WILLIAMSON
WATER & LAND ADVISORY

40 Elliot Street, Papakura

Preliminary and Detailed Site Investigation (Ground Contamination)

SOIL AND ROCK CONSULTANTS

WWLA1078 | Rev. 2

3 April 2024

WWLA

40 Elliot Street, Papakura

Project no:	WWLA1078
Document title:	Preliminary and Detailed Site Investigation (Ground Contamination)
Revision:	2
Date:	3 April 2024
Client name:	Soil and Rock Consultants
Project manager:	Shane Moore
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File name:	G:\Shared drives\Projects\Soil and Rock Consultants\WWLA1078_Papakura Courthouse\Deliverables\WWLA_Papakura Courthouse_Rev 2_030424.docx

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Document history and status

Rev	Date	Description	By	Review	Approved
1	19 March 2024	Ground contamination investigation for due diligence	Penelope Lindsay	Shane Moore	Shane Moore
2	3 April 2024	Ground contamination investigation for due diligence	Penelope Lindsay	Shane Moore	Shane Moore

Distribution of copies

Rev	Date issued	Issued to	Comments
1	19 March 2024	Soil and Rock Consultants	Draft for client comment – second round of gas monitoring to be undertaken.
2	3 April 2024	Soil and Rock Consultants	Final draft for client comment following completion of second round of gas monitoring.

Investigation Summary

Williamson Water & Land Advisory Ltd (WWLA) has prepared this ground contamination assessment to assist Soil & Rock Consultants (S&R) and its client, Ministry of Justice, with developing an interim courthouse at 40 Elliot Street, Papakura. The objective of this investigation was to determine the potential for contamination, assess ground conditions and confirm the ground contamination-related implications for the development. The key findings of this assessment are:

History and potential for contamination [Section 3]	**An evaluation of past activities against the Ministry for the Environment's Hazardous Activities and Industries List (HAIL; those with potential to cause ground contamination) was undertaken to inform the resource consent planning assessment and proposed soil disturbance.** • Review of the site history indicates the site was located on farmland at the edge of the Pahurehure Inlet, with the western boundary partially reclaimed by 1959, likely associated with operation of the Ray Small Park closed landfill known to be located immediately west of the site. In the 1970s the entire site was earthworked, presumably for final levelling for development and the Returned Services Assocation (RSA) building was constructed in the late 1970s. • Owing to the presence of up to some 4 m of fill beneath the site, HAIL Activity G3 (landfill sites) is considered to apply.
Site investigation [Section 4]	**Site investigations involved soil sampling, instantaneous surface emission monitoring (ISM) and soil gas measurements around underground services and manholes.** • Soil samples were collected via hand auger around the building. On the western side of the building up to 3 m of fill was encountered, described as silty gravel and gravelly clay, variably brown, green and orange. • Up to 1 m of gravelly silt fill was encountered at the remaining investigation locations. • No visual or olfactory evidence of contamination, including presence of waste materials, was noted in either fill units. The results of laboratory soil analyses showed: • Topsoil and fill contain low concentrations of metals, SVOCs and asbestos, above expected background ranges but below NESCS and AUP criteria, so these material do not present an unacceptable risks to human health or the environment. • Underlying natural soils can be considered cleanfill, once scrapped clean of any overlying fill material. Landfill gas screening indicates that the existing building platform has a low landfill gas risk.
Conceptual site model (CSM) [Section 5]	The CSM, a process to identify potential risk to people and environmental receptors during and post soil disturbing activities, shows there are **no unacceptable risks posed by ground contamination to site workers and environmental receptors during site development or subsequent use as a courthouse.** All soils can be reused on site but fill requiring offsite disposal will need to go to a managed fill site.
Future development implications [Section 6]	**Consent is expected to be required to be obtained on a controlled activity basis under the NESCS. Standard earthworks controls and procedures are applicable during development works.** • Consent for soil disturbance is not required under Section E30 of the Auckland Unitary Plan. • Earthworks can be carried out in accordance with standard earthworks controls and no contaminated land-specific health and safety procedures is required. • Surplus surficial fill requires disposal to managed fill. Excluding the upper 100-200 mm underlying natural soils are expected to be suitable for disposal as cleanfill. • Landfill gas mitigation measures are not expected to be required in building design or construction. But if a precautionary approach is preferred cutoffs could be installed in new wastewater and stormwater connections to east and south of the courthouse as the existing large diameter / deep underground services are expected to be the most likely pathway by which landfill gas could migrate from the adjoining closed landfill. • An asbestos survey of the building should be undertaken before any demolition activity. If present asbestos will need to be removed from the existing building and associated infrastructure by a Licensed Asbestos Removalist.

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1. Introduction

Williamson Water & Land Advisory (WWLA) has prepared this ground contamination assessment, comprising combined preliminary and detailed site investigations (PSI and DSI), to assist the Ministry of Justice (MoJ), via Soil and Rock Consultants (S&R), with development of an interim courthouse at 40 Elliot Street Papakura, Auckland (referred to herein as 'the site', see **Figure 1**).

Figure 1. Site location, outline in red (Image source: LINZ)

1.1 Background

The current Papakura courthouse is not fit for purpose, so MoJ propose to develop a new interim courthouse at the site while repairs on the original courthouse take place. The design life of the interim structure is intended to be at least 20 years. The site is currently occupied by building that was formerly used by the Returned Services Association (RSA). If possible MoJ would like to utilise off-site construction methodologies and reuse the floor slab of the existing building to support a central portal frame structure containing the courtrooms, with modular units adjacent, containing all other amenities.

The site adjoins Auckland Council's Ray Small Park closed landfill and previous investigations undertaken by S&R indicate that uncontrolled fill material extends into the western and southern parts of the site. Filling is potentially an activity included on the Ministry for the Environment's Hazardous Activities and Industries List (HAIL). Land where HAIL activities have occurred is subject to the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (the NESCS) and it may also be subject to the contaminated land requirements of the Auckland Unitary Plan (AUP). Additionally, there is a potential for landfill gas effects associated with Council's close landfill.

This investigation has been undertaken to:

1. Confirm the site's history and assess whether any HAIL[1] activities have occurred.
2. Determine the actual contamination present (if any), and the implications for consenting and construction of the interim courthouse.

1.2 Scope of work

The scope of this investigation comprised:

1. Assessment of the site's history comprising review of:
    a) Historical aerial photographs sourced from Retrolens, Auckland Council GeoMaps and Google Earth.
    b) The Auckland Council property file.
    c) Previous investigations provided by Auckland Council's closed landfill team.
2. Site walkover inspection by a Suitably Qualified and Experienced Practitioner (SQEP)/Contaminated Land Specialist.
3. Assessment of the potential for contamination, based on the current and historical land use and evaluation of that against the HAIL.
4. Site investigations comprising:
    a) Collection and testing of soil samples to investigate potential ground contamination impacts.
    b) Instantaneous surface monitoring (ISM) for methane and installation and monitoring of temporary gas probes to screen for landfill gas conditions in ground.
5. Development of a conceptual site model (CSM) to assess contaminant risks and mitigation requirements.
6. Evaluation of the implications of the findings on design, consenting, earthworks/construction, and post-construction for the proposed redevelopment.

