Drury Centre Project

Detailed Site Investigation

Kiwi Properties Holdings Ltd

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Executive Summary

Aurecon have completed a Detailed Site Investigation (DSI) at the Kiwi Properties Holdings No.2 Limited (Kiwi Properties) site located at 64, 68, 108, and 120 Flanagan Road, 133 Fitzgerald Road and 97 Brookfield Road, Drury, Auckland (the site), which comprise rural residential and farm use. The purpose of the DSI was to better quantify the contamination hazard associated with potentially contaminating activities identified by Aurecon's Preliminary Site Investigation (PSI,2020) that would potentially constrain future mixed use re-development of the site (which is likely to take place in two stages over the next two to five years).

The majority of the site is covered in grass and trees, utilised for cattle grazing and/or pastoral land, separated into paddocks. Five residential buildings are present across the site, as well as farm sheds and workshops, and gravelled access roads. The PSI identified that there was the potential for contamination to be present on site, with the sources including the residential dwellings and associated outbuildings, suspected filling, offal and/or burn pits, and the storage and usage of super-phosphate fertiliser. Investigations also confirm a landfill at 108 Flanagan Road, the extent, depth and volume of which have not been determined. An additional farm dump was also identified south of the 120 Flanagan Road homestead.

Contamination has confirmed to be present on the site associated with the following activities:

- Waste Disposal to Land (Landfill) (HAIL G5) - in the north-western corner of 108 Flanagan Road;
- Asbestos-containing material (HAIL E1) – in the residential dwellings and associated farm sheds built prior to 2000, located across the site; and
- Fertiliser application – this has occurred across the site and impacted topsoil material.

The site will be suitable for development; however, some localised hotspots will require remediation and additional management. Within the Stage 1 area, remediation of the residential dwelling and milk shed at 133 Fitzgerald Road will be required due to heavy metal contaminants being reported above the national guideline health risk criteria. The areas potentially requiring remediation within the Stage 2 area will require the assessment by a Suitably Qualified and Experienced Practitioner (SQEP) once the master plan has been confirmed. In the remainder of the site, the concentrations of contaminants give opportunity for material to be reused on site (in areas of less sensitive land use).

Specific recommendations regarding identified areas of environmental concern (AECs) are provided in Table 9, Section 7. General recommendations include the following:

- Remediation Action Plans will be required to manage contamination hotspots located within the proposed residential zoned land within Stage 1.
- Further investigation is recommended to delineate the extent of contamination present for the purposes of estimating volumes of impacted soils, and optimising design and earthworks methodologies. A staged approach to further investigations may be appropriate to manage smaller areas, and to best fit the project programme;
- Pre-demolition asbestos surveying of all site buildings is required to be undertaken prior to any demolition or removal activities. The surveying may help inform the potential for additional asbestos in soils at the site.

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1 Introduction

1.1 Project overview

Kiwi Properties Holdings No.2 Limited (Kiwi Properties) have engaged Aurecon New Zealand Limited (Aurecon) to undertake a Detailed Site Investigation (DSI) at 64, 68, 108, and 120 Flanagan Road, 133 Fitzgerald Road and 97 Brookfield Road, Drury, Auckland (the site). A site layout reference plan is presented in Appendix A (501611_0200_DRG_KF_0001-A) and Figure 1 below.

Figure 1 Site Layout with Stage 1 Extent

The site is currently and historically used as a dairy farm and currently consists of undeveloped pasture, with five residential dwellings and multiple outbuildings.

Aurecon understands that the development will occur in two stages, with the southern half of the site being developed as part of Stage 1 (likely for the 2021/22 earthworks season), and the northern half as Stage 2. Based on the Drury Town Centre Stage 1 Master Plan provided by Kiwi Properties, the proposed Stage 1 development will include approximately 11.57 ha of retail-zoned areas, 11.47 ha of mixed-use and high-density residential areas, and 2.75 ha of park area. These developments will also include the establishment of access roads and other service infrastructure. The western portion of the site, near the Hingaia Stream, will be re-purposed for open recreational land; as such land, in proximity of the Transpower electrical pylons present in the area will not be re-developed. The Stage 2 development plan not confirmed at the time of this report.

This development requires a change in land use, from Future Urban under the Auckland Unitary Plan to a mix of Metropolitan Centre, Mixed Use Residential and Open Space – Informal Recreation. The Stage 1 Masterplan is included in Appendix A.

1.2 Objectives

Aurecon previously complete a *Preliminary Site Investigation* (2020). The PSI was conducted to assess the potential for contamination sources to exist on the site as a result of current and historic land uses.

The PSI identified a number of potential sources of contamination arising from pastoral land use and potential waste disposal. The scope of this DSI is based on the findings and recommendations identified in the PSI.

The objectives of the DSI, as per the recommendations of the PSI, are to:

- To better quantify the risk of hazardous substance exposure to human health and the environment including site workers, future users and adjacent properties. Upfront knowledge of the type and extent of contamination will enable the early planning and implementation of management controls.
- To gain more certainty over construction cost and programme, including but not limited to, off-site soil disposal options and increased flexibility in materials handling on site.
- To inform consenting requirements under both the National Environmental Standards for Assessing and Managing Contaminants in Soil (NESCS) and Auckland Unitary Plan E30.

1.3 Scope

The following scope of works was undertaken:

- Review of Preliminary Site Investigation report and development of sampling strategy;
- Mobilisation planning and sub-contractor engagement, including fulfilment of health, safety and environmental requirements;
- Completion of intrusive ground investigation and environmental sampling;
- Laboratory analysis of selected samples for a range of potential contaminants; and
- Preparation of a Detailed Site Investigation report.

This report has been prepared in general accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2011)* (MfE 2011a).

Soil sampling and analysis has been undertaken in general accordance with MfE's *Contaminated Land Management Guideline No. 5: Site Investigation and Analysis of Soils (Revised 2011)* (MfE 2011b).

The persons undertaking, managing, reviewing and certifying (verifying) this report are suitably qualified and experienced practitioners (SQEPs) as defined in the MfE's NES Users' Guide (MfE 2012).

A geotechnical assessment (510611-002-06-REP-GG-001) at the site is occurring concurrently, and full liaison with the field work team was conducted to ensure efficiencies.

1.4 Explanatory Statement

1.4.1 Review scope and use

- Aurecon has prepared this report for Kiwi Properties, exclusively for its use. It has been prepared in accordance with our scope of services and the instructions given by or on behalf Kiwi Properties. Data or opinions contained within the report may not be used in other contexts or for any other purposes without Aurecon's prior review and agreement.
- Aurecon accepts no responsibility or liability to any third party for the use of, or reliance on, the report by any third party and the use of, or reliance on, the report by any third party is at the risk of that party.

1.4.2 Project Specific Limitations

- The majority of the intrusive investigation was restricted to surface soils only, with the exception of the test pits excavated to identify waste disposal to land.
- The current scope of work did not include a pre-demolition asbestos survey of site structures to be removed. Asbestos containing material within buildings should be assumed to be present until an independent survey can be undertaken.

1.4.3 Limits on Investigation and Information

- Soil and rock formations are often variable, and this along with use, storage or disposal of hazardous substances on a site can result in heterogeneous distribution of contaminants. Contaminant concentrations may be evaluated at chosen sample locations - however, conditions between sample sites can only be inferred based on geological and hydrological conditions and the nature and the extent of identified contamination. Boundaries between zones of contamination are often indistinct, and therefore interpretation is based on available information and the application of professional judgement.
- Only a finite amount of information has been collected to meet the specific technical requirements of the Kiwi Properties brief and this report does not purport to completely describe all the site's characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from the assumed model.
- This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should further information become available regarding the conditions at the site, including previously unknown likely sources of contamination, Aurecon reserves the right to review the report in the context of the additional information.
- This report has been prepared for Kiwi Properties for its own use and is based on information provided. Aurecon takes no responsibility and disclaims all liability whatsoever for any loss or damage that the Kiwi Properties may suffer as a result of using or relying on any such information or recommendations contained in this report, except to the extent Aurecon expressly indicates in this report that it has verified the information to its satisfaction. This report is not to be reproduced either wholly or in part without our prior written permission.

2 Site Description

2.1 Site Identification

Site identification details are presented in Table 1.

Table 1 Site Identification

Site Name	Drury Centre Project
Site Location	64, 68, 108, and 120 Flanagan Road, 133 Fitzgerald Road and 97 Brookfield Road, Drury, Auckland.
Legal Descriptions	■ Part Lot 2 DP 24845 (133 Fitzgerald Road) ■ Part Lot 1, Lot 2, Lot 3, Lot 4, and Lot 5 DP 57466 (133 Fitzgerald Road) ■ Lot 1 and Lot 8 DP 165262 (120 and 68 Fitzgerald Road respectively) ■ Lot 1 DP 87159 (133 Fitzgerald Road) ■ Part Allot 33 PSH of Opaheke (108 Fitzgerald Road) ■ Part Lot 1 DP 62094 (108 Fitzgerald Road) ■ Lot 1 DP 80559 (108 Fitzgerald Road) ■ Lot 9 DP 105988 (97 Brookfield Road) ■ Lot 1 DP 56120, Lot 7 DP 102224 (64 and 66 Flanagan Road)
Site Area	Approximately 53 ha.
Site Coordinates (Latitude/Longitude, World Geodesic System 84)	37.11°S, 174.95°E
Site Zoning	Future Urban Zone – land use change proposal recently closed for submissions (deadline was 22 October 2020).
Current Site Use	Rural residential dwellings with majority of site undeveloped and used as pastoral land.

2.2 Site Layout

A site layout plan showing the latest aerial imagery sourced from LINZ Data Service is presented in Drawing 501611_0100_DRG_KF_0001-A, Appendix A.

Key features of the site, which have been noted from recent aerial photography (accessed from Google Earth on 09/10/2020) are summarised below:

- The site contains five separate residential dwellings, one per lot located at 64 Flanagan Road, 120 Flanagan Road, and 133 Fitzgerald Road, and two located at 108 Flanagan Road. The dwellings are connected to the access roads by hardstanding driveways. Several farm sheds and/or storage sheds are located across the site, predominantly surrounding the residential dwellings;
- The site is bound to the west by Hingaia Stream;
- Two separate power lines supported by large electricity pylons are located along the western boundary of the site; and
- An unnamed stream runs from the northern site boundary through 68 Flanagan Road and 120 Flanagan Road.

2.2.1 Site Cover and Drainage

Most of the site is covered in grass and trees, utilised for cattle grazing and/or pastoral land, separated into paddocks. No significant evidence of horticulture or market gardening has been identified.

The site contains five (5) residential buildings, sheds or workshops, and gravelled access roads. These areas are not concentrated in one lot, rather spread throughout the site.

The access roads observed during the site inspection were in generally good condition.

2.3 Surrounding Land Use

The surrounding land uses are recorded in Table 2.

Table 2 Surrounding Land Use

North	Applaud BnB (46 Flanagan Road) and Rose growers (44 Flanagan Road). Residential dwellings and industrial buildings located beyond.
East	Farmland (113, 117, 121, 125 and 131 Fitzgerald Road) including residential dwellings, and Fitzgerald Road. Farmland and small industrial buildings also extend across the road.
South	Brookfield Road, with lifestyle blocks, including residential dwellings surrounded by farmland, located beyond.
West	Hingaia Stream and Flanagan Road. State Highway 1, Tegal Chicken hatchery and other industrial buildings located on the western side of Hingaia Stream.

2.4 Site Environment

2.4.1 Summary of Environmental Conditions

Based on desk study information, the expected environmental conditions at the site are summarised below.

The site is considered topographically undulating, with steep slopes down to both the Hingaia Stream and the unnamed stream in the northern section of the site. Ground conditions are likely to comprise topsoil underlain by a mixture of clays, silts and sands. Fill is likely to be present where land has been raised or levelled e.g. farm tracks. Fill comprising reworked natural soils has been identified in previous investigations (ENGEO, 2017b) within 68 Flanagan Road. The site straddles the geological boundary between the South Auckland Volcanic Field (SAVF) and the Puketoka Formation, which is part of the Tauranga Group alluvial sediment. The boundary sits east of the Hingaia Stream along 133 Fitzgerald Road, before curving north-east through 108 and 68 Flanagan Road, with the majority of the site being underlain by the SAVF.

Groundwater is likely to be encountered from 11 m bgl but may be shallower in low-lying areas and close to watercourses. The closest surface water course is the Hingaia Stream which marks the western boundary of the site, and the stream located within 68 Flanagan Road.

There are no identified ecological receptors or sensitive groundwater abstractions within the site or within a 100 m distance of the site. Groundwater within the underlying Drury Sands aquifer is considered sensitive to contamination using the MfE 2011c definition, due to the two Auckland Council overlays that detail the groundwater as being extracted as high usage with ongoing extraction reasonably foreseen. Groundwater is expected to flow in a general north-west direction.

For further detail regarding the site environment, refer to Aurecon PSI, 2020.

3 Site History

3.1 Introduction

A search of readily available information sources was conducted as part of the Aurecon Preliminary Site Investigation (PSI), with the objective of identification of past or present activities with the potential to contaminate land or other media such as sediment and groundwater. A summary is presented below, with full details included in the PSI (Aurecon, 2020).

3.2 Summary of Findings

64 Flanagan Road

This lot was developed in 1964, when the historical stream was filled and the vegetation cleared. A letter from the District Council of Papakura to R. Flanagan (included in the property files for 120 Flanagan Road, dated 7 March 1991) states that landfill activities, not previously consented by the council, had been identified on the site. ENGEO (2017a) conducted four hand augers on the lot that identified fill material from 0.4-1.4 m, that consisted of reworked natural soils.

A storage shed was constructed for commercial manure, and two further buildings were constructed for trucks (1965) and bulk storage of fertiliser (1975). The site walkover indicates these buildings are constructed out of metal. A residential dwelling was constructed in 2003 in the southern portion of the lot and appears to be made with cement board. Based on the information reviewed, there has been no contamination sampling or analysis within the lot.

68 Flanagan Road

This lot comprises fields historically used to store cattle, with cows visible across the paddocks through the available historical aerials. A storage shed, understood to be used for tractors, was consented and constructed between 1999 to 2000.

Aerial photography suggests that the unnamed stream located from the northern boundary to the south-eastern corner has been modified between 1942 and 1960. Previous investigation (ENGEO, 2017b) encountered fill, described as reworked natural soil, within two hand augers located on the southern boundary. Fill material has likely been used to create an access track across the stream in the south of the lot.

108 Flanagan Road

The central residential dwelling was constructed prior to the first available aerial photograph (1942), and the second was constructed in 1976. The former river bend located on the north-east corner was cleared between 1974 and 1996 aerial photographs, and the present landscape is reasonably flat indicating that filling is likely to have occurred. The type of fill used is unknown, however given the proximity of the railway sidings yard located north of the site, and the observations of stockpiling and excavations in the historical aerials, it is possible that uncontrolled filling has occurred.

The northern-most residential dwelling on the lot is located adjacent to the historical railway sidings yard that was present until the 1981 aerial photograph.

120 Flanagan Road

The residential dwelling was constructed prior to the first available aerial photograph (1942) and has been extended at least five times as recorded in the reviewed property files. Seven smaller buildings understood to have been used for general farm activities, likely to comprise storage sheds, workshops and garages are

shown in the historical aerials, and still exist around the dwelling. These appear to have been constructed out of metal and/or fibre board.

The area between Flanagan Road and the residential dwelling appears to have been used as a vegetable patch as observed in the 1974 and 1981 aerial photographs. An animal pen existed south-east of the residential dwelling from pre-1942, with the associated structure visible until the 2010 aerial.

The site may have undergone some recontouring, however the ENGEO (2017b) did not identify any fill material on this lot.

133 Fitzgerald Road

This lot has historically been used for cattle farming, with a residential dwelling, storage sheds and garaging present on the eastern portion. Two sheds visible in the 1960 aerial photograph had been demolished by the 1981 aerial, and a third metal shed was observed as dilapidated during the site walkover. The lot contains a milking shed west of the dwelling; which includes a cattle crusher, milk tank and effluent run off infrastructure. Spray paint was visible on the fencing during the site walkover. Runoff generated from the milk shed is collected into a sump, before being sprayed across the surrounding landscape.

A silage pit is present in the central portion of the lot, first visible in the 1981 aerial photograph. Small, localised burn bits, garden waste stockpiles and offal pits were identified across the lot.

A previous investigation (ENGEO, 2017c) identified asbestos fibres in one soil sample collected from the farm track near the residential dwelling, with seven other soil samples from along the farm track, near the milk shed and around the residential dwelling not detecting asbestos. Potential asbestos-containing material was not identified during the site walkover, however there is the potential that the farm track was constructed using demolition material as well as quarried aggregate. This investigation also reported four out of six surface soil samples, collected around the lot, reporting heavy metal concentrations above background criteria but below human health.

The archaeological report (Clough & Associates, 2019) identified a pine plantation on the western portion of the lot, used to grow firewood for the owners, and the site walkover identified some tree stumps in this area.

97 Brookfield Road

A review of all available information indicates that this lot has not previously been developed and has remained unused. Historical aerial photographs from 1940 show a depression, which may have been infilled. The surrounding area contains residential lifestyle blocks, however there is no indication of any potentially contaminating activities to have occurred on or adjacent to the lot.

3.3 Potential Contamination Sources

The Aurecon PSI (2020) confirmed the following four Hazardous Activities and Industry List (HAIL) contamination source activities have occurred on the site:

- Fertiliser storage (HAIL A6) – storage buildings at 64 Flanagan Road;
- Undocumented filling (HAIL G5) – under entire lot at 64 Flanagan Road;
- Potential filling (HAIL G5) - in the north-western corner of 108 Flanagan Road; and
- Asbestos-containing material (HAIL E1) – in the residential dwellings and and associated farm sheds built prior to 2000, located across the site.

The PSI also identified the following areas of environmental concern, determining them to be potential but not confirmed sources of contamination:

- Potential gully modifications / infilling – located within 68 Flanagan Road and 97 Brookfield Road;
- Isolated farm sheds – located across the site;
- Offal / burn pits – three offal pits identified within 120 Flanagan Road and 133 Fitzgerald Road, and unknown number of burn pits across the site;

- Sileage pit – located within 133 Fitzgerald Road; and
- Fertiliser application – the use of superphosphate fertilisers to improve the quality of dairy pasture is understood to have occurred across the upper North Island resulting in elevations of heavy metals, typically cadmium.

Electrical pylons (HAIL I) have been identified along the western portion of the site. However, as it is understood that the proposed development will not occur within close proximity of the pylons, these have been discounted as a source and not investigated further.

These potential areas of environmental concern are presented in Appendix A (510611-0002-DRG-KF-0002-A).

3.4 Summary of Contamination Risk

Several source areas have been identified that have been or are likely to have been undertaken within the study area. Possible source-pathway-receptor (SPR) linkages have been identified for:

- Future site users and residents, and construction and maintenance workers, that may come into direct contact with contaminated materials (soil, possibly groundwater) or inhale contaminated dust / asbestos fibres during excavation works. The principal source of these materials is likely to arise from direct contact with materials placed as part of localised filling, possible fertiliser application, and asbestos and heavy metals from degraded buildings / structures, into the shallow soils;
- Risk to surface water receptors and downstream ecological communities may be impacted by contaminated sediment discharges, surface run off generated by the construction works, or inflows from contaminated groundwater; and
- Future ecological habitats, such as This includes future reserves and habitats established as future developments and master planning, such as a pathway and/or park that was proposed to be established adjacent to the Hingaia Stream.

Groundwater underlying the site has been identified as sensitive due to the two Auckland Council overlays detailing that groundwater is being extracted as high usage with ongoing extraction reasonably foreseen. However, given the known depth to groundwater and the ground conditions encountered, specifically silts and clays, groundwater is unlikely to be significantly influenced by the potential contamination sources. As such, groundwater is considered a pathway to surface water receptors, but is not considered a receptor in its own right.

4 Site Investigation

4.1 Investigation Rationale

A limited intrusive investigation was conducted by ENGEO (2017) as part of a due diligence investigation for 133 Fitzgerald Road. The previous six (6) environmental sampling locations were not located to target identified HAIL sites, with the locations spread across the paddocks and residential dwelling, and additional investigation studies were recommended. No contaminated land assessments have been previously conducted for the remaining lots within the site.

The objective of the intrusive investigation is to obtain site-specific data for the isolated source activities (specifically, the confirmed HAIL activities and identified potential areas of environmental concern (AEC)). previously identified in the Aurecon 2020 Preliminary Site Investigation. This intrusive investigation is guided by specific data quality objectives outlined in Section 4.2.

4.2 Data Quality Objectives

Ground investigation and environmental sampling methodologies completed in accordance with MfE CLMG are developing utilising specific Data Quality Objectives, a distinct seven-step process originally derived by the USEPA (2000) to assist in rationalising the approach of investigations, to maximise quality of data to make informed decisions and recommendations. A summary of the site-specific Data Quality Objectives considered to inform the DSI, based on the findings of the PSI is presented in Table 3.

Table 3 Data Quality Objectives

Step	Discussion
1. State the Problem	The site is old farmland, proposed to be developed for residential and commercial land use as part of ongoing urban development. The Aurecon 2020 PSI identified contamination sources that may influence land use and require additional management or remediation requirements as part of or prior to construction and earthworks. The site is utilised for pastoral grazing, with five residential dwellings and associated outbuildings present. The Aurecon PSI identified four (4) HAIL activities and seven (7) potential areas of concern. This investigation is required to assess whether contamination is present in areas surrounding the identified source activities and to inform more specific investigations / remediation.
2. Identify the decision	The primary objective is to obtain site specific data regarding the potential contamination sources as well as the wider risks on the site. This will include collecting targeted surficial soil samples and analysis for key contaminants of concern. The result analyses will be compared to relevant health-based screening levels. Based on historic site use, contamination is likely to be contained within surficial topsoil and controlled fills. Deeper contamination may be present within landfilling areas.
3. Identify inputs into the decision	The primary contaminants of concern include asbestos, heavy metals and polycyclic aromatic hydrocarbons (PAH).
4. Define the study boundaries	The study boundaries are restricted to the site extent, as shown in Figure 1, Appendix A.

5. Develop a decision rule	Analytical results from laboratory testing will be screened against Tier 1 risk screening levels for human health and environmental risk. This will aid with developing an understanding of risk for the site. Testing will also be screened against background levels and waste disposal criteria to provide indication of likely disposal pathway. Contaminant concentration elevations above Tier 1 will inform the need for remediation/further work.
6. Specify limits on decision errors	An IANZ (International Accreditation New Zealand) laboratory will be used for the given analytes. Appropriate laboratory limits of reporting will be implemented. The laboratory provides a QA/QC report, and this will be reviewed to evaluate whether the DQOs have been achieved.
7. Optimise the design for obtaining data	The investigation sample locations were selected to target the identified potential contamination source activities, with 70 sample locations spread across the site.

4.3 Site Works Undertaken

Intrusive investigation and soil sampling were completed by Aurecon engineers between 13 and 18 January 2021. Photographs of the investigation are included in Appendix B.

Prior to commencement of site works, Task Based Risk Assessments (TBRA) and 'Take 5' risk assessment was completed. All works were completed without incidents or near misses.

The investigation comprised of six (6) test pits (TP035 to TP037, TP039 toTP041), with five pits targeting the *HAIL G5 – potential filling* area identified at 108 Flanagan Road, and one pit investigating identified fill material encountered as part of concurrent geotechnical investigations. The investigation included 64 surface soil samples, collected in targeted areas such as residential dwellings and sheds. A total of 70 locations were sampled. These locations targeted areas of potential environmental concern, as illustrated on Figure 2 in Appendix A (510611-0002-DRG-KF-0002-A).

Table 3 details the advancement depths for the test pits, which were completed to investigate the nature and extent of the fill material within the identified HAIL area. A maximum depth of 3.5 metres below ground level (m bgl) was reached.

The surface samples collected across the site reached maximum depths of 0.3 m bgl, with one sample collected per location.

An investigation location plan is included in Appendix A (510611_0200_DWG_KF_0002-A).

Table 4 Test Pit Excavation Depths

Location Type *(References refer to areas as labelled on Figure 2, Appendix A)*	ID	Termination Depth (m bgl)	Groundwater Encountered		
			Yes/No	Depth (m bgl)	Comments
Test Pit - Targeting HAIL G5 (Potential Filling) at 108 Flanagan Road. *Ref: Area 3*	TP035	3.0	No	-	-
	TP036	3.5	Yes	2.2	Hydrocarbon sheen on surface observed
	TP037	2.0	Yes	1.5	Slight white foam on surface observed
	TP039	3.0	No	Slight seepage from base of test pit	-
Test Pit – Farm waste dump identified during geotechnical investigation.	TP040	2.0	Yes	1.7	-
Test Pit – Targeting HAIL G5 (Potential Filling) at 108 Flanagan Road. *Ref: Area 3*	TP041	2.7	Yes	2.2 m	Slight white foam on surface observed

4.4 Sample Analysis

4.4.1 Soil

Soil sampling and testing was undertaken in accordance with principles set out within CLMG Volume 5: Site Investigation and Analysis of Soils (Revised 2011).

All environmental samples were placed within a laboratory-provided chilled container and provided to IANZ-accredited R.J. Hill Laboratories under chain of custody (CoC) documentation for analysis.

Table 1 in Appendix E details the sample regime, and the CoC documentation is provided in Appendix F.

4.4.2 Asbestos Bulk Samples

Sampling and field assessment for asbestos in soil was conducted using the procedure described in BRANZ 2017. This involved the collection of a 500g sample analysed for semi-quantitative analysis.

4.5 Quality Assurance / Quality Control

Quality assurance / quality control (QA/QC) procedures were implemented during field investigation works. All samples were collected under Aurecon chain of custody (COC) documentation procedures.

4.5.1 Sample Integrity

Prior to sampling, and between sample locations, equipment used (i.e. hand trowel/hand auger) was cleaned by washing with potable water, followed by a decontamination solution (Decon 90), and rinsing with potable water. Soil samples were collected using a clean pair of nitrile gloves for each sample and then placed into

laboratory supplied sample containers. Each sample was given a unique sample identification number and the location the sample was collected from was recorded at the time of sampling.

