



**Pakowhai Secondary
Stopbank**

Detailed Site Investigation

Prepared for
Hawke's Bay Regional Council

Prepared by
Tonkin & Taylor Ltd

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1 Introduction

HBRC has commissioned Tonkin & Taylor Ltd (T+T) to undertake contaminated land investigations for the proposed Pakowhai Secondary Stopbank (herein referred to as ‘the site’). The location of the site is presented in Figure 1.1 below, with individual investigation sites labelled (refer Section 1.2). This investigation builds on a preliminary site investigation (PSI) with preliminary soil sampling, completed by T+T in September 2024¹, which identified the need for further assessment in specific portions of the site. This investigation was carried out concurrently with a geotechnical investigation².

This report was undertaken in accordance with our proposal of 5 August 2024 and subsequent variations.

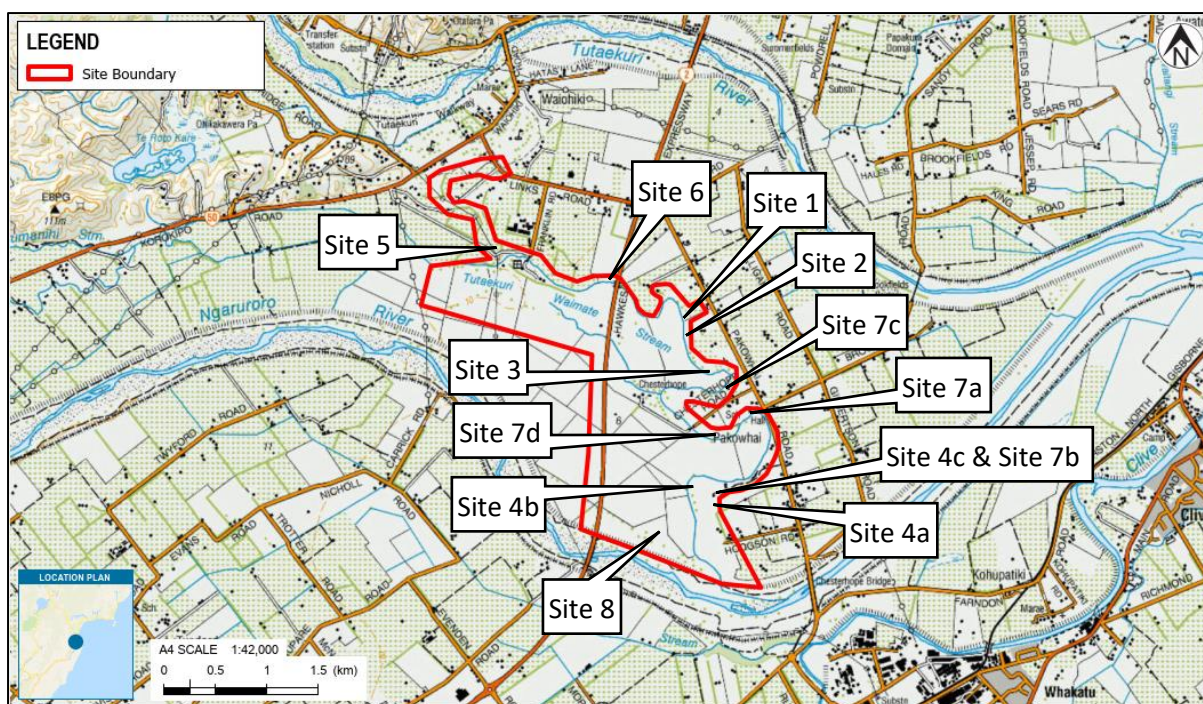


Figure 1.1: Site Location. Pakowhai Secondary Stopbank site location. Topomap sourced from Land Information New Zealand (crown copyright reserved).

1.1 Background

HBRC proposes to realign the Pakowhai Secondary Stopbank as part of the post Cyclone Gabrielle flood mitigation works. The proposed works will involve soil disturbance to source additional material from borrow areas, and to realign, rehabilitate and extend the existing stopbank.

HBRC have been granted an Order in Council (Oic) to reduce the regulatory pathways for the flood mitigation work. The Oic replaces the typical consenting pathway under the district and regional plans for the construction of the stopbank and includes a specific contaminated land related condition (Condition 17) to minimise human health and environmental effects from the disturbance and/or discharge of contaminated land. The Oic defines contaminated land as “land to which the

¹ T+T, September 2024. Pakowhai Secondary Stopbank – Preliminary Site Investigation. T+T ref- 1017353.2403 v1.

² Not yet finalised

Resource Management (National Environmental Standard for assessing and managing contaminants in soil to protect human health) regulations [(NESCS)³] apply.”

T+T carried out a PSI in 2024 to assess whether HAIL activities⁴ have occurred along the stopbank alignment, and the potential for these activities to have resulted in ground contamination. The PSI identified both confirmed and potential HAIL activities within the works area and therefore concluded that the NESCS would apply and the OiC contaminated land provisions are triggered for the proposed works.

The PSI identified that further investigation is required to assess the potential risks and implications associated with ground contamination in specific portions of the site, as described in Section 1.2 and Section 2, below.

1.2 Objective and scope of work

The objective of this investigation was to supplement existing information detailed in the PSI to further assess the nature and extent of ground contamination within the Pakowhai Secondary Stopbank works area. In particular, this investigation targeted specific portions of the site where confirmed or potential HAIL activities were identified in the PSI, and/or where soil disturbance works are proposed. This investigation informs management of contaminated land, including options for offsite disposal (if required) for the works, which will be documented as part of a Contaminated Site Management Plan (CSMP).

This report has been prepared in general accordance with the requirements for a detailed site investigation (DSI), referred to in the NESCS regulations, and as outlined in the Ministry for the Environment (MfE) Contaminated Land Management Guidelines (CLMG)⁵. We acknowledge that this report does not meet some of the requirements for a DSI, such as preparation of a conceptual site model (CSM), however, this is not expected to be required under the OiC process for the stopbank construction project and will instead be considered in the CSMP.

The persons undertaking, managing, certifying and undertaking technical review of this investigation are suitably qualified and experienced practitioners (SQEP), as required by the NESCS and defined in the NESCS Users' Guide (April 2012)⁶.

The areas of additional investigation included (as illustrated on Figure 1.1 and Figures A1 to A12, Appendix A):

- The private closed landfill at 2008 Pakowhai Road ('Site 1').
- The area of stockpiling and soil disturbance at 2026 Pakowhai Road ('Site 2').
- An area of buried building waste at 1980 Pakowhai Road ('Site 3').
- A stock burial area ('Site 4a'), farm waste area ('Site 4b'), and existing woolshed and stockyard ('Site 4c') at 1854 Pakowhai Road.
- An area of stockpiled waste materials at 56 Franklin Road ('Site 5').
- A storage and stockpiling area at the rear of 1023 Links Road ('Site 6').

³ Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

⁴ 'HAIL' refers to Ministry for the Environment's Hazardous Activities and Industries List (HAIL) which identifies activities and industries that have the potential to have resulted in ground contamination.

⁵ Ministry for the Environment, 2021. *Contaminated Land Management Guidelines No 1 – Reporting on Contaminated Sites in New Zealand*.

Ministry for the Environment, 2021. *Contaminated Land Management Guidelines No 5 – Site Investigation and Analysis of Soils*.

⁶ Ministry for the Environment, 2012. *Users' Guide - National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*.

- Discrete areas where asbestos-containing material (ACM) and/or lead paint may have been used in building construction⁷ ('Sites 7a to 7c').
- A storage and stockpiling area at the rear of 47 Chesterhope Road ('Site 7d').
- Southern-most proposed borrow area at the rear of Chesterhope Station ('Site 8').

Further information regarding the identification and potential contamination of the above-mentioned sites are provided in the PSI report.

The following scope of work was undertaken to meet the above objective:

- A site walkover inspection at each individual investigation area to assess evidence of contamination, and appropriate sampling locations.
- Excavation and observation of 35 machine-dug test pits⁸, and collection of soil samples from various depths between 0.05 and 3.5 m below ground level (bgl). The test pits were positioned to target and delineate areas of buried fill (i.e. Sites 1, 2, 3, and 4a and 4b).
- Collection of surface soil samples from 53 hand-dug locations, including one composite soil sample.
- Collection of 14 samples from stockpiled soils around the site.
- Collection of 12 fragments of suspected ACM, from the ground surface or from test pit excavations.
- Laboratory analysis of 135 samples for contaminants of concern, including six field duplicate samples.
- Assessment of laboratory testing results against relevant assessment criteria.
- Preparation of this report documenting the findings of the additional investigation including the nature and extent of ground contamination at the site.

2 Field investigation

The field investigation was undertaken between 3 and 6 December 2024. Sample locations are shown on Figures A1 to A12, Appendix A, along with the approximate stopbank alignment (including multiple potential alignment options in some areas) and notable site features. For sample depths and material type, refer to Table B1, Appendix B.

We consider investigations carried out at the site to date constitute a DSI commensurate with the potential effects associated with the current development proposal.

2.1 Sampling rationale

Samples were positioned to target specific areas and depths of contamination based on the findings of the PSI and site observations. A summary of the soil sampling and analysis, with the sampling rationale for each area is detailed in Table 2.1, below.

Sampling for asbestos (and for other potential contaminants in some areas where asbestos was not the only contaminant of concern) was carried out in accordance with the Asbestos in Soil Guidelines. In particular, the sampling regime involved:

- Sampling on an approximately 17-20 m systematic grid basis (as site conditions allowed) at Sites 1, 2 and 3, in general accordance with the recommended density for an 'initial screen for asbestos' when the likelihood of asbestos is 'suspected', as set out in the Asbestos in Soil

⁷ Pakowhai Memorial Hall at 1912 Pakowhai Road, woolshed and farm buildings at 1854 Pakowhai Road, residential outbuildings at 22 Chesterhope Road.

⁸ Includes TP406, TP408, TP411, TP412 and TP413, carried out as part of the concurrent geotechnical investigation.

Guidelines⁹. Samples were collected at various depths from fill within these areas. While, in some areas, the sampling does not meet the recommended density we consider it to be sufficient to inform development implications considering the findings and objective of the investigation.

- Sampling at 5-10 m intervals (as site conditions allowed) around the perimeter of buildings containing suspected ACM products (Sites 7a and 7c). Where suspected ACM products were only observed in specific parts of the building (e.g. single panels), samples were collected adjacent to these sides of the buildings only.
- In areas where suspected ACM fragments were observed on the ground surface but where asbestos was not identified as a contaminant of concern during the PSI (Sites 4a, 4b, 6 and 7d), samples were collected on a judgemental (targeted) basis from areas where suspected ACM was identified.

Sampling for other contaminants where asbestos was not a contaminant of concern was generally carried out on a judgemental basis, with investigation locations positioned to target potential sources of contamination (e.g. burn pits, stockpiled soils etc). In some areas, samples were collected from the ground surface to give an indication of concentrations away from potential ground contamination sources. Stockpile samples were collected on a judgemental grab-sampling basis, from soils representative of the stockpile.

⁹ BRANZ, 2017. *New Zealand Guidelines for Assessing and Managing Asbestos in Soil*.

Table 2.1: Rationale and sampling/analysis summary

Site area ID and address	Potential for contamination and HAIL category (where applicable)	Investigation and sample ID	Laboratory analysis
Site 1 2008 Pakowhai Road (refer Figure A9)	Uncontrolled filling, including demolition, domestic, and agricultural waste, and stockpiling of fill soils in various areas around site: <ul style="list-style-type: none">Private closed landfill (Site 1).Area of stockpiling and soil disturbance (Site 2).Buried demolition waste area (Site 3).Stock burial area (Site 4a).Farm dump area (Site 4b).Stockpiled farm waste material (Site 5).	15 x investigation locations: S1_TP1 to TP11, TP413, S1_SP1 to SP3 3 x suspected ACM fragments: S1_Bulk1, S1_Bulk2, S1_TP2_Bulk3	<ul style="list-style-type: none"> 23 x heavy metals¹⁰, (+ 2 x TCLP/SPLP analysis¹¹) 4 x OCP 3 x PAH/TPH 25 x semi-quantitative asbestos analysis 3 x bulk asbestos presence/absence
Site 2 2026 Pakowhai Road (refer Figure A8)	Surface refuse was also identified in a number of these areas, including suspected ACM fragments. Potential for a wide range of contaminants depending on the source of the fill material, typically asbestos and heavy metals, with the potential for hydrocarbons (total petroleum hydrocarbons and polycyclic aromatic hydrocarbons, TPH/PAH) and organochlorine pesticides (OCPs), particularly in farm waste areas. Contamination is likely to be present within fill/waste material itself, and the immediately underlying and surrounding soils.	14 x investigation locations: S2_TP1 to TP6, S2_TP9, S2_TP10, TP411, TP412, S2_SP1 to SP3, S2_SS1 1 x suspected ACM fragment: S2_TP5_Bulk10	<ul style="list-style-type: none"> 16 x heavy metals 6 x OCP 4 x PAH/TPH 28 x semi-quantitative asbestos analysis 1 x bulk asbestos presence/absence
Site 3 1980 Pakowhai Road (refer Figure A7)	<i>HAIL category:</i> G3 – landfill sites, including areas where deposition has occurred as a mound above the existing ground surface. Potentially E1 – asbestos products manufacture or disposal...	8 x investigation locations: S3_TP1 to TP7, TP408 4 x suspected ACM fragments: S3_TP2_Bulk7, S3_TP5_Bulk9, S3_TP5_Bulk10, S3_TP7_Bulk11	<ul style="list-style-type: none"> 9 x heavy metals 1 x OCP 18 x semi-quantitative asbestos analysis 4 x bulk asbestos presence/absence
Site 4a 1854 Pakowhai Road (refer Figure A1)		5 x investigation locations: S4a_TP1 and TP2, TP406, S4a_CS1, S4a_SS1 1 x suspected ACM fragment: S4a_Bulk4	<ul style="list-style-type: none"> 2 x heavy metals 2 x OCP 2 x semi-quantitative asbestos analysis 1 x bulk asbestos presence/absence
Site 4b 1854 Pakowhai Road (refer Figure A3)		4 x investigation locations: S4b_TP1 and TP2, S4b_SS1 and SS2 1 x suspected ACM fragment: S4b_Bulk5	<ul style="list-style-type: none"> 3 x heavy metals 2 x OCP 2 x PAH/TPH 3 x semi-quantitative asbestos analysis 1 x bulk asbestos presence/absence
Site 5 56 Franklin Road (refer Figure A11)		4 x investigation locations: S5_SS1 and SS2, S5_SP1 and SP2	<ul style="list-style-type: none"> 4 x heavy metals 2 x OCP 3 x PAH/TPH 2 x semi-quantitative asbestos analysis
Site 4c 1854 Pakowhai Road (refer Figure A2)	Stockyard/potential spray race and livestock dip located adjacent to the woolshed. Contaminants typically comprise arsenic and OCPs (e.g. DDT, Dieldrin). Contamination is expected to be present in the surface soils within and surrounding the livestock dip and potential spray race and decrease with depth and distance away from the spray/dip operations. <i>HAIL category:</i> A8 – Livestock dip or spray race operations	8 x investigation locations (includes 3 x samples from Site 7b): S4c_SS1 to SS5, S7b_SS1, S7b_SS4 and SS5	<ul style="list-style-type: none"> 8 x heavy metals (+ 2 x TCLP/SPLP) 7 x OCP (+ 1 x TCLP/SPLP) (including 3 x samples from Site 7b)

¹⁰ Arsenic, cadmium, chromium, copper, lead, nickel, zinc.

¹¹ TCLP refers to the 'toxicity characteristic leaching procedure' test, designed to determine the mobility of contaminants in waste/soil under weakly acidic conditions, simulating landfill conditions. SPLP refers to the 'synthetic precipitation leaching procedure' to determine the mobility of contaminants present in soils under neutral conditions.

Site area ID and address	Potential for contamination and HAIL category (where applicable)	Investigation and sample ID	Laboratory analysis
Site 6 1023 Links Road (refer Figure A10)	<p>Storage yard and laydown area, including the storage of farm vehicles and machinery, timber, horticultural materials, and stockpiled soil, green waste and sawdust. One burn pit was also identified, with surface refuse across the site.</p> <p>Wide range of contaminants possibly due to the diverse use of this site and potential for other historic uses. Contaminants may include heavy metals (particularly copper, chromium, and arsenic), hydrocarbons, OCPs, and asbestos. Contamination is expected to be present within surface soils, and stockpiled soils, and is likely to decrease with depth.</p> <p><i>HAIL category:</i> <i>Potentially 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.</i></p>	7 x investigation locations: S6_SS1 to SS5, S6_SP1 to SP2 1 x suspected ACM fragment: S6_SS3_Bulk8	<ul style="list-style-type: none"> • 7 x heavy metals • 1 x TPH/PAH • 2 x semi-quantitative asbestos analysis • 1 x bulk asbestos presence/absence
Site 7a Pakowhai Memorial Hall 1912 Pakowhai Road (refer Figure A4)	<p>Suspected asbestos and/or lead-based paints used in construction materials, with potential soil contamination from the release of lead and asbestos due to weathering and past maintenance activities. Some buildings observed to be in deteriorated condition, with ACM fragments observed on the surface in some locations.</p> <p>Contamination is expected to be present within surface soils immediately surrounding the buildings containing ACM and/or lead-based products (creating a 'halo' of contamination) and decrease with depth and distance from the buildings.</p>	6 x investigation locations: S7a_SS1 to SS6	<ul style="list-style-type: none"> • 3 x total lead (+ 1 x TCLP/SPLP analysis) • 6 x semi-quantitative asbestos analysis
Site 7b 1854 Pakowhai Road (refer Figure A2)	<p><i>HAIL category:</i> <i>E1 – Asbestos...sites with buildings containing asbestos products known to be in deteriorated condition.</i> <i>Potentially 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.</i></p>	5 x investigation locations: S7b_SS1 to SS5	<ul style="list-style-type: none"> • 3 x heavy metals (+ 1 x TCLP/SPLP analysis) • 2 x total lead`
Site 7c 22 Chesterhope Road (refer Figure A6)		3 x investigation locations: S7c_SS1 to SS3	<ul style="list-style-type: none"> • 2 x total lead • 3 x semi-quantitative asbestos analysis
Site 7d 47 Chesterhope Road (refer Figure A5)	<p>Storage and laydown area, including the storage of farm vehicles, machinery, and equipment, empty chemical and fuel drums, stockpiled timber, and stockpiled soil. One burn pit also identified on the stream bank, with trace surface refuse across the site.</p> <p>Wide range of contaminants possibly due to the diverse use of this site and potential for other historic uses. Contaminants may include heavy metals, hydrocarbons, solvents, OCPs, and asbestos. Contamination is expected to be present within surface soils and stockpiled soils and is likely to decrease with depth.</p> <p><i>HAIL category:</i> <i>F4 – Motor vehicle workshops. Potentially A17 – storage tanks or drums for fuels, chemicals or liquid waste.</i> <i>Potentially 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.</i></p>	9 x investigation locations: S7d_SP1 to SP4, S7d_SS1 to SS5	<ul style="list-style-type: none"> • 5 x heavy metals • 2 x OCP • 2 x PAH/TPH • 6 x semi-quantitative asbestos analysis • 1 x bulk asbestos presence/absence
Site 8 Proposed borrow area, Chesterhope Station (refer Figure A12)	<p>Mercury was identified in one sample during the preliminary investigation and sampling, above the Hawke's Bay Stopbank Construction fill criteria¹².</p>	3x investigation locations: S8_SS1 to S8_SS3	<ul style="list-style-type: none"> • 6 x heavy metals, including total mercury.

¹² Tonkin & Taylor Ltd, 2023. *Upper Limits for Contaminants in Hawke's Bay Stopbank Fill*. Prepared for Hawke's Bay Regional Council, T+T ref: 1017353.2102R v1.

2.2 Soil sampling procedure

Soil samples were collected in general accordance with the MfE Contaminated Land Management Guidelines No. 5 (CLMG No. 5)¹³ and Asbestos in Soil Guidelines using the following procedure:

- Freshly gloved hands (and a hand spade, where necessary) were used to collect samples directly from surface soils or soil stockpiles. Where test pits were machine excavated, samples were collected directly from excavated material, taking care to avoid material that had not come into direct contact with the excavator bucket.
- Samples were placed directly into laboratory supplied sample containers. Suspected ACM fragments were placed into new plastic zip-lock bags.
- The materials encountered were logged in general accordance with the NZ Geotechnical Society guidance, noting any anthropogenic materials and indicators of ground contamination observed within the soil.
- When used, the hand spade was decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent).
- Samples were kept chilled where necessary and shipped to IANZ accredited Hill Laboratories under chain of custody documentation for analysis.

2.3 Assessment criteria

The following assessment criteria were selected in accordance with the requirements of the regulatory framework:

- For the **protection of human health during construction works**:
 - The NESCS Soil Contaminant Standards (SCS)¹⁴ for commercial/industrial use as a proxy for outdoor workers involved in the proposed development.
 - Where NESCS SCS values have not been derived, guidance from the below documents were used, as per the MfE “*Contaminated Land Management Guideline No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011)*”:
 - o [Australian] National Environment Protection (Assessment of Site Contamination) Measure 1999, updated 2013.
 - o MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand¹⁵.
 - For asbestos in soil contamination, the criteria defined in the Asbestos in Soil Guidelines (commercial/industrial land use) have been adopted.
- For the **protection of environmental receptors during construction works**. This assumes that, at minimum, standard earthworks controls will be in place during all the stopbank construction works:
 - New Zealand ecological soil guideline values (Eco-SGVs)¹⁶ for a 60% level of protection, as the trigger for potential offsite impacts to environmental receptors. This has been used as a screening criteria to inform the CSMP, noting that more conservative

¹³ Ministry for the Environment, revised 2021: *Contaminated Land management guidelines No.5: Site investigation and analysis of soils*.

¹⁴ MfE, 2011. *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health*.

¹⁵ MfE, 2011. *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand*. Tier 1 Soil Acceptance Criteria used (commercial/industrial land use).

¹⁶ Landcare Research and Marlborough District Council, 2022. *Exploring the implementation of ecological soil guideline values for soil contaminants*.

- assessment criteria have been adopted (for the majority of contaminants) to assess the potential adverse effects on the environment on completion of the works (see below).
- WasteMINZ waste acceptance criteria¹⁷ for Class 3 Managed Fill, to understand the effects of potential runoff and leaching offsite during the works and from uncontrolled fill. These criteria have been used to compare the results of SPLP analysis, typically carried out on the highest concentrations for a given analyte to represent the highest leaching potential.
 - For **soil disposal**:
 - Predicted background concentrations specific to the area¹⁸ as a proxy for acceptance of soil to cleanfill sites.
 - Class A landfill total concentration and leachability limits, appropriate for the Ōmarunui Landfill¹⁹.
 - **For protection of human health, ecological receptors, and water quality on completion of the stopbank construction** (applicable for soil importation from the proposed borrow area, and soils retained on site for stopbank construction):
 - Hawke's Bay Stopbank Construction Upper Limit for Fill Acceptance criteria¹¹.

2.4 Site observations

Relevant observations relating to each of the investigation areas are summarised below, including soil profiles observed within test pit and hand excavations. Further information relating to the soil profiles across the wider site is outlined in the geotechnical report. Photographs are attached in Appendix B.

Site 1 – Photograph Appendix B.1 to Photograph Appendix B.4

- A largely vacant laydown area with a gravelly silt surface. Wood, timber, plastic, concrete and three suspected ACM fragments were identified across the surface.
- Fly-tipping including domestic waste was present to the immediate north, which was inaccessible at the time of investigation due to thick vegetation and fallen trees.
- Three large soil stockpiles (approximately 30, 60 and 200 m³) comprising brown silt, with minor gravel and trace refuse (plastic, concrete, clay tile, bones, wood, timber, shell, cloth and brick) were present on the site.
- Natural soils were encountered at shallow depths in the eastern-most test pit excavations (S1_TP3, S1_TP4, S1_TP9 and TP413), at depths of 0.1 to 0.3 m bgl, beneath a surface layer of silt fill. Natural soils comprised light brown sandy SILT, overlying grey-blue silty sand.
- Fill soils and buried refuse were observed in the remaining eight test pit excavations from the surface to depths of between 1.0 and 3.5 m bgl.
 - Fill soils generally comprised grey or brown silt and silty sand with varying amounts of gravel, organic matter, and refuse.
 - Refuse was observed in eight test pits, comprising concrete and brick fragments, glass, timber, plastic pipe, metal, car tyres, tiles, polystyrene, wood, and other domestic and farm waste. Refuse content ranged from trace to approximately 30% of the fill volume in some places.

¹⁷ Waste Management Institute New Zealand (WasteMINZ), 2023. *Technical Guidelines for Disposal to Land, Revision 3.1*.

¹⁸ Landcare Research, 2015. *Background soil concentrations of selected trace elements and organic contaminants in New Zealand*.

¹⁹ MFE, 2004. *Module 2: Hazardous Waste Guidelines, Landfill Waste Acceptance Criteria and Landfill Classification*.

- Suspected ACM fragments were observed in three test pits (S1_TP2, S1_TP8 and S1_TP10) at depths of up to 3.0 m bgl in the northern part of Site 1. S1_TP10 contained large volumes of fragments, estimated to be more than 0.01% of the soil volume at some depths. Laboratory testing confirmed that presence of asbestos in a fibre board fragment collected from TP2. While the fragments in TP8 and TP10 were not tested, they were visually consistent with fragments from TP2 and therefore presumed to also contain asbestos.
- Large volumes of organic material, including large tree trunks/branches, were encountered in a number of test pits, generally near the base of the fill profile.
- Underlying natural soils comprised grey-blue silty sand.
- Groundwater ingress was observed at depths of approximately 3 to 3.5 m bgl within four test pit excavations located close to the stream bank.

Site 2 – Photograph Appendix B.5 to Photograph Appendix B.8

- A largely vacant laydown area with a gravelly silt surface and access track. Trace timber and other farming equipment was observed across the site surface.
- The northern portion was being used for the storage of concrete, green waste, horticultural equipment and machinery.
- Several stockpiles (up to approximately 200 m³) of soil were present, largely comprised of screened silt and gravel in the southern end, with unscreened soils present along the stream side.
 - The majority of the screened stockpiles contained no or trace anthropogenic materials.
 - The unscreened stockpiles along the stream edge contained varying amounts of timber, plastic, concrete and organic material. One stockpile (SP2) contained trace charcoal material.
- Fill soils and refuse were encountered in all ten test pits, to depths of between 1.0 and approximately 3.0 m bgl.
 - Fill soils generally comprised brown silts, sands and gravels with variable organic and refuse content.
 - Refuse was observed in all test pits, comprising concrete, timber, wood and green waste, clay pipe, brick, plastic, metal (wire, rebar, pipes), car tyres, glass, and fabric.
 - While concrete fragments were observed in the majority of test pits, particularly large (up to 1 m across) and abundant (up to 60 % of the fill volume) concrete slabs were observed in S2_TP1, S2_TP2, and S2_TP4.
 - Large amounts of mechanical waste (e.g. car parts) and organic material were observed in one test pit (S2_TP6), accompanied by hydrocarbon and organic odours. Refuse observed in S2_TP6, in addition to general waste observed in the majority of test pits, included plastic jerry cans, car parts, and asphalt fragments.
 - Suspected ACM, in the form of linoleum flooring, was encountered in one test pit (S2_TP5) within fill at approximately 2.0 m bgl.
 - Underlying natural material comprised grey sand and sandy gravel.
- Groundwater was encountered in the test pits at depths of between 2.0 and 3.5 m bgl.

Site 3 – Photograph Appendix B.9 and Photograph Appendix B.10

- Vacant, flat area with good grass growth and newly planted trees, used to access the adjacent horse paddocks.

- Fill soils were encountered beneath the topsoil within all test pits to depths of between 1.0 and 2.8 m bgl.
 - Fill generally comprised brown silt and silty gravel or sand with varying amounts of organic and refuse materials.
 - Pockets of organic material were encountered in the majority of test pits, generally near to the base of the fill.
 - Refuse comprised concrete, clay tile, brick, wood, timber, plastic, glass, metal wire/cable and fabric.
 - Suspected ACM was observed in three test pits (S3_TP2, S3_TP5 and S3_TP7) at depths of 0.7 to 1.2 m bgl.
- Natural soils, comprising blue-grey silt and sand, were encountered beneath the fill in the majority of test pits, at depths of between 1.0 and 2.8 m bgl. Four test pits were terminated due to groundwater ingress at depths of 2.0 to 3.0 m bgl.

Site 4a – Photograph Appendix B.11 to Photograph Appendix B.13

- The proposed stopbank alignment generally follows a vacant, grassed shelterbelt ridge that lies between two recently ploughed and vacant paddocks.
- A single farm waste pit was observed on the site, with the excavated soils stockpiled adjacent to the pit.
 - The pit was being used for the deposition of timber, pallets, sheep carcasses, green waste, metal, empty plastic agricultural bottles, and general domestic refuse.
 - Suspected ACM fragments were observed around the farm pit on the soil surface.
- Natural soils, comprising brown silt (topsoil) overlying silty sand, were encountered in all three test pits.
- Fill soils, comprising reworked natural silt with trace amounts of gravel and wood to a depth of 0.3 m bgl, were observed immediately adjacent to the farm pit (within the western wall of S4a_TP1).

