



DETAILED SITE INVESTIGATION

297 TE PUNA STATION ROAD,
TE PUNA, TAURANGA

Prepared For: Momentum Planning and Design Limited

1. Record of Review

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2. Executive Summary

Momentum Planning and Design Limited (the 'client'), commissioned Pennan & Co Limited (Pennan & Co), on behalf of property owners, Te Puna Industrial Limited to complete a Detailed Site Investigation (DSI) for 297 Te Puna Station Road, Te Puna, Tauranga (Pt Lot 3 DP 22158 and SEC 3 SO 61751) (the 'site'). The client proposes to develop the land to support the establishment and operation of planned industrial activities on the site which is situated within the Te Puna Business Park.

As part of the current development proposal, the site will be developed for industrial use, with 4.8ha to be allocated to ContainerCo and 3.92ha to other yard-based industrial activities.

Land development activities will include:

- Earthworks and construction of an internal private road and vehicle access crossing to Te Puna Station Road;
- Earthworks, including the import of fill material, to achieve appropriate ground conditions and heights to accommodate the proposed industrial sites;
- Earthworks to establish necessary landscape planting and screening, drainage swales, and an artificial stormwater treatment wetland. More specifically, this will include a landscape bund along the full length of the northern boundary of the site; boundary shelter planting along half of the southern boundary starting from the southwestern corner; and a stormwater treatment wetland will be built in the northeastern corner of the property.

Most of the site is currently in pasture for grazing. A residential property is in the southwestern corner of the site and two yard areas are being utilised by a trailer fabrication business, a prefabrication building business and a landscaping company. Previous activities on the site include the storage of timber logs, orchard activities and a rural contractor's depot. Large areas of the site have also been filled with imported clean fill to raise the ground level of the site.

Based on the current and previous activities identified on the site, a Detailed Site Investigation (DSI) was required for the proposed development.

An initial desktop investigation undertaken as part of this DSI indicted evidence of several activities having taken place on the site that could be classified under the National Environmental Standards for Contaminants in Soil to Protect Human Health (NESCS) regulations:

- Category A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds, having identified that from 1970-1990s the property was formerly used as an orchard.
- Category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, relating to the placement of fill material to raise the ground level of the property under resource consent No. 62951.
- Category A17: Storage tanks or drums for fuel, chemicals or liquid waste, based on the presence of above ground fuel storage tanks in the yard areas of the site.
- Category D5: Engineering workshops with metal fabrication, based on the presence of a welding and metal fabrication workshop manufacturing trailers, currently on site.

- Category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, relating stockpiles of timber including treated timber.

Field investigations indicated that:

- Heavy metals were not detected above the soil guideline values for commercial/industrial land use for any of the samples collected.
- One sample exceeded the ecological guideline value for nickel.
- Two samples exceed the sediment quality guideline values for copper, two samples exceeded the sediment quality guideline values for nickel and one sample exceeded the sediment quality guideline value for zinc.
- One sample at two depths exceeded the ecological guideline values for total petroleum hydrocarbons.
- Two samples exceeded the sediment quality guideline values for total petroleum hydrocarbons.
- Selected samples exceeded the predicted background concentrations for the Bay of Plenty for arsenic, cadmium, chromium, copper, nickel, and zinc.
- Trace concentrations of 4,4' DDT, 4,4' DDE, and Total DDT (0.02 mg/kg) were recorded in one composite sample. The amounts detected were well below the assessment criteria for industrial land.
- No other organochlorine pesticides (OCPs) were detected above the laboratory limit of reporting.
- Total Petroleum Hydrocarbons (TPH) were detected in all the sample locations targeted.
- TPH results did not exceed the guideline values for commercial/industrial land use for all pathways.
- Benzo[a]pyrene toxic equivalency (TEQ) was detected at 0.03 mg/kg (the limit of reporting) for all samples tested.
- No samples exceeded the guideline values for commercial/industrial land use.

Pennan & Co has demonstrated that soil contamination does not exceed the soil guideline values for commercial/industrial land use. Additionally, Pennan & Co has concluded that there is a negligible risk to ecological receptors and the aquatic ecosystem either on the site or offsite. Therefore, Pennan & Co concludes that the land does not pose a risk to human health and the environment, and the site is suitable for the proposed industrial development.

3. Introduction

3.1. Purpose

Momentum Planning and Design Limited (the 'client'), commissioned Pennan & Co Limited (Pennan & Co), on behalf of property owners, Te Puna Industrial Limited to complete a Detailed Site Investigation (DSI) for 297 Te Puna Station Road, Te Puna, Tauranga (Pt Lot 3 DP 22158 and SEC 3 SO 61751) (the 'site'). The client proposes to develop the land to support the establishment and operation of planned industrial activities on the site which is situated within the Te Puna Business Park.

As part of the current development proposal, the site will be developed for industrial use, with 4.8ha to be allocated to ContainerCo and 3.92ha to other yard-based industrial activities. Land development activities will include:

- Earthworks and construction of an internal private road and vehicle access crossing to Te Puna Station Road;
- Earthworks, including the import of fill material, to achieve appropriate ground conditions and heights to accommodate the proposed industrial sites;
- Earthworks to establish necessary landscape planting and screening, drainage swales, and an artificial stormwater treatment wetland. More specifically, this will include a landscape bund along the full length of the northern boundary of the site; boundary shelter planting along half of the southern boundary starting from the southwestern corner; and a stormwater treatment wetland will be built in the northeastern corner of the property.

A copy of the scheme plan for the proposed development is provided in Appendix A.

Most of the site is currently in pasture for grazing. A residential property is in the southwestern corner of the site and two yard areas are being utilised by a trailer fabrication business, a prefabrication building business and a landscaping company. Previous activities on the site include the storage of timber logs, orchard activities and a rural contractor's depot. Large areas of the site have also been filled with imported clean fill to raise the ground level of the site.

Based on the current and previous activities identified on the site, a Detailed Site Investigation (DSI) is required for the proposed development.

The purpose of this DSI is to characterise potential contaminants in the site soils because of the identified historic hazardous activities and industries list (HAIL) activities.

3.2. Objectives

The objectives of the DSI are to:

- Determine whether land is a 'piece of land' subject to the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) regulations.
- Assess the potential risk to human health and the environment.

3.3. Scope of Work

The scope of work comprised:

- A desktop review of the history of the site, including a review of council property files; Assessment of Environmental Effects Report submitted with the resource consent application; and historical photographs.
- A summary of the results from the laboratory analysis of soil samples collected across the site.
- Recommendations for management of any potential contamination.
- Preparation of this report.

This report has been prepared in accordance with Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand (revised 2021) (Ref: MfEa) and Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (revised 2021) (Ref: MfEb).

In accordance with the requirements of Regulation 3 of the NESCS, the person certifying this DSI is a suitably qualified and experienced practitioner (refer Certification, page 2).

4. Site Description

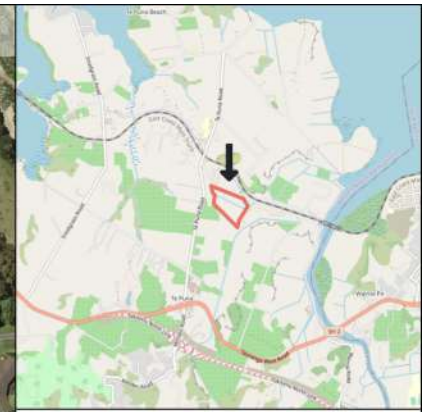
4.1. Site Details and Layout

Table 1 Site Details

Site Name:	Te Puna Business Park
Address:	297 Te Puna Station Road, Te Puna, Tauranga 3176
Legal Description:	Part Lot 3 DP 22158 (11.10 ha) and SEC 3 SO 61751 (0.87 ha)
Relevant authorities:	Western Bay of Plenty District Council Bay of Plenty Regional Council
Site area:	Refer Figure 1. 11.97 ha
Zoning:	Industrial (11.10 ha) Rural (0.87 ha)
Elevation:	Much of the site is low lying and flat, approximately 1 – 2 m above mean sea level (asml). The southwest corner of the property slopes upwards towards the corner reaching between 13-14 m asml where there is a residential home located. Generally, the site falls towards the eastern boundary of the property. A paper road runs the length of the southern boundary from northwest to southeast. The paper road is terraced, sloping upwards from southeast to northwest, to a maximum of approximately 21m amsl. The slope lies mostly to the south of the residential house site. The remainder of the paper road is flat and low lying.
General description:	The site is located within the Te Puna Business Park as outlined in the Western Bay of Plenty District Council's District Plan. Most of the site is currently used as grazing land. There are drainage canals on the property and at

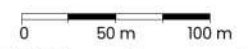
Site Name:	Te Puna Business Park
	<p>least two pond areas located on the western portion of the property. A third small pond is located near the middle of the property midway between the northern and southern boundaries.</p> <p>A residential property is in the southwest corner of the property and surrounded by trees.</p> <p>Located to the east of the residential site is a large three bay shed with associated yard area which currently houses a welding and fabrication workshop, and prefabrication building company.</p> <p>There is a second yard area further to the north of the workshop. A covered area has been erected within this second yard comprised of two shipping containers connected by an overhead canopy. This area currently houses a landscaping company.</p> <p>There are above ground fuel storage tanks located in both yards.</p>

The location and layout of the site is depicted in Figure 1.



Legend

□ Site Boundary



LINZ CC BY 4.0 © Imagery Basemap contributors



Title: Site Location		
Client: Momentum Planning and Design		Figure No: 1 Size: A4
Project: 297 Te Puna Station Rd	Drawn: EJ	
Date: 25-05-2022	Checked: EJ	
Proj No: 202201	Scale: 1:4000	Version: Final

4.2. Site Inspection

A site visit was undertaken by Pennan & Co. on 29 March 2022.

The following observations were made in reference to the current site:

- The majority of the site is grazing land with a residential property located in the southwest of the site on an upper terrace and two yards used for commercial/industrial activities. One yard area is in the mid-west portion of the site and is being used by a landscaping company. The other yard area is in the southwest of the site and contains a large three bay shed which is being utilised by a trailer manufacturer and prefabrication building business.
- Filling is evident in the northwest paddock and in the north-east paddocks although no fill has been placed in the northeastern paddock adjacent to the site boundary.
- Filling has occurred where the two yards are located.
- No fill has been placed in the south-east paddocks.
- The yard in the southwest of the site was compacted and had a stockpile of pellets and plywood with a small quantity of treated timber and including tyres, plastic, and rope visible. Another stockpile contained gravelly sand and broken bitumen.
- The three bay shed is constructed of metal sheeting and appeared to be in very good condition.
- An above ground storage tank for diesel was located directly north of the shed. The tank appeared to be old although the tank was bunded and there were no visible signs of contamination on the ground.
- There are two shipping containers located in the south-west yard although it is not evident what is being stored inside.
- There is a filled area directly north of the shed which appeared to be recent.
- A drainage channel traversed the middle of the site from the west to the east.
- An old cattle loading ramp is located adjacent to the landscaping yard in the mid-west of the site.
- The landscaping yard is compacted gravel and a covered section comprises two shipping containers connected by an overhead canopy.
- There is a small stockpile of wood located adjacent to an above ground fuel tank which appeared to be in reasonable condition with no visible signs of contamination on the ground.
- A small pond is located in the middle of the site in the northeastern paddocks and one pond is located in the northwestern paddock near the western boundary of the site.
- Orange/brown staining of the hard fill was noted outside the three bay shed.
- A walkover was undertaken in the paddocks and no refuse or anthropogenic material was identified. The northern paddocks were raised with the importation of fill and small stockpiles of fill material was evident in the northeastern paddocks. The fill appeared to be sandy clay.

The site is bounded by bush along the western boundary of the site. Further to the west, and along the southern boundary of the site, there is a mix of grazing land, avocado orchard and kiwifruit orchard. The eastern boundary of the site is bound by grazing land and industrial activities. The northern boundary of the property is bounded by Te Puna Station Road. Industrial activities are taking place to the north of the site directly across the other side of Te Puna Station Road.

4.3. Local Geology and Hydrology

Soils

There are two predominant soil types identified for the site. Approximately 84.4% of the site (9 ha) is mapped as Ohineangaaga (Ohin_9a.1) (high confidence) and the remaining 15.6% of the site (2 ha), which comprises the western most portion of the site, is mapped as Otorohanga (Otor_1a.2) (medium confidence).

Ohineangaaga (Ohin_9a.1)

Ohineangaaga soils belongs to the Gley soil order of the New Zealand soil classification. Gley soils are strongly affected by waterlogging, have been chemically reduced, have light grey subsoils, and usually have reddish brown or brown mottles. Waterlogging occurs in winter and spring, and some soils remain wet all year. It is formed in lake sediments, from rhyolite parent material.

The topsoil typically has loam texture and is moderately stony. The subsoil has dominantly clay textures, with at least 30 cm of rock fragments deposited by a volcano within 100 cm of the mineral soil depth. The plant rooting depth extends beyond 1m.

Generally the soil is poorly drained with high vulnerability of water logging in non-irrigated conditions, and has high soil water holding capacity. Inherently these soils have a moderate structural vulnerability and a very low N leaching potential. (Ref: Landcare 2021).

Otorohanga (Otor_1a.2)

Otorohanga soil belongs to the Allophanic soil order of the New Zealand soil classification. Allophanic Soils are dominated by allophane (and also imogolite or ferrihydrite) minerals. These stiff, jelly-like minerals coat the sand and silt grains and maintain a porous, low density structure with weak strength. The soils are identified by a distinctly greasy feel when moistened and rubbed firmly between the fingers. The soil is easy to dig and samples crumble easily when crushed in the hand. It is formed in fragmental material erupted from a volcano, from rhyolite parent material.

The topsoil typically has loam texture and is stoneless. The subsoil has dominantly loam textures, with at least 30 cm of rock fragments deposited by a volcano within 100 cm of the mineral soil depth. The plant rooting depth extends beyond 1m.

Generally the soil is well drained with very low vulnerability of water logging in non-irrigated conditions, and has high soil water holding capacity. Inherently these soils have a very low structural vulnerability and a low N leaching potential.

Geology

The site is mapped as a combination of Tauranga Group alluvium and Tauranga Group Fan Deposits. Tauranga Group alluvium is comprised of pumice-, crystal-and ash-rich sediments reworked from middle Quaternary Ignimbrites in the northwest and Greywacke gravels in the east. Tauranga Group Fan Deposits comprise of gravel and sand. (Ref: GNS 2010).

Hydrogeology

The site is located within the Tauranga Geothermal System. This system is a large low-temperature geothermal system (between 30°C and 70°C) that shares similar aquifers as the cold groundwater resource. It extends over 60 km from Katikati and Waihi Beach in the north-west to Te Puke and Maketu in the east, with the dominant heat source appearing to lie near Tauranga City. (REF: GNS & BOPRC 2021)

The Bay of Plenty Regional Council online mapping system maps most of the site as alluvial lowland and swamps, with the exception of the elevated area along the southwestern corner of the property which is mapped as alluvial terrace. The alluvial lowland and swamps is described as “flat, low lying alluvial land that dominates the coastal areas and low-lying areas of the region. This terrain is typically characterised by low lying, flat topography comprising streams, rivers and swamps. This terrain is one of the youngest in the project area.” The geological age is Holocene and groundwater depth is less than 4m below ground level.

As shown on the Bay of Plenty Regional Council (BOPRC) online mapping system, there is one active warm water bore located on the site, adjacent to the northern boundary (BN-4055). The bore was drilled on January 19th, 1979, to a depth of 274.5 m below ground level (bgl). A consent (20311) is held by the site owners to take water from this bore for irrigation (Expiry 2026).

The closest bore to the site is located to the northwest of the site (BN-4269). It is located 238 m from the eastern boundary of the site. It is an active cold water bore drilled in 1982 to a depth of 114m bgl.

There are two active bores located north of the site (BN-10758 and BN-93). BN-10758 is a cold water bore located 513 m from the northern boundary of the site, drilled to a depth of 285m bgl. BN-93 is a cold water bore located 573 m from the northern boundary of the site, drilled to a depth of 460.2 m bgl.

There are two active bores located east of the site (BN-4620 and BN-4187). BN-4620 is a cold water bore located 645 m from the eastern boundary of the site, drilled to a depth of 88.39 m bgl. BN-4187 is a cold water bore located 503 m from the eastern boundary of the site. The depth of this bore is not recorded. It was drilled in 1933.

There are two active bores located south of the site (BN-64 and BN19-0116). BN-64 is a warm water bore located 453 m from the southern boundary of the site, drilled to a depth of 179.8 m bgl. BN19-0116 is a warm water bore located 513 m from the southern boundary of the site. The depth of this bore is also not recorded.

There are other bores, identified on the BOPRC online mapping system, surrounding the site, however, these are all located more than 650 m from any one of the site’s boundaries.

Hydrology

The site low-lying and located approximately 1000 m west of the Wairoa River mouth where the river flows into the Tauranga Harbour.

The canalised/modified Hakao Stream lies to the east of the site and runs to the Wairoa River near its river mouth. A 20 m segment of the stream passes at the very eastern edge of the land owned by Te Puna Industrial Ltd. This area of land is not zoned within the Te Puna Business Park and is not proposed to be developed by this application.

There are two river centrelines identified on the site as mapped in the BOPRC online mapping system. One runs roughly west to east through the centre of the site and the second runs along a portion of the north-eastern boundary line and appears to be the modified Hakao Stream discussed above. Both centrelines meet on the boundary of the site and appear to run through the property adjacent (east) of the site before presumably entering a culvert under the road and eventually discharging into the Wairoa River.

Current aerial photographs of the site also show that drainage canals have been built around the paddocks on the site, and along the northern and eastern boundaries of the site. There also appears to be two ponds located near the western boundary of the site, and a smaller one in the middle of the site midway between the southern and northern boundaries.

The site falls within the Tauranga Harbour Primary Surface Drainage Catchment Area and Wairoa Secondary Surface Drainage Catchment area.

Wairoa Estuary Wetlands B is located approximately 1.2 km to the east of the site and is part of the larger Wairoa Pa Estuary which is a priority site identified by BOPRC and the Department of Conservation to serve as a tool for prioritising proactive (non-regulatory) biodiversity management by BOPRC and DOC.

The site is subject to a floodable area hazard overlay on the eastern end of the property. It is also identified as susceptible to inundation by tsunamis, and mapped as a possible location for liquefaction to occur.

