located along the eastern boundary of the site, to the south of the residential dwelling, and appeared to have been utilised for the storage of hay.

A gully system was observed through the northern area of the site and the remainder of the site was in pasture.

The site inspection photographs have been presented in Appendix F.

8.5 169 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a concrete driveway to the area of the residential dwelling.

A small pump house and garden shed were located along the eastern boundary of the site and a number of sheds utilised for storage were observed in the south western corner of the site. Evidence of former horticultural use was observed in this area.

An area utilised for the storage of potentially treated timber poles and pallets was observed along the western boundary of the site.

A concrete lined workshop and shed complex were observed along the eastern boundary of the site. The complex consisted of a main workshop building, a chemical storage shed, and a number of small storage sheds. The area was constructed on a concrete slab which appeared in relatively good condition.

A number of chemical containers were observed stored on pallets to the south of the workshop area. In addition, several used oil containers and a steel drum utilised for burning, potentially including refuse materials, were observed adjacent to the workshop building.

The majority of the site appeared to be utilised for the production of lawn.

The site inspection photographs have been presented in Appendix F.

8.6 207 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 19th of January 2016. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the area of the site buildings and residential dwelling. The residential area consisted of a single storey dwelling and associated parking area, a double attached garage, the site water tanks and a grassed curtilage area. Evidence of burning was identified in the area immediately to the north west of the dwelling.

An auxiliary shed (1) utilised for storage and a boat was located to the north west of the residential area. A small area of burning was identified in this general area. A large barn was located on the western side of the access way and was utilised for the storage of hay at the time of the site walkover and inspection.

The site stock loading yards and an additional auxiliary shed (2), utilised for storage at the time of the site walkover and inspection, were located adjacent to the eastern side of the access way. Due to the age of the stockyard facility it is considered that there is potential for spray race operations to have occurred in this area of the site.

A further auxiliary shed (3), utilised for storage, and storage area was located north of site stock loading yards. An area of potentially treated timber storage was noted adjacent to the auxiliary shed (3).

The central access way continues across a culvert into the far northern area of the site. A small area of vegetation dumping was observed along the eastern side of the access way adjacent to the gully.

The remainder of the site was in pasture and was utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.7 213 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 19th of January 2016. The site inspection was carried out during a period of relatively fine weather.

The site was accessed via a shared access way from Bremner Road via a hardstand driveway to the area of the auxiliary building and residential dwelling. The residential area consisted of a two storey dwelling and associated parking and curtilage area and a double attached garage.

An auxiliary shed utilised for storage was located to the west of the dwelling and a stock loading area was located immediately to the west of the auxiliary building. Due to the age of the stock loading area it is considered unlikely that potential spray race operations to have occurred in this area of the site.

The remainder of the site was in pasture and was utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.8 245 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the area of the site offices and associated buildings.

A hay barn and utility sheds were located in the south eastern corner of the site and a large water tank was observed near the central area of the site.

The site offices and pack house building were located through the central area of the site. A number of shipping containers, utilised for storage, the site chemical store and a workshop building were located adjacent to this area. The chemical storage shed was located on hardstand material and the workshop building was constructed on concrete slab. A stockpile of fill material was also located to the east of the main pack house building.

A greenhouse utilised for parking and germination was located to the north of the site buildings. The runner boards on the greenhouse buildings have the potential to contain asbestos containing materials, but were relatively intact at the time of the site inspection and walkover.

If these materials are to be removed from the site for disposal, they should be done so in accordance with the New Zealand Guidelines for the Management and Removal of Asbestos (3rd Edition), New Zealand Demolition and Asbestos Association, 2011 to avoid causing any ground contamination.

The northern area of the site was utilised for horticultural purposes.

The site inspection photographs have been presented in Appendix F.

8.9 249 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the area of the large greenhouse building. The runner boards on the greenhouse buildings have the potential to contain asbestos containing materials, but were relatively intact at the time of the site inspection and walkover.

A concrete lined chemical/pump shed and associated water tank was located immediately to the west of the greenhouse building.

The remainder of the site was utilised for horticultural purposes.

The site inspection photographs have been presented in Appendix F.

8.10 251 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway to the area of the large greenhouse building. The runner boards on the greenhouse buildings have the potential to contain asbestos containing materials, but were relatively intact at the time of the site inspection and walkover.

The remainder of the site was utilised for horticultural purposes.

The site inspection photographs have been presented in Appendix F.

8.11 253 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a concrete driveway to the area of the residential dwelling and garage.

The stock loading yards were observed in the south eastern corner of the site along with a small area utilised for grazing.

A large greenhouse was observed in the southern area of the site, along with a concrete lined chemical/pump shed and associated water tank, located immediately to the south of the greenhouse building. The runner boards on the greenhouse buildings have the potential to contain asbestos containing materials, but were relatively intact at the time of the site inspection and walkover.

The remainder of the site was utilised for horticultural purposes.

The site inspection photographs have been presented in Appendix F.

8.12 259 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a grassed driveway to the area of the pack house, water tank and large greenhouse building. The pack house was constructed on a concrete slab and was utilised for the storage of boxes.

The southern central area of the site was utilised for horticultural purposes.

A number of storage sheds and an additional greenhouse were observed in the south eastern area of the site and a number of soil stockpiles and a burning pile were observed along the eastern boundary in the southern area of the site.

A small stockpile of filling material, likely sourced from onsite materials, was observed to the north west of the large greenhouse building and the remainder of the site was utilised for grazing.

The site inspection photographs have been presented in Appendix F.

8.13 260 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway, past the stock loading yards, to the residential area. Due to the location of the stock loading yards it is considered that the potential for spray race operations in this area is low.