Following collection, all samples were placed directly into chilled storage and transported, under standard chain of custody procedures, to an International Accreditation New Zealand (IANZ) laboratory for analysis. The remaining material was placed back into its original location, ensuring each area was returned to a flat condition following completion of the sampling and compliance with Regulation 8 of the NES (soil sampling).

4.5.2 Laboratory

R. J. Hill Laboratories was selected to perform analysis of all samples. This laboratory is IANZ accredited and each of the test methods used are also IANZ accredited. Inspection of the laboratory report identified no QA/QC issues. All samples were analysed within the appropriate holding times for each analyte.

4.6 Field Observations

4.6.1 Stratigraphy

This investigation targeted surficial soils and areas of potential contamination, and as such the natural geology was only encountered in one test pit (TP040). This test pit confirmed the findings from the ENGEO (2017) report, as well as the Aurecon 2021 Geotechnical report completed in conjunction with this investigation. The Aurecon Geotechnical report confirms that a large proportion of the southern section of the site is underlain by South Auckland Volcanic Field (SAVF) basalt lava, while the northern section is predominantly underlain by Tauranga Group alluvium.

The Tauranga Group sediments comprise estuarine, fluvial and lacustrine deposits and include unconsolidated silts and clays, sand, and gravelly sand that is often interbedded with peat and organic rich clays.

SAVF material is highly variable due to age, erosion and weathering. The material encountered on site ranged from clay/silt residual soils to slightly weathered basalt.

The surficial soil material encountered included a mixture of sand, silt, and volcanic gravels. The quantity of gravel encountered increased in the locations within close proximity to residential dwellings and farm buildings.

4.6.2 Sensory Observations

Anthropogenic material was encountered in all test pits excavated as part of this investigation. TP035 - TP039 and TP041 targeted an area of suspected filling within 108 Flanagan Road, and identified a landfill consisting of glass fragments, brick, metal sheeting and machinery, steel, wood, rope, potential asbestos-containing material, and terracotta pottery. Isolated pockets of blue silty-sand material was encountered at depth in test-pits TP035 and TP039, within the waste-bearing layer. A strong hydrocarbon odour was observed during the excavation of TP036, specifically once groundwater had been encountered. The groundwater at this test pit had a hydrocarbon sheen on the surface.

The vertical extent of this landfill was not confirmed due to restrictions with the excavator, encountering shallow groundwater and the presence of overhead and underground services. It is estimated that the landfill area is approximately 0.7 ha, based on the topography.

TP040, located south of the homestead at 120 Flanagan Road, identified a farm dump, with anthropogenic material encountered consisting of glass bottles, metal horse-shoes and other broken pieces, bricks, and rope.

5 Results of Investigation

5.1 Ground Conditions

The Aurecon Geotechnical (2021) logs indicate the ground conditions in the southern part of the site comprise of basalt of the South Auckland Volcanic Field (SAVF) overlying Tauranga Group Alluvium. To the north where the topography is lower lying and there is an incised drainage channel, the Tauranga Group Alluvium if present at the surface. The South Auckland Volcanic Field appears to have a defined weathering sequence with depth, with a combination of ash and residual soil at the surface and unweathered basalt at depth, and the various weathering grades with depth in between. For full details, refer to Aurecon GIR 2021 (510611-002-06-REP-GG-001).

The general ground conditions encountered are detailed in Table 5. This investigation involved a targeted approach to sampling, so the full extent of fill material on the site has not been confirmed. The general site ground model comprises topsoil overlying SAVF. Fill material has been identified, however based on site investigations to date it has been observed to be localised to specific areas.

Firstly, landfilling has been identified as a HAIL source activity (TP021) and within a farm dump located directly south of 120 Flanagan Road (TP027). Due to the suspected asbestos-containing material and other waste materials within the fill, investigations through these areas were not comprehensive and as such these areas require re-visiting to confirm extent and volume.

Table 5 Ground Conditions

Geological Unit	Lithology	Depth Below Ground Level (m bgl)
Topsoil	Sandy silt to organic silt with trace rootlets.	0 – 0.35
Fill	SILT with some clay and trace sand. *Fill material was only encountered in TP029. Waste-bearing fill material was encountered at TP021 and TP027, causing refusal.*	0 – 0.25[1]
South Auckland Volcanic Field	Silty CLAY, with completely weathered to moderately weathered basalt.	0.2 – > 26

[1] *This excludes the depths for areas identified as waste disposal to land.*

Physical groundwater levels have been measured from the nine (9) boreholes installed as part of the geotechnical investigation, with depths ranging from 4.33 metres below ground level (m bgl) to 10.88 m bgl. A more comprehensive groundwater monitoring scheme has been conducted by the Aurecon GIR and should be referred to for further information.

5.2 Tier 1 Risk Screening Assessment

5.2.1 Introduction

The analytical results were assessed against three categories of Tier 1 acceptance criteria / guideline values, as summarised below. These criteria, and the results are discussed in further detail in the following sub-sections.

- Human Health Risk Screening Levels: To provide an assessment of potential adverse effects on all identified human health receptors based on generic, conservative exposure scenarios.
- Environmental Risk Screening Levels: To provide an assessment on potential adverse effects to ecological habitats, where in proximity of the site.

- Background concentrations: To determine the applicability of the NES and other legislation to the redevelopment, and to assess cleanfill disposal options.
- Disposal criteria: To determine potential re-use of material on site, or off-site disposal options should results be above background/cleanfill criteria.

A table presenting results assessed against these criteria is provided in Appendix E, and summarised details are provided below.

5.2.2 Soil

Human Health and Environmental Risk

The human health risk screening levels referenced in this report have been selected using the receptors identified in the conceptual site model and the hierarchy defined in the *Contaminated Land Management Guideline No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values* (MfE 2011d).

For human health values, the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health* (MfE 2011e) has been used. For contaminants where Soil Contaminant Standards (SCSs) are not available, the hierarchy defined in MfE 2011d has been used. Screening criteria for total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) were reviewed, however the concentrations reported were all below the generic screening levels.

In the absence of national environmental risk screening criteria, permitted activity criteria from Chapter E30 the Auckland Council Unitary Operative Plan have been selected.

National Environmental Soil Contaminant Standards (NESCS)

A summary of reported laboratory exceedances above relevant human health criteria is presented in Table 6.

Table 6 High Density Residential Human Health Contaminant Exceedances

Contaminant	Guideline Criteria	Sample Location	Depth (m bgl)	Concentration Reported (mg/kg)	Associated Activity *(References refer to areas as labelled on Figure 2, Appendix A)*	Address
Arsenic	45 mg/kg	SS008	0.1 – 0.2 (Topsoil)	47	Isolated Farm Shed (Area 10)	120 Flanagan Rd
		SS061	0.1 – 0.2 (Topsoil)	54	Residential Dwelling (Area 6)	133 Fitzgerald Rd
		TP039	0.1 – 0.2 (Topsoil)	47	Waste Disposal to Land (Area 3)	108 Flanagan Rd
Lead	500 mg/kg	SS035	0.1 – 0.2 (Topsoil)	850	Residential Dwelling (Area 4)	108 Flanagan Rd
		SS037	0.1 – 0.2 (Topsoil)	1,410	Residential Dwelling (Area 4)	108 Flanagan Rd
		SS043	0.1 – 0.2 (Topsoil)	4,200	Residential Dwelling (Area 5)	120 Flanagan Rd
		SS050	0.1 – 0.2 (Topsoil)	870	Milk Shed (Area 11)	133 Fitzgerald Rd
		SS058	0.1 – 0.2 (Topsoil)	1,800	Residential Dwelling (Area 6)	133 Fitzgerald Rd
		SS059	0.1 – 0.2 (Topsoil)	1,950	Residential Dwelling (Area 6)	133 Fitzgerald Rd
		SS063	0.1 – 0.2 (Topsoil)	700	Residential Dwelling (Area 6)	133 Fitzgerald Rd

There was one reported contaminant exceedance of the commercial and industrial land use human health guidelines, specifically SS043 (0.1-0.2m) for lead. There were also four reported exceedances for recreational criteria, all for lead, at SS043 (Area 5), SS037 (Area 4), SS058 and SS059 (both Area 6). These sample locations are all in the areas immediately adjacent to residential dwellings at 108 Flanagan Road, 120 Flanagan Road and 133 Fitzgerald Road.

Asbestos was detected in eight analysed samples, as detailed in Table 7.

Table 7 Asbestos Detections

Sample Location	Depth (m bgl)	Associated Activity *(References refer to areas as labelled on Figure 2, Appendix A)*	Address
TP035	1.8-1.9	Waste Disposal to Land (Area 3)	108 Flanagan Rd
TP036	0.1-0.2	Waste Disposal to Land (Area 3)	108 Flanagan Rd
TP036	2.1-2.2	Waste Disposal to Land (Area 3)	108 Flanagan Rd
TP040	1.9-2.0	Farm Dump (identified during geotechnical investigation)	120 Flanagan Rd
SS005	0.1-0.2	Isolated Farm Shed (Area 10)	120 Flanagan Rd
SS012	0.1-0.2	Isolated Farm Shed (Area 12)	133 Fitzgerald Rd
SS013	0.1-0.2	Isolated Farm Shed (Area 12)	133 Fitzgerald Rd
SS061	0.1-0.2	Residential Dwelling (Area 6)	133 Fitzgerald Rd

The asbestos type identified included loose fibres of chrysotile and amosite, as well as ACM debris and fibre cement. One sample (TP036 2.1-2.2 m bgl) reported a concentration of asbestos fibres at 0.001%, which does not exceed BRANZ Guidelines. Asbestos was also found in one sample during the ENGEO (2017) investigation, located within the farm track near the residential dwelling at 133 Fitzgerald Road and the concentration reported below the adopted BRANZ guidelines.

Auckland Council Unitary Plan Operative in Part (AUPOP) – Permitted Activity Criteria (Chapter E30)

Twenty-four (24) soil results, all topsoil samples with the exception of three (3) deeper samples from fill material encountered in test pits, exceeded the Permitted Activity Criteria for volcanic soils. These are detailed in Table 8.

Table 8 AUPOP Permitted Activity Criteria Exceedances

Contaminant	Guideline Criteria	Sample Location	Depth (m bgl)	Concentration Reported (mg/kg)	Associated Activity *(References refer to areas as labelled on Figure 2, Appendix A)*	Address
Copper	325 mg/kg	SS050	0.1-0.2 (Topsoil)	630	Milk Shed (Area 11)	133 Fitzgerald Rd
Lead	250 mg/kg	SS030	0.1-0.2 (Topsoil)	250	Residential dwelling (Area 4)	108 Flanagan Rd
		SS061	0.1-0.2 (Topsoil)	440	Residential dwelling (Area 6)	133 Fitzgerald Rd
		TP039	1.6-1.7 (Fill)	300	Waste disposal to land (Area 3)	108 Flanagan Rd
Nickel	105 mg/kg	TP035	2.9-3.0 (Fill)	470	Waste disposal to land (Area 3)	108 Flanagan Rd
Zinc	400 mg/kg	SS003	0.1-0.2 (Topsoil)	2,500	Fertiliser storage building (Area 2)	64 Flanagan Rd
		SS035	0.1-0.2 (Topsoil)	420	Residential dwelling (Area 4)	108 Flanagan Rd
		SS037	0.1-0.2 (Topsoil)	940	Residential dwelling (Area 4)	108 Flanagan Rd

Contaminant	Guideline Criteria	Sample Location	Depth (m bgl)	Concentration Reported (mg/kg)	Associated Activity *(References refer to areas as labelled on Figure 2, Appendix A)*	Address
Zinc	400 mg/kg	SS043	0.1-0.2 (Topsoil)	480	Residential dwelling (Area 5)	120 Flanagan Rd
		SS050	0.1-0.2 (Topsoil)	1,620	Milk Shed (Area 11)	133 Fitzgerald Rd
		SS051	0.1-0.2 (Topsoil)	470	Milk Shed (Area 11)	133 Fitzgerald Rd
		SS058	0.1-0.2 (Topsoil)	900	Residential dwelling (Area 6)	133 Fitzgerald Rd
		SS059	0.1-0.2 (Topsoil)	1,010	Residential dwelling (Area 6)	133 Fitzgerald Rd
		TP037	1.0-1.1 (Fill)	440	Waste disposal to land (Area 3)	108 Flanagan Rd
		TP039	0.1-0.2 (Topsoil)	1,140	Waste disposal to land (Area 3)	108 Flanagan Rd
		TP039	1.6-1.7 (Fill)	1,040	Waste disposal to land (Area 3)	108 Flanagan Rd
		TP040	0.1-0.2 (Topsoil)	460	Waste disposal to land	120 Flanagan Rd

These metal exceedances, of both the NESCS and the AUPOP guidelines, were from surficial soils collected around the residential buildings, the milk shed at 133 Fitzgerald Road and one of the farm buildings at 120 Flanagan Road. Deeper samples from fill material identified at 108 Flanagan Road also exceeded NESCS and AUPOP guidelines. No exceedances were identified for heavy metals at the silage pit, offal pits or farm sheds at 133 Fitzgerald Road.

5.2.3 Background Concentrations

Background concentrations of heavy metals/metalloids in the locality were identified using the *AUPOP, Chapter E30 (Table E30.6.1.4.2)* which is derived from the *Auckland Regional Council (ARC) Technical Publication No. 153 Background Concentrations of Inorganic Elements in Soils from the Auckland Region (ARC 2001).*

Thirty-six (36) of the soil samples analysed exceeded the background criteria, with the following number exceedances reported per analyte:

- Arsenic: Guideline value of 12 mg/kg – 14 exceedances
- Cadmium: Guideline value of 0.65 mg/kg – 12 exceedances
- Chromium: Guideline value of 125 mg/kg – 2 exceedances
- Copper: Guideline value of 90 mg/kg – 3 exceedances
- Lead: Guideline value of 65 mg/kg – 23 exceedances
- Nickel: Guideline value of 320 mg/kg – 1 exceedance
- Zinc: Guideline value of 1,160 mg/kg – 2 exceedances.

The background value for zinc is higher than the AUPOP guideline value, and as such all exceedances apart from at SS003 (2,500 mg/kg) and SS050 (1,620 mg/kg) are understood to be due to the volcanic nature of material encountered.

Four surface soil samples located at 133 Fitzgerald Road, collected as part of the ENGEO (2017) investigation, reported concentrations of cadmium, chromium and lead above background criteria. The cadmium exceedances were marginal.

Total Petroleum Hydrocarbons (TPH) C15-C36 was detected in two samples, TP036_2.5-2.6 (47 mg/kg) and TP039_1.6-1.7 (52 mg/kg).

Polycyclic aromatic hydrocarbons (PAH) compounds were detected in thirteen (13) samples. The total sum of PAH ranged from 0.4 mg/kg (TP036_2.5-2.6) to 62 mg/kg (SS035_0.1-0.2). The detections were reported in samples located around all four residential dwellings, in one sample by the milk shed at 133 Fitzgerald Road, the landfill identified at 108 Flanagan Road, and by one of the farm buildings at 120 Flanagan Road. There were no detections by any of the identified offal pits, the silage pit, or farm buildings at 133 Fitzgerald Road.

5.2.4 Disposal

For comparison with landfill acceptance criteria, the screening criteria in *Module 2 – Hazardous waste guidelines: Landfill waste acceptance criteria and landfill classification* (MfE 2004) were used.

Thirty (30) samples exceeded the Class A Landfill criteria for chromium, copper, lead, nickel and zinc. These exceedance locations are spread across all targeted sample areas, including offal pits. No TCLP testing has been conducted on these samples to date.

Please refer to Table E.2, Appendix E.

6 Conceptual Site Model

6.1 Introduction

The Conceptual Site Model (CSM) outlines the potential source-pathway-receptor linkages that may be present. The CSM for this site has been updated based on the findings from the DSI. The basis for sources, pathways and receptors relevant at the site is outlined below.

6.2 Sources

The intrusive investigation confirmed the presence of a landfill in the north-western corner of 108 Flanagan Road (HAIL G5), with significant quantities of buried anthropogenic material identified such as cement sheeting, metal, steel, wood and pottery.

Surficial soils surrounding the four residential dwellings (108 and 120 Flanagan Road, and 133 Fitzgerald Road) and the milk shed at 133 Fitzgerald Road contain concentrations of heavy metals in exceedance of the applicable national human health criteria. Low concentrations of PAH were also identified across the site.

Based on analytical results and visual observations, contamination is understood to have occurred on the site and have the potential to have an impact on human health from the following focus areas:

- Waste disposal to land (landfill) (HAIL G5) - in the north-western corner of 108 Flanagan Road;
- Asbestos-containing material (HAIL E1) – in the residential dwellings and and associated farm sheds built prior to 2000, located across the site; and
- Fertiliser application – this has occurred across the site and impacted topsoil material.

All other sources discussed in Section 4 have been discounted on the basis of laboratory analysis and site observations not indicating the presence of contamination or a risk to human health.

6.3 Receptors

Receptors include people and the environment (for example surface water ecosystems) that are or may be adversely affected by the identified contaminants. The potential receptors identified in the assessment include:

- Future site users (residential, commercial and potential recreational);
- Maintenance and construction/excavation workers;
- Ecology within multiple streams across the site; and
- Future reserves or ecological habitats.

6.4 Pathways

Pathways for contaminant exposure and offsite migration of contaminants generally include the transport of contaminants via air, solid phase, and water. The potentially complete pathways identified for this assessment include:

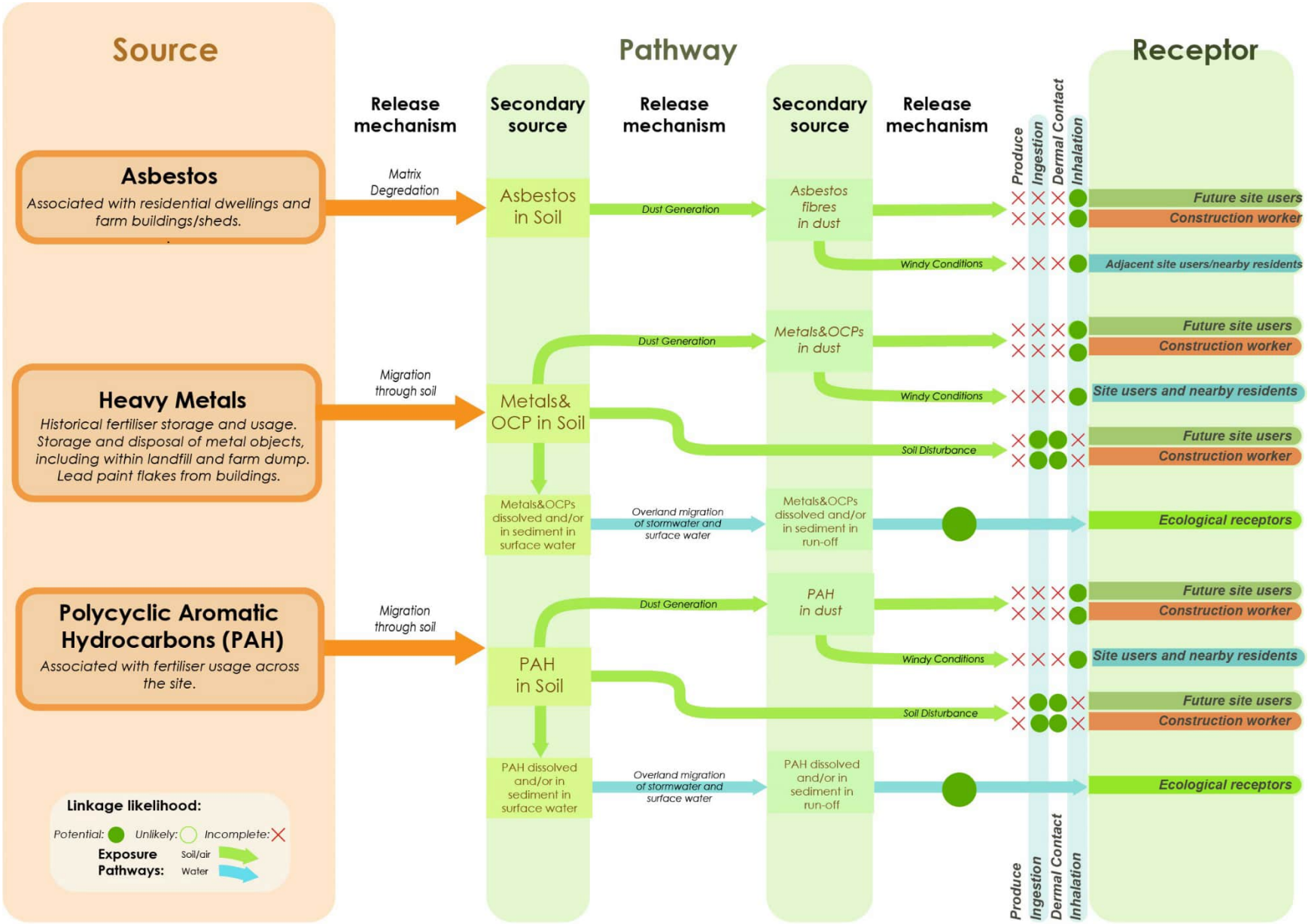
- Direct contact (dermal and ingestion);
- Inhalation of contaminated dust; and
- Migration of contaminants via surface water runoff.

Groundwater is considered separate from surface water, and thus has been discounted as a major pathway.

6.5 Summary

Based on the findings of this investigation, the CSM has been updated and is presented in Figure 1. This model indicates that there are three potentially complete pathways identified that could present a risk to human health: the direct contact and inhalation of contaminated soil dust, or in contaminated surface water runoff, from heavy metals, asbestos and PAH during soil disturbance activities around residential dwellings and farm buildings, posing a risk to future residents, site users, adjacent residents and earth workers. It is not expected that a significant migration pathway to off-site human heath receptors exists for the majority of the site. However, there is the potential for off-site migration of contaminants in leachate from the landfill identified in the north-western corner of the site.

Figure 2 Conceptual Site Model



7 Conclusions and Recommendations

7.1 Conclusions

A targeted investigation approach was undertaken to investigate areas of environmental concern (AECs) identified by the PSI. Some AECs originally identified by the PSI, suspected as areas of potential uncontrolled filling or waste disposal, were discounted following concurrent geotechnical investigations. A summary of specific conclusions and recommendations related to individual AECs based on the findings of investigations completed to date are presented in Table 9.

The site is generally suitable for development, however some localised hotspots will require remediation and additional management. Within Stage 1 area (Refer Figure 6), remediation of impacted soils around the residential dwelling and milk shed at 133 Fitzgerald Road will be required to facilitate residential development.

Contamination exceedances above the applicable human health risk criteria have been reported within the Stage 2 area. However, the need for specific remedial work will require an assessment conducted by a Suitably Qualified and Experienced Practitioner (SQEP) once the Stage 2 Master Plan has been confirmed. In the remainder of the site, the concentrations of contaminants give opportunity for material to be reused on site (in areas of less sensitive land use).

More significant than typical farming practices, our investigations confirm a landfill at 108 Flanagan Road (located within Stage 2), the extent, depth and volume of which cannot be determined, but could cover an area of approximately 1 hectare. Further investigation is required to provide an in-depth assessment into the impacts of this landfill on development and ongoing requirements, the scope of which shall be determined based on intended land use and design proposals.

Topsoil material across the site appears to have been potentially impacted by pastoral land use (i.e. fertiliser usage and storage), based on the concentration of heavy metals reported above background guideline values but below human health guidelines site wide. Based on this, the material cannot be considered as cleanfill. However, the topsoil across the site is generally suitable for re-use within recreational reserves and in areas of commercial development. Further testing of topsoil may identify cleaner areas, and aid better delineation to inform volume calculations and cost estimation.

Noting the confirmation of HAIL activities, and elevated contaminant concentrations in exceedance of NESCS as identified in this investigation, a controlled or restricted discretionary consent under the NES will be required in the event of a subdivision, land use change or earthworks exceeding permitted removal or disturbance volume criteria are exceeded. A resource consent is likely to be required under Chapter E30 of the AUPOP as either a controlled or discretionary activity. Where consents are staged to focus on smaller sections of the site, the requirements may vary.

7.2 Recommendations

The scope of testing to date befits a master planning exercise and demonstrates the general suitability of land for development. It is feasible given the scale of development that outstanding contamination risks can be managed through construction, however further delineation investigations at specific hotspots will be beneficial to inform cost estimation and limit delays associated the implementation of specific management controls on site. Earlier investigations will be beneficial to identify opportunities for sustainable and economic practices.

Specific recommendations regarding identified AECs are provided in Table 9. General recommendations are provided as follows:

- Preparation of Remediation Action Plans (RAPs) will be required to facilitate consent for Stage 1, bulk earthworks of which are expected to commence in Spring 2021. These will be required in addition to Contaminated Site Management Plans (CSMPs) required to ensure safe handling and management of impacted soils to prevent exposure or inadvertent discharges during construction.

- We recommend that remedial works are completed prior to the commencement of bulk earthworks to limit programme delays and reduce the amount of management required on site. Site Validation Reports will be required post completion of remedial works to demonstrate suitability of impacted areas for intended land use.
- While the investigations confirm the presence of localised contamination, further investigation is recommended to delineate the extent of contamination present for the purposes of estimating volumes of impacted soils, to secure more accurate budgeting, and to optimise design and earthworks methodologies. A staged approach to further investigations may be appropriate to manage smaller areas, and to best fit project programme. A scope of delineation testing, if the preferred option, can be completed prior to or included within proposed RAPs.
- A SQEP should be retained to re-assess the risk associated with confirmed contamination in alignment with the building layout to achieve a more sustainable and economic outcome;
- Pre-demolition asbestos surveying of all site buildings is required to be undertaken prior to any demolition or removal activities. The surveying may help inform the potential for additional asbestos in soils at the site. Any asbestos clearance completed as part of demolition activities must include soil validation sampling to demonstrate inadvertent discharge to soils has not occurred; and
- A planning assessment should be conducted by a qualified resource management planner. This would include consideration the relevance of the consenting requirements of the NES, potential requirement for a stormwater consent for the discharge of stormwater during construction phase and from the developed site and other matters. This DSI report can be included with consent applications.