Site 4b – Photograph Appendix B.14

- Site 4b comprised a vacant, grassed paddock with large areas of exposed, loose soil comprising reworked topsoil with trace refuse.
- Trace plastic, wood and suspected ACM fragments were observed on the surface of the site.
- One test pit excavation (S4b_TP1, positioned at the location of a former waste pit) encountered fill, comprising brown silt with gravel and clumps of grass, to a depth of 2.8 m bgl. One other test pit excavation (S4b_TP2, positioned north of the former waste pit) encountered natural soils beneath the surface layer of topsoil fill.
- No buried farm waste was encountered.

Site 4c & Site 7b – Photograph Appendix B.15 to Photograph Appendix B.18

- Large woolshed and associated buildings constructed with timber weatherboard cladding, and corrugated iron roofing. Buildings appeared in poor condition with peeling paint and damaged weatherboards. No suspected ACM materials were observed on/within the accessible portions of the buildings.
- The adjacent spray race/stockyard was overgrown, with some areas of paving and concrete observed within the race.

- Between the stockyard and woolshed were a number of structures that may relate to farming practices (including former livestock dipping), comprising a concrete livestock plunge dip, adjacent concrete trough, a brick furnace or forge-like structure, and water pump.
- Soils encountered during surface sampling around the exterior of the woolshed and spray race/stockyard comprised brown sandy silt (topsoil).
 - At four of the five sample locations from the perimeter of the woolshed, topsoil contained trace amounts of glass, clay pipe fragments, and/or red paint chips.
 - At one sample location (S4c_SS3, located adjacent to the brick furnace), trace amounts of white ash were observed within the soil.

Site 5 – Photograph Appendix B.19 and Photograph Appendix B.20

- Overgrown, hummocky area with stockpiled soil and green waste, and a burn pit. Landowner advised that the majority of the material on site was debris and sediment from the surrounding orchard following the Cyclone Gabriele floods.
- Small amounts of general farm waste (cloth, plastic wrap) also present within the burn pit.
- Soils encountered during stockpile and surface sampling comprised brown gravelly silt. Trace charcoal, wood and sand were encountered within the sample from the burn pit (S5_SS2).

Site 6 – Photograph Appendix B.21 and Photograph Appendix B.22 Laydown and storage area with a gravelly silt surface with trace wood, sawdust, clay pipe and concrete fragments.

- Suspected ACM fragments were observed on the surface in one location.
- Machinery, a lubricant barrel, timber and horticultural equipment was being stored along the northern edge of the site. No staining or other evidence of ground contamination was observed.
- One large stockpile was present, comprising soil and green waste with trace large cobbles and concrete fragments.
- Another large stockpile of sawdust and wood bark was present at the western end, observed being used for mulch on the adjacent fruit orchard.
- A burn pit was present in the centre, comprising burned wood, sawdust and ash, with trace plastic, metal and concrete.
- Soils encountered at the surface comprised dry silt with trace gravel, sawdust, and wood.

Site 7a – Photograph Appendix B.23 and Photograph Appendix B.24

- Pakowhai War Memorial Hall, constructed with timber, brick, stucco, fibre cement board, and corrugated iron cladding, with a primarily grassed ground surface around the perimeter, including the overgrown riverbank along the back (western) boundary. Ground around the front (eastern) portion of the building was sealed with concrete.
- Broken suspected ACM fragments were observed on the ground surface along the back (western) wall, and on the gable ends of the building. Suspected ACM was observed in the soffits and wall cladding of the building.
- Soils encountered comprised dry brown silt (topsoil).

Site 7c – Photograph Appendix B.25 and 25b

- Residential property with several outbuildings and structures.
- Two buildings identified as containing suspected ACM products in the exterior cladding – a tack shed (S7c_SS1), and an outside toilet (S7c_SS2). In addition, ‘Super 6’ style roofing material was being used as temporary fencing adjacent to the shed (S7c_SS3). All suspected ACM was observed to be in poor condition.

- The landowner mentioned that there had been areas of refuse present on the property when it was purchased in 2003, including an old boiler. The landowner had been advised to bury the refuse material, and it remains adjacent to the stream, to the south-west of the investigation site.
- Soils encountered comprised dry brown silt with trace fine gravel (topsoil).

Site 7d – Photograph Appendix B.26 to Photograph Appendix B.28

- Largely vacant laydown area, with patchy grass growth and overgrown portions, used for grazing. Scattered refuse comprising timber, wood, concrete, brick and plastic was observed.
- Several small stockpiles of fill were present in the south-western portion, adjacent to the stream, assumed to be part of the former stopbank or stockpiled Cyclone Gabriele flood debris. Stockpiled soils generally comprised brown silt with gravels, and trace concrete, brick, wood, timber and plastic.
 - Suspected ACM fragments were identified on the surface of the stockpiles in the southern portion.
- One permanent building comprised a modern steel shed with concrete floor, used for storing farm equipment, machinery and several jerry cans and steel drums of fuel. Evidence of minor oil staining was observed on the shed floor.
- A large number of empty, steel chemical drums, plastic intermediate bulk containers, and pallets were stacked around the outside of the shed. The drums were labelled for chemicals including alcohols, solvents, turpentine, and other flammable compounds. No evidence (olfactory or visual) of staining or spillages was observed around the drum storage area.
- A timber weatherboard transportable house was observed in the northern portion of the site, adjacent to a pile of timber, wood, fruit boxes and other burnable waste. A former burn pile was also observed along the stream bank (inaccessible).
- Soils encountered comprised brown silt with trace rootlets (topsoil).

Site 8

- The site comprised largely grassed and vacant paddocks, some of which were recently ploughed.
- Soils encountered comprised topsoil, comprising brown sandy silt, with no evidence of contamination noted.

2.5 Data quality

A quality assurance and quality control (QA/QC) program was implemented as part of field procedures to confirm data was fit for purpose, as described in Section 0.

Standard laboratory QA/QC reports were not examined as part of this project but are available from the laboratory on request.

2.5.1 Duplicate samples

Duplicate samples were collected on a basis of approximately one per 10 investigation locations, or one per 15 soil samples collected (excluding samples collected for asbestos analysis only). Six duplicate pairs were analysed for at least one analyte, typically heavy metals.

A quantitative measure of the variability in the results was undertaken independently of the laboratory by calculating the Relative Percentage Difference (RPD) values for the duplicate pairs of samples (field duplicates). The RPD value was calculated as follows:

$$RPD := \frac{(C_o - C_s)}{\left(\frac{C_o + C_s}{2}\right)} \cdot 100$$

Where C_o = concentration of the original sample

C_s = concentration of the duplicate sample

A summary of the QA/QC analytical results of the field duplicates is attached in Table C2, Appendix C. RPD values were not calculated for analytes that were recorded below the laboratory reporting limits.

As shown in Table C2, the concentrations in the duplicate sample pairs reported low RPDs, generally less than 20 %, up to a maximum of 42 %, with an average RPD of 11 % across all duplicate sample pairs. This indicates that variability in sample collection, handling and analysis is unlikely to impact on the findings of this investigation.

2.6 Soil sampling results

Analytical results for all soil samples tested are presented in Appendix C (Table C1), together with adopted assessment criteria. Full laboratory transcripts included in Appendix D.

The results are summarised below. Table 2.2 summarises the number of samples which exceed a particular assessment criterion to provide a simplified indication of ground contamination conditions at each site.

Table 2.2: Summary of soil samples exceeding assessment criteria

Site ID	Heavy metals, OCP, TPH						Asbestos*		
	No. of samples tested	Background concentrations**	NESCS SCS for human health (during construction)	Eco-SGVs for environmental protection (during construction)	Class A landfill screening criteria	Stopbank construction fill criteria	No. of samples tested	Asbestos presence / absence in soil	Asbestos in soil guidelines for human health
		No. of samples exceeding criteria						No. of detections/samples exceeding	
1	23	14	0	2	5	4	25	2	1
2	17	11	0	0	5	5	28	3	0
3	9	6	0	0	0	0	18	1	1
4a	2	0	0	0	0	0	2	0	0
4b	3	0	0	0	0	0	3	0	0

Site ID	Heavy metals, OCP, TPH						Asbestos*		
	No. of samples tested	Background concentrations**	NESCS SCS for human health (during construction)	Eco-SGVs for environmental protection (during construction)	Class A landfill screening criteria	Stopbank construction fill criteria	No. of samples tested	Asbestos presence / absence in soil	Asbestos in soil guidelines for human health
		No. of samples exceeding criteria						No. of detections/samples exceeding	
4c / 7b	10	9	2	2	7	7	0	N/A	N/A
5	4	2	2	1	1	2	2	0	0
6	7	5	1	0	1	2	2	0	0
7a	3	3	0	1	2	2	6	0	0
7c	2	2	0	0	0	0	3	1	0
7d	5	4	0	0	0	0	8	6	0
8	6	0	0	0	0	1	0	N/A	N/A
Total	91	56	5	6	21	23	97	13	2

Notes:

* Presence of asbestos as detected by laboratory testing in soil only, does not include presence of ACM in excavations or on soil surface.

** Low level concentrations of OCPs recorded at Sites 2, 4a, 4b, and 4c also but not considered 'above background' as no published background values.

'N/A' indicates that no samples were tested for asbestos from this site.

A single sample exceedance may relate to exceedances of multiple analytes for that sample.

Some exceedances may relate to different depths at the same investigation location.

Predicted background concentrations

- Concentrations of heavy metals were detected above predicted background concentrations in the majority (62 %) of samples from across the site.
- Individual OCP compounds were detected in 18 of the 26 samples tested (across Sites 1, 2, 4a, 4b and 4c/7b). OCP compounds were recorded below laboratory limits of reporting in samples from Sites 3, 5, and 7d.
- Individual TPH and/or PAH compounds were detected in 10 of the 15 samples tested (at Sites 1, 2, 5, and 7d). OCP compounds were recorded below laboratory limits of reporting in samples from Site 4b.

Assessment criteria for the protection of human health

- **Arsenic** concentrations exceeded the NESCS SCS (70 mg/kg) in five samples across Sites 4c/7b, 5 and 6, up to a maximum concentration of 199 mg/kg.

- All arsenic exceedances were recorded in surface or stockpiled soils.
- At Sites 5 and 6 the exceeding samples were collected from fill soils within, or in close proximity to, burn pits. At Site 4c/7b, the exceeding samples were collected from topsoil around the livestock dip and furnace.
- At Sites 5 and 6 the elevated arsenic was associated with elevated concentrations of other heavy metals, particularly copper and chromium at roughly proportionate levels. This indicates that the contamination may have resulted from the burning of treated timber containing chromated copper arsenate (CCA).
- **Lead** was reported at the NESCS SCS (3,300 mg/kg) in one sample at Site 7a, collected from topsoil adjacent to the Pakowhai Memorial Hall. We note that the laboratory reported a concentration and level of uncertainty of 3,260 mg/kg +/- 490 mg/kg respectively.
 - The sample was retested by the laboratory, reporting a secondary average concentration of 3,000 mg/kg, confirming the initial lead concentration. Despite consistent results, the laboratory notes that the “*sample is non-homogenous*” based on their internal processes.
- **Asbestos** was detected in soil above the Asbestos in Soil Guidelines for asbestos fines/fibrous asbestos (AF/FA, 0.001% w/w) in two samples, up to a maximum of 0.013% w/w.
 - The exceedances were recorded in samples collected from fill material at Sites 1 and 3, at depths of 1.3 m bgl and 0.1 m bgl, respectively. Both detections were of chrysotile (white asbestos) ACM debris.
 - The exceedances meet the criteria for ‘Low Level Asbestos’ mitigation controls at Site 3, and ‘Class B’ mitigation controls at Site 1.
 - Asbestos in soil was also detected in five other locations (at Sites 1, 2 and 7c), albeit below the guideline value of 0.001% w/w.
 - ACM fragments were also identified in a number of excavations across Sites 1, 2, and 3. In general, small volumes of ACM in soil were observed, however in one excavation at Site 1 (S1_TP10), higher concentrations of ACM were encountered, estimated to be more than 0.01% of the soil volume. This exceeds the criteria for ‘Low Level Asbestos’ mitigation controls and meets the criteria for ‘Class B’ works.
 - ACM fragments were also observed on the surface at Sites 1, 4b, and 7d, which contravenes “*no visible asbestos on surface soil*”, in accordance with the Asbestos in Soil Guidelines.

Class A landfill (Ōmarunui Landfill) screening criteria and leachability limits

- **The Class A landfill screening criteria** was exceeded in 21 samples for between one and four analytes, across Sites 1, 2, 4c/7b, 5, 6, and 7a.
 - Exceedances were typically for copper (up to 450 mg/kg), lead (up to 3,300 mg/kg) and/or zinc (up to 1,410 mg/kg), with arsenic also exceeding the criteria at three locations (up to 199 mg/kg).
 - Dieldrin was recorded above the landfill criteria (8 mg/kg) at a concentration of 49 mg/kg at one location (S4c_SS2).
 - With one exception, the exceedances at Sites 1, 2, 5, and 6 were recorded in samples collected from fill material at depths of up to 3.0 m bgl. One sample of saturated, natural soil also recorded exceedances of lead and zinc (S1_TP10 at 3.0 m bgl).
 - At sites 4c/7b and 7a the exceedances were recorded in samples collected from topsoil around the perimeter of buildings and other structures.

- **TCLP and/or SPLP analysis** was scheduled for five samples that recorded elevated contaminants above the Class A landfill criteria. The samples were selected to be representative of an individual site or soil contamination source and in general, samples with the maximum concentrations were selected for TCLP/SPLP analysis. The TCLP/SPLP analysis showed that:
 - At Site 1, TCLP analysis recorded concentrations of copper and lead at least one order of magnitude below the leachability limits for a Class A landfill. However, TCLP analysis of the sample where the maximum total zinc concentration was recorded (1,410 mg/kg), recorded zinc above the leachability limit. The second highest zinc concentration recorded (1,230 mg/kg) showed lower zinc within the TCLP extraction, below the leachability limits.
 - At Site 4c/7b, TCLP analysis recorded concentrations of heavy metals and Dieldrin significantly below the leachability limits.
 - At Site 7a (where lead was recorded more than 30 times higher than the landfill screening criteria, at S7a_SS3), TCLP analysis recorded lead above the leachability limit. Zinc also exceeded the leachability limit at this location. SPLP results were considerably lower, indicating that leaching would be much more prevalent under landfill conditions than *in situ*. SPLP results are discussed further below.

Assessment criteria for the protection of the environment (during construction)

- The environmental protection criteria were exceeded for arsenic, lead, or zinc at a total of six individual sampling locations across Sites 1, 4c/7b, 5 and 7a. Copper was also exceeded at one location where zinc was elevated.
- SPLP analysis was carried out on a number of samples where elevated concentrations of analytes (typically heavy metals) were recorded.
 - SPLP concentrations for heavy metals were all recorded below the Class 3 managed fill leachate criteria.
 - SPLP analysis for one sample (S4c_SS2, where the highest total Dieldrin concentration was recorded) showed a concentration of Dieldrin (0.0109 mg/L) above the Class 3 managed fill criteria (0.001 mg/L).

Hawke's Bay stopbank construction fill acceptance

- Exceedances of the stopbank construction fill criteria were recorded at Sites 1, 2, 4c/7b, 5, 6, and 7a for heavy metals (arsenic, copper, lead, and/or zinc) and/or TPH. Exceedances were recorded within topsoil, fill, and underlying natural material to depths of up to 3.0 m bgl.
- Topsoil within the borrow area also marginally exceeded the acceptance criteria for mercury (which is set at the laboratory limit of reporting) in one of the three samples (S8_SS3, 0.11 mg/kg). This is only slightly above laboratory limit of reporting (0.1 mg/kg) and within the reported level of uncertainty (between 0.045 and 0.181 mg/kg).
 - We note that no regional baseline concentration was established for mercury, due to data limitations, so the acceptance criteria is likely conservative.
 - Underlying natural material recorded lower concentrations, below laboratory limits of reporting and fill acceptance criteria.

3 Nature and extent of ground contamination by site

Site 1

Site 1 comprises a private landfill currently being used as a laydown area for stockpiled soils, machinery and surface waste. Surface fill is present across the laydown area, with deeper fill extending to depths of up to 3.5 m bgl towards the stream to the west. As shown in Figure A9, the extent of the fill to the east has been investigated, although not fully delineated to the north and south due to the presence of large trees. There is potential for further uncontrolled fill and buried refuse in these areas.

The fill contains variable amounts of refuse (up to approximately 30 % of the fill volume in some places) and includes ACM fragments in test pits in the north-western portion of Site 1 (TP2, TP8 and TP10). Asbestos volumes in one test pit (S1_TP10) meet the criteria for 'Class B' works, and ACM was also observed on the surface of the site.

Heavy metals, OCP, hydrocarbon and asbestos contamination is present within soils at Site 1, with concentrations that may present a risk to human health and/or the environment in some places. Concentrations are typically highest in fill soils where buried refuse is present. However, elevated concentrations of some contaminants are also present in the immediately underlying natural soils, beneath the groundwater table. The vertical extent of contamination has not been fully assessed in some locations due to the presence of groundwater intrusion during the investigation but is expected to decrease with depth.

Stockpiled soils and surface fill soils (< 0.5 m bgl) at Site 1 contain lower concentrations of contaminants, above published background levels but below other risk-based assessment criteria.

In general, Site 1 soils do not meet the stopbank construction fill acceptance criteria and, together with the high volume of refuse itself, may not be suitable for the stopbank construction if retained onsite. TCLP testing indicates that the material may not be suitable for offsite disposal to a licenced landfill due to elevated zinc. The presence of contaminants above relevant acceptance criteria will have implications for the development, and management, of Site 1.

Site 2

Site 2 comprises a laydown area for the storage of stockpiled soils, machinery, and horticulture equipment. Fill is present across Site 2 to depths of up to 3.0 m bgl. As shown in Figure A8, the lateral extent of the fill has been approximated and is expected to be confined to the approximately 40 m wide land strip between the stream and adjacent orchard. There is potential for further uncontrolled fill and buried refuse to be present to the north and south of the estimated fill extent. The fill contains large volumes of demolition material, mechanical waste and other refuse, including ACM (lino) identified at one location.

Heavy metals, OCP, hydrocarbon and asbestos contamination is present across Site 2, within buried fill, and some stockpiled soils. The highest contaminant concentrations are present within buried fill containing large volumes of refuse. Underlying natural material contained lower concentrations, below background values.

While contaminant concentrations do not indicate human health or environmental risks during construction, hydrocarbons and heavy metals are present at concentrations above the stopbank construction fill acceptance criteria which will have implications for the development of the site.

Site 3

Site 3 comprises a largely vacant grassed area with variable depths of underlying fill and buried refuse, up to 2.8 m bgl, below a surface layer of topsoil. As shown in Figure A7, the area of fill has not been fully delineated, however, it is not expected to extend into the area of trees to the east, or

into the horticultural land to the north. There is potential for further uncontrolled fill to the west, extending into the existing horse paddock.

The fill contains variable amounts of refuse, including demolition material and farm waste. ACM (fibre cement) was confirmed in one test pit location (S3_TP5). Asbestos concentrations are present in soil at one location that may present a risk to human health.

Low level heavy metal contamination is present within the fill across Site 3. Concentrations are above background levels but below other risk-based assessment criteria.

Underlying natural material (albeit only tested at one location) is indicated to contain similar concentrations of heavy metals, which are expected to continue to reduce with depth.

While concentrations of chemical contaminants do not indicate environmental risks at Site 3, asbestos contamination presents a human health risk and will have implications for the stopbank construction works. All soils meet the stopbank construction fill acceptance criteria (noting that there is no criteria for asbestos) however, due to the presence of refuse, may not be suitable for onsite reuse.

Site 4a & Site 4b

Site 4a consists of a vacant, grassed shelterbelt between two paddocks, in the approximate location of a known stock burial area. A farm waste pit was present to the west of the shelterbelt (and west of the proposed stopbank alignment) which was partially infilled and contained fill and farm refuse. Fill consisted of reworked natural silt to approximately 0.3 m bgl.

Site 4b consists of a vacant area within a recently ploughed or filled paddock, at the approximate location of a former farm waste pit (south/east of the proposed stopbank alignment). Fill soils are present across the surface of Site 4b, consisting of silt with trace plastic and wood. Trace ACM (fibre cement) fragments were confirmed on the surface. However, no asbestos fines or fibres were detected in soil. Silt fill (void of refuse) is present to a depth of up to approximately 2.8 m bgl within the former farm waste dump.

Concentrations of measured contaminants indicate that soils at Site 4a and Site 4b do not present a risk to human health or the environment and are appropriate for reuse on site for the stopbank construction.

There is potential for deeper fill to be present in other locations around Sites 4a and 4b, where farm waste or stock burial sites have been historically.

Site 4c & Site 7b

This area consists of an old woolshed, spray race/stockyard and associated structures including a livestock dip and former furnace.

Heavy metals and OCP contamination is present in topsoil across Site 4c and Site 7b. The highest concentrations of OCPs (in particular Dieldrin) are present within the spray race/stockyard, while heavy metals are highest around the perimeter of the woolshed (lead and zinc) and near the furnace and livestock dip (arsenic and copper).

Soil contamination has not been delineated; however, concentrations are expected to be highest in the topsoil and immediately surrounding/beneath the dip and furnace structures. Contamination is expected to reduce with depth and distance away from the agricultural structures/features.

In general, soils from these areas may present a risk to human health and/or the environment and are not suitable for the stopbank construction. TCLP testing indicates that the material may not be suitable for offsite disposal to a licenced landfill due to elevated Dieldrin at one location. The

presence of contaminants above relevant acceptance criteria will have implications for the development, and management, of Site 4c and Site 7b.

Site 5

Site 5 comprises a soil stockpiling area for the temporary storage of farm waste and soil, and as a site for burning farm waste.

Contaminant concentrations are variable. Fill/surface soils located in and around the burn pit (immediately east of the stopbank alignment) contain concentrations of arsenic and copper which may present a risk to human health and/or the environment and are not appropriate for reuse in construction of the stopbank. The vertical extent of contamination has not been delineated; however, contamination is expected to be confined to the fill, burn pit ash, and immediately underlying natural soils (less than 0.5 m deep from our experience). Surface fill (< 0.1 m bgl) and soils within a larger stockpile on the western portion of Site 5 contained much lower concentrations of contaminants, and do not present a risk to human health or the environment.

Site 6

Site 6 comprises a laydown and storage area for machinery, horticulture equipment, stockpiled soil and sawdust, and a burn pit. Surface and stockpiled soils across Site 6 included trace gravel, sawdust, wood, and concrete and clay pipe fragments.

Arsenic contamination is present in surface soils (< 0.1 m bgl) at two locations at levels that would preclude the use of this material for stopbank construction. At one location (in the vicinity of a burn pit) arsenic concentrations could present a risk to human health during soils disturbance works. The vertical extent of contamination has not been assessed but is expected to decrease rapidly with depth and likely to be less than 0.5 m deep from our experience.

Stockpiled soils at Site 6 contained concentrations of heavy metals below background levels and do not indicate a risk to human health or the environment. These soils would be appropriate for reuse in the stopbank construction if retained onsite.

The presence of contaminants above relevant acceptance criteria will have implications for the development, and management of Site 6.

Site 7a

Site 7a consists of the Pakowhai Memorial Hall which has the potential for lead-based paint and ACM in building materials.

Lead contamination is present within topsoil at Site 7a, with concentrations that may present a risk to the environment in some places. While the human health criteria for lead was met (but not exceeded), there is potential for higher concentrations to be present. The highest concentration of lead was detected in topsoil along the western side of the building, with lead contamination expected to form a 'halo' around the perimeter of the building. The vertical and lateral extent of contamination has not been fully assessed; however, concentrations are expected to decrease both with depth, and away from the building (beyond approximately 0.5 and 2.0 m respectively).

In general, Site 7a soils within the 'halo' around the building may not be suitable for the stopbank construction if retained onsite. TCLP testing indicates that the material may not be suitable for offsite disposal to a licenced landfill due to elevated lead and zinc concentrations. The presence of contaminants above relevant acceptance criteria will have implications for the development, and management, of Site 7a.

Site 7c

Site 7c comprises a number of outbuildings/structures containing suspected ACM products and/or lead-based paint, although generally outside of the stopbank alignment.

Low levels of lead and/or asbestos is present in topsoil in isolated locations at Site 7c, above background concentrations but below risk-based criteria. Underlying natural soils are expected to contain lower concentrations of contaminants.

Contaminant concentrations do not present a human health or environmental risk during construction, and are below the stopbank construction fill acceptance criteria, indicating that Site 7c soils can be retained on site and reused for the stopbank construction.

Site 7d

Site 7d largely comprises a vacant paddock with several small stockpiles of fill and flood debris. The site is also used to store farm equipment and machinery, and empty chemical containers, and stockpiled timber and other waste. ACM (fibre board) fragments were confirmed at one location in the southern portion of Site 7d, with the potential for further asbestos to be present in other stockpiles. However, no asbestos fines or fibres were detected in soil.

Low level soil contamination is present across Site 7d in both surface and stockpiled soils, with concentrations of heavy metals (lead and/or zinc) and hydrocarbons above background levels but below other risk-based acceptance criteria. Underlying natural soils were not assessed but are expected to contain lower concentrations of contaminants and decrease with depth.

Contaminant concentrations do not present a human health or environmental risk during construction, and are below the stopbank construction fill acceptance criteria, indicating that Site 7d soils can be retained on site and reused for the stopbank construction, assuming the ACM fragments are appropriately removed/managed.

Site 8

The proposed borrow area comprises largely vacant farmland, spanning several paddocks. No sources or evidence of ground contamination have been observed.

Topsoil and the underlying natural soils contain low concentrations of heavy metals, below predicted background levels. With the exception of mercury in the topsoil at one location, all results indicate that soils from the borrow area meet the criteria for reuse on site as part of the stopbank construction. We understand that the topsoil will be retained on site and not used for the stopbank construction works.

4 Development implications

The findings of this investigation, in addition to the existing PSI for the site, indicate that ground contamination is present in various areas across the site at levels that will require management during the proposed works to mitigate potential human health and environmental risks.

The construction works are to be completed under the Flood Mitigation OIC, with a Construction Environmental Management Plan (CEMP) prepared for the works. As an appendix to the CEMP, a Contamination Site Management Plan (CSMP) will need to be prepared to set out how potential adverse effects on human health and the environment will be managed during and on completion of the works. We expect that consultation with HBRC is required to inform the appropriate management approach(es) to be adopted as part of the works.

If development plans for the Pakowhai Secondary Stopbank are to change and/or additional areas incorporated, this report should be reviewed and updated to reflect the updates to proposed development plans to ensure that the implication and conclusions remain valid.

5 Conclusions

T+T has been commissioned by Hawke's Bay Regional Council to undertake additional contaminated land investigations for the Pakowhai Secondary Stopbank construction project. The intention of the investigations was to build on the existing PSI to assess the nature and extent of contamination at the site and inform management of contaminated land, for the works.

A summary of the findings is below:

- HAIL activities have been confirmed or are considered *more likely than not* to have occurred in several areas around the site. HAIL activities include uncontrolled filling and landfilling, asbestos disposal, asbestos and lead-based paint use, pesticide use, and storage yard operations which have included associated contaminating activities.
- Soil sampling was undertaken to target HAIL (and potential HAIL) activities and areas where soil disturbance is proposed, including the proposed borrow area. Leachability testing (TCLP and SPLP analysis) was undertaken to inform soil disposal and potential offsite impacts during the works.
- Results of laboratory analysis identified several human health and environmental exceedances for heavy metals, pesticides, and/or asbestos across various areas. The Class A landfill acceptance criteria was also exceeded in a number of locations.
- The results indicate that ground contamination is present in various areas across the site at levels that will require management during the proposed works to mitigate potential human health and environmental risks during and completion of the proposed stopbank construction works.
- HBRC have been granted an Order in Council (OIC) to reduce the regulatory pathways for the flood mitigation works, following Cyclone Gabrielle.
- Ground contamination management requirements for the proposed works, will be detailed in a CSMP prepared to meet the OIC conditions as an appendix to the Construction Environmental Management Plan (CEMP). We expect that this will require consultation with HBRC.

6 Applicability

This report has been prepared for the exclusive use of our client Hawke's Bay Regional Council , with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions contained in this report are based on our visual inspection and sampling of material within the proposed works area. The nature and continuity of the subsoil away from the test and sample locations is inferred but it must be appreciated that actual conditions may vary from the assumed model.

We understand and agree that this report will be used by Hawke's Bay Regional Council in undertaking their regulatory functions in relation to the site.

The persons undertaking, managing, providing technical review and certifying this assessment are suitably qualified and experienced practitioners as defined in the NESCS.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

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Project Director

Report reviewed and certified by a suitably qualified and experienced practitioner as prescribed under the NESCS Users Guide (April 2012).