A barn was located in the central area of the site and was utilised for the storage of hay at the time of the site walkover and inspection. An area of burning, potentially including refuse, was identified to the south east of the barn.

A culverted crossing provides access to the southern area of the site. It is considered that the crossing was likely formed from surrounding materials and is unlikely to contain imported soils.

A pump house and shed were located to the east of the residential area. The shed was utilised for storage and an area of burning was located adjacent to the western side of the shed.

A gully system was observed in the southern area of the site and the remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.14 263 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a hardstand driveway, past the site buildings to the residential area.

The area of the site buildings consisted of a workshop/storage building constructed on concrete slab, and a barn utilised for the storage of timber. A vegetation pile and a burning pile, potentially containing treated timber, were also observed in this area.

A stock loading yard and a rubbish pile were observed adjacent to the barn structure. It is considered that this area has the potential to have been utilised for spray race operations.

A pump house was observed in the southern area of the site and the remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.15 269 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a concrete driveway to the residential area.

An open watercourse was observed adjacent to the entrance way and the site stock loading yards were observed in the south eastern corner of the site. It appears as though the stock loading yards have been recently created and therefore are considered unlikely to have been subject to spray race operations.

A shed was located along the eastern boundary of the site and was in use as a chicken coop at the time of the site inspection and walkover.

The pond/dam structure was observed immediately to the north east of the residential area and a small wooden bridge was observed in the central area of the site and a small gravelled area was observed adjacent to the tidal inlet in the northern area of the site. It is considered that the dam structure has the potential to contain imported uncertified filling material.

An additional access way was observed along the western boundary of the site providing access to a number of auxiliary buildings.

The remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.16 312 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a tar sealed driveway to the residential area. The sewage treatment system and a circular tar sealed ring and an area of potentially uncertified filling materials were observed to the north of the residential area.

The large hay shed/stables building along the western boundary has been demolished and the demolition rubble, including asbestos materials, was spread across this area of the site.

The two western buildings had been removed and a new dwelling had been constructed in their place at the time of the site walkover and inspection. Numerous stockpiles of fill materials and demolition rubble containing asbestos containing materials were observed surrounding the site buildings.

A concrete lined barn and feed silo were observed to the south of the new dwelling. A stockpile of fill material and a stockpile of tyres were observed adjacent to the barn structure.

The stock loading yard and holding pens were observed to the south east of the new dwelling. It is considered that this area has the potential to have been utilised for spray race operations.

The horse track was observed in the southern area of the site along with a number of burning piles and stockpiles containing fill materials. The remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.17 322 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a concrete driveway to the residential area. The site garages and water tanks were also present in this area

A raised garden bed and garden shed were located along the eastern side of the dwelling and a drum utilised for burning, potentially including refuse, was observed to the south of the residential area.

Evidence of the recent filling activities could be seen across the site and the remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.18 330 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Bremner Road via a tar sealed driveway past the pergola to the residential area. A turn around area and the site garages were also located in this area.

A pump house was located in the south western corner of the site and a swimming pool and tennis court were located immediately to the east of the residential area.

A large pond, landscaped gardens and a low lying area were observed to the north of the residential area. It is likely that the materials utilised in landscaped garden were sourced from the construction of the site building platform.

The remainder of the site was mowed and in use for residential purposes at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.19 31 Burberry Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Burberry Road via a tar sealed driveway to the residential area. A turn around area and the site garages were also located in this area.

The remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.20 37 Burberry Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 19th of January 2016. The site inspection was carried out during a period of relatively fine weather.

The site was accessed from Burberry Road via a hardstand driveway to the residential area. The residential area consisted of a single storey dwelling and associated car parking and curtilage area, an attached double garage and garden shed. An auxiliary building was located to the west of the residential dwelling.

The remainder of the site was in pasture and utilised for grazing at the time of the site walkover and inspection.

The site inspection photographs have been presented in Appendix F.

8.21 Esplanade Reserve, 109 Bremner Road, Drury

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 31st of May 2016. The site inspection was carried out during a period of relatively fine weather.

The site was accessed directly from Bremner Road to the area of the site adjacent to the property at 121 Bremner Road. The area of the site adjacent to 121 Bremner Road was mixed established vegetation and pasture. The Ngakoroa Stream was observed along the eastern and northern boundaries of the site.

The area of the site adjacent to 169 Bremner Road was mixed vegetation and production grass. The Drury Creek was observed along the eastern, northern and western boundaries of the site.

The area of the site adjacent to 207 Bremner Road was mixed vegetation and pasture. Evidence of a historical farm dump was located along the north eastern area of the site adjacent to the existing pylon and an area of potentially treated timber storage was located along the north western area of the site. The Drury Creek was observed along the eastern, northern and north western boundaries of the site.

The area of the site adjacent to 259 Bremner Road was predominantly in pasture and was utilised for grazing. An area of horticultural soils disposal was observed in the central area of the site. The Drury Creek was observed along the northern boundary of the site.

The eastern area of the site adjacent to 263 Bremner Road was utilised as a residential curtilage area and the western area was in pasture. The Drury Creek was observed along the northern boundary of the site.

The area of the site adjacent to 269 Bremner Road was predominantly in pasture and was utilised for grazing. The Drury Creek was observed along the northern boundary of the site and an unnamed tributary of the Drury Creek was observed through the central area of the site.

The site inspection photographs have been presented in Appendix F.

8.22 Bremner Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

Bremner Road is a double lane coarse chip rural road without formed curb and channels. Generally entrances off Bremner Road were over culverts, with the road reserve generally being in pasture.

