



12 January 2024

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Dear Jo,

UPDATED - SUTTON BLOCK EXTENSION TO DRURY QUARRY - DETAILED SITE INVESTIGATION

1.0 Introduction and Background

Pattle Delamore Partners Limited (PDP) has been engaged by Stevenson Aggregates Limited (SAL) to undertake a Detailed Site Investigation (DSI) of the area surrounding the farm buildings located on 1189 Ponga Road, Drury, Auckland ('the site'). The site forms up part of the Sutton Block Extension to the existing Drury Quarry that also includes 121 MacWhinney Drive (collectively referred henceforth as 'the Sutton Block'). It is understood that the works proposed in the Sutton Block are to extend the current Drury Quarry with similar quarry operations including stripping of overburden and mining of aggregate, along with ancillary quarrying activities (refer to Section 1.1 below for a summary of the 2023 revised Sutton Block pit extension proposal).

This DSI builds upon the Updated Preliminary Site Investigation (PSI) report completed by PDP on 9 January 2024 for the Sutton Block, which identified a number of potential areas/activities categorised under the Hazardous Activity and Industry List (HAIL)¹ (PDP, 2024a). These included:

- ✧ Potential impacts of various contaminants (e.g., arsenic, DDT, lindane, dieldrin, etc.) from possible former spray race/sheep dip activities located in the area of the main dwelling/structures;
- ✧ Localised lead-in-soil impacts from painted surfaces on current/historical dwellings/structures constructed prior to the 1980s; and
- ✧ Localised asbestos/asbestos containing material (ACM) impacts to soils from current/historical building materials that are observed to be in deteriorated condition on the main dwelling/structures constructed prior to the 2000s.

¹ The Hazardous Activities and Industries List (HAIL) is a compilation of activities and industries that are considered likely to cause land contamination resulting from hazardous substance use, storage or disposal. The HAIL is intended to identify most

The PSI report concluded that the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* ('the NES-CS') applies to discrete, localised pieces of land at the site where these potential contamination sources are considered to be more-likely-than-not. Controls of the NES-CS are expected to be triggered by the proposed activities anticipated to be undertaken in the future, including change of land use (from rural to commercial/industrial) and soil disturbance activities.

Based on the expected area and volume of soil disturbance from the proposed quarry extension, the contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP-OP) may also be applicable to the proposed activities of the site if concentrations of contaminants are found to exceed the Permitted Activity criteria from Section E30 of AUP-OP the within those identified HAIL areas.

The PSI also concluded that large areas of the Sutton Block are confirmed as representing non-HAIL areas and will therefore be exempt from further requirements of the NES-CS (as described in Regulation 5 (7)) and the contaminated land rules of the AUP-OP.

This DSI has been carried out to determine the nature and extent of impacts of contaminants of concern in the soils within the site as a result of the current or historical activities that have potentially been undertaken at the site.

This DSI has been directed and reviewed by Suitably Qualified and Experienced Practitioners (SQEPs) with respect to contaminated land and has been undertaken in accordance with the Ministry for the Environment's (MfE's) Contaminated Land Management Guidelines (CLMG) No.1 – *Reporting on Contaminated Sites in New Zealand* (MfE, 2021a) and the relevant sections of CLMG No.5 – *Site Investigation and Analysis of Soils* (MfE, 2021b). A certifying statement to this effect is provided in Appendix A.

1.1 Project Description for the 2023 Revised Sutton Block Pit Extension

SAL Drury Quarry is located in Drury, within the Auckland Region, and has been in operation for over 80 years. Drury Quarry is a greywacke hard rock quarry supplying concrete, asphalt and roading aggregate to the Auckland market. The Drury Quarry pit is located within the wider landholdings owned by SAL which encompasses an area of approximately 562ha. This landholding includes quarry activities, a clean fill, farmland and large swathes of native vegetation.

Based on current demand estimates, the existing pit will provide approximately 20 years of aggregate supply to Auckland. To continue to provide a local supply of aggregate resource SAL proposes to develop a new pit within the existing site, called 'the Sutton Block'. The Sutton Block pit has been designed to provide approximately 185 million tonnes of additional aggregate to supply the market.

The Sutton Block is located to the northeast of the existing pit. The development of the Sutton Block will involve the staged development of an area of approximately 87.7 ha to a maximum pit depth of approximately 60 m RL. The Sutton Block is designed to be a separate quarry pit although it will be serviced by the existing Drury Quarry ancillary site infrastructure and facilities.

Further details are provided in the Drury Quarry, Sutton Block, Assessment of Environmental Effects (AEE) report (Tonkin + Taylor, in preparation).

1.2 Objectives

The key objectives of this DSI are to assess the:

- ✧ Likelihood of human health and environmental risk associated with the proposed activities through soil sampling and comparison of analytical results against relevant guidelines/criteria; and
- ✧ Requirements for potential contaminated land consents in relation to the NES-CS and the AUP-OP contaminated land rules.

1.3 Scope of Works

The scope of work undertaken by PDP, as agreed with Stevenson Aggregates Limited, includes:

- ✧ Preparing a Sampling and Analysis Plan (SAP) for the site based on the potential HAIL land-use, and general site characterisation of soils (i.e. targeted and grid-based sampling patterns);
- ✧ Targeted sampling of 20 surface/near-surface soil samples from around the main dwelling and auxiliary structures, including the spray race/sheep dip areas;
- ✧ IANZ laboratory analysis including heavy metals (HM), lead, organochlorine pesticides (OCPs), and selected semi-quantitative asbestos (SQA);
- ✧ Assessment and comparison of results to applicable criteria; and
- ✧ Completion of the SQEP-certified DSI report to comply with MfE CLMG No. 1 and No. 5 (to be used for resource consent application).

2.0 Site Description

The site, which is a part of the Sutton Block is located at 1189 Ponga Road (refer Figure 1) and the site's details are provided in Table 1.

Table 1: Property Information		
Site Address	Description	Site Area (Hectares)
1189 Ponga Road	ALLOT 37 Parish OF HUNUA	88.3
<i>Note:</i> 1. 1189 Ponga Road also includes SECT 2 SP 467566, ALLOT 198 Parish OF HUNUA, ALLOT 190A Parish OF HUNUA, SPO 190 ALLT 190 PARO Hunua, ALLOT 191 Parish OF HUNUA and ALLOT 197 Parish OF HUNUA; however, these are excluded from the investigation area.		

The current site comprises of the main dwelling and ancillary structures including three storage sheds, a shearing shed and two wooden structures at 1189 Ponga Road. The balance of the site is used for pastoral grazing and farming activities, with areas of native bush. The site is zoned as 'Special Purpose – Quarry Zone', and as 'Rural Zone'.

Surrounding land use appears to be rural residential blocks to the north, and east. The existing Drury Quarry is located to the south, with rural residential properties beyond.

2.1 Geology and Hydrogeology

The Geological Map of Auckland (Edbrooke, 2001) indicates that the site area is underlain by three major geological formations being, greywacke of the Waipapa Group, fine-grained and coarse-grained, porphyritic, olivine basalt, basanite and hawaiiite lava flows and carbonaceous mudstone and claystone with coal seams, minor sandstone and rare conglomerate of the Waikato Coal Measures.

The site has a topographic high in the north-eastern corner of the site (~300 m RL) and gently slopes away to a topographic low of ~50 m RL at the south-western part of the site.