.....
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Senior Environmental Scientist

GEPA






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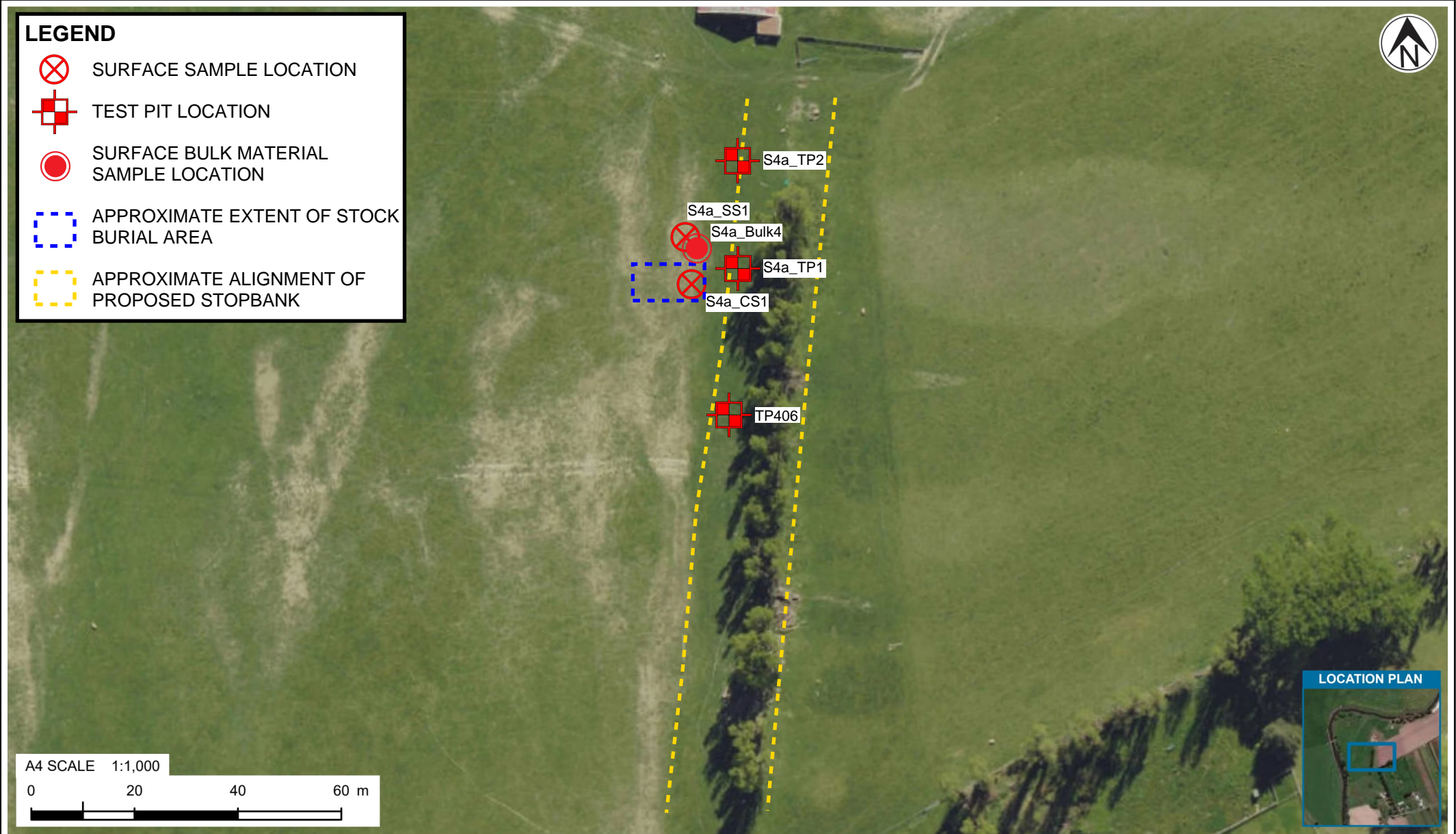
Appendix A Figures

Figures are ordered from south to north, with the exception of Site 8.

- **Figure A1 – Site 4a**
- **Figure A2 – Sites 4c and 7b**
- **Figure A3 – Site 4b**
- **Figure A4 – Site 7a**
- **Figure A5 – Site 7d**
- **Figure A6 – Site 7c**
- **Figure A7 – Site 3**
- **Figure A8 – Site 2**
- **Figure A9 – Site 1**
- **Figure A10 – Site 6**
- **Figure A11 – Site 5**
- **Figure A12 – Site 8**

LEGEND

-  SURFACE SAMPLE LOCATION
-  TEST PIT LOCATION
-  SURFACE BULK MATERIAL SAMPLE LOCATION
-  APPROXIMATE EXTENT OF STOCK BURIAL AREA
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK





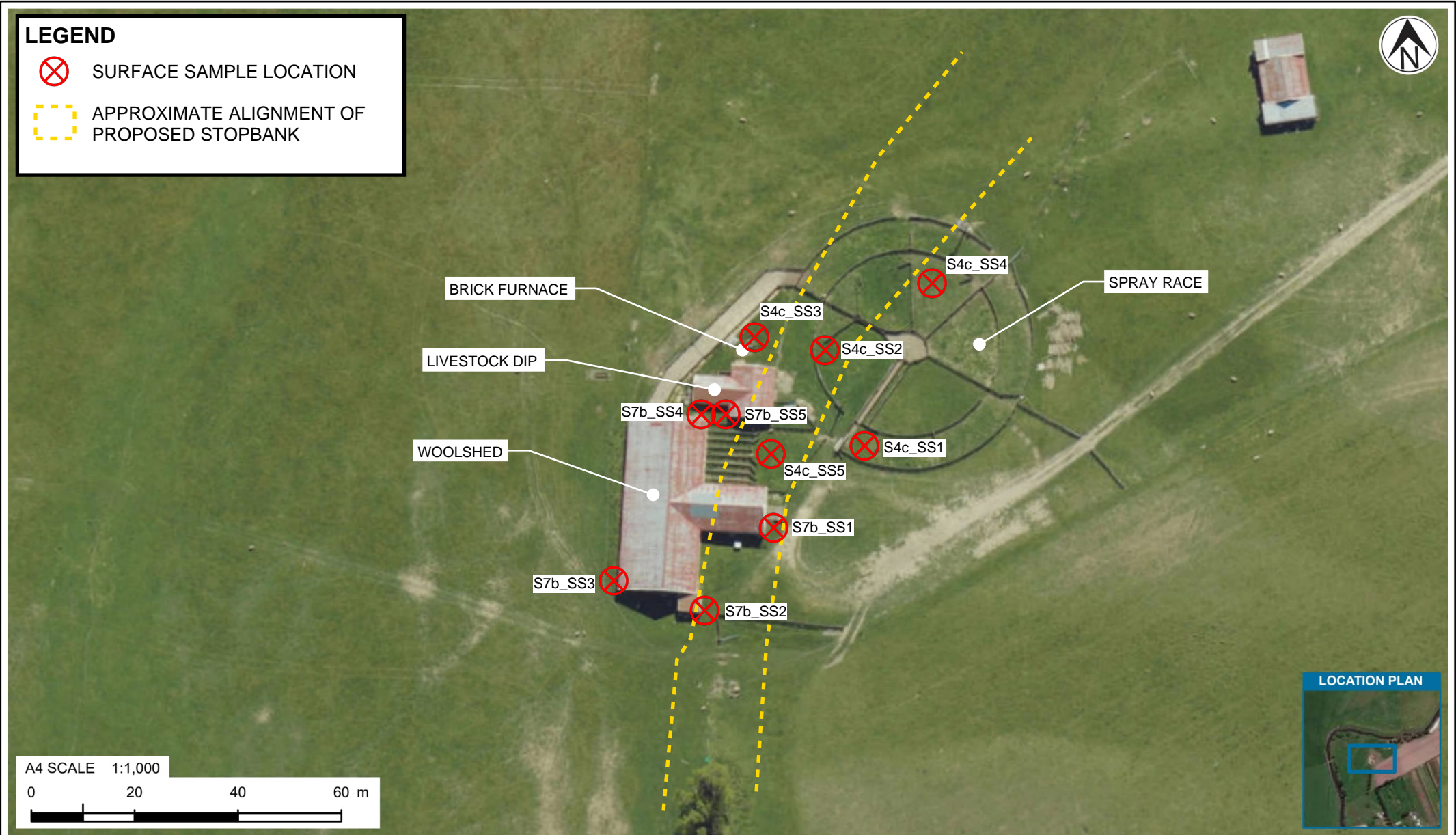
NOTES:

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PROJECT No. 1017353.2403			CLIENT HAWKE'S BAY REGIONAL COUNCIL		
DESIGNED	XXXX	DEC.24	PROJECT PAKOWHAI SECONDARY STOPBANK		
DRAWN	-WEB-	DEC.24	TITLE GROUND CONTAMINATION INVESTIGATION SITE 4a - 1854 PAKOWHAI ROAD		
CHECKED	AJDC	FEB.25			
TGM		MAR.2025	SCALE (A4) 1:1,000		
APPROVED		DATE	FIG No. FIGURE A1		REV 0

LEGEND

-  SURFACE SAMPLE LOCATION
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK








NOTES:

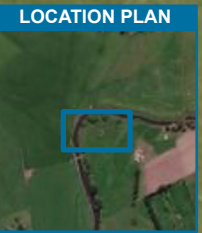
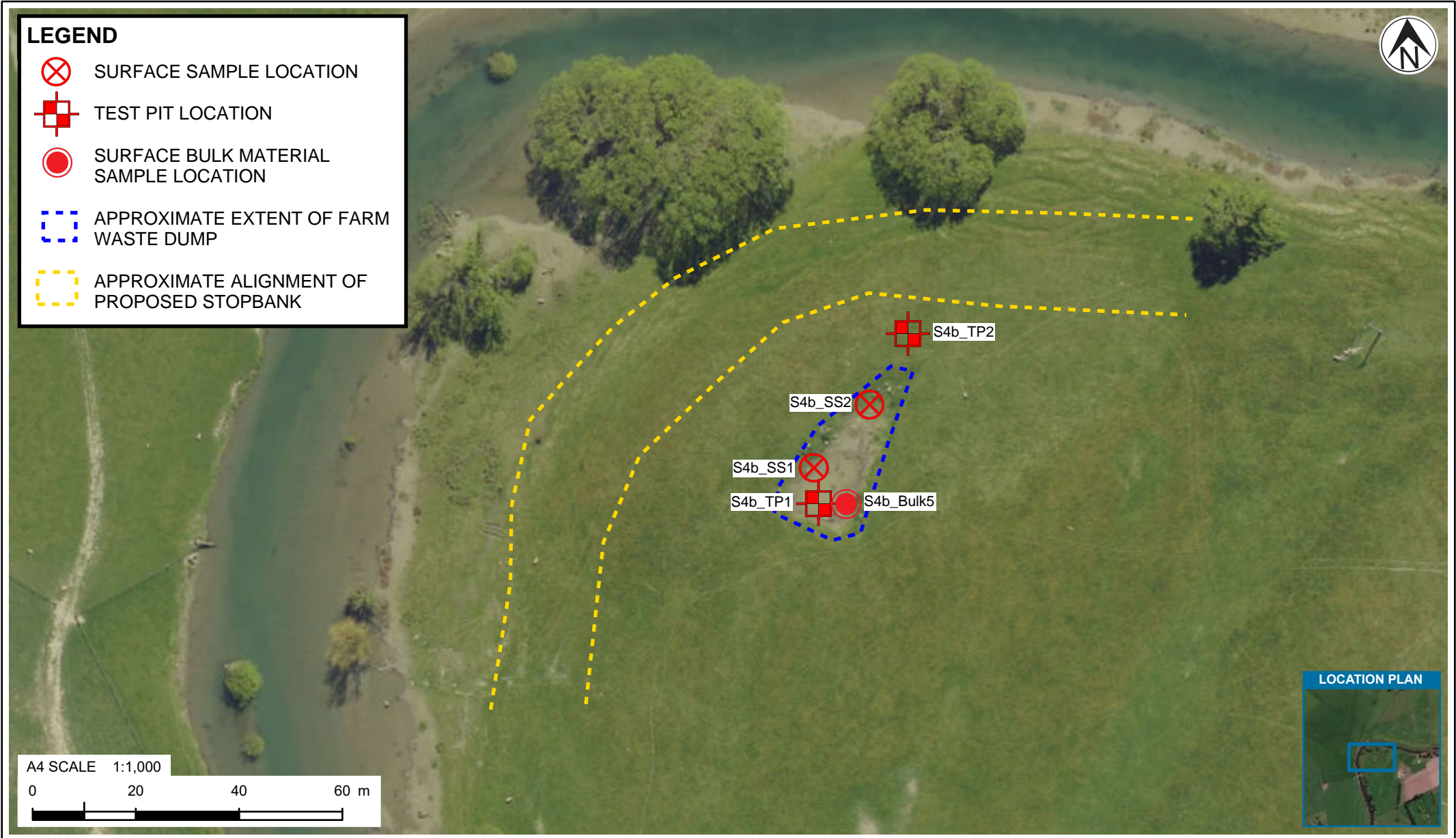
CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403		
DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25
TGM	MAR.2025	
APPROVED	DATE	

CLIENT	HAWKE'S BAY REGIONAL COUNCIL
PROJECT	PAKOWHAI SECONDARY STOPBANK
TITLE	GROUND CONTAMINATION INVESTIGATION SITE 4c & 7b - 1854 PAKOWHAI ROAD

LEGEND

-  SURFACE SAMPLE LOCATION
-  TEST PIT LOCATION
-  SURFACE BULK MATERIAL SAMPLE LOCATION
-  APPROXIMATE EXTENT OF FARM WASTE DUMP
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK



NOTES:

CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

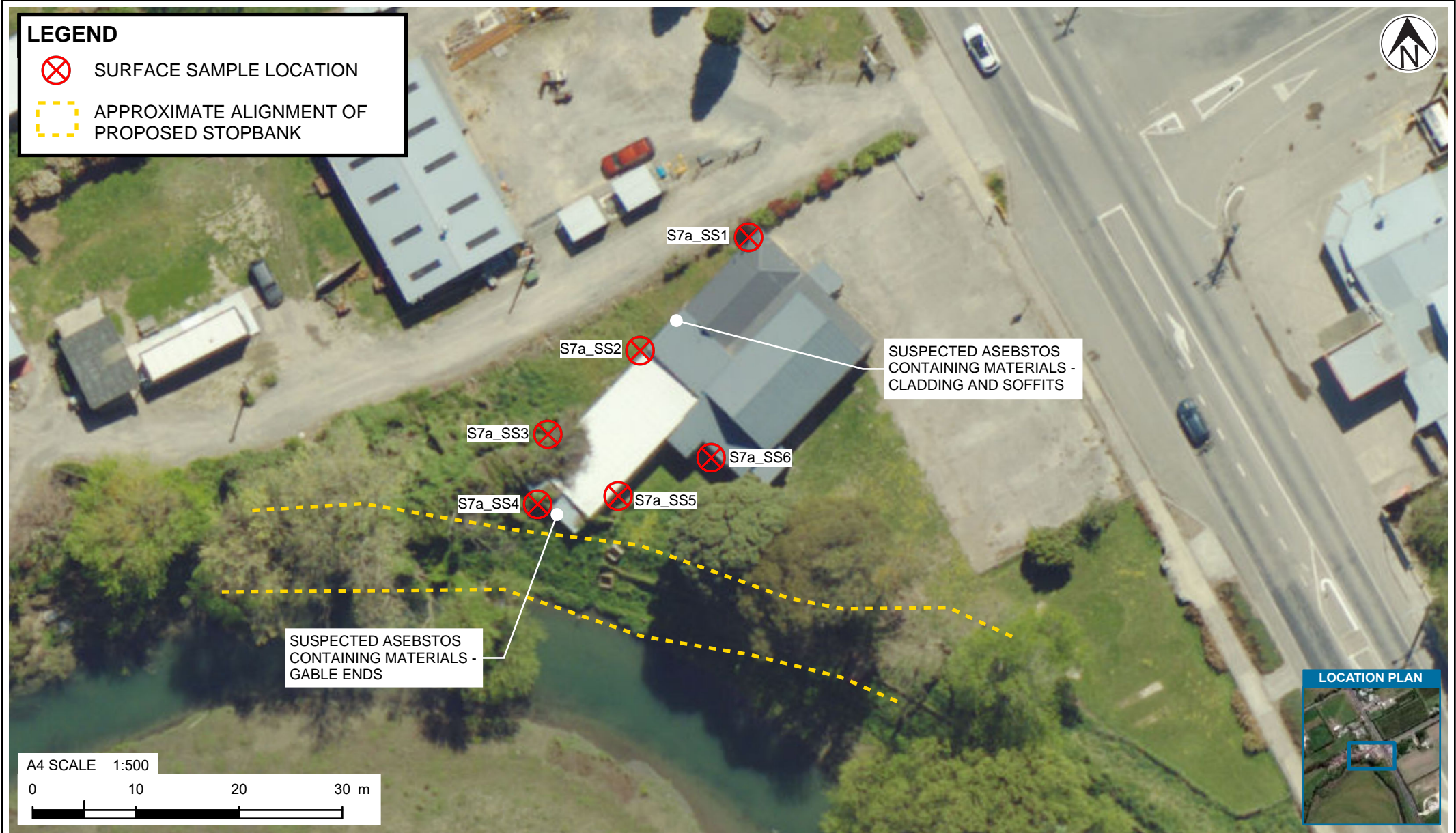
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DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25
TGM	MAR.2025	
APPROVED	DATE	

CLIENT	HAWKE'S BAY REGIONAL COUNCIL
PROJECT	PAKOWHAI SECONDARY STOPBANK
TITLE	GROUND CONTAMINATION INVESTIGATION SITE 4b - 1854 PAKOWHAI ROAD

LEGEND

 SURFACE SAMPLE LOCATION

 APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK



A4 SCALE 1:500



LOCATION PLAN



NOTES:

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PROJECT No. 1017353.2403

DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25

TGM MAR.2025

APPROVED DATE

CLIENT **HAWKE'S BAY REGIONAL COUNCIL**
PROJECT **PAKOWHAI SECONDARY STOPBANK**






TITLE **GROUND CONTAMINATION INVESTIGATION**
SITE 7a - PAKOWHAI MEMORIAL HALL

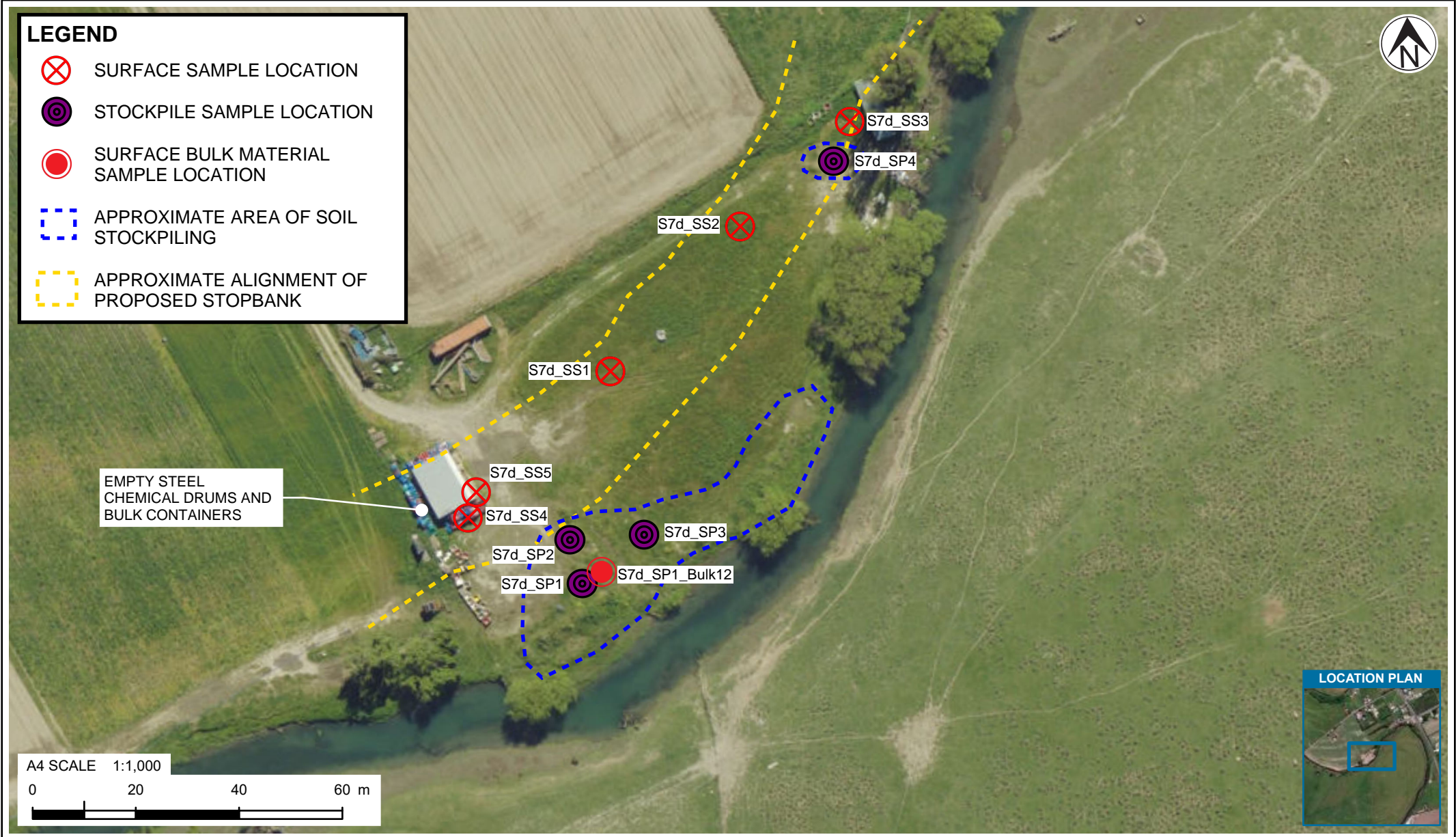
SCALE (A4) 1:500

FIG No. FIGURE A4

REV 0

LEGEND

-  SURFACE SAMPLE LOCATION
-  STOCKPILE SAMPLE LOCATION
-  SURFACE BULK MATERIAL SAMPLE LOCATION
-  APPROXIMATE AREA OF SOIL STOCKPILING
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK





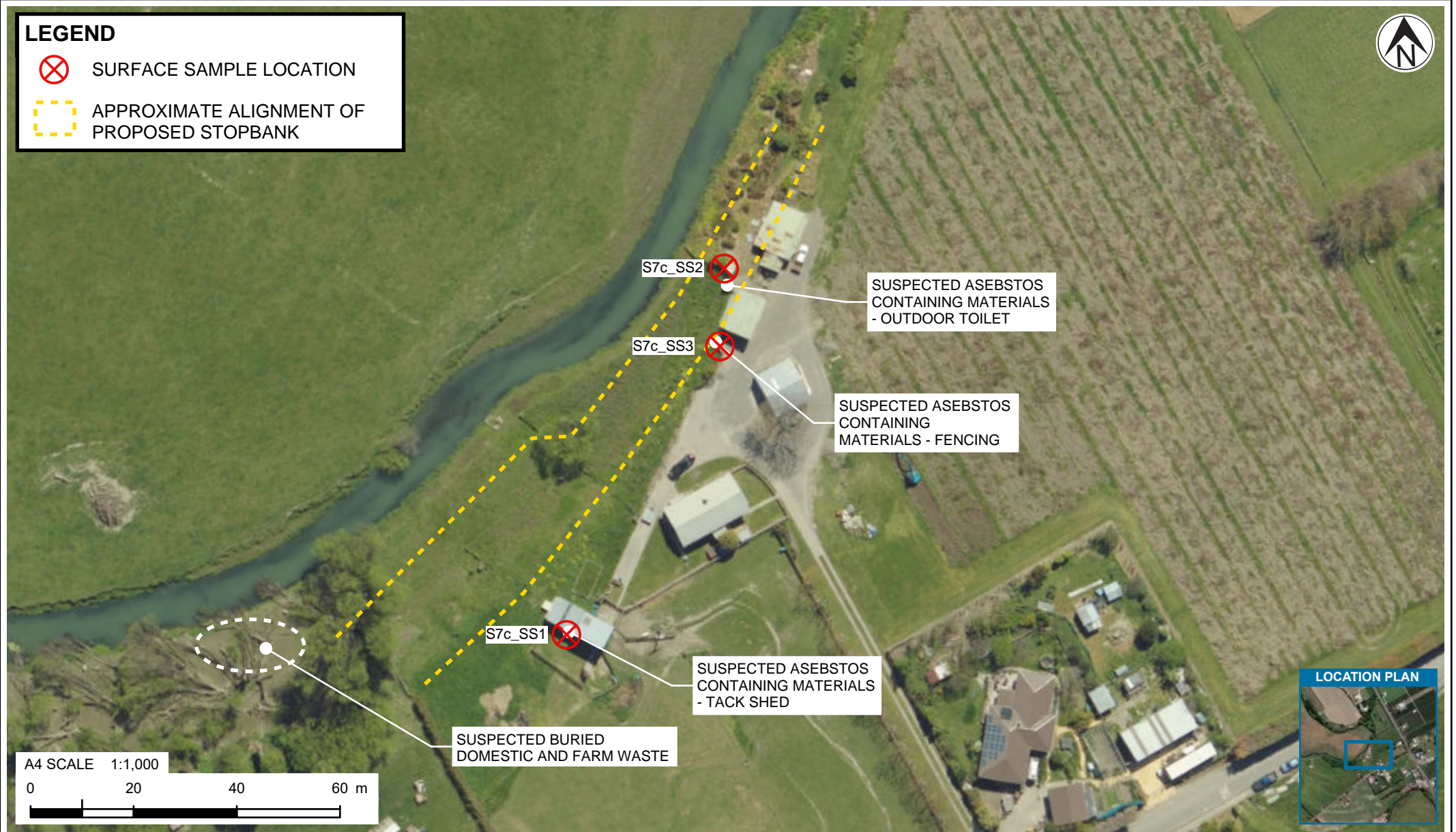
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CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403			CLIENT HAWKE'S BAY REGIONAL COUNCIL		
DESIGNED	XXXX	DEC.24	PROJECT PAKOWHAI SECONDARY STOPBANK		
DRAWN	-WEB-	DEC.24			
CHECKED	AJDC	FEB.25			
TGM MAR.2025			TITLE GROUND CONTAMINATION INVESTIGATION SITE 7d - 47 CHESTERHOPE ROAD		
APPROVED			SCALE (A4) 1:1,000		
DATE			FIG No. FIGURE A5		
			REV 0		

LEGEND

-  SURFACE SAMPLE LOCATION
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK





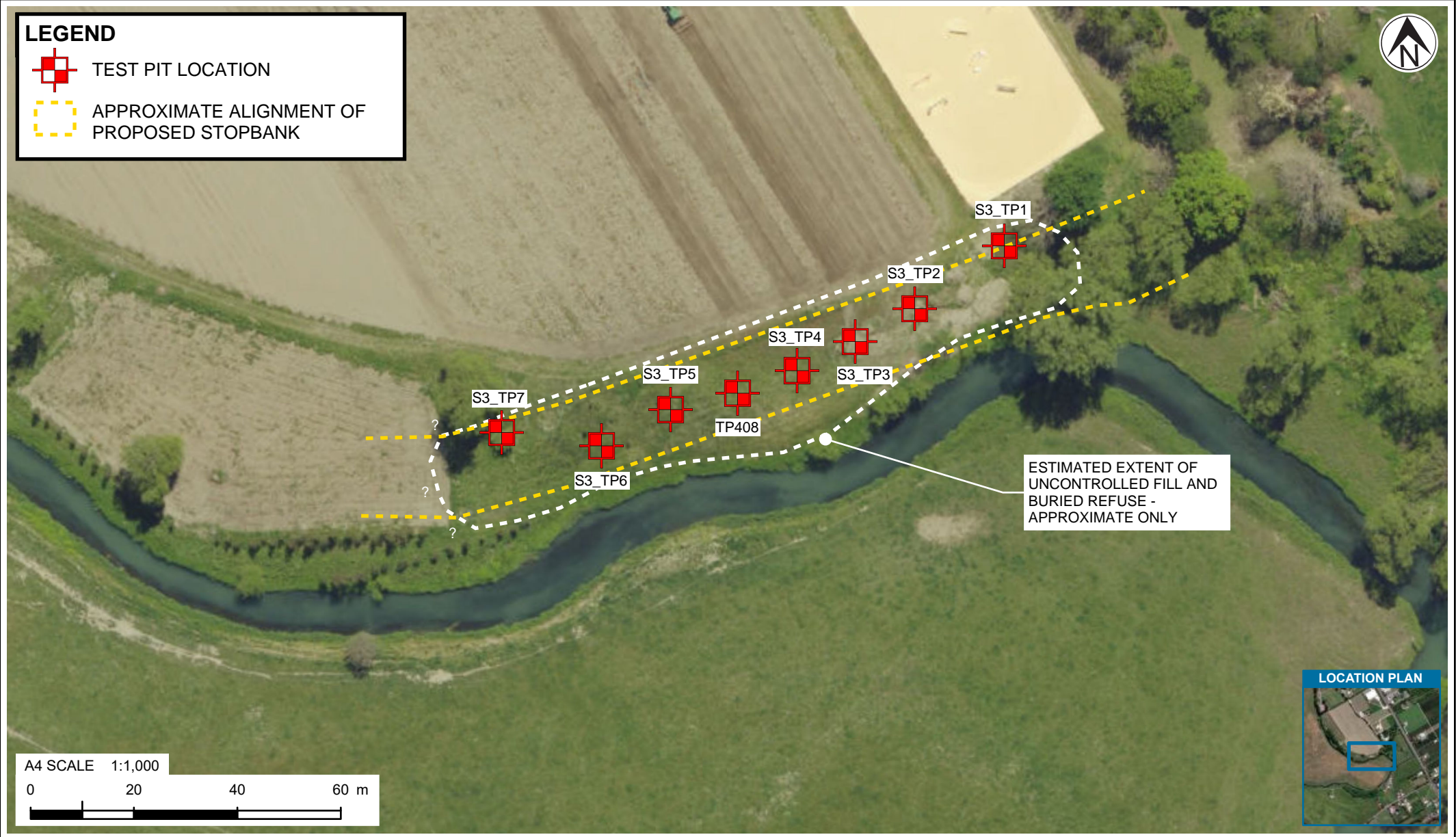
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PROJECT No. 1017353.2403			CLIENT HAWKE'S BAY REGIONAL COUNCIL		
DESIGNED	XXXX	DEC.24	PROJECT PAKOWHAI SECONDARY STOPBANK		
DRAWN	-WEB-	DEC.24	TITLE GROUND CONTAMINATION INVESTIGATION SITE 7c - 22 CHESTERHOPE ROAD		
CHECKED	AJDC	FEB.25			
TGM		MAR.2025	SCALE (A4) 1:1,000 FIG No. FIGURE A6 REV 0		
APPROVED		DATE			