Table 9 Summary of Conclusions and Recommendations for Areas of Environmental Concern

Area of Environmental Concern	Address	Summary of investigations	Ground conditions	Confirmed Contamination	Summary Conclusions	Recommendations	Further investigation required?
1 – Potential Filling (HAIL G5)	64 Flanagan Road	Review of previous investigation results (ENGEO – 4 hand augers)	Topsoil underlain by clayey silt/gravelly silt to 1.6m, and Tauranga Group alluvium	No testing completed however investigations confirm fill to represent reworked natural.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
2 - Fertiliser Storage (HAIL A6)	64 Flanagan Road	Four surface samples collected	Gravel within silt matrix	Yes. Metal background exceedances, and PAH detects. No exceedances above human health. Zinc above Class A Landfill Criteria.	Area is suitable for development and topsoil material suitable for retention on site. However, if surplus to requirements then will require disposal to Class A Landfill, subject to TCLP[1] testing.	Targeted sampling confirms contamination present. Additional testing is required to assess waste disposal requirements. If required for disposal offsite, TCLP[1] testing will be required.	Yes
3 - Potential Filling (HAIL G5)	108 Flanagan Road	Five test pits	Topsoil underlain by waste-bearing fill (metal, steel, potential asbestos, brick, concrete)	Yes. Metal exceedances above human health criteria (lead, arsenic), PAH and asbestos detections. Metals above Class A Landfill Criteria (copper, lead, nickel, zinc).	Landfill has been identified and is filled with industrial waste and anthropogenic material. This material is not suitable for reuse on site. Site specific investigations to be undertaken to confirm feasibility of further developing this area.	Depending on final end use of the site in this area, additional investigation may be required to assess groundwater quality, leachate mobility, generation of ground gas, and impact to off-site sources.	Yes
4 - Potential asbestos in dwelling (HAIL E1)	108 Flanagan Road	Four surface samples collected	Topsoil (Sandy silt)	Yes. No asbestos, but PAH detected and metal exceedances above background (arsenic, cadmium) and Class A Landfill (lead, zinc).	Area is suitable for development and topsoil material suitable for retention on site. However, if surplus to requirements then will require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms contamination from heavy metals is present, but not asbestos. Additional testing is required to assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required. An asbestos survey of the building is also recommended.	Yes
5 - Potential asbestos in dwelling (HAIL E1)	120 Flanagan Road	10 surface samples collected	Topsoil (Sandy silt)	Yes. No asbestos, but PAH detected and metal exceedances above human health high density residential (lead, zinc), background (arsenic, lead, zinc) and Class A Landfill (lead, zinc).	Area is suitable for development; however, the topsoil material is not suitable for retention on site in residential areas due to human health risk. It may be suitable for reuse in areas of commercial or recreational land use. The material may require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms contamination from heavy metals is present but not asbestos. Additional testing is required to assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required. An asbestos survey of the building is also recommended.	Yes
6 - Potential asbestos in dwelling (HAIL E1)	133 Fitzgerald Road	10 surface samples collected	Topsoil (Sandy silt)	Yes. Asbestos and PAH detects, and metal exceedances above human health high density residential	Area is suitable for development; however, the topsoil material is not suitable for retention on site in residential areas due to human health	Targeted sampling confirms contamination present from heavy metals and asbestos. Additional testing is required to further delineate the extent of impacted material, as	Yes

[1] Toxicity Characteristic Leaching Procedure (TCLP); this laboratory analysis is required by landfills prior to accepting soil material containing elevated concentrations of contaminants.

				(arsenic, lead), background (arsenic, cadmium, lead, zinc) and Class A Landfill (lead, zinc).	risk. It may be suitable for reuse in areas of commercial or recreational land use. The material may require disposal to Class A Landfill, subject to TCLP testing.	well as assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required. An asbestos survey of the building is also recommended.	
7 – Possible gully modifications / infilling	68 and 120 Flanagan Road	Review of geotechnical investigation logs (TP31 to TP33)	Topsoil underlain by SAVF.	No. Fill material was reworked natural.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
8 - Isolated sheds / former sheds (possible lead paint)	68 Flanagan	Review of previous results (ENGEO – 1 hand auger)	Fill material, described as silt and clay with minor gravel, underlain by SAVF.	No. Fill material was reworked natural.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
9 - Offal / burn pits (possible shallow soil impact)	120 Flanagan Road and 133 Fitzgerald Road	Two surface samples per pit (6 samples total)	Topsoil (Sandy silt)	Yes. Metal concentrations reported above background (chromium, lead) and Class A Landfill (lead).	Area is suitable for development. Topsoil material can be reused on site as it does not pose a risk to human health or environment. The material is not clean however and may require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms low levels of contamination present. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
10 - Isolated sheds / former sheds (possible lead paint)	120 Flanagan Road	Six surface samples	Topsoil (Sandy silt with minor gravel)	Yes. Asbestos and PAH both detected in one sample. Metal exceedances above human health high density residential (arsenic), background (arsenic) and Class A Landfill (zinc).	Area is suitable for development; however, the topsoil material is not suitable for retention on site in residential areas due to human health risk and presence of asbestos. The material may require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms contamination present from asbestos and heavy metals. Additional testing is required to further delineate the extent of impacted material, as well as assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required.	Yes
11 - Milk shed (possible degraded ACM, lead paint and possible chemical storage) and effluent spreading	133 Fitzgerald Road	Six surface samples	Topsoil (Sandy silt)	Yes. PAH detected. Metal exceedances above human health high density residential (lead, copper), background (arsenic, cadmium, copper, lead, zinc) and Class A Landfill (copper, lead, zinc).	Area is suitable for development; however, the topsoil material is not suitable for retention on site in residential areas due to human health risk. It may be suitable for reuse in areas of commercial or recreational land use. The material may require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms contamination present. Additional testing is required to further delineate the extent of impacted material, as well as assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required.	Yes
12 - Isolated sheds (possible lead paint)	133 Fitzgerald Road	Ten surface samples	Topsoil (Sandy silt)	Yes. Asbestos and PAH detected. Metal exceedances above background (arsenic, cadmium, lead, zinc) and Class A Landfill (lead, zinc)	Area is suitable for development; however, the topsoil material is not suitable for retention on site in residential areas due to human health risk and presence of asbestos. The topsoil material will require disposal to Class A Landfill, subject to TCLP testing.	Targeted sampling confirms contamination present. Additional testing is required to further delineate the extent of impacted material, as well as assess waste disposal requirements. If required for disposal offsite, TCLP testing will be required.	Yes
13 - Stream modification along western site boundary	133 Fitzgerald Road	Review of geotechnical investigation logs	Topsoil underlain by SAVF.	No. Fill material not encountered.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering	No

		(TP11-12, TP15, TP22)				suitability, suggest confirmation testing prior to construction.	
14 - Modification of depression along southern boundary	133 Fitzgerald Road	Review of geotechnical investigation logs (BH001)	Topsoil underlain by SAVF.	No. Fill material not encountered.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
15 - Silage pit (possible leaching of degrading vegetation into shallow soil)	133 Fitzgerald Road	Four surface samples	Topsoil (Sandy silt)	No. Metal exceedances of Class A Landfill (chromium).	Topsoil material can be considered cleanfill as it does not pose a risk to human health. Restrictions may be put in place for waste disposal. The topsoil material will require disposal to Class A Landfill, subject to TCLP testing.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction. If required for disposal offsite, TCLP testing will be required.	No
16 - Possible demolition material used within Farm Track (only if ACM is observed)	133 Fitzgerald Road	Visual inspection and previous result review (ENGEO – 8 surface soil samples)	-	Yes. Asbestos detected in one sample, taken near the dwelling. None identified during site walkover.	Farm track may include buried waste material that contains potential asbestos material.	Conditions to be included in CSMP[2] to define process if unexpected contamination is encountered.	No
17 – Topographical modification of depression	97 Brookfield Road	Review of geotechnical investigation logs (TP09, TP10)	Topsoil underlain by SAVF.	No. Fill material not encountered.	Fill material did not include anthropogenic material, and not anticipated to present risk to human health.	This can be discounted as an area of concern. If fill material is proposed to be retained on site, subject to engineering suitability, suggest confirmation testing prior to construction.	No
General widespread pastoral use and possible fertiliser application (not numbered)	Entire site	Samples across the site analysed for contaminants of concern (i.e. metals)	Topsoil (Sandy silt)	Yes. Large number of samples reported metal concentrations above background criteria, particularly arsenic, cadmium and lead.	Topsoil material cannot be considered cleanfill unless delineation testing is conducted around the areas of concern, specifically those with identified risks to human health.	Further testing of topsoil within the paddocks, as well as delineation testing around identified contamination hotspots, should be conducted, including leachate/contaminant mobility – this will impact waste disposal and soil movements if material is retained on site.	Yes

[2] Contaminant Site Management Plan (CSMP)

8 Reference List

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Appendix A
Figures

64 FLANAGAN ROAD

108 FLANAGAN ROAD DRURY AUCKLAND 2113

68 FLANAGAN ROAD DRURY AUCKLAND 2113

108 FLANAGAN ROAD DRURY AUCKLAND 2113

120 FLANAGAN ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

133 FITZGERALD ROAD DRURY AUCKLAND 2113

97 BROOKFIELD ROAD DRURY AUCKLAND 2577

SOURCE: ESRI, MAXAR, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY, SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

LEGEND

- Lot Boundaries
- Site Boundary

NOTES:
AREAS AND SAMPLE LOCATIONS ARE APPROXIMATE.

aurecon

CLIENT

Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	04.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	SIZE
1:1,715	A3

DRAWN: S. ENSOLL
DESIGNED: S. HOWELL
CHECKED: R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION

DATE *10.02.21*

W. NEL

PROJECT: DRURY PRECINCT

TITLE: SITE LAYOUT

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611 -	0002 -	DRG -	KF -	0001 -	A

NOTES
AREAS ARE APPROXIMATE.
NUMBERS REFER TO TABLE 6
IN DETAILED SITE INV. REPORT
(510611-0000-REP-KF-0002)

LEGEND

- SITE BOUNDARY

HAIL ACTIVITIES
- FERTILISER STORAGE (HAIL A6)
- FILLING (HAIL G5)
- POTENTIAL ACM (E1)
- POTENTIAL FILLING (G5)

ADDITIONAL AREAS OF CONCERN
- EFFLUENT SPRAY
- FARM TRACK
- FILLING / MODIFICATION
- ISOLATED FARM SHED
- MILKING SHED
- OFFAL PIT
- SILAGE PIT

CONTAM GI
- CONTAM TP
- CONTAM SS

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CLIENT: Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	08.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	SIZE
1:1,715	A3

DRAWN: S. ENSOLL
DESIGNED: S. HOWELL
CHECKED: R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION

DATE
18.02.21

W. NEL

120 60 0 120 240 Meters

PROJECT	DRURY PRECINCT
TITLE	PROPOSED DETAILED SITE INVESTIGATION SAMPLE LOCATIONS

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611 -	00002 -	DRG -	KF -	0002 -	A

NOTES:
AREAS AND SAMPLE LOCATIONS ARE APPROXIMATE.

LEGEND

Metal Exceeding AUP P.A.

- Not Analysed
- No
- Yes
- Lot Boundaries
- Site Boundary

aurecon

CLIENT: Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	04.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	1:1,715
SIZE	A3
DRAWN	S. ENSOLL
DESIGNED	S. HOWELL
CHECKED	R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION

DATE 10.02.21

W. NEL

PROJECT	DRURY PRECINCT
TITLE	SOIL SAMPLE ANALYTICAL RESULTS: HEAVY METAL EXCEEDANCES OF AUPOP PERMITTED ACTIVITY CRITERIA

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611 -	0002 -	DRG -	KF -	0003 -	A

NOTES:
AREAS AND SAMPLE LOCATIONS ARE APPROXIMATE.

LEGEND

PAH Detected
- Not Analysed
- No
- Yes
- Lot Boundaries
- Site Boundary

aurecon

CLIENT: Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	04.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	SIZE
1:1,715	A3

DRAWN: S. ENSOLL
DESIGNED: S. HOWELL
CHECKED: R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION
DATE 04.02.21
W. NEL

PROJECT: DRURY PRECINCT

TITLE: SOIL SAMPLE ANALYTICAL RESULTS: POLYCYCLIC AROMATIC HYDROCARBON (PAH) DETECTIONS

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611	0002	DRG	KF	0004	A

NOTES:
AREAS AND SAMPLE LOCATIONS ARE APPROXIMATE.

LEGEND

Asbestos Detected
- Not Analysed
- No
- Yes

Lot Boundaries

Site Boundary

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CLIENT: Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	04.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	1:1,715
SIZE	A3
DRAWN	S. ENSOLL
DESIGNED	S. HOWELL
CHECKED	R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION

DATE 10.02.21

W. NEL

PROJECT	DRURY PRECINCT
TITLE	SOIL SAMPLE ANALYTICAL RESULTS ASBESTOS DETECTIONS

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611 -	0002 -	DRG -	KF -	0005 -	A

NOTES
AREAS ARE APPROXIMATE.
NUMBERS REFER TO TABLE 6
IN DETAILED SITE INV. REPORT
(510611-0000-REP-KF-0002)

LEGEND

- SITE BOUNDARY
- LOT BOUNDARIES

HAIL ACTIVITIES

- FERTILISER STORAGE (HAIL A6)
- POTENTIAL ACM (E1)
- WASTE DISPOSAL TO LAND (G5)

ADDITIONAL AREAS OF CONCERN

- EFFLUENT SPRAY
- ISOLATED FARM SHED
- MILKING SHED

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CLIENT: Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	08.02.2021	FOR ISSUE WITH DETAILED SITE INVESTIGATION REPORT 510611_0000_REP_KF_0002	

SCALE	1:1,715
SIZE	A3
DRAWN	S. ENSOLL
DESIGNED	S. HOWELL
CHECKED	R. GRIFFITHS

PRELIMINARY
NOT FOR CONSTRUCTION

DATE 19.02.21

W. NEL

120 60 0 120 240 Meters

PROJECT	DRURY PRECINCT
TITLE	AREAS OF ENVIRONMENTAL CONCERN

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUM	REV
	510611 -	00002 -	DRG -	KF -	0006 -	A

AREA SCHEDULE

LARGE FORMAT RETAIL - PHASE 1

M09 - L00	10200m²
M10 - L00	6400m²
M11 - L00	5000m²
M13A - L00	1650m²
M13B - L00	375m²
M13C - L00	375m²
Total	**24,000m²**

Client

Kiwi Property

Consultants

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IGNITE

Rev	Description	By	Date

FAST TRACK CONSENT 2022

Drawing Title
PLAN - GROUND FLOOR LEVEL - WITH REFS

RC - 300 PROPOSED PLANS

PROJECT NAME
DRURY METROPOLITAN CENTRE DEVELOPMENT - STAGE 01

Project Number.
0460-119

Original Size. A3 Scale. 1 : 2500

Drawing Number. RC 336

Revision.

Appendix B
Site Photographs

Site Investigation Photographs

Photograph 1 Flanagan Road, looking north.

Photograph 2 Residential dwelling at 64 Flanagan Road.

Photograph 3 Storage buildings at 64 Flanagan Road.

Photograph 4 Looking south-east over 64 Flanagan Road..

Photograph 5 Unnamed stream at 68 Flanagan Road, looking north.

Photograph 6 68 Flanagan Road, looking north-east.

Photograph 7 68 Flanagan Road, showing cattle pens and workshop, looking east.

Photograph 8 108 Flanagan Road, looking west towards SH1. Photo shows older residential dwelling.

Photograph 9 108 Flanagan Road, showing both residential dwelling, looking north.

Photograph 10 108 Flanagan Road, northern most dwelling, looking west.

Photograph 11 108 Flanagan Road, looking south-east. On the left side is the area where the forest was historically cleared (potential HAIL G5).

Photograph 12 120 Flanagan Road, driveway and front garden, looking north.

Photograph 13 120 Flanagan Road, looking north across paddocks and 68 Flanagan Road.

Photograph 14 120 Flanagan Road, looking south over the original driveway/entrance.

Photograph 15 120 Flanagan Road, looking south. Offal pit visible in the top right corner, and unnamed stream in the middle.

Photograph 16 120 Flanagan Road, looking north-east.

Photograph 17 133 Fitzgerald Road, taken from south-east corner looking north-west. In view are three sheds and the residential dwelling.

Photograph 18 Residential dwelling at 133 Fitzgerald Road.

Photograph 19 Bull shed within 133 Fitzgerald Road, behind residential dwelling.

Photograph 20 Inside a small workshop at 133 Fitzgerald Road.

Photograph 21 Tin / wood shed at 133 Fitzgerald Road.

Photograph 22 Inside the shed shown in Photograph 21, at 133 Fitzgerald Road.

Photograph 23 Looking east towards residential dwelling and associated sheds at 133 Fitzgerald Road.

Photograph 24 Implement (hay) shed at 133 Fitzgerald Road.

Photograph 25 Milking shed at 133 Fitzgerald Road.

Photograph 26 Milking shed at 133 Fitzgerald Road, showing the two sumps/wells where runoff is stored.

Photograph 27 Burn pit north of the milk shed at 133 Fitzgerald Road.

Photograph 28 Bore pump located at 133 Fitzgerald Road.

Photograph 29 133 Fitzgerald Road, at the silage pit looking east.

Photograph 30 Western wall of silage pit at 133 Fitzgerald Road.

Photograph 31 Suspected offal pit / burn pit at highest point of 133 Fitzgerald Road, in south-western portion.

Photograph 32 Looking east, up the hill from Hingaia Stream at 133 Fitzgerald Road. In view are two electric pylons that run through the western portion of the site.

Photograph 33 Hingaia Stream, looking north – taken from 133 Fitzgerald Road.

Photograph 34 Example of steep hills located along the western portion of the site, taken at 133 Fitzgerald Road.

Photograph 35 Offal pit located in the north-western corner of 133 Fitzgerald Road.

Photograph 36 133 Fitzgerald Road, looking south-east.

Photograph 37 Collapsed/taken down tin shed at 133 Fitzgerald Road, looking north.

Photograph 38 97 Brookfield Road, looking north.

Photograph 39 Service Location conducted at TP037.

Photograph 40 Landfill identified at 108 Flanagan Road, looking east. Landfil bound to south and east by steep cliff.

Photograph 41 Example of surface sample collection, photo taken at 133 Fitzgerald Road.

Photograph 42 Waste material encountered at TP036.

Photograph 43 TP036, excavated and backfilled.

Photograph 44 TP040, excavated and backfilled.

Appendix C
Field Logs

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Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **108 Flanagan Road**
Project Reference: **510611**

TP035

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION		
Excavated by:	Land Clearing Solutions	Easting:	317732.01m	Width: m		Logged by: SE/NB
Excavator type:	12t excavator	Northing:	5891116m	Length: m	A / D / B / C (Deg)	Input by: SE
Date started:	14/01/2021	Ground level:	N/A			Checked by: SH
Date completed:	14/01/2021					Verified by: RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		Fc	**0m:** SILT with some clay and trace fine sand; dark brown. Very stiff, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	
1		FR	**0.4m:** Fine sandy SILT with trace gravels; orange-brown. Very stiff, dry, low plasticity. Waste bearing; potential asbestos-containing material, brick, metal pipe, glass, plastic.	0.5m to 0.6m: ES	**0.4m: FILL**	1
			1.2m: SILT with minor clay, brown-black. Very stiff, dry, moderate plasticity. Waste bearing; potential asbestos-containing material, brick, metal pipe, glass, plastic.			
			1.5m: Silty SAND; bluish-black. Very stiff, dry, low plasticity. Waste bearing; potential asbestos-containing material, brick, metal/steel, glass, plastic, concrete.			
2			**1.7m:** Silty SAND; black. Very stiff, dry, low plasticity. Waste bearing; potential asbestos-containing material, brick, metal/steel, glass, plastic, concrete.	1.8m to 1.9m: ES		2
3				2.9m to 3m: ES		3
4			Terminated at 3m (Refusal)			

Draft

REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to excavator restrictions and waste encountered.
6. Location backfilled upon completion.
7. Groundwater not encountered.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

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Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **108 Flanagan Road**
Project Reference: **510611**

TP036

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION		
Excavated by:	Land Clearing Solutions	Easting:	317734.11m	Width: m		Logged by: SE/NB
Excavator type:	12t excavator	Northing:	5891167.99m	Length: m	A D B C (Deg)	Input by: SE
Date started:	14/01/2021	Ground level:	N/A			Checked by: SH
Date completed:	14/01/2021					Verified by: RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
			0m: SILT with some clay and trace fine sand; dark brown. Very stiff, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	
		Fc	**0.2m:** Fine sandy silty GRAVEL with trace cobbles; brown. Well compacted, dry, no plasticity. Gravel, fine to medium subangular basalt and greywacke. Cobbles, fine subangular greywacke.		**0.2m: FILL**	
			0.5m to 0.7m:.....change in matrix colour to orange-brown. No cobbles.	0.5m to 0.6m: ES		
1			**0.7m:** Fine sandy SILT with minor gravels; brown. Stiff, dry, low plasticity. Gravel, fine to medium subangular basalt and greywacke. Minor organics (wood plank). Waste bearing; metal, bricks, glass.			1
			1m: Clayey SILT with minor fine sand and trace gravels; brownish-grey. Stiff, moist, high plasticity. Gravel, fine to medium subangular basalt and greywacke. Waste bearing; potential asbestos-containing material, brick, metal, glass, plastic, concrete, rubber, wooden planks.			
2		FR	**1.4m:** Clayey SILT with minor gravels; black. Stiff, wet, high plasticity. Gravel, fine to medium subangular basalt and greywacke. Waste bearing; brick, rubber, glass bottles and broken fragments, metal cog and bent pieces, wires.			2
			2.2m to 3.5m:.....becomes saturated.	2.1m to 2.2m: ES		
3				2.5m to 2.6m: ES		3
4			Terminated at 3.5m (Refusal)			

Draft

REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to groundwater level and excavator restrictions.
6. Location backfilled upon completion.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 14/01/21 00:00 | m | 2.1 m bgl

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

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Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **108 Flanagan Road**
Project Reference: **510611**

TP037

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION		
Excavated by:	Land Clearing Solutions	Easting:	317782.53m	Width: m		Logged by: SE/NB
Excavator type:	12t excavator	Northing:	5891141.29m	Length: m	A D B C (Deg)	Input by: SE
Date started:	14/01/2021	Ground level:	N/A			Checked by: SH
Date completed:	14/01/2021					Verified by: RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		Fc	**0m:** SILT with some clay and trace fine sand; dark brown. Very stiff, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	
			0.2m: Fine sandy SILT with trace fine gravels; red-brown with white speckles. Stiff, moist, low plasticity.		**0.2m: FILL**	
			0.3m: Fine sandy SILT with minor gravels; orange-brown with grey mottling. Gravel, fine to medium subangular basalt. Minor waste bearing; potential asbestos-containing material.			
			0.5m: Fine sandy SILT; dark brown. Stiff, moist, low plasticity. Waste bearing; potential asbestos-containing material, metal, wood.	0.5m to 0.6m: ES		
			0.7m: Fine sandy SILT; brown-black. Stiff, wet, low plasticity. electrical wires, steel, concrete, bricks, wooden branches, terracotta pipes, metal sheeting.			
1		FR		1m to 1.1m: ES		1
			1.5m to 2m:.....becomes saturated.			
2						2
			Terminated at 2m (Refusal)			
3						
4						

Draft

REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to groundwater level and excavator restrictions.
6. Location backfilled upon completion.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 14/01/21 00:00 | m | 1.5 m bgl

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

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PO Box 9762, Newmarket
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Tel: +64 9 520 6019
www.aurecongroup.com

Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **108 Flanagan Road**
Project Reference: **510611**

TP039

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION		
Excavated by:	Land Clearing Solutions	Easting:	317779.98m	Width: m		Logged by: SE/NB
Excavator type:	12t excavator	Northing:	5891089.75m	Length: m	A D B C (Deg)	Input by: SE
Date started:	14/01/2021	Ground level:	N/A			Checked by: SH
Date completed:	14/01/2021					Verified by: RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0		Fc	**0m:** SILT with some clay and trace fine sand; dark brown. Very stiff, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	0
		Fc	**0.2m:** Fine sandy SILT with minor gravels; orange-brown. Stiff, dry, low plasticity. Gravel, fine to medium subangular basalt and greywacke.		**0.2m: FILL**	
1		Fc	**0.6m:** SAND; brown. Loosely packed, dry, fine to medium grained, poorly graded.			1
		FR	**1m:** Fine sandy SILT; dark brown. Stiff, dry, low plasticity. Waste bearing; glass, plastic, potential asbestos-containing material, steel sheeting, metal, terracotta pipes, wooden planks, concrete.	1m to 1.1m: ES		
		FR	**1.6m to 2.8m:**.....increase in waste material.	1.6m to 1.7m: ES		
2		FR	**2.5m to 2.8m:**.....large concrete pieces, >60cm wide, 10cm thick.			2
		FR	**2.8m:** SILT with organics; black. Stiff, moist, no plasticity. Waste bearing; glass, plastic, potential asbestos-containing material, steel sheeting, metal, wooden planks.			
3		FR	**2.9m to 3m:**.....western corner, isolated pocket of blue silty sand. Loose, moist, fine grained.	2.9m to 3m: ES		3
			Terminated at 3m (Refusal)			
4						

Draft

REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to groundwater level and excavator restrictions.
6. Location backfilled upon completion.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 14/01/21 00:00 | m | 3.0 m bgl

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

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Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **120 Flanagan Road**
Project Reference: **510611**