3.0 Site Investigation

A site investigation in accordance with CLMG No. 5 (MfE, 2021b) was undertaken to assess the nature and extent of the actual/potential areas/activities categorised under the HAIL identified in the PSI report (PDP, 2024a) for the Sutton Block. Soil samples were collected from 23 locations as shown in Figure 2.

3.1 Site Sampling Methodology

Site investigation works were undertaken on 9 January 2022 and comprised the following:

- ✧ A total of 23 surface soil samples (~0-0.1 m below ground level (bgl)) were collected using a spade in the selected locations in the halo of the main dwelling/structures within appropriate age ranges for the use of lead-based paint on their associated surfaces². Of the 23 surface samples, 11 were taken in the inner halo of the buildings (within 1 m), nine were taken in the outer halo of the buildings (within 3 m) and three were taken in the potential spray race/sheep dip area to the east of the main dwelling.
- ✧ A total of 12 near-surface soil samples were collected using a spade within the inner halo of the buildings. These soil samples were collected from depths ranging between 0.2 – 0.3 m bgl and analysed as discrete soil samples. Of the 12 near-surface samples, nine were taken in the inner halo of the buildings (within 1 m) and 3 were taken in the potential spray race/sheep dip area to the east of the main dwelling.

During the completion of soil sample collection, the site soils were observed and logged by the site operative. The site geology observed during the field investigation comprised of silty sand and sandy gravel down to 0.1 m below ground level (bgl), underlain by clayey silt and sandy silt down to 0.1-0.3 m bgl.

Fresh nitrile gloves were worn, and sample collection equipment was decontaminated at each sample location. Samples were immediately placed into laboratory supplied glass and plastic jars, and chilled cool storage bins for subsequent transport to the analysing laboratory. At the completion of the site works, sample bins were sent directly to the IANZ accredited laboratory (Hill Laboratories Limited) under standard chain-of-custody procedures and the soil samples collected from the following areas were analysed for the following list of analytes:

- ✧ Potential spray race/sheep dip – heavy metals and OCPs.
- ✧ Main dwelling – lead.
- ✧ Shearing shed and storage sheds – lead (and semi-quantitative asbestos where deteriorated ACM was noted at the southern end of the shearing shed [SQ_SS08]).

4.0 Applicable Guidelines and Criteria

The following assessment guidelines and criteria have been selected to enable a Tier 1 risk assessment of the soil sample results. These guideline values were selected in accordance with the guidance provided in the MfE (2021a) CLMG No. 2 '*Hierarchy and Application in New Zealand of Environmental Guideline Values*'.

²The potential spray race/sheep dip structure and farm sheds to the west of the main farm dwelling were not sampled due to their construction age of after 2000 (based on aerial images).

4.1 Background Concentrations

According to Regulation 5(9) of the NES-CS, if a DSI can demonstrate that contaminants at a known/potential HAIL area are at/below published background concentrations, then the NES-CS regulations do not apply. To assess heavy metal results, Auckland Council Background Concentrations for heavy metals are taken from the non-volcanic range soils (AUP-OP Table E30.6.1.4.2). Relevant background concentrations are summarised in Table 2.

Note that for anthropogenic contaminants such as OCPs and semi-quantitative asbestos, there are no concentrations above the laboratory limit of reporting (LOR) that can be considered to be 'background'. A detection of these contaminants in a sample equates to an exceedance of background concentrations.

4.2 Soil Contaminant Standards (NES-CS)

The NES-CS provides soil contaminant standards (SCSs) for seven inorganic substances and five organic compounds (or groups of compounds) (the SCSs are published in the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health* (MfE, 2011b), which is incorporated by reference into the NES-CS). SCSs are available for these substances and compounds when present in soil, for five land use scenarios. The contaminants analysed at this site for which SCSs are available are arsenic, cadmium, chromium, copper, lead, DDT and dieldrin. As the Sutton Block Extension proposes to extend the current Drury Quarry with similar quarry operations (including stripping of overburden and mining of aggregate, along with ancillary quarrying activities) onto the site, the commercial/industrial land use scenario has been adopted for this DSI, which includes the following source-pathway-receptor assumptions:

- ∴ The selected commercial/industrial SCSs assume that intended future land use will be commercial site with varying degrees of exposed soil. These SCSs have been used to assess the potential risks to outdoor workers carrying out routine activities involving soil exposure to surface or near-surface soil through maintenance, and occasional shallow excavation for routine underground service maintenance activities.
- ∴ Potential receptors include outdoor workers on a largely unpaved site and site maintenance personnel following the development.

Relevant SCSs are summarised in Table 2.

4.3 Other Applicable Human Health Standards

For contaminants of concern that are not priority contaminants, the NES-CS references the hierarchy defined in the MfE's CLMG No.2 (MfE, 2021a).

In accordance with this hierarchy, the Australian National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM) *Guidelines on investigation levels for soil and groundwater* (NEPC, 2013) has been used for two heavy metals (nickel and zinc). Health-based investigation levels for 'Commercial/Industrial D' land use have been selected in accordance with the proposed end use of the site and to protect site workers following the development work (and summarised in Table 2). The NEPM describes the health-based investigation levels as being protective of the selected land use scenario as follows:

- ∴ 'Commercial/Industrial D' – Commercial/industrial such as shops, offices, factories and industrial sites.

The Building Research Association of New Zealand (BRANZ, 2017) *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* (herein referred to as 'the BRANZ guidelines') gives asbestos in soil guideline values (SGVs) for human health risk assessment in a variety of land use scenarios. For this assessment, a commercial and industrial land use scenario was selected.

Relevant soil guideline values (SGVs) are summarised in Table 2.

4.4 Auckland Council Criteria

Rule E30.6.1.4 of the AUP-OP sets out the soil acceptance criteria for the discharge of contaminants to comply with the Permitted Activity (PA) standards. The PA soil acceptance criteria referenced in this report have been selected from Table E30.6.1.4.1 and are summarised in Table 2. Where a contaminant has both an associated background concentration and PA value, the higher of the two values is to be used as the appropriate discharge screening criteria.

4.5 Waste Acceptance Criteria

As the Drury Quarry is the preferred disposal facility for any impacted soils at the site, the waste acceptance criteria as listed in the 'Decision on an application to change/cancel conditions of a resource consent under section 127 of the Resource Management Act 1991' for the Drury Quarry (DIS60083642-A), which outlines the amended guideline values for disposal, has been adopted. As these values are in line with the AUP-OP permitted activity guideline values, only the AUP-OP values are shown in Table 2.

5.0 Results

Results from sampling observations and laboratory soil analyses are outlined below.

5.1 Sampling Observations

The following observations were made during the collection of soil samples:

- ✧ No fill material was witnessed during the excavations across the site.
- ✧ No olfactory or visual signs of staining were witnessed during the excavations across the site.
- ✧ No groundwater was witnessed during the field investigation.
- ✧ Fragments of potential Asbestos Containing Material (ACM) were noted at the southern end of the shearing shed.

5.2 Analytical Results

Laboratory analytical results of the analysed soil samples are summarised in Table 2. The COC documentation and laboratory analytical reports are provided in Appendix B.

5.2.1 Potential Spray Race/Sheep Dip Area

- ✧ The concentrations of heavy metals and OCPs in all three surface soil samples collected from this area are below their respective NES-CS SCSs/SGVs for commercial/industrial land use, AUP-OP PA soil acceptance criteria, and background concentrations of non-volcanic soils in the Auckland region.