5. Historical Site Use

The following information was used to prepare a site history:

- Review of Western Bay of Plenty District Council (WBOPDC) property file.
- Review of the Bay of Plenty Regional Council Selected Land Use Register.
- Review of Assessment of Environmental Effects report prepared by Momentum Planning and Design Limited in support of the resource consent for the proposed industrial development.
- Review of available aerial photography.

5.1. Review of Council Information

The property file for the site was obtained from the Western Bay of Plenty District Council on 17 March 2022 and contained the following relevant information:

Table 2 Summary of WBOPDC files

Date	File Number	Details
February 1977	Building Permit No. 9304	Re-erecting of a 40 year old dwelling on site. Dwelling was weatherboard exterior and iron roof. Inside linings were generally gib board. Front part of the house has fibrous plaster ceilings on beams. Rear has board and batten ceilings. The building permit included a requirement for redecoration to council's satisfaction. Relocation also included installation of a septic system (tank and soak hole).
April 1997	Building consent No. 57883	Consent granted to build a farm implement shed. Code compliance certificate not issued. A septic tank and effluent disposal system was included (tank and tile field). Shed is colour steel cladding and roof. Original drawings submitted show shed location to be adjacent to the southern boundary. Shed was not built as per the drawing submitted but roughly perpendicular to the southern boundary. (Refer to RC401306L)
02 July 1997	Photo	Photo showing evidence of an above ground fuel storage tank on the property. No additional details. Heavy machinery also parked adjacent to the fuel tank.

Date	File Number	Details
February 2000	Building Consent No. 62934	<p>New Dwelling including solid fuel heater. Colour steel roofing and texture harditex siding. (Current residential house on site). Plumbed to the septic system associated with the existing implement shed (above).</p> <p>A site investigation completed on 23 December 1999 for the proposed new dwelling indicated that it was to be located on an elevated cut platform that was previously occupied by a house which was removed from the site in February 1999. It is presumed that this is reference to the house that was relocated to the site in 1977. The former house site was lowered by about 0.5 m and the soil was pushed over the bank to the north-east.</p>
February 2000	Resource Consent RC401306L	<p>Consent granted for a discretionary activity being the establishment of a rural contractor's depot with conditions to be completed. Application was submitted on 12 February 1999.</p> <p>In February 1998, WBOPDC requested that a resource consent be applied for, siting that the contractor depot was a discretionary activity requiring the consent of the neighbours. The three bay shed was the site of the contractor's depot.</p> <p>Site plans show the correct location of the three bay shed (previously called the implementation shed), as well as the location of an old shed adjacent (north), and diesel tank and heavy machinery area adjacent (south). The site map also indicates that hard fill was added to the yard area to a depth of approximately 2.4 m. The wastewater disposal area is to the east of the hard fill area.</p>
May 2003	Building Consent No. 69028	Installation of a solid fuel heater. CCC issued.
21 March 2005	RC62951	To carry out large scale earthworks for infilling of land with clean fill and the discharge of treated sediment-contaminated stormwater to land at Te Puna Station Road. This resource consent was surrendered.
2002	Inspection	Entrance way was not previously sealed as per requirements of the resource consent RC401306L. Inspection note from 28 February 2002 shows the driveway formed and sealed.
16 Sept 2020	Site visit by Western Bay of Plenty District Council staff member to Te Puna Business Park	<p>The three bay shed was occupied by a welding and metal fabrication company. Storage of a small pile of timber logs. New fill area has been built adjacent to the area used by a firewood company.</p> <p>A second yard area was occupied by a landscaping company with vehicles and landscaping product on site.</p>
2021	Correspondence from WBOPRC	Information indicating that the property is affected by New Flood Maps.
2022	Resource Consent RC13360L	Establishment of industrial yards and activities, with associated earthworks, landscaping, drainage and intersection improvements, giving effect to the Industrial zoning and Te Puna Business Park Structure Plan within the WBOPDC District Plan.

The site is not identified as a verified hazardous activities and Industries List (HAIL) site within the Bay of Plenty Regional Council Mapping system. However, the Bay of Plenty Regional Council has requested that the client have a DSI prepared in support of the resource consent application, as per their correspondence below:

“Through due diligence and the use of readily available historical aerial images Regional Council has confirmed activities listed on the Ministry for the Environment’s Hazardous Activities and Industries List (HAIL) have taken place at 297 Te Puna Station Road. This includes category A10. Persistent

pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds, having identified that from 1970-1990s the property was formerly used as an orchard, and category I. Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, relating to the placement of fill material to raise the ground level of the property. It is acknowledged the filling took place under Regional Council Resource Consent 62951; however on review of the conditions relating to the acceptance of material and the time between the granting of that consent and the current application it is recognised that there is the possibility that the material accepted onto the site could have contained contaminated soils, materials from contaminated sites or demolition relating activities that could have included materials that contained asbestos and/or heavy metals at concentrations that may need to be managed as part of any future disturbance.”

Below is relevant consent history for the site, as summarised by Momentum Planning and Design Limited in the Assessment of Environmental Effects Report submitted in support of the resource consent for this development:

- “Resource consent for groundwater take for irrigation at a rate of up to 200m³ /day was granted in 1977 (BOPRC reference 20311);
- Building consent for the existing three-bay implement shed was granted in the late 1990’s (WBOPDC reference BC 57883);
- Building consent for the existing dwelling at the site was granted in February 2000 (WBOPDC reference BC 62934). Specified within this building consent was an exemption to the relevant District Plan yards rules at the time, as the dwelling is site 5m from a property boundary;
- Resource consent to establish a rural contractors depot utilising the three-bay shed and surrounding areas was granted in February 2000 (WBOPDC reference RC 401306L);
- “Environment Court decision RMA 608/03 approves Te Puna Business Park provisions and changes the zoning of the Te Puna Business Park to Industrial (February 2005);
- Resource consent 69251 was granted by BOPRC in March 2005 to carry out large-scale earthworks (depositing of cleanfill only) and discharge sediment-laden water to land where it may enter a drain to the Wairoa River. This consent was given effect to, as observed by a discernible rise in paddock level to the front paddocks of the site (as well as signage at the front of the site as required by conditions of the consent). This consent was surrendered in December 2013, preceding a stipulated expiry date of June 2014.”

5.2. Review of Aerial Photography

Aerial photographs were obtained from Retrolens for the years 1943, 1953, 1959, 1963, 1974, 1981, 1986, 1992, 1994, and from the Western Bay of Plenty District Council online mapping system for the years 2002, 2006, 2010-2012, 2014-2015, 2019, and 2021. The following table (Table 2) summarises observations from each photograph in relation to the entire site, and the surrounding area. The historical aerial photography is included in Appendix B.

Table 3 Historical Aerial Photography Review

Year	Site Observations	Surrounding Area Observations
1943	Site in in pasture although the land towards the eastern end of the property still has a large amount of scrub present as well.	Surround area is in pasture.

Year	Site Observations	Surrounding Area Observations
1953	Site appears unchanged	Surrounding area largely unchanged. The properties adjacent to the site to the west and northwest of the site have been planted in orchards.
1959	Site appears unchanged	Surrounding area appears unchanged.
1963	Site appears unchanged	Surrounding area appears unchanged.
1974	Site remains in pasture but it appears that the scrub that was present on the site has been removed.	There has been further conversion of pasture to orchards on the adjacent properties to the south and west of the site. The surrounding area still remains largely in pasture.
1981	An aerial photograph was only available that showed approximately half of the site. What can be seen has been converted to orchard. Presumably this would be the same for the remainder of the site. There is also evidence of a building/shed located in a cleared area adjacent to the edge of the photograph which would be approximately midway between the southern and northern boundaries of the site.	Much of the surrounding properties have been converted from pasture to orchards. There is some pasture land remaining on the property directly north of the site (across Te Puna Station Road).
1986	Approximately half of the property appears to be in orchards (northern paddocks and two southern paddocks). The remainder is in pasture land. Some of the pasture land appeared to have been converted back into pasture after having been planted out into orchards from what could be observed of the site in the 1981 photo. There are two additional areas that have been cleared on the site. One is at the location of the current house and is likely the site of the house that was relocated to the site in 1977. The other cleared area to the east of house site also appears to have a building sited there.	Surrounding area is largely in orchards. There is some pasture land remaining on the adjacent properties to the south and southeast of the site. The property directly north of the site has been put into orchard.
1992	Site looks unchanged	Surrounding area looks unchanged. The property to the north of the site, across the road appears to have been cleared of orchard and is being returned to pasture land.
1994	Site looks unchanged.	The surrounding area looks unchanged.
2002	Site has been cleared of all orchards and the long building/shed located adjacent to the orchards has also been removed. The land has been returned to pasture. Drainage canals are visible between paddocks and along the northern and eastern boundary of the site. Mounds can be seen at regular intervals along the eastern and northern boundaries, presumably silt cleared from the drainage canals. A pond is also visible to the north of the house site. The farm implementation shed and associated yard are clearly visible. Another smaller shed is also visible adjacent (north) to the implementation shed.	The surrounding area is still largely in orchards along the properties adjacent to the north, east and southeast are in pasture.
2006	Most of the site remains in pasture. However, fill is being deposited and spread onto on the paddocks adjacent to the driveway. The yard area adjacent to the implementation shed has	The surrounding area looks largely unchanged with the exception of the addition of a large building on the property north of the site and clearing of pasture land on

Year	Site Observations	Surrounding Area Observations
	<p>been expanded towards the southern boundary. Heavy machinery is visible in the yard along with what may be logs. There is also a large dirt pile just to the east of the yard.</p>	<p>the property adjacent to the eastern boundary of the site.</p>
<p>2010-2012</p>	<p>The area that was previously filled is now largely grassed over. There is a new roadway the extends through the paddocks to the east of the driveway running parallel with Te Puna Station Road. There also appears to be trees planted at regular intervals adjacent to the new roadway. At the end of this roadway there appears to be new fill added. A small square shaped pond has appeared, midway between the northern and southern boundaries approximately in the centre of the site.</p> <p>The yard adjacent to the implementation shed has been further expanded and encompasses the area where there was previously a large dirt pile. The yard area has been expanded right to the southern boundary and within the paper road. There are logs/timber being stored in this area.</p>	<p>The surrounding area appears largely unchanged.</p>
<p>2014-2015</p>	<p>The site appears mostly unchanged with the exception that the yard adjacent to the implementation shed has been expanded again (northward). There appears to be a significant number of logs stored on site, as well as stockpiles of possibly bark/mulch in rows and piles covered with black tarp.</p>	<p>The surrounding area looks largely unchanged with the exception of the property to the north of the site which appears to be undergoing filling or conversion to yards for industrial activity.</p>
<p>2019</p>	<p>Most of the site is still in pasture. The yard adjacent to the implementation shed has been expanded further again (northward). There are four rows of bark/mulch being stored along with logs in this yard. A second yard has also been established to the north of the existing yard. This appears to be storing containers, equipment, and trucks.</p>	<p>The surrounding area looks largely unchanged with the exception of the property to the north of the site which appears to be undergoing further conversion to yards for industrial activities. The property to the east of the site is also undergoing conversion to yards for industrial activities.</p>
<p>2021</p>	<p>Most of the site is still in pasture. The yard adjacent to the implementation shed appears to have been tidied up. Logs are neatly stacked towards the southern boundary and most of the mulch appears to be gone. The area of the yard that was expanded in 2019 appears to have grassed over. The new yard made to the north of the original yard area now has canopy cover between two containers (landscaping company depot). There appears to be additional planting along the roadway that runs parallel to Te Puna Station Road. The entrance to the site also appears to have been landscaped. A pond is now visible in the northwest corner of the property.</p>	<p>The surrounding area looks largely unchanged, just further development of the industrial properties to the north and the east of the site.</p>

6. Initial Site Characterisation

The Conceptual Site Model (CSM) (refer Table 4 below) was developed to inform the design of this DSI and to describe the relationship between sources of contamination on site, the human and environmental receptors that may be exposed to those contaminants in the context of the use of the site for industrial activities, and the pathways by which those receptors may be exposed.

The CSM will be updated in the later sections of this report to reflect the results of the intrusive ground investigation and inform the conclusions and recommendations.

Table 4 Initial Conceptual Site Model

Source	Receptor	Pathway	Pathway Complete?
Agrichemical and metal contaminants from pesticide use on the identified orchard. HAIL category A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds)	Construction workers	Dermal contact	Incomplete Pathway – Contaminant exposure of a construction worker would be no more than a few occasions per year with minimal exposure. The risk to human health would be negligible for both threshold and non-threshold contaminants associated with HAIL A10.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Potentially Complete Pathway – Contaminants could be present at a level that poses a risk to human health with a change in land use from production land to industrial land and may require specific controls.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Most of the site is currently in pasture, with the exception of the yard areas currently being used for commercial/industrial uses. Due to the nature of the site, current site users would have minimal exposure to contaminants.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – The site is not accessible to the general public and it is unlikely that contaminants associated with HAIL A10 would migrate offsite at concentrations that would be a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – There are drainage canals and two ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.
Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Groundwater over much of the site is expected to be less than 4 m bgl. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.	
		Dermal contact	

Source	Receptor	Pathway	Pathway Complete?
<p>Imported fill of unknown origin. The site accepted cleanfill to raise the level of the site, however, it is not known if the material accepted was in general accordance with the MfE cleanfill guidelines.</p> <p>HAIL category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.</p>	Construction workers	Ingestion	Potentially Complete Pathway – Contaminant exposure of a construction worker would be no more than a few occasions per year with minimal exposure. However, some contaminants that could be present such as asbestos, can be an immediate or short-term risk to human health.
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Potentially Complete Pathway – Contaminants could be present at a level that poses a risk to human health with a change in land use from production land to industrial land and may require specific controls.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Most of the site is currently in pasture, with the exception of the yard areas currently being used for commercial/industrial uses. Due to the nature of the site, current site users would have minimal exposure to contaminants.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – The site is not accessible to the general public and it is unlikely that contaminants associated with HAIL I would migrate offsite at concentrations that would be a risk to human health.
		Ingestion	
Inhalation of dust/vapours			
Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – There are drainage canals and three ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.	
Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Groundwater over much of the site is expected to be less than 4 m bgl. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.	
<p>Presence of above ground fuel storage tanks.</p> <p>HAIL category A17: Storage tanks or drums for fuel, chemicals or liquid waste.</p>	Construction workers	Dermal contact	Incomplete Pathway – Contaminant exposure of a construction worker would be no more than a few occasions per year with minimal exposure. The risk to human health would be negligible for both threshold and non-threshold contaminants associated with HAIL A17.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Potentially Complete Pathway – Contaminants could be present at a level that poses a risk to human health with a change in land use from production land to industrial land and may require specific controls.
		Ingestion	
		Inhalation of dust/vapours	

Source	Receptor	Pathway	Pathway Complete?	
	Current site users	Dermal contact	Incomplete Pathway –Due to presence of hard fill around the above ground storage tanks, current site users would have minimal exposure to contaminants.	
		Ingestion		
		Inhalation of dust/vapours		
	General public	Dermal contact	Incomplete Pathway – The site is not accessible to the general public and it is unlikely that contaminants associated with HAIL A17 would migrate offsite at concentrations that would be a risk to human health.	
		Ingestion		
		Inhalation of dust/vapours		
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – There are drainage canals and two ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.	
	Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Groundwater over much of the site is expected to be less than 4 m bgl. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.	
	Welding and metal fabrication workshop on site for trailer manufacturing. HAIL category D5: Engineering workshops with metal fabrication.	Construction workers	Dermal contact	Incomplete Pathway – Contaminant exposure of a construction worker would be no more than a few occasions per year with minimal exposure. The risk to human health would be negligible for both threshold and non-threshold contaminants associated with HAIL D5.
			Ingestion	
Inhalation of dust/vapours				
Future site users		Dermal contact	Potentially Complete Pathway – Contaminants could be present at a level that poses a risk to human health with a change in land use from production land to industrial land and may require specific controls.	
		Ingestion		
		Inhalation of dust/vapours		
Current site users		Dermal contact	Incomplete Pathway – Due to the presence of hard fill adjacent to the shed where the trailer manufacturing is occurring, current site users would have minimal exposure to contaminants.	
		Ingestion		
		Inhalation of dust/vapours		
General public		Dermal contact	Incomplete Pathway – The site is not accessible to the general public and it is unlikely that contaminants associated with HAIL D5 would migrate offsite at concentrations that would be a risk to human health.	
	Ingestion			
	Inhalation of dust/vapours			

Source	Receptor	Pathway	Pathway Complete?
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – There are drainage canals and three ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.
	Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Groundwater over much of the site is expected to be less than 4 m bgl. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.
<p>Stockpiles of timber including treated timber.</p> <p>HAIL category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.</p>	Construction workers	Dermal contact	Incomplete Pathway – Contaminant exposure of a construction worker would be no more than a few occasions per year with minimal exposure. The risk to human health would be negligible for both threshold and non-threshold contaminants associated with HAIL I.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Potentially Complete Pathway – Contaminants could be present at a level that poses a risk to human health with a change in land use from production land to industrial land and may require specific controls.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Due to the presence of hard fill adjacent to the shed and the filled area directly north having no activities occurring there, current site users would have minimal exposure to contaminants.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – The site is not accessible to the general public and it is unlikely that contaminants associated with HAIL I would migrate offsite at concentrations that would be a risk to human health.
Ingestion			
Inhalation of dust/vapours			
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – There are drainage canals and three ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.
	Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Groundwater over much of the site is expected to be less than 4 m bgl. However, the type of contaminants associated with the source activity will generally remain in the surface soils on the site.