TP040

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION		
Excavated by:	Land Clearing Solutions	Easting:	317945.27m	Width: m		Logged by: SE/NB
Excavator type:	12t excavator	Northing:	5890909.27m	Length: m	A D B C (Deg)	Input by: SE
Date started:	15/01/2021	Ground level:	N/A			Checked by: SH
Date completed:	15/01/2021					Verified by: RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		Fc	**0m:** SILT with some clay and trace fine sand; dark brown. Very stiff, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	
1		FR	**0.3m:** Clayey SILT with trace fine sand and gravels, orangish-brown. Firm, moist, moderate plasticity. Waste bearing; glass bottles (medicine), ceramic fragments, plastic, metal horseshoe and wires, metal/steel fragments.	0.8m to 0.9m: ES	**0.3m: FILL**	1
2		VRt	**1.2m:** Clayey SILT with trace fine sand and gravels, dark brown-black. Firm, moist, moderate plasticity. Waste bearing; glass bottles (medicine), ceramic fragments, plastic, metal horseshoe and wires, metal/steel fragments. **1.9m:** Clayey SILT with minor gravel, brown with orange mottling. Stiff, wet, moderate plasticity. Gravel, fine to medium subangular, extremely weathered basalt with rings where completely weathered. Terminated at 2m (Refusal)	1.9m to 2m: ES	**1.9m: SOUTH AUCKLAND VOLCANIC FIELD**	2
3						
4						

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REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to groundwater level and excavator restrictions.
6. Location backfilled upon completion.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 15/01/21 00:00 | m | 1.7 m bgl

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

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Client: **Kiwi Properties Ltd**
Project: **Drury Development - Detailed Site Investigation**
Location: **108 Flanagan Road**
Project Reference: **510611**

TP041

Sheet **1** of **1**

TRIAL PIT INFORMATION		CO-ORDINATES: N/A		DIMENSIONS AND ORIENTATION			
Excavated by:	Land Clearing Solutions	Easting:	317763.6m	Width: m		Logged by:	SE/NB
Excavator type:	12t excavator	Northing:	5891173.59m	Length: m	A D B C (Deg)	Input by:	SE
Date started:	14/01/2021	Ground level:	N/A			Checked by:	SH
Date completed:	14/01/2021					Verified by:	RG

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		Fc	**0m:** SILT with some clay and trace fine sand; dark brown. Firm, dry, non-plastic; some organics. [TOPSOIL]	0.1m to 0.2m: ES	**0m: TOPSOIL**	
1		FR	**0.2m:** Clayey SILT with trace fine sand, orangish-brown. Stiff, moist, moderate plasticity. Waste bearing; potential asbestos-containing material, metal, bricks, glass.	1m to 1.1m: ES	**0.2m: FILL**	1
2			**2.1m:** Clayey SILT with trace fine sand, orangish-brown. Stiff, wet, moderate plasticity. Waste bearing; potential asbestos-containing material, metal, steel, wooden planks.	2.6m to 2.7m: ES		2
3			Terminated at 2.7m (Refusal)			
4						

Draft

REMARKS:
1. Refer to site location plan for test pit locations.
2. Logged in general accordance with NZGS Guidelines for Field Description of Soil and Rock (2005).
3. Soil strength and consistency descriptions are inferred from logging observations.
4. Visual and olfactory evidence of contamination noted in the log.
5. Refusal due to groundwater level and excavator restrictions.
6. Location backfilled upon completion.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 14/01/21 00:00 | m | 2.2 m bgl

Database File: TAMAKI GIRLS COLLEGE 2020 GI.GPJ **Library file:** AURECON_AKL_20210114.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON TP LOG 1.0 **Date Generated:** 10/02/2021

Appendix D
Log Photographs

Test Pit Photographs

Photograph 1: TP035

Photograph 2: TP035

Photograph 3: TP035

Photograph 4: TP036

Photograph 5: TP036

Photograph 6: TP036

Photograph 7: TP036

Photograph 8: TP037

Photograph 9: TP037

Photograph 10: TP039

Photograph 11: TP039

Photograph 9: TP040

Photograph 10: TP040

Photograph 11: TP041

Photograph 12: TP041

Appendix E
Laboratory Result Tables

Table E.1
Sample Regime

Sample ID	Depth (m)	Date	Analysis Requested								
			Asbestos Semi-Quant	Heavy Metals	TPH	PAH	BTEX	Ammonia + Cyanide	SVOC	VOC	Hold Cold
TP035_1	0.1 - 0.2	14/01/2021	X	X	X	X					
TP036_1	0.1 - 0.2	14/01/2021	X	X	X	X					
TP037_1	0.1 - 0.2	14/01/2021	X	X	X	X					
TP039_1	0.1 - 0.2	14/01/2021	X	X	X	X					
TP040_1	0.1 - 0.2	15/01/2021	X	X	X	X					
TP041_1	0.1 - 0.2	14/01/2021	X	X	X	X					
TP035_2	0.5 - 0.6	14/01/2021									X
TP036_2	0.5 - 0.6	14/01/2021									X
TP037_2	0.5 - 0.6	14/01/2021									X
TP039_2	1.0 - 1.1	14/01/2021									X
TP040_2	0.8 - 0.9	15/01/2021									X
TP041_2	1.0 - 1.1	14/01/2021									X
TP035_3	1.8 - 1.9	14/01/2021	X	X	X	X				X	
TP036_3	2.1 - 2.2	14/01/2021	X	X	X	X				X	
TP037_3	1.0 - 1.1	14/01/2021	X	X	X	X				X	
TP039_3	1.6 - 1.7	14/01/2021	X	X	X	X				X	
TP040_3	1.9 - 2.0	15/01/2021	X	X	X	X				X	
TP041_3	2.6 - 2.7	14/01/2021	X	X	X	X				X	
TP035_4	2.9 - 3.0	14/01/2021		X					X		
TP036_4	2.5 - 2.6	14/01/2021		X	X	X	X				
TP039_4	2.9 - 3.0	14/01/2021		X	X		X	X	X		
SS001	0.1-0.2	15/01/2021		X		X					
SS002	0.1-0.2	15/01/2021									X
SS003	0.1-0.2	15/01/2021		X		X					
SS004	0.1-0.2	15/01/2021									X
SS005	0.1-0.2	13/01/2021	X	X		X					
SS006	0.1-0.2	13/01/2021									X
SS007	0.1-0.2	13/01/2021									X
SS008	0.1-0.2	13/01/2021	X	X		X					
SS009	0.1-0.2	13/01/2021	X	X		X					
SS010	0.1-0.2	13/01/2021									X
SS011	0.1-0.2	15/01/2021									X
SS012	0.1-0.2	15/01/2021	X	X		X					
SS013	0.1-0.2	15/01/2021	X	X		X					
SS014	0.1-0.2	15/01/2021									X
SS015	0.1-0.2	15/01/2021									X
SS016	0.1-0.2	15/01/2021	X	X		X					
SS017	0.1-0.2	13/01/2021	X	X		X					
SS018	0.1-0.2	13/01/2021									X
SS019	0.1-0.2	13/01/2021	X	X		X					
SS020	0.1-0.2	13/01/2021									X
SS021	0.1-0.2	13/01/2021		X		X					
SS022	0.1-0.2	13/01/2021									X
SS023	0.1-0.2	13/01/2021		X		X					
SS024	0.1-0.2	13/01/2021									X
SS025	0.1-0.2	15/01/2021		X		X					
SS026	0.1-0.2	15/01/2021									X
SS027	0.1-0.2	15/01/2021									X
SS028	0.1-0.2	15/01/2021	X	X		X					
SS029	0.1-0.2	15/01/2021									X
SS030	0.1-0.2	15/01/2021	X	X		X					
SS031	0.1-0.2	13/01/2021									X
SS032	0.1-0.2	13/01/2021		X							
SS033	0.1-0.2	13/01/2021									X
SS034	0.1-0.2	13/01/2021		X							
SS035	0.1-0.2	15/01/2021	X	X		X					
SS036	0.1-0.2	15/01/2021									X
SS037	0.1-0.2	15/01/2021	X	X		X					
SS038	0.1-0.2	15/01/2021									X
SS039	0.1-0.2	15/01/2021									X
SS040	0.1-0.2	15/01/2021	X	X		X					
SS041	0.1-0.2	15/01/2021									X
SS042	0.1-0.2	15/01/2021									X
SS043	0.1-0.2	18/01/2021	X	X		X					
SS044	0.1-0.2	18/01/2021									X
SS045	0.1-0.2	18/01/2021	X	X		X					
SS046	0.1-0.2	18/01/2021	X	X		X					
SS047	0.1-0.2	18/01/2021									X
SS048	0.1-0.2	18/01/2021									X
SS049	0.1-0.2	13/01/2021									X
SS050	0.1-0.2	13/01/2021	X	X		X					
SS051	0.1-0.2	15/01/2021	X	X		X					
SS052	0.1-0.2	15/01/2021									X
SS053	0.1-0.2	15/01/2021	X	X		X					
SS054	0.1-0.2	15/01/2021	X	X		X					
SS055	0.1-0.2	13/01/2021	X	X	3	X					
SS056	0.1-0.2	13/01/2021									X
SS057	0.1-0.2	13/01/2021									X
SS058	0.1-0.2	13/01/2021	X	X		X					
SS059	0.1-0.2	13/01/2021	X	X		X					
SS060	0.1-0.2	13/01/2021									X
SS061	0.1-0.2	13/01/2021	X	X		X					
SS062	0.1-0.2	13/01/2021									X
SS063	0.1-0.2	13/01/2021	X	X		X					
SS064	0.1-0.2	13/01/2021									X

Project: Drury Precinct DSI
Ref: 510611

Table E.2
Environmental Soil Results

	Metals							TPH				PAH											
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Nickel	Zinc	C7-C9	C10-C14	C15-C36	C7-C36	PAHs (Sum of total)	Benzo(a)pyrene	Perylene	1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.	*12*	*0.65*	125[#1]	*90*	65[#2]	*320*	*1,160*																
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.	100	7.5	400[#3]	325	250	105	400														20[#4]		
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A	100	20	100[#6]	100	100	200	200														300		
Module 4, Tier 1 Residential (SANDY SILT)								500 | 500 | 3,800[#13#13#14]	510 | 670 | 1,000[#15#15#16]														
0-1m								500[#13]	510[#15]														
1-4m								500[#13]	670[#15]														
>=4m								3,800[#14]	1,000[#14]														
NESCS - High density residential	45	230[#18]	1,500[#19]	10,000[#20]	500[#21]																		
NESCS - Commercial / Industrial	70	1,300[#18]	6,300[#19]	10,000[#20]	3,300[#21]																		

Lab Report Number	Field ID	Date																					
2509315_2	SS001 0.1-0.2	15/01/2021	*16*	*2.0*	35	44	14.4	56	280					<0.3	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
2509315_2	SS003 0.1-0.2	15/01/2021	*17*	2.2	32	37	*86*	50	*2,500*					<0.4	0.016	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.015	0.018	0.016	<0.013
2509315_2	SS005 0.1-0.2	13/01/2021	6	<0.10	16	5	29	5	19					<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
2509315_2	SS008 0.1-0.2	13/01/2021	*47*	0.38	47	45	29	9	220					<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	0.012	<0.012	<0.012
2509315_2	SS009 0.1-0.2	13/01/2021	9	0.60	21	29	27	10	171					<0.4	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2509315_2	SS012 0.1-0.2	20/01/2021	*7*	*0.81*	19	15	40	8	210					<0.3	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	SS013 0.1-0.2	15/01/2021	11	*0.81*	26	20	*66*	9	98					<0.4	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	SS016 0.1-0.2	15/01/2021	11	0.39	23	25	*100*	8	96					<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	SS017 0.1-0.2	13/01/2021	9	0.52	20	21	*126*	9	129					2.7	0.21	0.067	<0.013	<0.013	<0.013	0.071	0.051	0.21	0.29	0.22	0.129
2509315_2	SS019 0.1-0.2	13/01/2021	*19*	0.51	23	26	26	8	121					<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	SS021 0.1-0.2	13/01/2021	6	0.24	*146*	39	18.4	37	75					<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
2509315_2	SS023 0.1-0.2	13/01/2021	8	0.23	77	24	*128*	20	129					<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	SS025 0.1-0.2	20/01/2021	8	0.18	21	23	19.3	26	87					<0.3	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
2509315_2	SS028 0.1-0.2	15/01/2021	*16*	0.51	22	24	48	15	130					<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
2509315_2	SS030 0.1-0.2	15/01/2021	*33*	0.53	33	90	*250*	12	260					<0.4	0.016	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.017	0.019	<0.013	<0.013
2509315_2	SS032 0.1-0.2	13/01/2021	11	0.48	97	33	12.3	19	156																
2509315_2	SS034 0.1-0.2	13/01/2021	3	0.57	115	36	10.0	30	131																
2509315_2	SS035 0.1-0.2	15/01/2021	10	0.46	43	45	*650*	12	420					62	3.9	1.49	0.018	0.026	0.022	0.57	0.72	4.9	6.2	4.6	2.5
2509315_2	SS037 0.1-0.2	15/01/2021	*19*	*1.0*	25	48	*1,410*	17	940					3.3	0.21	0.069	<0.016	<0.016	<0.016	0.032	0.041	0.25	0.31	0.23	0.126
2509315_2	SS040 0.1-0.2	15/01/2021	12	0.23	15	18	24	9	250					0.6	0.038	0.012	<0.012	<0.012	<0.012	<0.012	0.014	0.050	0.061	0.046	0.024
2509315_2	SS043 0.1-0.2	18/01/2021	11	0.54	30	28	*4,200*	14	480					20	1.37	0.49	<0.012	<0.012	<0.012	0.22	0.194	1.48	2.0	1.61	0.86
2509315_2	SS045 0.1-0.2	18/01/2021	*38*	0.62	29	51	*118*	10	141					0.4	0.032	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.033	0.047	0.038	0.018
2509315_2	SS046 0.1-0.2	18/01/2021	10	0.28	16	14	*68*	8	102					0.5	0.039	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.041	0.055	0.040	0.022
2509315_2	SS050 0.1-0.2	13/01/2021	*14*	*2.1*	26	*630*	*870*	14	*1,620*					<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
2509315_2	SS051 0.1-0.2	15/01/2021	10	*0.7*	20	33	*71*	11	470					<0.3	0.014	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.023	0.021	0.016	<0.013
2509315_2	SS053 0.1-0.2	15/01/2021	11	0.44	21	29	40	9	199					<0.3	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	SS054 0.1-0.2	15/01/2021	11	0.51	22	24	*72*	9	151					<0.3	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	SS055 0.1-0.2	13/01/2021	*14*	0.46	23	27	*91*	20	340					<0.3	0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.019	0.019	0.013	<0.013
2509315_2	SS058 0.1-0.2	13/01/2021	*18*	*1.04*	36	43	*1,890*	14	900					1.3	0.051	<0.013	<0.013	<0.013	<0.013	<0.013	0.046	0.075	0.049	0.045	0.026
2509315_2	SS059 0.1-0.2	13/01/2021	9	0.63	24	52	*1,950*	9	1,010					<0.3	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	SS061 0.1-0.2	13/01/2021	*54*	0.42	36	59	*440*	10	290					<0.4	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2509315_2	SS063 0.1-0.2	13/01/2021	7	0.28	26	11	*700*	6	210					<0.3	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
2509315_2	TP035_1 0.1-0.2	14/01/2021	5	0.38	20	21	25	19	81	<8	<20	<40	<70	0.5	0.031	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	0.036	0.046	0.035	0.018
2509315_2	TP035_3 1.8-1.9	14/01/2021	3	0.23	14	20	45	14	81	<8	<20	<40	<70	<0.3	0.018	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.023	0.028	0.021	<0.013
2509315_2	TP035_4 2.9-3.0	14/01/2021	11	0.19	18	*173*	*172*	*470*	78									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2509315_2	TP036_1 0.1-.02	14/01/2021	4	0.32	20	14	21	12	70	<8	<20	<40	<70	<0.3	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
2509315_2	TP036_3 2.1-2.2	14/01/2021	9	*3.7*	22	46	63	26	131	<9	<20	<40	<70	0.4	0.028	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.031	0.040	0.029	0.015
2509315_2	TP036_4 2.5-2.6	14/01/2021	7	*5.2*	23	34	*97*	14	270	<9	<20	47	<70	<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	TP037_1 0.1-0.2	14/01/2021	8	0.39	26	36	61	20	110	<8	<20	<40	<70	0.7	0.045	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.047	0.068	0.042	0.027
2509315_2	TP037_3 1.0-1.1	14/01/2021	*13*	0.24	28	34	56	32	440	<9	<20	<40	<70	0.8	0.044	0.040	<0.015	<0.015	<0.015	<0.015	<0.015	0.053	0.070	0.051	0.031
2509315_2	TP039_1 0.1-0.2	14/01/2021	*47*	*4.3*	41	*98*	*95*	13	1,140	<9	<20	<40	<70	<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	TP039_3 1.6-1.7	14/01/2021	8	*1.48*	29	76	*300*	42	1,040	<8	<20	52	<70	0.8	0.059	0.019	<0.012	<0.012	<0.012	<0.012	<0.012	0.058	0.090	0.063	0.036
2509315_2	TP039_4 2.9-3.0	14/01/2021	4	0.17	41	12	17.3	14	89	<8	<20	<40	<70					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2509315_2	TP040_1 0.1-0.2	15/01/2021	7	0.63	59	23	49	14	460	<9	<20	<40	<70	<0.4	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
2509315_2	TP040_3 1.9-2.0	15/01/2021	5	<0.10	*300*	32	5.5	28	49	<9	<20	<40	<70	<0.4	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2509315_2	TP041_1 0.1-0.2	14/01/2021	6	0.24	19	18	30	13	240	<8	<20	<40	<70	<0.4	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	<0.013	<0.013
2509315_2	TP041_3 2.6-2.7	14/01/2021	5	0.34	26	22	43	26	151	<10	<20	<40	<70	<0.4	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
#2 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
#3 Value is for total chromium
#4 Value is for benzo (a) pyrene (equivalent)
#5 Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichloroethane) and DDE (dichlorodiphenyldichloroethylene).
#6 Refer to value for Chromium (VI)
#7 Refer to value for Xylene (m,o,p)
#8 Refer to value for Dibromochloromethane.
#9 Refer to value for 1,2 Dichloroethene
#10 Refer to value for 1,3 Dichloropropene
#11 Refer to value for Endosulfan
#12 Refer to value for Carbon disulphide
#13 RSPH m
#14 RSPH v
#15 RSPH x
#16 v
#17 p
#18 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#19 Value for hexavalent chromium
#20 No limit. Derived value exceeds 10,000 mg/kg.
#21 Value is for inorganic lead
#22 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrin if both are involved.
#23 DDT (as the sum of DDT and its metabolites DDD and DDE)

Environmental Standards
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
MfE, 2004, Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A
Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Project: Drury Precinct DSI
Ref: 510611

Table E.2
Environmental Soil Results

										NA											BTEX				
			Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Ammonium-N	Benzo[a]pyrene Potency Equivalency Factor (PEF) AES	Benzo[a]pyrene Toxic Equivalence (TEF)	Freon 113	1&2-Chloronaphthalene	3|4-Methylphenol (m|p-Cresol)	Benzo[b]fluoranthene + Benzo[j]fluoranthene	Bis(2-ethylhexyl)adipate	Dry Matter	N-Nitrosodiphenylamine + Diphenylamine	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg dry wt	mg/kg dry wt	mg/kg dry wt	mg/kg	mg/kg dry wt	mg/kg	mg/kg dry wt	mg/kg	g/100g as rcvd	mg/kg dry wt	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																									
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.																									
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A								200													10	1,000	2,000	2,000[#7]	2,000[#7]
Module 4, Tier 1 Residential (SANDY SILT)								63 | 83 | 130[#15#15#14]		1,600[#17]											1.1 | 1.9 | 2.4[#15#15#15]	59 | 92 | 140[#14#14#14]	82 | 170 | 240[#14#14#14]		
0-1m								63[#16]		1,600[#17]											1.1[#16]	59[#14]	82[#14]		
1-4m								83[#16]													1.9[#16]	92[#14]	170[#14]		
>=4m								130[#14]													2.4[#16]	140[#14]	240[#14]		
NESCS - High density residential																									
NESCS - Commercial / Industrial																									
Lab Report Number	**Field ID**	**Date**																							
2509315_2	**SS001 0.1-0.2**	**15/01/2021**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.06	<0.011	<0.011		<0.03	<0.03				<0.011		94						
2509315_2	**SS003 0.1-0.2**	**15/01/2021**	0.014	<0.013	0.023	<0.013	0.015	<0.07	<0.013	0.027		<0.04	<0.04				0.023		77						
2509315_2	**SS005 0.1-0.2**	**13/01/2021**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012		<0.03	<0.03				<0.012		83						
2509315_2	**SS008 0.1-0.2**	**13/01/2021**	<0.012	<0.012	0.023	<0.012	<0.012	<0.06	<0.012	0.022		<0.03	<0.03				0.015		85						
2509315_2	**SS009 0.1-0.2**	**13/01/2021**	<0.015	<0.015	<0.015	<0.015	<0.015	<0.08	<0.015	<0.015		<0.04	<0.04				<0.015		68						
2509315_2	**SS012 0.1-0.2**	**20/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.04	<0.04				<0.013		80						
2509315_2	**SS013 0.1-0.2**	**15/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.04	<0.04				<0.013		76						
2509315_2	**SS016 0.1-0.2**	**15/01/2021**	<0.014	<0.014	<0.014	<0.014	<0.014	<0.07	<0.014	<0.014		<0.04	<0.04				<0.014		74						
2509315_2	**SS017 0.1-0.2**	**13/01/2021**	0.22	0.048	0.29	<0.013	0.22	<0.07	0.047	0.31		0.43	0.43				0.34		78						
2509315_2	**SS019 0.1-0.2**	**13/01/2021**	<0.014	<0.014	<0.014	<0.014	<0.014	<0.07	<0.014	<0.014		<0.04	<0.04				<0.014		71						
2509315_2	**SS021 0.1-0.2**	**13/01/2021**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012		<0.03	<0.03				<0.012		86						
2509315_2	**SS023 0.1-0.2**	**13/01/2021**	<0.014	<0.014	<0.014	<0.014	<0.014	<0.07	<0.014	<0.014		<0.04	<0.04				<0.014		74						
2509315_2	**SS025 0.1-0.2**	**20/01/2021**	<0.011	<0.011	<0.011	<0.011	<0.011	<0.06	<0.011	<0.011		<0.03	<0.03				<0.011		89						
2509315_2	**SS028 0.1-0.2**	**15/01/2021**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012		<0.03	<0.03				<0.012		86						
2509315_2	**SS030 0.1-0.2**	**15/01/2021**	0.014	<0.013	0.025	<0.013	<0.013	<0.07	<0.013	0.026		0.03	0.03				0.029		75						
2509315_2	**SS032 0.1-0.2**	**13/01/2021**																							
2509315_2	**SS034 0.1-0.2**	**13/01/2021**																							
2509315_2	**SS035 0.1-0.2**	**15/01/2021**	4.6	0.81	8.6	0.091	4.6	0.15	2.5	9.6		8.9	8.8				6.3		80						
2509315_2	**SS037 0.1-0.2**	**15/01/2021**	0.26	0.040	0.48	<0.016	0.22	<0.08	0.142	0.53		0.45	0.45				0.34		63						
2509315_2	**SS040 0.1-0.2**	**15/01/2021**	0.048	<0.012	0.095	<0.012	0.041	<0.06	0.032	0.104		0.09	0.09				0.066		84						
2509315_2	**SS043 0.1-0.2**	**18/01/2021**	1.52	0.29	2.6	0.023	1.69	<0.06	0.70	3.0		3.0	3.0				2.3		81						
2509315_2	**SS045 0.1-0.2**	**18/01/2021**	0.030	<0.014	0.061	<0.014	0.035	<0.07	<0.014	0.068		0.07	0.07				0.052		74						
2509315_2	**SS046 0.1-0.2**	**18/01/2021**	0.042	<0.013	0.069	<0.013	0.040	<0.07	<0.013	0.081		0.08	0.08				0.060		77						
2509315_2	**SS050 0.1-0.2**	**13/01/2021**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012		<0.03	<0.03				<0.012		87						
2509315_2	**SS051 0.1-0.2**	**15/01/2021**	0.018	<0.013	0.039	<0.013	0.017	<0.07	0.018	0.041		0.03	0.03				0.024		79						
2509315_2	**SS053 0.1-0.2**	**15/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.03	<0.03				<0.013		81						
2509315_2	**SS054 0.1-0.2**	**15/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.03	<0.03				<0.013		77						
2509315_2	**SS055 0.1-0.2**	**13/01/2021**	0.017	<0.013	0.039	<0.013	0.014	<0.07	<0.013	0.036		<0.03	<0.03				0.025		79						
2509315_2	**SS058 0.1-0.2**	**13/01/2021**	0.085	<0.013	0.38	<0.013	0.044	<0.07	0.155	0.27		0.08	0.08				0.073		74						
2509315_2	**SS059 0.1-0.2**	**13/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.03	<0.03				<0.013		78						
2509315_2	**SS061 0.1-0.2**	**13/01/2021**	<0.015	<0.015	0.017	<0.015	<0.015	<0.08	<0.015	0.015		<0.04	<0.04				0.014		68						
2509315_2	**SS063 0.1-0.2**	**13/01/2021**	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013		<0.04	<0.03				<0.013		78						
2509315_2	**TP035_1 0.1-0.2**	**14/01/2021**	0.034	<0.012	0.065	<0.012	0.034	<0.06	0.022	0.070		0.07	0.07				0.054		85						
2509315_2	**TP035_3 1.8-1.9**	**14/01/2021**	0.020	<0.013	0.041	<0.013	0.020	<0.07	0.014	0.049		0.04	0.04	<0.3			0.031		78		<0.2	<0.3	<0.3	<0.4	<0.3
2509315_2	**TP035_4 2.9-3.0**	**14/01/2021**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<1.3	<1.3		<0.5	<5	<0.5	<1.0	61	<1.0					
2509315_2	**TP036_1 0.1-.02**	**14/01/2021**	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	0.013		<0.03	<0.03				<0.012		84						
2509315_2	**TP036_3 2.1-2.2**	**14/01/2021**	0.034	<0.014	0.071	<0.014	0.027	<0.07	0.024	0.076		0.06	0.06	<0.3			0.043		72		<0.3	<0.3	<0.3	<0.5	<0.3
2509315_2	**TP036_4 2.5-2.6**	**14/01/2021**	<0.014	<0.014	<0.014	<0.014	<0.014	<0.07	<0.014	<0.014		<0.04	<0.04				<0.014		73		<0.06	<0.06	<0.06	<0.12	<0.06
2509315_2	**TP037_1 0.1-0.2**	**14/01/2021**	0.059	<0.013	0.113	<0.013	0.043	<0.07	0.041	0.117		0.10	0.09				0.077		75						
2509315_2	**TP037_3 1.0-1.1**	**14/01/2021**	0.052	<0.015	0.117	<0.015	0.050	<0.08	0.057	0.126		0.09	0.09	<0.3			0.075		68		<0.3	<0.3	<0.3	<0.5	<0.3
2509315_2	**TP039_1 0.1-0.2**	**14/01/2021**	<0.014	<0.014	0.015	<0.014	<0.014	<0.07	0.015	0.014		<0.04	<0.04				<0.014		74						
2509315_2	**TP039_3 1.6-1.7**	**14/01/2021**	0.063	<0.012	0.087	<0.012	0.066	<0.06	0.023	0.099		0.12	0.12	<0.3			0.101		81		<0.10	<0.3	<0.3	<0.4	<0.3
2509315_2	**TP039_4 2.9-3.0**	**14/01/2021**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	82	<1.3	<1.3		<0.5	<5	<0.5	<1.0	73	<0.9	<0.06	<0.06	<0.06	<0.12	<0.06
2509315_2	**TP040_1 0.1-0.2**	**15/01/2021**	<0.014	<0.014	<0.014	<0.014	<0.014	<0.07	<0.014	<0.014		<0.04	<0.04				<0.014		72						
2509315_2	**TP040_3 1.9-2.0**	**15/01/2021**	<0.015	<0.015	<0.015	<0.015	<0.015	<0.08	<0.015	<0.015		<0.04	<0.04	<0.3			<0.015		68		<0.3	<0.3	<0.3	<0.5	<0.3
2509315_2	**TP041_1 0.1-0.2**	**14/01/2021**	<0.013	<0.013	0.020	<0.013	<0.013	<0.07	<0.013	0.019		<0.04	<0.04				0.019		79						
2509315_2	**TP041_3 2.6-2.7**	**14/01/2021**	<0.016	<0.016	<0.016	<0.016	<0.016	<0.08	<0.016	<0.016		<0.04	<0.04	<0.3			<0.016		62		<0.3	<0.3	<0.3	<0.6	<0.3