5.2.2 Halo of Main Dwelling and associated Sheds

- ✧ The concentration of lead in eight of the 11 analysed surface soil samples collected from the inner halo of the main dwelling/sheds are above the background value for non-volcanic soils in the Auckland region but did not exceed the NES-CS SCS for commercial/industrial land use.
- ✧ The concentration of lead in two of the 11 surface soil samples above (SQ_SS16 [420 mg/kg] and SQ_SS19 [350 mg/kg]) exceed the AUP-OP PA soil acceptance criteria for lead (250 mg/kg).
- ✧ The concentration of lead in the near-surface samples (SQ_SS16 [0.3] and SQ_SS19 [0.3]) and the outer halo samples (SS_SQ17 and SQ_SS20) did not exceed the AUP-OP PA soil acceptance criteria for lead.

- ∴ Asbestos fines are absent in surface soil sample SQ_SS08, which was collected from the area adjacent to the south of the shearing shed where several pieces of potential ACM were observed during the PSI (2022). Concentrations of asbestos as ACM and as fibrous asbestos and asbestos fines (FA+AF) are below the laboratory detection limit and therefore also below the BRANZ guidelines for commercial/industrial land users (0.05% w/w and 0.001% w/w, respectively).

6.0 Conceptual Site Model and Risk Assessment

A Conceptual Site Model (CSM) was developed using the information acquired in the preparation of the PSI report (PDP, 2024a). The CSM has been updated to reflect the findings of this DSI, as summarised below in Table 3.

Table 3: Conceptual Site Model			
HAIL land use	Sheep Dip and Spray Race Operations (HAIL Category A8)	Lead-Based Paint (potential Category I)	Asbestos Building Products (potential Category E1)
Onsite Location	In the area of the potential spray race/sheep dip (as shown in Figure 2).	Immediately surrounding dwellings (typically <3 m halo) and current/historical buildings/structures if painted with lead-based paint.	Attached to, and immediately surrounding dwellings (typically <3 m halo) and current/historical buildings if asbestos containing and subject to deterioration.
Identified Contaminants of Concern	Potential contaminants could include arsenic, organochlorine pesticides (OCP) (including DDT, lindane, dieldrin and aldrin) and organophosphates).	Lead (associated with the use of lead-based paint).	Asbestos/ACM and asbestos fibres.
Potential Mechanism of Contamination	Leaching of contaminants to ground, runoff to surface water and infiltration to groundwater.	Progressive deterioration or active disturbance/ maintenance of lead-based painted surfaces. Uncontrolled demolition of historical structures.	Progressive deterioration or active disturbance/ maintenance of asbestos containing materials. Uncontrolled demolition of historical structures.
Identified Receptor(s)	Short term: - Current site users (i.e. tenants and farm workers/growers/pickers) who remain onsite in advance of proposed quarry expansion. - Quarry mine workers/contractors during soil disturbance. - Environmental receptors (via surface water) during soil disturbance. Long term: - Future site users (if contaminated soil remains onsite). - Quarry mine workers/contractors during soil disturbance (if contaminated soil remains onsite at shallow depths). - Environmental receptors (if contaminated soil remains onsite).		Short term: - Current site users (i.e. tenants and farm workers/growers/pickers) who remain onsite in advance of proposed development. - Earthworks/demolition contractors during removal of structures and soil disturbance. Long term: - Future site users if material remains onsite/is not removed appropriately. - Maintenance and excavation workers (if material remains onsite/is not removed properly).

Table 3: Conceptual Site Model			
HAIL land use	Sheep Dip and Spray Race Operations (HAIL Category A8)	Lead-Based Paint (potential Category I)	Asbestos Building Products (potential Category E1)
Potentially Complete Exposure Pathways	Dermal contact and soil ingestion for current site users, earthworks contractors during soil disturbance works – incomplete as concentrations of identified contaminants were all below NES-CS SCS (/selected contaminant concentrations below background concentrations). Dermal contact and soil ingestion for future site users during future soil disturbance – incomplete as concentrations of identified contaminants were all below NES-CS SCS (/selected contaminant concentrations below background concentrations). Discharges to surface water/groundwater during soil disturbance – incomplete as lead concentrations above AUP-OP PA criteria were found to be limited to surface soils only; remainder of concentrations below background concentrations.		Inhalation of airborne asbestos fibres for current site user, workers, demolition contractors during demolition and soil disturbance works – incomplete as asbestos was absent from the analysed soil sample. Inhalation of airborne asbestos fibres for future site users during future soil disturbance works – incomplete as asbestos was absent from the analysed soil sample.
Applicable Human Health Guideline Criteria	National Environmental Standards for Assessing and Managing Contaminants in Soil (NES-CS) to Protect Human Health – Soil Contaminant Standards (SCS) and Soil Guideline Values (SGV) – Commercial/Industrial land use scenario.		New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2017) soil guideline values and HSWA (Asbestos) 2016 Regulations.
Applicable Discharge Criteria	Auckland Unitary Plan, Operative in Part – Contaminated Land Rules E30.		N/A

7.0 Regulatory Assessment (Contaminated Land)

7.1 Application of the NES-CS

The NES-CS regulations apply to activities being undertaken at the site, in areas where more-likely-than-not HAIL activities have occurred. In this case, these HAIL activities may have impacted soils surrounding the main dwelling (i.e., including the curtilage), the storage shed, the potential spray race/sheep dip and the shearing shed.

For the discrete areas of the site where HAIL activities have been confirmed (as outlined in Table 3 above), and contaminants have been detected in soil samples at concentrations above the published background concentrations of non-volcanic soils in the Auckland region but below the NESCS SCSs/SGVs for commercial/industrial land use, a **controlled activity** consent under Regulation 9 of the NES-CS will be required for the proposed soil disturbance. A Contaminated Site Management Plan (CSMP) and Remedial Action Plan (RAP) has been prepared by PDP (2024b) for the Sutton Block to support above mentioned resource consent application (refer Figure 2).

The NES-CS does not apply to the remaining areas of the site where sampling and analysis results confirm contaminant concentrations comply with background ranges (i.e. the potential spray race/sheep dip area complying with NES-CS Regulation 5(9)).

7.2 Application of AUP-OP E30 Rules

Discharges of contaminants into air, or into water, or onto or into land from disturbing soil on land containing elevated levels of contaminants as a permitted activity are regulated by AUP-OP rules E30.6.1.2 and E30.6.1.4.

Rule E30.6.1.2 requires that:

- ✧ The volume of cumulative soil disturbance at a site is less than 200 m³;
- ✧ The discharge must not contain separate phase liquid contaminants; and
- ✧ The duration of soil disturbance must not exceed two months.

Rule E30.6.1.4 requires that:

- ✧ Contaminant concentrations, or the 95% upper confidence limit of the mean concentration, must not exceed:
 - The AUP-OP permitted activity soil acceptance criteria;
 - For contaminants not included in the AUP-OP permitted activity soil acceptance criteria, a number of additional specified guidelines; or
 - The natural background levels for that soil or fill material or the relevant background levels specified in Table E30.6.1.4.2; and
- ✧ Any discharge from land containing elevated levels of contaminants must not contain separate phase liquid contaminants.

While the lead concentration of two surface soil sample exceeds the AUP-OP PA soil acceptance criteria, the volume of this lead-contaminated soil is estimated to be below 200 m³ (the area immediately surrounding the sample locations, and to a depth of 0.3 m bgl). Therefore, it is considered that a consent for contaminated land rules under the AUP-OP is not required for the soil disturbance associated with the proposed quarry extension. Further, a discharge consent is not considered to be required as the quantity of soils containing lead at concentrations above the PA criteria is of a minor volume and the representative soil impacts have been delineated to be limited to the topsoil and are located above the groundwater table.