7. Sampling and Analysis Plan

7.1. Contaminants of Potential Concern

Table 5 Contaminants of Potential Concern

Activity	HAIL code	Location	Rationale	Contaminants of Potential Concern
Orchard activities	A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds	Majority of the site.	Historical aerial photographs identified an orchard over the majority the property	Metals, in particular arsenic, organochlorine pesticides
Fill of unknown origin. The site accepted cleanfill however, it is not known if the material accepted was in general accordance with the MfE cleanfill guidelines.	I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	Northwest paddock, northeast paddocks and southwest area with the landscaping yard and yard with three bay shed.	Historical aerial imagery and site visit identifies that these areas of the site has had some filling activities take place.	Metals, organochlorine pesticides, potentially asbestos if construction waste is noted in the samples.
Above ground storage tanks of fuel.	A17: Storage tanks or drums for fuel, chemicals or liquid waste	Two locations next to the existing sheds.	The tanks were identified during the site walkover.	Total petroleum hydrocarbons and polycyclic aromatic hydrocarbons.
Trailer manufacturing	D5: Engineering workshops with metal fabrication	The building in the southwest of the site.	The lease holder of the building was spoken to during the site walkover where his trailer manufacturing was evident.	Based on what was observed on site – metals.
Stockpiles of timber including treated timber	I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment	To the south and east of the building located in the southwest.	Treated timber was identified in the pile of wood which mainly contained untreated timber. Historical aerial imagery identified stockpiles of logs on site and it is not known if they were treated.	Metals – in particular arsenic, copper and chromium.

7.2. Data quality objectives

The data quality objective (DQO) Process is used to establish performance or acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the investigation. The DQO process consists of seven iterative steps that are documented in Table 5.

Table 6 DQO Process

Step	Description	Outcomes
1	State the problem	<p>The site has been used historically for grazing, orchard activities, and disposal of cleanfill of unverified origin. In addition to this, there are above ground storage tanks and industrial operations taking place on site that may also present a contamination risk. The level of risk of exposure to contaminants is unknown so to quantify the risk and how best to manage it, further investigations of the soil contaminants is required.</p> <p>The proposed works trigger the Resource Management (National Environmental Standard for Assessment and Management of Contaminated Soils to Protect Human Health) Regulations. Soil contaminant concentrations must be assessed to determine consenting requirements.</p>
2	Identify the decisions/goal of the investigation	<p>The decisions to be made for the investigation are as follows:</p> <ul style="list-style-type: none"> • Is the site investigation design sufficiently robust to meet the requirements of Contaminated Land Management Guideline No. 5? • Have all the contaminants of concern been identified? • Are the data gaps at the site clear? • Are there contaminant risks which need to be managed during the works? • Are there contaminant risks that need to be managed on completion of the works? • What controls are needed to manage the contaminant risks during and on completion of the works? • Where can the soil excess be disposed of? • What consents are triggered by the presence of contamination? • What is the cost of managing contamination risks and what impact will this have on the overall works' budget?
	Identify the inputs to the decision	<p>The inputs required to make the above decisions are as follows:</p> <ul style="list-style-type: none"> • Background data on site history • Observation data including presence of odours and discolouration of the soil • Geological and hydrological data • Concentrations of contaminants of concern in soil • Site assessment criteria for soil • Distribution of identified soil contamination (if any)
4	Define the study boundary/constraints on data	<p>The boundary of the investigation area is defined as the whole property located at 297 Te Puna Station Road, with the exception of the residential house site located in the southwestern corner of the property. (Refer to figure 1)</p>
5	Develop a decision rule	<p>If concentrations exceed the adopted assessment criteria, then:</p> <ul style="list-style-type: none"> • Consent will be required. • Controls will be implemented to manage contaminant risks during and on completion of works. • Soil excess will be managed on site or disposed of at a facility that is licenced to accept this type of waste. • Requirements for further assessment, remedial and/or management options will be considered.
6	Specify limits on decision errors	<p>The acceptable limits on decision errors to be applied in the investigation and the manner of addressing possible decision errors have been developed based on the data quality indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness.</p>
7	Optimise the design for obtaining data	<p>This assessment has been designed considering the information obtained during the desktop review undertaken by Pennan & Co. It is based on the principles set out in</p>

Step	Description	Outcomes
		<p>Contaminated Land Management Guidelines (CLMG) No. 5 (revised 2021) and the details of the proposed works.</p> <p>To ensure the design satisfies the DQOs, DQIs (for accuracy, comparability, completeness, precision and reproducibility) have been established to set acceptance limits on field methodologies and laboratory data collected.</p>

7.3. Basis for Guideline Values

As the proposed development is to build an industrial development for yard based activities, the assessment criteria for an industrial land use scenario have been adopted using:

- Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Soil Contaminant Standards for a 'Commercial/industrial outdoor worker (unpaved)' land use scenario.
- National Environmental Protection (Assessment of Site Contamination) Measures 2013 (NEPC, 2013) for a commercial/industrial 'D' scenario.
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE, 1999).
- User Guide: Background soil concentrations and soil guideline values for the protection of ecological receptors (Eco SGVs) Consultation draft (Landcare Research 2019).
- Australian and New Zealand guidelines for fresh and marine water quality (ANZECC & ARMCANZ 2018) (sediment quality guideline values).

The Eco SGV's have been used as they have been developed as a nationally consistent method for assessing the ecological impact of contaminants in soil.

The sediment quality guideline values have been used for assessing the potential impact of soil disturbance on the aquatic ecosystem.

7.4. Sampling Design

Based on the type of fill observed (generally clay soil) with no obvious signs of refuse or anthropogenic inclusions, an approximate grid size of 40 m² was proposed. The former orchard area where filling activities had not occurred and was subject to the broad-based application of pesticides had an approximate grid size of 50 m². As the proposed land use is to be industrial, a smaller grid size was not deemed necessary.

Targeted sampling was to be used around the existing buildings, stockpiles and above ground fuel tanks to assess for the presence of contamination from any spills or storage of materials.

No sampling was proposed around the residential dwelling given the recent age of the current dwelling and that the house site was lowered by about 0.5 m prior to construction and the soil was pushed over the bank to the north-east removing any potential contamination from the previous dwelling.

The surface layer of the soil was the targeted location of potential contaminants in the former orchard area, yards and surrounding the buildings. The surface and subsurface to 0.4 m bgl was to be targeted within the fill areas. However, a third of samples within the former orchard area and fill locations would have a deeper sample at 1.0 m bgl collected to characterise the fill.

Field screening or on-site testing is not applicable for this site as volatile analysis is not required.

7.5. Sample collection

Sampling included the following:

- Soil samples (0-0.1 m below ground level (bgl)) were collected from a total of 60 locations. The number of locations is in general accordance with Ministry for the Environment Contaminated Land Management Guidelines No. 5 (revised 2021). The hotspot radius has been determined as approximately 40 m² based within the fill locations and 50 m² in the former orchard area.
- Soil sampling included deeper samples collected at approximately 0.3-0.4 m bgl (41 locations) in the fill areas to target the depth that is proposed to be disturbed for the development and potentially different layers and origin locations of the fill material.
- Sampling included an additional deeper sample collected at approximately a third of the sample locations (10 locations) where fill activities have taken place. Sampling was approximately 1.0-1.1 m bgl or if there is a visual or olfactory change identified.
- Soil sampling was undertaken using a hand auger and/or a stainless-steel trowel. Soil samples were collected directly from the trowel or hand auger using disposable nitrile gloves and placed in a laboratory supplied glass jar for sample analytical purposes.
- Collection of quality control samples as per Section 7.6.
- Where re-useable sampling equipment is used, such as hand augers and trowels, this equipment was decontaminated prior to collection of another sample.
- Soil samples were collected in the appropriate sample jars, stored and transported in chilled containers in accordance with IANZ laboratory requirements.
- Field observations were made of soil descriptions such as odour, discoloration, presence of unusual materials such as waste, etc. GPS sample locations will be recorded together with notes on the sample location.

7.6. Quality Assurance and Quality Control

Analytica Laboratories is accredited by International Accreditation New Zealand (IANZ). Analyses was performed in accordance with the terms of accreditation.

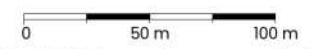
Four field blind replicate samples were collected.

Decontamination of non-dedicated sampling equipment (i.e. hand auger and trowel) was undertaken between each sample collection, using Decon 90 solution, followed by rinsing each piece of equipment with potable water.

Personnel handling soil samples replaced nitrile gloves between each sample.



- Legend**
- Sample Locations
 - Site Boundary
 - Sample Locations



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Title: Sample Location Plan		
Client: Momentum Planning and Design		Figure No: 2 Size: A4
Project: 297 Te Puna Station Rd	Drawn: EJ	
Date: 03-06-2022	Checked: EJ	
Proj No: 202201	Scale: 1:3000	Version: Final

8. Sampling Results

8.1. Investigation Rationale

The purpose of the sampling was to:

- Establish the type and location of any contamination on the site.
- Determine the concentration of any contaminants on the site.
- Determine whether the concentration of contaminants exceed soil guideline values for proposed future land uses.
- Establish the associated risk to human health with respect to the proposed land use change.

8.2. Field Investigation Methodology

Due to the number of soils samples to be collected, the field investigation was completed by Pennan & Co. across two days, 29 April 2022 and the 3 May 2022. The field investigation was undertaken in general accordance with the Sampling and Analysis Plan (SAP). The field investigation comprised the collection of soil samples for laboratory analysis.

Deviations from the SAP included:

- Sample location S19 – sample not collected at 1.0 m bgl due to hole collapse from groundwater presence.
- Sample locations S53 and S55 – samples collected at 0.2-0.3 m bgl due to refusal.
- Sample location S56 – an extra sample was collected at 0.3-0.4 m bgl.
- Sample locations S51, S52, S54 and S59 – samples collected at 0.4-0.5 m bgl instead of 0.3-0.4 m bgl.

The sampling locations are shown on Figure 2.

The laboratory reports are provided in Appendix C.

8.3. Field Observations

The fill material comprised a dark brown loam to 0.2 m bgl generally overlying a light brown/orange sandy clay to 0.9 m overlying brown/blue/green clay. Some locations contained grey sand from 0.4 m and a couple of locations contained gravel inclusions. No visual or olfactory signs of contamination were noted during the field investigation.

The sample locations are identified on Figure 2.

8.4. Laboratory Analysis

Table 7 Summary of Laboratory Analysis of Soil Samples

Laboratory Analysis	Location	Additional Notes
Heavy metals suite (7 Elements: arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), nickel (Ni), lead (Pb), zinc (Zn))	All sample locations, both systematic and targeted	60 sample locations tested. S1- S60. All locations were sampled at 0.0-0.1 m. S1-S26, S41-S54, S55, S56 and S59 had a deeper sample collected at approximately 0.3-0.4 m (43 samples).

Laboratory Analysis	Location	Additional Notes
		S1, S4, S8, S11, S13, S16, S23, S26, S42, S46 and S48 were collected at approximately 1.0-1.1 m.
Organochlorine pesticides (OCP)	In the previous orchard and fill areas – all areas except the targeted samples.	25 composite samples were analysed. Each composite comprised soil taken at the same depth from either 3 or 4 sample locations. S1-S54 sample locations were included in composites. Note: surface sample composites comprised samples from 0.0-0.1 m bgl and composites at depth comprised samples from 0.3-0.4 m bgl.
Total petroleum hydrocarbons / polycyclic aromatic hydrocarbons	Targeted locations around the above ground storage tanks and locations around the buildings where visual signs of spills are noted.	5 samples were analysed. S55 0.0-0.1 m, S56 0.0-0.1 m, S56 0.3-0.4 m, S57 0.0-0.1 m.
Intra-laboratory (field) duplicate	Random selection	Analysed for heavy metals. 4 blind field replicates were submitted: S10 0.4-0.5 m, S21 0.4-0.5 m, S24 0.2-0.3 m, S44 0.4-0.5 m.

8.5. Results Summary

Metals

- Heavy metals were not detected above the soil guideline values for commercial/industrial land use for any of the samples collected.
- Sample S57 0.0-0.1 m (664 mg/kg) exceeded the ecological guideline value for zinc (480 mg/kg).
- Sample S57 0.0-0.1 m (69 mg/kg) and sample S44 0.3-0.4 m (90.7 mg/kg) exceeded the sediment quality guideline value for copper (65 mg/kg).
- Sample S56 0.0-0.1 m (34.6 mg/kg) and sample S60 0.0-0.1 m (21.6 mg/kg) exceeded the sediment quality guideline value for nickel (21 mg/kg).
- Sample S57 0.0-0.1 m (664 mg/kg) also exceeded the sediment quality guideline value for zinc (200 mg/kg).
- Selected samples exceeded the predicted background concentrations for the Bay of Plenty for arsenic, cadmium, chromium, copper, nickel, and zinc.

Organochlorine Pesticides

- Trace concentrations of 4,4' DDT, 4,4' DDE, and Total DDT (0.02 mg/kg) were recorded in Composite Sample 1 (S1, S2, S7 and S8, 0.0-0.1m bgl). The amounts detected were well below the assessment criteria for industrial land.
- No other organochlorine pesticides (OCPs) were detected above the laboratory limit of reporting.

Total Petroleum Hydrocarbons

- Total Petroleum Hydrocarbons (TPH) were detected in all the sample locations targeted.
- TPH results did not exceed the guideline values for commercial/industrial land use for all pathways.
- Sample S55 0.0-0.1 m exceeded the exceeded the ecological guideline value for the C10-C14 fraction and the C15-C36 fraction. Sample S55 0.2-0.3 m also exceeded the ecological guideline value for the C15-C36 fraction.
- Sample S55 0.0-0.1 m, sample S55 0.2-0.3 m and sample S56 0.0-0.1 m exceeded the sediment quality guideline value for total TPH (280 mg/kg).

Polycyclic Aromatic Hydrocarbons

- Benzo[a]pyrene toxic equivalency (TEQ) was detected at 0.03 mg/kg (the limit of reporting) for all samples tested.
- No samples exceeded the human health or ecological guideline values for commercial/industrial land use.