LEGEND

-  TEST PIT LOCATION
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK








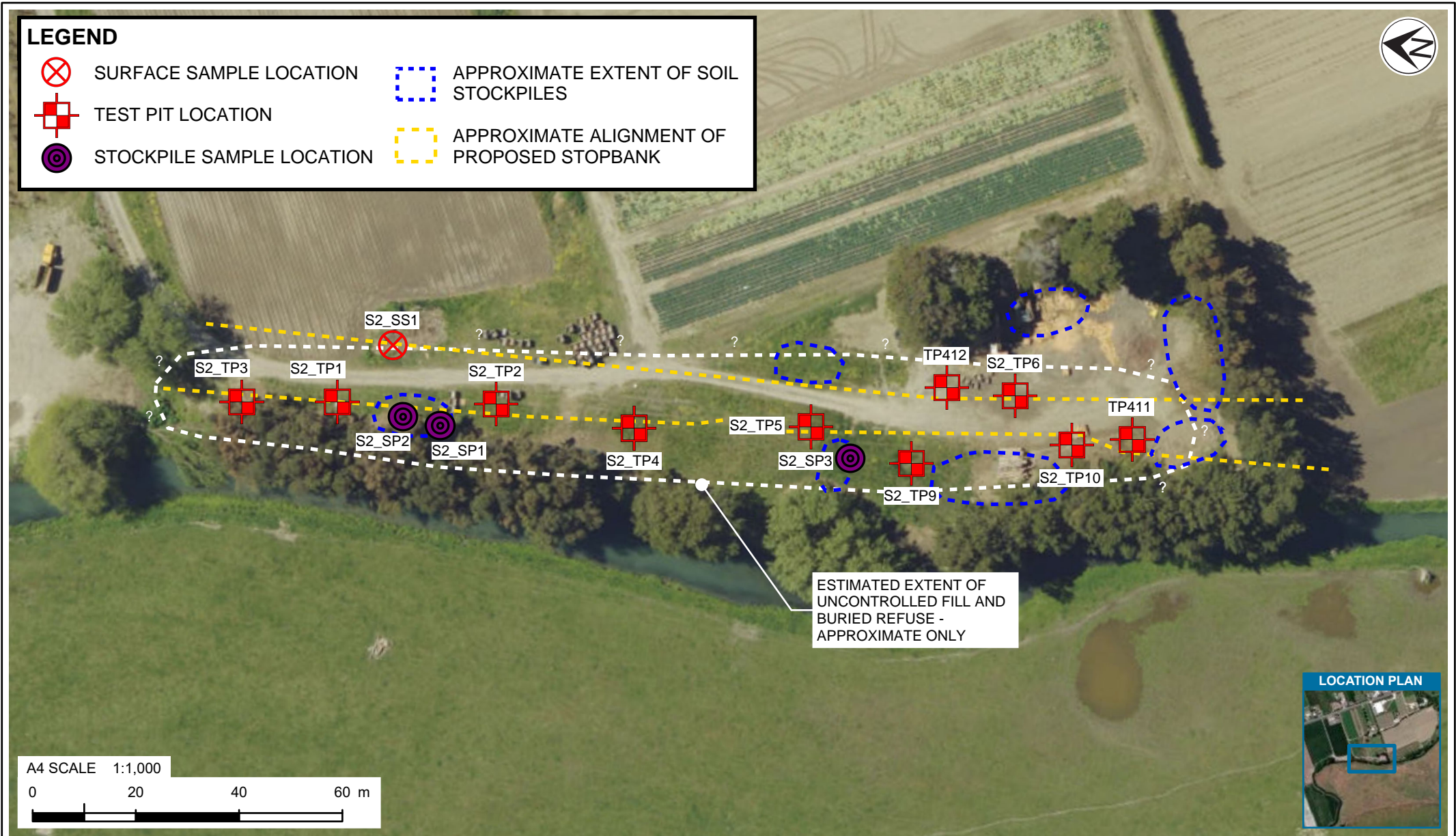
NOTES:

CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, MET/NASA, USGS

PROJECT No. 1017353.2403		CLIENT HAWKE'S BAY REGIONAL COUNCIL	
DESIGNED	XXXX	DEC.24	PROJECT PAKOWHAI SECONDARY STOPBANK
DRAWN	-WEB-	DEC.24	
CHECKED	AJDC	FEB.25	
TGM MAR.2025		TITLE GROUND CONTAMINATION INVESTIGATION	
APPROVED		DATE	
		SCALE (A4) 1:1,000	FIG No. FIGURE A7
			REV 0

LEGEND

-  SURFACE SAMPLE LOCATION
-  TEST PIT LOCATION
-  STOCKPILE SAMPLE LOCATION
-  APPROXIMATE EXTENT OF SOIL STOCKPILES
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK









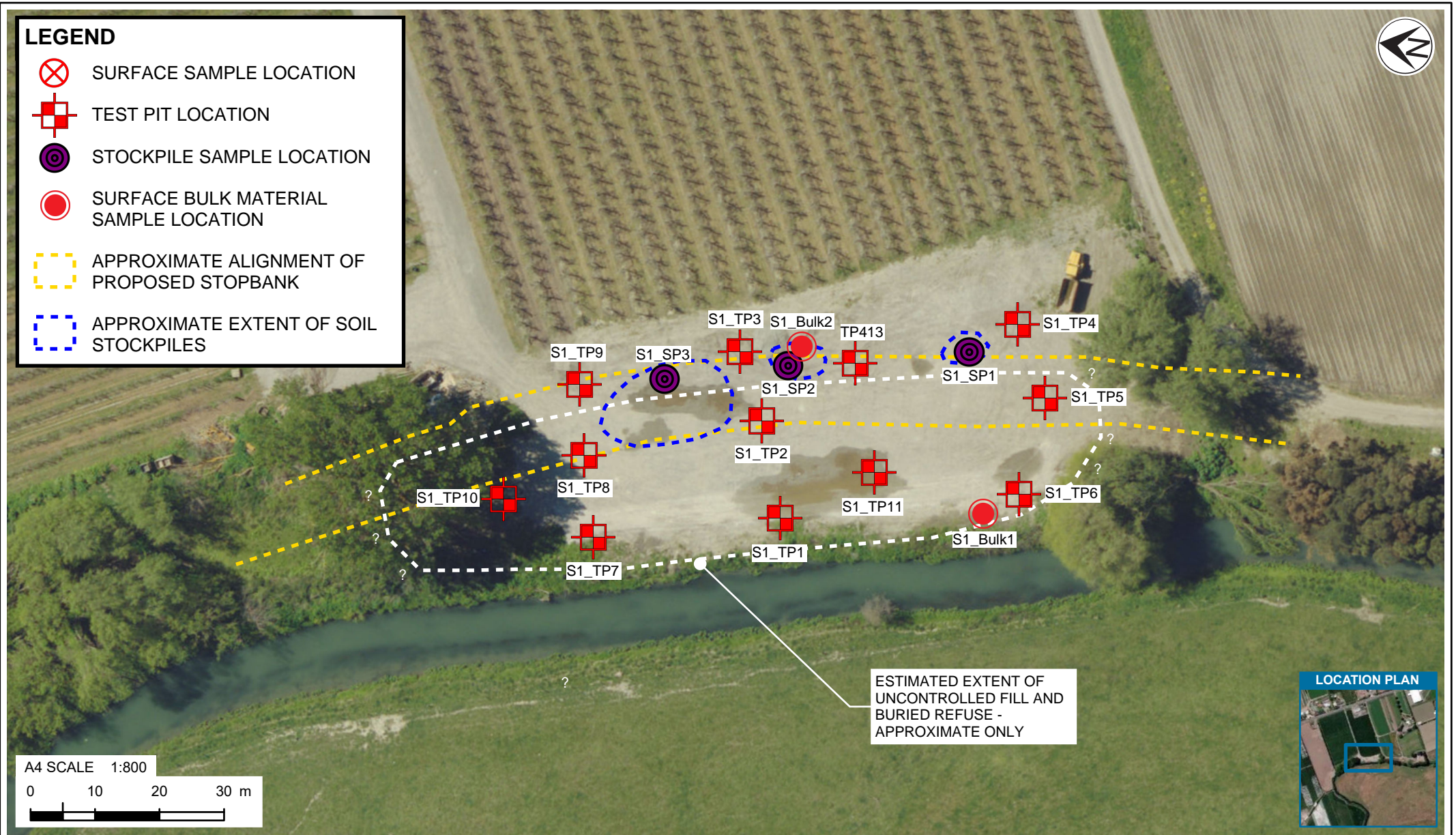
ESTIMATED EXTENT OF UNCONTROLLED FILL AND BURIED REFUSE - APPROXIMATE ONLY



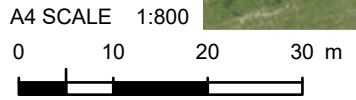


LEGEND

-  SURFACE SAMPLE LOCATION
-  TEST PIT LOCATION
-  STOCKPILE SAMPLE LOCATION
-  SURFACE BULK MATERIAL SAMPLE LOCATION
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK
-  APPROXIMATE EXTENT OF SOIL STOCKPILES



ESTIMATED EXTENT OF UNCONTROLLED FILL AND BURIED REFUSE - APPROXIMATE ONLY








NOTES:

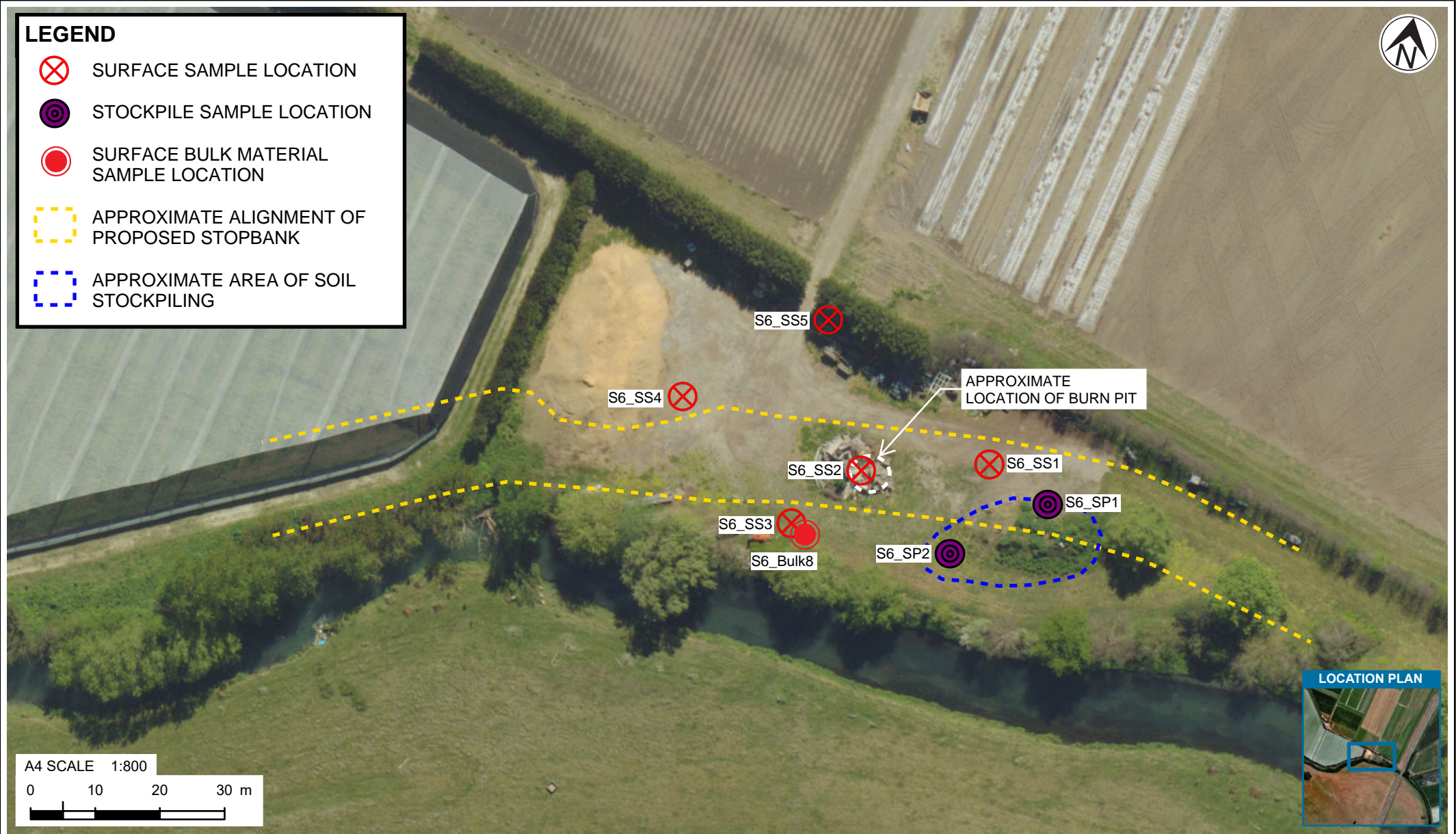
CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403		
DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25
TGM	MAR.2025	
APPROVED	DATE	

CLIENT	HAWKE'S BAY REGIONAL COUNCIL	
PROJECT	PAKOWHAI SECONDARY STOPBANK	
TITLE	GROUND CONTAMINATION INVESTIGATION	
	SITE 1 - 2008 PAKOWHAI ROAD	
SCALE (A4)	1:800	FIG No. FIGURE A9
		REV 0

LEGEND

-  SURFACE SAMPLE LOCATION
-  STOCKPILE SAMPLE LOCATION
-  SURFACE BULK MATERIAL SAMPLE LOCATION
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK
-  APPROXIMATE AREA OF SOIL STOCKPILING








NOTES:

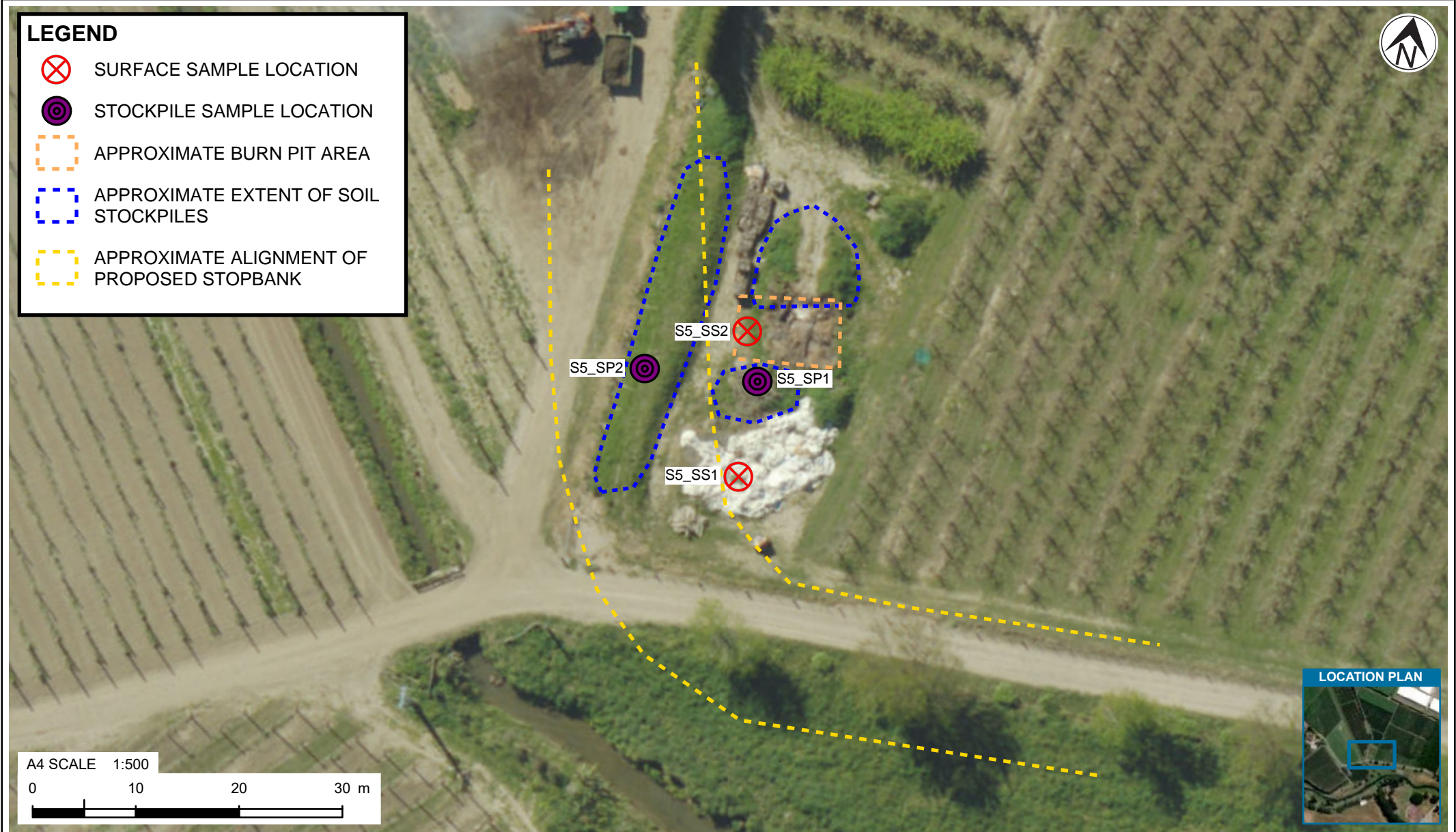
CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403		
DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25
TGM	MAR.2025	
APPROVED	DATE	

CLIENT	HAWKE'S BAY REGIONAL COUNCIL	
PROJECT	PAKOWHAI SECONDARY STOPBANK	
TITLE	GROUND CONTAMINATION INVESTIGATION	
	SITE 6 - 1023 LINKS ROAD	
SCALE (A4)	1:800	FIG No. FIGURE A10
		REV 0

LEGEND

-  SURFACE SAMPLE LOCATION
-  STOCKPILE SAMPLE LOCATION
-  APPROXIMATE BURN PIT AREA
-  APPROXIMATE EXTENT OF SOIL STOCKPILES
-  APPROXIMATE ALIGNMENT OF PROPOSED STOPBANK



A4 SCALE 1:500





NOTES:

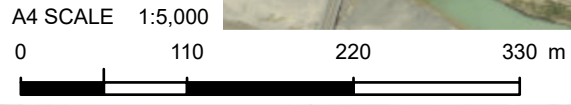
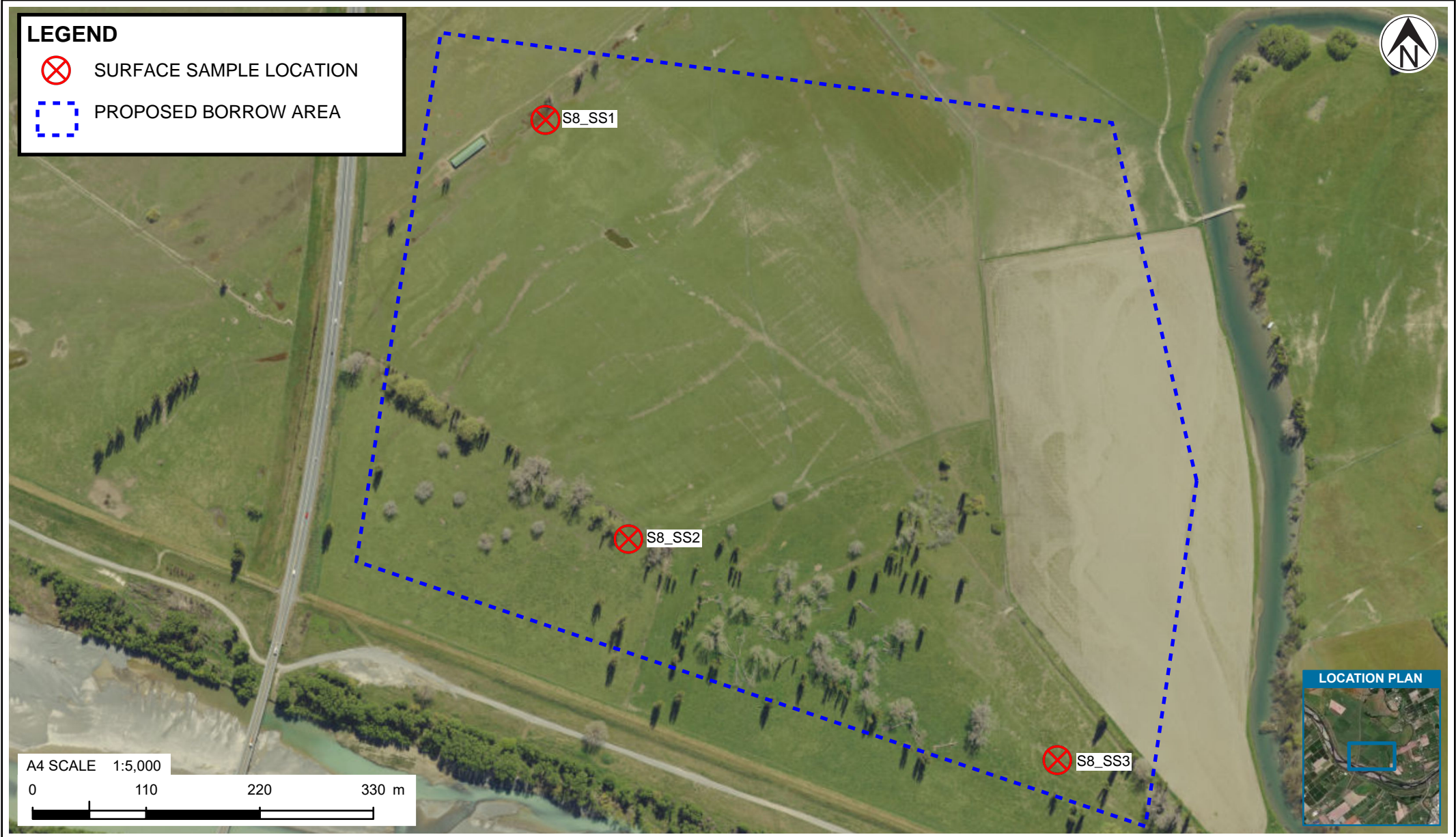
CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Maxar, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403		
DESIGNED	XXXX	DEC.24
DRAWN	-WEB-	DEC.24
CHECKED	AJDC	FEB.25
TGM	MAR.2025	
APPROVED	DATE	

CLIENT	HAWKE'S BAY REGIONAL COUNCIL	
PROJECT	PAKOWHAI SECONDARY STOPBANK	
TITLE	GROUND CONTAMINATION INVESTIGATION SITE 5 - 56 FRANKLIN ROAD	
SCALE (A4)	1:500	FIG No. FIGURE A11
REV	0	

LEGEND

-  SURFACE SAMPLE LOCATION
-  PROPOSED BORROW AREA



NOTES:

CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Hawkes Bay RC, Earthstar Geographics, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

PROJECT No. 1017353.2403			CLIENT HAWKE'S BAY REGIONAL COUNCIL		
DESIGNED	XXXX	DEC.24	PROJECT PAKOWHAI SECONDARY STOPBANK		
DRAWN	-WEB-	DEC.24	TITLE GROUND CONTAMINATION INVESTIGATION SITE 8 - BORROW AREA, CHESTERHOPE STATION		
CHECKED	AJDC	FEB.25			
TGM		MAR.2025	SCALE (A4) 1:5,000		
APPROVED		DATE	FIG No. FIGURE A12		REV 0

Appendix B Site photographs



Photograph Appendix B.1: Site 1 – laydown area with stockpiled soils. Facing north.



Photograph Appendix B.2: Site 1 – stockpiled soils. Facing south.



Photograph Appendix B.3: Site 1 – fill soils and refuse in S1_TP2.



Photograph Appendix B.4: Site 1 – natural soils in S1_TP4 at southern end of site.



Photograph Appendix B.5: Site 2 – fill soils and concrete rubble in S2_TP4 and wider site. Facing south.



Photograph Appendix B.6: Site 2 – large concrete slabs in S2_TP4.



Photograph Appendix B.7: Site 2 - stockpiled tyres, concrete and screened soil at southern end of laydown area.



Photograph Appendix B.8: Site 2 – Large volumes of organic material and industrial waste in S2_TP6.



Photograph Appendix B.9: Site 3 – vacant, grassed paddocks. Facing north-east.



Photograph Appendix B.10: Site 3 – fill soils and refuse within S3_TP2.



Photograph Appendix B.11: Site 4a – grassed shelterbelt along proposed stopbank alignment with adjacent ploughed paddocks. Facing south.



Photograph Appendix B.12: Site 4a – Farm waste pit within paddock to east of shelterbelt.



Photograph Appendix B.13: Site 4a – farm waste within waste pit, including sheep carcasses, treated timber, plastic jerry cans and other domestic waste.



Photograph Appendix B.14: Site 4b – filled and graded paddocks, with trace refuse in loose soils. Facing north.



Photograph Appendix B.15: Site 4c and Site 7b – front (western side) of woolshed, with adjacent spray race/stockyard.



Photograph Appendix B.16: Site 4c and Site 7b – northern side of woolshed with fenced area leading to spray race/stockyard. Brick furnace structure to left of image.



Photograph Appendix B.17: Site 4c and Site 7b – disused spray race/stockyard adjacent to woolshed, overgrown with grass and weeds.



Photograph Appendix B.18: Site 4c and Site 7b – livestock dip north of the woolshed.



Photograph Appendix B.19: Site 5 – overgrown, stockpiled soils and burn pit to west of orchard. Facing north.



Photograph Appendix B.20: Site 5 – burn pit with unburned green waste, cloth and other farm waste.



Photograph Appendix B.21: Site 6 – laydown area with stockpiled soil and green waste, burn pit, and stored machinery and other farm equipment. Facing south-east.



Photograph Appendix B.22: Site 6 – laydown area with stockpiled sawdust at western end of site.



Photograph Appendix B.23: Site 7a – rear of Pakowhai Memorial Hall with damaged ACM fibre board cladding.



Photograph Appendix B.24: Site 7a – western side of Pakowhai Memorial Hall, facing north-east.



Photograph Appendix B.25: and 25B: Site 7c – suspected ACM products at 22 Chesterhope Road. ‘Super 6’ fencing (left) and fibre board in tack shed (right).



Photograph Appendix B.26: Site 7d – steel shed used for storage of machinery and farm equipment, with empty intermediate bulk containers and steel drums stored on either side.



Photograph Appendix B.27: Site 7d – stored empty steel chemical drums on the southern side of the shed.



Photograph Appendix B.28: Site 7d – transportable house, stockpiled soils, and stockpiled green waste, timber and farm waste in the northern end of site 7d.