8.0 Soil Disposal Classification

Due to the site investigation area being located within the future Quarry Pit, PDP has been advised that soils within the investigation area will be excavated, stockpiled and disposed of. Further soil disposal classifications as outlined below.

8.1 Contaminated Soils

Lead contaminated soils exceeding the AUP-OP PA soil acceptance criteria and the published background concentration of non-volcanic soils in the Auckland region but below the NES-CS SCSs/SGVs for commercial/industrial land use have been identified to the south of the main dwelling and to the north of the storage shed.

The known lateral extent of these lead-impacted soils comprise the soil within 3 m to the southwest of the main dwelling and the soil within 3 m to the north of the storage shed. Additional soil validation samples will be required to be collected near the main dwelling to confirm the lateral extent to the northwest, northeast and southeast of the excavation once contaminated material has been removed. Additional soil validation samples will also be required to be collected near the storage shed to confirm the lateral extent to the south, east and west of the excavation once contaminated material has been removed.

The vertical extent of lead contaminated soils is expected to extend to natural ground (identified at depths between 0.1-0.3 m below ground level) and validation inspection/sampling will be completed (where required) following removal of the topsoil layer.

These soils will require to be disposed of at a landfill appropriately licensed to accept material of this nature as lead concentrations exceed the AUP-OP PA (and Drury Managed Fill) soil acceptance criteria (in SQ_SS16 and SQ_SS19).

8.2 Impacted Soils

Lead impacted soils containing concentrations of contaminants above the published background concentrations of non-volcanic soils in the Auckland region but below the AUP-OP PA soil acceptance criteria and the NES-CS SCSs/SGVs for commercial/industrial land use have been identified within the halo of the main dwelling, the halo of the western shed, the northern and eastern halos of the storage shed and the halo of the shearing shed.

Additional soil validation samples will be required to be collected at these locations once impacted material has been removed to confirm the lateral extent of impacted material.

The vertical extent of impacted soils is expected to extend to natural ground (identified at depths between 0.1-0.3 m below ground level). Validation inspection/sampling will be required following removal of the topsoil layer.

These soils will require to be disposed of at a managed fill appropriately licensed to accept material of this nature (i.e. material complying with the AUP-OP PA (and Drury Managed Fill) criteria).

8.3 Clean Fill

The remaining soils across the site meet the AUP-OP PA soil acceptance criteria and the published background concentrations of non-volcanic soils in the Auckland region and as such, can be removed offsite to be re-used at another site or to a disposal facility at the discretion of the site operator (without restriction from a contamination perspective).

9.0 Conclusion and Recommendations

PDP has been engaged by SAL to undertake a DSI of the site area surrounding the main dwelling and associated structures located on 1189 Ponga Road, Drury, which is a part of the larger Sutton Block Extension. The objectives of this DSI were to assess the likelihood of human health and environmental risks associated with residual soil impacts from past HAIL activities undertaken at the site. In addition, the DSI aimed to provide guidance on the requirements for applicable resource consents in relation to the NES-CS and the AUP-OP contaminated land rules.

The key findings of this DSI are as follows:

- ✧ No fill material was identified during the site investigation.
- ✧ No olfactory or visual signs of contamination were identified during the site investigation.
- ✧ No groundwater was identified during the site investigation.
- ✧ Fragments of suspected ACM were noted at the southern end of the shearing shed, although soil sample results confirmed no related asbestos materials in underlying soils.
- ✧ All analysed soil samples report heavy metals concentrations of contaminants that are below the NES-CS SCSs and SGVs for commercial/industrial land use, but above background ranges and/or the AUP-OP PA soil acceptance criteria within the building halos.
- ✧ No detectable concentrations of OCPs and/or semi-quantitative asbestos were identified.

Surface and near-surface soil samples collected from the main dwelling, storage shed and shearing shed report concentrations of heavy metals in excess of background criteria and hence cannot comply with NES-CS Regulation 5(9), indicating a **controlled activity** consent will be required under the NES-CS during soil disturbance in this area of the site. Whereas samples collected from the potential spray race/sheep dip area have concentrations of heavy metals and OCPs that are below background criteria and hence comply with NES-CS Regulation 5(9). The NES-CS framework does not apply to these areas.

Areas of the site report soil contaminant concentrations in excess of the AUP-OP PA criteria, but based on the total volume of soils represented by these samples being less than 200 m³ consent category under the AUP-OP is expected to be a Permitted Activity consent.

10.0 References

- AUP-OP, 2021. Auckland Unitary Plan; Operative in Part.
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- MfE, 2021a. Contaminated Land Management Guidelines No. 1. Reporting on Contaminated Sites in New Zealand. Ministry for the Environment.
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PDP, 2024a. Updated - Sutton Block Extension to Drury Quarry – Preliminary Site Investigation. Pattle Delamore Partners Limited.

PDP, 2024b. Updated - Sutton Block Extension to Drury Quarry – Contaminated Site Management and Remedial Action Plan. Pattle Delamore Partners Limited.

T+T, in preparation. *Drury Quarry, Sutton Block, Assessment of Environmental Effects*. Tonkin + Taylor.

11.0 Limitations

This document has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Stevenson Aggregates Limited. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the document. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This document has been prepared based on the collection and laboratory analysis of 18 soil samples from 23 locations within the site for heavy metals, OCPs and/or the semi-quantitative asbestos. The site conditions as described in this document have been interpreted from, and are subject to, this information and its limitations and accordingly PDP does not represent that its interpretation accurately represents the full site conditions.

This assessment is limited to collection and analysis of soil samples from discrete sampling locations. Interpretations of subsurface conditions, including contaminant concentrations, are not guaranteed at distance away from the specific points of sampling.

The information contained within this document applies to soil sampling undertaken on the dates stated in this document, or if none is stated, the date of this document. With time, the site conditions and environmental standards may change. Accordingly, the reported assessments and conclusions are not guaranteed to apply at a later date.

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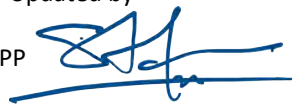
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Yours faithfully