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
#2 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics
#3 Value is for total chromium
#4 Value is for benzo (a) pyrene (equivalent)
#5 Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichlor
#6 Refer to value for Chromium (VI)
#7 Refer to value for Xylene (m,o,p)
#8 Refer to value for Dibromochloromethane.
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#17 p
#18 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
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#20 No limit. Derived value exceeds 10,000 mg/kg.
#21 Value is for inorganic lead
#22 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrir
#23 DDT (as the sum of DDT and its metabolites DDD and DDE)

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Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Table E.2
Environmental Soil Results

			Phenols										Amino Aliphatics												
			2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4-chloro-3-methylphenol	Pentachlorophenol	Phenol	N-nitrosodi-n-propylamine	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1-dichloropropene	1,1,2-trichloroethane	1,1,2,2-tetrachloroethane	1,2-dibromo-3-chloropropane	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																									
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.																									
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A				2	0.1		0.1					800			4,000		10,000	1,000	40					20
Module 4, Tier 1 Residential (SANDY SILT)																									
0-1m																									
1-4m																									
>=4m																									
NESCS - High density residential											110														
NESCS - Commercial / Industrial											360														
Lab Report Number	**Field ID**	**Date**																							
2509315_2	SS001 0.1-0.2	15/01/2021																							
2509315_2	SS003 0.1-0.2	15/01/2021																							
2509315_2	SS005 0.1-0.2	13/01/2021																							
2509315_2	SS008 0.1-0.2	13/01/2021																							
2509315_2	SS009 0.1-0.2	13/01/2021																							
2509315_2	SS012 0.1-0.2	20/01/2021																							
2509315_2	SS013 0.1-0.2	15/01/2021																							
2509315_2	SS016 0.1-0.2	15/01/2021																							
2509315_2	SS017 0.1-0.2	13/01/2021																							
2509315_2	SS019 0.1-0.2	13/01/2021																							
2509315_2	SS021 0.1-0.2	13/01/2021																							
2509315_2	SS023 0.1-0.2	13/01/2021																							
2509315_2	SS025 0.1-0.2	20/01/2021																							
2509315_2	SS028 0.1-0.2	15/01/2021																							
2509315_2	SS030 0.1-0.2	15/01/2021																							
2509315_2	SS032 0.1-0.2	13/01/2021																							
2509315_2	SS034 0.1-0.2	13/01/2021																							
2509315_2	SS035 0.1-0.2	15/01/2021																							
2509315_2	SS037 0.1-0.2	15/01/2021																							
2509315_2	SS040 0.1-0.2	15/01/2021																							
2509315_2	SS043 0.1-0.2	18/01/2021																							
2509315_2	SS045 0.1-0.2	18/01/2021																							
2509315_2	SS046 0.1-0.2	18/01/2021																							
2509315_2	SS050 0.1-0.2	13/01/2021																							
2509315_2	SS051 0.1-0.2	15/01/2021																							
2509315_2	SS053 0.1-0.2	15/01/2021																							
2509315_2	SS054 0.1-0.2	15/01/2021																							
2509315_2	SS055 0.1-0.2	13/01/2021																							
2509315_2	SS058 0.1-0.2	13/01/2021																							
2509315_2	SS059 0.1-0.2	13/01/2021																							
2509315_2	SS061 0.1-0.2	13/01/2021																							
2509315_2	SS063 0.1-0.2	13/01/2021																							
2509315_2	TP035_1 0.1-0.2	14/01/2021																							
2509315_2	TP035_3 1.8-1.9	14/01/2021												<0.3	<0.3	<0.3	<0.4	<0.3	<0.5	<0.3	<0.3	<0.5	<0.4	<0.3
2509315_2	TP035_4 2.9-3.0	14/01/2021	<1.0	<1.0	<5	<5	<1.0	<1.0	<5	<5	<30	<1.0	<1.0												
2509315_2	TP036_1 0.1-.02	14/01/2021																							
2509315_2	TP036_3 2.1-2.2	14/01/2021												<0.3	<0.3	<0.3	<0.5	<0.3	<0.5	<0.3	<0.3	<0.5	<0.5	<0.3
2509315_2	TP036_4 2.5-2.6	14/01/2021																							
2509315_2	TP037_1 0.1-0.2	14/01/2021																							
2509315_2	TP037_3 1.0-1.1	14/01/2021												<0.3	<0.3	<0.3	<0.5	<0.3	<0.5	<0.3	<0.3	<0.5	<0.5	<0.3
2509315_2	TP039_1 0.1-0.2	14/01/2021																							
2509315_2	TP039_3 1.6-1.7	14/01/2021												<0.3	<0.3	<0.3	<0.4	<0.3	<0.5	<0.3	<0.3	<0.5	<0.4	<0.3
2509315_2	TP039_4 2.9-3.0	14/01/2021	<1.0	<1.0	<5	<5	<1.0	<1.0	<5	<5	<30	<1.0	<0.9												
2509315_2	TP040_1 0.1-0.2	15/01/2021																							
2509315_2	TP040_3 1.9-2.0	15/01/2021												<0.3	<0.3	<0.3	<0.5	<0.3	<0.5	<0.3	<0.3	<0.5	<0.5	<0.3
2509315_2	TP041_1 0.1-0.2	14/01/2021																							
2509315_2	TP041_3 2.6-2.7	14/01/2021												<0.3	<0.3	<0.3	<0.6	<0.3	<0.6	<0.3	<0.3	<0.5	<0.6	<0.3

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
#2 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics
#3 Value is for total chromium
#4 Value is for benzo (a) pyrene (equivalent)
#5 Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichlor
#6 Refer to value for Chromium (VI)
#7 Refer to value for Xylene (m,o,p)
#8 Refer to value for Dibromochloromethane.
#9 Refer to value for 1,2 Dichloroethene
#10 Refer to value for 1,3 Dichloropropene
#11 Refer to value for Endosulfan
#12 Refer to value for Carbon disulphide
#13 RSPH m
#14 RSPH v
#15 RSPH x
#16 v
#17 p
#18 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#19 Value for hexavalent chromium
#20 No limit. Derived value exceeds 10,000 mg/kg.
#21 Value is for inorganic lead
#22 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrir
#23 DDT (as the sum of DDT and its metabolites DDD and DDE)

Environmental Standards
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
MfE, 2004, Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A
Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Project: Drury Precinct DSI
Ref: 510611

Table E.2
Environmental Soil Results

	Chlorinated Hydrocarbons																			Explosives		
	1,3-dichloropropane	Bromodichloromethane	Bromoform	Chlorodibromomethane	Carbon tetrachloride	Chloroethane	Chloroform	Hexachloroethane	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichloromethane	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl chloride	Hexachlorobutadiene	2,6-dinitrotoluene	2,4-Dinitrotoluene	Nitrobenzene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg as rcvd	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																						
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.																						
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A		20	200	200[#8]						200[#9]	40[#10]		40			40[#10]		4				
Module 4, Tier 1 Residential (SANDY SILT)																						
0-1m																						
1-4m																						
>=4m																						
NESCS - High density residential																						
NESCS - Commercial / Industrial																						
Lab Report Number	**Field ID**	**Date**																				
2509315_2	SS001 0.1-0.2	15/01/2021																				
2509315_2	SS003 0.1-0.2	15/01/2021																				
2509315_2	SS005 0.1-0.2	13/01/2021																				
2509315_2	SS008 0.1-0.2	13/01/2021																				
2509315_2	SS009 0.1-0.2	13/01/2021																				
2509315_2	SS012 0.1-0.2	20/01/2021																				
2509315_2	SS013 0.1-0.2	15/01/2021																				
2509315_2	SS016 0.1-0.2	15/01/2021																				
2509315_2	SS017 0.1-0.2	13/01/2021																				
2509315_2	SS019 0.1-0.2	13/01/2021																				
2509315_2	SS021 0.1-0.2	13/01/2021																				
2509315_2	SS023 0.1-0.2	13/01/2021																				
2509315_2	SS025 0.1-0.2	20/01/2021																				
2509315_2	SS028 0.1-0.2	15/01/2021																				
2509315_2	SS030 0.1-0.2	15/01/2021																				
2509315_2	SS032 0.1-0.2	13/01/2021																				
2509315_2	SS034 0.1-0.2	13/01/2021																				
2509315_2	SS035 0.1-0.2	15/01/2021																				
2509315_2	SS037 0.1-0.2	15/01/2021																				
2509315_2	SS040 0.1-0.2	15/01/2021																				
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2509315_2	SS045 0.1-0.2	18/01/2021																				
2509315_2	SS046 0.1-0.2	18/01/2021																				
2509315_2	SS050 0.1-0.2	13/01/2021																				
2509315_2	SS051 0.1-0.2	15/01/2021																				
2509315_2	SS053 0.1-0.2	15/01/2021																				
2509315_2	SS054 0.1-0.2	15/01/2021																				
2509315_2	SS055 0.1-0.2	13/01/2021																				
2509315_2	SS058 0.1-0.2	13/01/2021																				
2509315_2	SS059 0.1-0.2	13/01/2021																				
2509315_2	SS061 0.1-0.2	13/01/2021																				
2509315_2	SS063 0.1-0.2	13/01/2021																				
2509315_2	TP035_1 0.1-0.2	14/01/2021																				
2509315_2	TP035_3 1.8-1.9	14/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
2509315_2	TP035_4 2.9-3.0	14/01/2021								<1.0											<1.0	<1.0	<5	<0.5
2509315_2	TP036_1 0.1-.02	14/01/2021																						
2509315_2	TP036_3 2.1-2.2	14/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
2509315_2	TP036_4 2.5-2.6	14/01/2021																						
2509315_2	TP037_1 0.1-0.2	14/01/2021																						
2509315_2	TP037_3 1.0-1.1	14/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
2509315_2	TP039_1 0.1-0.2	14/01/2021																						
2509315_2	TP039_3 1.6-1.7	14/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
2509315_2	TP039_4 2.9-3.0	14/01/2021								<0.9											<0.9	<1.0	<5	<0.5
2509315_2	TP040_1 0.1-0.2	15/01/2021																						
2509315_2	TP040_3 1.9-2.0	15/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
2509315_2	TP041_1 0.1-0.2	14/01/2021																						
2509315_2	TP041_3 2.6-2.7	14/01/2021	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
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#12 Refer to value for Carbon disulphide
#13 RSPH m
#14 RSPH v
#15 RSPH x
#16 v
#17 p
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Environmental Standards
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MfE, 2004, Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A
Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Project: Drury Precinct DSI
Ref: 510611

Table E.2
Environmental Soil Results

	Halogenated Benzenes											Halogenated Hydrocarbons				Inorganics	MAH					
	1,3,5-Trichlorobenzene	1,2,3-trichlorobenzene	Hexachlorobenzene	2-chlorotoluene	1,2,4-trichlorobenzene	4-chlorotoluene	1,2-dichlorobenzene	Bromobenzene	1,3-dichlorobenzene	Chlorobenzene	1,4-dichlorobenzene	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	Cyanide Total	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																						
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.																						
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A		1,000			800		4		1,000													
Module 4, Tier 1 Residential (SANDY SILT)																						
0-1m																						
1-4m																						
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Lab Report Number	**Field ID**	**Date**																				
2509315_2	SS001 0.1-0.2	15/01/2021																				
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2509315_2	SS023 0.1-0.2	13/01/2021																				
2509315_2	SS025 0.1-0.2	20/01/2021																				
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2509315_2	SS032 0.1-0.2	13/01/2021																				
2509315_2	SS034 0.1-0.2	13/01/2021																				
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2509315_2	SS037 0.1-0.2	15/01/2021																				
2509315_2	SS040 0.1-0.2	15/01/2021																				
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2509315_2	TP035_1 0.1-0.2	14/01/2021																				
2509315_2	TP035_3 1.8-1.9	14/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
2509315_2	TP035_4 2.9-3.0	14/01/2021			<0.5		<0.5		<1.0		<1.0		<1.0										
2509315_2	TP036_1 0.1-.02	14/01/2021																					
2509315_2	TP036_3 2.1-2.2	14/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
2509315_2	TP036_4 2.5-2.6	14/01/2021																					
2509315_2	TP037_1 0.1-0.2	14/01/2021																					
2509315_2	TP037_3 1.0-1.1	14/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
2509315_2	TP039_1 0.1-0.2	14/01/2021																					
2509315_2	TP039_3 1.6-1.7	14/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
2509315_2	TP039_4 2.9-3.0	14/01/2021			<0.5		<0.5		<0.9		<0.9		<0.9					<0.10						
2509315_2	TP040_1 0.1-0.2	15/01/2021																					
2509315_2	TP040_3 1.9-2.0	15/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
2509315_2	TP041_1 0.1-0.2	14/01/2021																					
2509315_2	TP041_3 2.6-2.7	14/01/2021	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
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#3 Value is for total chromium
#4 Value is for benzo (a) pyrene (equivalent)
#5 Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichlor
#6 Refer to value for Chromium (VI)
#7 Refer to value for Xylene (m,o,p)
#8 Refer to value for Dibromochloromethane.
#9 Refer to value for 1,2 Dichloroethene
#10 Refer to value for 1,3 Dichloropropene
#11 Refer to value for Endosulfan
#12 Refer to value for Carbon disulphide
#13 RSPH m
#14 RSPH v
#15 RSPH x
#16 v
#17 p
#18 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#19 Value for hexavalent chromium
#20 No limit. Derived value exceeds 10,000 mg/kg.
#21 Value is for inorganic lead
#22 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrir
#23 DDT (as the sum of DDT and its metabolites DDD and DDE)

Environmental Standards
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
MfE, 2004, Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A
Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Project: Drury Precinct DSI
Ref: 510611

Table E.2
Environmental Soil Results

				Organochlorine Pesticides																		Pesticides
	sec-butylbenzene	Styrene	tert-butylbenzene	4,4-DDE	a-BHC	Aldrin	b-BHC	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Carbazole
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																				
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.										12[#5]										
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A		120				0.00016				500	8	6[#11]	6[#11]						1,500	
Module 4, Tier 1 Residential (SANDY SILT)																				
0-1m																				
1-4m																				
>=4m																				
NESCS - High density residential						45[#22]				240[#23]	45[#22]									
NESCS - Commercial / Industrial						160[#22]				1,000[#23]	160[#22]									
Lab Report Number	**Field ID**	**Date**																			
2509315_2	SS001 0.1-0.2	15/01/2021																			
2509315_2	SS003 0.1-0.2	15/01/2021																			
2509315_2	SS005 0.1-0.2	13/01/2021																			
2509315_2	SS008 0.1-0.2	13/01/2021																			
2509315_2	SS009 0.1-0.2	13/01/2021																			
2509315_2	SS012 0.1-0.2	20/01/2021																			
2509315_2	SS013 0.1-0.2	15/01/2021																			
2509315_2	SS016 0.1-0.2	15/01/2021																			
2509315_2	SS017 0.1-0.2	13/01/2021																			
2509315_2	SS019 0.1-0.2	13/01/2021																			
2509315_2	SS021 0.1-0.2	13/01/2021																			
2509315_2	SS023 0.1-0.2	13/01/2021																			
2509315_2	SS025 0.1-0.2	20/01/2021																			
2509315_2	SS028 0.1-0.2	15/01/2021																			
2509315_2	SS030 0.1-0.2	15/01/2021																			
2509315_2	SS032 0.1-0.2	13/01/2021																			
2509315_2	SS034 0.1-0.2	13/01/2021																			
2509315_2	SS035 0.1-0.2	15/01/2021																			
2509315_2	SS037 0.1-0.2	15/01/2021																			
2509315_2	SS040 0.1-0.2	15/01/2021																			
2509315_2	SS043 0.1-0.2	18/01/2021																			
2509315_2	SS045 0.1-0.2	18/01/2021																			
2509315_2	SS046 0.1-0.2	18/01/2021																			
2509315_2	SS050 0.1-0.2	13/01/2021																			
2509315_2	SS051 0.1-0.2	15/01/2021																			
2509315_2	SS053 0.1-0.2	15/01/2021																			
2509315_2	SS054 0.1-0.2	15/01/2021																			
2509315_2	SS055 0.1-0.2	13/01/2021																			
2509315_2	SS058 0.1-0.2	13/01/2021																			
2509315_2	SS059 0.1-0.2	13/01/2021																			
2509315_2	SS061 0.1-0.2	13/01/2021																			
2509315_2	SS063 0.1-0.2	13/01/2021																			
2509315_2	TP035_1 0.1-0.2	14/01/2021																			
2509315_2	TP035_3 1.8-1.9	14/01/2021	<0.3	<0.3	<0.3																
2509315_2	TP035_4 2.9-3.0	14/01/2021				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<1.0	<2	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5
2509315_2	TP036_1 0.1-.02	14/01/2021																			
2509315_2	TP036_3 2.1-2.2	14/01/2021	<0.3	<0.3	<0.3																
2509315_2	TP036_4 2.5-2.6	14/01/2021																			
2509315_2	TP037_1 0.1-0.2	14/01/2021																			
2509315_2	TP037_3 1.0-1.1	14/01/2021	<0.3	<0.3	<0.3																
2509315_2	TP039_1 0.1-0.2	14/01/2021																			
2509315_2	TP039_3 1.6-1.7	14/01/2021	<0.3	<0.3	<0.3																
2509315_2	TP039_4 2.9-3.0	14/01/2021				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<1.0	<2	<1.0	<0.9	<1.0	<0.5	<0.5	<0.5	<0.5
2509315_2	TP040_1 0.1-0.2	15/01/2021																			
2509315_2	TP040_3 1.9-2.0	15/01/2021	<0.3	<0.3	<0.3																
2509315_2	TP041_1 0.1-0.2	14/01/2021																			
2509315_2	TP041_3 2.6-2.7	14/01/2021	<0.3	<0.3	<0.3																

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
#2 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics
#3 Value is for total chromium
#4 Value is for benzo (a) pyrene (equivalent)
#5 Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichlor
#6 Refer to value for Chromium (VI)
#7 Refer to value for Xylene (m,o,p)
#8 Refer to value for Dibromochloromethane.
#9 Refer to value for 1,2 Dichloroethene
#10 Refer to value for 1,3 Dichloropropene
#11 Refer to value for Endosulfan
#12 Refer to value for Carbon disulphide
#13 RSPH m
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#15 RSPH x
#16 v
#17 p
#18 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#19 Value for hexavalent chromium
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#21 Value is for inorganic lead
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#23 DDT (as the sum of DDT and its metabolites DDD and DDE)

Environmental Standards
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
MfE, 2004, Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A
Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Table E.2
Environmental Soil Results

	Phthalates						Solvents						SVOCs						
	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Dimethyl phthalate	Di-n-octyl phthalate	Diethylphthalate	Di-n-butyl phthalate	Acetone	Methyl Ethyl Ketone	Isophorone	4-Methyl-2-pentanone	Carbon disulfide	MTBE	4-bromophenyl phenyl ether	4-chlorophenyl phenyl ether	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	Dibenzofuran
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.																			
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.																			
Hazardous Waste Guidelines - Landfill WAC & Landfill Classification - Class A			8,000		2,000	6,000					60[#12]								
Module 4, Tier 1 Residential (SANDY SILT)																			
0-1m																			
1-4m																			
>=4m																			
NESCS - High density residential																			
NESCS - Commercial / Industrial																			
Lab Report Number	**Field ID**	**Date**																	
2509315_2	**SS001 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS003 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS005 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS008 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS009 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS012 0.1-0.2**	**20/01/2021**																	
2509315_2	**SS013 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS016 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS017 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS019 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS021 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS023 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS025 0.1-0.2**	**20/01/2021**																	
2509315_2	**SS028 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS030 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS032 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS034 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS035 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS037 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS040 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS043 0.1-0.2**	**18/01/2021**																	
2509315_2	**SS045 0.1-0.2**	**18/01/2021**																	
2509315_2	**SS046 0.1-0.2**	**18/01/2021**																	
2509315_2	**SS050 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS051 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS053 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS054 0.1-0.2**	**15/01/2021**																	
2509315_2	**SS055 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS058 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS059 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS061 0.1-0.2**	**13/01/2021**																	
2509315_2	**SS063 0.1-0.2**	**13/01/2021**																	
2509315_2	**TP035_1 0.1-0.2**	**14/01/2021**																	
2509315_2	**TP035_3 1.8-1.9**	**14/01/2021**							<40	<40		<8	<0.3	<0.3						
2509315_2	**TP035_4 2.9-3.0**	**14/01/2021**	<5	<1.0	<1.0	<1.0	<1.0	<1.0			<0.5				<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
2509315_2	**TP036_1 0.1-.02**	**14/01/2021**																			
2509315_2	**TP036_3 2.1-2.2**	**14/01/2021**							<50	<50		<9	<0.3	<0.3							
2509315_2	**TP036_4 2.5-2.6**	**14/01/2021**																			
2509315_2	**TP037_1 0.1-0.2**	**14/01/2021**																			
2509315_2	**TP037_3 1.0-1.1**	**14/01/2021**							<50	<50		<10	<0.3	<0.3							
2509315_2	**TP039_1 0.1-0.2**	**14/01/2021**																			
2509315_2	**TP039_3 1.6-1.7**	**14/01/2021**							<40	<40		<8	<0.3	<0.3							
2509315_2	**TP039_4 2.9-3.0**	**14/01/2021**	<5	<1.0	<1.0	<1.0	<1.0	<1.0			<0.5				<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
2509315_2	**TP040_1 0.1-0.2**	**15/01/2021**																			
2509315_2	**TP040_3 1.9-2.0**	**15/01/2021**							<50	<50		<10	<0.3	<0.3							
2509315_2	**TP041_1 0.1-0.2**	**14/01/2021**																			
2509315_2	**TP041_3 2.6-2.7**	**14/01/2021**							<60	<60		<12	<0.3	<0.3							

Comments
#1 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalt
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Ministry for the Environment, August 1999, Module 4, Tier 1 Residential (SANDY SILT)
Ministry for the Environment, 2012, NESCS - High density residential
Ministry for the Environment, 2012, NESCS - Commercial / Industrial