1.3 Legislative requirements

WWLA has undertaken the investigations and prepared this report in general accordance with requirements of a preliminary site investigation (PSI) and detailed site investigation (DSI) as set out in industry best practice guidance, including:

- Ministry for the Environment (MfE) Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2021), (CLMG1);
- MfE's Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2021), (CLMG5); and
- New Zealand Guidelines for Assessing and Managing Asbestos in Soil (NZAG; BRANZ, November 2017).

This report has been prepared, reviewed, and certified by SQEPs as described in the NESCS Users' Guide[2]. CVs confirming the SQEP status of our contaminated land specialists are available on request.

[1] Ministry for the Environment's Hazardous Activities and Industries List.
[2] Ministry for the Environment. 2012. Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

2. Site Description

2.1 Site identification

The property comprises a single land parcel on the southern side of Elliot Street, Papakura. The property details are described in **Table 1**.

Table 1. Site details

Address	Legal description	Certificate of title	Area (m^2)	Zoning (Auckland Unitary Plan)
40 Elliot Street, Papakura 2113	Lot 3 DP 468814	629977	7,925	Residential – mixed housing urban

2.2 Site setting

The site setting is described in **Table 2**. The features of the site setting are considered in the context of their potential to affect the distribution, mobility and form of contaminants (if present).

Table 2. Environmental setting

Surrounding land use	The site is located at the edge of the Papakura town centre so surrounding use is a mixture of commercial, community, and residential properties. Immediately south of the site, and sharing the same carpark, is the Hawkins Theatre and a further 130m south of the site is Papakura Central School. To the west of the site is Ray Small Park (a closed landfill) and to the north across Elliot Street are various commercial or light industrial businesses including a dance studio, picture framer, mechanical workshop and to the northeast a Caltex service station. Land to the east is under high-density residential use (townhouses).
Topography and drainage	*The topography and drainage influences where contaminants may migrate to if present and surface water features are potential receiving environments for contaminants (if any) derived from the site.* The topography surrounding the site falls to gently the southwest, with the site having an elevation of approximately 11 m RL in its northeast corner and around 8 m RL along its southern boundaries. A single building is located on the site. The building is surrounded by asphalt car park areas to the north, south and west which controls surface runoff into stormwater drain systems. Auckland Council GeoMaps indicates that stormwater in the area is reticulated to the west, ultimately discharging to the Pahurehure Inlet of the Manukau Harbour which is located some 170 m away. Information on GeoMaps shows an overland flow path near the southern boundary, and potential for flooding across the southern quarter of the site, including impinging slightly on the existing building.
Geology	*The geology is considered in the context of describing the conceptual site model (CSM) (**Section 5**) should a potential for contamination be identified by the desk study component of this report. For example, more porous soils can enable contaminants (if present) to move more quickly and potentially further than clay-rich soils that retain or prevent penetration of contaminants.* The published geological map[3] shows the site is located on Puketoka Formation sediments, but this and other investigations (refer **Section 3.2.3**) indicate that fill was used to reclaim the site and surrounds in the 1950s-1970s Fill of up to 4 m in thickness is underlain by Puketoka Formation silty clay and clayey silt, with sandy alluvial deposits present closer to the location of the former inlet along the western boundary.
Hydrogeology	*Hydrogeological conditions affect the potential risk of a contaminant entering and being transported in groundwater*. Geotechnical investigations conducted concurrently by S&R[4], and previous investigations (refer **Section 3.2.3**), have encountered groundwater between approximately 2.5 m to 3.5 m below ground level (m BGL) at the site. Shallow groundwater is expected to follow the topography, flowing to the west towards the Papakura Inlet.

[3] Kermode, L.O., 1992. Geology of the Auckland urban area. Scale 1:50,000. Institute of Geological & Nuclear Sciences geological map 2
[4] Geotechnical Investigation for Proposed District Courthouse at 40 Elliot Street, Papakura. Report prepared for Ministry of Justice by Soil and Rock Consultants, dated 5 March 2024. Reference: 220761 - Rev A.

Sensitive receptors	*Sensitive human receptors could, for example, be children at a school or kindergarten on or adjacent to a site. Workers on industrial land (including or adjacent to a site) would be considered less sensitive.* The site surrounds are occupied by a mixture of school, recreational and residential land uses. Occupants and users of these lands could be considered sensitive receptors.
	Sensitive environmental receptors could include aquatic or terrestrial ecosystems. This is not an ecological assessment but is instead an initial review of the surrounding environment to assess where contaminants (if present) on the site could migrate to and affect. The ecosystem of the Papakura Inlet could be considered sensitive given its proximity to the site.

3. HAIL Assessment

This section details a HAIL Assessment, a review of current and historical activities to determine whether activities listed on MfE's HAIL have occurred on the site. The findings of the HAIL Assessment inform the scope of detailed investigations (sampling) and the subsequent contamination consenting assessment.

3.1 Site layout and current use

The site was visited by a SQEP from WWLA on a number of occasions during February 2024. Site observations and selected photographs are provided below:

- The site is accessed via Elliot Street and contains one building within a carpark that is shared with the neighbouring Hawkins Theatre to the south. The site has an open boundary with Ray Small park (closed landfill) and skate park to the west, a St John ambulance base to the southwest, and a fenced boundary with a high-density residential development to the east.
- The building is vacant but was most recently occupied by the Papakura RSA and a culinary school.
- Building construction material is predominantly a mixture of brick, timber and corrugated sheet metal roofs (Photograph 1 to Photograph 4). However soffits and some facia panels comprise fibre cement board, which has the potential to contain asbestos. A covered walkway, also clad with fibre cement board, is located along the northern side of the building (Photograph 3). The building appeared to be in good condition.
- The site slopes down gently to the west. The southeastern end of the building has been built into the slope creating a partial basement (**Photograph 5**).
- Landscaped borders are present along the northern boundary of the site (Elliot Street frontage) and at the western entrance to the building. All vegetation appeared healthy with no visible signs of distress (**Photograph 1, Photograph 6 and Photograph 7**).
- There are two garages / sheds in the southern corner of the site, constructed from profiled steel over the asphalt pavement. The interiors of the sheds were not inspected but were expected to be empty given that the main building was vacant (**Photograph 8**).
- No signs of surface staining or other visual indicators of potential ground contamination were observed.

Photograph 1. View looking southwest from northeast site boundary (Elliot Street) towards former RSA building.

Photograph 2. Building entrance from Elliot Street, view looking east.

Photograph 3. Western entrance to RSA building looking east, showing site sloping to the west.

Photograph 4. Western entrance to RSA building looking east, showing site sloping to the west.

Photograph 5. Southern end of building, formerly used by a culinary school associated with the RSA.

Photograph 6. Area used for carparking south and west of main building, looking south towards Hawkins Theatre.

Photograph 7. View of site from northwestern end of carpark looking north.