Table 8 Laboratory Results

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S1	0.0-0.1m	29/04/2022	6.1	0.25	5.7	25.5	13.9	2.8	61.0	-	-
S1	0.3-0.4m	29/04/2022	5.4	0.31	6.0	26.4	11.5	2.5	64.2	-	-
S1	0.9-1.0m	29/04/2022	5.7	0.021	6.0	2.4	7.36	1.0	9.72	-	-
S2	0.0-0.1m	29/04/2022	7.4	0.35	5.9	23.1	10.6	2.6	62.6	-	-
S2	0.3-0.4m	29/04/2022	9.2	0.43	7.4	27.3	13.2	3.3	72.1	-	-
S3	0.0-0.1m	29/04/2022	7.1	0.18	5.8	17.7	16.0	2.9	79.2	-	-
S3	0.3-0.4m	29/04/2022	8.6	0.26	7.6	24.0	16.7	3.0	81.7	-	-
S4	0.0-0.1m	29/04/2022	7.9	0.43	7.5	30.3	9.79	3.5	75.1	-	-
S4	0.3-0.4m	29/04/2022	6.3	0.20	9.0	28.5	12.6	3.2	55.7	-	-
S4	1.0-1.1m	29/04/2022	5.4	0.11	6.6	10.3	19.3	3.3	62.3	-	-
S5	0.0-0.1m	29/04/2022	6.5	0.559	6.6	24.4	9.65	2.7	65.4	-	-
S5	0.3-0.4m	29/04/2022	4.8	0.059	7.0	9.79	11.5	3.2	40.3	-	-
S6	0.0-0.1m	29/04/2022	6.8	0.35	4.1	6.4	7.55	2.7	23.3	-	-
S6	0.3-0.4m	29/04/2022	5.0	0.14	6.7	11.1	11.8	2.5	41.5	-	-
S7	0.0-0.1m	29/04/2022	5.8	0.27	4.5	38.6	13.8	2.0	68.5	-	-
S7	0.3-0.4m	29/04/2022	7.3	0.46	6.6	28.7	10.6	3.6	88.7	-	-
S8	0.0-0.1m	29/04/2022	8.5	0.33	5.4	60.1	19.6	2.2	93.7	-	-
S8	0.3-0.4m	29/04/2022	4.3	0.048	7.6	10.0	23.3	2.9	28.1	-	-
S8	1.0-1.1m	29/04/2022	4.4	0.054	8.8	13.6	28.3	3.3	33.4	-	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S9	0.0-0.1m	29/04/2022	4.2	0.10	7.7	15.0	14.3	3.4	50.3	-	-
S9	0.3-0.4m	29/04/2022	5.3	0.076	9.2	15.9	18.3	4.2	45.4	-	-
S10	0.0-0.1m	29/04/2022	5.6	0.18	5.9	16.4	11.7	2.7	53.4	-	-
S10	0.3-0.4m	29/04/2022	5.8	0.15	6.2	13.0	13.7	2.9	51.2	-	-
S11	0.0-0.1m	29/04/2022	6.7	0.42	7.2	25.2	14.8	3.3	62.2	-	-
S11	0.3-0.4m	29/04/2022	4.4	0.069	9.0	11.8	36.3	3.1	30.4	-	-
S11	1.0-1.1m	29/04/2022	4.7	0.062	2.6	6.7	9.80	2.7	41.1	-	-
S12	0.0-0.1m	29/04/2022	4.2	0.14	5.4	6.4	7.42	2.2	14.0	-	-
S12	0.3-0.4m	29/04/2022	2.6	0.040	7.4	1.7	8.84	1.6	15.7	-	-
S13	0.0-0.1m	29/04/2022	7.5	0.30	4.6	20.1	36.8	2.4	95.4	-	-
S13	0.3-0.4m	29/04/2022	3.6	0.10	3.5	4.2	7.78	1.5	20.6	-	-
S14	0.0-0.1m	29/04/2022	8.1	0.21	12	28.1	26.3	5.73	57.0	-	-
S14	0.3-0.4m	29/04/2022	6.3	0.14	5.8	9.80	12.3	2.9	51.8	-	-
S15	0.0-0.1m	29/04/2022	6.4	0.38	4.4	20.3	15.7	2.0	49.9	-	-
S15	0.3-0.4m	29/04/2022	6.9	0.21	7.8	18.5	16.0	3.2	49.3	-	-
S16	0.0-0.1m	29/04/2022	7.4	0.25	7.1	19.7	15.6	3.7	64.4	-	-
S16	0.3-0.4m	29/04/2022	6.0	0.14	7.0	16.4	14.0	4.0	52.4	-	-
S16	1.0-1.1m	29/04/2022	5.7	0.13	6.8	14.3	13.1	3.5	49.0	-	-
S17	0.0-0.1m	29/04/2022	6.4	0.20	5.6	14.9	11.9	3.0	55.2	-	-
S17	0.3-0.4m	29/04/2022	6.2	0.18	5.7	11.4	11.9	2.9	54.1	-	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S18	0.0-0.1m	03/05/2022	8.3	0.45	6.0	34.2	10.7	3.7	74.7	-	-
S18	0.3-0.4m	03/05/2022	4.7	0.085	4.9	6.4	9.16	2.3	36.0	-	-
S19	0.0-0.1m	03/05/2022	5.0	0.068	5.9	2.4	12.1	2.0	25.0	-	-
S19	0.3-0.4m	03/05/2022	2.9	0.043	4.8	2.0	4.7	1.0	11.2	-	-
S20	0.0-0.1m	03/05/2022	4.3	0.23	3.5	4.2	6.61	2.3	17.6	-	-
S20	0.3-0.4m	03/05/2022	1.5	0.054	5.5	3.0	6.65	1.5	13.8	-	-
S21	0.0-0.1m	29/04/2022	7.5	0.31	7.0	18.9	13.5	3.1	59.9	-	-
S21	0.3-0.4m	29/04/2022	5.1	0.11	8.9	14.0	18.6	4.4	41.0	-	-
S22	0.0-0.1m	29/04/2022	7.0	0.19	19.5	54.9	22.5	11.4	76.4	-	-
S22	0.3-0.4m	29/04/2022	4.2	0.19	5.6	9.39	27.9	2.5	22.9	-	-
S23	0.0-0.1m	29/04/2022	6.1	0.17	6.1	7.88	13.8	3.0	59.0	-	-
S23	0.3-0.4m	29/04/2022	3.2	0.21	3.8	8.35	7.71	1.8	18.3	-	-
S23	1.0-1.1m	29/04/2022	3.7	0.074	7.3	2.7	10.6	2.2	20.4	-	-
S24	0.0-0.1m	03/05/2022	6.6	0.19	5.7	14.4	11.8	3.0	72.2	-	-
S24	0.3-0.4m	03/05/2022	2.9	0.16	4.5	8.04	7.96	2.0	25.2	-	-
S25	0.0-0.1m	03/05/2022	3.9	0.20	4.3	5.2	12.3	2.2	23.8	-	-
S25	0.3-0.4m	03/05/2022	1.4	0.026	5.5	1.5	4.8	1.4	14.3	-	-
S26	0.0-0.1m	03/05/2022	3.6	0.30	3.8	4.5	6.73	2.5	28.0	-	-
S26	0.3-0.4m	03/05/2022	2.0	0.045	5.7	1.9	6.77	1.9	16.8	-	-
S26	1.0-1.1m	03/05/2022	1.9	0.040	7.3	1.8	5.61	2.2	14.8	-	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S27	0.0-0.1m	03/05/2022	3.8	0.17	3.6	31.5	8.43	2.1	25.7	-	-
S28	0.0-0.1m	03/05/2022	2.9	0.20	4.5	11.2	6.65	2.0	20.0	-	-
S29	0.0-0.1m	03/05/2022	3.8	0.18	4.0	11.5	6.91	2.0	23.9	-	-
S30	0.0-0.1m	03/05/2022	4.7	0.20	4.8	8.94	13.1	2.3	45.1	-	-
S31	0.0-0.1m	03/05/2022	4.0	0.17	5.6	22.0	9.18	2.7	26.9	-	-
S32	0.0-0.1m	03/05/2022	3.4	0.21	3.9	10.9	7.38	1.9	22.7	-	-
S33	0.0-0.1m	03/05/2022	5.3	0.18	5.2	9.60	9.02	2.3	26.7	-	-
S34	0.0-0.1m	03/05/2022	5.2	0.14	5.4	4.6	11.2	2.2	25.0	-	-
S35	0.0-0.1m	03/05/2022	4.8	0.26	2.8	22.4	8.03	2.0	46.4	-	-
S36	0.0-0.1m	03/05/2022	2.8	0.087	4.3	5.1	8.90	2.3	21.2	-	-
S37	0.0-0.1m	03/05/2022	4.2	0.20	3.7	9.71	10.5	1.9	24.6	-	-
S38	0.0-0.1m	03/05/2022	7.3	0.26	4.5	9.84	14.9	2.4	44.0	-	-
S39	0.0-0.1m	03/05/2022	3.0	0.076	5.1	2.7	12.2	1.6	20.0	-	-
S40	0.0-0.1m	03/05/2022	5.2	0.30	4.4	11.0	15.8	2.1	47.2	-	-
S41	0.0-0.1m	03/05/2022	4.4	0.18	3.5	23.1	11.9	1.3	34.8	-	-
S41	0.3-0.4m	03/05/2022	4.1	0.28	4.6	13.5	14.6	1.8	56.2	-	-
S42	0.0-0.1m	03/05/2022	5.9	0.082	7.0	6.1	10.1	1.7	24.5	-	-
S42	0.3-0.4m	03/05/2022	2.3	0.061	6.0	3.2	7.71	1.6	21.8	-	-
S42	1.0-1.1m	03/05/2022	5.4	0.31	5.7	16.0	10.4	2.8	37.9	-	-
S43	0.0-0.1m	03/05/2022	3.6	0.15	4.0	9.14	11.4	1.5	38.5	-	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S43	0.3-0.4m	03/05/2022	3.2	0.12	4.3	3.7	9.99	1.4	31.8	-	-
S44	0.0-0.1m	03/05/2022	6.3	0.30	3.6	34.1	8.91	1.7	38.8	-	-
S44	0.3-0.4m	03/05/2022	4.1	0.28	2.7	90.7	7.61	1.4	21.3	-	-
S45	0.0-0.1m	03/05/2022	5.6	0.13	5.3	22.5	11.2	2.7	35.7	-	-
S45	0.3-0.4m	03/05/2022	12	0.23	3.2	53.4	7.31	3.1	37.2	-	-
S46	0.0-0.1m	03/05/2022	4.5	0.22	3.6	32.2	11.1	1.6	43.6	-	-
S46	0.3-0.4m	03/05/2022	2.8	0.18	3.7	10.5	9.06	1.7	41.9	-	-
S46	1.0-1.1m	03/05/2022	1.5	0.070	5.4	2.1	6.51	1.4	22.3	-	-
S47	0.0-0.1m	03/05/2022	8.5	0.506	5.6	28.8	9.62	3.8	77.2	-	-
S47	0.3-0.4m	03/05/2022	3.9	0.079	4.7	4.3	10.2	2.2	28.4	-	-
S48	0.0-0.1m	03/05/2022	7.1	0.16	6.2	12.7	12.2	2.8	51.8	-	-
S48	0.3-0.4m	03/05/2022	2.4	0.061	2.9	3.1	5.02	1.3	25.5	-	-
S48	1.0-1.1m	03/05/2022	5.1	0.080	3.8	4.5	8.00	2.0	37.8	-	-
S49	0.0-0.1m	03/05/2022	4.9	0.14	5.6	9.35	14.9	2.8	47.3	-	-
S49	0.3-0.4m	03/05/2022	4.7	0.13	5.7	8.56	15.1	2.8	42.6	-	-
S50	0.0-0.1m	03/05/2022	3.7	0.082	8.1	10.9	20.9	2.9	21.2	-	-
S50	0.3-0.4m	03/05/2022	2.8	0.064	8.0	8.96	21.7	2.8	16.5	-	-
S51	0.0-0.1m	03/05/2022	8.4	0.16	9.1	12.1	12.3	2.4	62.4	-	-
S51	0.4-0.5m	03/05/2022	3.8	0.12	4.9	5.9	12.9	2.5	42.5	-	-
S52	0.0-0.1m	03/05/2022	3.7	0.12	5.3	5.9	11.9	2.5	40.0	-	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
S52	0.4-0.5m	03/05/2022	3.9	0.12	4.8	5.7	11.9	2.2	38.3	-	-
S53	0.0-0.1m	03/05/2022	10	0.17	11	22.3	13.8	4.2	73.8	-	-
S53	0.2-0.3m	03/05/2022	9.7	0.14	11	17.8	11.3	3.2	67.5	-	-
S54	0.0-0.1m	03/05/2022	5.9	0.16	5.1	13.5	14.6	2.6	68.0	-	-
S54	0.4-0.5m	03/05/2022	3.0	0.095	4.2	9.20	10.3	2.0	48.3	-	-
S55	0.0-0.1m	03/05/2022	7.6	0.16	9.2	16.2	11.6	3.7	168	0.030	-
S55	0.2-0.3m	03/05/2022	6.1	0.20	4.7	12.3	18.7	2.2	134	0.030	-
S56	0.0-0.1m	03/05/2022	4.0	0.097	20.8	16.7	5.32	34.6	39.1	0.030	-
S56	0.3-0.4m	03/05/2022	6.3	0.17	12	16.7	6.98	12.7	58.6	0.030	-
S57	0.0-0.1m	03/05/2022	7.4	0.14	42.0	69.0	12.6	19.6	664	0.030	-
S58	0.0-0.1m	03/05/2022	17.2	0.091	28.4	12.5	10.0	1.6	31.0	-	-
S59	0.0-0.1m	03/05/2022	4.8	0.10	4.7	7.55	13.8	2.4	41.2	-	-
S59	0.4-0.5m	03/05/2022	8.7	0.13	7.5	11.8	12.5	2.9	69.3	-	-
S60	0.0-0.1m	03/05/2022	15.5	0.12	18.4	25.2	7.75	21.6	53.2	-	-
Comp 1 (S1 0.0-0.1m, S2 0.0-0.1m, S7 0.0-0.1m, S8 0.0-0.1m)			-	-	-	-	-	-	-	-	0.02
Comp 2 (S1 0.3-0.4m, S2 0.3-0.4m, S7 0.3-0.4m, S8 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 3 (S3 0.0-0.1m, S4 0.0-0.1m, S9 0.0-0.1m, S10 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
Comp 4 (S3 0.3-0.4m, S4 0.3-0.4m, S9 0.3-0.4m, S10 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 5 (S5 0.0-0.1m, S6 0.0-0.1m, S11 0.0-0.1m, S12 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 6 (S5 0.3-0.4m, S6 0.3-0.4m, S11 0.3-0.4m, S12 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 7 (S14 0.0-0.1m, S15 0.0-0.1m, S21 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 8 (S14 0.3-0.4m, S15 0.3-0.4m, S21 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 9 (S16 0.0-0.1m, S17 0.0-0.1m, S22 0.0-0.1m, S23 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 10 (S16 0.3-0.4m, S17 0.3-0.4m, S22 0.3-0.4m, S23 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 11 (S18 0.0-0.1m, S19 0.0-0.1m, S24 0.0-0.1m, S25 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 12 (S18 0.3-0.4m, S19 0.3-0.4m, S24 0.3-0.4m, S25 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 13 (S13 0.0-0.1m, S20 0.0-0.1m, S26 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 14 (S13 0.3-0.4m, S20 0.3-0.4m, S26 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 15 (S27 0.0-0.1m, S28 0.0-0.1m, S31 0.0-0.1m, S32 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
Comp 16 (S29 0.0-0.1m, S30 0.0-0.1m, S33 0.0-0.1m, S34 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 17 (S35 0.0-0.1m, S36 0.0-0.1m, S37 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 18 (S38 0.0-0.1m, S39 0.0-0.1m, S40 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 19 (S51 0.0-0.1m, S52 0.0-0.1m, S53 0.0-0.1m, S54 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 20 (S44 0.0-0.1m, S45 0.0-0.1m, S48 0.0-0.1m, S49 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 21 (S44 0.3-0.4m, S45 0.3-0.4m, S48 0.3-0.4m, S49 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 22 (S43 0.0-0.1m, S47 0.0-0.1m, S50 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 23 (S43 0.3-0.4m, S47 0.3-0.4m, S50 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Comp 24 (S41 0.0-0.1m, S42 0.0-0.1m, S46 0.0-0.1m)			-	-	-	-	-	-	-	-	<LOR
Comp 25 (S41 0.3-0.4m, S42 0.3-0.4m, S46 0.3-0.4m)			-	-	-	-	-	-	-	-	<LOR
Guideline Values	SCS (commercial/industrial) ²		70	1,300	6,300	>10,000	3,300	-	-	35	1,000
	NEPM ⁵		-	-	-	-	-	4,000	400,000	-	-
	EcoSGV ³		150	33	650	420	250	-	480	47	-

Sample ID	Depth	Date	Contaminant ¹								
			As	Cd	Cr	Cu	Pb	Ni	Zn	BaP TEQ (LOR)	Total DDT
	Sediment Quality Guidelines ⁵		20	1.5	80	65	50	21	200		
Soil Background	SEM ⁴		<2 - 14	<0.1 – 0.5	<2 - 11	3 - 26	2.9 – 37.7	<2 - 6	19 - 99	-	-

Table notes:

1 All concentrations listed are in mg/kg

2 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) 2012. Soil Contaminant Standard for residential land use

3 Landcare Research: Updated User Guide: Background soil concentrations and soil guideline values for the protection of ecological receptors (Eco SGVs) Consultation draft

4 SEM background Levels of Agrichemical Residues in Bay of Plenty Soils, SEM NZ Limited. Tauranga. 2005. Control Sites (range n = 25)

5 National Environmental Protection (Assessment of Site Contamination) Measures 1999. NEPM Schedule B health investigation levels – residential A

6 ANZECC & ARMCANZ (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Sediment quality guideline values.

LOR - Limit of reporting

Red bold text denotes concentrations above soil guideline value

Black bold text denotes concentrations above background range

Underlined text denotes concentrations above ecological guideline value

Italics text denotes concentrations above sediment quality guideline value

Table 9 Total Petroleum Hydrocarbon Results

Sample ID	Depth	Contaminant ¹			
		C7-C9	C10-C14	C15-C36	C7-C36 (Total)
S55	0.0-0.1m	<10	1,148	8,999	<u>10,147</u>
S55	0.2-0.3m	<10	89	4,064	<u>4,153</u>
S56	0.0-0.1m	<10	26	1,506	<u>1,532</u>
S56	0.3-0.4m	<10	<15	191	191
S57	0.0-0.1m	<10	<15	229	229
Guideline Values	Petroleum Guidelines (sand < 1 m) ²	120	1,500	NA	
	EcoSGV ³	170	140	1700	
	Sediment Quality Guidelines ⁴				280

Table notes:

1 All concentrations listed are in mg/kg

2 Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011). Commercial/industrial use for all pathways and protection of groundwater quality.

3 Landcare Research: Updated User Guide: Background soil concentrations and soil guideline values for the protection of ecological receptors (Eco SGVs) Consultation draft

4 ANZECC & ARMCANZ (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Sediment quality guideline values

NA indicates estimated criterion exceeds 20,000 mg/kg.

Black bold text denotes concentrations above ecological guideline value

Underlined text denotes concentrations above sediment quality guideline value

8.6. Quality Assurance and Quality Control

Analytica Laboratories is accredited by International Accreditation New Zealand (IANZ). Analyses were performed in accordance with the terms of accreditation.

Four blind field replicates were collected and analysed for heavy metals (samples S10 0.4-0.5 m, S21 0.4-0.5 m, S24 0.2-0.3 m and S44 0.4-0.5 m). The mean relative percent difference (RPD) of the metal duplicate analyses was between 0 and 28.9% and the results were within the acceptable limits ($< \pm 30$ -50% of the mean concentration of the analyte).

Analytica completed laboratory duplicates on S4 0.0-0.1 m, S12 0.0-0.1 m, S21 0.3-0.4 m, S32 0.0-0.1 m, S45 0.3-0.4 m and S54 0.4-0.5 m. The RPD of the metal duplicate analyses was between 0 and 12.7%. The results are determined to be within the acceptable limits.

9. Risk Assessment

One sample (S57 0.0-0.1 m) exceeded the ecological guideline value for zinc. The sample location is directly outside the three-bay shed and the contamination likely originates from the manufacturing and fabrication of trailers.

Sample S55 exceeded the ecological guideline values for TPH. The C10-C14 fraction at 0.0-0.1 m depth and the C15-C36 fraction at 0.0-0.1 m and 0.2-0.3 m depth concentrations were exceeded. Sample S55 was collected adjacent to the above ground diesel tank directly south of the three-bay shed.

As groundwater over much of the site is expected to be less than 4 m bgl, there are drainage canals and two ponds located on the site, and the site is located near the Hakao Stream and Wairoa River which flows to the Tauranga Harbour, the ANZECC sediment quality guideline values have been used for assessing the potential impact of soil disturbance and movement on the aquatic ecosystem.

Samples exceeded the ANZECC sediment quality guideline values as follows:

- Sample S57 0.0-0.1 m exceeded the sediment guideline values for copper and the upper sediment quality guideline value (GV-high) was exceeded for zinc. The sample location is directly outside the three-bay shed.
- Sample S44 0.3-0.4 m exceeded the sediment quality guideline value for copper. Sample S44 is located in the north west paddock close to Te Puna Station Road.
- Sample S56 0.0-0.1 m exceeded the sediment quality guideline value for nickel and total TPH. The sample location is adjacent to the above ground diesel tank within the landscaping yard in the centre of site.
- Sample S55 0.0-0.1 m and S55 0.2-0.3 m exceeded the sediment quality guideline value for total TPH. Sample S55 was collected adjacent to the above ground diesel tank directly south of the three bay shed.
- Sample S60 0.0-0.1 m exceeded the sediment quality guideline value for nickel. The sample location is within the landscaping yard and directly outside the area of two shipping containers connected by an overhead canopy.

9.1. Ecological Risk Assessment

The two locations that exceed the ecological guideline values (S55 0.0-0.1 m (TPH) and S57 0.0-0.1 m (zinc)) are within an area that has been previously raised and filled and is compacted with hardstanding metal.

It is expected that all infrastructure including the above ground diesel tank and shed will be removed for the proposed works.

Geotechnical recommendations at the time of preparing this report is to use fill to raise the proposed ground surface to the proposed level. Additionally, as the soils are compressible and organic, particularly in the lower-lying areas of the site, it will therefore be required to preload the fill areas prior to construction.

It is proposed that a thick layer of sand fill shall be placed on the surface with structural filling placed above the sand layer across the site to raise the ground surface to the required level.

The surface will then be 'over-filled' in order to form a preload embankment. The preload embankment will consist of the same material in order to enable savings in the earth moving by requiring trimming of the excess portion at the end of the preload period. The preload may need to be left in place for approximately 12 months.

Based on the above proposed works, it is likely that any disturbance works in close proximity to samples S55 and S57 will only impact the immediate area with no impact on any areas of ecological value. It is not expected that any soil will be removed from site or moved to another location within the site. Additionally, no topsoil is located within this area (hardstanding metal) and the location is proposed to be pre-loaded with fill with some fill remaining in place to raise the ground surface to the required level.