8.23 Burberry Road

The site inspection and walk over was carried out by Focus Environmental Services Limited personnel on the 16th of July 2015. The site inspection was carried out during a period of relatively fine weather.

Burberry Road is a double lane rural road without formed curb and channels. Generally entrances off Burberry Road were over culverts, with the road reserve generally being in pasture lined with trees.

9.0 Potentially Contaminating Activities or Land Uses

9.1 121 Bremner Road

During the site walkover and inspection evidence of storage of potentially treated timber was noted adjacent to the animal shelter and due to the age of the site stock loading yards it is considered likely to be utilised for spray race operations.

Furthermore, following the review of the available historical photographs, due to the buildings associated with the neighbouring horticultural activities being located on the subject site there is potential for chemical storage in the area of the former site buildings in the south western area of the site.

In addition, due to the topography of the northern area of the site it is considered that the low lying area has potentially been subject to reclamation and may contain uncertified filling materials.

Therefore, following the desktop assessment and site inspection and walk over of the site at 121 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Storage of potentially treated timber posts
- Potential spray race operations
- Potential storage of horticultural chemicals
- Suspected uncertified fill material

9.2 132 Bremner Road

Following the review of the available historical photographs for the site, the northern area of the site is suspected to be utilised for horticultural activities between 2010 & 2012.

However, as these activities were carried out for a very short duration, several decades following the ban of persistent pesticide use in New Zealand (ca. 1970), and almost a decade following the implementation of the Stockholm Convention (ca. 2004), which controls the production and use of persistent organic pesticides, it is considered that the horticultural activities identified do not meet the HAIL criteria and no potentially contaminating land uses and/or activities have occurred at the site at 132 Bremner Road, Drury.

9.3 138 Bremner Road

During the site walkover and inspection evidence of a single area of burning was noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 138 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning

9.4 160 Bremner Road

During the site walkover and inspection evidence of a printing workshop were noted, evidence of burning and evidence of potential spray race operations were observed.

Therefore, following the desktop assessment and site inspection and walk over of the site at 160 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Printing workshop
- Evidence of burning
- Potential spray race operations

9.5 169 Bremner Road

During the site walkover and inspection evidence of former horticultural activities, evidence of storage of potentially treated timber, evidence of chemical storage, evidence of workshop activities and evidence of burning were noted.

Furthermore, following the review of the available historical photographs, the southern area of the site appears to have been utilised for horticultural purposes.

In addition, due to the topography of the northern area of the site it is considered that the low lying area has potentially been subject to reclamation and may contain uncertified filling materials.

Therefore, following the desktop assessment and site inspection and walk over of the site at 169 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities
- Storage of potentially treated timber posts

- Chemical storage
- Workshop activities
- Evidence of burning
- Suspected uncertified fill material

9.6 207 Bremner Road

During the site walkover and inspection evidence of burning was identified in two localised areas, evidence of storage of potentially treated timber, and evidence of potential spray race operations were observed.

Therefore, following the desktop assessment and site inspection and walk over of the site at 207 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning
- Storage of potentially treated timber
- Potential spray race operations

9.7 213 Bremner Road

Following the review of the available information relating to the subject site and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the site at 213 Bremner Road, Drury.

9.8 245 Bremner Road

During the site walkover and inspection evidence of horticultural activities, chemical storage and uncertified filling materials were noted.

Furthermore, following the review of the available historical photographs, the northern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 245 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities
- Chemical storage
- Suspected uncertified fill material

9.9 249 Bremner Road

During the site walkover and inspection evidence of horticultural activities were noted.

Furthermore, following the review of the available historical photographs, the entire site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 249 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities

9.10 251 Bremner Road

During the site walkover and inspection evidence of horticultural activities were noted.

Furthermore, following the review of the available historical photographs, the entire site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 251 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities

9.11 253 Bremner Road

During the site walkover and inspection evidence of horticultural activities were noted.

Furthermore, following the review of the available historical photographs, the northern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 253 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities

9.12 259 Bremner Road

During the site walkover and inspection evidence of horticultural activities, evidence of burning and uncertified fill material was noted.

Furthermore, following the review of the available historical photographs, the southern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 259 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities
- Evidence of burning
- Suspected uncertified fill materials

9.13 260 Bremner Road

During the site walkover and inspection evidence of two areas of burning were noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 260 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning

9.14 263 Bremner Road

During the site walkover and inspection evidence of burning potentially treated timber and evidence of spray race operations were observed.

Therefore, following the desktop assessment and site inspection and walk over of the site at 263 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning
- Potential spray race operations

9.15 269 Bremner Road

During the site walkover and inspection evidence of potentially uncertified filling materials were noted in the pond/dam structure.

Therefore, following the desktop assessment and site inspection and walk over of the site at 269 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Suspected uncertified fill materials

9.16 312 Bremner Road

During the site walkover and inspection evidence of asbestos contamination, evidence of spray race operations, evidence of burning and evidence of uncertified fill material were noted.

Therefore, following the desktop assessment and site inspection and walk over of the site at 312 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Presence of asbestos containing materials
- Potential spray race operations
- Evidence of burning
- Suspected uncertified fill material

9.17 322 Bremner Road

During the site walkover and inspection evidence of burning was noted in the area to the south of the residential area.

Furthermore, following the review of the available historical photographs and the available property file information the site has been subject to filling activities.

Therefore, following the desktop assessment and site inspection and walk over of the site at 322 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of burning
- Potentially uncertified fill material

9.18 330 Bremner Road

During the site walkover and inspection no signs of potential contamination were noted.

However, following the review of the available historical photographs, the south eastern area of the site appears to have been utilised for horticultural purposes.