Appendix C Results tables

- Table C1: Analytical results table
- Table C2: RPD values

Table C1 - Tabulated analytical results

Sample location and site ID	Site 1 - Closed private landfill and laydown area, 2008 Pakowhai Road																											
Sample ID	S1_TP1	S1_TP2	S1_TP2	S1_TP2	S1_TP3	S1_TP4	S1_TP5	S1_TP6	S1_TP7	S1_TP8	S1_TP9	S1_TP10	S1_TP10	S1_TP10	S1_TP11*	TP413	S1_SP1	S1_SP2	S1_SP3	S1_Buk1	S1_Buk2							
Laboratory reference no.	3734624.1	3734624.2	3734624.3	3734624.5	3734624.7	3734624.9	3734624.10	3734624.11	3734624.12	3734624.13	3734624.14	3734624.15	3734624.16	3734624.17	3734624.18	3734624.19	3734624.20	3734624.21	3734624.22	3734624.23	3734624.24	3734624.25						
Adbestos laboratory reference no. (s)	3734625.1	3734625.2	3734625.3	3734625.5	3734625.6	3734625.7	3734625.8	3734625.21	3734625.22	3734625.23	3734625.24	3734625.25	3734625.26	3734625.27	3734625.28	3734625.29	3734625.30	3734625.31	3734625.32	3734625.33	3734625.34	3734625.35						
Sampling date	3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024		3/12/2024							
Depth (m)	0.5	1.5	3.0	0.2	1.3	0.2	0.1	0.4	1.0	0.5	3.0	0.5	1.0	0.2	0.8	0.1	1.0	3.0	0.5	0.5	1.2	1.2	3.0					
Ecological unit	FB	FB	SAND	FB	FB	FB	FB	FB	Sandy SILT	FB	FB	FB	FB	FB	FB	Silty SAND	FB	FB	FB	FB	FB	Sandy SILT	FB					
Heavy Metals																												
As	4	3	3	7	50	0.021 / 0.3	20	9	3	12	5	18	8	8	6	3	10	30	0.002 / 0.001	6	8	3	7	8				
Cadmium	0.1	0.27	0.86	7 / 0.04	0.36	0.0006	0.15	0.2	0.12	14	17	14	14	14	11	15	25	0.0007 / 0.001	11	14	12	17	14					
Chromium	15	13	10	15	39	0.0006	23	12	16	17	14	14	14	14	11	15	25	0.0007 / 0.001	11	14	12	17	14					
Copper	10	9	5	7	102	0.04 / 0.095	105	21	15	6	16	22	36	49	14	14	6	22	0.004 / 0.004	11	22	10	32	19				
Lead	28	12	7.8	51	140	0.0317 / 0.167	88	12	10.5	11	25	31	18	42	24	63	8.3	55	0.0176 / 0.134	16.7	54	6.7	29	27				
Manganese	11	11	8	9	14	0.0153 / 0.014	13	9	10	14	10	12	13	11	10	11	9	10	0.0086 / 0.021	10	10	9	12	10				
Zinc	72	64	38	163	1200	0.056 / 4.6	430	56	37	53	86	120	151	77	93	73	41	138	0.187 / 11.6	62	134	40	103	79				
Organochlorine Pesticides (OCP)																												
γ-HCH																												
β-HCH																												
α-HCH																												
γ-DDE																												
β-DDE																												
α-DDE																												
γ-DDT																												
β-DDT																												
α-DDT																												
Total DDT isomers																												
Endrin																												
Endrin sulfate																												
Other individual OCP compounds																												
Polycyclic Aromatic Hydrocarbons (PAH)																												
Fluorene					2.3																							
1-Methylphenanthrene					0.02																							
2-Methylphenanthrene					0.025																							
Acenaphthene					0.029																							
Acenaphthylene					0.022																							
Benzo[a]anthracene					0.094																							
Benzo[a]pyrene					0.164																							
Benzo[b]fluoranthene (BbF)					0.29																							
Benzo[b]fluoranthene TEF					0.28																							
Benzo[k]fluoranthene					0.27																							
Benzo[e]pyrene					0.187																							
Benzo[g]perylene					0.25																							
Benzo[h]perylene					0.181																							
Chrysene					0.13																							
Fluorene					0.04																							
Fluoranthene					0.182																							
Indene					0.01																							
Indeno[1,2,3-cd]pyrene					0.195																							
Naphthalene					0.01																							
Phenanthrene					0.031																							
Phenanthrene					0.186																							
Pyrene					0.2																							
Total Petroleum Hydrocarbons (TPH)																												
C1 - C9																												
C10 - C14																												
C15 - C30					310																							
TPH Hydrocarbons (C7 - C30)					300																							
Asbestos																												
Asbestos in bulk material (asbestos/abestos*)						Amosite, chrysotile									Not tested								Chrysotile	Chrysotile				
Asbestos form (if present)						Fibre cement									Fibre cement								Fibre cement	Fibre cement				
Asbestos in soil (presence/absence)	ND	ND	ND	ND	Chrysotile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Asbestos form (if present)					ACTM fibers																							
Asbestos in ACM (asbestos)					0.001																							
Asbestos in PFPA (asbestos)					0.001																							

Notes:

- * Denotes not analysed or not applicable
- ND - Not detected
- mg/kg - indicates concentrations less than the laboratory limit of reporting
- Red values indicate above Class A Landfill Criteria
- Bold text denotes above predicted background concentrations
- Blue text indicates above relevant human health criteria
- Green cells indicate above environmental criteria (Co-SQA) or SPK above Class 3 managed fill criteria
- Red shaded grid (NE) green indicates concentrations above human health AND environmental criteria
- Red outlined cells above the Stopbank Construction Upper Fill Limits
- * Denoted as Benzo[a]pyrene Potency Equivalency Factor (PEF) NES in laboratory results transcript
- * Bulk material fragments collected from variety of depths within test pits across the site. Results have been tabulated at depths within the same strata that they were collected from and the indicative depth may not be exact. Samples with no depth indicated were hand-picked from the ground or stockpile surface.
- * Results for S1_TP11 are incorrectly denoted on the lab transcript as S1_TP11 (3734625.39 to 3734625.41), results for 'S4_Buk1' are incorrectly denoted on the lab transcript as 'S4_Buk2' (3734625.5).
- 1. All values in mg/kg unless otherwise stated (i.e. asbestos)
- 2. Upper limit of background concentrations from Landcare Research, 2016. Predicted background soil concentrations for multistart (MMS) soil type.
- 3. Criteria from MIT, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated). Commercial/Industrial Land use.
- 4. Nafal and zinc criteria sourced from Guidelines on the Investigation Levels for Soil and Groundwater, NEMA, Australia, updated 2013 (Residential A and Commercial values).
- 5. No - No limit. Derived value exceeds 10,000 mg/kg
- 6. Tonkin & Taylor Ltd, 2023. Upper Limits for Contaminants in Hawke's Bay Stopbank Fill. Prepared for Hawke's Bay Regional Council, T1 ref: 107353.21028.v1
- 7. MS 2004. Model 2 Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification. Spawning Criteria for Class A Landfills. Liability limits displayed in brackets for comparison against TGP analysis results.
- 8. Derived from the concentration at which this product will be present in leachate.
- 9. Sourced from MRE (2011) Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Tier 1 Soil Acceptance Criteria. All PAHs/MS, sandy fill soils at surface (1 m depth, most conservative), commercial/Industrial Land use.
- 10. Not validated, consistent not testing as estimated health based criteria is significantly higher than that likely to be encountered on site
- 11. BRANZ, 2017, updated December 2024. New Zealand Guidelines for Assessing and Managing Contaminants in Soil
- 12. Waste Management Institute New Zealand (WasteMNZ), 2023. Technical Guidelines for Design and Land Use. Division 11. Class 3 Managed Fill Waste Acceptance Criteria. Target leachate concentrations for an aquatic environment.
- 13. Landcare Research and Marlborough District Council, 2022. Exploring the implementation of ecological soil guideline values for soil contaminants. Tables 13 to 15. Copper and zinc values assume typical soil and aged condition. Fine soils for TPH

Table C2: Duplicate sample results and RPD values

Sample / duplicate ID	S1_SP3	Dup 1	RPD %	S1_TP6 3.0	Dup 2	RPD %	S7b_SS3	Dup 3	RPD %	S7b_SS1	Dup 4	RPD %	S6_SS1	Dup 7	RPD %	S7d_SS4	Dup 8	RPD %
Metals																		
Arsenic	8	8	0	18	17	6	-	8	-	17	-	-	15	15	0	5	5	0
Cadmium	0.12	0.1	18	0.16	0.19	17	-	0.53	-	0.34	-	-	0.19	0.16	17	0.12	0.12	0
Chromium	14	14	0	17	18	6	-	19	-	18	-	-	20	18	11	15	14	7
Copper	19	18	5	22	18	20	-	21	-	20	-	-	44	41	7	15	13	14
Lead	27	22	20	31	28	10	160	162	1	1080	920	16	53	63	17	26	25	4
Nickel	10	11	10	12	12	0	-	11	-	9	-	-	13	11	17	12	11	9
Zinc	79	73	8	320	350	9	-	320	-	300	-	-	139	191	32	137	122	12
Organochlorine Pesticides (OCP)																		
4,4'-DDE	0.013	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	<LOR	<LOR	-
4,4'-DDT	0.012	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	<LOR	<LOR	-
All other OCP compounds	<LOR	<LOR	-	-	-	-	-	-	-	-	-	-	-	-	-	<LOR	<LOR	-
Total petroleum hydrocarbons (TPH)																		
C7 - C9	< 20	< 20	-	-	-	-	-	-	-	-	-	-	-	-	-	<20	< 20	-
C10 - C14	< 20	< 20	-	-	-	-	-	-	-	-	-	-	-	-	-	<20	< 20	-
C15 - C36	< 40	< 40	-	-	-	-	-	-	-	-	-	-	-	-	-	42	64	42
Total hydrocarbons (C7 - C36)	< 80	< 80	-	-	-	-	-	-	-	-	-	-	-	-	-	<80	< 80	-
Polycyclic aromatic hydrocarbons (PAH)																		
Benzo[a]pyrene	< 0.010	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.011	0.011	-
Benzo[b]&[j] fluoranthene	0.01	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.011	0.013	-
Fluoranthene	0.013	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.011	0.014	-
Pyrene	< 0.010	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.011	0.012	-
All other individual PAH compounds	<LOR	<LOR	-	-	-	-	-	-	-	-	-	-	-	-	-	<LOR	<LOR	-

Appendix D Laboratory transcripts

- **3734624-SP-2: Chemistry results (Sites 1, 2, 3, 4a-c, 5, 6, 7b & c)**
- **3738309-SP-2: Chemistry results (Sites 7a and 8)**
- **3734625-A2P-1: Asbestos results (Sites 1, 2, 3, 4a-c, 5, 6, 7b & c)**
- **3738687-A2P-1: Asbestos results (Site 7a)**
- **3734626-A2P-1: Bulk material asbestos results (all sites)**

Certificate of Analysis

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Client: Tonkin & Taylor	Lab No: 3734624	SPV2
Contact: Genevieve Palmer	Date Received: 06-Dec-2024	
C/- Tonkin & Taylor	Date Reported: 24-Jan-2025	(Amended)
PO Box 9544	Quote No: 80842	
Hamilton 3240	Order No: 1017353.2403	
	Client Reference: 1017353.2403	
	Submitted By: Genevieve Palmer	

Sample Type: Soil						
Sample Name:	S1 TP1@ 0.5 03-Dec-2024	S1 TP1@ 1.5 03-Dec-2024	S1 TP1@ 3.0 03-Dec-2024	S1 TP2@ 0.2 03-Dec-2024	S1 TP2@ 1.3 03-Dec-2024	
Lab Number:	3734624.1	3734624.2	3734624.3	3734624.4	3734624.5	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	74
SPLP Sample Weight	g	-	-	-	-	50
SPLP Extractant Type*		-	-	-	-	De-ionised Water, pH 5.8 +/- 0.4
SPLP Final pH	pH Units	-	-	-	-	8.6
TCLP Weight of Sample Taken	g	-	-	-	-	50
TCLP Initial Sample pH	pH Units	-	-	-	-	9.1
TCLP Acid Adjusted Sample pH	pH Units	-	-	-	-	1.8
TCLP Extractant Type*		-	-	-	-	NaOH/Acetic acid at pH 4.93 +/- 0.05
TCLP Extraction Fluid pH	pH Units	-	-	-	-	5.0
TCLP Post Extraction Sample pH	pH Units	-	-	-	-	5.7
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	3	3	7	50
Total Recoverable Cadmium	mg/kg dry wt	0.10	< 0.10	< 0.10	0.27	0.86
Total Recoverable Chromium	mg/kg dry wt	15	13	10	15	39
Total Recoverable Copper	mg/kg dry wt	10	9	5	17	450
Total Recoverable Lead	mg/kg dry wt	28	12.1	7.8	51	590
Total Recoverable Nickel	mg/kg dry wt	11	11	8	9	14
Total Recoverable Zinc	mg/kg dry wt	72	64	38	163	1,230
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	-	< 0.014
alpha-BHC	mg/kg dry wt	-	-	-	-	< 0.014
beta-BHC	mg/kg dry wt	-	-	-	-	< 0.014
delta-BHC	mg/kg dry wt	-	-	-	-	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	-	< 0.014
cis-Chlordane	mg/kg dry wt	-	-	-	-	< 0.014
trans-Chlordane	mg/kg dry wt	-	-	-	-	< 0.014
2,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.014
4,4'-DDD	mg/kg dry wt	-	-	-	-	0.062
2,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.014
4,4'-DDE	mg/kg dry wt	-	-	-	-	0.048
2,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.014
4,4'-DDT	mg/kg dry wt	-	-	-	-	0.021
Total DDT Isomers	mg/kg dry wt	-	-	-	-	0.13
Dieldrin	mg/kg dry wt	-	-	-	-	0.028
Endosulfan I	mg/kg dry wt	-	-	-	-	< 0.014
Endosulfan II	mg/kg dry wt	-	-	-	-	< 0.014

Sample Type: Soil						
Sample Name:	S1 TP1@ 0.5 03-Dec-2024	S1 TP1@ 1.5 03-Dec-2024	S1 TP1@ 3.0 03-Dec-2024	S1 TP2@ 0.2 03-Dec-2024	S1 TP2@ 1.3 03-Dec-2024	
Lab Number:	3734624.1	3734624.2	3734624.3	3734624.4	3734624.5	
Organochlorine Pesticides Screening in Soil						
Endosulfan sulphate	mg/kg dry wt	-	-	-	-	< 0.014
Endrin	mg/kg dry wt	-	-	-	-	< 0.014
Endrin aldehyde	mg/kg dry wt	-	-	-	-	< 0.014
Endrin ketone	mg/kg dry wt	-	-	-	-	< 0.014
Heptachlor	mg/kg dry wt	-	-	-	-	< 0.014
Heptachlor epoxide	mg/kg dry wt	-	-	-	-	< 0.014
Hexachlorobenzene	mg/kg dry wt	-	-	-	-	< 0.014
Methoxychlor	mg/kg dry wt	-	-	-	-	< 0.014
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	2.2
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	0.020
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	0.025
Acenaphthylene	mg/kg dry wt	-	-	-	-	0.026
Acenaphthene	mg/kg dry wt	-	-	-	-	< 0.014
Anthracene	mg/kg dry wt	-	-	-	-	0.032
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	0.094
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	0.164
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	0.29
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	0.28
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	0.27
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	0.187
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	0.25
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	0.081
Chrysene	mg/kg dry wt	-	-	-	-	0.130
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	0.054
Fluoranthene	mg/kg dry wt	-	-	-	-	0.182
Fluorene	mg/kg dry wt	-	-	-	-	0.021
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	0.195
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.07
Perylene	mg/kg dry wt	-	-	-	-	0.031
Phenanthrene	mg/kg dry wt	-	-	-	-	0.185
Pyrene	mg/kg dry wt	-	-	-	-	0.20
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	310
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	320
Sample Name:	S1 TP2@ 2.5 03-Dec-2024	S1 TP4@ 0.1 03-Dec-2024	S1 TP5@ 0.4 03-Dec-2024	S1 TP5@ 1.0 03-Dec-2024	S1 TP6@ 0.5 03-Dec-2024	
Lab Number:	3734624.6	3734624.9	3734624.11	3734624.12	3734624.13	
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	23	6	3	12	5
Total Recoverable Cadmium	mg/kg dry wt	0.36	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	23	12	16	17	14
Total Recoverable Copper	mg/kg dry wt	105	31	15	6	16
Total Recoverable Lead	mg/kg dry wt	88	12.3	10.5	11.0	25
Total Recoverable Nickel	mg/kg dry wt	13	9	10	14	10
Total Recoverable Zinc	mg/kg dry wt	430	56	37	53	66
Sample Name:	S1 TP6@ 3.0 03-Dec-2024	S1 TP7@ 0.5 03-Dec-2024	S1 TP7@ 1.0 03-Dec-2024	S1 TP8@ 0.2 03-Dec-2024	S1 TP8@ 0.8 03-Dec-2024	
Lab Number:	3734624.14	3734624.15	3734624.16	3734624.17	3734624.18	

Sample Type: Soil

Sample Name:		S1 TP6@ 3.0 03-Dec-2024	S1 TP7@ 0.5 03-Dec-2024	S1 TP7@ 1.0 03-Dec-2024	S1 TP8@ 0.2 03-Dec-2024	S1 TP8@ 0.8 03-Dec-2024
Lab Number:		3734624.14	3734624.15	3734624.16	3734624.17	3734624.18
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	18	8	8	8	6
Total Recoverable Cadmium	mg/kg dry wt	0.16	0.20	0.12	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	17	12	14	14	14
Total Recoverable Copper	mg/kg dry wt	22	36	40	14	14
Total Recoverable Lead	mg/kg dry wt	31	184	42	24	63
Total Recoverable Nickel	mg/kg dry wt	12	13	11	10	11
Total Recoverable Zinc	mg/kg dry wt	320	151	77	93	73

Sample Name:		S1 TP9@ 0.1 03-Dec-2024	S1 TP10@ 1.0 03-Dec-2024	S1 TP10@ 3.0 03-Dec-2024	S1 SP1 03-Dec-2024	S1 SP2 03-Dec-2024
Lab Number:		3734624.19	3734624.20	3734624.21	3734624.22	3734624.23

Individual Tests						
Dry Matter	g/100g as rcvd	-	88	-	-	-
SPLP Sample Weight	g	-	-	50	-	-
SPLP Extractant Type*		-	-	De-ionised Water, pH 5.8 +/- 0.4	-	-
SPLP Final pH	pH Units	-	-	5.1	-	-
TCLP Weight of Sample Taken	g	-	-	50	-	-
TCLP Initial Sample pH	pH Units	-	-	8.1	-	-
TCLP Acid Adjusted Sample pH	pH Units	-	-	1.7	-	-
TCLP Extractant Type*		-	-	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-
TCLP Extraction Fluid pH	pH Units	-	-	5.0	-	-
TCLP Post Extraction Sample pH	pH Units	-	-	5.2	-	-

Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	10	32	3	7
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.15	0.80	< 0.10	0.15
Total Recoverable Chromium	mg/kg dry wt	11	15	25	12	17
Total Recoverable Copper	mg/kg dry wt	6	22	32	10	32
Total Recoverable Lead	mg/kg dry wt	8.3	55	300	6.7	29
Total Recoverable Nickel	mg/kg dry wt	9	10	13	9	12
Total Recoverable Zinc	mg/kg dry wt	41	178	1,410	40	103

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	-	0.061	-	-	-
2,4'-DDE	mg/kg dry wt	-	< 0.012	-	-	-
4,4'-DDE	mg/kg dry wt	-	0.031	-	-	-
2,4'-DDT	mg/kg dry wt	-	< 0.012	-	-	-
4,4'-DDT	mg/kg dry wt	-	0.024	-	-	-
Total DDT Isomers	mg/kg dry wt	-	0.12	-	-	-
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	-	-	-

Sample Type: Soil						
Sample Name:	S1 TP9@ 0.1 03-Dec-2024	S1 TP10@ 1.0 03-Dec-2024	S1 TP10@ 3.0 03-Dec-2024	S1 SP1 03-Dec-2024	S1 SP2 03-Dec-2024	
Lab Number:	3734624.19	3734624.20	3734624.21	3734624.22	3734624.23	
Organochlorine Pesticides Screening in Soil						
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	-	5.9	-	-	-
1-Methylnaphthalene	mg/kg dry wt	-	0.012	-	-	-
2-Methylnaphthalene	mg/kg dry wt	-	< 0.012	-	-	-
Acenaphthylene	mg/kg dry wt	-	0.137	-	-	-
Acenaphthene	mg/kg dry wt	-	< 0.012	-	-	-
Anthracene	mg/kg dry wt	-	0.086	-	-	-
Benzo[a]anthracene	mg/kg dry wt	-	0.44	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	0.62	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	0.91	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	0.90	-	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	0.66	-	-	-
Benzo[e]pyrene	mg/kg dry wt	-	0.36	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	0.49	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	-	0.24	-	-	-
Chrysene	mg/kg dry wt	-	0.43	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	0.098	-	-	-
Fluoranthene	mg/kg dry wt	-	0.72	-	-	-
Fluorene	mg/kg dry wt	-	0.049	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	0.47	-	-	-
Naphthalene	mg/kg dry wt	-	< 0.06	-	-	-
Perylene	mg/kg dry wt	-	0.122	-	-	-
Phenanthrene	mg/kg dry wt	-	0.27	-	-	-
Pyrene	mg/kg dry wt	-	0.72	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	< 20	-	-	-
C10 - C14	mg/kg dry wt	-	< 20	-	-	-
C15 - C36	mg/kg dry wt	-	162	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	175	-	-	-
Sample Name:	S1 SP3 03-Dec-2024	S4c SS1 04-Dec-2024	S4c SS2 04-Dec-2024	S4c SS3 04-Dec-2024	S4c SS4 04-Dec-2024	
Lab Number:	3734624.24	3734624.25	3734624.26	3734624.27	3734624.28	
Individual Tests						
Dry Matter	g/100g as rcvd	99	94	87	88	88
SPLP Sample Weight	g	-	-	65	50	-
SPLP Extractant Type*		-	-	De-ionised Water, pH 5.8 +/- 0.4	De-ionised Water, pH 5.8 +/- 0.4	-
SPLP Final pH	pH Units	-	-	7.3	7.5	-
TCLP Weight of Sample Taken	g	-	-	66	50	-
TCLP Initial Sample pH	pH Units	-	-	5.9	7.1	-
TCLP Acid Adjusted Sample pH	pH Units	-	-	1.6	1.8	-
TCLP Extractant Type*		-	-	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	-
TCLP Extraction Fluid pH	pH Units	-	-	5.0	5.0	-
TCLP Post Extraction Sample pH	pH Units	-	-	5.0	5.1	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	8	19	12	199	8
Total Recoverable Cadmium	mg/kg dry wt	0.12	< 0.10	0.14	0.48	< 0.10
Total Recoverable Chromium	mg/kg dry wt	14	15	14	19	18
Total Recoverable Copper	mg/kg dry wt	19	17	36	370	17
Total Recoverable Lead	mg/kg dry wt	27	28	36	290	18.0

Sample Type: Soil						
Sample Name:		S1 SP3 03-Dec-2024	S4c SS1 04-Dec-2024	S4c SS2 04-Dec-2024	S4c SS3 04-Dec-2024	S4c SS4 04-Dec-2024
Lab Number:		3734624.24	3734624.25	3734624.26	3734624.27	3734624.28
Heavy Metals, Screen Level						
Total Recoverable Nickel	mg/kg dry wt	10	10	8	30	14
Total Recoverable Zinc	mg/kg dry wt	79	90	129	380	81
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
alpha-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
beta-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
delta-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
4,4'-DDD	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
4,4'-DDE	mg/kg dry wt	0.013	< 0.011	0.021	0.013	< 0.011
2,4'-DDT	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
4,4'-DDT	mg/kg dry wt	0.012	0.011	0.24	0.041	< 0.011
Total DDT Isomers	mg/kg dry wt	< 0.06	< 0.07	0.26	< 0.07	< 0.07
Dieldrin	mg/kg dry wt	< 0.010	0.158	49	0.196	0.115
Endosulfan I	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Endosulfan II	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Endrin	mg/kg dry wt	< 0.010	< 0.011	0.40	< 0.011	< 0.011
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Endrin ketone	mg/kg dry wt	< 0.010	< 0.011	0.28	< 0.011	< 0.011
Heptachlor	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Methoxychlor	mg/kg dry wt	< 0.010	< 0.011	< 0.012	< 0.011	< 0.011
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.010	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.010	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.010	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.010	-	-	-	-
Anthracene	mg/kg dry wt	< 0.010	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.010	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.025	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.025	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.010	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.010	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010	-	-	-	-
Chrysene	mg/kg dry wt	< 0.010	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010	-	-	-	-
Fluoranthene	mg/kg dry wt	0.013	-	-	-	-
Fluorene	mg/kg dry wt	< 0.010	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010	-	-	-	-
Naphthalene	mg/kg dry wt	< 0.05	-	-	-	-
Perylene	mg/kg dry wt	< 0.010	-	-	-	-
Phenanthrene	mg/kg dry wt	< 0.010	-	-	-	-
Pyrene	mg/kg dry wt	< 0.010	-	-	-	-

Sample Type: Soil						
Sample Name:	S1 SP3	S4c SS1	S4c SS2	S4c SS3	S4c SS4	
	03-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	
Lab Number:	3734624.24	3734624.25	3734624.26	3734624.27	3734624.28	
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-	-	-	-
Sample Name:	S4c SS5	S4a TP1@ 0.3	S4a CS1	S4b TP1@ 1.0	S4b SS1	
	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	
Lab Number:	3734624.29	3734624.30	3734624.32	3734624.33	3734624.34	
Individual Tests						
Dry Matter	g/100g as rcvd	92	91	98	84	93
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	23	8	4	5	4
Total Recoverable Cadmium	mg/kg dry wt	0.10	< 0.10	< 0.10	0.12	0.11
Total Recoverable Chromium	mg/kg dry wt	19	19	13	14	13
Total Recoverable Copper	mg/kg dry wt	14	15	5	15	13
Total Recoverable Lead	mg/kg dry wt	30	19.2	8.4	13.0	14.2
Total Recoverable Nickel	mg/kg dry wt	14	16	10	11	10
Total Recoverable Zinc	mg/kg dry wt	78	78	42	58	63
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
alpha-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
beta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
delta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
cis-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
trans-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
2,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
4,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
2,4'-DDE	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
4,4'-DDE	mg/kg dry wt	< 0.011	0.012	< 0.010	0.029	0.024
2,4'-DDT	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
4,4'-DDT	mg/kg dry wt	< 0.011	0.015	< 0.010	0.033	0.066
Total DDT Isomers	mg/kg dry wt	< 0.07	< 0.07	< 0.06	< 0.07	0.10
Dieldrin	mg/kg dry wt	0.038	< 0.011	< 0.010	0.019	0.016
Endosulfan I	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Endosulfan II	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Endosulfan sulphate	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Endrin	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Endrin aldehyde	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Endrin ketone	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Heptachlor	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Heptachlor epoxide	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Hexachlorobenzene	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Methoxychlor	mg/kg dry wt	< 0.011	< 0.011	< 0.010	< 0.012	< 0.011
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	< 0.3	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
2-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Acenaphthylene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Acenaphthene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Anthracene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[a]anthracene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	< 0.029	< 0.025

Sample Type: Soil						
Sample Name:	S4c SS5 04-Dec-2024	S4a TP1@ 0.3 04-Dec-2024	S4a CS1 04-Dec-2024	S4b TP1@ 1.0 04-Dec-2024	S4b SS1 04-Dec-2024	
Lab Number:	3734624.29	3734624.30	3734624.32	3734624.33	3734624.34	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	< 0.029	< 0.025
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[e]pyrene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Chrysene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Fluoranthene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Fluorene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Naphthalene	mg/kg dry wt	-	-	-	< 0.06	< 0.06
Perylene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Phenanthrene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Pyrene	mg/kg dry wt	-	-	-	< 0.012	< 0.011
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 20	< 20
C10 - C14	mg/kg dry wt	-	-	-	< 20	< 20
C15 - C36	mg/kg dry wt	-	-	-	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 80	< 80
Sample Name:	S4b SS2 04-Dec-2024	S7b SS1 04-Dec-2024	S7b SS2 04-Dec-2024	S7b SS3 04-Dec-2024	S7b SS4 04-Dec-2024	
Lab Number:	3734624.35	3734624.36	3734624.37	3734624.38	3734624.39	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	98
SPLP Sample Weight	g	-	-	-	-	50
SPLP Extractant Type*		-	-	-	-	De-ionised Water, pH 5.8 +/- 0.4
SPLP Final pH	pH Units	-	-	-	-	7.3
Total Recoverable Lead	mg/kg dry wt	-	-	1,050	160	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	17	-	-	17
Total Recoverable Cadmium	mg/kg dry wt	0.13	0.34	-	-	1.92
Total Recoverable Chromium	mg/kg dry wt	16	18	-	-	28
Total Recoverable Copper	mg/kg dry wt	16	20	-	-	30
Total Recoverable Lead	mg/kg dry wt	15.7	1,080	-	-	700
Total Recoverable Nickel	mg/kg dry wt	12	9	-	-	14
Total Recoverable Zinc	mg/kg dry wt	66	300	-	-	1,260
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	-	< 0.010
alpha-BHC	mg/kg dry wt	-	-	-	-	< 0.010
beta-BHC	mg/kg dry wt	-	-	-	-	0.027
delta-BHC	mg/kg dry wt	-	-	-	-	< 0.010
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	-	< 0.010
cis-Chlordane	mg/kg dry wt	-	-	-	-	< 0.010
trans-Chlordane	mg/kg dry wt	-	-	-	-	< 0.010
2,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.010
2,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.010
2,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.010
Total DDT Isomers	mg/kg dry wt	-	-	-	-	< 0.06
Dieldrin	mg/kg dry wt	-	-	-	-	0.183