As it is likely that the areas that exceeded the ecological guideline values will be buried under structural fill material and that the site is proposed for industrial use, Pennan & Co determines that the risk to ecological receptors is negligible.

9.2. Aquatic Ecosystem Risk Assessment

The sediment guideline values (default guideline values) indicate the concentrations below which there is a low risk of unacceptable effects occurring. The upper guideline value (GV-high) is considered as more likely to be associated with biological effects.

The exceedance of the sediment guideline values is only considered a risk to the aquatic ecosystem if soil from the immediate area is to enter water. Given that the concentrations for sample S44 0.3-0.4 m, sample S56 0.0-0.1 m, sample S55 0.0-0.1 m, S55 0.2-0.3 m and sample S60 0.0-0.1 m were well below the upper guideline value, are less than two times the default guideline value (not identifying a hot spot), the surrounding soil is not considered a risk to the environment or human health and the site is proposed to be pre-loaded with fill with some fill remaining in place to raise the ground surface to the required level, Pennan & Co has concluded that there is a negligible risk to the aquatic ecosystem either on the site or offsite.

The exceedance of the sediment guideline values for zinc is only considered a risk to the aquatic ecosystem if soil from the immediate area was to enter water. The pathway is only complete if the soil enters the water through inadequate management of sediment and erosion controls. Sample

location S57 0.0-0.1 m is within an area that has been previously raised and filled and is compacted with hardstanding metal.

As described above in the ecological risk assessment, based on the above proposed works, it is likely that any disturbance works in close proximity to sample S57 will only impact the immediate area with no impact on any areas of ecological value. It is not expected that any soil will be removed from site or moved to another location within the site. Additionally, no topsoil is located within this area (hardstanding metal) and the location is proposed to be pre-loaded with fill with some fill remaining in place to raise the ground surface to the required level.

Additional analysis has been undertaken for sample S44 0.3-0.4 m as, at the time of preparing this report, this location is an area which will be disturbed to create new bunds and drains for the structure plan. Statistical analysis was undertaken on samples 41 to 45 which are within the same row (east to west) as the exceedance using ProUCL software to calculate the 95% upper confidence limit (UCL). The 95% UCL for copper at this location was calculated at 51.06 mg/kg which is below the sediment quality guideline value of 65 mg/kg. If this area is disturbed and generally combined through the creation of the bund and drainage canals, there is no environmental risk to either soil or water. A copy of the Pro UCL calculation is included in Appendix D.

9.3. Final Conceptual Site Model

Based on the DSI results and risk assessment, no complete linkages for contaminants from source-pathway-receptor are likely to occur.

Table 10 Final Conceptual Site Model

Source	Receptor	Pathway	Pathway Complete?
Agrichemical and metal contaminants from pesticide use on the identified orchard. HAIL category A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds)	Construction workers	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	

Source	Receptor	Pathway	Pathway Complete?
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
	Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
<p>Imported fill of unknown origin. The site accepted cleanfill to raise the level of the site, however, it is not known if the material accepted was in general accordance with the MfE cleanfill guidelines.</p> <p>HAIL category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.</p>	Construction workers	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
	Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
<p>Presence of above ground fuel storage tanks.</p> <p>HAIL category A17: Storage tanks or drums for fuel, chemicals or liquid waste.</p>	Construction workers	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	

Source	Receptor	Pathway	Pathway Complete?	
		Inhalation of dust/vapours	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	
	Current site users	Dermal contact		
		Ingestion		
		Inhalation of dust/vapours		
	General public	Dermal contact		
		Ingestion		
		Inhalation of dust/vapours		
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.		Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
	Groundwater	Leaching and migration of soil contaminants into groundwater.		Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
	Welding and metal fabrication workshop on site for trailer manufacturing. HAIL category D5: Engineering workshops with metal fabrication.	Construction workers		Dermal contact
Ingestion				
Inhalation of dust/vapours				
Future site users		Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	
		Ingestion		
		Inhalation of dust/vapours		
Current site users		Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	
		Ingestion		
		Inhalation of dust/vapours		
General public		Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	
		Ingestion		
		Inhalation of dust/vapours		
Surface water		Sediment and runoff directly into surface water discharging	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	

Source	Receptor	Pathway	Pathway Complete?
		into nearby watercourses.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
	Groundwater	Leaching and migration of soil contaminants into groundwater.	
Stockpiles of timber including treated timber. HAIL category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	Construction workers	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Future site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	Current site users	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
	General public	Dermal contact	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.
		Ingestion	
		Inhalation of dust/vapours	
Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	
Groundwater	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – Contaminant concentrations do not pose a risk to human health.	

9.4. Risk Evaluation

Pursuant to regulation 9(1)(b) and regulation 9(3)(b), it is demonstrated that soil contamination does not exceed soil guideline values for commercial/industrial land use as outlined in regulation 7.

Pennan and Co considers that there is no risk to human health and the environment because of the proposed industrial development on the site.

9.5. Planning Implications

The findings of this DSI show that concentrations of contaminants in soil exceeded the predicted background concentrations for the Bay of Plenty but were well below the applicable guideline values for commercial/industrial land use.

Regulation 8(4) of the NES:CS allows land-use change or subdivision of a piece of land where it can be demonstrated it is highly unlikely that there will be a risk to human health given the intended activity. However, it is anticipated that soil disturbance will occur as part of the land-use change and will exceed the permitted disturbance volumes of 25 m³ per 500 m².

Due to contaminant concentrations exceeding regional background concentrations at selected locations and the exceedance of permitted soil disturbance volumes, a controlled activity consent application is required under Regulation 9 of the NES:CS for soil disturbance, the proposed subdivision and change in land use.

Under Regulation 9 of the NES:CS, as the activity includes disturbing soil, the consent authority will likely require information on how the activity will be managed, monitored and reported, which may include the requirement for a site management plan to be in place for the duration of the works.

Based on the findings of the DSI, a consent will not be required for the disturbance of contaminated land under DW R25 of the Bay of Plenty Regional Council Natural Resources Plan.

10. Conclusions

An initial desktop investigation undertaken as part of this DSI indicted evidence of several activities having taken place on the site that could be classified under the National Environmental Standards for Contaminants in Soil to Protect Human Health (NESCS) regulations:

- Category A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds, having identified that from 1970-1990s the property was formerly used as an orchard.
- Category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, relating to the placement of fill material to raise the ground level of the property under resource consent No. 62951.
- Category A17: Storage tanks or drums for fuel, chemicals or liquid waste, based on the presence of above ground fuel storage tanks in the yard areas of the site.
- Category D5: Engineering workshops with metal fabrication, based on the presence of a welding and metal fabrication workshop manufacturing trailers, currently on site.
- Category I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, relating stockpiles of timber including treated timber.

Field investigations indicated that:

- Heavy metals were not detected above the soil guideline values for commercial/industrial land use for any of the samples collected.
- One sample exceeded the ecological guideline value for nickel.

- Two samples exceeded the sediment quality guideline values for copper, two samples exceeded the sediment quality guideline values for nickel and one sample exceeded the sediment quality guideline value for zinc.
- One sample at two depths exceeded the ecological guideline values for total petroleum hydrocarbons.
- Two samples exceeded the sediment quality guideline values for total petroleum hydrocarbons.
- Selected samples exceeded the predicted background concentrations for the Bay of Plenty for arsenic, cadmium, chromium, copper, nickel, and zinc.
- Trace concentrations of 4,4' DDT, 4,4' DDE, and Total DDT (0.02 mg/kg) were recorded in one composite sample. The amounts detected were well below the assessment criteria for industrial land.
- No other organochlorine pesticides (OCPs) were detected above the laboratory limit of reporting.
- Total Petroleum Hydrocarbons (TPH) were detected in all the sample locations targeted.
- TPH results did not exceed the guideline values for commercial/industrial land use for all pathways.
- Benzo[a]pyrene toxic equivalency (TEQ) was detected at 0.03 mg/kg (the limit of reporting) for all samples tested.
- No samples exceeded the guideline values for commercial/industrial land use.

Pennan & Co has demonstrated that soil contamination does not exceed the soil guideline values for commercial/industrial land use. Additionally, Pennan & Co has concluded that there is a negligible risk to ecological receptors and the aquatic ecosystem either on the site or offsite. Therefore, Pennan & Co concludes that the land does not pose a risk to human health and the environment, and the site is suitable for the proposed industrial development.

11. Limitations

This report has been prepared for Momentum Planning and Design Limited by Pennan & Co in accordance with the purpose and scope set out above, and the usual care and thoroughness of the consulting profession. Any use of any part of this report by any other party, or in any other context, is the responsibility of the user.

- Information from cited sources has not been independently verified unless specifically stated, and Pennan & Co assumes no responsibility for any inaccuracy or omission therein.
- The locations of apparent current and historical HAIL activities are used to target soil sampling locations. Unreported activities may have occurred on other areas of the site, and the condition of soils in such areas is unknown.
- Systematic grid soil sampling does not ensure that localised hotspots do not exist between sample locations.

This document does not purport to give legal or financial advice.

12. Certifying Statement

National Environmental Standard for assessing and managing contaminants in soil to protect human health - DETAILED SITE INVESTIGATION CERTIFYING STATEMENT

I Emma Joss of Pennan & Co Limited certify that:

- 1) this detailed site investigation meets the requirements of the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (the NESCS) because it has been:
 - a) done by a suitably qualified and experienced practitioner, and
 - b) done in accordance with the current edition of *Contaminated land management guidelines No 5 – Site investigation and analysis of soils*, and
 - c) reported on in accordance with the current edition of *Contaminated land management guidelines No 1 – Reporting on contaminated sites in New Zealand*, and
 - d) the report is certified by a suitably qualified and experienced practitioner.

- 2) This detailed site investigation concludes that:
 - a) For activities under R9 of the NESCS, the DSI does not exceed the applicable standard in Regulation 7 of the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations*

Evidence of the qualifications and experience of the suitably qualified and experienced practitioner(s) who have done this investigation and have certified this report is detailed on page 2 of the detailed site investigation report.

Signed and dated:.....13 March 2023

13. References

GNS Science (GNS) 2010: Geology of the Rotorua area: scale 1:250,000. 1:250,000 geological map 5. Leonard, G.S., Begg, J.G, Wilson, C.J.N (compilers). Institute of Geological and Nuclear Sciences Limited. Lower Hutt.

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Landcare Research S-Map Online (2021): <https://smap.landcareresearch.co.nz/>

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Ministry for the Environment (MfE) 1997: User's Guide to the Guidelines for Assessing and Managing Contaminated Gasworks Sites in New Zealand.

MfE 1999: Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand

MfE 2006: Identifying, investigating and Managing Risks Associated with Former Sheep-dip Sites

MfE 2011a: Hazardous activities and industries list (HAIL). Revised edition. Ministry for the Environment. Wellington.

MfE 2011b: Methodology for deriving standards for contaminants in soil to protect human health. Ministry for the Environment. Wellington.

MfE 2021a: Contaminated land management guideline No. 1: Reporting on contaminated sites in New Zealand. Revised edition. Ministry for the Environment. Wellington.

MfE 2021b: Contaminated land management guideline No. 5: Site investigation and analysis of soils. Revised edition. Ministry for the Environment. Wellington.

NES:CS 2011: Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations.

National Environment Protection Council (NEPC) 2013: National Environmental Protection (Assessment of Site Contamination) Measures 2013.

Retrolens Aerial images Sourced from <http://retrolens.nz> and licensed by LINZ CC-BY 3.0

Appendix A

Scheme Plan



Appendix B

Historical Aerial Photographs

1943



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1943 (cropped)





1953 (cropped)



1959

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1959 (cropped)



1963

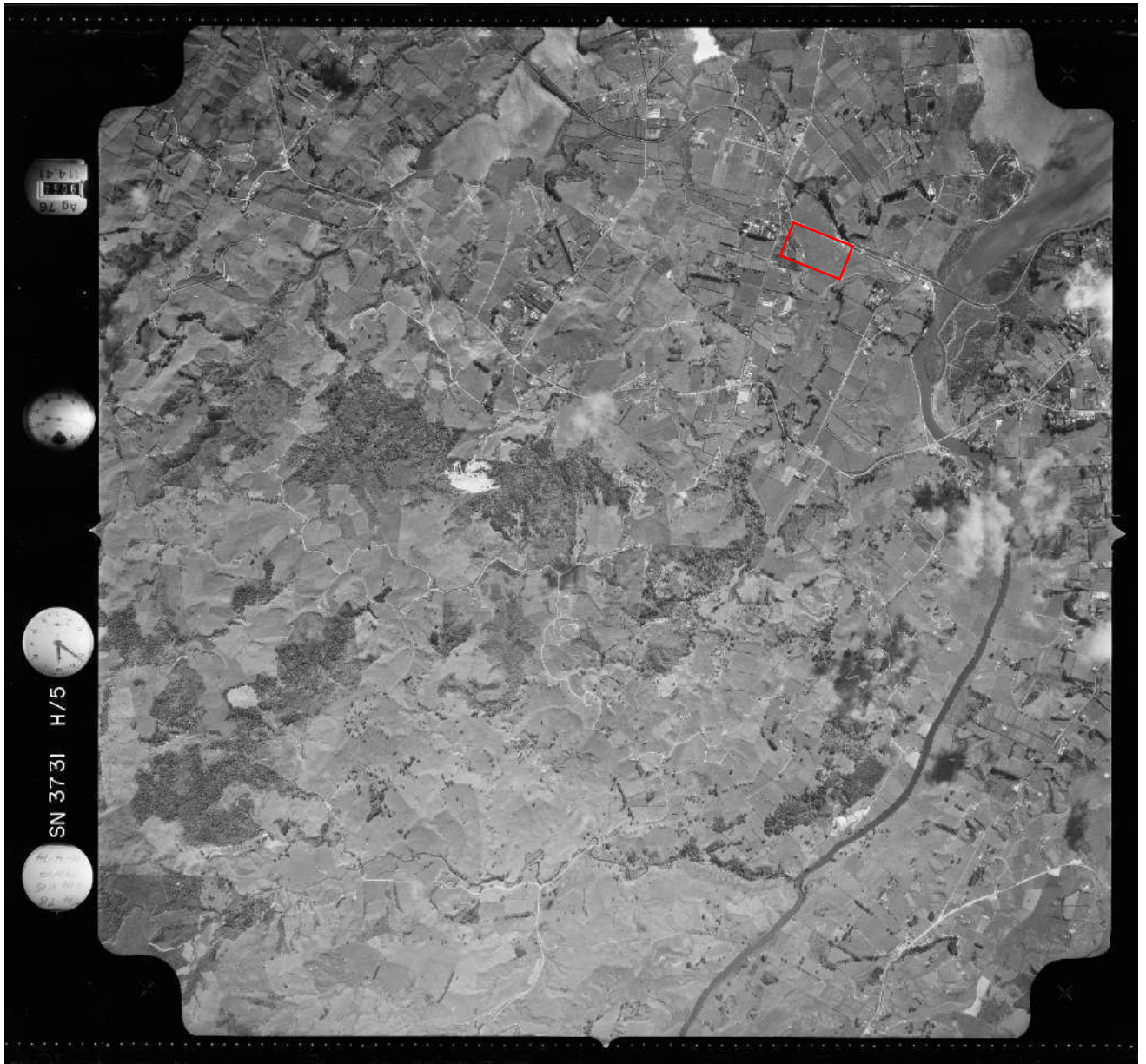


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1963 (cropped)



1974



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1974 (cropped)









1986 (cropped)



1986 (cropped further)



1992

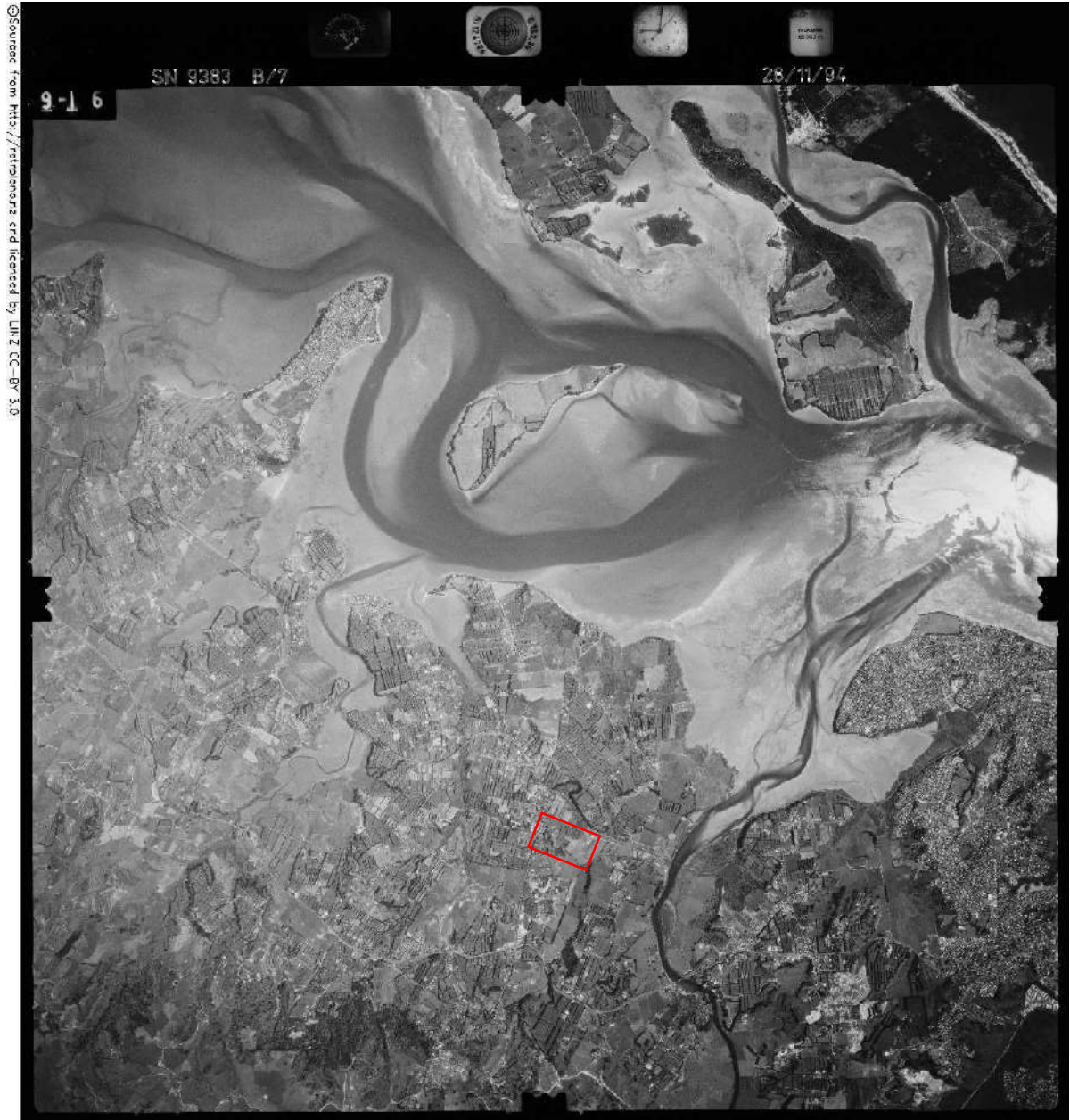


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1992 (cropped)