Therefore, following the desktop assessment and site inspection and walk over of the site at 330 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities

9.19 31 Burberry Road

Following the review of the available information relating to the subject site and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the site at 31 Burberry Road, Drury.

9.20 37 Burberry Road

Following the review of the available historical photographs for the site, a small area of the site along the western boundary appears to be utilised for horticultural activities between 1996 & 2008.

Therefore, following the desktop assessment and site inspection and walk over of the site at 37 Burberry Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Evidence of horticultural activities

9.21 Esplanade Reserve, 109 Bremner Road, Drury

During the site walkover and inspection evidence of suspected reclamation was noted adjacent to the northern areas of 121 Bremner Road and 169 Bremner Road, evidence of horticultural activities were noted adjacent to the northern area of 169 Bremner Road, evidence of a historical farm dump was noted adjacent to the north eastern area of 207 Bremner Road, evidence of potentially treated timber disposal was noted adjacent to the north western area of 207 Bremner Road and evidence of the disposal of horticultural soils to land was noted adjacent to the northern boundary of 259 Bremner Road.

Therefore, following the desktop assessment and site inspection and walk over of the site at Esplanade Reserve, 109 Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Suspected uncertified fill material
- Evidence of horticultural activities
- Evidence of filling potentially including refuse materials
- Storage of potentially treated timber
- Evidence of horticultural activities

9.22 Bremner Road

It is considered that due to the rural nature and relatively low use of Bremner Road the potential for contamination associated with surface water runoff is considered to be low.

In addition, as the road was potentially gravel in the 1980 historical photograph, and due to the proximity of the road to historical gas works operations, it is unlikely that the road was constructed using gas works waste. However, due to the lack of early historical photographs available for the site (i.e. 1940) this cannot be confirmed.

Therefore, following the desktop assessment and site inspection and walk over of the road Bremner Road, Drury the following potential contaminating land uses and/or activities have been identified:

- Potentially uncertified fill material

9.23 Burberry Road

Following the review of the available information relating to the subject site and the site walkover and inspection no potentially contaminating land uses and/or activities were identified at the road Burberry Road, Karaka.

10.0 Conclusions and Recommendations

The history of the site was researched by Focus Environmental Services personnel, which involved a review of the available historical aerial photographs of the site, a review of the Auckland Council Property file and a contaminated sites enquiry to Auckland Council. During the review of the available information any potentially contaminating activities or land uses were identified.

Following the desk top assessment the site was visited and a site inspection and walk over was carried out. The site was inspected by Focus Environmental Services Limited personnel on the 16th of July 2015, the 19th of January 2016 and the 31st of May 2016. During the site inspection any potentially contaminating activities or land uses were identified.

In summary, following the desk top assessment and site inspection and walkover, storage of potentially treated timber posts, potential spray race operation, chemical storage associated with horticultural activities and potentially uncertified fill materials were noted for 121 Bremner Road; a single area of burning was noted for 138 Bremner Road; a printing workshop, evidence of burning and potential spray race operations were noted for 160 Bremner Road; horticultural activities, storage of treated timber posts, chemical storage, workshop activities and evidence of burning were noted for 169 Bremner Road; evidence of burning, storage of potentially treated timber and potential spray race operations were noted for 207 Bremner Road; horticultural activities, chemical storage and potentially uncertified fill materials were noted for 245 Bremner Road; horticultural activities were noted for 249, 251 and 253 Bremner Road; horticultural activities, evidence of burning and potentially uncertified fill materials were noted for 259 Bremner Road; evidence of burning was noted in two areas for 260 Bremner Road; evidence of burning and potential spray race operations were noted for 263 Bremner Road; potentially uncertified fill materials were noted for 269 Bremner Road; presence of asbestos containing materials, potential spray race operations,

evidence of burning and potentially uncertified fill materials were noted for 312 Bremner Road; evidence of burning and potentially uncertified fill materials were noted for 322 Bremner Road; horticultural activities were noted for 330 Bremner Road; horticultural activities were noted for 37 Burberry Road; potentially uncertified fill materials, horticultural activities, evidence of a historical farm dump, evidence of potentially treated timber storage and evidence of the disposal of horticultural soils to land was at Esplanade Reserve, 109 Bremner Road and potentially uncertified fill materials were noted for Bremner Road. No potentially contaminating land uses and/or activities were identified at the site at 132 & 213 Bremner Road, Drury, 31 Burberry Road, Drury and the road Burberry Road.

The information obtained of the sites history and from the site inspection and walk over was assessed to determine if any potential hazardous activities listed on the Hazardous Activities and Industries List (HAIL) had occurred on site as a result of past or current land use. Due to the potential sources of contamination identified at the above sites it is considered that there is evidence to suggest that an activity outlined in the HAIL list has been, or is currently being, carried out on the pieces of land.

Prior to the development of the areas of the site where potentially contaminating land uses and/or activities have taken place, a detailed site investigation is recommended. The detailed site investigation would confirm if the identified land uses and/or activities have affected the site soils and will confirm the consenting requirements for these areas of the site.