Sample Type: Soil						
Sample Name:	S4b SS2	S7b SS1	S7b SS2	S7b SS3	S7b SS4	
	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	
Lab Number:	3734624.35	3734624.36	3734624.37	3734624.38	3734624.39	
Organochlorine Pesticides Screening in Soil						
Endosulfan I	mg/kg dry wt	-	-	-	-	< 0.010
Endosulfan II	mg/kg dry wt	-	-	-	-	< 0.010
Endosulfan sulphate	mg/kg dry wt	-	-	-	-	< 0.010
Endrin	mg/kg dry wt	-	-	-	-	< 0.010
Endrin aldehyde	mg/kg dry wt	-	-	-	-	< 0.010
Endrin ketone	mg/kg dry wt	-	-	-	-	< 0.010
Heptachlor	mg/kg dry wt	-	-	-	-	< 0.010
Heptachlor epoxide	mg/kg dry wt	-	-	-	-	< 0.010
Hexachlorobenzene	mg/kg dry wt	-	-	-	-	< 0.010
Methoxychlor	mg/kg dry wt	-	-	-	-	< 0.010
Sample Name:	S7b SS5	TP411@ 0.8	TP412@ 0.2	TP412@ 1.0	S2 TP1 @ 1.5	
	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	04-Dec-2024	
Lab Number:	3734624.40	3734624.42	3734624.44	3734624.45	3734624.48	
Individual Tests						
Dry Matter	g/100g as rcvd	97	-	-	83	89
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	132	9	4	6	6
Total Recoverable Cadmium	mg/kg dry wt	0.43	0.16	< 0.10	0.25	0.14
Total Recoverable Chromium	mg/kg dry wt	16	10	9	13	13
Total Recoverable Copper	mg/kg dry wt	39	27	8	14	25
Total Recoverable Lead	mg/kg dry wt	400	35	18.7	34	29
Total Recoverable Nickel	mg/kg dry wt	11	8	6	7	9
Total Recoverable Zinc	mg/kg dry wt	280	93	41	67	170
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
alpha-BHC	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
beta-BHC	mg/kg dry wt	0.030	-	-	< 0.012	< 0.011
delta-BHC	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
cis-Chlordane	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
trans-Chlordane	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
2,4'-DDD	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
4,4'-DDD	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
2,4'-DDE	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
4,4'-DDE	mg/kg dry wt	< 0.010	-	-	0.030	< 0.011
2,4'-DDT	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
4,4'-DDT	mg/kg dry wt	0.016	-	-	0.027	0.012
Total DDT Isomers	mg/kg dry wt	< 0.06	-	-	< 0.08	< 0.07
Dieldrin	mg/kg dry wt	0.69	-	-	< 0.012	< 0.011
Endosulfan I	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Endosulfan II	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Endosulfan sulphate	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Endrin	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Endrin aldehyde	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Endrin ketone	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Heptachlor	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Heptachlor epoxide	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Hexachlorobenzene	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Methoxychlor	mg/kg dry wt	< 0.010	-	-	< 0.012	< 0.011
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.011
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.011
Acenaphthylene	mg/kg dry wt	-	-	-	-	< 0.011

Sample Type: Soil						
Sample Name:	S7b SS5 04-Dec-2024	TP411@ 0.8 04-Dec-2024	TP412@ 0.2 04-Dec-2024	TP412@ 1.0 04-Dec-2024	S2 TP1@ 1.5 04-Dec-2024	
Lab Number:	3734624.40	3734624.42	3734624.44	3734624.45	3734624.48	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Acenaphthene	mg/kg dry wt	-	-	-	-	< 0.011
Anthracene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	0.019
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	0.024
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	0.037
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	0.037
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	0.033
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	0.019
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	0.027
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	0.011
Chrysene	mg/kg dry wt	-	-	-	-	0.020
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	< 0.011
Fluoranthene	mg/kg dry wt	-	-	-	-	0.029
Fluorene	mg/kg dry wt	-	-	-	-	< 0.011
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	0.026
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.06
Perylene	mg/kg dry wt	-	-	-	-	< 0.011
Phenanthrene	mg/kg dry wt	-	-	-	-	< 0.011
Pyrene	mg/kg dry wt	-	-	-	-	0.026
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	< 80
Sample Name:	S2 TP2 @ 1.5 04-Dec-2024	S2 SP1 04-Dec-2024	S2 SP2 04-Dec-2024	S2 SP3 04-Dec-2024	S2 TP4@ 0.5 04-Dec-2024	
Lab Number:	3734624.51	3734624.55	3734624.56	3734624.57	3734624.58	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	88
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	11	3	64	4	-
Total Recoverable Cadmium	mg/kg dry wt	0.23	< 0.10	0.41	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	17	11	38	12	-
Total Recoverable Copper	mg/kg dry wt	46	13	102	8	-
Total Recoverable Lead	mg/kg dry wt	78	9.0	47	13.8	-
Total Recoverable Nickel	mg/kg dry wt	11	10	10	9	-
Total Recoverable Zinc	mg/kg dry wt	180	42	270	50	-
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	-	-	-	-	0.031
Total DDT Isomers	mg/kg dry wt	-	-	-	-	< 0.07

Sample Type: Soil						
Sample Name:	S2 TP2 @ 1.5 04-Dec-2024	S2 SP1 04-Dec-2024	S2 SP2 04-Dec-2024	S2 SP3 04-Dec-2024	S2 TP4@ 0.5 04-Dec-2024	
Lab Number:	3734624.51	3734624.55	3734624.56	3734624.57	3734624.58	
Organochlorine Pesticides Screening in Soil						
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
Sample Name:	S2 TP5@ 0.8 04-Dec-2024	S2 SS1 04-Dec-2024	S2 TP6@ 0.6 04-Dec-2024	S2 TP6@ 2.0 04-Dec-2024	S2 TP6@ 2.5 04-Dec-2024	
Lab Number:	3734624.61	3734624.63	3734624.64	3734624.65	3734624.66	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	77	67	76
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	23	15	13	12	2
Total Recoverable Cadmium	mg/kg dry wt	0.34	0.12	2.8	0.26	< 0.10
Total Recoverable Chromium	mg/kg dry wt	25	17	44	11	12
Total Recoverable Copper	mg/kg dry wt	50	24	35	33	7
Total Recoverable Lead	mg/kg dry wt	142	40	42	46	9.0
Total Recoverable Nickel	mg/kg dry wt	15	10	13	9	9
Total Recoverable Zinc	mg/kg dry wt	230	82	270	101	50
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
alpha-BHC	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
beta-BHC	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
delta-BHC	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
cis-Chlordane	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
trans-Chlordane	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
2,4'-DDD	mg/kg dry wt	-	-	< 0.013	0.033	< 0.013
4,4'-DDD	mg/kg dry wt	-	-	0.044	0.088	< 0.013
2,4'-DDE	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
4,4'-DDE	mg/kg dry wt	-	-	0.028	0.181	< 0.013
2,4'-DDT	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
4,4'-DDT	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Total DDT Isomers	mg/kg dry wt	-	-	< 0.08	0.31	< 0.08
Dieldrin	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endosulfan I	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endosulfan II	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endrin	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endrin aldehyde	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Endrin ketone	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Heptachlor	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Methoxychlor	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	0.5	< 0.4	< 0.4
1-Methylnaphthalene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013

Sample Type: Soil

Sample Name:	S2 TP5@ 0.8 04-Dec-2024	S2 SS1 04-Dec-2024	S2 TP6@ 0.6 04-Dec-2024	S2 TP6@ 2.0 04-Dec-2024	S2 TP6@ 2.5 04-Dec-2024
Lab Number:	3734624.61	3734624.63	3734624.64	3734624.65	3734624.66

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Acenaphthylene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Acenaphthene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Anthracene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Benzo[a]anthracene	mg/kg dry wt	-	-	0.033	< 0.015	< 0.013
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	0.042	0.016	< 0.013
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	0.064	< 0.036	< 0.032
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	0.063	< 0.036	< 0.031
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	0.053	0.015	< 0.013
Benzo[e]pyrene	mg/kg dry wt	-	-	0.032	< 0.015	< 0.013
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	0.041	< 0.015	< 0.013
Benzo[k]fluoranthene	mg/kg dry wt	-	-	0.018	< 0.015	< 0.013
Chrysene	mg/kg dry wt	-	-	0.038	< 0.015	< 0.013
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Fluoranthene	mg/kg dry wt	-	-	0.072	0.022	< 0.013
Fluorene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	0.032	< 0.015	< 0.013
Naphthalene	mg/kg dry wt	-	-	< 0.07	< 0.08	< 0.07
Perylene	mg/kg dry wt	-	-	< 0.013	< 0.015	< 0.013
Phenanthrene	mg/kg dry wt	-	-	0.042	< 0.015	< 0.013
Pyrene	mg/kg dry wt	-	-	0.082	0.016	< 0.013

Total Petroleum Hydrocarbons in Soil

C7 - C9	mg/kg dry wt	-	-	< 20	< 30	< 20
C10 - C14	mg/kg dry wt	-	-	< 20	29	< 20
C15 - C36	mg/kg dry wt	-	-	690	129	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	710	158	< 80

Sample Name:	S6 SS1 05-Dec-2024	S6 SS2 05-Dec-2024	S6 SS3 05-Dec-2024	S6 SS4 05-Dec-2024	S6 SS5 05-Dec-2024
Lab Number:	3734624.68	3734624.69	3734624.70	3734624.71	3734624.72

Individual Tests

Dry Matter	g/100g as rcvd	-	-	-	-	89
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	15	88	35	18	6
Total Recoverable Cadmium	mg/kg dry wt	0.19	0.21	0.27	0.17	0.14
Total Recoverable Chromium	mg/kg dry wt	20	70	28	18	15
Total Recoverable Copper	mg/kg dry wt	44	100	64	28	22
Total Recoverable Lead	mg/kg dry wt	53	46	60	31	15.9
Total Recoverable Nickel	mg/kg dry wt	13	9	10	11	11
Total Recoverable Zinc	mg/kg dry wt	139	153	210	103	110

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
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	< 0.027
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	< 0.027
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	-	-	< 0.012

Sample Type: Soil

Sample Name:		S6 SS1	S6 SS2	S6 SS3	S6 SS4	S6 SS5
		05-Dec-2024	05-Dec-2024	05-Dec-2024	05-Dec-2024	05-Dec-2024
Lab Number:		3734624.68	3734624.69	3734624.70	3734624.71	3734624.72
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
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
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	160
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	168
Sample Name:		S6 SP1	S6 SP2	S2 TP9@ 0.5-2	S2 TP10@	S2 TP10@
		05-Dec-2024	05-Dec-2024	05-Dec-2024	0.4-1.5	1.5-1.9
Lab Number:		3734624.73	3734624.74	3734624.76	3734624.79	3734624.80
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	6	25	29	2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.38	0.75	< 0.10
Total Recoverable Chromium	mg/kg dry wt	18	16	18	23	12
Total Recoverable Copper	mg/kg dry wt	11	13	34	145	7
Total Recoverable Lead	mg/kg dry wt	11.5	11.0	76	128	10.0
Total Recoverable Nickel	mg/kg dry wt	14	12	12	10	9
Total Recoverable Zinc	mg/kg dry wt	55	53	290	430	53
Sample Name:		S1 TP11@ 0-0.5	S1 TP11@	TP408@ 0.6-1.4	S3 TP1@ 0.4	S3 TP1@ 1.3
		05-Dec-2024	0.5-1.2	05-Dec-2024	05-Dec-2024	05-Dec-2024
Lab Number:		3734624.81	3734624.82	3734624.86	3734624.87	3734624.88
Individual Tests						
Dry Matter	g/100g as rcvd	-	81	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	8	7	6	15
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.16	0.32	< 0.10	0.26
Total Recoverable Chromium	mg/kg dry wt	13	14	18	20	18
Total Recoverable Copper	mg/kg dry wt	11	22	21	10	33
Total Recoverable Lead	mg/kg dry wt	16.7	54	14.8	14.1	32
Total Recoverable Nickel	mg/kg dry wt	10	10	12	14	13
Total Recoverable Zinc	mg/kg dry wt	62	134	105	61	145
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.013	-	-	-
alpha-BHC	mg/kg dry wt	-	< 0.013	-	-	-
beta-BHC	mg/kg dry wt	-	< 0.013	-	-	-
delta-BHC	mg/kg dry wt	-	< 0.013	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.013	-	-	-
cis-Chlordane	mg/kg dry wt	-	< 0.013	-	-	-
trans-Chlordane	mg/kg dry wt	-	< 0.013	-	-	-
2,4'-DDD	mg/kg dry wt	-	< 0.013	-	-	-
4,4'-DDD	mg/kg dry wt	-	< 0.013	-	-	-
2,4'-DDE	mg/kg dry wt	-	< 0.013	-	-	-
4,4'-DDE	mg/kg dry wt	-	< 0.013	-	-	-

Sample Type: Soil						
Sample Name:	S1 TP11@ 0-0.5 05-Dec-2024	S1 TP11@ 0.5-1.2 05-Dec-2024	TP408@ 0.6-1.4 05-Dec-2024	S3 TP1@ 0.4 05-Dec-2024	S3 TP1@ 1.3 05-Dec-2024	
Lab Number:	3734624.81	3734624.82	3734624.86	3734624.87	3734624.88	
Organochlorine Pesticides Screening in Soil						
2,4'-DDT	mg/kg dry wt	-	< 0.013	-	-	-
4,4'-DDT	mg/kg dry wt	-	< 0.013	-	-	-
Total DDT Isomers	mg/kg dry wt	-	< 0.08	-	-	-
Dieldrin	mg/kg dry wt	-	< 0.013	-	-	-
Endosulfan I	mg/kg dry wt	-	< 0.013	-	-	-
Endosulfan II	mg/kg dry wt	-	< 0.013	-	-	-
Endosulfan sulphate	mg/kg dry wt	-	< 0.013	-	-	-
Endrin	mg/kg dry wt	-	< 0.013	-	-	-
Endrin aldehyde	mg/kg dry wt	-	< 0.013	-	-	-
Endrin ketone	mg/kg dry wt	-	< 0.013	-	-	-
Heptachlor	mg/kg dry wt	-	< 0.013	-	-	-
Heptachlor epoxide	mg/kg dry wt	-	< 0.013	-	-	-
Hexachlorobenzene	mg/kg dry wt	-	< 0.013	-	-	-
Methoxychlor	mg/kg dry wt	-	< 0.013	-	-	-
Sample Name:	S3 TP2@ 1.2 05-Dec-2024	S3 TP3@ 1.2 05-Dec-2024	S3 TP4@ 0.1 05-Dec-2024	S3 TP4@ 0.8 05-Dec-2024	S3 TP6@ 0.5 05-Dec-2024	
Lab Number:	3734624.91	3734624.94	3734624.95	3734624.96	3734624.100	
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	9	6	12	6	5
Total Recoverable Cadmium	mg/kg dry wt	0.21	< 0.10	0.14	0.11	< 0.10
Total Recoverable Chromium	mg/kg dry wt	15	17	16	15	15
Total Recoverable Copper	mg/kg dry wt	23	20	27	18	15
Total Recoverable Lead	mg/kg dry wt	100	15.6	59	55	12.9
Total Recoverable Nickel	mg/kg dry wt	11	13	11	11	12
Total Recoverable Zinc	mg/kg dry wt	137	61	105	95	56
Sample Name:	S3 TP7@ 0.7 05-Dec-2024	S7d SP4 05-Dec-2024	S7d SS1 05-Dec-2024	S7d SS3 05-Dec-2024	S7d SS4 05-Dec-2024	
Lab Number:	3734624.103	3734624.108	3734624.109	3734624.111	3734624.112	
Individual Tests						
Dry Matter	g/100g as rcvd	74	-	-	-	92
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	11	5	9	8	5
Total Recoverable Cadmium	mg/kg dry wt	0.22	< 0.10	0.11	0.13	0.12
Total Recoverable Chromium	mg/kg dry wt	22	13	25	20	15
Total Recoverable Copper	mg/kg dry wt	54	12	14	17	15
Total Recoverable Lead	mg/kg dry wt	44	38	21	33	26
Total Recoverable Nickel	mg/kg dry wt	14	10	18	14	12
Total Recoverable Zinc	mg/kg dry wt	117	110	81	106	137
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	-	-	-	< 0.011
alpha-BHC	mg/kg dry wt	< 0.014	-	-	-	< 0.011
beta-BHC	mg/kg dry wt	< 0.014	-	-	-	< 0.011
delta-BHC	mg/kg dry wt	< 0.014	-	-	-	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	-	-	-	< 0.011
cis-Chlordane	mg/kg dry wt	< 0.014	-	-	-	< 0.011
trans-Chlordane	mg/kg dry wt	< 0.014	-	-	-	< 0.011
2,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	< 0.011
4,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	< 0.011
2,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	< 0.011
4,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	< 0.011
2,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	< 0.011
4,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Total DDT Isomers	mg/kg dry wt	< 0.08	-	-	-	< 0.07
Dieldrin	mg/kg dry wt	< 0.014	-	-	-	< 0.011

Sample Type: Soil						
Sample Name:	S3 TP7@ 0.7 05-Dec-2024	S7d SP4 05-Dec-2024	S7d SS1 05-Dec-2024	S7d SS3 05-Dec-2024	S7d SS4 05-Dec-2024	
Lab Number:	3734624.103	3734624.108	3734624.109	3734624.111	3734624.112	
Organochlorine Pesticides Screening in Soil						
Endosulfan I	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Endosulfan II	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Endosulfan sulphate	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Endrin	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Endrin aldehyde	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Endrin ketone	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Heptachlor	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Heptachlor epoxide	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Hexachlorobenzene	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Methoxychlor	mg/kg dry wt	< 0.014	-	-	-	< 0.011
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.017
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.03
Acenaphthylene	mg/kg dry wt	-	-	-	-	< 0.011
Acenaphthene	mg/kg dry wt	-	-	-	-	< 0.011
Anthracene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	< 0.026
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	< 0.026
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	< 0.011
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	< 0.011
Chrysene	mg/kg dry wt	-	-	-	-	< 0.011
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	< 0.011
Fluoranthene	mg/kg dry wt	-	-	-	-	< 0.011
Fluorene	mg/kg dry wt	-	-	-	-	< 0.011
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	< 0.011
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.06
Perylene	mg/kg dry wt	-	-	-	-	< 0.011
Phenanthrene	mg/kg dry wt	-	-	-	-	< 0.011
Pyrene	mg/kg dry wt	-	-	-	-	< 0.011
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	42
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	< 80
Sample Name:	S7d SS5 05-Dec-2024	S7c SS1 06-Dec-2024	S7c SS2 06-Dec-2024	S5 SS1 06-Dec-2024	S5 SS2 06-Dec-2024	
Lab Number:	3734624.113	3734624.114	3734624.115	3734624.116	3734624.117	
Individual Tests						
Dry Matter	g/100g as rcvd	96	-	-	97	99
Total Recoverable Lead	mg/kg dry wt	-	71	29	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	7	-	-	5	88
Total Recoverable Cadmium	mg/kg dry wt	0.14	-	-	< 0.10	0.14
Total Recoverable Chromium	mg/kg dry wt	20	-	-	14	46
Total Recoverable Copper	mg/kg dry wt	20	-	-	10	84
Total Recoverable Lead	mg/kg dry wt	22	-	-	8.9	19.1
Total Recoverable Nickel	mg/kg dry wt	13	-	-	11	11

Sample Type: Soil						
Sample Name:	S7d SS5 05-Dec-2024	S7c SS1 06-Dec-2024	S7c SS2 06-Dec-2024	S5 SS1 06-Dec-2024	S5 SS2 06-Dec-2024	
Lab Number:	3734624.113	3734624.114	3734624.115	3734624.116	3734624.117	
Heavy Metals, Screen Level						
Total Recoverable Zinc	mg/kg dry wt	118	-	-	48	109
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.011	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.011	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.011	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.011	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.011	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.011	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.011	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.011	-	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.011	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.011	-	-	-	-
4,4'-DDE	mg/kg dry wt	< 0.011	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.011	-	-	-	-
4,4'-DDT	mg/kg dry wt	< 0.011	-	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.07	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.011	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.011	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.011	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.011	-	-	-	-
Endrin	mg/kg dry wt	< 0.011	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.011	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.011	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.011	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.011	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.011	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.011	-	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-	< 0.3	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
2-Methylnaphthalene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Acenaphthylene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Acenaphthene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Anthracene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Benzo[a]anthracene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.025	-	-	< 0.025	< 0.025
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.025	-	-	< 0.025	< 0.025
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.013	-	-	< 0.011	< 0.010
Benzo[e]pyrene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Benzo[k]fluoranthene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Chrysene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Fluoranthene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Fluorene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Naphthalene	mg/kg dry wt	< 0.06	-	-	< 0.06	< 0.05
Perylene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Phenanthrene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010
Pyrene	mg/kg dry wt	< 0.011	-	-	< 0.011	< 0.010

Sample Type: Soil						
Sample Name:	S7d SS5	S7c SS1	S7c SS2	S5 SS1	S5 SS2	
	05-Dec-2024	06-Dec-2024	06-Dec-2024	06-Dec-2024	06-Dec-2024	
Lab Number:	3734624.113	3734624.114	3734624.115	3734624.116	3734624.117	
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	-	-	< 20	< 20
C10 - C14	mg/kg dry wt	< 20	-	-	< 20	< 20
C15 - C36	mg/kg dry wt	260	-	-	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	270	-	-	< 80	< 80
Sample Name:	S5 SP1	S5 SP2	Dup 1	Dup 2	Dup 3	
	06-Dec-2024	06-Dec-2024	03-Dec-2024	03-Dec-2024	04-Dec-2024	
Lab Number:	3734624.118	3734624.119	3734624.120	3734624.121	3734624.122	
Individual Tests						
Dry Matter	g/100g as rcvd	98	92	99	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	181	5	8	17	8
Total Recoverable Cadmium	mg/kg dry wt	0.21	< 0.10	0.10	0.19	0.53
Total Recoverable Chromium	mg/kg dry wt	75	14	14	18	19
Total Recoverable Copper	mg/kg dry wt	157	17	18	18	21
Total Recoverable Lead	mg/kg dry wt	16.2	8.4	22	28	162
Total Recoverable Nickel	mg/kg dry wt	12	11	11	12	11
Total Recoverable Zinc	mg/kg dry wt	190	51	73	350	320
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
alpha-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
beta-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
delta-BHC	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
4,4'-DDD	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
4,4'-DDE	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
2,4'-DDT	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
4,4'-DDT	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Total DDT Isomers	mg/kg dry wt	< 0.06	< 0.07	< 0.06	-	-
Dieldrin	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endosulfan I	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endosulfan II	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endrin	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Endrin ketone	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Heptachlor	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Methoxychlor	mg/kg dry wt	< 0.010	< 0.011	< 0.010	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Acenaphthylene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Acenaphthene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Anthracene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.025	-	< 0.025	-	-

Sample Type: Soil						
Sample Name:	S5 SP1	S5 SP2	Dup 1	Dup 2	Dup 3	
	06-Dec-2024	06-Dec-2024	03-Dec-2024	03-Dec-2024	04-Dec-2024	
Lab Number:	3734624.118	3734624.119	3734624.120	3734624.121	3734624.122	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.025	-	< 0.025	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Chrysene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Fluoranthene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Fluorene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Naphthalene	mg/kg dry wt	< 0.05	-	< 0.05	-	-
Perylene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Phenanthrene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Pyrene	mg/kg dry wt	< 0.010	-	< 0.010	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	-	< 20	-	-
C10 - C14	mg/kg dry wt	< 20	-	< 20	-	-
C15 - C36	mg/kg dry wt	1,110	-	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	1,110	-	< 80	-	-
Sample Name:	Dup 4 04-Dec-2024		Dup 7 05-Dec-2024		Dup 8 05-Dec-2024	
Lab Number:	3734624.123		3734624.126		3734624.127	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	91
Total Recoverable Lead	mg/kg dry wt	920	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	15	-	5
Total Recoverable Cadmium	mg/kg dry wt	-	-	0.16	-	0.12
Total Recoverable Chromium	mg/kg dry wt	-	-	18	-	14
Total Recoverable Copper	mg/kg dry wt	-	-	41	-	13
Total Recoverable Lead	mg/kg dry wt	-	-	63	-	25
Total Recoverable Nickel	mg/kg dry wt	-	-	11	-	11
Total Recoverable Zinc	mg/kg dry wt	-	-	191	-	122
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	-	< 0.011
alpha-BHC	mg/kg dry wt	-	-	-	-	< 0.011
beta-BHC	mg/kg dry wt	-	-	-	-	< 0.011
delta-BHC	mg/kg dry wt	-	-	-	-	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	-	< 0.011
cis-Chlordane	mg/kg dry wt	-	-	-	-	< 0.011
trans-Chlordane	mg/kg dry wt	-	-	-	-	< 0.011
2,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.011
4,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.011
2,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.011
4,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.011
2,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.011
4,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.011
Total DDT Isomers	mg/kg dry wt	-	-	-	-	< 0.07
Dieldrin	mg/kg dry wt	-	-	-	-	< 0.011
Endosulfan I	mg/kg dry wt	-	-	-	-	< 0.011
Endosulfan II	mg/kg dry wt	-	-	-	-	< 0.011
Endosulfan sulphate	mg/kg dry wt	-	-	-	-	< 0.011
Endrin	mg/kg dry wt	-	-	-	-	< 0.011
Endrin aldehyde	mg/kg dry wt	-	-	-	-	< 0.011

Sample Type: Soil						
Sample Name:	Dup 4 04-Dec-2024	Dup 7 05-Dec-2024	Dup 8 05-Dec-2024			
Lab Number:	3734624.123	3734624.126	3734624.127			
Organochlorine Pesticides Screening in Soil						
Endrin ketone	mg/kg dry wt	-	-	-	< 0.011	
Heptachlor	mg/kg dry wt	-	-	-	< 0.011	
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.011	
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.011	
Methoxychlor	mg/kg dry wt	-	-	-	< 0.011	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	< 0.3	
1-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.011	
2-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.011	
Acenaphthylene	mg/kg dry wt	-	-	-	< 0.011	
Acenaphthene	mg/kg dry wt	-	-	-	< 0.011	
Anthracene	mg/kg dry wt	-	-	-	< 0.011	
Benzo[a]anthracene	mg/kg dry wt	-	-	-	< 0.011	
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	0.011	
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	< 0.026	
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	< 0.026	
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	-	0.013	
Benzo[e]pyrene	mg/kg dry wt	-	-	-	< 0.011	
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	< 0.011	
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	< 0.011	
Chrysene	mg/kg dry wt	-	-	-	< 0.011	
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.011	
Fluoranthene	mg/kg dry wt	-	-	-	0.014	
Fluorene	mg/kg dry wt	-	-	-	< 0.011	
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	< 0.011	
Naphthalene	mg/kg dry wt	-	-	-	< 0.06	
Perylene	mg/kg dry wt	-	-	-	< 0.011	
Phenanthrene	mg/kg dry wt	-	-	-	< 0.011	
Pyrene	mg/kg dry wt	-	-	-	0.012	
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 20	
C10 - C14	mg/kg dry wt	-	-	-	< 20	
C15 - C36	mg/kg dry wt	-	-	-	64	
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 80	
Sample Type: Aqueous						
Sample Name:	S1 TP2@ 1.3 [SPLP Extract]	S1 TP2@ 1.3 [TCLP Extract]	S1 TP10@ 3.0 [SPLP Extract]	S1 TP10@ 3.0 [TCLP Extract]	S4c SS2 [SPLP Extract]	
Lab Number:	3734624.128	3734624.129	3734624.130	3734624.131	3734624.132	
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m ³	0.027	-	0.0082	-	-
Total Cadmium	g/m ³	< 0.000053	-	0.00020	-	-
Total Chromium	g/m ³	0.0026	-	0.00090	-	-
Total Copper	g/m ³	0.044	-	0.0084	-	-
Total Lead	g/m ³	0.031	-	0.0175	-	-
Total Nickel	g/m ³	0.00153	-	0.00086	-	-
Total Zinc	g/m ³	0.056	-	0.165	-	-
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples						
Total Arsenic	g/m ³	-	0.20	-	0.057	-
Total Cadmium	g/m ³	-	0.0040	-	0.0014	-
Total Chromium	g/m ³	-	< 0.011	-	< 0.011	-
Total Copper	g/m ³	-	0.095	-	< 0.011	-
Total Lead	g/m ³	-	0.167	-	0.174	-
Total Nickel	g/m ³	-	0.014	-	0.021	-