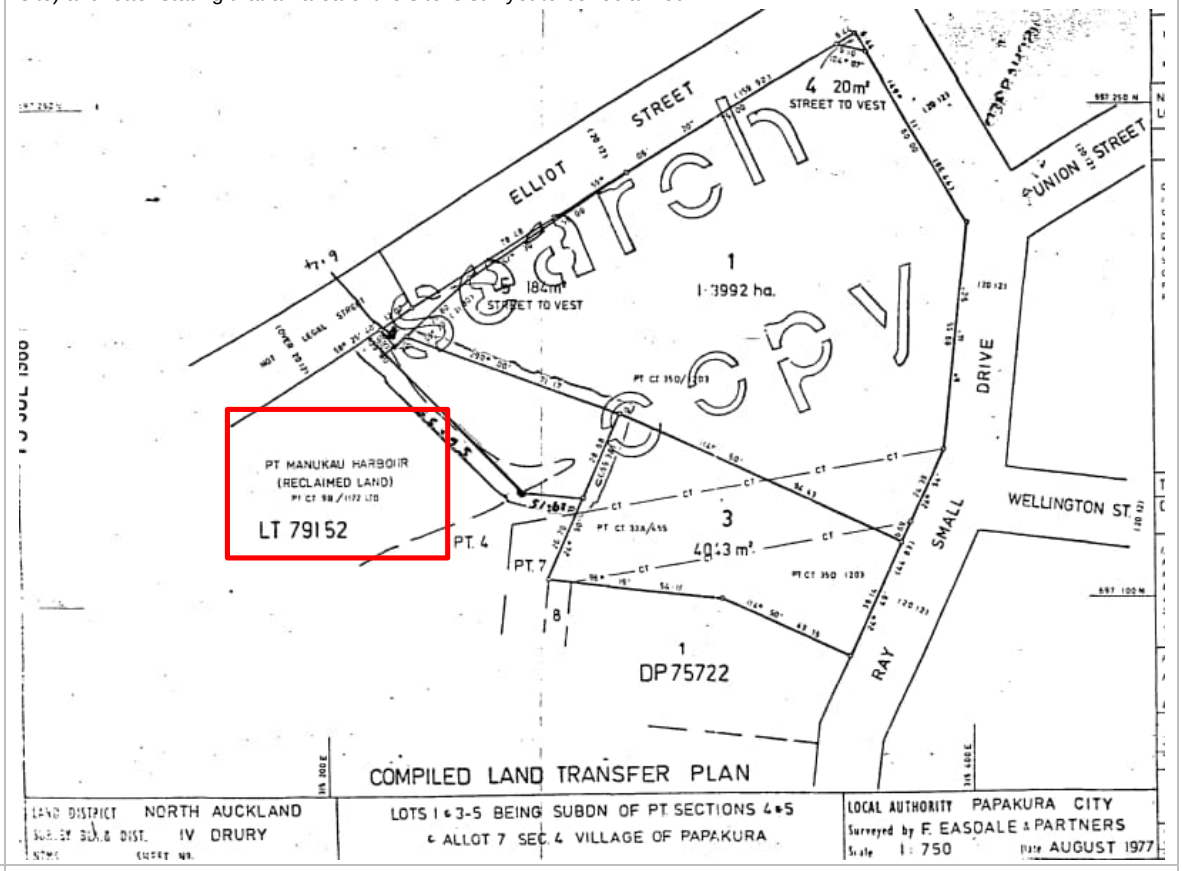
Photograph 8.Two garages in the southeastern corner of the site.

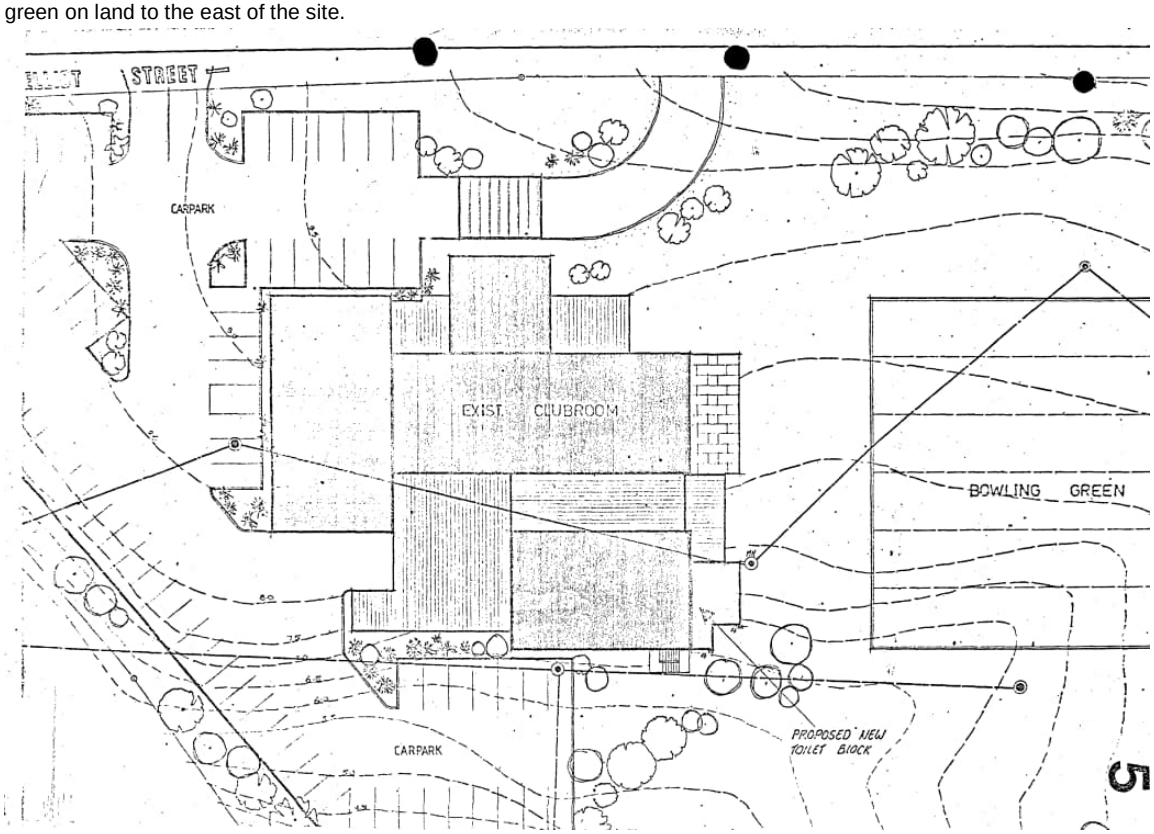
3.2 Site History review

3.2.1 Auckland Council property file

The property file for 40 Elliot Street was received from Auckland Council in March 2024. The documents in the file relevant to prior land uses or potential contamination sources are summarised in **Table 3**.