Figures

Figure 1 - Site Location Plan

Figure 2-1 - Site Features Plan: 121 Bremner Road

Figure 2-2 - Site Features Plan: 132 Bremner Road

Figure 2-3 - Site Features Plan: 138 Bremner Road

Figure 2-4 - Site Features Plan: 160 Bremner Road

Figure 2-5 - Site Features Plan: 169 Bremner Road

Figure 2-6 - Site Features Plan: 207 Bremner Road

Figure 2-7 - Site Features Plan: 213 Bremner Road

Figure 2-8 - Site Features Plan: 245 Bremner Road

Figure 2-9 - Site Features Plan: 249 & 251 Bremner Road

Figure 2-10 - Site Features Plan: 253 Bremner Road

Figure 2-11 - Site Features Plan: 259 Bremner Road

Figure 2-12 - Site Features Plan: 260 Bremner Road

Figure 2-13 - Site Features Plan: 263 Bremner Road

Figure 2-14 - Site Features Plan: 269 Bremner Road

Figure 2-15 - Site Features Plan: 312 Bremner Road

Figure 2-16 - Site Features Plan: 322 Bremner Road

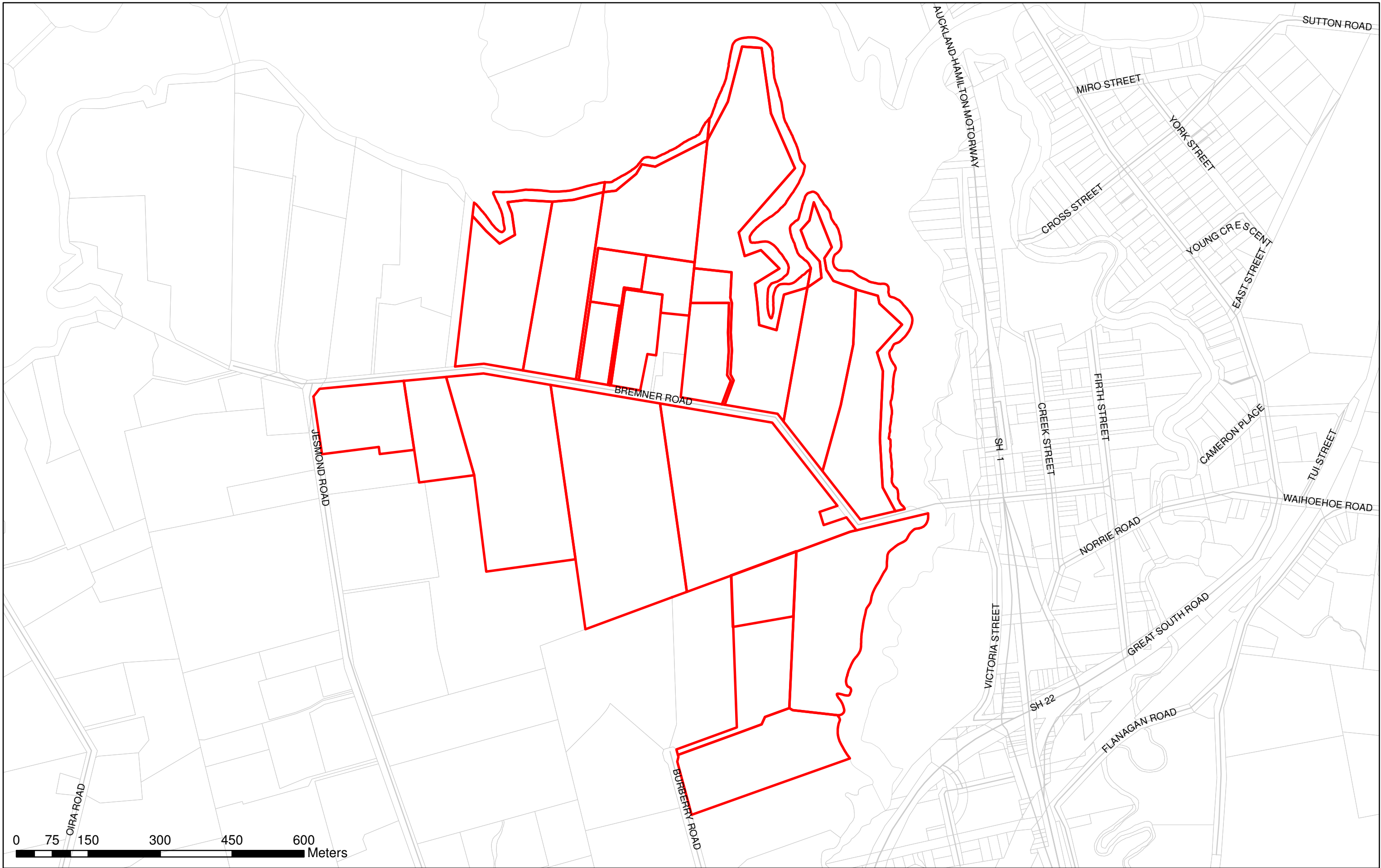
Figure 2-17 - Site Features Plan: 330 Bremner Road

Figure 2-18 - Site Features Plan: 31 Burberry Road

Figure 2-19 - Site Features Plan: 37 Burberry Road

Figure 2-20 - Site Features Plan: Esplanade Reserve


Figure 3 - Neighbouring Environment




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Figure 1: Site Location Plan
 Preliminary Site Investigation


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Figure 2-1: Site Features Plan
121 Bremner Road
 Preliminary Site Investigation


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Location of former dwelling

Central track

Approximate location of former buildings


Approximate location of former site buildings



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Figure 2-2: Site Features Plan
132 Bremner Road, Drury
 Preliminary Site Investigation



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Stock Loading Yards

138

Area of Burning

Dwelling (1)


Dwelling (2)



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Figure 2-3: Site Features Plan
138 Bremner Road, Drury
 Preliminary Site Investigation