Sample Type: Aqueous

Sample Name:	S1 TP2@ 1.3 [SPLP Extract]	S1 TP2@ 1.3 [TCLP Extract]	S1 TP10@ 3.0 [SPLP Extract]	S1 TP10@ 3.0 [TCLP Extract]	S4c SS2 [SPLP Extract]
Lab Number:	3734624.128	3734624.129	3734624.130	3734624.131	3734624.132

Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples

Total Zinc	g/m ³	-	6.6	-	16.6	-
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Organochlorine Pesticides Screening in Water, By Liq/Liq*

Aldrin	g/m ³	-	-	-	-	< 0.00010
alpha-BHC	g/m ³	-	-	-	-	< 0.0002
beta-BHC	g/m ³	-	-	-	-	< 0.0002
delta-BHC	g/m ³	-	-	-	-	< 0.0002
gamma-BHC (Lindane)	g/m ³	-	-	-	-	< 0.0002
cis-Chlordane	g/m ³	-	-	-	-	< 0.00010
trans-Chlordane	g/m ³	-	-	-	-	< 0.00010
2,4'-DDD	g/m ³	-	-	-	-	< 0.0002
4,4'-DDD	g/m ³	-	-	-	-	< 0.0002
2,4'-DDE	g/m ³	-	-	-	-	< 0.0002
4,4'-DDE	g/m ³	-	-	-	-	< 0.0002
2,4'-DDT	g/m ³	-	-	-	-	< 0.0002
4,4'-DDT	g/m ³	-	-	-	-	< 0.0002
Total DDT Isomers*	g/m ³	-	-	-	-	< 0.005
Dieldrin	g/m ³	-	-	-	-	0.0109
Endosulfan I	g/m ³	-	-	-	-	< 0.0002
Endosulfan II	g/m ³	-	-	-	-	< 0.0002
Endosulfan sulphate	g/m ³	-	-	-	-	< 0.0002
Endrin	g/m ³	-	-	-	-	0.00016
Endrin aldehyde	g/m ³	-	-	-	-	< 0.00010
Endrin ketone	g/m ³	-	-	-	-	0.0004
Heptachlor	g/m ³	-	-	-	-	< 0.00010
Heptachlor epoxide	g/m ³	-	-	-	-	< 0.00010
Hexachlorobenzene	g/m ³	-	-	-	-	< 0.0008
Methoxychlor	g/m ³	-	-	-	-	< 0.00010

Sample Name:	S4c SS2 [TCLP Extract]	S4c SS3 [SPLP Extract]	S4c SS3 [TCLP Extract]	S7b SS4 [SPLP Extract]
Lab Number:	3734624.133	3734624.134	3734624.135	3734624.136

Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn

Total Arsenic	g/m ³	-	0.038	-	0.0045
Total Cadmium	g/m ³	-	< 0.000053	-	0.00022
Total Chromium	g/m ³	-	0.00085	-	0.00109
Total Copper	g/m ³	-	0.066	-	0.0120
Total Lead	g/m ³	-	0.020	-	0.0045
Total Nickel	g/m ³	-	0.00130	-	0.0023
Total Zinc	g/m ³	-	0.026	-	0.119

Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples

Total Arsenic	g/m ³	-	-	0.083	-
Total Cadmium	g/m ³	-	-	0.0012	-
Total Chromium	g/m ³	-	-	< 0.011	-
Total Copper	g/m ³	-	-	0.085	-
Total Lead	g/m ³	-	-	0.020	-
Total Nickel	g/m ³	-	-	< 0.011	-
Total Zinc	g/m ³	-	-	0.74	-

Organochlorine Pesticides Screening in Water, By Liq/Liq*

Aldrin	g/m ³	< 0.00010	-	-	-
alpha-BHC	g/m ³	< 0.0002	-	-	-
beta-BHC	g/m ³	< 0.0002	-	-	-
delta-BHC	g/m ³	< 0.0002	-	-	-
gamma-BHC (Lindane)	g/m ³	< 0.0002	-	-	-
cis-Chlordane	g/m ³	< 0.00010	-	-	-
trans-Chlordane	g/m ³	< 0.00010	-	-	-

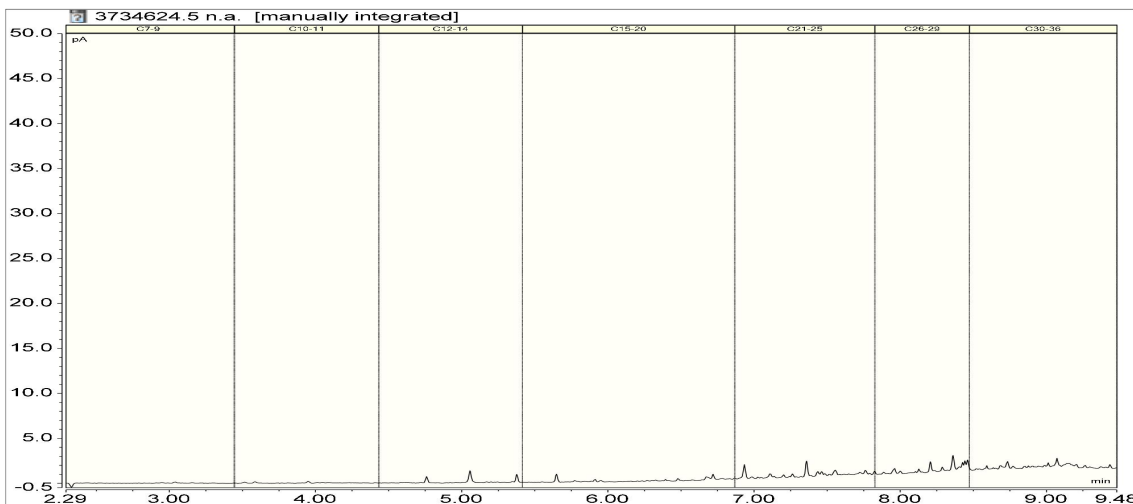
Sample Type: Aqueous

Sample Name:		S4c SS2 [TCLP Extract]	S4c SS3 [SPLP Extract]	S4c SS3 [TCLP Extract]	S7b SS4 [SPLP Extract]
Lab Number:		3734624.133	3734624.134	3734624.135	3734624.136
Organochlorine Pesticides Screening in Water, By Liq/Liq*					
2,4'-DDD	g/m ³	< 0.0002	-	-	-
4,4'-DDD	g/m ³	< 0.0002	-	-	-
2,4'-DDE	g/m ³	< 0.0002	-	-	-
4,4'-DDE	g/m ³	< 0.0002	-	-	-
2,4'-DDT	g/m ³	< 0.0002	-	-	-
4,4'-DDT	g/m ³	< 0.0002	-	-	-
Total DDT Isomers	g/m ³	< 0.005	-	-	-
Dieldrin	g/m ³	0.0088	-	-	-
Endosulfan I	g/m ³	< 0.0002	-	-	-
Endosulfan II	g/m ³	< 0.0002	-	-	-
Endosulfan sulphate	g/m ³	< 0.0002	-	-	-
Endrin	g/m ³	0.00014	-	-	-
Endrin aldehyde	g/m ³	< 0.00010	-	-	-
Endrin ketone	g/m ³	0.0004	-	-	-
Heptachlor	g/m ³	< 0.00010	-	-	-
Heptachlor epoxide	g/m ³	< 0.00010	-	-	-
Hexachlorobenzene	g/m ³	< 0.0008	-	-	-
Methoxychlor	g/m ³	< 0.00010	-	-	-

3734624.5

S1 TP2 @ 1.3 03-Dec-2024

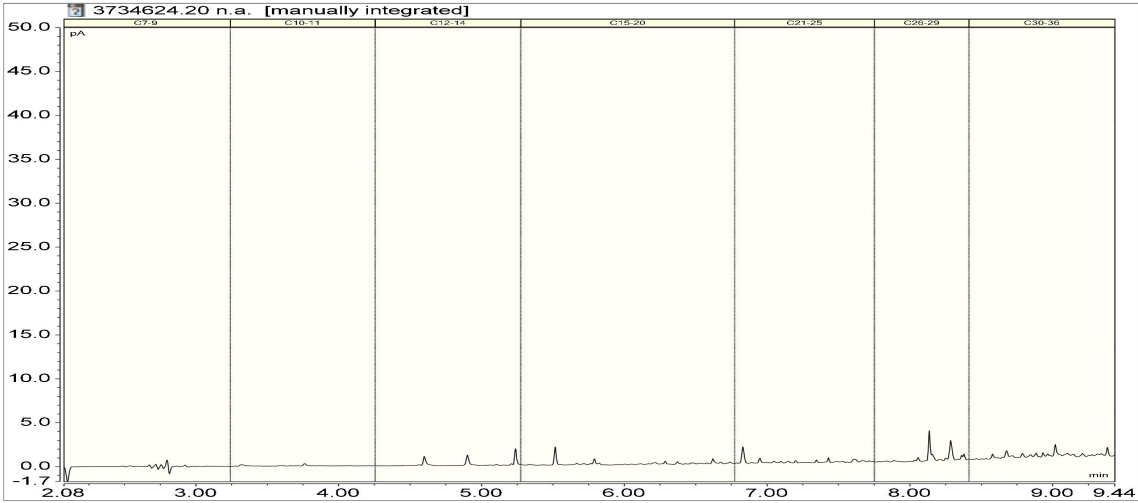
Client Chromatogram for TPH by FID



3734624.20

S1 TP10@ 1.0 03-Dec-2024

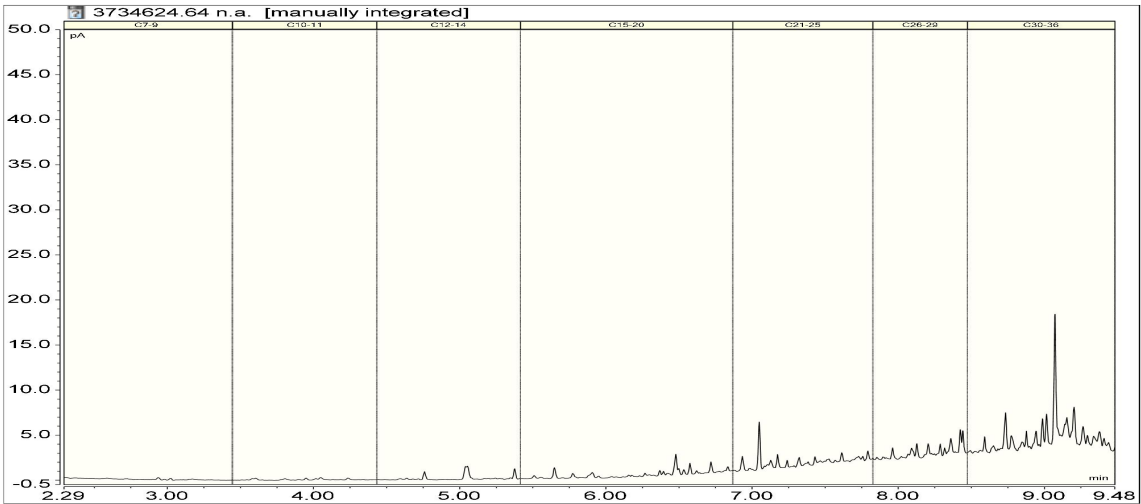
Client Chromatogram for TPH by FID



3734624.64

S2 TP6@ 0.6 04-Dec-2024

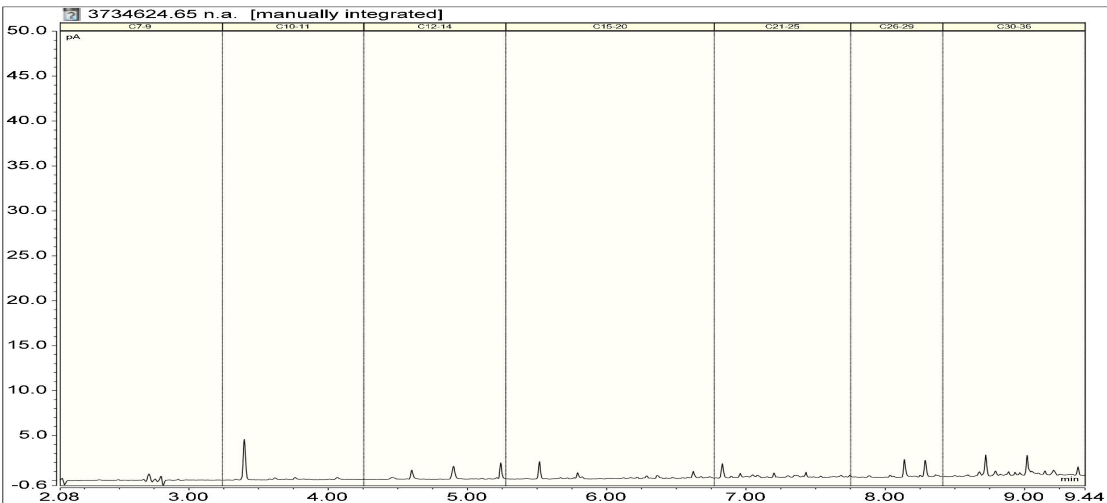
Client Chromatogram for TPH by FID



3734624.65

S2 TP6@ 2.0 04-Dec-2024

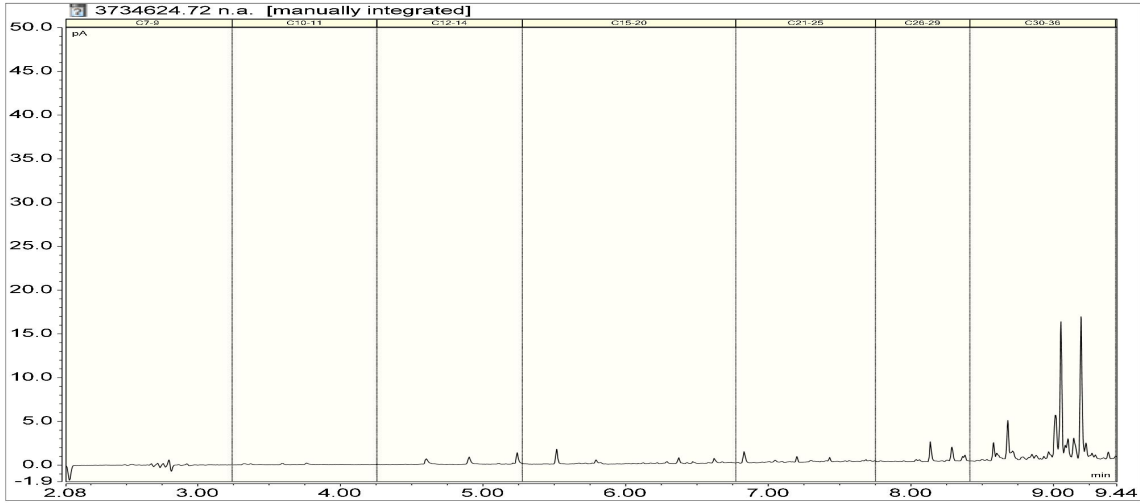
Client Chromatogram for TPH by FID



3734624.72

S6 SS5 05-Dec-2024

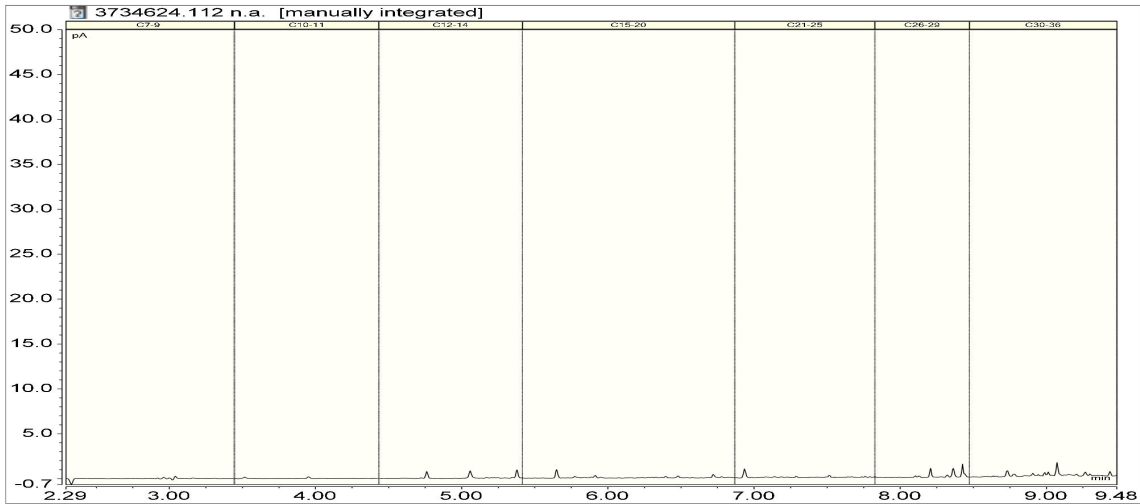
Client Chromatogram for TPH by FID



3734624.112

S7d SS4 05-Dec-2024

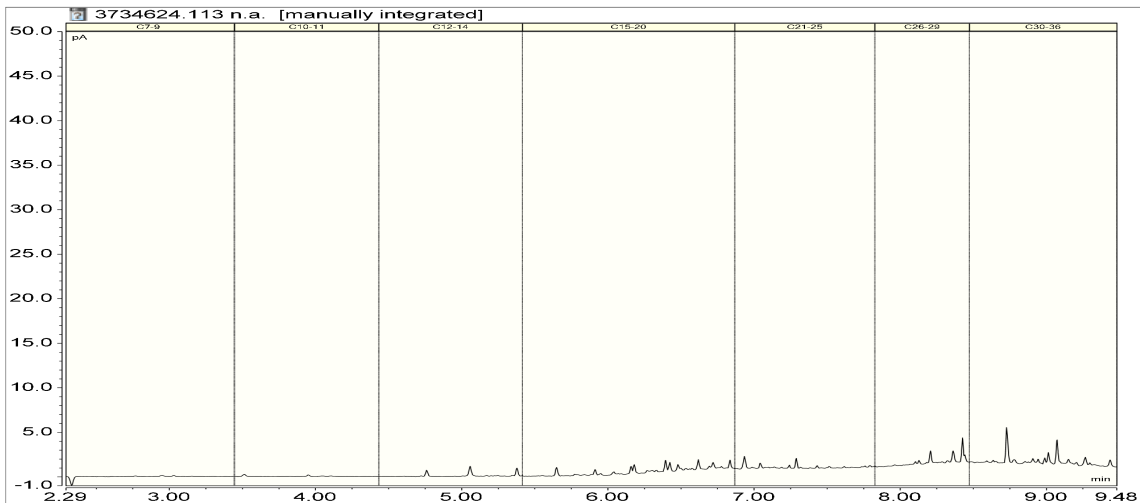
Client Chromatogram for TPH by FID



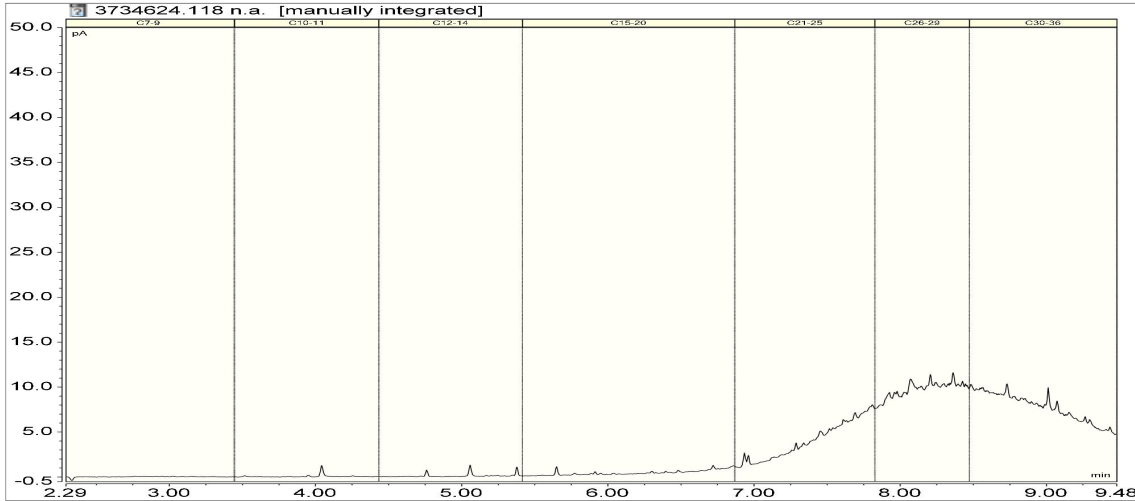
3734624.113

S7d SS5 05-Dec-2024

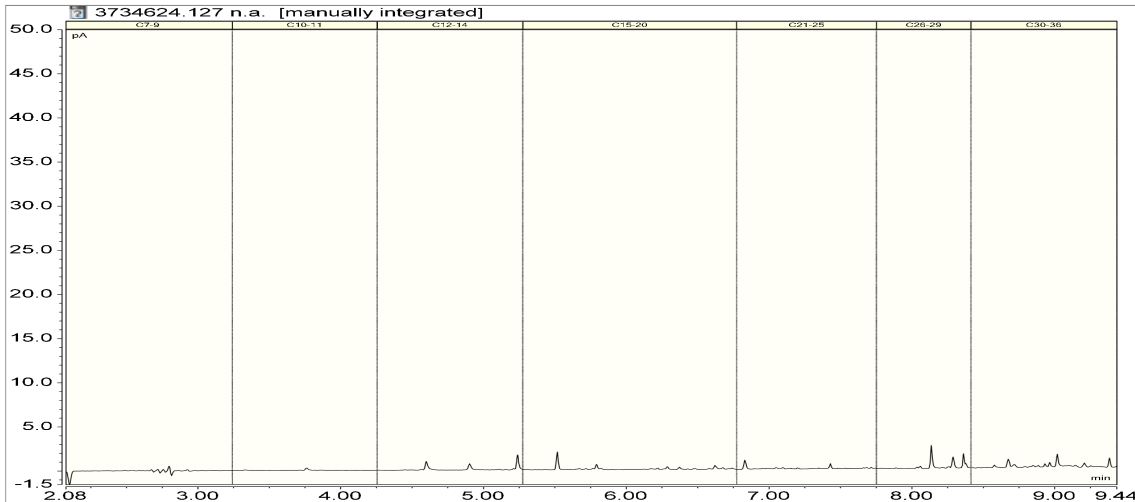
Client Chromatogram for TPH by FID



3734624.118
 S5 SP1 06-Dec-2024
 Client Chromatogram for TPH by FID



3734624.127
 Dup 8 05-Dec-2024
 Client Chromatogram for TPH by FID



Analyst's Comments

It was noted that OCP analysis of 3734624.5, 20, 64 and 65 was affected by breakdown, whereby 4,4-DDT was converted to 4,4-DDD and 2,4-DDT was converted to 2,4-DDD. Therefore the 4,4-DDT and 2,4-DDT results may be underestimated, and the 4,4-DDD and 2,4-DDD results may be over-estimated for these samples.

Amended Report: This certificate of analysis replaces report '3734624-SPv1' issued on 31-Dec-2024 at 10:01 am.
 Reason for amendment: Further testing added.

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 Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			

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%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-6, 9, 11-30, 32-40, 42, 44-45, 48, 51, 55-57, 61, 63-66, 68-74, 76, 79-82, 86-88, 91, 94-96, 100, 103, 108-109, 111-123, 126-127
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%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	37-38, 114-115, 123
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
Dry Matter	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	5, 20, 24-30, 32-34, 39-40, 45, 48, 58, 64-66, 72, 82, 103, 112-113, 116-120, 127
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	37-38, 114-115, 123
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	37-38, 114-115, 123
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.	0.024 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
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).	0.024 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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	1-6, 9, 11-30, 32-36, 39-40, 42, 44-45, 48, 51, 55-57, 61, 63-66, 68-74, 76, 79-82, 86-88, 91, 94-96, 100, 103, 108-109, 111-113, 116-122, 126-127
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	5, 20, 24-30, 32-34, 39-40, 45, 48, 58, 64-66, 82, 103, 112-113, 118-120, 127
SPLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1312.	-	5, 21, 26-27, 39
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	5, 21, 26-27
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	5, 20, 64-65, 72, 112-113, 118, 127
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	70 mg/kg dry wt	5, 20, 24, 33-34, 48, 64-66, 72, 112-113, 116-118, 120, 127
SPLP Profile			
SPLP Sample Weight	Gravimetric. US EPA 1312.	0.1 g	5, 21, 26-27, 39
SPLP Extractant Type*	US EPA 1312 (Modified for New Zealand conditions to use De-ionised Water unless otherwise specified).	-	5, 21, 26-27, 39
SPLP Final pH	pH meter. US EPA 1312.	0.1 pH Units	5, 21, 26-27, 39
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	5, 21, 26-27
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	5, 21, 26-27
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	5, 21, 26-27

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
TCLP Extractant Type*	US EPA 1311.	-	5, 21, 26-27
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	5, 21, 26-27
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	5, 21, 26-27

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	128-131, 134-136
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B (modified) : Online Edition / US EPA 200.8.	0.000053 - 0.0011 g/m ³	128, 130, 134, 136
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B (modified) 23rd ed. 2017.	0.0011 - 0.053 g/m ³	129, 131, 135
Organochlorine Pesticides Screening in Water, By Liq/Liq*	Liquid / liquid extraction, GC-ECD analysis. In-house based on US EPA 8081.	0.00010 - 0.005 g/m ³	132-133

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

Testing was completed between 20-Dec-2024 and 24-Jan-2025. 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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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

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Client: Tonkin & Taylor	Lab No: 3734625 A2Pv1
Contact: Genevieve Palmer	Date Received: 06-Dec-2024
C/- Tonkin & Taylor	Date Reported: 06-Jan-2025
PO Box 9544	Quote No: 80842
Hamilton 3240	Order No: 1017353.2403
	Client Reference: 1017353.2403
	Submitted By: Genevieve Palmer

Sample Type: Soil

Sample Name:	S1 TP1@ 0.5 03-Dec-2024	S1 TP1@ 1.5 03-Dec-2024	S1 TP1@ 3.0 03-Dec-2024	S1 TP2@ 0.2 03-Dec-2024	S1 TP2@ 1.3 03-Dec-2024
Lab Number:	3734625.1	3734625.2	3734625.3	3734625.4	3734625.5
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Chrysotile (White Asbestos) detected.
Description of Asbestos Form	-	-	-	-	ACM debris
Asbestos in ACM as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	0.013
Asbestos as Fibrous Asbestos as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	0.013
As Received Weight g	746.3	663.4	864.2	935.9	634.4
Dry Weight g	628.5	406.8	658.7	886.0	497.3
Moisture* %	16	39	24	5	22
Sample Fraction >10mm g dry wt	24.0	< 0.1	< 0.1	275.5	79.5
Sample Fraction <10mm to >2mm g dry wt	150.8	18.1	11.4	327.4	146.5
Sample Fraction <2mm g dry wt	453.2	387.2	646.3	282.3	270.2
<2mm Subsample Weight g dry wt	52.8	58.0	55.8	51.7	57.4
Weight of Asbestos in ACM (Non-Friable) g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable) g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)* g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.06531

Sample Name:	S1 TP2@ 2.5 03-Dec-2024	S1 TP3@ 0.2 03-Dec-2024	S1 TP4@ 0.1 03-Dec-2024	S1 TP6@ 0.5 03-Dec-2024	S1 TP6@ 3.0 03-Dec-2024
Lab Number:	3734625.6	3734625.7	3734625.8	3734625.9	3734625.10
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight g	718.1	711.1	852.7	886.3	1,081.5
Dry Weight g	389.0	618.0	804.7	768.2	831.9
Moisture* %	46	13	6	13	23