1994



1994 (cropped)





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Date: 28/03/2022
Printed By: MAPI
A4 Scale 1: 6,288
0 314 Meters



2002





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A4 Scale 1: 6,288
0 314 Meters



2006





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0 314 Meters



2010-2012





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2014-2015





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0 314 Meters



2019





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Date: 31/03/2022
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A4 Scale 1:6,288
0 314 Meters




2021



Appendix C

Laboratory Documentation

CLIENT INFORMATION				Lab ID (Lab use only)	22-16868		
Client	Pennan & Co Limited			Registered By (Lab use only)		Date Registered (Lab use only)	
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112						Extra Comments Section:  22-16868
Project Leader	Emma Joss						
Project ID		PO Number					
Site	297 Te Puna Station Rd						
Sampler	Emma Joss						
Phone	0274845555						
Email	emma.joss@pennan.co.nz						
Invoice Email	emma.joss@pennan.co.nz						
CLIENT REQUESTS (Please Tick)							
Routine	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	ESDAT	<input type="checkbox"/>	QC Report	

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED										
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)	
					ICP_S_HM7	OCP_S	TPH_S + PAH_S	SOIL_COMP		
1	S1	0.0-0.1m	29/04/2022	S	x					
2	S1	0.3-0.4m	29/04/2022	S	x					
3	S1	0.9-1.0m	29/04/2022	S	x					
4	S2	0.0-0.1m	29/04/2022	S	x					
5	S2	0.3-0.4m	29/04/2022	S	x					
6	S3	0.0-0.1m	29/04/2022	S	x					
7	S3	0.3-0.4m	29/04/2022	S	x					
8	S4	0.0-0.1m	29/04/2022	S	x					
9	S4	0.3-0.4m	29/04/2022	S	x					
10	S4	1.0-1.1m	29/04/2022	S	x					
11	S5	0.0-0.1m	3/05/2022	S	x					
12	S5	0.3-0.4m	3/05/2022	S	x					
13	S6	0.0-0.1m	3/05/2022	S	x					
14	S6	0.3-0.4m	3/05/2022	S	x					X 2 SAMPLES DID NOT RECEIVE
15	S7	0.0-0.1m	29/04/2022	S	x					
16	S7	0.3-0.4m	29/04/2022	S	x					EMMA CONFIRMED
17	S8	0.0-0.1m	29/04/2022	S	x					MAKE A DUPLICATE
18	S8	0.3-0.4m	29/04/2022	S	x					DEPTH 0.3-0.4m
19	S8	1.0-1.1m	29/04/2022	S	x					SINCE THEY ARE FROM
20	S9	0.0-0.1m	29/04/2022	S	x					THE SAME SUBSTRATE FH
Sender Name	Emma Joss	Date Sent	04/05/22	Time sent	11:00	Courier company		Courier #	JDA00009220 9/5/22	
Received by Staff Member	Tanya	Date Received	5/5/22	Time Received	8	Seal Status	<input checked="" type="checkbox"/>	Sample Temp		

CLIENT INFORMATION					Lab ID (Lab use only)
Client	Pennan & Co Limited				Registered By (Lab use only)
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112				Date Registered (Lab use only)
Project Leader	Emma Joss				<i>Extra Comments Section:</i>
Project ID		PO Number			
Site	297 Te Puna Station Rd				
Sampler	Emma Joss				
Phone	0274845555				
Email	emma.joss@pennan.co.nz				
Invoice Email	emma.joss@pennan.co.nz				
CLIENT REQUESTS (Please Tick)					
Routine	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	ESDAT	<input type="checkbox"/>
				QC Report	<input type="checkbox"/>

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED									
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)
					ICP_S_HM7	OCP_S	TPH_S + PAH_S	SOIL_COMP	
1 S9	0.3-0.4m	29/04/2022		S	X				
2 S10	0.0-0.1m	29/04/2022		S	X				
3 S10	0.3-0.4m	29/04/2022		S	X				
4 S10	0.4-0.5m	29/04/2022		S	X				
5 S11	0.0-0.1m	3/05/2022		S	X				
6 S11	0.3-0.4m	3/05/2022		S	X				
7 S11	1.0-1.1m	3/05/2022		S	X				
8 S12	0.0-0.1m	3/05/2022		S	X				
9 S12	0.3-0.4m	3/05/2022		S	X				
10 S13	0.0-0.1m	3/05/2022		S	X				
11 S13	0.3-0.4m	3/05/2022		S	X				
12 S14	0.0-0.1m	29/04/2022		S	X				
13 S14	0.3-0.4m	29/04/2022		S	X				
14 S15	0.0-0.1m	29/04/2022		S	X				
15 S15	0.3-0.4m	29/04/2022		S	X				
16 S16	0.0-0.1m	29/04/2022		S	X				
17 S16	0.3-0.4m	29/04/2022		S	X				
18 S16	1.0-1.1m	29/04/2022		S	X				
19 S17	0.0-0.1m	29/04/2022		S	X				
20 S17	0.3-0.4m	29/04/2022		S	X				

Sender Name	Emma Joss	Date Sent	4/05/2022	Time sent	11:00	Courier company		Courier #	
Received by Staff Member		Date Received		Time Received		Seal Status		Sample Temp	

CLIENT INFORMATION				Lab ID (Lab use only)					
Client	Pennan & Co Limited			Registered By (Lab use only)		Date Registered (Lab use only)			
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112			Extra Comments Section:					
Project Leader	Emma Joss								
Project ID		PO Number							
Site	297 Te Puna Station Rd								
Sampler	Emma Joss								
Phone	0274845555								
Email	emma.joss@pennan.co.nz								
Invoice Email	emma.joss@pennan.co.nz								
CLIENT REQUESTS (Please Tick)									
Routine	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>				ESDAT	<input type="checkbox"/>	QC Report

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED										
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)	
					ICP_S_HM7	OCP_S	TPH_S + PAH_S	SOIL_COMP		
60 1	S26	0.3-0.4m	3/05/2022	S	X					
62 2	S26	1.0-1.1m	3/05/2022	S	X					
62 3	S27	0.0-0.1m	3/05/2022	S	X					
64 4	S28	0.0-0.1m	3/05/2022	S	X					
64 5	S29	0.0-0.1m	3/05/2022	S	X					
66 6	S30	0.0-0.1m	3/05/2022	S	X					
68 7	S31	0.0-0.1m	3/05/2022	S	X					→ DID NOT RECEIVE
68 8	S32	0.0-0.1m	3/05/2022	S	X					
68 9	S33	0.0-0.1m	3/05/2022	S	X					
70 10	S34	0.0-0.1m	3/05/2022	S	X					
70 11	S35	0.0-0.1m	3/05/2022	S	X					
72 12	S36	0.0-0.1m	3/05/2022	S	X					
72 13	S37	0.0-0.1m	3/05/2022	S	X					
74 14	S38	0.0-0.1m	3/05/2022	S	X					
74 15	S39	0.0-0.1m	3/05/2022	S	X					
76 16	S40	0.0-0.1m	3/05/2022	S	X					
76 17	S41	0.0-0.1m	3/05/2022	S	X					
78 18	S41	0.3-0.4m	3/05/2022	S	X					
78 19	S42	0.0-0.1m	3/05/2022	S	X					
80 20	S42	0.3-0.4m	3/05/2022	S	X					
Sender Name	Emma Joss	Date Sent	4/05/2022	Time sent	11:00	Courier company		Courier #		
Received by Staff Member		Date Received		Time Received		Seal Status		Sample Temp		

CLIENT INFORMATION				Lab ID (Lab use only)		
Client	Pennan & Co Limited			Registered By (Lab use only)		Date Registered (Lab use only)
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112			Extra Comments Section:		
Project Leader	Emma Joss					
Project ID		PO Number				
Site	297 Te Puna Station Rd					
Sampler	Emma Joss					
Phone	0274845555					
Email	emma.joss@pennan.co.nz					
Invoice Email	emma.joss@pennan.co.nz					
CLIENT REQUESTS (Please Tick)						
Routine	<input checked="" type="checkbox"/>	Urgent	<input type="checkbox"/>	ESDAT	<input type="checkbox"/>	QC Report

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED										
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)	
					ICP_S_HM7	OCP_S	TPH_S + PAH_S	SOIL_COMP		
1	S42	1.0-1.1m	3/05/2022	S	X					
2	S43	0.0-0.1m	29/04/2022	S	X					
3	S43	0.3-0.4m	29/04/2022	S	X					
4	S44	0.0-0.1m	29/04/2022	S	X					
5	S44	0.3-0.4m	29/04/2022	S	X					
6	S44	0.4-0.5m	29/04/2022	S	X					
7	S45	0.0-0.1m	29/04/2022	S	X					
8	S45	0.3-0.4m	29/04/2022	S	X					
9	S46	0.0-0.1m	3/05/2022	S	X					
10	S46	0.3-0.4m	3/05/2022	S	X					
11	S46	1.0-1.1m	3/05/2022	S	X					
12	S47	0.0-0.1m	29/04/2022	S	X					
13	S47	0.3-0.4m	29/04/2022	S	X					
14	S48	0.0-0.1m	29/04/2022	S	X					
15	S48	0.3-0.4m	29/04/2022	S	X					
16	S48	1.0-1.1m	29/04/2022	S	X					
17	S49	0.0-0.1m	29/04/2022	S	X					
18	S49	0.3-0.4m	29/04/2022	S	X					
19	S50	0.0-0.1m	3/05/2022	S	X					
20	S50	0.3-0.4m	3/05/2022	S	X					
Sender Name	Emma Joss	Date Sent	4/05/2022	Time sent	11:00	Courier company		Courier #		
Received by Staff Member		Date Received		Time Received		Seal Status		Sample Temp		

CLIENT INFORMATION				Lab ID (Lab use only)					
Client	Pennan & Co Limited			Registered By (Lab use only)		Date Registered (Lab use only)			
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112			Extra Comments Section:					
Project Leader	Emma Joss								
Project ID		PO Number							
Site	297 Te Puna Station Rd								
Sampler	Emma Joss								
Phone	0274845555								
Email	emma.joss@pennan.co.nz								
Invoice Email	emma.joss@pennan.co.nz								
CLIENT REQUESTS (Please Tick)									
Routine		Urgent					ESDAT		QC Report

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED										
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)	
					ICP_S_HM7	OCP_S	TPH_S + PAH_S	SOIL_COMP		
1	S51	0.0-0.1m	3/05/2022	S	x					
2	S51	0.4-0.5m	3/05/2022	S	x					
3	S52	0.0-0.1m	3/05/2022	S	x					
4	S52	0.4-0.5m	3/05/2022	S	x					
5	S53	0.0-0.1m	3/05/2022	S	x					
6	S53	0.2-0.3m	3/05/2022	S	x					
7	S54	0.0-0.1m	3/05/2022	S	x					
8	S54	0.4-0.5m	3/05/2022	S	x					
9	S55	0.0-0.1m	3/05/2022	S	x		x			
10	S55	0.2-0.3m	3/05/2022	S	x		x			
11	S56	0.0-0.1m	3/05/2022	S	x		x			
12	S56	0.3-0.4m	3/05/2022	S	x		x			
13	S57	0.0-0.1m	3/05/2022	S	x		x			
14	S58	0.0-0.1m	3/05/2022	S	x					
15	S59	0.0-0.1m	3/05/2022	S	x					
16	S59	0.4-0.5m	3/05/2022	S	x					
17	S60	0.0-0.1m	3/05/2022	S	x					
18	Comp (S1, S2, S7, S8)	0.0-0.1m	29/04/2022	S		x		x		
19	Comp (S1, S2, S7, S8)	0.3-0.4m	29/04/2022	S		x		x		
20	Comp (S3, S4, S9, S10)	0.0-0.1m	29/04/2022	S		x		x		
Sender Name	Emma Joss	Date Sent	4/05/2022	Time sent	11:00	Courier company		Courier #		
Received by Staff Member		Date Received		Time Received		Seal Status		Sample Temp		

6 of 8

CLIENT INFORMATION				Lab ID (Lab use only)
Client	Pennan & Co Limited			Registered By (Lab use only)
Client Address	96 Freeburn Rd, Pyes Pa, Tauranga 3112			Date Registered (Lab use only)
Project Leader	Emma Joss			Extra Comments Section:
Project ID		PO Number		
Site	297 Te Puna Station Rd			
Sampler	Emma Joss			
Phone	0274845555			
Email	emma.joss@pennan.co.nz			
Invoice Email	emma.joss@pennan.co.nz			
CLIENT REQUESTS (Please Tick)				
Routine	<input type="checkbox"/>	Urgent	<input type="checkbox"/>	ESDAT
	<input type="checkbox"/>		<input type="checkbox"/>	QC Report

MATRIX KEY (Customers: Please ensure all samples have the correct matrix assigned)			
S (Solids)	CW (Clean Water)	SW (Saline Water)	WW (Waste Water)
All soils, sediment, sludge	Surface, Ground, Bore, Fresh	Sea Water, Geothermal	Effluent, Trade Waste, Leachate

TESTS REQUESTED									
Sample ID	Depth	Sampling Date	Time	Matrix (Please Circle)	Analysis Requests/Suites [Enter Test Code Below]				Sample Comments (ie: extra test requests, high odour, bulk material)
					ICP_S_HM 7	OCP_S	TPH_S + PAH_S	SOIL_COMP	
1	Comp (S41, S42, S46)	0.0-0.1m	3/05/2022	S		X		X	
2	Comp (S41, S42, S46)	0.3-0.4m	3/05/2022	S		X		X	
3				S					
4				S					
5				S					
6				S					
7				S					
8				S					
9				S					
10				S					
11				S					
12				S					
13				S					
14				S					
15				S					
16				S					
17				S					
18				S					
19				S					
20				S					

Sender Name	Emma Joss	Date Sent	4/05/2022	Time sent	11:00	Courier company		Courier #	
Received by Staff Member		Date Received		Time Received		Seal Status		Sample Temp	



Certificate of Analysis

Pennan & Co Limited
 96 Freeburn Rd
 Tauranga 3112

Attention: Emma Joss
 Phone: 0274845555
 Email: emma.joss@pennan.co.nz

Lab Reference: 22-16868
 Submitted by: Emma Joss
 Date Received: 05/05/2022
 Testing Initiated: 6/05/2022
 Date Completed: 13/05/2022
 Order Number:
 Reference:

Sampling Site: 297 Te Puna Station Rd

Report Comments

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

Heavy Metals in Soil

Client Sample ID			S1 0.0-0.1m	S1 0.3-0.4m	S1 0.9-1.0m	S2 0.0-0.1m	S2 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-1	22-16868-2	22-16868-3	22-16868-4	22-16868-5
Arsenic	mg/kg dry wt	0.125	6.1	5.4	5.7	7.4	9.2
Cadmium	mg/kg dry wt	0.005	0.25	0.31	0.021	0.35	0.43
Chromium	mg/kg dry wt	0.125	5.7	6.0	6.0	5.9	7.4
Copper	mg/kg dry wt	0.075	25.5	26.4	2.4	23.1	27.3
Lead	mg/kg dry wt	0.25	13.9	11.5	7.36	10.6	13.2
Nickel	mg/kg dry wt	0.05	2.8	2.5	1.0	2.6	3.3
Zinc	mg/kg dry wt	0.05	61.0	64.2	9.72	62.6	72.1

Heavy Metals in Soil

Client Sample ID			S3 0.0-0.1m	S3 0.3-0.4m	S4 0.0-0.1m	S4 0.3-0.4m	S4 1.0-1.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-6	22-16868-7	22-16868-8	22-16868-9	22-16868-10
Arsenic	mg/kg dry wt	0.125	7.1	8.6	7.9	6.3	5.4
Cadmium	mg/kg dry wt	0.005	0.18	0.26	0.43	0.20	0.11
Chromium	mg/kg dry wt	0.125	5.8	7.6	7.5	9.0	6.6
Copper	mg/kg dry wt	0.075	17.7	24.0	30.3	28.5	10.3
Lead	mg/kg dry wt	0.25	16.0	16.7	9.79	12.6	19.3
Nickel	mg/kg dry wt	0.05	2.9	3.0	3.5	3.2	3.3
Zinc	mg/kg dry wt	0.05	79.2	81.7	75.1	55.7	62.3

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited. This test report shall not be reproduced except in full, without the written permission of Analytica Laboratories.