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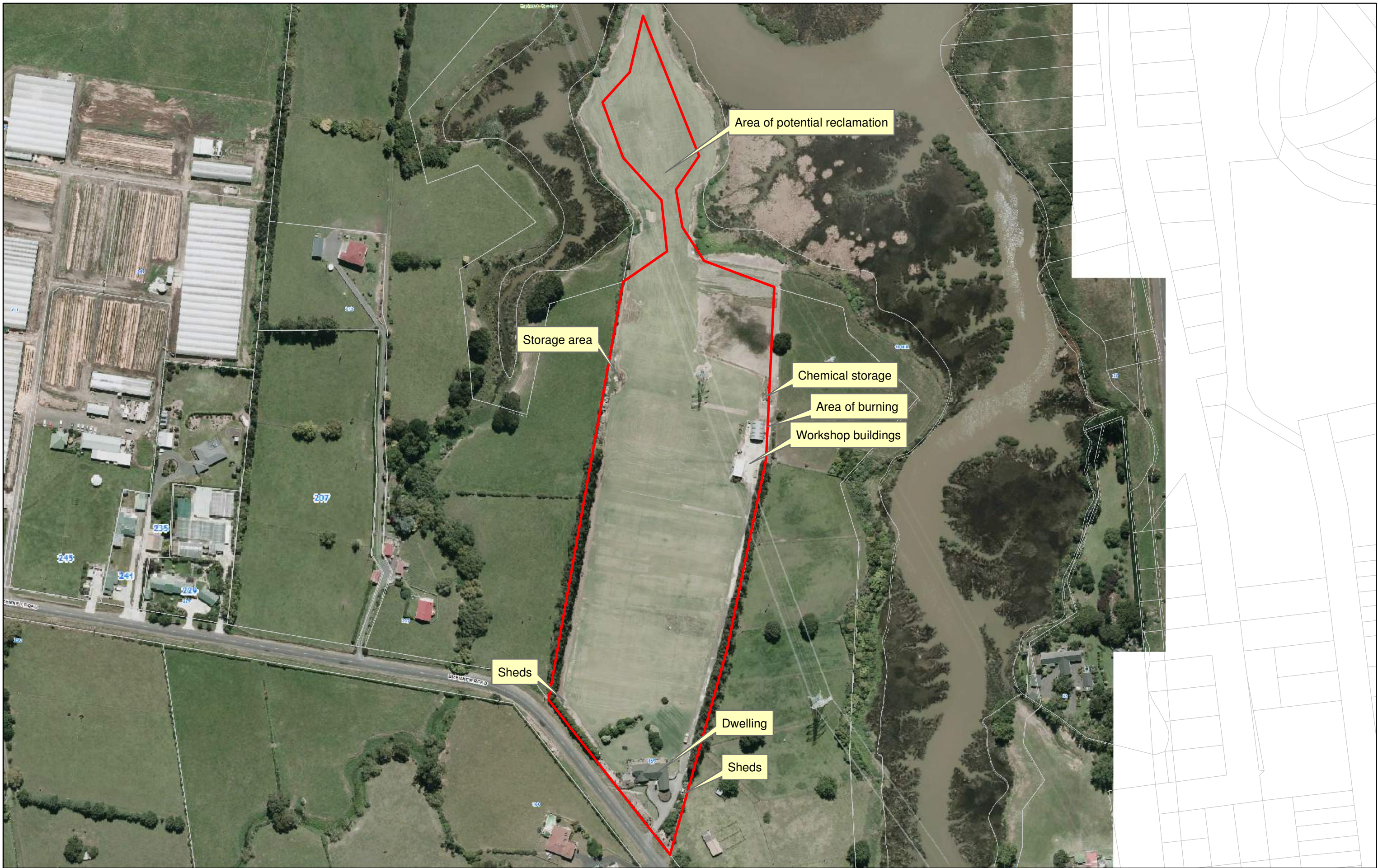

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Figure 2-4: Site Features Plan
160 Bremner Road, Drury
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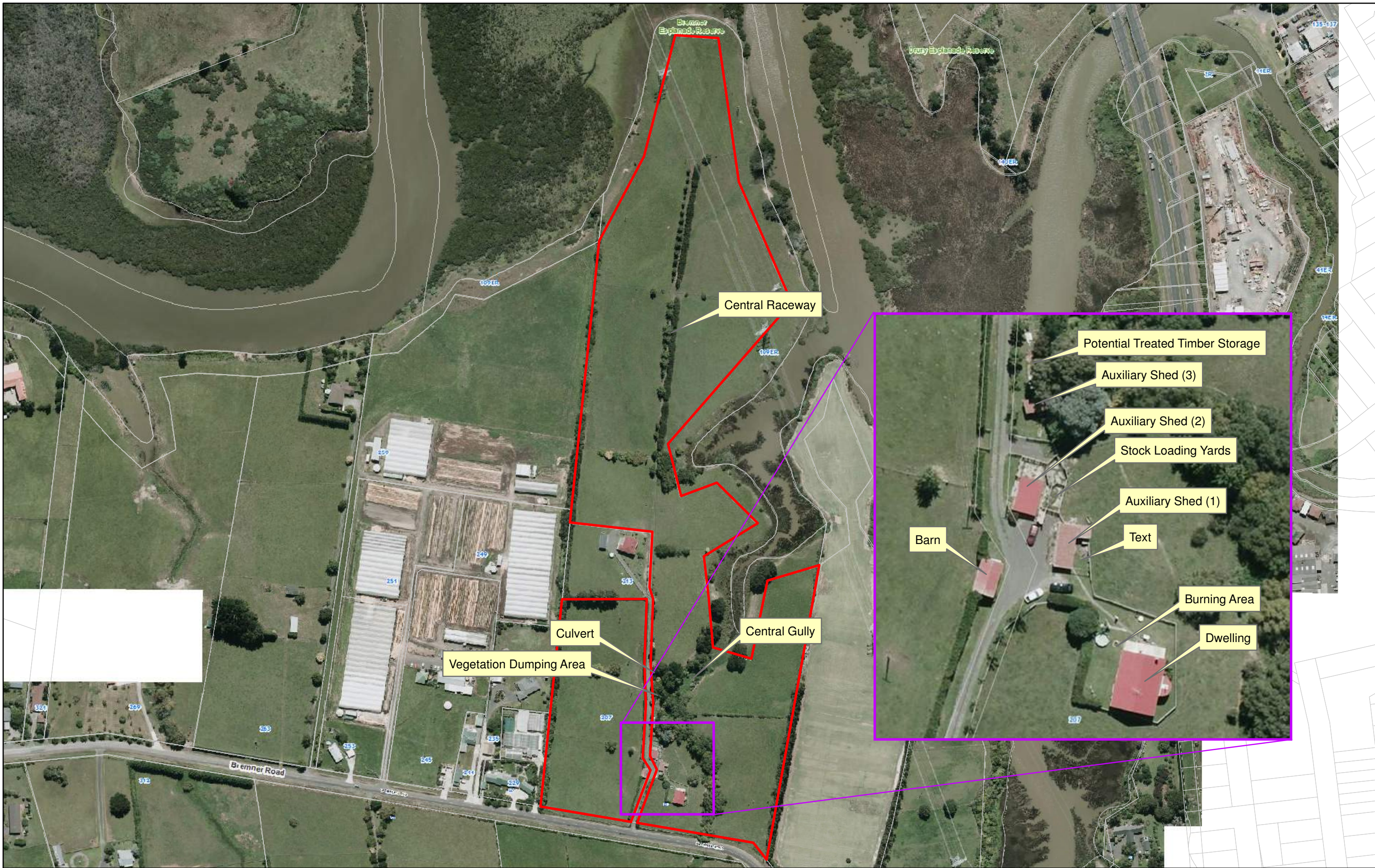
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Figure 2-5: Site Features Plan
169 Bremner Road, Drury
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Figure 2-6: Site Features Plan
207 Bremner Road, Drury
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Figure 2-7: Site Features Plan
213 Bremner Road, Drury
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Figure 2-8: Site Features Plan
245 Bremner Road, Drury
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Greenhouse