Table 3. Summary of relevant property file documents

1977-1978	Scheme plan for subdivision showing (red outline) that reclamation of Manukau Harbour has occurred (to southwest of site) and letter stating that an area of the site is still yet to be reclaimed. 
1976	Letter from RSA to Council agreeing to purchase the site.
1978	Building permit for new club building for Papakura RSA. Building materials specified are concrete, timber and iron.
1979	Building permit for a bowling green storage shed for Papakura RSA. Building materials specified are fibrolite walls and iron roof.
1984	Plans for the galvanised iron shed on the southern boundary, plans show it in the current location.
1985	Building permit to add an office block to RSA building. Building materials specified are concrete and brick with iron roofing.
1986	Building permit for a new soil and implement shed for the RSA bowling club. Building materials specified are timber and concrete.
1990	Building permit to alter and extend the RSA building for new kitchen, dining, lounge and toilet facilities. Building materials are concrete, wood and galvanised steel roof.
1990	Geotechnical investigation report for proposed new clubroom extensions. The report states that gravelly silt fill was encountered to 1.2 m depth in both investigation locations. One borehole then encountered impenetrable gravel at 1.2 m depth and could not be advanced further; the second borehole had natural clayey silt below 1.2 m depth. Groundwater was at 3 m depth. The borehole location plan was not attached to the document and could not be located in the file.

~1990	Undated plans for a new clubroom extension including new toilet block (assumed 1990) showing position of bowling green on land to the east of the site. 
1994	Consent for a groundwater take to irrigate the two bowling greens.
1997	Building permit for new garage next to the existing shed in the south of the site.
2015	Permit for alteration to existing building to construct commercial training kitchen.

3.2.2 Aerial photograph review

Historical aerial imagery available from the Retrolens, Auckland Council GeoMaps and Google Earth Pro were reviewed and are summarised in **Table 4**.

Table 4. Historical aerial photograph review

Photograph date (source)	Activities	Aerial image (site in red outline)
1939 Retrolens (SN139/36/9)	The site is vacant and likely used as pasture. The western site boundary borders the Pahurehure Inlet. A gully runs from the inlet along the southern boundary of the site. Surrounding land is also pasture, with residential development occurring further east.	

Photograph date (source)	Activities	Aerial image (site in red outline)
1959 GeoMaps	The western part of the site bordering the inlet has been partially reclaimed. The wider site remains vacant and unchanged. The reclamation to the west shows disturbed soil so is actively being filled at this time. A partial image available from Retrolens for 1961 suggests that filling continued to extend out to the west of the site. Land to the north has been redeveloped for commercial use and additional residential development has occurred in the wider surrounding area.	
1979 Retrolens (SN5783B/T/11)	The site has been fully developed, with the RSA building and surrounding car park constructed. Reclamation of the inlet to the west/northwest is complete and development of land to the south and southwest also appears to have involved filling. The bowling green has been established immediately east of the site.	
1989 Retrolens (SN8772/U/4)	Additions to the northeast of the building have occurred and a shed has been built in the south. A second bowling green has been built to the southeast of the site, and reserve land established to the west.	

Photograph date (source)	Activities	Aerial image (site in red outline)
2001 GeoMaps	Some additions to the building have occurred since 1989, widening the building footprint. The shed in the south of the site has been replaced. The Hawkins Theatre has been constructed to the south.	
2003, 2006 (pictured), 2008, 2010 GeoMaps	No material changes evident on the site or on surrounding land relative to 2001 imagery.	
2017 GeoMaps	No material changes evident onsite. Both bowling greens to the east have been removed and this area is being redeveloped.	

3.2.3 Other information

3.2.3.1 Geotechnical investigations

S&R completed a preliminary geotechnical investigation of the site in 2022[5]. Machine- and hand-drilled boreholes advanced across the site encountered between 1.3-4.8 m of nonengineered fill. It was interpreted

[5] Geotechnical Investigation for Concept Design of Proposed Courthouse at 40 Elliot Street, Papakura, Report prepared for Ministry of Justice by Soil and Rock Consultants, dated 30 September 2022. Reference: 220761-Rev A.

that fill closer to the building was associated with its construction but the thicker deposits of fill encountered at the western and southern margins of the site were associated with reclamation undertaken in the site surrounds. The cohesive fill was described as clayey silt and silty clay with occasional inorganic materials (paper, plastic, wood, brick, rubber, glass). However, our review of the borehole logs shows that the fill did not include refuse (domestic rubbish) or significant quantities of organic material. Groundwater was encountered at between 2 and 3.4 m BGL during drilling works but was measured depths of between 2 and 2.7 m BGL in a piezometer installed for this purpose.

As noted in **Section 2.2**, S&R undertook additional geotechnical investigations concurrently with this assessment. From a ground contamination perspective the findings were broadly consistent with those described above. However, the additional investigations were focussed immediately around the existing building and encountered considerably less in organic wastes within the fill materials.

Auckland Council's closed landfill team also provided a number of geotechnical investigation reports (refer to **Section 3.2.3.2**) however, the only additions to S&R's findings were:

- The landfill materials underlying Ray Small Park are overlain by a clay cap of highly variable thickness (0.1 to 2 m, although generally >1 m) which is covered by some 200 mm of topsoil[6].
- Fill was confirmed as extending up to 4 m BGL in the vicinity of the skate park. The fill was described as refuse but review of the borehole logs indicates it principally comprised inorganic wastes such as concrete, tiles, glass, plastic, brick, wire etc. Some localised areas of paper and organic material and associated odours were identified.
- Fill materials thickened slightly (up to some 5 m BGL) to the northwest, in the vicinity of the Badminton Club, and also contained more refuse type wastes[7].

3.2.3.2 Auckland Council closed landfill records

WWLA requested information from Auckland Council's closed landfill on its monitoring records relating to Ray Small Park closed landfill. Monitoring reports for the period from 2019 through 2023[8] were provided and in summary show:

- The closed landfill is classified under the Council's own framework as having a "moderate" potential for landfill gas generation.
- ISM surveys of the Badminton Club building (north of Elliot Street) and Northern (near the skate park) and Southern toilet blocks are carried out annually.
- Methane measurements of up to 650 ppm were reported in 2021 and early 2022 but no methane was detected in November 2022. The trigger level for further investigation is 1,000 ppm.
- The reports conclude that the landfill gas monitoring does "not indicate a significant risk" to human health.
- Visual inspection of the wider park and sampling of leachate discharges into the Pahurehure Inlet are also undertaken but are not considered relevant given the separation distance from the subject site.

The information provided by Auckland Council also included an Assessment of Environmental Effects prepared in 2007[9].

- The report states that there is limited historical information about the nature and extent of filling but notes that "It is believed to have received municipal waste from the Papakura District and the landfill most likely closed during the mid 1970s…".