Heavy Metals in Soil

Client Sample ID			S5 0.0-0.1m	S5 0.3-0.4m	S6 0.0-0.1m	S6 0.3-0.4m	S7 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-11	22-16868-12	22-16868-13	22-16868-14	22-16868-15
Arsenic	mg/kg dry wt	0.125	6.5	4.8	6.8	5.0	5.8
Cadmium	mg/kg dry wt	0.005	0.559	0.059	0.35	0.14	0.27
Chromium	mg/kg dry wt	0.125	6.6	7.0	4.1	6.7	4.5
Copper	mg/kg dry wt	0.075	24.4	9.79	6.4	11.1	38.6
Lead	mg/kg dry wt	0.25	9.65	11.5	7.55	11.8	13.8
Nickel	mg/kg dry wt	0.05	2.7	3.2	2.7	2.5	2.0
Zinc	mg/kg dry wt	0.05	65.4	40.3	23.3	41.5	68.5

Heavy Metals in Soil

Client Sample ID			S7 0.3-0.4m	S8 0.0-0.1m	S8 0.3-0.4m	S8 1.0-1.1m	S9 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-16	22-16868-17	22-16868-18	22-16868-19	22-16868-20
Arsenic	mg/kg dry wt	0.125	7.3	8.5	4.3	4.4	4.2
Cadmium	mg/kg dry wt	0.005	0.46	0.33	0.048	0.054	0.10
Chromium	mg/kg dry wt	0.125	6.6	5.4	7.6	8.8	7.7
Copper	mg/kg dry wt	0.075	28.7	60.1	10.0	13.6	15.0
Lead	mg/kg dry wt	0.25	10.6	19.6	23.3	28.3	14.3
Nickel	mg/kg dry wt	0.05	3.6	2.2	2.9	3.3	3.4
Zinc	mg/kg dry wt	0.05	88.7	93.7	28.1	33.4	50.3

Heavy Metals in Soil

Client Sample ID			S9 0.3-0.4m	S10 0.0-0.1m	S10 0.3-0.4m	S10 0.4-0.5m	S11 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-21	22-16868-22	22-16868-23	22-16868-24	22-16868-25
Arsenic	mg/kg dry wt	0.125	5.3	5.6	5.8	5.5	6.7
Cadmium	mg/kg dry wt	0.005	0.076	0.18	0.15	0.14	0.42
Chromium	mg/kg dry wt	0.125	9.2	5.9	6.2	7.4	7.2
Copper	mg/kg dry wt	0.075	15.9	16.4	13.0	12.0	25.2
Lead	mg/kg dry wt	0.25	18.3	11.7	13.7	14.0	14.8
Nickel	mg/kg dry wt	0.05	4.2	2.7	2.9	3.4	3.3
Zinc	mg/kg dry wt	0.05	45.4	53.4	51.2	47.8	62.2

Heavy Metals in Soil

Client Sample ID			S11 0.3-0.4m	S11 1.0-1.1m	S12 0.0-0.1m	S12 0.3-0.4m	S13 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-26	22-16868-27	22-16868-28	22-16868-29	22-16868-30
Arsenic	mg/kg dry wt	0.125	4.4	4.7	4.2	2.6	7.5
Cadmium	mg/kg dry wt	0.005	0.069	0.062	0.14	0.040	0.30
Chromium	mg/kg dry wt	0.125	9.0	2.6	5.4	7.4	4.6
Copper	mg/kg dry wt	0.075	11.8	6.7	6.4	1.7	20.1
Lead	mg/kg dry wt	0.25	36.3	9.80	7.42	8.84	36.8
Nickel	mg/kg dry wt	0.05	3.1	2.7	2.2	1.6	2.4
Zinc	mg/kg dry wt	0.05	30.4	41.1	14.0	15.7	95.4

Heavy Metals in Soil

Client Sample ID			S13 0.3-0.4m	S14 0.0-0.1m	S14 0.3-0.4m	S15 0.0-0.1m	S15 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-31	22-16868-32	22-16868-33	22-16868-34	22-16868-35
Arsenic	mg/kg dry wt	0.125	3.6	8.1	6.3	6.4	6.9
Cadmium	mg/kg dry wt	0.005	0.10	0.21	0.14	0.38	0.21
Chromium	mg/kg dry wt	0.125	3.5	12	5.8	4.4	7.8
Copper	mg/kg dry wt	0.075	4.2	28.1	9.80	20.3	18.5
Lead	mg/kg dry wt	0.25	7.78	26.3	12.3	15.7	16.0
Nickel	mg/kg dry wt	0.05	1.5	5.73	2.9	2.0	3.2
Zinc	mg/kg dry wt	0.05	20.6	57.0	51.8	49.9	49.3

Heavy Metals in Soil

Client Sample ID			S16 0.0-0.1m	S16 0.3-0.4m	S16 1.0-1.1m	S17 0.0-0.1m	S17 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-36	22-16868-37	22-16868-38	22-16868-39	22-16868-40
Arsenic	mg/kg dry wt	0.125	7.4	6.0	5.7	6.4	6.2
Cadmium	mg/kg dry wt	0.005	0.25	0.14	0.13	0.20	0.18
Chromium	mg/kg dry wt	0.125	7.1	7.0	6.8	5.6	5.7
Copper	mg/kg dry wt	0.075	19.7	16.4	14.3	14.9	11.4
Lead	mg/kg dry wt	0.25	15.6	14.0	13.1	11.9	11.9
Nickel	mg/kg dry wt	0.05	3.7	4.0	3.5	3.0	2.9
Zinc	mg/kg dry wt	0.05	64.4	52.4	49.0	55.2	54.1

Heavy Metals in Soil

Client Sample ID			S18 0.0-0.1m	S18 0.3-0.4m	S19 0.0-0.1m	S19 0.3-0.4m	S20 0.0-0.1m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-41	22-16868-42	22-16868-43	22-16868-44	22-16868-45
Arsenic	mg/kg dry wt	0.125	8.3	4.7	5.0	2.9	4.3
Cadmium	mg/kg dry wt	0.005	0.45	0.085	0.068	0.043	0.23
Chromium	mg/kg dry wt	0.125	6.0	4.9	5.9	4.8	3.5
Copper	mg/kg dry wt	0.075	34.2	6.4	2.4	2.0	4.2
Lead	mg/kg dry wt	0.25	10.7	9.16	12.1	4.7	6.61
Nickel	mg/kg dry wt	0.05	3.7	2.3	2.0	1.0	2.3
Zinc	mg/kg dry wt	0.05	74.7	36.0	25.0	11.2	17.6

Heavy Metals in Soil

Client Sample ID			S20 0.3-0.4m	S21 0.0-0.1m	S21 0.3-0.4m	S21 0.4-0.5m	S22 0.0-0.1m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-46	22-16868-47	22-16868-48	22-16868-49	22-16868-50
Arsenic	mg/kg dry wt	0.125	1.5	7.5	5.1	4.9	7.0
Cadmium	mg/kg dry wt	0.005	0.054	0.31	0.11	0.12	0.19
Chromium	mg/kg dry wt	0.125	5.5	7.0	8.9	9.0	19.5
Copper	mg/kg dry wt	0.075	3.0	18.9	14.0	13.3	54.9
Lead	mg/kg dry wt	0.25	6.65	13.5	18.6	20.8	22.5
Nickel	mg/kg dry wt	0.05	1.5	3.1	4.4	4.5	11.4
Zinc	mg/kg dry wt	0.05	13.8	59.9	41.0	42.5	76.4

Heavy Metals in Soil

Client Sample ID			S22 0.3-0.4m	S23 0.0-0.1m	S23 0.3-0.4m	S23 1.0-1.1m	S24 0.0-0.1m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-51	22-16868-52	22-16868-53	22-16868-54	22-16868-55
Arsenic	mg/kg dry wt	0.125	4.2	6.1	3.2	3.7	6.6
Cadmium	mg/kg dry wt	0.005	0.19	0.17	0.21	0.074	0.19
Chromium	mg/kg dry wt	0.125	5.6	6.1	3.8	7.3	5.7
Copper	mg/kg dry wt	0.075	9.39	7.88	8.35	2.7	14.4
Lead	mg/kg dry wt	0.25	27.9	13.8	7.71	10.6	11.8
Nickel	mg/kg dry wt	0.05	2.5	3.0	1.8	2.2	3.0
Zinc	mg/kg dry wt	0.05	22.9	59.0	18.3	20.4	72.2

Heavy Metals in Soil

Client Sample ID			S24 0.2-0.3m	S24 0.3-0.4m	S25 0.0-0.1m	S25 0.3-0.4m	S26 0.0-0.1m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-56	22-16868-57	22-16868-58	22-16868-59	22-16868-60
Arsenic	mg/kg dry wt	0.125	6.1	2.9	3.9	1.4	3.6
Cadmium	mg/kg dry wt	0.005	0.18	0.16	0.20	0.026	0.30
Chromium	mg/kg dry wt	0.125	5.7	4.5	4.3	5.5	3.8
Copper	mg/kg dry wt	0.075	13.9	8.04	5.2	1.5	4.5
Lead	mg/kg dry wt	0.25	11.5	7.96	12.3	4.8	6.73
Nickel	mg/kg dry wt	0.05	3.0	2.0	2.2	1.4	2.5
Zinc	mg/kg dry wt	0.05	69.2	25.2	23.8	14.3	28.0

Heavy Metals in Soil

Client Sample ID			S26 0.3-0.4m	S26 1.0-1.1m	S27 0.0-0.1m	S28 0.0-0.1m	S29 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-61	22-16868-62	22-16868-63	22-16868-64	22-16868-65
Arsenic	mg/kg dry wt	0.125	2.0	1.9	3.8	2.9	3.8
Cadmium	mg/kg dry wt	0.005	0.045	0.040	0.17	0.20	0.18
Chromium	mg/kg dry wt	0.125	5.7	7.3	3.6	4.5	4.0
Copper	mg/kg dry wt	0.075	1.9	1.8	31.5	11.2	11.5
Lead	mg/kg dry wt	0.25	6.77	5.61	8.43	6.65	6.91
Nickel	mg/kg dry wt	0.05	1.9	2.2	2.1	2.0	2.0
Zinc	mg/kg dry wt	0.05	16.8	14.8	25.7	20.0	23.9

Heavy Metals in Soil

Client Sample ID			S30 0.0-0.1m	S31 0.0-0.1m	S32 0.0-0.1m	S33 0.0-0.1m	S34 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-66	22-16868-67	22-16868-68	22-16868-69	22-16868-70
Arsenic	mg/kg dry wt	0.125	4.7	4.0	3.4	5.3	5.2
Cadmium	mg/kg dry wt	0.005	0.20	0.17	0.21	0.18	0.14
Chromium	mg/kg dry wt	0.125	4.8	5.6	3.9	5.2	5.4
Copper	mg/kg dry wt	0.075	8.94	22.0	10.9	9.60	4.6
Lead	mg/kg dry wt	0.25	13.1	9.18	7.38	9.02	11.2
Nickel	mg/kg dry wt	0.05	2.3	2.7	1.9	2.3	2.2
Zinc	mg/kg dry wt	0.05	45.1	26.9	22.7	26.7	25.0

Heavy Metals in Soil

Client Sample ID			S35 0.0-0.1m	S36 0.0-0.1m	S37 0.0-0.1m	S38 0.0-0.1m	S39 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-71	22-16868-72	22-16868-73	22-16868-74	22-16868-75
Arsenic	mg/kg dry wt	0.125	4.8	2.8	4.2	7.3	3.0
Cadmium	mg/kg dry wt	0.005	0.26	0.087	0.20	0.26	0.076
Chromium	mg/kg dry wt	0.125	2.8	4.3	3.7	4.5	5.1
Copper	mg/kg dry wt	0.075	22.4	5.1	9.71	9.84	2.7
Lead	mg/kg dry wt	0.25	8.03	8.90	10.5	14.9	12.2
Nickel	mg/kg dry wt	0.05	2.0	2.3	1.9	2.4	1.6
Zinc	mg/kg dry wt	0.05	46.4	21.2	24.6	44.0	20.0

Heavy Metals in Soil

Client Sample ID			S40 0.0-0.1m	S41 0.0-0.1m	S41 0.3-0.4m	S42 0.0-0.1m	S42 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-76	22-16868-77	22-16868-78	22-16868-79	22-16868-80
Arsenic	mg/kg dry wt	0.125	5.2	4.4	4.1	5.9	2.3
Cadmium	mg/kg dry wt	0.005	0.30	0.18	0.28	0.082	0.061
Chromium	mg/kg dry wt	0.125	4.4	3.5	4.6	7.0	6.0
Copper	mg/kg dry wt	0.075	11.0	23.1	13.5	6.1	3.2
Lead	mg/kg dry wt	0.25	15.8	11.9	14.6	10.1	7.71
Nickel	mg/kg dry wt	0.05	2.1	1.3	1.8	1.7	1.6
Zinc	mg/kg dry wt	0.05	47.2	34.8	56.2	24.5	21.8

Heavy Metals in Soil

Client Sample ID			S42 1.0-1.1m	S43 0.0-0.1m	S43 0.3-0.4m	S44 0.0-0.1m	S44 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-81	22-16868-82	22-16868-83	22-16868-84	22-16868-85
Arsenic	mg/kg dry wt	0.125	5.4	3.6	3.2	6.3	4.1
Cadmium	mg/kg dry wt	0.005	0.31	0.15	0.12	0.30	0.28
Chromium	mg/kg dry wt	0.125	5.7	4.0	4.3	3.6	2.7
Copper	mg/kg dry wt	0.075	16.0	9.14	3.7	34.1	90.7
Lead	mg/kg dry wt	0.25	10.4	11.4	9.99	8.91	7.61
Nickel	mg/kg dry wt	0.05	2.8	1.5	1.4	1.7	1.4
Zinc	mg/kg dry wt	0.05	37.9	38.5	31.8	38.8	21.3

Heavy Metals in Soil

Client Sample ID			S44 0.4-0.5m	S45 0.0-0.1m	S45 0.3-0.4m	S46 0.0-0.1m	S46 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-86	22-16868-87	22-16868-88	22-16868-89	22-16868-90
Arsenic	mg/kg dry wt	0.125	4.0	5.6	12	4.5	2.8
Cadmium	mg/kg dry wt	0.005	0.23	0.13	0.23	0.22	0.18
Chromium	mg/kg dry wt	0.125	2.8	5.3	3.2	3.6	3.7
Copper	mg/kg dry wt	0.075	67.8	22.5	53.4	32.2	10.5
Lead	mg/kg dry wt	0.25	6.79	11.2	7.31	11.1	9.06
Nickel	mg/kg dry wt	0.05	1.5	2.7	3.1	1.6	1.7
Zinc	mg/kg dry wt	0.05	20.3	35.7	37.2	43.6	41.9

Heavy Metals in Soil

Client Sample ID			S46 1.0-1.1m	S47 0.0-0.1m	S47 0.3-0.4m	S48 0.0-0.1m	S48 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-91	22-16868-92	22-16868-93	22-16868-94	22-16868-95
Arsenic	mg/kg dry wt	0.125	1.5	8.5	3.9	7.1	2.4
Cadmium	mg/kg dry wt	0.005	0.070	0.506	0.079	0.16	0.061
Chromium	mg/kg dry wt	0.125	5.4	5.6	4.7	6.2	2.9
Copper	mg/kg dry wt	0.075	2.1	28.8	4.3	12.7	3.1
Lead	mg/kg dry wt	0.25	6.51	9.62	10.2	12.2	5.02
Nickel	mg/kg dry wt	0.05	1.4	3.8	2.2	2.8	1.3
Zinc	mg/kg dry wt	0.05	22.3	77.2	28.4	51.8	25.5

Heavy Metals in Soil

Client Sample ID			S48 1.0-1.1m	S49 0.0-0.1m	S49 0.3-0.4m	S50 0.0-0.1m	S50 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-96	22-16868-97	22-16868-98	22-16868-99	22-16868-100
Arsenic	mg/kg dry wt	0.125	5.1	4.9	4.7	3.7	2.8
Cadmium	mg/kg dry wt	0.005	0.080	0.14	0.13	0.082	0.064
Chromium	mg/kg dry wt	0.125	3.8	5.6	5.7	8.1	8.0
Copper	mg/kg dry wt	0.075	4.5	9.35	8.56	10.9	8.96
Lead	mg/kg dry wt	0.25	8.00	14.9	15.1	20.9	21.7
Nickel	mg/kg dry wt	0.05	2.0	2.8	2.8	2.9	2.8
Zinc	mg/kg dry wt	0.05	37.8	47.3	42.6	21.2	16.5

Heavy Metals in Soil

Client Sample ID			S51 0.0-0.1m	S51 0.4-0.5m	S52 0.0-0.1m	S52 0.4-0.5m	S53 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-101	22-16868-102	22-16868-103	22-16868-104	22-16868-105
Arsenic	mg/kg dry wt	0.125	8.4	3.8	3.7	3.9	10
Cadmium	mg/kg dry wt	0.005	0.16	0.12	0.12	0.12	0.17
Chromium	mg/kg dry wt	0.125	9.1	4.9	5.3	4.8	11
Copper	mg/kg dry wt	0.075	12.1	5.9	5.9	5.7	22.3
Lead	mg/kg dry wt	0.25	12.3	12.9	11.9	11.9	13.8
Nickel	mg/kg dry wt	0.05	2.4	2.5	2.5	2.2	4.2
Zinc	mg/kg dry wt	0.05	62.4	42.5	40.0	38.3	73.8

Heavy Metals in Soil

Client Sample ID			S53 0.2-0.3m	S54 0.0-0.1m	S54 0.4-0.5m	S55 0.0-0.1m	S55 0.2-0.3m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-106	22-16868-107	22-16868-108	22-16868-109	22-16868-110
Arsenic	mg/kg dry wt	0.125	9.7	5.9	3.0	7.6	6.1
Cadmium	mg/kg dry wt	0.005	0.14	0.16	0.095	0.16	0.20
Chromium	mg/kg dry wt	0.125	11	5.1	4.2	9.2	4.7
Copper	mg/kg dry wt	0.075	17.8	13.5	9.20	16.2	12.3
Lead	mg/kg dry wt	0.25	11.3	14.6	10.3	11.6	18.7
Nickel	mg/kg dry wt	0.05	3.2	2.6	2.0	3.7	2.2
Zinc	mg/kg dry wt	0.05	67.5	68.0	48.3	168	134

Heavy Metals in Soil

Client Sample ID			S56 0.0-0.1m	S56 0.3-0.4m	S57 0.0-0.1m	S58 0.0-0.1m	S59 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-111	22-16868-112	22-16868-113	22-16868-114	22-16868-115
Arsenic	mg/kg dry wt	0.125	4.0	6.3	7.4	17.2	4.8
Cadmium	mg/kg dry wt	0.005	0.097	0.17	0.14	0.091	0.10
Chromium	mg/kg dry wt	0.125	20.8	12	42.0	28.4	4.7
Copper	mg/kg dry wt	0.075	16.7	16.7	69.0	12.5	7.55
Lead	mg/kg dry wt	0.25	5.32	6.98	12.6	10.0	13.8
Nickel	mg/kg dry wt	0.05	34.6	12.7	19.6	1.6	2.4
Zinc	mg/kg dry wt	0.05	39.1	58.6	664	31.0	41.2