251

249

Mixing shed

Greenhouse


Water tank



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Figure 2-9: Site Features Plan
249 & 251 Bremner Road, Drury
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Figure 2-10: Site Features Plan
253 Bremner Road, Drury
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Figure 2-11: Site Features Plan
259 Bremner Road, Drury
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Figure 2-12: Site Features Plan
260 Bremner Road, Drury
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**Figure 2-13: Site Features Plan
 263 Bremner Road, Drury**

Preliminary Site Investigation



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Gravelled area

Approximate location of bridge

Pond/dam structure

Shed/chicken coop

Residential area

Stock loading yard

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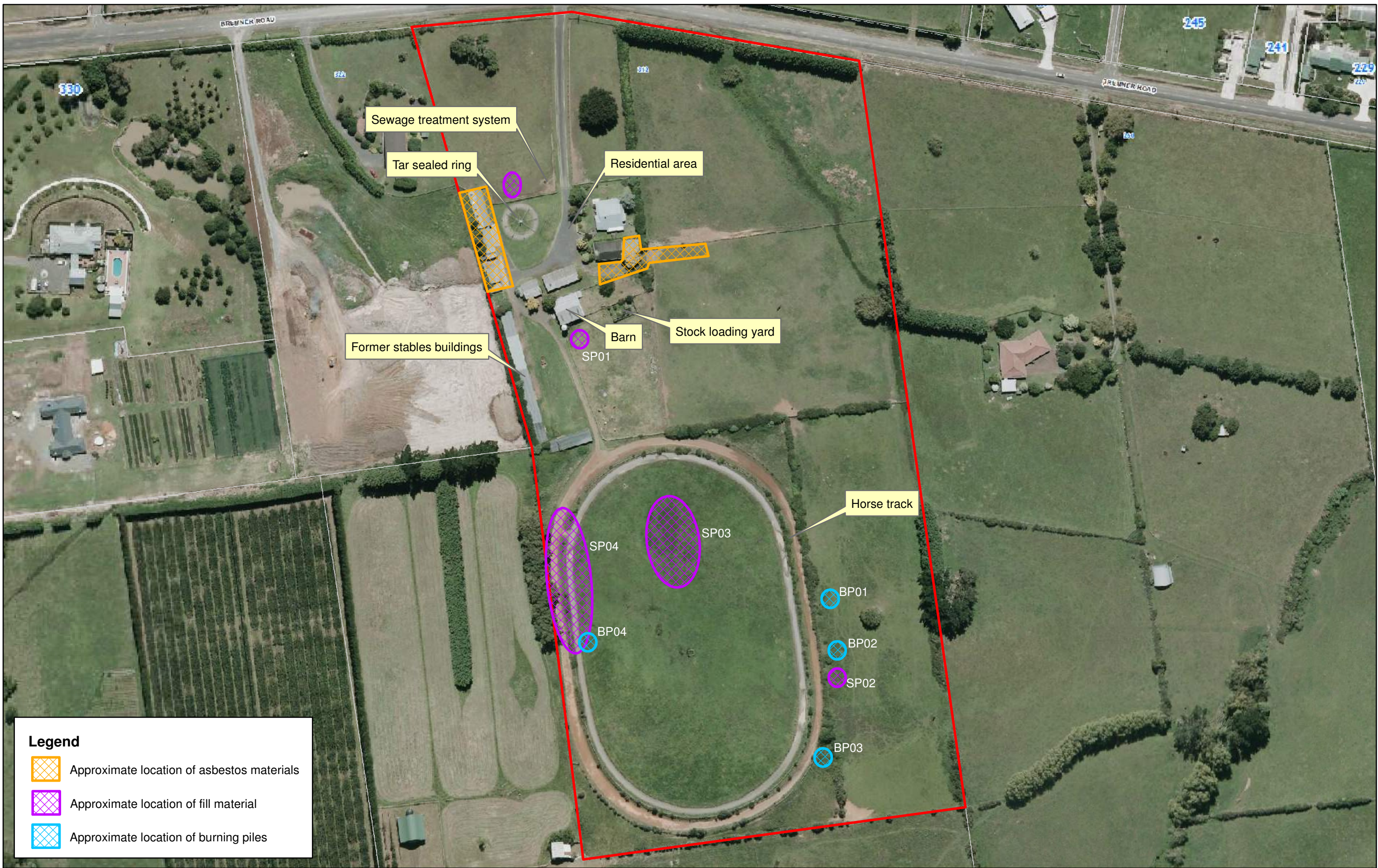
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Figure 2-14: Site Features Plan
269 Bremner Road, Drury
 Preliminary Site Investigation