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Prepared by

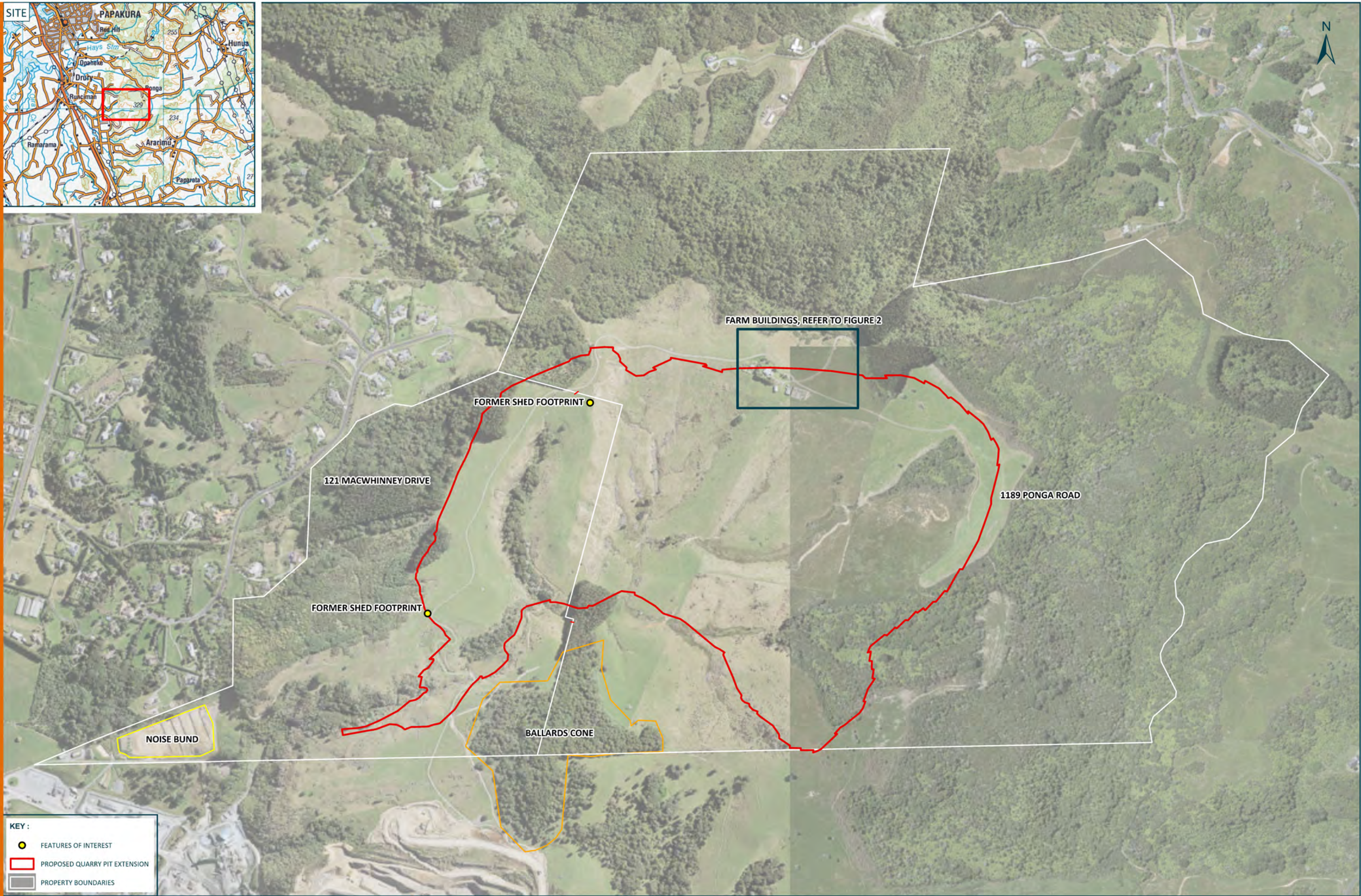
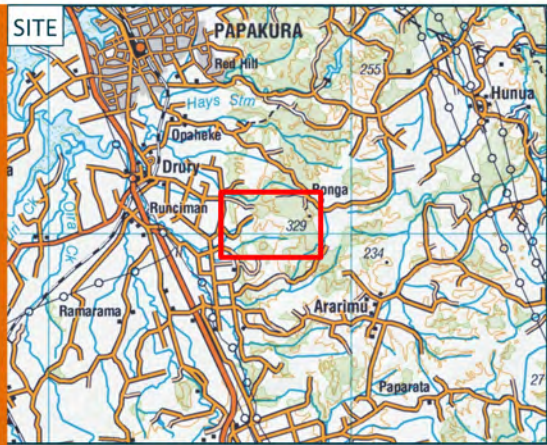


Nathan van Maanen
Environmental Scientist

Approved by



Rod Lidgard – CEnvP SC, LAA
Technical Director - Contaminated Land



KEY :

- FEATURES OF INTEREST
- ▭ PROPOSED QUARRY PIT EXTENSION
- ▭ PROPERTY BOUNDARIES



0 100 200
METRES
SCALE : 1:8,500 (A3)

THIS DRAWING REMAINS THE PROPERTY OF PATTLE DELAMORE PARTNERS LTD AND MAY NOT BE REPRODUCED OR ALTERED WITHOUT WRITTEN PERMISSION. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THE DRAWING.

D	FINAL	JAN 24	ME
C	ISSUED FOR REVIEW	OCT 23	TK
B	ISSUED FOR REVIEW	JAN 22	TK
A	ISSUED FOR REVIEW	DEC 21	TK
NO.	REVISION	DATE	BY

SOURCE:
1. AERIAL IMAGERY (FLOWN 2017) SOURCED FROM THE LINZ DATA SERVICE www.linz.govt.nz/about-linz/linz-data-service/help/using-linz-data/attributing-aerial-imagery-data AND LICENCED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET DERIVED FROM LINZ DATA.



FIGURE
FIGURE 1 - GENERAL SITE LOCATION PLAN

PROJECT
UPDATED - SUTTON BLOCK EXTENSION TO DRURY QUARRY - PRELIMINARY SITE INVESTIGATION



KEY :

- FEATURES OF INTEREST
- ▨ PROPOSED QUARRY PIT EXTENSION



0 10 20
METRES
SCALE : 1:750 (A3)

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2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET DERIVED FROM LINZ DATA.

CLIENT
STEVENSON

FIGURE
FIGURE 2 - FARM BUILDINGS

PROJECT
UPDATED - SUTTON BLOCK EXTENSION TO DRURY QUARRY - PRELIMINARY SITE INVESTIGATION

Table 2: Soil Analytical Results - Heavy Metals ¹, Organochlorine Pesticides (OCPs) ¹ and Asbestos ² - COMMERCIAL/INDUSTRIAL LAND USE ³

Sample Name	SQ_SS01	SQ_SS02	SQ_SS03	SQ_SS04	SQ_SS06	SQ_SS08	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁵ / Waste Acceptance Criteria ⁶	NES SCS & SGV Commercial/Industrial ⁷
Lab Identification Number	2862111.1	2862111.2	2862111.3	2862111.4	2862111.6	2862111.8			
Date Sampled	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022			
Sample Depth (m bgl)	0.1	0.1	0.1	0.1	0.1	0.1	Non-volcanic ⁴		
Heavy Metals									
Arsenic	5	4	5	-	-	-	0.4 - 12	100	70
Cadmium	0.14	0.14	0.13	-	-	-	< 0.1 - 0.65	7.5	1,300
Chromium (total)	14	15	16	-	-	-	2 - 55	400	6,300 ^{7a}
Copper	15	17	16	-	-	-	1 - 45	325	> 10,000
Lead	6.6	8.0	8.5	99	66	140	< 5 - 65	250	3,300 ^{7b}
Nickel	10	12	12	-	-	-	0.9 - 35	105	6,000 ⁸
Zinc	47	52	55	-	-	-	9 - 180	400	400,000 ⁸
Organochlorine Pesticide (OCPs)									
Total DDT	ND	ND	ND	-	-	-	-	12	1,000
Dieldrin	ND	ND	ND	-	-	-	-	-	160 ⁹
All other OCPs	ND	ND	ND	-	-	-	-	-	-
Asbestos Semi-Quantitative									
Lab Identification Number	-	-	-	-	-	2864530.1	-	-	-
Present (Y/N) ¹⁰	-	-	-	-	-	N	-	-	-
Description of Asbestos Form	-	-	-	-	-	-	-	-	-
Asbestos as ACM ¹¹	-	-	-	-	-	ND	-	-	0.05 ¹³
Asbestos Fines / Fibrous Asbestos ¹²	-	-	-	-	-	ND	-	-	0.001 ¹³

100	Concentration above Auckland Council background criteria for non-volcanic soils
100	Concentration above AUP OP criteria
ND	Concentration(s) below laboratory limit of detection
-	Parameter not tested/No guideline value available

Notes.