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Soil						
Sample Name:		S1 TP2@ 2.5 03-Dec-2024	S1 TP3@ 0.2 03-Dec-2024	S1 TP4@ 0.1 03-Dec-2024	S1 TP6@ 0.5 03-Dec-2024	S1 TP6@ 3.0 03-Dec-2024
Lab Number:		3734625.6	3734625.7	3734625.8	3734625.9	3734625.10
Sample Fraction >10mm	g dry wt	51.9	40.0	120.7	118.8	165.6
Sample Fraction <10mm to >2mm	g dry wt	96.8	162.7	248.6	256.8	207.5
Sample Fraction <2mm	g dry wt	238.7	414.5	434.3	392.0	457.2
<2mm Subsample Weight	g dry wt	56.8	50.7	58.5	58.7	50.6
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Sample Name:		S1 TP7@ 0.5 03-Dec-2024	S1 TP7@ 1.0 03-Dec-2024	S1 TP8@ 0.2 03-Dec-2024	S1 TP8@ 0.8 03-Dec-2024	S1 TP9@ 0.1 03-Dec-2024
Lab Number:		3734625.11	3734625.12	3734625.13	3734625.14	3734625.15
Asbestos Presence / Absence		Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	Loose fibres	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	672.9	602.6	879.0	774.1	779.8
Dry Weight	g	531.7	424.5	862.2	634.2	724.2
Moisture*	%	21	30	2	18	7
Sample Fraction >10mm	g dry wt	83.8	12.8	145.6	30.9	20.3
Sample Fraction <10mm to >2mm	g dry wt	234.7	174.4	335.9	173.3	199.8
Sample Fraction <2mm	g dry wt	212.1	235.6	378.7	429.0	503.1
<2mm Subsample Weight	g dry wt	56.3	57.4	57.0	55.4	57.7
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	0.00282	< 0.00001	< 0.00001	< 0.00001
Sample Name:		S1 TP10@ 1.0 03-Dec-2024	S1 TP10@ 3.0 03-Dec-2024	S1 SP1 03-Dec-2024	S1 SP2 03-Dec-2024	S1 SP3 03-Dec-2024
Lab Number:		3734625.16	3734625.17	3734625.18	3734625.19	3734625.20
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	870.2	857.0	743.4	568.7	732.9
Dry Weight	g	805.0	572.4	740.7	565.0	728.2
Moisture*	%	7	33	< 1	< 1	< 1
Sample Fraction >10mm	g dry wt	220.9	92.3	36.8	29.8	55.0
Sample Fraction <10mm to >2mm	g dry wt	322.3	182.8	103.9	261.0	320.9
Sample Fraction <2mm	g dry wt	260.9	291.7	599.1	272.0	350.6

Sample Type: Soil

Sample Name:		S1 TP10@ 1.0 03-Dec-2024	S1 TP10@ 3.0 03-Dec-2024	S1 SP1 03-Dec-2024	S1 SP2 03-Dec-2024	S1 SP3 03-Dec-2024
Lab Number:		3734625.16	3734625.17	3734625.18	3734625.19	3734625.20
<2mm Subsample Weight	g dry wt	57.5	55.2	57.4	56.2	55.4
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:		S1 TP5@ 0.1 03-Dec-2024	S4a SS1 04-Dec-2024	S4a TP1@ 0.3 04-Dec-2024	S4b TP1@ 1.0 04-Dec-2024	S4b SS1 04-Dec-2024
Lab Number:		3734625.21	3734625.22	3734625.23	3734625.24	3734625.25
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	685.8	483.6	552.0	765.2	782.5
Dry Weight	g	642.0	450.4	511.5	673.8	737.7
Moisture*	%	6	7	7	12	6
Sample Fraction >10mm	g dry wt	81.8	6.4	24.0	15.3	16.6
Sample Fraction <10mm to >2mm	g dry wt	298.8	178.4	204.1	100.4	147.5
Sample Fraction <2mm	g dry wt	256.9	258.6	278.0	556.8	572.5
<2mm Subsample Weight	g dry wt	51.8	51.5	50.2	53.6	57.9
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:		S4b SS2 04-Dec-2024	TP411@ 0.1 04-Dec-2024	TP411@ 0.8 04-Dec-2024	TP411@ 1.2 04-Dec-2024	TP412@ 0.2 04-Dec-2024
Lab Number:		3734625.26	3734625.27	3734625.28	3734625.29	3734625.30
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	739.6	715.8	521.1	798.8	706.1
Dry Weight	g	689.1	659.1	339.6	672.4	636.5
Moisture*	%	7	8	35	16	10
Sample Fraction >10mm	g dry wt	16.8	16.7	< 0.1	63.0	27.3
Sample Fraction <10mm to >2mm	g dry wt	123.9	207.0	49.3	288.9	178.9
Sample Fraction <2mm	g dry wt	546.8	433.9	289.6	319.3	429.4
<2mm Subsample Weight	g dry wt	58.7	54.8	55.3	58.2	55.3
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Type: Soil						
Sample Name:	S4b SS2 04-Dec-2024	TP411@ 0.1 04-Dec-2024	TP411@ 0.8 04-Dec-2024	TP411@ 1.2 04-Dec-2024	TP412@ 0.2 04-Dec-2024	
Lab Number:	3734625.26	3734625.27	3734625.28	3734625.29	3734625.30	
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Sample Name:	TP412@ 1.0 04-Dec-2024	S2 TP1@ 0.3 04-Dec-2024	S2 TP1@ 1.5 04-Dec-2024	S2 TP2 0.2 04-Dec-2024	S2 TP2 @ 1.5 04-Dec-2024	
Lab Number:	3734625.31	3734625.32	3734625.33	3734625.34	3734625.35	
Asbestos Presence / Absence	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	
Description of Asbestos Form	Loose fibres	-	-	-	-	
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
As Received Weight	g 693.7	778.1	790.7	904.0	790.3	
Dry Weight	g 586.2	712.5	719.9	877.5	717.2	
Moisture*	% 16	8	9	3	9	
Sample Fraction >10mm	g dry wt 37.6	78.7	202.6	145.7	185.2	
Sample Fraction <10mm to >2mm	g dry wt 223.3	199.3	228.9	398.3	290.6	
Sample Fraction <2mm	g dry wt 324.3	433.4	287.1	331.9	240.7	
<2mm Subsample Weight	g dry wt 57.4	59.4	57.2	57.1	56.5	
Weight of Asbestos in ACM (Non- Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt 0.00030	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Sample Name:	S2 TP3@ 0.2 04-Dec-2024	S2 TP3@ 1.0 04-Dec-2024	S2 SP1 04-Dec-2024	S2 SP2 04-Dec-2024	S2 SP3 04-Dec-2024	
Lab Number:	3734625.36	3734625.37	3734625.39	3734625.40	3734625.41	
Asbestos Presence / Absence	Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	
Description of Asbestos Form	-	Loose fibres	-	-	-	
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
As Received Weight	g 652.6	839.7	694.8	510.1	806.6	
Dry Weight	g 613.4	812.2	669.7	459.3	801.6	
Moisture*	% 6	3	4	10	< 1	
Sample Fraction >10mm	g dry wt 25.7	153.2	42.0	47.6	118.4	
Sample Fraction <10mm to >2mm	g dry wt 265.3	213.2	171.6	90.5	288.2	
Sample Fraction <2mm	g dry wt 320.7	444.7	455.1	320.5	393.8	
<2mm Subsample Weight	g dry wt 52.4	56.0	59.6	56.1	54.0	
Weight of Asbestos in ACM (Non- Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	0.00194	< 0.00001	< 0.00001	< 0.00001	

Sample Type: Soil

Sample Name:	S2 TP4@ 0.5 04-Dec-2024	S2 TP4@ 2.0 04-Dec-2024	S2 TP5@ 0.0 04-Dec-2024	S2 TP5@ 0.8 04-Dec-2024	S2 TP5@ 2.1 04-Dec-2024
Lab Number:	3734625.42	3734625.43	3734625.44	3734625.45	3734625.46
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Amosite (Brown Asbestos) detected.
Description of Asbestos Form	-	-	-	-	Loose fibres
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
As Received Weight	g 799.8	g 746.5	g 744.6	g 691.2	g 667.7
Dry Weight	g 723.8	g 653.8	g 710.9	g 575.9	g 380.6
Moisture*	% 10	% 12	% 5	% 17	% 43
Sample Fraction >10mm	g dry wt 117.1	g dry wt 102.8	g dry wt 166.8	g dry wt 146.9	g dry wt < 0.1
Sample Fraction <10mm to >2mm	g dry wt 351.5	g dry wt 299.0	g dry wt 241.1	g dry wt 239.3	g dry wt 175.9
Sample Fraction <2mm	g dry wt 252.8	g dry wt 251.4	g dry wt 300.3	g dry wt 189.0	g dry wt 203.0
<2mm Subsample Weight	g dry wt 56.4	g dry wt 58.4	g dry wt 56.6	g dry wt 57.2	g dry wt 56.4
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt 0.00122

Sample Name:	S2 SS1 04-Dec-2024	S2 TP6@ 0.6 04-Dec-2024	S2 TP6@ 2.0 04-Dec-2024	S6 SS1 05-Dec-2024	S6 SS3 05-Dec-2024
Lab Number:	3734625.47	3734625.48	3734625.49	3734625.51	3734625.52
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
As Received Weight	g 691.5	g 570.9	g 528.4	g 645.2	g 678.4
Dry Weight	g 681.5	g 425.8	g 367.3	g 616.1	g 670.5
Moisture*	% 1	% 25	% 30	% 5	% 1
Sample Fraction >10mm	g dry wt 8.5	g dry wt 51.0	g dry wt 7.1	g dry wt 81.3	g dry wt 46.9
Sample Fraction <10mm to >2mm	g dry wt 76.2	g dry wt 143.3	g dry wt 63.4	g dry wt 138.0	g dry wt 195.1
Sample Fraction <2mm	g dry wt 591.9	g dry wt 230.1	g dry wt 295.1	g dry wt 393.9	g dry wt 426.3
<2mm Subsample Weight	g dry wt 54.1	g dry wt 50.8	g dry wt 50.4	g dry wt 56.3	g dry wt 55.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001

Sample Name:	S2 TP9@ 0-0.5 05-Dec-2024	S2 TP9@ 0.5-2 05-Dec-2024	S2 TP9@ 2-2.5 05-Dec-2024	S2 TP10@ 0-0.4 05-Dec-2024	S2 TP10@ 0.4-1.5 05-Dec-2024
Lab Number:	3734625.53	3734625.54	3734625.55	3734625.56	3734625.57
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-

Sample Type: Soil

Sample Name:	S2 TP9@ 0-0.5 05-Dec-2024	S2 TP9@ 0.5-2 05-Dec-2024	S2 TP9@ 2-2.5 05-Dec-2024	S2 TP10@ 0-0.4 05-Dec-2024	S2 TP10@ 0.4-1.5 05-Dec-2024
Lab Number:	3734625.53	3734625.54	3734625.55	3734625.56	3734625.57
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g 700.8	706.1	688.8	824.3	765.3
Dry Weight	g 546.8	538.2	425.0	752.2	623.8
Moisture*	% 22	24	38	9	18
Sample Fraction >10mm	g dry wt 63.0	24.5	< 0.1	183.3	94.1
Sample Fraction <10mm to >2mm	g dry wt 222.1	110.7	0.5	292.8	175.4
Sample Fraction <2mm	g dry wt 259.6	401.5	422.8	275.5	353.0
<2mm Subsample Weight	g dry wt 51.3	58.4	54.7	53.5	54.0
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

G.Palmer 15/01/2025: Sample transcript error - S1_TP11, not S2_TP11

Sample Name:	S2 TP10@ 1.5-1.9 05-Dec-2024	S2 TP11@ 0-0.5 05-Dec-2024	S2 TP11@ 0.5-1.2 05-Dec-2024	S2 TP11@ 1.2-2.3 05-Dec-2024	TP413@ 0-0.3 05-Dec-2024
Lab Number:	3734625.58	3734625.59	3734625.60	3734625.61	3734625.62
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g 900.6	845.0	783.4	798.7	677.5
Dry Weight	g 690.4	770.8	641.4	659.4	584.2
Moisture*	% 23	9	18	17	14
Sample Fraction >10mm	g dry wt < 0.1	97.4	53.3	25.3	3.2
Sample Fraction <10mm to >2mm	g dry wt 67.8	257.6	159.8	179.1	87.5
Sample Fraction <2mm	g dry wt 621.2	414.7	427.7	454.0	492.7
<2mm Subsample Weight	g dry wt 55.2	54.9	55.3	54.4	55.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:	TP408@ 0-0.6 05-Dec-2024	TP408@ 0.6-1.4 05-Dec-2024	S3 TP1@ 0.4 05-Dec-2024	S3 TP1@ 1.3 05-Dec-2024	S3 TP2@ 0.5 05-Dec-2024
Lab Number:	3734625.63	3734625.64	3734625.65	3734625.66	3734625.67
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Sample Type: Soil

Sample Name:	TP408@ 0-0.6 05-Dec-2024	TP408@ 0.6-1.4 05-Dec-2024	S3 TP1@ 0.4 05-Dec-2024	S3 TP1@ 1.3 05-Dec-2024	S3 TP2@ 0.5 05-Dec-2024
Lab Number:	3734625.63	3734625.64	3734625.65	3734625.66	3734625.67
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	740.3	665.9	650.5	592.5
Dry Weight	g	652.8	445.3	552.9	364.2
Moisture*	%	12	33	15	39
Sample Fraction >10mm	g dry wt	97.7	75.1	< 0.1	0.4
Sample Fraction <10mm to >2mm	g dry wt	229.8	121.7	185.2	112.0
Sample Fraction <2mm	g dry wt	324.4	247.8	366.0	248.1
<2mm Subsample Weight	g dry wt	53.6	50.4	53.6	53.0
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:	S3 TP2@ 1.2 05-Dec-2024	S3 TP3@ 0.4 05-Dec-2024	S3 TP3@ 1.2 05-Dec-2024	S3 TP4@ 0.1 05-Dec-2024	S3 TP4@ 0.8 05-Dec-2024
Lab Number:	3734625.68	3734625.69	3734625.70	3734625.71	3734625.72
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	ACM debris	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	0.010
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	0.010
As Received Weight	g	591.3	702.4	852.9	625.6
Dry Weight	g	423.0	652.7	722.6	565.5
Moisture*	%	28	7	15	10
Sample Fraction >10mm	g dry wt	11.8	112.0	165.0	17.9
Sample Fraction <10mm to >2mm	g dry wt	105.0	234.6	246.8	158.2
Sample Fraction <2mm	g dry wt	303.2	303.7	300.4	382.5
<2mm Subsample Weight	g dry wt	52.2	53.0	51.9	51.3
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	0.05679

Sample Name:	S3 TP5@ 1.0 05-Dec-2024	S3 TP5@ 1.2 05-Dec-2024	S3 TP5@ 1.4 05-Dec-2024	S3 TP6@ 0.5 05-Dec-2024	S3 TP6@ 1.8 05-Dec-2024
Lab Number:	3734625.73	3734625.74	3734625.75	3734625.76	3734625.77
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	691.6	561.8	629.9	648.8

Sample Type: Soil

Sample Name:		S3 TP5@ 1.0 05-Dec-2024	S3 TP5@ 1.2 05-Dec-2024	S3 TP5@ 1.4 05-Dec-2024	S3 TP6@ 0.5 05-Dec-2024	S3 TP6@ 1.8 05-Dec-2024
Lab Number:		3734625.73	3734625.74	3734625.75	3734625.76	3734625.77
Dry Weight	g	558.9	427.9	503.2	574.6	453.4
Moisture*	%	19	24	20	11	37
Sample Fraction >10mm	g dry wt	75.9	31.3	95.6	65.7	< 0.1
Sample Fraction <10mm to >2mm	g dry wt	133.5	99.3	212.1	194.1	77.7
Sample Fraction <2mm	g dry wt	346.8	294.1	192.4	311.6	370.8
<2mm Subsample Weight	g dry wt	53.7	50.8	50.5	52.9	52.3
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:		S3 TP7@ 0.3 05-Dec-2024	S3 TP7@ 0.7 05-Dec-2024	S3 TP7@ 1.5 05-Dec-2024	S7d SP1 05-Dec-2024	S7d SP2 05-Dec-2024
Lab Number:		3734625.78	3734625.79	3734625.80	3734625.81	3734625.82
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	732.4	543.5	786.5	470.2	699.5
Dry Weight	g	669.1	418.6	521.7	468.5	693.6
Moisture*	%	9	23	34	< 1	< 1
Sample Fraction >10mm	g dry wt	96.4	8.8	< 0.1	17.8	44.1
Sample Fraction <10mm to >2mm	g dry wt	272.0	211.9	31.2	143.3	220.3
Sample Fraction <2mm	g dry wt	295.9	193.4	486.6	300.8	426.6
<2mm Subsample Weight	g dry wt	50.7	52.3	51.8	51.0	52.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:		S7d SP3 05-Dec-2024	S7d SP4 05-Dec-2024	S7d SS1 05-Dec-2024	S7d SS3 05-Dec-2024	S7c SS1 06-Dec-2024
Lab Number:		3734625.83	3734625.84	3734625.85	3734625.87	3734625.88
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	485.5	631.3	550.5	595.5	523.8
Dry Weight	g	478.4	625.5	529.6	544.6	462.6
Moisture*	%	1	< 1	4	9	12
Sample Fraction >10mm	g dry wt	11.7	3.8	15.8	11.0	28.3
Sample Fraction <10mm to >2mm	g dry wt	131.7	155.3	216.1	193.6	80.7

Sample Type: Soil						
Sample Name:	S7d SP3 05-Dec-2024	S7d SP4 05-Dec-2024	S7d SS1 05-Dec-2024	S7d SS3 05-Dec-2024	S7c SS1 06-Dec-2024	
Lab Number:	3734625.83	3734625.84	3734625.85	3734625.87	3734625.88	
Sample Fraction <2mm	g dry wt	331.0	462.4	286.7	336.9	349.5
<2mm Subsample Weight	g dry wt	53.7	50.6	50.9	52.1	50.6
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Sample Name:	S7c SS2 06-Dec-2024	S7c SS3 06-Dec-2024	S5 SS1 06-Dec-2024	S5 SP1 06-Dec-2024	
Lab Number:	3734625.89	3734625.90	3734625.91	3734625.92	
Asbestos Presence / Absence	Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.	
Description of Asbestos Form	-	Loose fibres	-	-	
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	340.7	575.7	752.0	616.4
Dry Weight	g	319.2	535.2	744.2	607.6
Moisture*	%	6	7	1	1
Sample Fraction >10mm	g dry wt	9.6	31.2	79.5	10.4
Sample Fraction <10mm to >2mm	g dry wt	156.5	173.9	279.0	138.1
Sample Fraction <2mm	g dry wt	148.7	325.0	380.9	453.3
<2mm Subsample Weight	g dry wt	50.5	50.0	50.6	52.2
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	0.00296	< 0.00001	< 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.

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 Labs, 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; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	1-37, 39-49, 51-85, 87-92
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	1-37, 39-49, 51-85, 87-92
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-37, 39-49, 51-85, 87-92
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-37, 39-49, 51-85, 87-92
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; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-37, 39-49, 51-85, 87-92
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-37, 39-49, 51-85, 87-92
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-37, 39-49, 51-85, 87-92
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-37, 39-49, 51-85, 87-92
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; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-37, 39-49, 51-85, 87-92
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	1-37, 39-49, 51-85, 87-92
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-37, 39-49, 51-85, 87-92
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	1-37, 39-49, 51-85, 87-92
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-37, 39-49, 51-85, 87-92
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	1-37, 39-49, 51-85, 87-92
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	1-37, 39-49, 51-85, 87-92

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

Testing was completed between 23-Dec-2024 and 06-Jan-2025. 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.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

A handwritten signature in blue ink, appearing to read 'John Keneth Paglingayen', with a stylized flourish at the end.

John Keneth Paglingayen BApSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client: Tonkin & Taylor Contact: Genevieve Palmer C/- Tonkin & Taylor PO Box 9544 Hamilton 3240	Lab No: 3734626 Date Received: 06-Dec-2024 Date Reported: 11-Dec-2024 Quote No: 80842 Order No: 1017353.2403 Client Reference: 1017353.2403 Add. Client Ref: Date sampled: 3-5/12/24 Submitted By: Genevieve Palmer	A2PV1
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Sample Type: Building Material

Sample Name	Lab Number	Sample Category*	Sample Weight on receipt (g)	Asbestos Presence / Absence	Description of Asbestos in Non Homogeneous Samples
S1 - Bulk 1	3734626.1	Fibre Cement	32.63	Chrysotile (White Asbestos) detected.	N/A
S1 - Bulk 2	3734626.2	Fibre Cement	51.50	Chrysotile (White Asbestos) detected. Organic fibres detected.	N/A
S1 TP2 Bulk 3	3734626.3	Fibre Cement	31.03	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A
S4a Bulk 4	3734626.4	Fibre Cement	32.96	Asbestos NOT detected. Organic fibres detected.	N/A
S46 Bulk 5	3734626.5	Fibre Cement	5.22	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A
G.Palmer 15/01/2025: Sample transcript error - should be 'S4b Bulk 5', not 'S46 Bulk 5'					
S2 TP5 - Bulk 6	3734626.6	Linoleum / Vinyl floor tile	50.26	Chrysotile (White Asbestos) detected. Organic fibres detected. #1	N/A
S3TP2 Bulk 7	3734626.7	Other #2	19.47	Asbestos NOT detected. Synthetic mineral fibres detected.	N/A
S6 SS3 Bulk 8	3734626.8	Fibre Cement	7.53	Asbestos NOT detected. Organic fibres detected.	N/A
S3TP5 Bulk 9	3734626.9	Fibre Cement	43.18	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A
S3TP5 Bulk 10	3734626.10	Fibre Cement	7.70	Asbestos NOT detected. Organic fibres detected.	N/A
S3TP7 Bulk 11	3734626.11	Fibre Board	43.64	Asbestos NOT detected. Organic fibres detected.	N/A
S7d SP1 - Bulk 12	3734626.12	Fibre Cement	15.16	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A

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.

Analyst's Comments

#1 Asbestos fibres detected in paper backing.

#2 Membrane

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 Labs, 28 Duke Street, Frankton, Hamilton 3204.

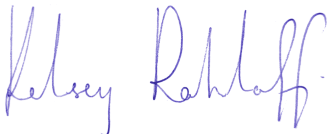
Sample Type: Building Material			
Test	Method Description	Default Detection Limit	Sample No
Asbestos in Bulk Material			
Sample Category*	Assessment of sample type. Analysed at Hill Laboratories - Asbestos; 204 Thorndon Quay, Wellington.	-	1-12
Sample Weight on receipt	Sample weight (approximate). Analysed at Hill Laboratories - Asbestos; 204 Thorndon Quay, Wellington.	0.01 g	1-12
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 204 Thorndon Quay, Wellington. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-12
Description of Asbestos in Non Homogeneous Samples	Form, dimensions and/or weight of asbestos fibres present. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-12

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

Testing was completed between 10-Dec-2024 and 11-Dec-2024. 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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Kelsey Rohloff BSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 3

Client: Tonkin & Taylor	Lab No: 3738309	SPV2
Contact: Genevieve Palmer	Date Received: 12-Dec-2024	
C/- Tonkin & Taylor	Date Reported: 24-Jan-2025	(Amended)
PO Box 9544	Quote No: 80842	
Hamilton 3240	Order No: 1017353.2403	
	Client Reference: 1017353.2403	
	Submitted By: Genevieve Palmer	

Sample Type: Soil

Sample Name:	S7a SS1 06-Dec-2024	S7a SS3 06-Dec-2024	S7a SS5 06-Dec-2024	S8 SS1@0.05m 06-Dec-2024	S8 SS2@0.05m 06-Dec-2024
Lab Number:	3738309.1	3738309.2	3738309.3	3738309.4	3738309.5

Individual Tests

SPLP Sample Weight	g	-	50	-	-	-
SPLP Extractant Type*		-	De-ionised Water, pH 5.8 +/- 0.4	-	-	-
SPLP Final pH	pH Units	-	9.6	-	-	-
TCLP Weight of Sample Taken	g	-	50	-	-	-
TCLP Initial Sample pH	pH Units	-	7.9	-	-	-
TCLP Acid Adjusted Sample pH	pH Units	-	1.6	-	-	-
TCLP Extractant Type*		-	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-	-
TCLP Extraction Fluid pH	pH Units	-	5.0	-	-	-
TCLP Post Extraction Sample pH	pH Units	-	5.1	-	-	-
Total Recoverable Lead	mg/kg dry wt	430	3,300	68	-	-

Heavy Metals with Mercury, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	-	-	-	5	4
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	< 0.10	0.28
Total Recoverable Chromium	mg/kg dry wt	-	-	-	16	12
Total Recoverable Copper	mg/kg dry wt	-	-	-	9	11
Total Recoverable Lead	mg/kg dry wt	-	-	-	14.0	11.2
Total Recoverable Mercury	mg/kg dry wt	-	-	-	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	-	-	11	8
Total Recoverable Zinc	mg/kg dry wt	-	-	-	63	95

Sample Name:	S8 SS3@0.05m 06-Dec-2024	S8 SS1@0.4m 06-Dec-2024	S8 SS2@0.5m 06-Dec-2024	S8 SS3@0.5m 06-Dec-2024
Lab Number:	3738309.6	3738309.7	3738309.8	3738309.9

Heavy Metals with Mercury, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	8	6	6	5
Total Recoverable Cadmium	mg/kg dry wt	0.11	< 0.10	0.14	< 0.10
Total Recoverable Chromium	mg/kg dry wt	25	14	15	14
Total Recoverable Copper	mg/kg dry wt	16	11	11	11
Total Recoverable Lead	mg/kg dry wt	25	15.6	13.9	14.2
Total Recoverable Mercury	mg/kg dry wt	0.11	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	20	12	12	12
Total Recoverable Zinc	mg/kg dry wt	84	61	76	55

Sample Type: Aqueous

Sample Type: Aqueous			
Sample Name:		S7a SS3 [SPLP Extract]	S7a SS3 [TCLP Extract]
Lab Number:		3738309.10	3738309.11
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn			
Total Arsenic	g/m ³	0.0020	-
Total Cadmium	g/m ³	0.000094	-
Total Chromium	g/m ³	0.00146	-
Total Copper	g/m ³	0.0033	-
Total Lead	g/m ³	0.28	-
Total Nickel	g/m ³	0.00080	-
Total Zinc	g/m ³	0.146	-
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples			
Total Arsenic	g/m ³	-	< 0.021
Total Cadmium	g/m ³	-	0.0077
Total Chromium	g/m ³	-	< 0.011
Total Copper	g/m ³	-	< 0.011
Total Lead	g/m ³	-	8.8
Total Nickel	g/m ³	-	< 0.011
Total Zinc	g/m ³	-	14.4

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3738309-SPv1' issued on 24-Dec-2024 at 8:23 am.
Reason for amendment: TCLP and SPLP metals added to one sample.

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 Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-9
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%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-3
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-3
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	1-3
Heavy Metals with Mercury, 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	4-9
SPLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1312.	-	2
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	2
SPLP Profile			
SPLP Sample Weight	Gravimetric. US EPA 1312.	0.1 g	2
SPLP Extractant Type*	US EPA 1312 (Modified for New Zealand conditions to use De-ionised Water unless otherwise specified).	-	2
SPLP Final pH	pH meter. US EPA 1312.	0.1 pH Units	2
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	2
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Extractant Type*	US EPA 1311.	-	2
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	2

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	10-11
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B (modified) : Online Edition / US EPA 200.8.	0.000053 - 0.0011 g/m ³	10
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn, for TCLP samples	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B (modified) 23rd ed. 2017.	0.0011 - 0.053 g/m ³	11

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

Testing was completed between 20-Dec-2024 and 24-Jan-2025. 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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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client: Tonkin & Taylor	Lab No: 3738687 A2Pv1
Contact: Genevieve Palmer	Date Received: 12-Dec-2024
C/- Tonkin & Taylor	Date Reported: 06-Jan-2025
PO Box 9544	Quote No: 80842
Hamilton 3240	Order No: 1017353.2403
	Client Reference: 1017353.2403
	Submitted By: Genevieve Palmer

Sample Type: Soil

Sample Name:	S7a SS1 06-Dec-2024	S7a SS2 06-Dec-2024	S7a SS3 06-Dec-2024	S7a SS4 06-Dec-2024	S7a SS5 06-Dec-2024
Lab Number:	3738687.1	3738687.2	3738687.3	3738687.4	3738687.5
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
As Received Weight	g 831.0	g 648.2	g 563.6	g 551.4	g 637.6
Dry Weight	g 782.3	g 602.9	g 493.0	g 510.8	g 548.9
Moisture*	% 6	% 7	% 13	% 7	% 14
Sample Fraction >10mm	g dry wt 130.8	g dry wt 12.7	g dry wt 14.0	g dry wt 1.8	g dry wt 35.6
Sample Fraction <10mm to >2mm	g dry wt 254.9	g dry wt 62.6	g dry wt 22.4	g dry wt 12.9	g dry wt 65.9
Sample Fraction <2mm	g dry wt 394.8	g dry wt 526.3	g dry wt 455.5	g dry wt 494.6	g dry wt 446.1
<2mm Subsample Weight	g dry wt 56.0	g dry wt 53.8	g dry wt 54.8	g dry wt 53.2	g dry wt 52.6
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001

Sample Name:	S7a SS6 06-Dec-2024
Lab Number:	3738687.6
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 714.0
Dry Weight	g 667.7
Moisture*	% 6
Sample Fraction >10mm	g dry wt 77.9



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Soil		
Sample Name:	S7a SS6 06-Dec-2024	
Lab Number:	3738687.6	
Sample Fraction <10mm to >2mm	g dry wt	175.2
Sample Fraction <2mm	g dry wt	412.8
<2mm Subsample Weight	g dry wt	56.3
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.

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 Labs, 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; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	1-6
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	1-6
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-6
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-6
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; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-6
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-6
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-6
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-6
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; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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	1-6
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6
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	1-6
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6
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	1-6
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	1-6

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

Testing was completed between 30-Dec-2024 and 03-Jan-2025. 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.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



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