[6] Geotechnical Investigation for Skate Park Extensions, Ray Small Park, Papakura. Report prepared for Isthmus Group by Geotek Services Limited, dated 18 June 2014. Reference: 4802.
[7] Proposed Extension to Ray Phillips (Badminton) Hall, Elliot Street, Papakura. Geotechnical Investigation Report. Report prepared for Counties Manukau Badminton Association by Geotek Services Limited, dated 1 May 2008. Reference: 3885.
[8] Tonkin & Taylor Ltd, January 2023. *Landfill Gas Monitoring Report, Ray Small Park (Elliot Street) Closed Landfill: February 2022 to January 2023*. Prepared for Auckland Council - Closed Landfills Team. Reference: 28645.5020 v2
[9] Elliot closed landfill, Assessment of Environmental Effects. Report prepared for Papakura District Council by Environmental & Earth Sciences Ltd, dated March 2007. Reference: 305045 AEE (Rev1).

- While only eight test pits were excavated across the landfill it is reported that "*there was little evidence of household putrescible waste and no evidence of any hazardous or industrial wastes*". The fill is reported to have mainly consisted of "*building rubble (brick and timber), glass, paper, plastics and wire/fence materials…"*
- Landfill gas was not encountered during excavation of the test pits.
- Soil samples were tested for metals and semi-volatile organic compounds (SVOCs), which showed that while these analytes were locally present above background concentrations they complied with the guidelines for residential and parkland use adopted at the time.

3.2.3.3 11 Ray Small Drive

The property file for the residential development on 11 Ray Small Drive was obtained to determine if investigations, particularly a landfill gas assessment, had been undertaken on this site. A combined DSI and remediation action plan (RAP)[10] were identified in the file. However, no landfill gas investigations were conducted, and only low concentrations of metals and polycyclic aromatic hydrocarbon (PAH) contamination were reported in fill encountered at the site. The nature and extent of fill is not described in the report. Higher contaminants levels were encountered in the surface soils of the former bowling greens.

3.2.4 Summary

In summary, the site history review indicates that:

- The site originally comprised farmland at the edge of the Pahurehure Inlet.
- Its western boundary was partially reclaimed by 1959, which appears to coincide with the commencement of operation of a wider landfill, which is now occupied by Ray Small Park. While the landfill is believed to have received municipal wastes investigations have identified principally inorganic materials such as building rubble, glass, paper, plastics and wire.
- In the 1970s the entire site was earthworked, presumably for final levelling for development.
- The RSA building was constructed in the late 1970s and had several additions and internal alterations through to the 2010s. Two bowling greens associated with the RSA were located east and southeast of the site (now removed).
- Previous investigations have confirmed that up to 4 m of cohesive fill is present at the western and southern ends of the site. The fill thins rapidly to the northeast and is only present as a thin veneer in the vicinity of the former RSA building. No evidence of household putrescible waste or hazardous or industrial wastes have been identified in the fill materials investigated beneath the site.
- Landfill gas monitoring conducted in relation to the Ray Small Park closed landfill does not indicate a significant risk to human health.

3.3 Potential for contamination

Potentially contaminating activities identified for the site are described in **Table 5** along with an assessment of the likelihood and magnitude of any contamination resulting from the activity, and whether the activity constitutes a HAIL. Colour coding in the table is used to indicate:

- Red highlight indicates a confirmed HAIL activity.
- Orange highlight indicates activities that have the potential to be a HAIL but require soil testing to confirm the HAIL status.
- Green highlight indicates an activity not considered to be HAIL.

[10] Detailed Site Investigation, Remediation Action Plan & Assessment of Environmental Effects, 11 Ray Small Drive, Papakura, Auckland. Report prepared for Mex Enterprises Limited by Focus Environmental Services Limited, dated September 2015. Reference: FES 0469.001.

Table 5. Evaluation of potentially contaminating activities

Land use and associated HAIL activity	**Potential contaminants**	**Possible extent of contamination**	**HAIL Assessment**
Reclamation and filling which may have included municipal wastes. *HAIL Activity G3. Landfill sites*	Metals and polycyclic aromatic hydrocarbons (PAH) are common urban fill contaminants. Landfills may include a wide range of contaminants.	The western end of the site was reclaimed around the time that the Ray Small Park closed landfill commenced operations. The site was later levelled around the time landfill operations were ceasing. The presence of up to 4 m of fill at the western and southern ends indicates that landfilling encroached onto the site, probably as a result of filling low points in the inlet and a former gully.	HAIL Activity G3 is more likely than not to have occurred at the site.
Asbestos use on RSA building or demolition of ACM during various alterations. *HAIL Activity E1. Asbestos… including sites with buildings containing asbestos products known to be in a deteriorated condition.*	Asbestos	The building was constructed at a time when ACM was commonly used. Several alterations have been made to the building since the 1970s. The risk presented by ACM is that degradation of these materials, and certain property maintenance activities (water blasting, painting prep/sanding), have the potential to deposit asbestos fibres to surficial soils around building margins. In this instance, as the site has been largely impervious since it the 1970s and there has been limited opportunity for fibres to accumulate in soil. They are more likely to have been dispersed by wind and rain before they could accumulate in soil at concentrations that present a risk to health. For these reasons HAIL category E1 is not considered to apply in this instance.	HAIL Activity E1 not considered to apply in this instance.
Use of lead-based paint. *HAIL Activity I. Intentional or accidental release of a hazardous substance in sufficient quantity that could pose a risk to human health or the environment.*	Lead	The age of the building means use of lead-based paints at some point is likely. Maintenance or degradation of lead-based paint has the potential to deposit lead to surficial soils around building margins and/or areas of stormwater flow and collection. As with asbestos, the presence impervious surfaces around the building would limit the extent of any lead associated with building maintenance activities. For these reasons HAIL category I relating to use of lead-based paint, is not considered to apply in this instance.	Not considered to be a HAIL in this instance.

4. Site Investigations

4.1 Sampling and analysis rationale

The HAIL Assessment confirms that landfilling, and possibly later levelling with uncontrolled fill, has the potential to have caused ground contamination at the site. Sampling locations were targeted to investigate the potential for contamination, particularly in relation to the existing building, as outlined in **Table 6**. Sampling locations are presented in **Figure 2**.

Table 6. Sampling rationale

Potential contamination source	Contaminants tested	Sampling rationale	Sample locations
Landfill and/or imported fill materials	Metals, asbestos, PAHs, total petroleum hydrocarbons (TPH) with a subset of samples tested for volatile and semi-volatile organic compounds (VOC, SVOC) and per- and polyfluoroalkyl substances (PFAS)	Testing through the fill profile.	All locations but particularly AH03/AH11*, AH04 where the greatest thickness of fill was encountered.
Landfill gas	Landfill gas – methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), carbon monoxide (CO) and hydrogen sulphide (H_2S)	Survey of existing building and installation of temporary gas probes around building and major underground services (refer to **Section 4.2.2** for further discussion).	Building surveys and probe locations S1 to S8.
Leaching of contaminants into underlying natural soils	Variably: metals, TPH, PAH, SVOC, VOC, PFAS	Natural soils immediately below the interface with fill and deeper in situ soils.	AH03/AH11*, AH04 and AH13
Lead based paint and ACM associated with former and/or existing structures	Metals and asbestos	Topsoil where present but selected fill samples also tested.	AH04, AH05, AH08, AH03/AH11*, AH013
Notes: * as refusal was encountered at shallow depth in AH11 this location was merged with AH03 (located only a few metres away) to provide coverage of the fill profile.			