Heavy Metals in Soil

Client Sample ID			S59 0.4-0.5m	S60 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-116	22-16868-117
Arsenic	mg/kg dry wt	0.125	8.7	15.5
Cadmium	mg/kg dry wt	0.005	0.13	0.12
Chromium	mg/kg dry wt	0.125	7.5	18.4
Copper	mg/kg dry wt	0.075	11.8	25.2
Lead	mg/kg dry wt	0.25	12.5	7.75
Nickel	mg/kg dry wt	0.05	2.9	21.6
Zinc	mg/kg dry wt	0.05	69.3	53.2

Total Petroleum Hydrocarbons - Soil

Client Sample ID			S55 0.0-0.1m	S55 0.2-0.3m	S56 0.0-0.1m	S56 0.3-0.4m	S57 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-109	22-16868-110	22-16868-111	22-16868-112	22-16868-113
C7-C9	mg/kg dry wt	10	<10	<10	<10	<10	<10
C10-C14	mg/kg dry wt	15	1,148	89	26	<15	<15
C15-C36	mg/kg dry wt	25	8,999	4,064	1,506	191	229
C7-C36 (Total)	mg/kg dry wt	50	10,147	4,153	1,532	191	229

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			S55 0.0-0.1m	S55 0.2-0.3m	S56 0.0-0.1m	S56 0.3-0.4m	S57 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-109	22-16868-110	22-16868-111	22-16868-112	22-16868-113
1-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo[b] & [j] fluoranthene	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			S55 0.0-0.1m	S55 0.2-0.3m	S56 0.0-0.1m	S56 0.3-0.4m	S57 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Fluoranthene	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	mg/kg dry wt	0.02	0.31	0.052	<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	0.030	0.030	0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	1	87	88	95	90	89

Moisture Content

Client Sample ID			S55 0.0-0.1m	S55 0.2-0.3m	S56 0.0-0.1m	S56 0.3-0.4m	S57 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-109	22-16868-110	22-16868-111	22-16868-112	22-16868-113
Moisture Content	%	1	34	19	12	11	9

Organochlorine Pesticides - Soil

Client Sample ID			Comp 1 (S1 0.0-0.1m, S2 0.0-0.1m, S7 0.0-0.1m, S8 0.0-0.1m)	Comp 2 (S1 0.3-0.4m, S2 0.3-0.4m, S7 0.3-0.4m, S8 0.3-0.4m)	Comp 3 (S3 0.0-0.1m, S4 0.0-0.1m, S9 0.0-0.1m, S10 0.0-0.1m)	Comp 4 (S3 0.3-0.4m, S4 0.3-0.4m, S9 0.3-0.4m, S10 0.3-0.4m)	Comp 5 (S5 0.0-0.1m, S6 0.0-0.1m, S11 0.0-0.1m, S12 0.0-0.1m)
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-118	22-16868-119	22-16868-120	22-16868-121	22-16868-122
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	0.012	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	0.0058	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Organochlorine Pesticides - Soil

Client Sample ID			Comp 1 (S1 0.0-0.1m, S2 0.0-0.1m, S7 0.0-0.1m, S8 0.0-0.1m)	Comp 2 (S1 0.3-0.4m, S2 0.3-0.4m, S7 0.3-0.4m, S8 0.3-0.4m)	Comp 3 (S3 0.0-0.1m, S4 0.0-0.1m, S9 0.0-0.1m, S10 0.0-0.1m)	Comp 4 (S3 0.3-0.4m, S4 0.3-0.4m, S9 0.3-0.4m, S10 0.3-0.4m)	Comp 5 (S5 0.0-0.1m, S6 0.0-0.1m, S11 0.0-0.1m, S12 0.0-0.1m)
Date Sampled							
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	110	110	100	94	83

Organochlorine Pesticides - Soil

Client Sample ID			Comp 6 (S5 0.3-0.4m, S6 0.3-0.4m, S11 0.3-0.4m, S12 0.3-0.4m)	Comp 7 (S14 0.0-0.1m, S15 0.0-0.1m, S21 0.0-0.1m)	Comp 8 (S14 0.3-0.4m, S15 0.3-0.4m, S21 0.3-0.4m)	Comp 9 (S16 0.0-0.1m, S17 0.0-0.1m, S22 0.0-0.1m, S23 0.0-0.1m)	Comp 10 (S16 0.3-0.4m, S17 0.3-0.4m, S22 0.3-0.4m, S23 0.3-0.4m)
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-123	22-16868-124	22-16868-125	22-16868-126	22-16868-127
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	89	89	94	99	97

Organochlorine Pesticides - Soil

Client Sample ID			Comp 11 (S18 0.0-0.1m, S19 0.0-0.1m, S24 0.0-0.1m, S25 0.0-0.1m)	Comp 12 (S18 0.3-0.4m, S19 0.3-0.4m, S24 0.3-0.4m, S25 0.3-0.4m)	Comp 13 (S13 0.0-0.1m, S20 0.0-0.1m, S26 0.0-0.1m)	Comp 14 (S13 0.3-0.4m, S20 0.3-0.4m, S26 0.3-0.4m)	Comp 15 (S27 0.0-0.1m, S28 0.0-0.1m, S31 0.0-0.1m, S32 0.0-0.1m)
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-128	22-16868-129	22-16868-130	22-16868-131	22-16868-132
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	120	120	85	110	91

Organochlorine Pesticides - Soil

Client Sample ID			Comp 16 (S29 0.0-0.1m, S30 0.0-0.1m, S33 0.0-0.1m, S34 0.0-0.1m)	Comp 17 (S35 0.0-0.1m, S36 0.0-0.1m, S37 0.0-0.1m)	Comp 18 (S38 0.0-0.1m, S39 0.0-0.1m, S40 0.0-0.1m)	Comp 19 (S51 0.0-0.1m, S52 0.0-0.1m, S53 0.0-0.1m, S54 0.0-0.1m)	Comp 20 (S44 0.0-0.1m, S45 0.0-0.1m, S48 0.0-0.1m, S49 0.0-0.1m)
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-133	22-16868-134	22-16868-135	22-16868-136	22-16868-137
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Organochlorine Pesticides - Soil

Client Sample ID			Comp 16 (S29 0.0-0.1m, S30 0.0-0.1m, S33 0.0-0.1m, S34 0.0-0.1m)	Comp 17 (S35 0.0-0.1m, S36 0.0-0.1m, S37 0.0-0.1m)	Comp 18 (S38 0.0-0.1m, S39 0.0-0.1m, S40 0.0-0.1m)	Comp 19 (S51 0.0-0.1m, S52 0.0-0.1m, S53 0.0-0.1m, S54 0.0-0.1m)	Comp 20 (S44 0.0-0.1m, S45 0.0-0.1m, S48 0.0-0.1m, S49 0.0-0.1m)
Date Sampled							
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	100	110	110	110	110

Organochlorine Pesticides - Soil

Client Sample ID			Comp 21 (S44 0.3-0.4m, S45 0.3-0.4m, S48 0.3-0.4m, S49 0.3-0.4m)	Comp 22 (S43 0.0-0.1m, S47 0.0-0.1m, S50 0.0-0.1m)	Comp 23 (S43 0.3-0.4m, S47 0.3-0.4m, S50 0.3-0.4m)	Comp 24 (S41 0.0-0.1m, S42 0.0-0.1m, S46 0.0-0.1m)	Comp 25 (S41 0.3-0.4m, S42 0.3-0.4m, S46 0.3-0.4m)
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-138	22-16868-139	22-16868-140	22-16868-141	22-16868-142
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Organochlorine Pesticides - Soil

Client Sample ID			Comp 21 (S44 0.3-0.4m, S45 0.3-0.4m, S48 0.3-0.4m, S49 0.3-0.4m)	Comp 22 (S43 0.0-0.1m, S47 0.0-0.1m, S50 0.0-0.1m)	Comp 23 (S43 0.3-0.4m, S47 0.3-0.4m, S50 0.3-0.4m)	Comp 24 (S41 0.0-0.1m, S42 0.0-0.1m, S46 0.0-0.1m)	Comp 25 (S41 0.3-0.4m, S42 0.3-0.4m, S46 0.3-0.4m)
Date Sampled							
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	100	100	100	100	97

Soil Composite

Client Sample ID			S1 0.0-0.1m	S1 0.3-0.4m	S2 0.0-0.1m	S2 0.3-0.4m	S3 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-1	22-16868-2	22-16868-4	22-16868-5	22-16868-6
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S3 0.3-0.4m	S4 0.0-0.1m	S4 0.3-0.4m	S5 0.0-0.1m	S5 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-7	22-16868-8	22-16868-9	22-16868-11	22-16868-12
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S6 0.0-0.1m	S6 0.3-0.4m	S7 0.0-0.1m	S7 0.3-0.4m	S8 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-13	22-16868-14	22-16868-15	22-16868-16	22-16868-17
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S8 0.3-0.4m	S9 0.0-0.1m	S9 0.3-0.4m	S10 0.0-0.1m	S10 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-18	22-16868-20	22-16868-21	22-16868-22	22-16868-23
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S11 0.0-0.1m	S11 0.3-0.4m	S12 0.0-0.1m	S12 0.3-0.4m	S13 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-25	22-16868-26	22-16868-28	22-16868-29	22-16868-30
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S13 0.3-0.4m	S14 0.0-0.1m	S14 0.3-0.4m	S15 0.0-0.1m	S15 0.3-0.4m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Analyte	Unit	Reporting Limit	22-16868-31	22-16868-32	22-16868-33	22-16868-34	22-16868-35
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S16 0.0-0.1m	S16 0.3-0.4m	S17 0.0-0.1m	S17 0.3-0.4m	S18 0.0-0.1m
Date Sampled			29/04/2022	29/04/2022	29/04/2022	29/04/2022	
Analyte	Unit	Reporting Limit	22-16868-36	22-16868-37	22-16868-39	22-16868-40	22-16868-41
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S18 0.3-0.4m	S19 0.0-0.1m	S19 0.3-0.4m	S20 0.0-0.1m	S20 0.3-0.4m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-42	22-16868-43	22-16868-44	22-16868-45	22-16868-46
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S21 0.0-0.1m	S21 0.3-0.4m	S22 0.0-0.1m	S22 0.3-0.4m	S23 0.0-0.1m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-47	22-16868-48	22-16868-50	22-16868-51	22-16868-52
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S23 0.3-0.4m	S24 0.0-0.1m	S24 0.3-0.4m	S25 0.0-0.1m	S25 0.3-0.4m
Date Sampled							
Analyte	Unit	Reporting Limit	22-16868-53	22-16868-55	22-16868-57	22-16868-58	22-16868-59
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S26 0.0-0.1m	S26 0.3-0.4m	S27 0.0-0.1m	S28 0.0-0.1m	S29 0.0-0.1m
Date Sampled				03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-60	22-16868-61	22-16868-63	22-16868-64	22-16868-65
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S30 0.0-0.1m	S31 0.0-0.1m	S32 0.0-0.1m	S33 0.0-0.1m	S34 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-66	22-16868-67	22-16868-68	22-16868-69	22-16868-70
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S35 0.0-0.1m	S36 0.0-0.1m	S37 0.0-0.1m	S38 0.0-0.1m	S39 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-71	22-16868-72	22-16868-73	22-16868-74	22-16868-75
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S40 0.0-0.1m	S41 0.0-0.1m	S41 0.3-0.4m	S42 0.0-0.1m	S42 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-76	22-16868-77	22-16868-78	22-16868-79	22-16868-80
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S43 0.0-0.1m	S43 0.3-0.4m	S44 0.0-0.1m	S44 0.3-0.4m	S45 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-82	22-16868-83	22-16868-84	22-16868-85	22-16868-87
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S45 0.3-0.4m	S46 0.0-0.1m	S46 0.3-0.4m	S47 0.0-0.1m	S47 0.3-0.4m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-88	22-16868-89	22-16868-90	22-16868-92	22-16868-93
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite

Client Sample ID			S48 0.0-0.1m	S48 0.3-0.4m	S49 0.0-0.1m	S49 0.3-0.4m	S50 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-94	22-16868-95	22-16868-97	22-16868-98	22-16868-99
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Soil Composite



Client Sample ID			S50 0.3-0.4m	S51 0.0-0.1m	S52 0.0-0.1m	S53 0.0-0.1m	S54 0.0-0.1m
Date Sampled			03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Analyte	Unit	Reporting Limit	22-16868-100	22-16868-101	22-16868-103	22-16868-105	22-16868-107
Soil - Composite prep - DS			Complete	Complete	Complete	Complete	Complete

Method Summary

- Elements in Soil** Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.
- TPH in Soil** Solvent extraction, silica cleanup, followed by GC-FID analysis. (C7-C36). (In accordance with in-house procedure based on US EPA 8015).
- PAH in Soil** Solvent extraction, silica cleanup, followed by GC-MS analysis.
Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH.
Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation.
 Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to '*Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health*'. Ministry for the Environment. 2011. (In accordance with in-house procedure).
- Moisture** Moisture content is determined gravimetrically by drying at 103 °C.
- OCP in Soil** Samples are extracted with hexane, pre-concentrated then analysed by GC-MSMS. (Chlordane (sum) is calculated from the main actives in technical Chlordane: Chlordane, Nonachlor and Heptachlor). (In accordance with in-house procedure).
- Total DDT** Sum of DDT, DDD and DDE (4,4' and 2,4 isomers)
- Soil Composite*** Analytica Laboratories is not accredited for the preparation of composite samples; however, the chemical analysis does hold IANZ accreditation. As composite analysis is conducted when requested by the sampler if they deem fit as per the NES guideline, the results of the chemical analyses still hold proper accreditation based on Analytica's methods.



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Appendix D

ProUCL Calculation

	A	B	C	D	E	F	G	H	I	J	K	L		
1	UCL Statistics for Uncensored Full Data Sets													
2														
3	User Selected Options													
4	Date/Time of Computation		ProUCL 5.17/03/2023 12:53:16 pm											
5	From File		WorkSheet.xls											
6	Full Precision		OFF											
7	Confidence Coefficient		95%											
8	Number of Bootstrap Operations		2000											
9														
10														
11	Copper sample S41-S45													
12														
13	General Statistics													
14	Total Number of Observations				11		Number of Distinct Observations				11			
15							Number of Missing Observations				1			
16	Minimum				3.2		Mean				25.04			
17	Maximum				90.7		Median				16			
18	SD				26.39		Std. Error of Mean				7.958			
19	Coefficient of Variation				1.054		Skewness				1.817			
20														
21	Normal GOF Test													
22	Shapiro Wilk Test Statistic				0.795		Shapiro Wilk GOF Test							
23	5% Shapiro Wilk Critical Value				0.85		Data Not Normal at 5% Significance Level							
24	Lilliefors Test Statistic				0.257		Lilliefors GOF Test							
25	5% Lilliefors Critical Value				0.251		Data Not Normal at 5% Significance Level							
26	Data Not Normal at 5% Significance Level													
27														
28	Assuming Normal Distribution													
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)							
30	95% Student's-t UCL				39.46		95% Adjusted-CLT UCL (Chen-1995)				42.79			
31							95% Modified-t UCL (Johnson-1978)				40.19			
32														
33	Gamma GOF Test													
34	A-D Test Statistic				0.219		Anderson-Darling Gamma GOF Test							
35	5% A-D Critical Value				0.748		Detected data appear Gamma Distributed at 5% Significance Level							
36	K-S Test Statistic				0.138		Kolmogorov-Smirnov Gamma GOF Test							
37	5% K-S Critical Value				0.261		Detected data appear Gamma Distributed at 5% Significance Level							
38	Detected data appear Gamma Distributed at 5% Significance Level													
39														
40	Gamma Statistics													
41	k hat (MLE)				1.179		k star (bias corrected MLE)				0.918			
42	Theta hat (MLE)				21.25		Theta star (bias corrected MLE)				27.28			
43	nu hat (MLE)				25.93		nu star (bias corrected)				20.19			
44	MLE Mean (bias corrected)				25.04		MLE Sd (bias corrected)				26.14			
45							Approximate Chi Square Value (0.05)				10.99			
46	Adjusted Level of Significance				0.0278		Adjusted Chi Square Value				9.902			
47														
48	Assuming Gamma Distribution													
49	95% Approximate Gamma UCL (use when n>=50)				46		95% Adjusted Gamma UCL (use when n<50)				51.06			
50														
51	Lognormal GOF Test													
52	Shapiro Wilk Test Statistic				0.974		Shapiro Wilk Lognormal GOF Test							
53	5% Shapiro Wilk Critical Value				0.85		Data appear Lognormal at 5% Significance Level							
54	Lilliefors Test Statistic				0.0929		Lilliefors Lognormal GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L	
55	5% Lilliefors Critical Value				0.251	Data appear Lognormal at 5% Significance Level							
56	Data appear Lognormal at 5% Significance Level												
57													
58	Lognormal Statistics												
59	Minimum of Logged Data				1.163	Mean of logged Data				2.74			
60	Maximum of Logged Data				4.508	SD of logged Data				1.062			
61													
62	Assuming Lognormal Distribution												
63	95% H-UCL				77.56	90% Chebyshev (MVUE) UCL				51.23			
64	95% Chebyshev (MVUE) UCL				62.96	97.5% Chebyshev (MVUE) UCL				79.24			
65	99% Chebyshev (MVUE) UCL				111.2								
66													
67	Nonparametric Distribution Free UCL Statistics												
68	Data appear to follow a Discernible Distribution at 5% Significance Level												
69													
70	Nonparametric Distribution Free UCLs												
71	95% CLT UCL				38.13	95% Jackknife UCL				39.46			
72	95% Standard Bootstrap UCL				37.53	95% Bootstrap-t UCL				52.89			
73	95% Hall's Bootstrap UCL				101.8	95% Percentile Bootstrap UCL				38.15			
74	95% BCA Bootstrap UCL				44.57								
75	90% Chebyshev(Mean, Sd) UCL				48.91	95% Chebyshev(Mean, Sd) UCL				59.73			
76	97.5% Chebyshev(Mean, Sd) UCL				74.74	99% Chebyshev(Mean, Sd) UCL				104.2			
77													
78	Suggested UCL to Use												
79	95% Adjusted Gamma UCL				51.06								
80													
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
82	Recommendations are based upon data size, data distribution, and skewness.												
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
85													