Project: Drury Precinct
Ref: 510611

Table E.3
Asbestos Soil Results

aurecon

			Asbestos																
			Asbestos in soil (<2mm AF/FA)		<2mm Subsample Weight	As Received Weight	Asbestos as Asbestos Fines as % of Total Sample	Asbestos as Fibrous Asbestos as % of Total Sample	Asbestos in ACM as % of Total Sample	Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Dry Matter	Dry Weight	Freon 113	Sample Fraction <10mm to >2mm	Sample Fraction >10mm	Weight of Asbestos as Asbestos Fines (Friable)	Weight of Asbestos as Fibrous Asbestos (Friable)	Weight of Asbestos in ACM (Non-Friable)
		Unit	g dry wt		g dry wt	g	% w/w	% w/w	% w/w	% w/w	g/100g as rcvd	g	mg/kg	g dry wt	g dry wt	g dry wt	g dry wt	g dry wt
		BRANZ (2017) - Residential								0.001								
2509328_1	SS005 0.1-0.2	13/01/2021	347.9		57.6	714.2	<0.001	<0.001	<0.001	<0.001	-	623.0	-	272.8	<0.1	0.00008	<0.00001	<0.00001
2509328_1	SS008 0.1-0.2	13/01/2021	293.7		52.8	531.5	<0.001	<0.001	<0.001	<0.001	-	426.6	-	118.9	13.6	<0.00001	<0.00001	<0.00001
2509328_1	SS009 0.1-0.2	13/01/2021	182.5		56.0	612.0	<0.001	<0.001	<0.001	<0.001	-	397.1	-	213.8	<0.1	<0.00001	<0.00001	<0.00001
2509328_1	SS012 0.1-0.2	15/01/2021	155.2		59.9	444.7	<0.001	<0.001	<0.001	<0.001	-	348.8	-	192.7	<0.1	0.00003	<0.00001	<0.00001
2509328_1	SS013 0.1-0.2	15/01/2021	117.1		56.2	670.5	<0.001	<0.001	<0.001	<0.001	-	509.3	-	320.9	70.9	0.00006	<0.00001	<0.00001
2509328_1	SS016 0.1-0.2	15/01/2021	232.8		54.6	592.1	<0.001	<0.001	<0.001	<0.001	-	446.1	-	180.6	31.8	<0.00001	<0.00001	<0.00001
2509328_1	SS017 0.1-0.2	13/01/2021	225.5		52.5	573.6	<0.001	<0.001	<0.001	<0.001	-	447.6	-	206.4	15.0	<0.00001	<0.00001	<0.00001
2509328_1	SS019 0.1-0.2	13/01/2021	135.3		55.1	635.9	<0.001	<0.001	<0.001	<0.001	-	480.4	-	220.5	124.3	<0.00001	<0.00001	<0.00001
2509328_1	SS028 0.1-0.2	15/01/2021	304.8		60.0	648.0	<0.001	<0.001	<0.001	<0.001	-	546.4	-	155.0	85.6	<0.00001	<0.00001	<0.00001
2509328_1	SS030 0.1-0.2	15/01/2021	309.0		59.2	575.9	<0.001	<0.001	<0.001	<0.001	-	425.1	-	109.9	5.6	<0.00001	<0.00001	<0.00001
2509328_1	SS035 0.1-0.2	15/01/2021	280.4		55.1	636.4	<0.001	<0.001	<0.001	<0.001	-	503.8	-	206.1	16.1	<0.00001	<0.00001	<0.00001
2509328_1	SS037 0.1-0.2	15/01/2021	176.7		56.8	450.6	<0.001	<0.001	<0.001	<0.001	-	289.9	-	104.5	8.3	<0.00001	<0.00001	<0.00001
2509328_1	SS040 0.1-0.2	15/01/2021	169.0		55.1	360.5	<0.001	<0.001	<0.001	<0.001	-	270.9	-	90.9	10.2	<0.00001	<0.00001	<0.00001
2509328_1	SS043 0.1-0.2	18/01/2021	322.5		58.0	573.9	<0.001	<0.001	<0.001	<0.001	-	464.6	-	141.1	<0.1	<0.00001	<0.00001	<0.00001
2509328_1	SS045 0.1-0.2	18/01/2021	338.6		55.9	530.1	<0.001	<0.001	<0.001	<0.001	-	391.6	-	50.9	2.2	<0.00001	<0.00001	<0.00001
2509328_1	SS046 0.1-0.2	18/01/2021	194.9		51.5	527.3	<0.001	<0.001	<0.001	<0.001	-	394.0	-	198.0	<0.1	<0.00001	<0.00001	<0.00001
2509328_1	SS050 0.1-0.2	13/01/2021	446.9		56.8	769.6	<0.001	<0.001	<0.001	<0.001	-	653.8	-	183.0	23.1	<0.00001	<0.00001	<0.00001
2509328_1	SS051 0.1-0.2	15/01/2021	238.7		56.3	553.5	<0.001	<0.001	<0.001	<0.001	-	414.4	-	118.0	57.3	<0.00001	<0.00001	<0.00001
2509328_1	SS053 0.1-0.2	15/01/2021	174.8		59.7	687.3	<0.001	<0.001	<0.001	<0.001	-	545.4	-	199.2	171.0	<0.00001	<0.00001	<0.00001
2509328_1	SS054 0.1-0.2	15/01/2021	216.8		58.1	652.0	<0.001	<0.001	<0.001	<0.001	-	499.2	-	273.6	8.7	<0.00001	<0.00001	<0.00001
2509328_1	SS055 0.1-0.2	13/01/2021	277.6		54.1	605.5	<0.001	<0.001	<0.001	<0.001	-	472.7	-	185.1	9.8	<0.00001	<0.00001	<0.00001
2509328_1	SS058 0.1-0.2	13/01/2021	291.9		56.4	681.2	<0.001	<0.001	<0.001	<0.001	-	507.1	-	210.1	5.0	<0.00001	<0.00001	<0.00001
2509328_1	SS059 0.1-0.2	13/01/2021	228.6		57.6	533.0	<0.001	<0.001	<0.001	<0.001	-	423.8	-	189.2	5.6	<0.00001	<0.00001	<0.00001
2509328_1	SS061 0.1-0.2	13/01/2021	221.6		57.9	547.7	<0.001	<0.001	<0.001	<0.001	-	359.0	-	131.2	6.0	0.00006	<0.00001	<0.00001
2509328_1	SS063 0.1-0.2	13/01/2021	254.7		52.8	598.6	<0.001	<0.001	<0.001	<0.001	-	469.3	-	211.6	3.0	<0.00001	<0.00001	<0.00001
2509328_1	TP035_1 0.1-0.2	14/01/2021	524.4		58.3	755.6	<0.001	<0.001	<0.001	<0.001	-	621.4	-	73.5	23.5	<0.00001	<0.00001	<0.00001
2509328_1	TP035_3 1.8-1.9	14/01/2021	223.4		57.9	713.2	<0.001	<0.001	0.245	<0.001	-	569.2	-	260.5	84.3	0.00288	<0.00001	1.3952
2509328_1	TP036_1 0.1-.02	14/01/2021	467.6		50.0	668.5	<0.001	<0.001	<0.001	<0.001	-	561.0	-	44.2	48.7	0.00032	<0.00001	<0.00001
2509328_1	TP036_3 2.1-2.2	14/01/2021	261.1		57.0	722.3	0.001	<0.001	<0.001	0.001	-	596.8	-	229.4	105.1	0.00613	<0.00001	<0.00001
2509328_1	TP037_1 0.1-0.2	14/01/2021	326.6		52.7	683.8	<0.001	<0.001	<0.001	<0.001	-	522.3	-	155.6	38.4	<0.00001	<0.00001	<0.00001
2509328_1	TP037_3 1.0-1.1	14/01/2021	255.8		58.1	729.8	<0.001	<0.001	<0.001	<0.001	-	576.4	-	146.1	172.9	<0.00001	<0.00001	<0.00001
2509328_1	TP039_1 0.1-0.2	14/01/2021	284.0		58.9	543.8	<0.001	<0.001	<0.001	<0.001	-	406.1	-	106.5	14.6	<0.00001	<0.00001	<0.00001
2509328_1	TP039_3 1.6-1.7	14/01/2021	297.2		56.3	596.2	<0.001	<0.001	<0.001	<0.001	-	470.0	-	121.3	51.0	<0.00001	<0.00001	<0.00001
2509328_1	TP040_1 0.1-0.2	15/01/2021	252.3		55.6	712.4	<0.001	<0.001	<0.001	<0.001	-	518.8	-	246.4	17.8	<0.00001	<0.00001	<0.00001
2509328_1	TP040_3 1.9-2.0	15/01/2021	258.4		57.6	679.6	<0.001	<0.001	<0.001	<0.001	-	466.7	-	190.3	17.2	0.00135	<0.00001	<0.00001
2509328_1	TP041_1 0.1-0.2	14/01/2021	431.4		58.4	740.0	<0.001	<0.001	<0.001	<0.001	-	580.6	-	138.8	8.5	<0.00001	<0.00001	<0.00001
2509328_1	TP041_3 2.6-2.7	14/01/2021	280.3		57.0	691.3	<0.001	<0.001	<0.001	<0.001	-	563.7	-	180.3	101.3	<0.00001	<0.00001	<0.00001

Appendix F
Chain of Custody Documentation

Hill Laboratories
TRIED, TESTED AND TRUSTED

ANALYSIS REQUEST

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

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

Job No: **250 9315**

Date Recv: 18-Jan-21 14:16

Received by: Alexa Badenhorst

3125083153

Quote No	109279
Primary Contact	Sarah Ensoll
Submitted By	Sarah Ensoll
Client Name	Aurecon
Address	139 Carlton Gore Road
Newmarket	*Postcode* 1023
Phone	*Mobile* 0279469904
Email	sarah.cammell@aurecongroup.com

Charge To

Client Reference 510611

Order No

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

☑ *Email Primary Contact* ☐ *Email Submitter* ☐ *Email Client*

☐ *Email Other*

☐ *Other*

Dates of testing are not routinely included in the Certificates of Analysis. Please inform the Laboratory if you would like this information reported.

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 18 January 2021

Name: S Ensoll

☑ *Tick if you require COC to be emailed back*

Signature: S Ensoll

Received at Hill Laboratories *(Refer to Lab created Job No above)*

Date & Time:

Name:

Signature:

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen*

Temp: 6.3°C

ADDITIONAL INFORMATION / KNOWN HAZARDS

Please send the ESdat files.

Priority ☐ **Low** ☑ **Normal** ☐ **High**

☐ **Urgent** (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	Sample Info attached. 85 Samples				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Continued on next page

Aurecon
Quote No. 109279
Client Ref: 501611

Sample ID	Depth (m)	Date	Analysis Requested					
			Asbestos Semi-Quant	Heavy Metals	TPH	PAH	VOC	Hold Cold
TP035_1	0.1 - 0.2	14/01/2021	X	X	X	X		
TP036_1	0.1 - 0.2	14/01/2021	X	X	X	X		
TP037_1	0.1 - 0.2	14/01/2021	X	X	X	X		
TP039_1	0.1 - 0.2	14/01/2021	X	X	X	X		
TP040_1	0.1 - 0.2	15/01/2021	X	X	X	X		
TP041_1	0.1 - 0.2	14/01/2021	X	X	X	X		
TP035_2	0.5 - 0.6	14/01/2021						X
TP036_2	0.5 - 0.6	14/01/2021						X
TP037_2	0.5 - 0.6	14/01/2021						X
TP039_2	1.0 - 1.1	14/01/2021						X
TP040_2	0.8 - 0.9	15/01/2021						X
TP041_2	1.0 - 1.1	14/01/2021						X
TP035_3	1.8 - 1.9	14/01/2021	X	X	X	X	X	
TP036_3	2.1 - 2.2	14/01/2021	X	X	X	X	X	
TP037_3	1.0 - 1.1	14/01/2021	X	X	X	X	X	
TP039_3	1.6 - 1.7	14/01/2021	X	X	X	X	X	
TP040_3	1.9 - 2.0	15/01/2021	X	X	X	X	X	
TP041_3	2.6 - 2.7	14/01/2021	X	X	X	X	X	
TP035_4	2.9 - 3.0	14/01/2021						X
TP036_4	2.5 - 2.6	14/01/2021						X
TP039_4	2.9 - 3.0	14/01/2021						X
SS001	0.1-0.2	15/01/2021		X		X		
SS002	0.1-0.2	15/01/2021						X
SS003	0.1-0.2	15/01/2021		X		X		
SS004	0.1-0.2	15/01/2021						X
SS005	0.1-0.2	13/01/2021	X	X		X		
SS006	0.1-0.2	13/01/2021						X
SS007	0.1-0.2	13/01/2021						X
SS008	0.1-0.2	13/01/2021	X	X		X		
SS009	0.1-0.2	13/01/2021	X	X		X		
SS010	0.1-0.2	13/01/2021						X

Aurecon
Quote No. 109279
Client Ref: 501611

Sample ID	Depth (m)	Date	Analysis Requested					
			Asbestos Semi-Quant	Heavy Metals	TPH	PAH	VOC	Hold Cold
SS011	0.1-0.2	15/01/2021						X
SS012	0.1-0.2	15/01/2021	X	X		X		
SS013	0.1-0.2	15/01/2021	X	X		X		
SS014	0.1-0.2	15/01/2021						X
SS015	0.1-0.2	15/01/2021						X
SS016	0.1-0.2	15/01/2021	X	X		X		
SS017	0.1-0.2	13/01/2021	X	X		X		
SS018	0.1-0.2	13/01/2021						X
SS019	0.1-0.2	13/01/2021	X	X		X		
SS020	0.1-0.2	13/01/2021						X
SS021	0.1-0.2	13/01/2021		X		X		
SS022	0.1-0.2	13/01/2021						X
SS023	0.1-0.2	13/01/2021		X		X		
SS024	0.1-0.2	13/01/2021						X
SS025	0.1-0.2	15/01/2021		X		X		
SS026	0.1-0.2	15/01/2021						X
SS027	0.1-0.2	15/01/2021						X
SS028	0.1-0.2	15/01/2021	X	X		X		
SS029	0.1-0.2	15/01/2021						X
SS030	0.1-0.2	15/01/2021	X	X		X		
SS031	0.1-0.2	13/01/2021						X
SS032	0.1-0.2	13/01/2021		X				
SS033	0.1-0.2	13/01/2021						X
SS034	0.1-0.2	13/01/2021		X				
SS035	0.1-0.2	15/01/2021	X	X		X		
SS036	0.1-0.2	15/01/2021						X
SS037	0.1-0.2	15/01/2021	X	X		X		
SS038	0.1-0.2	15/01/2021						X
SS039	0.1-0.2	15/01/2021						X
SS040	0.1-0.2	15/01/2021	X	X		X		

Aurecon
Quote No. 109279
Client Ref: 501611

Sample ID	Depth (m)	Date	Analysis Requested					
			Asbestos Semi-Quant	Heavy Metals	TPH	PAH	VOC	Hold Cold
SS041	0.1-0.2	15/01/2021						X
SS042	0.1-0.2	15/01/2021						X
SS043	0.1-0.2	18/01/2021	X	X		X		
SS044	0.1-0.2	18/01/2021						X
SS045	0.1-0.2	18/01/2021	X	X		X		
SS046	0.1-0.2	18/01/2021	X	X		X		
SS047	0.1-0.2	18/01/2021						X
SS048	0.1-0.2	18/01/2021						X
SS049	0.1-0.2	13/01/2021						X
SS050	0.1-0.2	13/01/2021	X	X		X		
SS051	0.1-0.2	15/01/2021	X	X		X		
SS052	0.1-0.2	15/01/2021						X
SS053	0.1-0.2	15/01/2021	X	X		X		
SS054	0.1-0.2	15/01/2021	X	X		X		
SS055	0.1-0.2	13/01/2021	X	X		X		
SS056	0.1-0.2	13/01/2021						X
SS057	0.1-0.2	13/01/2021						X
SS058	0.1-0.2	13/01/2021	X	X		X		
SS059	0.1-0.2	13/01/2021	X	X		X		
SS060	0.1-0.2	13/01/2021						X
SS061	0.1-0.2	13/01/2021	X	X		X		
SS062	0.1-0.2	13/01/2021						X
SS063	0.1-0.2	13/01/2021	X	X		X		
SS064	0.1-0.2	13/01/2021						X
		TOTAL	37	44	12	42	6	41

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Job Information Summary

Client:	Aurecon New Zealand Limited	**Lab No:**	2509315
Contact:	Sarah Ensoll	**Date Registered:**	19-Jan-2021 4:12 pm
	C/- Aurecon New Zealand Limited	**Priority:**	High
	PO Box 9762	**Quote No:**	109279
	Newmarket	**Order No:**	
	Auckland 1149	**Client Reference:**	510611
		Add. Client Ref:	
		Submitted By:	Sarah Ensoll
		Charge To:	Aurecon New Zealand Limited
		Target Date:	04-Feb-2021 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	TP035_1 0.1-0.2 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
2	TP036_1 0.1-.02 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
3	TP037_1 0.1-0.2 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
4	TP039_1 0.1-0.2 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
5	TP040_1 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
6	TP041_1 0.1-0.2 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
7	TP035_2 0.5-0.6 14-Jan-2021	Soil	cGSoil	Hold Cold
8	TP036_2 0.5-0.6 14-Jan-2021	Soil	cGSoil	Hold Cold
9	TP037_2 0.5-0.6 14-Jan-2021	Soil	cGSoil	Hold Cold
10	TP039_2 1.0-1.1 14-Jan-2021	Soil	cGSoil	Hold Cold
11	TP040_2 0.8-0.9 15-Jan-2021	Soil	cGSoil, cGSoil	Hold Cold
12	TP041_2 1.0-1.1 14-Jan-2021	Soil	cGSoil	Hold Cold
13	TP035_3 1.8-1.9 14-Jan-2021	Soil	cGSoil, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
14	TP036_3 2.1-2.2 14-Jan-2021	Soil	cGSoil, cGSoil, cpBag, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
15	TP037_3 1.0-1.1 14-Jan-2021	Soil	cGSoil, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
16	TP039_3 1.6-1.7 14-Jan-2021	Soil	cGSoil, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
17	TP040_3 1.9-2.0 15-Jan-2021	Soil	cGSoil, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
18	TP041_3 2.6-2.7 14-Jan-2021	Soil	cGSoil, cpBag	Volatile Organic Compounds Screening in Soil by Headspace GC-MS; Heavy Metals, Screen Level; TPH Oil Industry Profile + PAHscreen
19	TP035_4 2.9-3.0 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Semivolatile Organic Compounds Screening in Soil by GC-MS
20	TP036_4 2.5-2.6 14-Jan-2021	Soil	cGSoil, cGSoil, cpBag	Heavy Metals, Screen Level; TPH + PAH + BTEX profile
21	TP039_4 2.9-3.0 14-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Semivolatile Organic Compounds Screening in Soil by GC-MS; Total Cyanide; Ammonium-N; TPH + BTEX profile, Soil
22	SS001 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
23	SS002 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
24	SS003 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
25	SS004 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
26	SS005 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
27	SS006 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
28	SS007 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
29	SS008 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
30	SS009 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
31	SS010 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
32	SS013 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
33	SS014 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
34	SS015 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
35	SS016 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
36	SS017 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
37	SS018 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
38	SS019 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
39	SS020 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
40	SS021 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
41	SS022 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
42	SS023 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
43	SS024 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
44	SS027 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
45	SS028 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
46	SS029 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
47	SS030 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
48	SS031 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
49	SS032 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level
50	SS033 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
51	SS034 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level
52	SS035 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
53	SS036 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
54	SS037 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
55	SS038 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
56	SS039 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
57	SS040 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
58	SS041 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
59	SS042 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
60	SS043 0.1-0.2 18-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
61	SS044 0.1-0.2 18-Jan-2021	Soil	cGSoil	Hold Cold
62	SS045 0.1-0.2 18-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
63	SS046 0.1-0.2 18-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
64	SS047 0.1-0.2 18-Jan-2021	Soil	cGSoil	Hold Cold
65	SS048 0.1-0.2 18-Jan-2021	Soil	cGSoil	Hold Cold

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
66	SS049 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
67	SS050 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
68	SS051 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
69	SS052 0.1-0.2 15-Jan-2021	Soil	cGSoil	Hold Cold
70	SS053 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
71	SS054 0.1-0.2 15-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
72	SS055 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
73	SS056 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
74	SS057 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
75	SS058 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
76	SS059 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
77	SS060 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
78	SS061 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
79	SS062 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
80	SS063 0.1-0.2 13-Jan-2021	Soil	cGSoil	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
81	SS064 0.1-0.2 13-Jan-2021	Soil	cGSoil	Hold Cold
82	SS011 0.1-0.2 20-Jan-2021	Soil	GSoil300	Hold Cold
83	SS012 0.1-0.2 20-Jan-2021	Soil	GSoil300	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
84	SS025 0.1-0.2 20-Jan-2021	Soil	GSoil300	Heavy Metals, Screen Level; Polycyclic Aromatic Hydrocarbons Screening in Soil
85	SS026 0.1-0.2 20-Jan-2021	Soil	GSoil300	Hold Cold

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-6, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 49, 51-52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-6, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
2M KCl Extraction	2M potassium chloride extraction of as received fraction for analysis of NH4N, NO2N and NO3N. Analyst, 109, 549, (1984).	-	21
Total Cyanide Distillation	Distillation of sample as received. APHA 4500-CN^- C (modified) 23rd ed. 2017.	-	21
Total Cyanide	Distillation, colorimetry. APHA 4500-CN^- C (modified) 23rd ed. 2017 & Skalar Method I295-004(+P14). ISO 14403:2012(E).	0.10 mg/kg dry wt	21
Ammonium-N	2M potassium chloride extraction on as received fraction. Phenol/hypochlorite colorimetry. Flow Injection Analyser. APHA 4500-NH_3 H (modified) 23rd ed. 2017.	5 mg/kg dry wt	21
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	BaP Potency Equivalence calculated from; Benzo(a) anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a) pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Benzo[a]pyrene Toxic Equivalence (TEF)	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	1-6, 13-18
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, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 49, 51-52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	20-21

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Semivolatile Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 30 mg/kg dry wt	19, 21
TPH + PAH + BTEX profile	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	20
Volatile Organic Compounds Screening in Soil by Headspace GC-MS	Sonication extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	-	13-18
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.	-	3, 6, 16, 20-21
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	8 mg/kg dry wt	1-6, 13-18, 20-21
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-6, 13-18, 20-21
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-6, 13-18, 20-21
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	1-6, 13-18, 20-21

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	2509315 SPv3
Contact:	Sarah Ensoll	**Date Received:**	18-Jan-2021
	C/- Aurecon New Zealand Limited	**Date Reported:**	03-Feb-2021 **(Amended)**
	PO Box 9762	**Quote No:**	109279
	Newmarket	**Order No:**	
	Auckland 1149	**Client Reference:**	510611
		Submitted By:	Sarah Ensoll

Sample Type: Soil

Sample Name:		TP035_1 0.1-0.2 14-Jan-2021	TP036_1 0.1-.02 14-Jan-2021	TP037_1 0.1-0.2 14-Jan-2021	TP039_1 0.1-0.2 14-Jan-2021	TP040_1 0.1-0.2 15-Jan-2021
Lab Number:		2509315.1	2509315.2	2509315.3	2509315.4	2509315.5
Individual Tests						
Dry Matter	g/100g as rcvd	85	84	75	74	72
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	4	8	47	7
Total Recoverable Cadmium	mg/kg dry wt	0.38	0.32	0.39	4.3	0.63
Total Recoverable Chromium	mg/kg dry wt	20	20	26	41	59
Total Recoverable Copper	mg/kg dry wt	21	14	36	98	23
Total Recoverable Lead	mg/kg dry wt	25	21	61	95	49
Total Recoverable Nickel	mg/kg dry wt	19	12	20	13	14
Total Recoverable Zinc	mg/kg dry wt	81	70	110	1,140	460
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.5	< 0.3	0.7	< 0.4	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
2-Methylnaphthalene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Acenaphthylene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Acenaphthene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Anthracene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Benzo[a]anthracene	mg/kg dry wt	0.036	< 0.012	0.047	< 0.014	< 0.014
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.046	< 0.012	0.068	< 0.014	< 0.014
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.07	< 0.03	0.10	< 0.04	< 0.04
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.07	< 0.03	0.09	< 0.04	< 0.04
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.054	< 0.012	0.077	< 0.014	< 0.014
Benzo[e]pyrene	mg/kg dry wt	0.031	< 0.012	0.045	< 0.014	< 0.014
Benzo[g,h,i]perylene	mg/kg dry wt	0.035	< 0.012	0.042	< 0.014	< 0.014
Benzo[k]fluoranthene	mg/kg dry wt	0.018	< 0.012	0.027	< 0.014	< 0.014
Chrysene	mg/kg dry wt	0.034	< 0.012	0.059	< 0.014	< 0.014
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Fluoranthene	mg/kg dry wt	0.065	< 0.012	0.113	0.015	< 0.014
Fluorene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.034	< 0.012	0.043	< 0.014	< 0.014
Naphthalene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.07	< 0.07
Perylene	mg/kg dry wt	< 0.012	< 0.012	< 0.013	< 0.014	< 0.014
Phenanthrene	mg/kg dry wt	0.022	< 0.012	0.041	0.015	< 0.014
Pyrene	mg/kg dry wt	0.070	0.013	0.117	0.014	< 0.014

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:		TP035_1 0.1-0.2 14-Jan-2021	TP036_1 0.1-.02 14-Jan-2021	TP037_1 0.1-0.2 14-Jan-2021	TP039_1 0.1-0.2 14-Jan-2021	TP040_1 0.1-0.2 15-Jan-2021
Lab Number:		2509315.1	2509315.2	2509315.3	2509315.4	2509315.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	< 9	< 9
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70

Sample Name:		TP041_1 0.1-0.2 14-Jan-2021	TP035_3 1.8-1.9 14-Jan-2021	TP036_3 2.1-2.2 14-Jan-2021	TP037_3 1.0-1.1 14-Jan-2021	TP039_3 1.6-1.7 14-Jan-2021
Lab Number:		2509315.6	2509315.13	2509315.14	2509315.15	2509315.16
Individual Tests						
Dry Matter	g/100g as rcvd	79	78	72	68	81
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	3	9	13	8
Total Recoverable Cadmium	mg/kg dry wt	0.24	0.23	3.7	0.24	1.48
Total Recoverable Chromium	mg/kg dry wt	19	14	22	28	29
Total Recoverable Copper	mg/kg dry wt	18	20	46	34	76
Total Recoverable Lead	mg/kg dry wt	30	45	63	56	300
Total Recoverable Nickel	mg/kg dry wt	13	14	26	32	42
Total Recoverable Zinc	mg/kg dry wt	240	81	131	440	1,040
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.3	0.4	0.8	0.8
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Acenaphthene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Anthracene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Benzo[a]anthracene	mg/kg dry wt	< 0.013	0.023	0.031	0.053	0.058
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.013	0.028	0.040	0.070	0.090
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.04	0.04	0.06	0.09	0.12
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.04	0.04	0.06	0.09	0.12
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	0.019	0.031	0.043	0.075	0.101
Benzo[e]pyrene	mg/kg dry wt	< 0.013	0.018	0.028	0.044	0.059
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	0.021	0.029	0.051	0.063
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	< 0.013	0.015	0.031	0.036
Chrysene	mg/kg dry wt	< 0.013	0.020	0.034	0.052	0.063
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Fluoranthene	mg/kg dry wt	0.020	0.041	0.071	0.117	0.087
Fluorene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.015	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	0.020	0.027	0.050	0.066
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.07	< 0.08	< 0.06
Perylene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	0.040	0.019
Phenanthrene	mg/kg dry wt	< 0.013	0.014	0.024	0.057	0.023
Pyrene	mg/kg dry wt	0.019	0.049	0.076	0.126	0.099
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 9	< 9	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	52
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70
BTEX in VOC Soils by Headspace GC-MS						
Benzene	mg/kg dry wt	-	< 0.2	< 0.3	< 0.3	< 0.19
Ethylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Toluene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
m&p-Xylene	mg/kg dry wt	-	< 0.4	< 0.5	< 0.5	< 0.4
o-Xylene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3