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Legend


-  Approximate location of asbestos materials
-  Approximate location of fill material
-  Approximate location of burning piles



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Figure 2-15: Site Features Plan
312 Bremner Road, Drury
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Figure 2-16: Site Features Plan
322 Bremner Road, Drury
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Legend


 Approximate location of historical horticultural activities



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Figure 2-17: Site Features Plan
 Preliminary Site Investigation



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Figure 2-18: Site Features Plan
31 Burberry Road, Drury
 Preliminary Site Investigation



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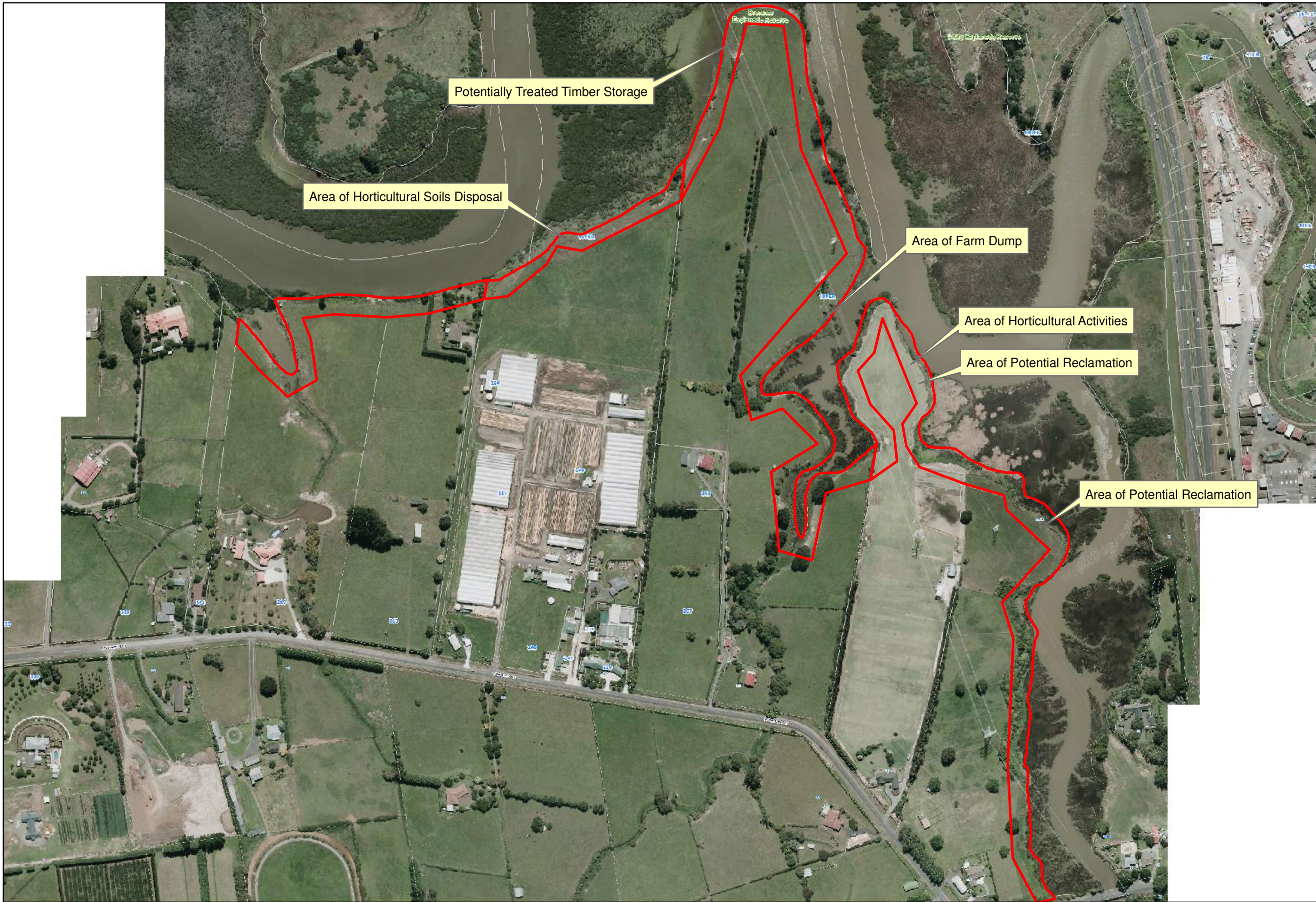
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Figure 2-19: Site Features Plan
37 Burberry Road, Drury
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Figure 2-20: Site Features Plan
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Figure 3: Surrounding Environment
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