- Results in mg/kg.
- Results as weight for weight percentage (w/w%) of the total sample.
- Based on proposed future land use.
- Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - Non-volcanic range.
- Criteria from Table E30.6.1.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
- As the Drury Quarry Waste Acceptance Criteria and Auckland Unitary Plan Operative in part's permitted activity soil acceptance criteria are the same, they have been combined into one column.
- NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Commercial/industrial.
- SCS value is for chromium VI.
- SCS value is for inorganic lead.
- Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013 - Commercial/industrial D.
- The SCS is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrin if both are involved.
- Asbestos presence/absence from analytical testing ('Y' = yes or 'N' = no).
- Weight of asbestos in ACM as a percent of the total sample (weight for weight percent (w/w%)).
- Combined fibrous asbestos and asbestos fines (FA/AF) as weight for weight percentage (w/w%) of the total sample.
- Criteria from New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Guidelines, 2017) - Commercial and industrial.

Table 2 Continue: Soil Analytical Results - Heavy Metals ¹, Organochlorine Pesticides (OCPs) ¹ and Asbestos ² - COMMERCIAL/INDUSTRIAL LAND USE ³

Sample Name	SQ_SS10	SQ_SS12	SQ_SS14	SQ_SS16	SQ_SS16 (0.3)	SQ_SS17	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁵ / Waste Acceptance Criteria ⁶	NES SCS & SGV Commercial/Industrial ⁷
Lab Identification Number	2862111.10	2862111.12	2862111.14	2862111.16	2862111.32	2862111.17			
Date Sampled	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022			
Sample Depth (m bgl)	0.1	0.1	0.1	0.1	0.3	0.1	Non-volcanic ⁴		
Heavy Metals									
Arsenic	-	-	-	-	-	-	0.4 - 12	100	70
Cadmium	-	-	-	-	-	-	< 0.1 - 0.65	7.5	1,300
Chromium (total)	-	-	-	-	-	-	2 - 55	400	6,300 ^{7a}
Copper	-	-	-	-	-	-	1 - 45	325	> 10,000
Lead	37	51	130	420	51	115	< 5 - 65	250	3,300 ^{7b}
Nickel	-	-	-	-	-	-	0.9 - 35	105	6,000 ⁸
Zinc	-	-	-	-	-	-	9 - 180	400	400,000 ⁸

Sample Name	SQ_SS18	SQ_SS19	SQ_SS19 (0.3)	SQ_SS20	SQ_SS21	SQ_SS22	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁵ / Waste Acceptance Criteria ⁶	NES SCS & SGV Commercial/Industrial ⁷
Lab Identification Number	2862111.18	2862111.19	2862111.33	2862111.20	2862111.21	2862111.22			
Date Sampled	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022	9/02/2022			
Sample Depth (m bgl)	0.1	0.1	0.3	0.1	0.1	0.1	Non-volcanic ⁴		
Heavy Metals									
Arsenic	-	-	-	-	-	-	0.4 - 12	100	70
Cadmium	-	-	-	-	-	-	< 0.1 - 0.65	7.5	1,300
Chromium (total)	-	-	-	-	-	-	2 - 55	400	6,300 ^{7a}
Copper	-	-	-	-	-	-	1 - 45	325	> 10,000
Lead	65	350	177	120	111	230	< 5 - 65	250	3,300 ^{7b}
Nickel	-	-	-	-	-	-	0.9 - 35	105	6,000 ⁸
Zinc	-	-	-	-	-	-	9 - 180	400	400,000 ⁸

100	Concentration above Auckland Council background criteria for non-volcanic soils
100	Concentration above AUP OP criteria
ND	Concentration(s) below laboratory limit of detection
-	Parameter not tested/No guideline value available

Notes.

- Results in mg/kg.
- Results as weight for weight percentage (w/w%) of the total sample.
- Based on proposed future land use.
- Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - Non-volcanic range.
- Criteria from Table E30.6.1.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
- As the Drury Quarry Waste Acceptance Criteria and Auckland Unitary Plan Operative in part's permitted activity soil acceptance criteria are the same, they have been combined into one column.
- NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Commercial/Industrial.
- Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
- SCS value is for chromium VI.
- SCS value is for inorganic lead.
- Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013 - Commercial/Industrial D.

Appendix A: Certifying Statements

I, Rod Lidgard, of Pattle Delamore Partners certify that:

1. This combined 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 NES-CS) because it has been:
 - a. Completed by a suitably qualified and experienced practitioner, and
 - b. Completed 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. Certified by a suitably qualified and experienced practitioner.
2. This detailed site investigation concludes that the activities that will occur under regulation 5(2) to (6) are subject to the regulations of the NES-CS because contaminant concentrations exceed the background standards in regulation 5 (9) of NES-CS.

Evidence of the qualifications and experience of the suitably qualified and experienced practitioner(s) who have done this investigation and certified this report is provided below.

Signed



Rod Lidgard, CEnvP (SC), LAA

Technical Director - Contaminated Land

Rod Lidgard – Project Director

Rod is an environmental geologist with 15 years of experience in undertaking environmental and contaminated land assessments. Rod is a Certified Environmental Practitioner – Site Contamination specialist. Certification numbers 1272 CEnvP, and SC41119.



Stefan Yap – Reviewer and Project Manager

Stefan is an environmental scientist with over 19 years of diverse experience within the environmental field throughout New Zealand and Asia Pacific with practical expertise in contaminated land management, environmental regulatory compliance and hazardous waste management. He has a BEnvSc (Hons) from Murdoch University. Stefan has prepared detailed assessments of contaminated sites, conceptual site models, remedial action plans, long-term management & monitoring plans and risk assessments. He has worked as a contaminated land specialist with small and large clients across a wide variety of industries including large-scale infrastructure, transport, oil & gas, energy, telecommunication, construction, education, manufacturing, recreation, agriculture & horticulture, and solid waste.

Nathan van Maanen – Author

Nathan is an environmental scientist who has recently entered the field of contaminated land investigations. He has a BSc in Geography and Environmental Science from The University of Auckland. Nathan has practical experience in a variety of contaminated land assessment techniques and has gained relevant experience in carrying out and reporting on both Preliminary and Detailed Site Investigations.

Myra Belkot – Co-Author

Myra is an environmental scientist with over 3 years' experience in undertaking environmental and contaminated land assessments. She has a BSc in Geography and Environmental Science from Canterbury University of Christchurch. Myra has practical experience in a variety of contaminated land assessment techniques and has relevant experience in carrying out and reporting on both Preliminary and Detailed Site Investigations.