Sample Type: Soil						
Sample Name:		TP041_1 0.1-0.2 14-Jan-2021	TP035_3 1.8-1.9 14-Jan-2021	TP036_3 2.1-2.2 14-Jan-2021	TP037_3 1.0-1.1 14-Jan-2021	TP039_3 1.6-1.7 14-Jan-2021
Lab Number:		2509315.6	2509315.13	2509315.14	2509315.15	2509315.16
Halogenated Aliphatics in VOC Soils by Headspace GC-MS						
Bromomethane (Methyl Bromide)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Carbon tetrachloride	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Chloroethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Chloromethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2-Dibromo-3-chloropropane	mg/kg dry wt	-	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dibromoethane (ethylene dibromide, EDB)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Dibromomethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,3-Dichloropropane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Dichlorodifluoromethane	mg/kg dry wt	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2-Dichloroethane	mg/kg dry wt	-	< 0.4	< 0.5	< 0.5	< 0.4
1,1-Dichloroethene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
cis-1,2-Dichloroethene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
trans-1,2-Dichloroethene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Dichloromethane (methylene chloride)	mg/kg dry wt	-	< 4	< 5	< 5	< 4
1,2-Dichloropropane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,1-Dichloropropene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
cis-1,3-Dichloropropene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
trans-1,3-Dichloropropene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Hexachlorobutadiene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,1,1,2-Tetrachloroethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,1,2,2-Tetrachloroethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Tetrachloroethene (tetrachloroethylene)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,1,1-Trichloroethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,1,2-Trichloroethane	mg/kg dry wt	-	< 0.4	< 0.5	< 0.5	< 0.4
Trichloroethene (trichloroethylene)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Trichlorofluoromethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2,3-Trichloropropane	mg/kg dry wt	-	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichlorotrifluoroethane (Freon 113)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Vinyl chloride	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Haloaromatics in VOC Soils by Headspace GC-MS						
Bromobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,3-Dichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
4-Chlorotoluene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Chlorobenzene (monochlorobenzene)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2-Dichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,4-Dichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
2-Chlorotoluene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2,3-Trichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,3,5-Trichlorobenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Monoaromatic Hydrocarbons in VOC Soils by Headspace GC-MS						
n-Butylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
tert-Butylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Isopropylbenzene (Cumene)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
4-Isopropyltoluene (p-Cymene)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
n-Propylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
sec-Butylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Styrene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trimethylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3

Sample Type: Soil						
Sample Name:		TP041_1 0.1-0.2 14-Jan-2021	TP035_3 1.8-1.9 14-Jan-2021	TP036_3 2.1-2.2 14-Jan-2021	TP037_3 1.0-1.1 14-Jan-2021	TP039_3 1.6-1.7 14-Jan-2021
Lab Number:		2509315.6	2509315.13	2509315.14	2509315.15	2509315.16
Monoaromatic Hydrocarbons in VOC Soils by Headspace GC-MS						
1,3,5-Trimethylbenzene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Ketones in VOC Soils by Headspace GC-MS						
2-Butanone (MEK)	mg/kg dry wt	-	< 40	< 50	< 50	< 40
4-Methylpentan-2-one (MIBK)	mg/kg dry wt	-	< 8	< 9	< 10	< 8
Acetone	mg/kg dry wt	-	< 40	< 50	< 50	< 40
Methyl tert-butylether (MTBE)	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Trihalomethanes in VOC Soils by Headspace GC-MS						
Bromodichloromethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Bromoform (tribromomethane)	mg/kg dry wt	-	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform (Trichloromethane)	mg/kg as rcvd	-	< 0.3	< 0.3	< 0.3	< 0.3
Dibromochloromethane	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Other VOC in Soils by Headspace GC-MS						
Carbon disulphide	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg dry wt	-	< 0.3	< 0.3	< 0.3	< 0.3

Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	TP035_4 2.9-3.0 14-Jan-2021	TP036_4 2.5-2.6 14-Jan-2021	TP039_4 2.9-3.0 14-Jan-2021
Lab Number:		2509315.17	2509315.18	2509315.19	2509315.20	2509315.21
Individual Tests						
Dry Matter	g/100g as rcvd	68	62	61	73	73
Total Cyanide*	mg/kg dry wt	-	-	-	-	< 0.10
Ammonium-N*	mg/kg dry wt	-	-	-	-	82
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	11	7	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.34	0.19	5.2	0.17
Total Recoverable Chromium	mg/kg dry wt	300	26	18	23	41
Total Recoverable Copper	mg/kg dry wt	32	22	173	34	12
Total Recoverable Lead	mg/kg dry wt	5.5	43	172	97	17.3
Total Recoverable Nickel	mg/kg dry wt	28	26	470	14	14
Total Recoverable Zinc	mg/kg dry wt	49	151	78	270	89
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	-	-	< 0.06	< 0.06
Toluene	mg/kg dry wt	-	-	-	< 0.06	< 0.06
Ethylbenzene	mg/kg dry wt	-	-	-	< 0.06	< 0.06
m&p-Xylene	mg/kg dry wt	-	-	-	< 0.12	< 0.12
o-Xylene	mg/kg dry wt	-	-	-	< 0.06	< 0.06
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.4	-	< 0.4	-
1-Methylnaphthalene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
2-Methylnaphthalene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Acenaphthylene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Acenaphthene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Anthracene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[a]anthracene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.04	< 0.04	-	< 0.04	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.04	< 0.04	-	< 0.04	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[e]pyrene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Chrysene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-

Sample Type: Soil						
Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	TP035_4 2.9-3.0 14-Jan-2021	TP036_4 2.5-2.6 14-Jan-2021	TP039_4 2.9-3.0 14-Jan-2021
Lab Number:		2509315.17	2509315.18	2509315.19	2509315.20	2509315.21
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Fluoranthene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Fluorene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Naphthalene	mg/kg dry wt	< 0.08	< 0.08	-	< 0.07	-
Perylene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Phenanthrene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Pyrene	mg/kg dry wt	< 0.015	< 0.016	-	< 0.014	-
Haloethers in SVOC Soil Samples by GC-MS						
Bis(2-chloroethoxy) methane	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Bis(2-chloroethyl)ether	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Bis(2-chloroisopropyl)ether	mg/kg dry wt	-	-	< 0.5	-	< 0.5
4-Bromophenyl phenyl ether	mg/kg dry wt	-	-	< 0.5	-	< 0.5
4-Chlorophenyl phenyl ether	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Nitrogen containing compounds in SVOC Soil Samples by GC-MS						
2,4-Dinitrotoluene	mg/kg dry wt	-	-	< 5	-	< 5
2,6-Dinitrotoluene	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Nitrobenzene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
N-Nitrosodi-n-propylamine	mg/kg dry wt	-	-	< 1.0	-	< 0.9
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	-	-	< 1.0	-	< 0.9
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Aldrin	mg/kg dry wt	-	-	< 0.5	-	< 0.5
alpha-BHC	mg/kg dry wt	-	-	< 0.5	-	< 0.5
beta-BHC	mg/kg dry wt	-	-	< 0.5	-	< 0.5
delta-BHC	mg/kg dry wt	-	-	< 0.5	-	< 0.5
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.5	-	< 0.5
4,4'-DDD	mg/kg dry wt	-	-	< 0.5	-	< 0.5
4,4'-DDE	mg/kg dry wt	-	-	< 0.5	-	< 0.5
4,4'-DDT	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Dieldrin	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Endosulfan I	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Endosulfan II	mg/kg dry wt	-	-	< 2	-	< 2
Endosulfan sulphate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Endrin	mg/kg dry wt	-	-	< 1.0	-	< 0.9
Endrin ketone	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Heptachlor	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*						
Acenaphthene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Acenaphthylene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Anthracene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[a]anthracene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[k]fluoranthene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
1&2-Chloronaphthalene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Chrysene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Fluoranthene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Fluorene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.5	-	< 0.5

Sample Type: Soil						
Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	TP035_4 2.9-3.0 14-Jan-2021	TP036_4 2.5-2.6 14-Jan-2021	TP039_4 2.9-3.0 14-Jan-2021
Lab Number:		2509315.17	2509315.18	2509315.19	2509315.20	2509315.21
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*						
Naphthalene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Phenanthrene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Pyrene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	< 1.3	-	< 1.3
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	< 1.3	-	< 1.3
Phenols in SVOC Soil Samples by GC-MS						
4-Chloro-3-methylphenol	mg/kg dry wt	-	-	< 5	-	< 5
2-Chlorophenol	mg/kg dry wt	-	-	< 1.0	-	< 1.0
2,4-Dichlorophenol	mg/kg dry wt	-	-	< 5	-	< 5
2,4-Dimethylphenol	mg/kg dry wt	-	-	< 5	-	< 5
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	-	-	< 5	-	< 5
2-Methylphenol (o-Cresol)	mg/kg dry wt	-	-	< 1.0	-	< 1.0
2-Nitrophenol	mg/kg dry wt	-	-	< 5	-	< 5
Pentachlorophenol (PCP)	mg/kg dry wt	-	-	< 30	-	< 30
Phenol	mg/kg dry wt	-	-	< 1.0	-	< 1.0
2,4,5-Trichlorophenol	mg/kg dry wt	-	-	< 1.0	-	< 1.0
2,4,6-Trichlorophenol	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Plasticisers in SVOC Soil Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	-	-	< 5	-	< 5
Butylbenzylphthalate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Di(2-ethylhexyl)adipate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Diethylphthalate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Dimethylphthalate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Di-n-butylphthalate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Di-n-octylphthalate	mg/kg dry wt	-	-	< 1.0	-	< 1.0
Other Halogenated compounds in SVOC Soil Samples by GC-MS						
1,2-Dichlorobenzene	mg/kg dry wt	-	-	< 1.0	-	< 0.9
1,3-Dichlorobenzene	mg/kg dry wt	-	-	< 1.0	-	< 0.9
1,4-Dichlorobenzene	mg/kg dry wt	-	-	< 1.0	-	< 0.9
Hexachlorobutadiene	mg/kg dry wt	-	-	< 1.0	-	< 0.9
Hexachloroethane	mg/kg dry wt	-	-	< 1.0	-	< 0.9
1,2,4-Trichlorobenzene	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Other compounds in SVOC Soil Samples by GC-MS						
Benzyl alcohol	mg/kg dry wt	-	-	< 10	-	< 10
Carbazole	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Dibenzofuran	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Isophorone	mg/kg dry wt	-	-	< 0.5	-	< 0.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 9	< 10	-	< 9	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	-	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	-	47	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	-	< 70	< 70
BTEX in VOC Soils by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Toluene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.5	< 0.6	-	-	-
o-Xylene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Halogenated Aliphatics in VOC Soils by Headspace GC-MS						
Bromomethane (Methyl Bromide)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Carbon tetrachloride	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Chloroethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-

Sample Type: Soil						
Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	TP035_4 2.9-3.0 14-Jan-2021	TP036_4 2.5-2.6 14-Jan-2021	TP039_4 2.9-3.0 14-Jan-2021
Lab Number:		2509315.17	2509315.18	2509315.19	2509315.20	2509315.21
Halogenated Aliphatics in VOC Soils by Headspace GC-MS						
Chloromethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2-Dibromo-3-chloropropane	mg/kg dry wt	< 0.5	< 0.6	-	-	-
1,2-Dibromoethane (ethylene dibromide, EDB)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Dibromomethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,3-Dichloropropane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Dichlorodifluoromethane	mg/kg dry wt	< 0.5	< 0.5	-	-	-
1,1-Dichloroethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2-Dichloroethane	mg/kg dry wt	< 0.5	< 0.6	-	-	-
1,1-Dichloroethene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
cis-1,2-Dichloroethene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
trans-1,2-Dichloroethene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Dichloromethane (methylene chloride)	mg/kg dry wt	< 5	< 6	-	-	-
1,2-Dichloropropane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,1-Dichloropropene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
cis-1,3-Dichloropropene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
trans-1,3-Dichloropropene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Hexachlorobutadiene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Tetrachloroethene (tetrachloroethylene)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,1,1-Trichloroethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,1,2-Trichloroethane	mg/kg dry wt	< 0.5	< 0.6	-	-	-
Trichloroethene (trichloroethylene)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Trichlorofluoromethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2,3-Trichloropropane	mg/kg dry wt	< 0.5	< 0.5	-	-	-
1,1,2-Trichlorotrifluoroethane (Freon 113)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Vinyl chloride	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Haloaromatics in VOC Soils by Headspace GC-MS						
Bromobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,3-Dichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
4-Chlorotoluene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Chlorobenzene (monochlorobenzene)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2-Dichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,4-Dichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
2-Chlorotoluene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2,3-Trichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2,4-Trichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,3,5-Trichlorobenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Monoaromatic Hydrocarbons in VOC Soils by Headspace GC-MS						
n-Butylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
tert-Butylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Isopropylbenzene (Cumene)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
4-Isopropyltoluene (p-Cymene)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
n-Propylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
sec-Butylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Styrene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,2,4-Trimethylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
1,3,5-Trimethylbenzene	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Ketones in VOC Soils by Headspace GC-MS						
2-Butanone (MEK)	mg/kg dry wt	< 50	< 60	-	-	-

Sample Type: Soil						
Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	TP035_4 2.9-3.0 14-Jan-2021	TP036_4 2.5-2.6 14-Jan-2021	TP039_4 2.9-3.0 14-Jan-2021
Lab Number:		2509315.17	2509315.18	2509315.19	2509315.20	2509315.21
Ketones in VOC Soils by Headspace GC-MS						
4-Methylpentan-2-one (MIBK)	mg/kg dry wt	< 10	< 12	-	-	-
Acetone	mg/kg dry wt	< 50	< 60	-	-	-
Methyl tert-butylether (MTBE)	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Trihalomethanes in VOC Soils by Headspace GC-MS						
Bromodichloromethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Bromoform (tribromomethane)	mg/kg dry wt	< 0.5	< 0.5	-	-	-
Chloroform (Trichloromethane)	mg/kg as rcvd	< 0.3	< 0.3	-	-	-
Dibromochloromethane	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Other VOC in Soils by Headspace GC-MS						
Carbon disulphide	mg/kg dry wt	< 0.3	< 0.3	-	-	-
Naphthalene	mg/kg dry wt	< 0.3	< 0.3	-	-	-

Sample Name:		SS001 0.1-0.2 15-Jan-2021	SS003 0.1-0.2 15-Jan-2021	SS005 0.1-0.2 13-Jan-2021	SS008 0.1-0.2 13-Jan-2021	SS009 0.1-0.2 13-Jan-2021
Lab Number:		2509315.22	2509315.24	2509315.26	2509315.29	2509315.30
Individual Tests						
Dry Matter	g/100g as rcvd	94	77	83	85	68
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	16	17	6	47	9
Total Recoverable Cadmium	mg/kg dry wt	2.0	2.2	< 0.10	0.38	0.60
Total Recoverable Chromium	mg/kg dry wt	35	32	16	47	21
Total Recoverable Copper	mg/kg dry wt	44	37	5	45	29
Total Recoverable Lead	mg/kg dry wt	14.4	86	29	29	27
Total Recoverable Nickel	mg/kg dry wt	56	50	5	9	10
Total Recoverable Zinc	mg/kg dry wt	280	2,500	19	220	171
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.4	< 0.3	< 0.3	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
2-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Acenaphthylene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Acenaphthene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Anthracene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Benzo[a]anthracene	mg/kg dry wt	< 0.011	0.015	< 0.012	< 0.012	< 0.015
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.011	0.018	< 0.012	0.012	< 0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	< 0.04	< 0.03	< 0.03	< 0.04
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	< 0.04	< 0.03	< 0.03	< 0.04
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.011	0.023	< 0.012	0.015	< 0.015
Benzo[e]pyrene	mg/kg dry wt	< 0.011	0.016	< 0.012	< 0.012	< 0.015
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.011	0.016	< 0.012	< 0.012	< 0.015
Benzo[k]fluoranthene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Chrysene	mg/kg dry wt	< 0.011	0.014	< 0.012	< 0.012	< 0.015
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Fluoranthene	mg/kg dry wt	< 0.011	0.023	< 0.012	0.023	< 0.015
Fluorene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.011	0.015	< 0.012	< 0.012	< 0.015
Naphthalene	mg/kg dry wt	< 0.06	< 0.07	< 0.06	< 0.06	< 0.08
Perylene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Phenanthrene	mg/kg dry wt	< 0.011	< 0.013	< 0.012	< 0.012	< 0.015
Pyrene	mg/kg dry wt	< 0.011	0.027	< 0.012	0.022	< 0.015

Sample Name:		SS013 0.1-0.2 15-Jan-2021	SS016 0.1-0.2 15-Jan-2021	SS017 0.1-0.2 13-Jan-2021	SS019 0.1-0.2 13-Jan-2021	SS021 0.1-0.2 13-Jan-2021
Lab Number:		2509315.32	2509315.35	2509315.36	2509315.38	2509315.40

Sample Type: Soil						
	Sample Name:	SS013 0.1-0.2 15-Jan-2021	SS016 0.1-0.2 15-Jan-2021	SS017 0.1-0.2 13-Jan-2021	SS019 0.1-0.2 13-Jan-2021	SS021 0.1-0.2 13-Jan-2021
	Lab Number:	2509315.32	2509315.35	2509315.36	2509315.38	2509315.40
Individual Tests						
Dry Matter	g/100g as rcvd	76	74	78	71	86
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	11	11	9	19	6
Total Recoverable Cadmium	mg/kg dry wt	0.81	0.39	0.52	0.51	0.24
Total Recoverable Chromium	mg/kg dry wt	26	23	20	23	146
Total Recoverable Copper	mg/kg dry wt	20	25	21	26	39
Total Recoverable Lead	mg/kg dry wt	66	100	126	26	18.4
Total Recoverable Nickel	mg/kg dry wt	9	8	9	8	37
Total Recoverable Zinc	mg/kg dry wt	98	96	129	121	75
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.4	2.7	< 0.4	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.014	< 0.013	< 0.014	< 0.012
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.014	< 0.013	< 0.014	< 0.012
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.014	0.071	< 0.014	< 0.012
Acenaphthene	mg/kg dry wt	< 0.013	< 0.014	< 0.013	< 0.014	< 0.012
Anthracene	mg/kg dry wt	< 0.013	< 0.014	0.051	< 0.014	< 0.012
Benzo[a]anthracene	mg/kg dry wt	< 0.013	< 0.014	0.21	< 0.014	< 0.012
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	< 0.014	0.29	< 0.014	< 0.012
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.04	< 0.04	0.43	< 0.04	< 0.03
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.04	< 0.04	0.43	< 0.04	< 0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	< 0.014	0.34	< 0.014	< 0.012
Benzo[e]pyrene	mg/kg dry wt	< 0.013	< 0.014	0.21	< 0.014	< 0.012
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	< 0.014	0.22	< 0.014	< 0.012
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	< 0.014	0.129	< 0.014	< 0.012
Chrysene	mg/kg dry wt	< 0.013	< 0.014	0.22	< 0.014	< 0.012
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.014	0.048	< 0.014	< 0.012
Fluoranthene	mg/kg dry wt	< 0.013	< 0.014	0.29	< 0.014	< 0.012
Fluorene	mg/kg dry wt	< 0.013	< 0.014	< 0.013	< 0.014	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	< 0.014	0.22	< 0.014	< 0.012
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.07	< 0.07	< 0.06
Perylene	mg/kg dry wt	< 0.013	< 0.014	0.067	< 0.014	< 0.012
Phenanthrene	mg/kg dry wt	< 0.013	< 0.014	0.047	< 0.014	< 0.012
Pyrene	mg/kg dry wt	< 0.013	< 0.014	0.31	< 0.014	< 0.012

	Sample Name:	SS023 0.1-0.2 13-Jan-2021	SS028 0.1-0.2 15-Jan-2021	SS030 0.1-0.2 15-Jan-2021	SS032 0.1-0.2 13-Jan-2021	SS034 0.1-0.2 13-Jan-2021
	Lab Number:	2509315.42	2509315.45	2509315.47	2509315.49	2509315.51
Individual Tests						
Dry Matter	g/100g as rcvd	74	86	75	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	8	16	33	11	3
Total Recoverable Cadmium	mg/kg dry wt	0.23	0.51	0.53	0.48	0.57
Total Recoverable Chromium	mg/kg dry wt	77	22	33	97	115
Total Recoverable Copper	mg/kg dry wt	24	24	90	33	36
Total Recoverable Lead	mg/kg dry wt	128	48	250	12.3	10.0
Total Recoverable Nickel	mg/kg dry wt	20	15	12	19	30
Total Recoverable Zinc	mg/kg dry wt	129	130	260	156	131
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.3	< 0.4	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-

Sample Type: Soil						
Sample Name:		SS023 0.1-0.2 13-Jan-2021	SS028 0.1-0.2 15-Jan-2021	SS030 0.1-0.2 15-Jan-2021	SS032 0.1-0.2 13-Jan-2021	SS034 0.1-0.2 13-Jan-2021
Lab Number:		2509315.42	2509315.45	2509315.47	2509315.49	2509315.51
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Anthracene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.014	< 0.012	0.017	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.014	< 0.012	0.019	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.04	< 0.03	0.03	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.04	< 0.03	0.03	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.014	< 0.012	0.029	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.014	< 0.012	0.016	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Chrysene	mg/kg dry wt	< 0.014	< 0.012	0.014	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Fluoranthene	mg/kg dry wt	< 0.014	< 0.012	0.025	-	-
Fluorene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	< 0.07	-	-
Perylene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Phenanthrene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Pyrene	mg/kg dry wt	< 0.014	< 0.012	0.026	-	-

Sample Name:		SS035 0.1-0.2 15-Jan-2021	SS037 0.1-0.2 15-Jan-2021	SS040 0.1-0.2 15-Jan-2021	SS043 0.1-0.2 18-Jan-2021	SS045 0.1-0.2 18-Jan-2021
Lab Number:		2509315.52	2509315.54	2509315.57	2509315.60	2509315.62
Individual Tests						
Dry Matter	g/100g as rcvd	80	63	84	81	74
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	10	19	12	11	38
Total Recoverable Cadmium	mg/kg dry wt	0.48	1.0	0.23	0.54	0.62
Total Recoverable Chromium	mg/kg dry wt	43	25	15	30	29
Total Recoverable Copper	mg/kg dry wt	45	48	18	28	51
Total Recoverable Lead	mg/kg dry wt	850	1,410	24	4,200	118
Total Recoverable Nickel	mg/kg dry wt	12	17	9	14	10
Total Recoverable Zinc	mg/kg dry wt	420	940	250	480	141
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	62	3.3	0.6	20	0.4
1-Methylnaphthalene	mg/kg dry wt	0.018	< 0.016	< 0.012	< 0.012	< 0.014
2-Methylnaphthalene	mg/kg dry wt	0.026	< 0.016	< 0.012	< 0.012	< 0.014
Acenaphthylene	mg/kg dry wt	0.57	0.032	< 0.012	0.22	< 0.014
Acenaphthene	mg/kg dry wt	0.022	< 0.016	< 0.012	< 0.012	< 0.014
Anthracene	mg/kg dry wt	0.72	0.041	0.014	0.194	< 0.014
Benzo[a]anthracene	mg/kg dry wt	4.9	0.25	0.050	1.48	0.033
Benzo[a]pyrene (BAP)	mg/kg dry wt	6.2	0.31	0.061	2.0	0.047
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	8.9	0.45	0.09	3.0	0.07
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	8.8	0.45	0.09	3.0	0.07
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	6.3	0.34	0.066	2.3	0.052
Benzo[e]pyrene	mg/kg dry wt	3.9	0.21	0.038	1.37	0.032
Benzo[g,h,i]perylene	mg/kg dry wt	4.6	0.23	0.046	1.61	0.038
Benzo[k]fluoranthene	mg/kg dry wt	2.5	0.126	0.024	0.86	0.018
Chrysene	mg/kg dry wt	4.6	0.26	0.048	1.52	0.030
Dibenzo[a,h]anthracene	mg/kg dry wt	0.81	0.040	< 0.012	0.29	< 0.014
Fluoranthene	mg/kg dry wt	8.6	0.48	0.095	2.6	0.061
Fluorene	mg/kg dry wt	0.091	< 0.016	< 0.012	0.023	< 0.014

Sample Type: Soil						
Sample Name:		SS035 0.1-0.2 15-Jan-2021	SS037 0.1-0.2 15-Jan-2021	SS040 0.1-0.2 15-Jan-2021	SS043 0.1-0.2 18-Jan-2021	SS045 0.1-0.2 18-Jan-2021
Lab Number:		2509315.52	2509315.54	2509315.57	2509315.60	2509315.62
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	4.6	0.22	0.041	1.69	0.035
Naphthalene	mg/kg dry wt	0.15	< 0.08	< 0.06	< 0.06	< 0.07
Perylene	mg/kg dry wt	1.49	0.069	0.012	0.49	< 0.014
Phenanthrene	mg/kg dry wt	2.5	0.142	0.032	0.70	< 0.014
Pyrene	mg/kg dry wt	9.6	0.53	0.104	3.0	0.068