4.2 Sampling methodology

4.2.1 Soil sampling

Soil sampling was undertaken by a SQEP from WWLA on 15 and 20 February 2024. Samples were collected using hand augering techniques as follows:

- Materials encountered were logged in general accordance with the NZ Geotechnical Society “Guidelines for the classification and field description of soils and rocks for engineering purposes”.
- Soil sampling was in general accordance with CLMG No. 5. This involved:
  - Collection of samples using gloved hands directly from the auger and placed into laboratory-supplied containers for testing.
  - Gloves were changed between samples.
  - Samples were couriered to the laboratory chilled, under chain of custody documentation, soon after they were collected.
- All samples were sent to Eurofins Laboratories in Auckland for analysis.

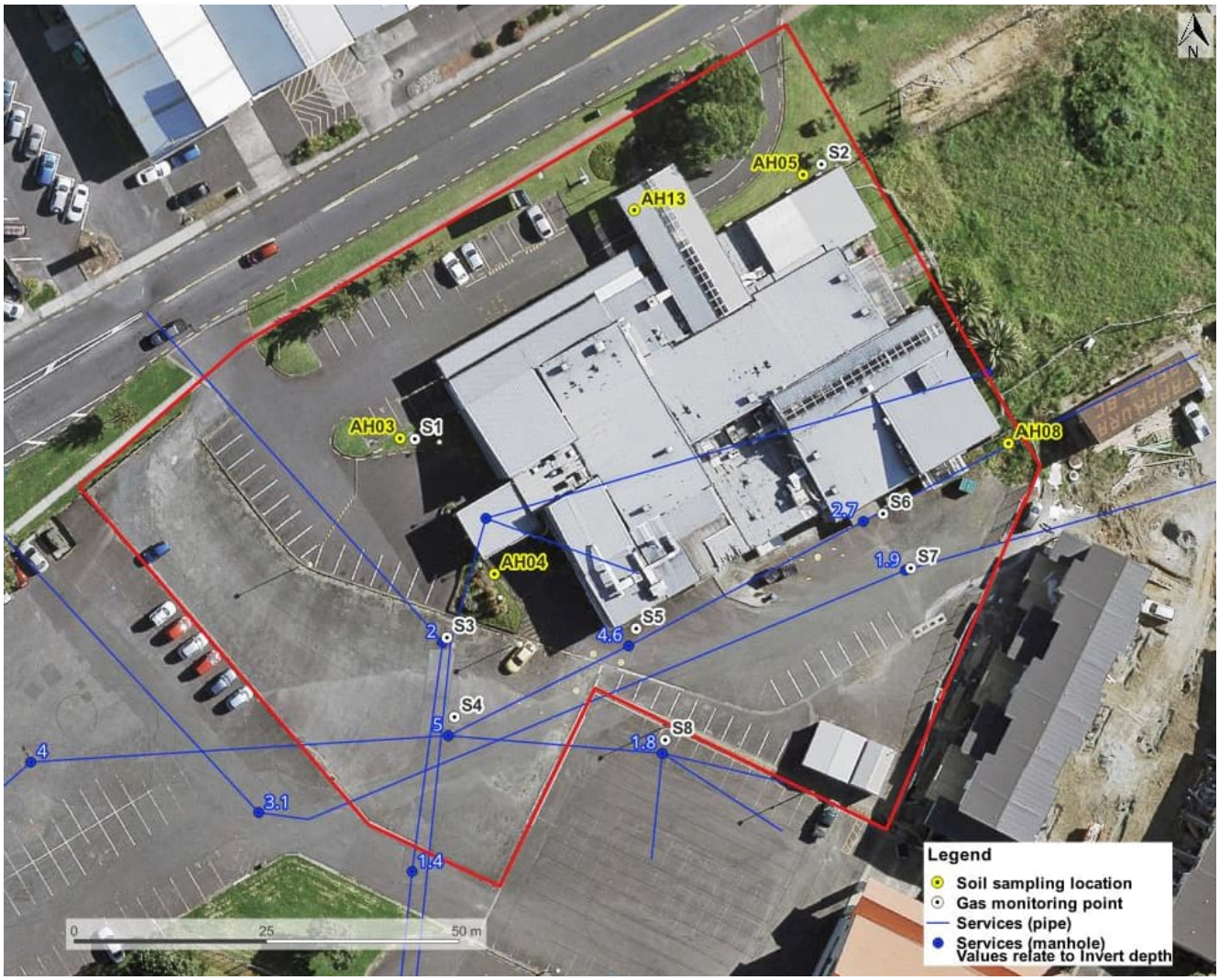


Figure 2. Investigation location plan

4.2.2 Landfill gas screening

WWLA carried out the instantaneous surface monitoring (ISM) and soil gas probe surveys on 21 and 22 February 2024 and 27 March 2024. The March 2024 monitoring event was undertaken during a period of falling barometric pressure, relative to the preceding week, however, pressures were within normal ranges for the region (i.e. neither particularly high nor low).

The ISM survey was conducted using Auckland Council Closed Landfill Teams standard survey methodology with particular attention given to monitoring locations (both interior and exterior) where services and other penetrations to the building slab were able to be accessed.

Gas measurements (both ISM and probes) were made using a combination of Eagle 2 five gas, Eagle 1 (low range) and GA5000 gas monitoring equipment hired from Envco. Envco provided a current calibration certificate at the time of hire.

The temporary soil gas probes were installed using an AMS gas vapour kit. A slide hammer and hollow drive extensions are used to insert a dedicated stainless steel gas vapor probe (GVP) and 1/4' Teflon tubing to the desired sampling depth. Once the desired sampling depth is reached the drive extensions are extracted leaving the GVP and tubing in place allowing measurement of vapours at surface. Due to refusal on granular hardfill probes were generally installed to ~1m BGL, but in some instances greater depths were achieved.

Landfill gas concentrations were measured both as the probes were advanced, on completion and then again before the field team left site. The probes were temporarily capped to allow repeat screening to be conducted (March 2024).

The temporary soil gas probes were principally installed to target backfill around the existing wastewater and stormwater lines and manhole locations. Several wastewater and stormwater lines, installed to depths of between 2 and 5 m BGL, are located to the south and west of the former RSA building (see **Figure 2**). These services range from approximately 400 to 1300 mm in diameter. The deep and wide service trenches are expected to provide the path of least resistance for migration of landfill gas from the adjoining closed landfill, therefore an absence of gas in the vicinity of these structures would indicate a low gas risk to the existing building. As illustrated in **Figure 2** and **Figure 3** the location and configuration of the deep service trenches is also expected to intercept landfill gas and direct it away from or around the existing building (former RSA).