Appendix B: Laboratory Reports



Hill Laboratories

TRIED, TESTED AND TRUSTED

Quote No

Primary Contact Rod Lidgard

Submitted By Myra Belkot

Client Name Pattle Delamore Partners Limited

Address PO BOX 9528 Newmarket

Auckland 1149

Phone Mobile 0223026110

Email

Charge To PDP

Client Reference A02447108

Order No

Results To *Reports will be emailed to Primary Contact by default.
Additional Reports will be sent as specified below.*

☒ Email Primary Contact ☒ Email Submitter ☐ Email Client

☒ Email Other Myra.belkot@pdp.co.nz;

☒ Other Rod.lidgard@pdp.co.nz

ANALYSIS REQUEST

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

Job No: Date Recv: 09-Feb-22 17:15

286 2111

Received by: Sanaya Hansotia



3128621119

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

W www.hill-laboratories.com

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories Date & Time:

Tick if you require COC

☒ to be emailed back

Name:

Signature:

Received at Hill Laboratories

Date & Time:

(Refer to Lab created Job
No above)

Name:

Signature:

Condition

Room Temp

Chilled

Frozen

Temp:



14-0

ADDITIONAL INFORMATION / KNOWN HAZARDS

Priority ☐ Low ☐ Normal ☒ High
☐ Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	SQ_SS01	09 /01/2022	—	S	Hold cold
2	SQ_SS02	09 /01/2022	—	S	
3	SQ_SS03	09 /01/2022	—	S	
4	SQ_SS04	/01/2022 09 /02/22	—	S	
5	SQ_SS05	/01/2022	—	S	
6	SQ_SS06	/01/2022	—	S	

7	SQ_SS07	9 /02/2022	S	Hold Cold
8	SQ_SS08	9 /01/2022	S	
9	SQ_SS09	9 /01/2022	S	
10	SQ_SS10	/01/2022	S	
11	SQ_SS11	/01/2022	S	
12	SQ_SS12	/01/2022	S	
13	SQ_SS13	/01/2022	S	
14	SQ_SS14	/01/2022	S	
15	SQ_SS15	/01/2022	S	
16	SQ_SS16	/01/2022	S	
17	SQ_SS17	/01/2022	S	
18	SQ_SS18	/01/2022	S	
19	SQ_SS19	/01/2022	S	
20	SQ_SS20	/01/2022	S	
21	SQ_SS21	/01/2022	S	
22	SQ_SS22	/01/2022	S	
23	SQ_SS23	/01/2022	S	
24	SQ_SS24 01 (0.3)	/01/2022	S	
25	SQ_SS25 03 (0.3)	/01/2022	S	
26	SQ_SS26 04 (0.3)	/01/2022	S	
27	SQ_SS27 06 (0.2)	/01/2022	S	
28	SQ_SS28 08 (0.3)	/01/2022	S	
29	SQ_SS29 10 (0.25)	/01/2022	S	
30	SQ_SS30 12 (0.2)	/01/2022	S	
31	SQ_SS31 14 (0.25)	/01/2022	S	
32	SQ_SS32 16 (0.3)	/01/2022	S	
33	SQ_SS33 19 (0.3)	/01/2022	S	
34	SQ_SS34 22 (0.3)	/01/2022	S	
35	SQ_SS35 28 (0.3)	/01/2022	S	



Job Information Summary

Page 1 of 2

Client:	Pattle Delamore Partners Limited	Lab No:	2862111
Contact:	R Lidgard	Date Registered:	10-Feb-2022 5:49 pm
	C/- Pattle Delamore Partners Limited	Priority:	High
	PO Box 9528	Quote No:	81087
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	A02447108
		Add. Client Ref:	
		Submitted By:	Myra Belkot
		Charge To:	Pattle Delamore Partners Limited
		Target Date:	21-Feb-2022 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	SQ_SS01 09-Feb-2022	Soil	cGSoil	Heavy Metals, Screen Level; Organochlorine Pesticides Screening in Soil
2	SQ_SS02 09-Feb-2022	Soil	GSoil300	Heavy Metals, Screen Level; Organochlorine Pesticides Screening in Soil
3	SQ_SS03 09-Feb-2022	Soil	GSoil300	Heavy Metals, Screen Level; Organochlorine Pesticides Screening in Soil
4	SQ_SS04 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
5	SQ_SS05 09-Feb-2022	Soil	GSoil300	Hold Cold
6	SQ_SS06 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
7	SQ_SS07 09-Feb-2022	Soil	GSoil300	Hold Cold
8	SQ_SS08 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
9	SQ_SS09 09-Feb-2022	Soil	GSoil300	Hold Cold
10	SQ_SS10 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
11	SQ_SS11 09-Feb-2022	Soil	GSoil300	Hold Cold
12	SQ_SS12 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
13	SQ_SS13 09-Feb-2022	Soil	GSoil300	Hold Cold
14	SQ_SS14 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
15	SQ_SS15 09-Feb-2022	Soil	cGSoil	Hold Cold
16	SQ_SS16 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
17	SQ_SS17 09-Feb-2022	Soil	GSoil300	Hold Cold
18	SQ_SS18 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
19	SQ_SS19 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
20	SQ_SS20 09-Feb-2022	Soil	GSoil300	Hold Cold
21	SQ_SS21 09-Feb-2022	Soil	cGSoil	Total Recoverable Lead
22	SQ_SS22 09-Feb-2022	Soil	GSoil300	Total Recoverable Lead
23	SQ_SS23 09-Feb-2022	Soil	cGSoil	Hold Cold
24	SQ_SS01 (0.3) 09-Feb-2022	Soil	GSoil300	Hold Cold
25	SQ_SS03 (0.3) 09-Feb-2022	Soil	GSoil300	Hold Cold
26	SQ_SS04 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold
27	SQ_SS06 (0.2) 09-Feb-2022	Soil	cGSoil	Hold Cold
28	SQ_SS08 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold
29	SQ_SS10 (0.25) 09-Feb-2022	Soil	cGSoil	Hold Cold
30	SQ_SS12 (0.2) 09-Feb-2022	Soil	cGSoil	Hold Cold
31	SQ_SS14 (0.25) 09-Feb-2022	Soil	cGSoil	Hold Cold
32	SQ_SS16 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold
33	SQ_SS19 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold
34	SQ_SS22 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold
35	SQ_SS28 (0.3) 09-Feb-2022	Soil	cGSoil	Hold Cold

Samples				
No	Sample Name	Sample Type	Containers	Tests Requested
36	SQ_SS28 09-Feb-2022	Soil	cGSoil	Heavy Metals, Screen Level; Organochlorine Pesticides Screening in Soil; Polycyclic Aromatic Hydrocarbons Screening in Soil

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-4, 6, 8, 10, 12, 14, 16, 18-19, 21-22, 36
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	4, 6, 8, 10, 12, 14, 16, 18-19, 21-22
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	36
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-3, 36
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1-3, 36
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	36
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-3, 36
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	4, 6, 8, 10, 12, 14, 16, 18-19, 21-22
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	4, 6, 8, 10, 12, 14, 16, 18-19, 21-22
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	36
Benzo[a]pyrene Toxic Equivalence (TEF)	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	36



Certificate of Analysis

Page 1 of 4

Client:	Pattle Delamore Partners Limited	Lab No:	2862111	SPv5
Contact:	R Lidgard	Date Received:	09-Feb-2022	
	C/- Pattle Delamore Partners Limited	Date Reported:	13-Apr-2022	
	PO Box 9528	Quote No:	81087	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	A02447108	
		Submitted By:	Myra Belkot	

Sample Type: Soil

Sample Name:	SQ_SS01	SQ_SS02	SQ_SS03	SQ_SS04	SQ_SS06
	09-Feb-2022	09-Feb-2022	09-Feb-2022	09-Feb-2022	09-Feb-2022
Lab Number:	2862111.1	2862111.2	2862111.3	2862111.4	2862111.6

Individual Tests

Dry Matter	g/100g as rcvd	82	86	85	-	-
Total Recoverable Lead	mg/kg dry wt	-	-	-	99	66

Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	5	4	5	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.14	0.13	-	-
Total Recoverable Chromium	mg/kg dry wt	14	15	16	-	-
Total Recoverable Copper	mg/kg dry wt	15	17	16	-	-
Total Recoverable Lead	mg/kg dry wt	6.6	8.0	8.5	-	-
Total Recoverable Nickel	mg/kg dry wt	10	12	12	-	-
Total Recoverable Zinc	mg/kg dry wt	47	52	55	-	-

Organochlorine Pesticides Screening in Soil

Aldrin	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
alpha-BHC	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
beta-BHC	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
delta-BHC	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
cis-Chlordane	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
trans-Chlordane	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
2,4'-DDD	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
4,4'-DDD	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
2,4'-DDE	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
4,4'-DDE	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
2,4'-DDT	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
4,4'-DDT	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.07	< 0.07	-	-
Dieldrin	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endosulfan I	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endosulfan II	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endrin	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endrin aldehyde	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Endrin ketone	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Heptachlor	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-
Methoxychlor	mg/kg dry wt	< 0.012	< 0.012	< 0.012	-	-



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Sample Type: Soil						
Sample Name:		SQ_SS08 09-Feb-2022	SQ_SS10 09-Feb-2022	SQ_SS12 09-Feb-2022	SQ_SS14 09-Feb-2022	SQ_SS16 09-Feb-2022
Lab Number:		2862111.8	2862111.10	2862111.12	2862111.14	2862111.16
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	140	37	51	130	420
Sample Name:		SQ_SS17 09-Feb-2022	SQ_SS18 09-Feb-2022	SQ_SS19 09-Feb-2022	SQ_SS20 09-Feb-2022	SQ_SS21 09-Feb-2022
Lab Number:		2862111.17	2862111.18	2862111.19	2862111.20	2862111.21
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	115	65	350	120	111
Sample Name:		SQ_SS22 09-Feb-2022	SQ_SS16 (0.3) 09-Feb-2022	SQ_SS19 (0.3) 09-Feb-2022	SQ_SS28 09-Feb-2022	
Lab Number:		2862111.22	2862111.32	2862111.33	2862111.36	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	83	-
Total Recoverable Lead	mg/kg dry wt	230	51	177	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	3	-
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	0.20	-
Total Recoverable Chromium	mg/kg dry wt	-	-	-	7	-
Total Recoverable Copper	mg/kg dry wt	-	-	-	4	-
Total Recoverable Lead	mg/kg dry wt	-	-	-	8.3	-
Total Recoverable Nickel	mg/kg dry wt	-	-	-	3	-
Total Recoverable Zinc	mg/kg dry wt	-	-	-	17	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.012	-
alpha-BHC	mg/kg dry wt	-	-	-	< 0.012	-
beta-BHC	mg/kg dry wt	-	-	-	< 0.012	-
delta-BHC	mg/kg dry wt	-	-	-	< 0.012	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.012	-
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.012	-
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.012	-
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.012	-
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.012	-
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.012	-
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.012	-
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.012	-
4,4'-DDT	mg/kg dry wt	-	-	-	< 0.012	-
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.08	-
Dieldrin	mg/kg dry wt	-	-	-	< 0.012	-
Endosulfan I	mg/kg dry wt	-	-	-	< 0.012	-
Endosulfan II	mg/kg dry wt	-	-	-	< 0.012	-
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.012	-
Endrin	mg/kg dry wt	-	-	-	< 0.012	-
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.012	-
Endrin ketone	mg/kg dry wt	-	-	-	< 0.012	-
Heptachlor	mg/kg dry wt	-	-	-	< 0.012	-
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.012	-
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.012	-
Methoxychlor	mg/kg dry wt	-	-	-	< 0.012	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	< 0.3	-
1-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.012	-
2-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.012	-
Acenaphthylene	mg/kg dry wt	-	-	-	< 0.012	-
Acenaphthene	mg/kg dry wt	-	-	-	< 0.012	-
Anthracene	mg/kg dry wt	-	-	-	< 0.012	-
Benzo[a]anthracene	mg/kg dry wt	-	-	-	< 0.012	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	< 0.012	-

Sample Type: Soil						
Sample Name:		SQ_SS22 09-Feb-2022	SQ_SS16 (0.3) 09-Feb-2022	SQ_SS19 (0.3) 09-Feb-2022	SQ_SS28 09-Feb-2022	
Lab Number:		2862111.22	2862111.32	2862111.33	2862111.36	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	< 0.03	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	< 0.03	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	-	< 0.012	-
Benzo[e]pyrene	mg/kg dry wt	-	-	-	< 0.012	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	< 0.012	-
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	< 0.012	-
Chrysene	mg/kg dry wt	-	-	-	< 0.012	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.012	-
Fluoranthene	mg/kg dry wt	-	-	-	< 0.012	-
Fluorene	mg/kg dry wt	-	-	-	< 0.012	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	< 0.012	-
Naphthalene	mg/kg dry wt	-	-	-	< 0.06	-
Perylene	mg/kg dry wt	-	-	-	< 0.012	-
Phenanthrene	mg/kg dry wt	-	-	-	< 0.012	-
Pyrene	mg/kg dry wt	-	-	-	< 0.012	-

Analyst's Comments

The matrix of samples 2862111.36 has affected the System Monitoring Compounds 1-methylnaphthalene-d10, Fluoranthene-d10 and Benzo[a]pyrene-d12 in the PAH analysis, whereby the recoveries ranged from 60%-65%. Therefore the results may be underestimated.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-4, 6, 8, 10, 12, 14, 16-22, 32-33, 36
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	4, 6, 8, 10, 12, 14, 16-22, 32-33
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	36
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-3, 36
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1-3, 36
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	36
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-3, 36
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	4, 6, 8, 10, 12, 14, 16-22, 32-33
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	4, 6, 8, 10, 12, 14, 16-22, 32-33

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	36
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	36

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

Testing was completed between 17-Feb-2022 and 13-Apr-2022. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental



Certificate of Analysis

Page 1 of 2

Client:	Pattle Delamore Partners Limited	Lab No:	2864530	A2Pv1
Contact:	R Lidgard	Date Received:	10-Feb-2022	
	C/- Pattle Delamore Partners Limited	Date Reported:	21-Feb-2022	
	PO Box 9528	Quote No:	81087	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	A02447108	
		Submitted By:	Myra Belkot	

Sample Type: Soil

Sample Name:	SQ_SS08				
Lab Number:	2864530.1				
Asbestos Presence / Absence	Asbestos NOT detected.	-	-	-	-
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	-	-	-	-
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	-	-	-	-
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	-	-	-	-
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	-	-	-	-
As Received Weight	g 562.8	-	-	-	-
Dry Weight	g 459.3	-	-	-	-
Moisture	% 18	-	-	-	-
Sample Fraction >10mm*	g dry wt 7.8	-	-	-	-
Sample Fraction <10mm to >2mm*	g dry wt 278.1	-	-	-	-
Sample Fraction <2mm*	g dry wt 171.7	-	-	-	-
<2mm Subsample Weight*	g dry wt 51.2	-	-	-	-
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	-	-	-	-
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001	-	-	-	-
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	-	-	-	-

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
 - Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
 - ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
 - ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
 - Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
 - Trace - Trace levels of asbestos, as defined by AS4964-2004.
- For further details, please contact the Asbestos Team.

Please refer to the **BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil**.
<https://www.branz.co.nz/asbestos>

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.



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Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <10mm to >2mm*	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	-	1
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1

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

Testing was completed between 18-Feb-2022 and 21-Feb-2022. For completion dates of individual analyses please contact the laboratory.

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

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