Sample Name:		SS046 0.1-0.2 18-Jan-2021	SS050 0.1-0.2 13-Jan-2021	SS051 0.1-0.2 15-Jan-2021	SS053 0.1-0.2 15-Jan-2021	SS054 0.1-0.2 15-Jan-2021
Lab Number:		2509315.63	2509315.67	2509315.68	2509315.70	2509315.71
Individual Tests						
Dry Matter	g/100g as rcvd	77	87	79	81	77
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	10	14	10	11	11
Total Recoverable Cadmium	mg/kg dry wt	0.28	2.1	0.7	0.44	0.51
Total Recoverable Chromium	mg/kg dry wt	16	26	20	21	22
Total Recoverable Copper	mg/kg dry wt	14	630	33	29	24
Total Recoverable Lead	mg/kg dry wt	68	870	71	40	72
Total Recoverable Nickel	mg/kg dry wt	8	14	11	9	9
Total Recoverable Zinc	mg/kg dry wt	102	1,620	470	199	151
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.5	< 0.3	< 0.3	< 0.3	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Acenaphthene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Anthracene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Benzo[a]anthracene	mg/kg dry wt	0.041	< 0.012	0.023	< 0.013	< 0.013
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.055	< 0.012	0.021	< 0.013	< 0.013
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.08	< 0.03	0.03	< 0.03	< 0.03
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.08	< 0.03	0.03	< 0.03	< 0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.060	< 0.012	0.024	< 0.013	< 0.013
Benzo[e]pyrene	mg/kg dry wt	0.039	< 0.012	0.014	< 0.013	< 0.013
Benzo[g,h,i]perylene	mg/kg dry wt	0.040	< 0.012	0.016	< 0.013	< 0.013
Benzo[k]fluoranthene	mg/kg dry wt	0.022	< 0.012	< 0.013	< 0.013	< 0.013
Chrysene	mg/kg dry wt	0.042	< 0.012	0.018	< 0.013	< 0.013
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Fluoranthene	mg/kg dry wt	0.069	< 0.012	0.039	< 0.013	< 0.013
Fluorene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.040	< 0.012	0.017	< 0.013	< 0.013
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	< 0.07	< 0.07	< 0.07
Perylene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	< 0.013	< 0.013
Phenanthrene	mg/kg dry wt	< 0.013	< 0.012	0.018	< 0.013	< 0.013
Pyrene	mg/kg dry wt	0.081	< 0.012	0.041	< 0.013	< 0.013

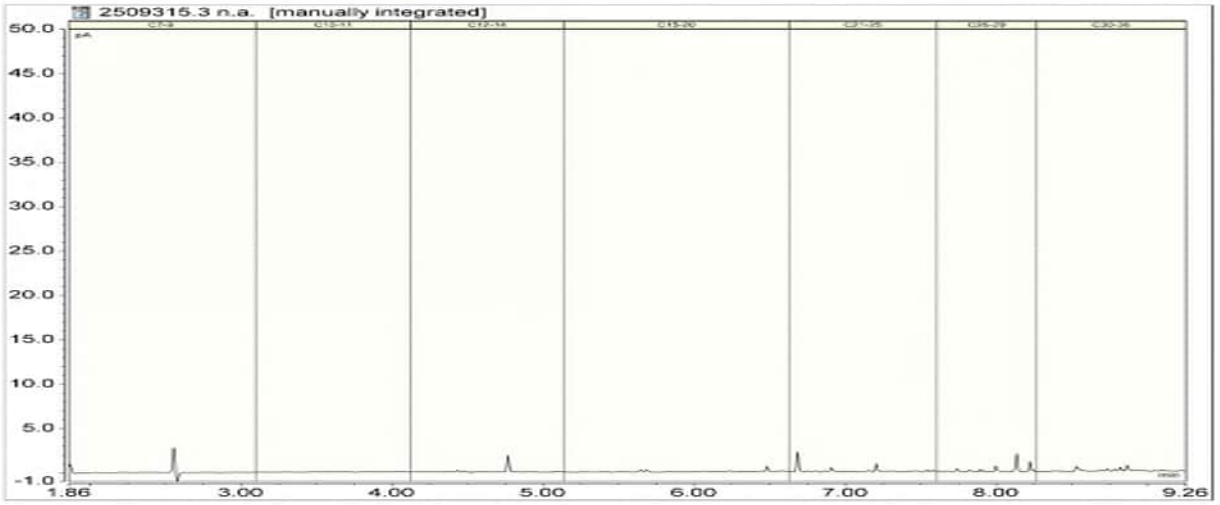
Sample Name:		SS055 0.1-0.2 13-Jan-2021	SS058 0.1-0.2 13-Jan-2021	SS059 0.1-0.2 13-Jan-2021	SS061 0.1-0.2 13-Jan-2021	SS063 0.1-0.2 13-Jan-2021
Lab Number:		2509315.72	2509315.75	2509315.76	2509315.78	2509315.80
Individual Tests						
Dry Matter	g/100g as rcvd	79	74	78	68	78
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	14	18	9	54	7
Total Recoverable Cadmium	mg/kg dry wt	0.46	1.04	0.63	0.42	0.28
Total Recoverable Chromium	mg/kg dry wt	23	36	24	36	26
Total Recoverable Copper	mg/kg dry wt	27	43	52	59	11

Sample Type: Soil						
Sample Name:		SS055 0.1-0.2 13-Jan-2021	SS058 0.1-0.2 13-Jan-2021	SS059 0.1-0.2 13-Jan-2021	SS061 0.1-0.2 13-Jan-2021	SS063 0.1-0.2 13-Jan-2021
Lab Number:		2509315.72	2509315.75	2509315.76	2509315.78	2509315.80
Heavy Metals, Screen Level						
Total Recoverable Lead	mg/kg dry wt	91	1,890	1,950	440	700
Total Recoverable Nickel	mg/kg dry wt	20	14	9	10	6
Total Recoverable Zinc	mg/kg dry wt	340	900	1,010	290	210
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	1.3	< 0.3	< 0.4	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Acenaphthene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Anthracene	mg/kg dry wt	< 0.013	0.046	< 0.013	< 0.015	< 0.013
Benzo[a]anthracene	mg/kg dry wt	0.019	0.075	< 0.013	< 0.015	< 0.013
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.019	0.049	< 0.013	< 0.015	< 0.013
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	0.08	< 0.03	< 0.04	< 0.04
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	0.08	< 0.03	< 0.04	< 0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.025	0.073	< 0.013	0.014	< 0.013
Benzo[e]pyrene	mg/kg dry wt	0.013	0.051	< 0.013	< 0.015	< 0.013
Benzo[g,h,i]perylene	mg/kg dry wt	0.013	0.045	< 0.013	< 0.015	< 0.013
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	0.026	< 0.013	< 0.015	< 0.013
Chrysene	mg/kg dry wt	0.017	0.085	< 0.013	< 0.015	< 0.013
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Fluoranthene	mg/kg dry wt	0.039	0.38	< 0.013	0.017	< 0.013
Fluorene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.014	0.044	< 0.013	< 0.015	< 0.013
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.07	< 0.08	< 0.07
Perylene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.015	< 0.013
Phenanthrene	mg/kg dry wt	< 0.013	0.155	< 0.013	< 0.015	< 0.013
Pyrene	mg/kg dry wt	0.036	0.27	< 0.013	0.015	< 0.013

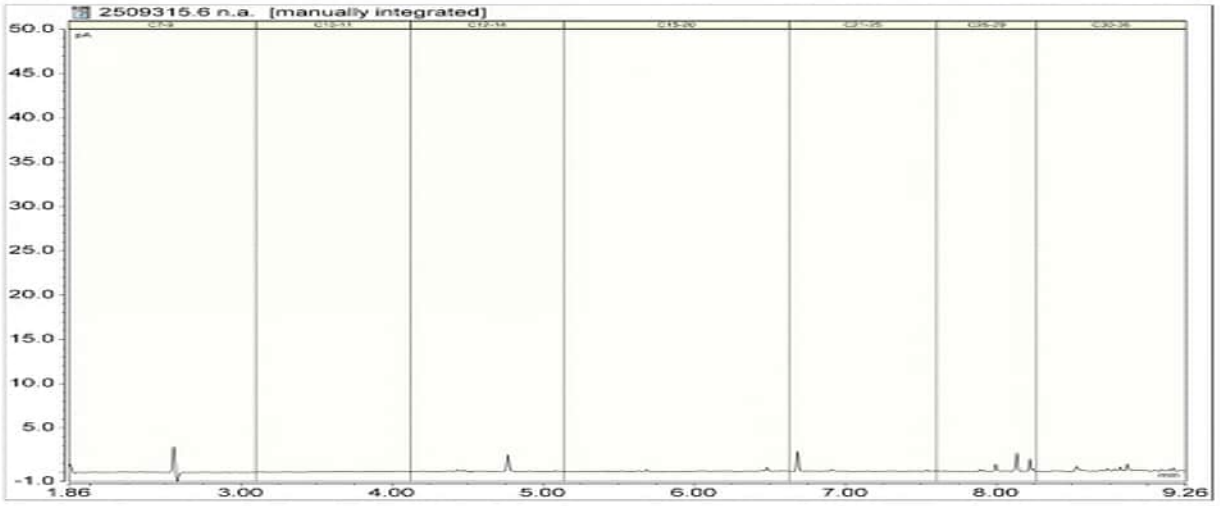
Sample Name:		SS012 0.1-0.2 20-Jan-2021	SS025 0.1-0.2 20-Jan-2021			
Lab Number:		2509315.83	2509315.84			
Individual Tests						
Dry Matter	g/100g as rcvd	80	89	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	7	8	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.81	0.18	-	-	-
Total Recoverable Chromium	mg/kg dry wt	19	21	-	-	-
Total Recoverable Copper	mg/kg dry wt	16	23	-	-	-
Total Recoverable Lead	mg/kg dry wt	40	19.3	-	-	-
Total Recoverable Nickel	mg/kg dry wt	8	26	-	-	-
Total Recoverable Zinc	mg/kg dry wt	210	87	-	-	-
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	< 0.013	< 0.011	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Anthracene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.04	< 0.03	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.04	< 0.03	-	-	-

Sample Type: Soil						
Sample Name:		SS012 0.1-0.2 20-Jan-2021	SS025 0.1-0.2 20-Jan-2021			
Lab Number:		2509315.83	2509315.84			
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Chrysene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Fluoranthene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Fluorene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	-	-	-
Perylene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Phenanthrene	mg/kg dry wt	< 0.013	< 0.011	-	-	-
Pyrene	mg/kg dry wt	< 0.013	< 0.011	-	-	-

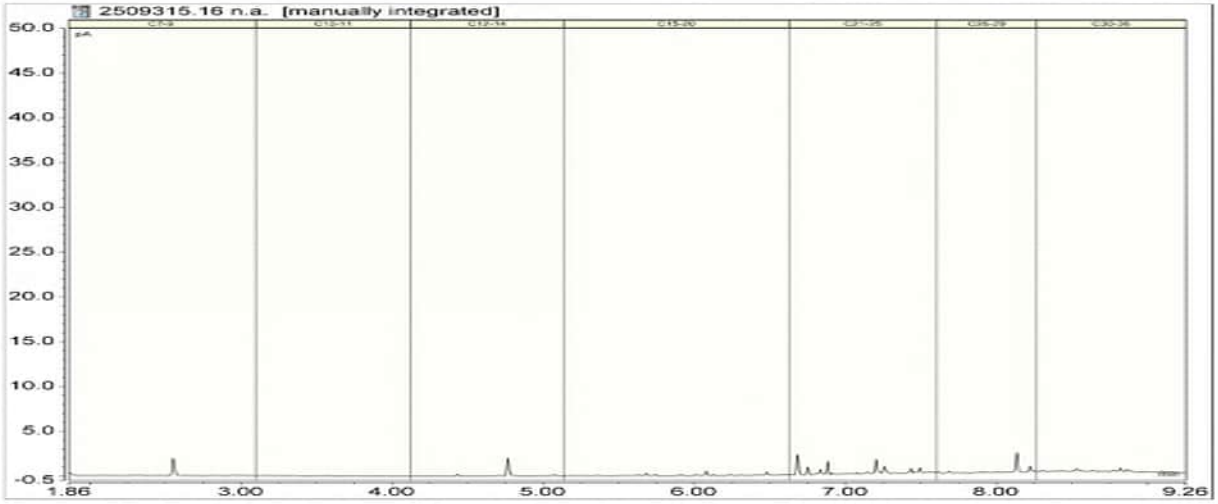
2509315.3
TP037_1 0.1-0.2 14-Jan-2021
Client Chromatogram for TPH by FID



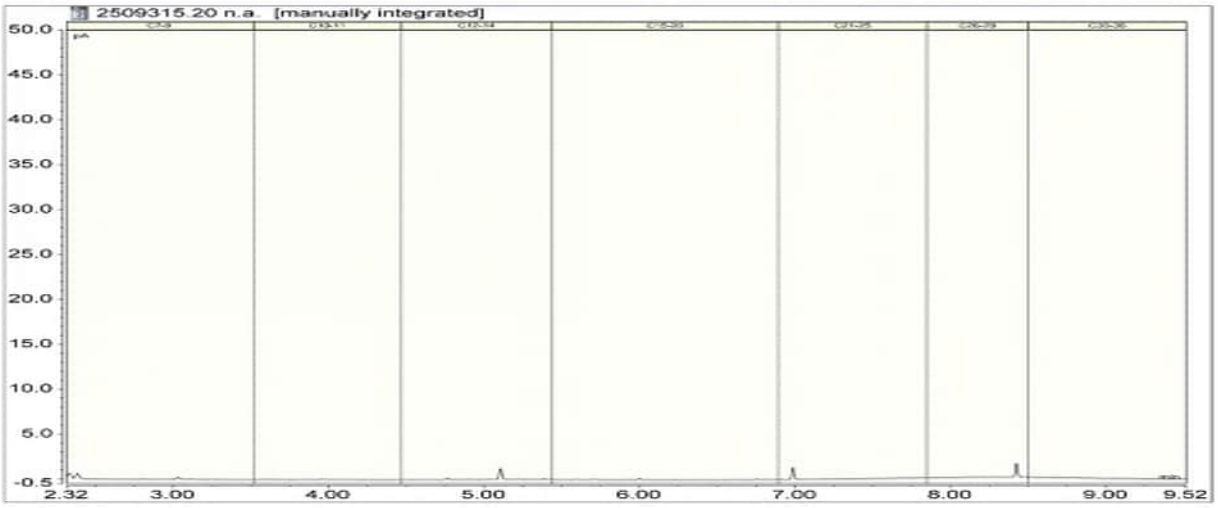
2509315.6
TP041_1 0.1-0.2 14-Jan-2021
Client Chromatogram for TPH by FID



2509315.16
TP039_3 1.6-1.7 14-Jan-2021
Client Chromatogram for TPH by FID



2509315.20
TP036_4 2.5-2.6 14-Jan-2021
Client Chromatogram for TPH by FID



Analyst's Comments

Amended Report: This certificate of analysis replaces report '2509315-SPv2' issued on 26-Jan-2021 at 4:16 pm.
Reason for amendment: Additional testing added as per clients request.

Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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%.	-	1-6, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 49, 51-52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-6, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
2M KCl Extraction*	2M potassium chloride extraction of as received fraction for analysis of NH4N, NO2N and NO3N. Analyst, 109, 549, (1984).	-	21
Total Cyanide Distillation*	Distillation of sample as received. APHA 4500-CN^- C (modified) 23rd ed. 2017.	-	21
Total Cyanide*	Distillation, colorimetry. APHA 4500-CN^- C (modified) 23rd ed. 2017 & Skalar Method I295-004(+P14). ISO 14403:2012(E).	0.10 mg/kg dry wt	21
Ammonium-N*	2M potassium chloride extraction on as received fraction. Phenol/hypochlorite colorimetry. Flow Injection Analyser. APHA 4500-NH_3 H (modified) 23rd ed. 2017.	5 mg/kg dry wt	21
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1-6, 13-18, 20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	1-6, 13-18

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, 13-22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 49, 51-52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	20-21
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	20, 22, 24, 26, 29-30, 32, 35-36, 38, 40, 42, 45, 47, 52, 54, 57, 60, 62-63, 67-68, 70-72, 75-76, 78, 80, 83-84
Semivolatile Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 30 mg/kg dry wt	19, 21
TPH + PAH + BTEX profile	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	20
Volatile Organic Compounds Screening in Soil by Headspace GC-MS	Sonication extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	-	13-18
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.	-	3, 6, 16, 20
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	8 mg/kg dry wt	1-6, 13-18, 20-21
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-6, 13-18, 20-21
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-6, 13-18, 20-21
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	1-6, 13-18, 20-21

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

Testing was completed between 20-Jan-2021 and 03-Feb-2021. 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.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	2509328	A2Pv1
Contact:	Sarah Ensoll	**Date Received:**	18-Jan-2021	
	C/- Aurecon New Zealand Limited	**Date Reported:**	22-Jan-2021	
	PO Box 9762	**Quote No:**	109279	
	Newmarket	**Order No:**	510611	
	Auckland 1149	**Client Reference:**	510611	
		Submitted By:	Sarah Ensoll	

Sample Type: Soil

Sample Name:		TP035_1 0.1-0.2 14-Jan-2021	TP036_1 0.1-.02 14-Jan-2021	TP037_1 0.1-0.2 14-Jan-2021	TP039_1 0.1-0.2 14-Jan-2021	TP040_1 0.1-0.2 15-Jan-2021
Lab Number:		2509328.1	2509328.2	2509328.3	2509328.4	2509328.5
Asbestos Presence / Absence		Asbestos NOT detected.	Amosite (Brown Asbestos) and Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT 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	< 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	755.6	668.5	683.8	543.8	712.4
Dry Weight	g	621.4	561.0	522.3	406.1	518.8
Moisture	%	18	16	24	25	27
Sample Fraction >10mm	g dry wt	23.5	48.7	38.4	14.6	17.8
Sample Fraction <10mm to >2mm	g dry wt	73.5	44.2	155.6	106.5	246.4
Sample Fraction <2mm	g dry wt	524.4	467.6	326.6	284.0	252.3
<2mm Subsample Weight	g dry wt	58.3	50.0	52.7	58.9	55.6
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	0.00032	< 0.00001	< 0.00001	< 0.00001

Sample Name:		TP041_1 0.1-0.2 14-Jan-2021	TP035_3 1.8-1.9 14-Jan-2021	TP036_3 2.1-2.2 14-Jan-2021	TP037_3 1.0-1.1 14-Jan-2021	TP039_3 1.6-1.7 14-Jan-2021
Lab Number:		2509328.6	2509328.13	2509328.14	2509328.15	2509328.16
Asbestos Presence / Absence		Asbestos NOT detected.	Amosite (Brown Asbestos) and Chrysotile (White Asbestos) detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	Fibre cement and Loose fibres	Loose fibres	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	0.245	< 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

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:		TP041_1 0.1-0.2 14-Jan-2021	TP035_3 1.8-1.9 14-Jan-2021	TP036_3 2.1-2.2 14-Jan-2021	TP037_3 1.0-1.1 14-Jan-2021	TP039_3 1.6-1.7 14-Jan-2021
Lab Number:		2509328.6	2509328.13	2509328.14	2509328.15	2509328.16
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	0.001	< 0.001	< 0.001
As Received Weight	g	740.0	713.2	722.3	729.8	596.2
Dry Weight	g	580.6	569.2	596.8	576.4	470.0
Moisture	%	22	20	17	21	21
Sample Fraction >10mm	g dry wt	8.5	84.3	105.1	172.9	51.0
Sample Fraction <10mm to >2mm	g dry wt	138.8	260.5	229.4	146.1	121.3
Sample Fraction <2mm	g dry wt	431.4	223.4	261.1	255.8	297.2
<2mm Subsample Weight	g dry wt	58.4	57.9	57.0	58.1	56.3
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	1.3952	< 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	0.00288	0.00613	< 0.00001	< 0.00001

Sample Name:		TP040_3 1.9-2.0 15-Jan-2021	TP041_3 2.6-2.7 14-Jan-2021	SS005 0.1-0.2 13-Jan-2021	SS008 0.1-0.2 13-Jan-2021	SS009 0.1-0.2 13-Jan-2021
Lab Number:		2509328.17	2509328.18	2509328.26	2509328.29	2509328.30
Asbestos Presence / Absence		Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		Loose fibres	-	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	679.6	691.3	714.2	531.5	612.0
Dry Weight	g	466.7	563.7	623.0	426.6	397.1
Moisture	%	31	18	13	20	35
Sample Fraction >10mm	g dry wt	17.2	101.3	< 0.1	13.6	< 0.1
Sample Fraction <10mm to >2mm	g dry wt	190.3	180.3	272.8	118.9	213.8
Sample Fraction <2mm	g dry wt	258.4	280.3	347.9	293.7	182.5
<2mm Subsample Weight	g dry wt	57.6	57.0	57.6	52.8	56.0
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	0.00135	< 0.00001	0.00008	< 0.00001	< 0.00001

Sample Name:		SS012 0.1-0.2 15-Jan-2021	SS013 0.1-0.2 15-Jan-2021	SS016 0.1-0.2 15-Jan-2021	SS017 0.1-0.2 13-Jan-2021	SS019 0.1-0.2 13-Jan-2021
Lab Number:		2509328.33	2509328.34	2509328.37	2509328.38	2509328.40
Asbestos Presence / Absence		Chrysotile (White Asbestos) detected.	Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		Loose fibres	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	444.7	670.5	592.1	573.6	635.9
Dry Weight	g	348.8	509.3	446.1	447.6	480.4

Sample Type: Soil						
Sample Name:		SS012 0.1-0.2 15-Jan-2021	SS013 0.1-0.2 15-Jan-2021	SS016 0.1-0.2 15-Jan-2021	SS017 0.1-0.2 13-Jan-2021	SS019 0.1-0.2 13-Jan-2021
Lab Number:		2509328.33	2509328.34	2509328.37	2509328.38	2509328.40
Moisture	%	22	24	25	22	24
Sample Fraction >10mm	g dry wt	< 0.1	70.9	31.8	15.0	124.3
Sample Fraction <10mm to >2mm	g dry wt	192.7	320.9	180.6	206.4	220.5
Sample Fraction <2mm	g dry wt	155.2	117.1	232.8	225.5	135.3
<2mm Subsample Weight	g dry wt	59.9	56.2	54.6	52.5	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	0.00003	0.00006	< 0.00001	< 0.00001	< 0.00001

Sample Name:		SS028 0.1-0.2 15-Jan-2021	SS030 0.1-0.2 15-Jan-2021	SS035 0.1-0.2 15-Jan-2021	SS037 0.1-0.2 15-Jan-2021	SS040 0.1-0.2 15-Jan-2021
Lab Number:		2509328.49	2509328.51	2509328.56	2509328.58	2509328.61
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	648.0	575.9	636.4	450.6	360.5
Dry Weight	g	546.4	425.1	503.8	289.9	270.9
Moisture	%	16	26	21	36	25
Sample Fraction >10mm	g dry wt	85.6	5.6	16.1	8.3	10.2
Sample Fraction <10mm to >2mm	g dry wt	155.0	109.9	206.1	104.5	90.9
Sample Fraction <2mm	g dry wt	304.8	309.0	280.4	176.7	169.0
<2mm Subsample Weight	g dry wt	60.0	59.2	55.1	56.8	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:		SS043 0.1-0.2 18-Jan-2021	SS045 0.1-0.2 18-Jan-2021	SS046 0.1-0.2 18-Jan-2021	SS050 0.1-0.2 13-Jan-2021	SS051 0.1-0.2 15-Jan-2021
Lab Number:		2509328.64	2509328.66	2509328.67	2509328.71	2509328.72
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	573.9	530.1	527.3	769.6	553.5
Dry Weight	g	464.6	391.6	394.0	653.8	414.4
Moisture	%	19	26	25	15	25
Sample Fraction >10mm	g dry wt	< 0.1	2.2	< 0.1	23.1	57.3
Sample Fraction <10mm to >2mm	g dry wt	141.1	50.9	198.0	183.0	118.0
Sample Fraction <2mm	g dry wt	322.5	338.6	194.9	446.9	238.7

Sample Type: Soil						
Sample Name:		SS043 0.1-0.2 18-Jan-2021	SS045 0.1-0.2 18-Jan-2021	SS046 0.1-0.2 18-Jan-2021	SS050 0.1-0.2 13-Jan-2021	SS051 0.1-0.2 15-Jan-2021
Lab Number:		2509328.64	2509328.66	2509328.67	2509328.71	2509328.72
<2mm Subsample Weight	g dry wt	58.0	55.9	51.5	56.8	56.3
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:		SS053 0.1-0.2 15-Jan-2021	SS054 0.1-0.2 15-Jan-2021	SS055 0.1-0.2 13-Jan-2021	SS058 0.1-0.2 13-Jan-2021	SS059 0.1-0.2 13-Jan-2021
Lab Number:		2509328.74	2509328.75	2509328.76	2509328.79	2509328.80
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	687.3	652.0	605.5	681.2	533.0
Dry Weight	g	545.4	499.2	472.7	507.1	423.8
Moisture	%	21	23	22	26	20
Sample Fraction >10mm	g dry wt	171.0	8.7	9.8	5.0	5.6
Sample Fraction <10mm to >2mm	g dry wt	199.2	273.6	185.1	210.1	189.2
Sample Fraction <2mm	g dry wt	174.8	216.8	277.6	291.9	228.6
<2mm Subsample Weight	g dry wt	59.7	58.1	54.1	56.4	57.6
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:		SS061 0.1-0.2 13-Jan-2021	SS063 0.1-0.2 13-Jan-2021			
Lab Number:		2509328.82	2509328.84			
Asbestos Presence / Absence		Chrysotile (White Asbestos) detected.	Asbestos NOT detected.	-	-	-
Description of Asbestos Form		Loose fibres	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	-	-	-
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	-	-	-
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	-	-	-
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	-	-	-
As Received Weight	g	547.7	598.6	-	-	-
Dry Weight	g	359.0	469.3	-	-	-
Moisture	%	34	22	-	-	-
Sample Fraction >10mm	g dry wt	6.0	3.0	-	-	-
Sample Fraction <10mm to >2mm	g dry wt	131.2	211.6	-	-	-
Sample Fraction <2mm	g dry wt	221.6	254.7	-	-	-
<2mm Subsample Weight	g dry wt	57.9	52.8	-	-	-
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	-	-	-
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	-	-	-

Sample Type: Soil						
Sample Name:	SS061 0.1-0.2 13-Jan-2021	SS063 0.1-0.2 13-Jan-2021			
Lab Number:	2509328.82	2509328.84			
Weight of Asbestos as Asbestos Fines (Friable)* g dry wt	0.00006	< 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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Wgt of Asbestos as Asbestos Fines in <10mm >2mm Fraction*	Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.00001 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
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; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
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, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
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, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-6, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84
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, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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, 13-18, 26, 29-30, 33-34, 37-38, 40, 49, 51, 56, 58, 61, 64, 66-67, 71-72, 74-76, 79-80, 82, 84

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

Testing was completed on 22-Jan-2021. 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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