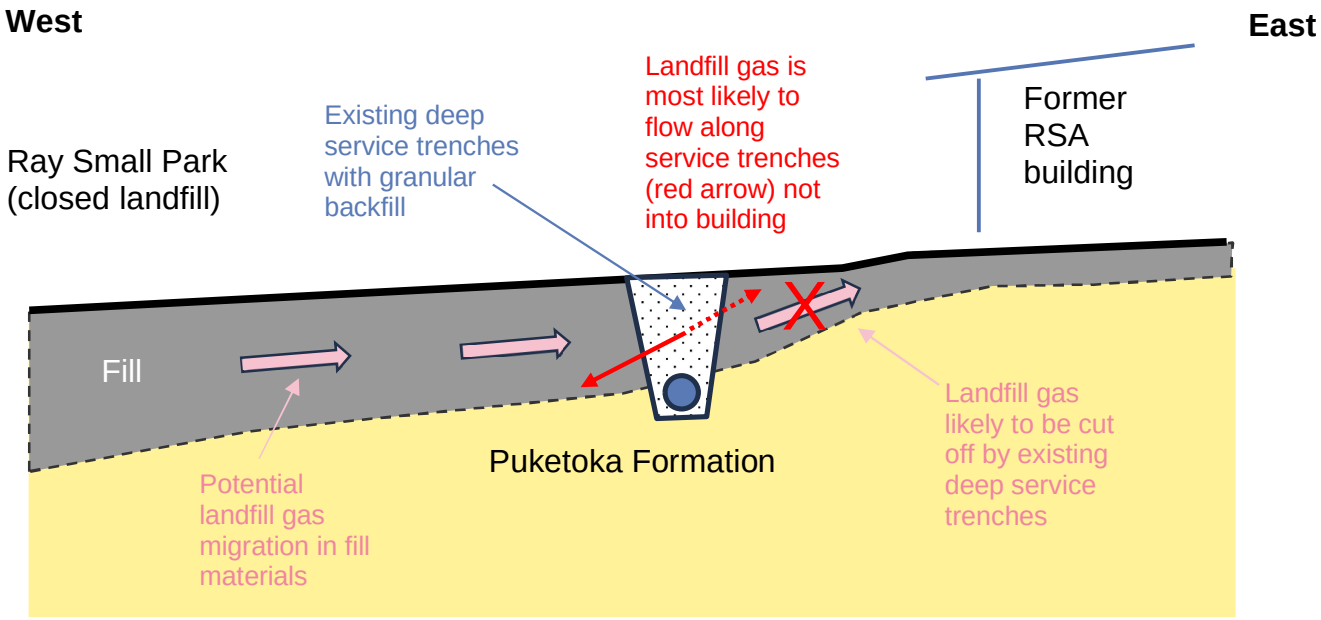


Figure 3. Illustration of the site in section showing expected influence of existing services

4.2.3 Data quality

The data quality objectives (DQOs) for this investigation were to:

- Undertake the investigation in general accordance with CLMG 5; and
- Collect and analyse soil samples and with sufficient accuracy and precision to provide evaluation against relevant human health and environmental acceptance criteria.
- Provide screening data to assess the level of landfill gas present in the vicinity of the existing building (former RSA).

The following quality assurance and quality control measures were implemented to meet the investigation DQOs:

- Appropriately experienced staff were used to undertake the field investigation work.
- Sampling equipment was decontaminated (as required).
- Soil analyses were carried out by International Accreditation New Zealand (IANZ) accredited laboratories using industry standard methods.
- Appropriate chain of custody documentation was used.
- Calibrated gas monitoring equipment was used.

4.3 Results

4.3.1 Field observations

The following observations of soil or inground conditions were made during sampling. Borehole logs are provided in **Appendix A**:

- Consistent with previous investigations, locations AH03 and AH04, on the western side of the building encountered the greatest thickness of fill, between approximately 2 and 3 m respectively. The fill was described as silty gravel and gravelly clay, variably brown, green and orange in colour. No waste materials were observed in the fill materials.
- In contrast less than 1 m of gravelly silty fill was encountered at the other investigation locations. Geotechnical logs show slightly greater depths of fill compared to some WWLA logs, we consider this to be the result of use of hydrovac excavation during the geotechnical investigations making identification of the fill / natural interface difficult in some instances.
- Silts and clays of the Puketoka Formation were encountered beneath the fill (where penetrated). These were reported as being blue-grey and including possible shell material at locations AH03 and AH04, possibly reflecting the original estuarine environment before filling occurred.
- No visual or olfactory evidence of contamination was observed.

4.3.2 Soil analytical results

The laboratory testing results are discussed in **Table 7** and presented in **Table 8** (overpage). Sample locations are shown in **Figure 4.** Full laboratory transcripts are attached in **Appendix B**.

The soil analytical data was compared against the criteria set out below:

Protection of Human Health	NESCS SCS[11,12] for commercial/industrial land use given the proposed use of the site as a courthouse; also used as a proxy for assessing potential exposures to construction workers undertaking redevelopment works.
Discharges to the Environment	Auckland Unitary Plan (AUP) Permitted Activity Criteria[13].
Soil Disposal	Published background concentrations[14] are typically used as a basis for acceptance of soil to cleanfill sites.

In summary, topsoil and fill in the vicinity of the existing building contain low concentrations of contaminants that do not present an unacceptable risk to human health or the environment. Underlying natural soils that are in direct contact with fill have been slightly affected by leaching / migration of contaminants, but deeper natural soils are not expected to be impacted.

Table 7. Evaluation of soil testing results

Topsoil and fill in the vicinity of the existing building	**Topsoil and fill contain low concentrations of contaminants but does not present an unacceptable risk to human health or the environment.** • There were no exceedances of NESCS or AUP criteria, so these materials do not present an unacceptable risk to human health or the environment. • Trace amounts (<0.001% w/w) of asbestos fibres were detected at sampling locations AH04 and AH08, although only in near surface soils (<0.5 m depth) in both cases.

[11] Soil Contaminant Standards (SCS) as set out in Ministry for the Environment, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.
[12] Where NESCS are not provided, guidelines have been adopted in accordance with Ministry for the Environment, 2011. Contaminated Land Management Guidelines No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011). Wellington: Ministry for the Environment.
[13] As defined by Standard E30.6.1.4 of the AUP.
[14] Auckland Regional Council, 2001. Background Concentrations of Inorganic Elements in Soils from the Auckland Region. Auckland Regional Council, Technical Publication No. 153, October 2001 (TP153).

	• Arsenic, copper or lead concentrations slightly exceeded published background in several samples. • Trace PAHs were detected but only in three of the 11 topsoil and fill samples tested. • At AH03 (1.6-1.7 m) the SVOCs 4-aminobiphenyl and aniline were detected. Both compounds were historically used as additives to tyres and dyes. • No TPH, VOCs, PFAS, or other SVOC were detected.
Underlying natural soils	**Following removal of overlying fill natural soils are expected to be classified as cleanfill.** • Contaminants were within expected background ranges for non-volcanic soils in the Auckland region except for slightly elevated lead at AH08 0.4-0.5 m, and a trace amount of endrin at AH13 0.4-0.5 m. • This is interpreted to reflect some minor leaching and/or carryover of contaminants from the overlying fill materials and is not expected to extend more than 100-200 mm into natural soil.

4.3.3 Landfill gas screening

As described previously, the site is located directly adjacent to the Ray Small Park closed landfill, so there is potential for migration of landfill gas onto the site via either the fill materials and/or preferential pathways such as underground service trenches. Landfill gases can accumulate inside buildings, presenting an asphyxiation risk (e.g. carbon dioxide, carbon monoxide) or explosive risk (methane).

However, methane was not detected in or around the existing building during the ISM surveys undertaken in February or March. As shown in **Appendix C**, methane was typically not detected in the temporary probes, only probe S4, installed adjacent to the deepest stormwater manhole (~5 m depth) returned a consistent detection of methane at 4% LEL in February. However, methane was not detected at this location in March, nor in the probe locations installed nearer the building (S3, S5).

Hydrogen sulphide was not detected (other than inconsistently at S3) and carbon monoxide was consistently detected at low concentrations (peak of 5.8 but steady state of <1.5 %). Carbon dioxide concentrations are within the range typical of the natural organic soils.

Where they were able to be measured gas flow rates were reported to be very low (<0.1 litres/hr).

Of note, low gas concentrations and flows were reported at the western end of the building platform (S1 and S3) closest to Ray Small Park and where the greatest thickness of fill was encountered.

Collectively the information available on waste types, Auckland Council's landfill gas monitoring and the screening conducted during this investigation, indicates that the existing building platform has a low landfill gas risk.

Table 8. Summary soil analytical results

Sample information	Sample Location	NESCS Commercial/ Industrial/ Outdoor worker [1]	AUP permitted activity discharge criteria [2]	Published background (non-volcanic) [3]	AH03 and AH11*					AH04							AH05	AH08		AH13	
	Depth (m bgl)				0-0.1	0.9-1.0	1-1.5	1.6-1.7	2.0-2.1	0-0.1	0.4-0.5	0.9-1.0	1.1-1.2	2.1-2.2	2.4-2.5	3.2-3.3	0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
	Material type				Topsoil	Fill	Fill	Fill	Natural	Topsoil	Fill	Fill	Fill	Fill	Fill	Natural	Topsoil	Topsoil	Fill	Topsoil	Natural
Asbestos	ACM (bonded) % w/w [6]	0.05	-	-	ND	ND	ND	-	-	ND	ND	ND	ND	-	-	-	ND	ND	ND	ND	ND
	AF+FA* %w/w [6]	0.001	-	-				-	-	<0.001	<0.001			-	-	-		<0.001			
Metals	Arsenic	70	100	12	8.8	5	-	-	6.6	6.4	8.6	6.1	-	-	2.1	6	8.2	11	7	21	11
	Cadmium	1,300	7.5	0.65	0.22	0.01	-	-	0.03	0.21	0.15	0.15	-	-	0.08	0.04	0.17	0.29	0.24	0.34	0.09
	Chromium	6,300	400	55	25	9.7	-	-	12	39	47	47	-	-	23	8.6	23	28	21	57	22
	Copper	>10,000	325	45	29	3.7	-	-	7.1	23	21	25	-	-	48	2.3	24	37	26	33	20
	Lead	3,300	250	65	110	12	-	-	22	34	33	38	-	-	7.9	20	54	100	70	76	26
	Nickel	6,000 [4]	105	35	17	3.6	-	-	5.4	23	23	31	-	-	85	3.3	14	18	15	33	17
	Zinc	400,000 [4]	400	180	150	20	-	-	15	77	62	68	-	-	55	34	110	160	88	160	110
TPH	C_7-C_9	8,800 [5]	710 [5]	-	< 5	< 5	-	-	< 5	< 5	< 5	-	-	-	< 5	< 5	< 5	< 5	-	< 5	-
	C_{10}-C_{14}	1,900 [5]	1,500 [5]	-	< 10	< 10	-	-	< 10	< 10	< 10	-	-	-	< 10	< 10	< 10	< 10	-	< 10	-
	C_{15}-C_{36}	>20,000 [5]	>20,000 [5]	-	< 20	< 20	-	-	< 20	< 20	< 20	-	-	-	< 20	< 20	< 20	< 20	-	< 20	-
PAH	Acenaphthylene	-	-	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Acenaphthene	45,000 [7]	-	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Anthracene	230,000 [7]	-	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Benzo[a]anthracene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Benzo[a]pyrene (BAP)	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	0.04	< 0.3	-	-	< 0.3	< 0.03	< 0.03	0.43	< 0.3	< 0.3	< 0.03
	Benzo[a]pyrene PEF	35	20	-	< 0.8	< 0.08	-	< 0.08	< 0.08	< 0.8	0.09	< 0.8	-	-	< 0.8	< 0.08	< 0.08	0.8	< 0.8	< 0.8	< 0.08
	Benzo[b]fluoranthene + Benzo[j]fluoranthene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	0.06	< 0.3	-	-	< 0.3	< 0.03	< 0.03	0.63	< 0.3	< 0.3	< 0.03
	Benzo[g,h,i]perylene	-	-	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Benzo[k]fluoranthene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	0.04	< 0.3	-	-	< 0.3	< 0.03	0.06	0.51	< 0.3	< 0.3	< 0.03
	Chrysene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Dibenzo[a,h]anthracene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Fluoranthene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	0.05	< 0.3	-	-	< 0.3	< 0.03	0.04	0.54	< 0.3	< 0.3	< 0.03
	Indeno(1,2,3-c,d)pyrene	Refer BaP PEF	Refer BaP PEF	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Naphthalene	69 [5]	0.047 [5]	-	< 0.3	< 0.1	-	< 0.1	< 0.1	< 0.3	< 0.1	< 0.3	-	-	< 0.3	< 0.1	< 0.1	< 0.3	< 0.3	< 0.3	< 0.1
	Phenanthrene	-	-	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	< 0.03	< 0.3	-	-	< 0.3	< 0.03	< 0.03	< 0.3	< 0.3	< 0.3	< 0.03
	Pyrene	>20,000 [5]	1.3 [5]	-	< 0.3	< 0.03	-	< 0.03	< 0.03	< 0.3	0.05	< 0.3	-	-	< 0.3	< 0.03	0.06	0.54	< 0.3	< 0.3	< 0.03
SVOC	4-Aminobiphenyl	-	-	-	-	-	-	0.7	-	-	-	< 5	-	-	< 5	-	-	-	< 5	-	< 5
	Aniline	4,000 [7]	-	-	-	-	-	0.7	-	-	-	< 5	-	-	< 5	-	-	-	< 5	-	< 5
	Endrin	100 [4]	-	-	-	-	-	< 0.01	-	-	-	< 0.1	-	-	< 0.1	-	-	-	< 0.1	-	0.02
	All other SVOC				-	-	-	<LoR	-	-		<LoR	-	-	<LoR	-	-	-	<LoR	-	<LoR
VOC	All VOCs				-	-	-	<LoR	-	-	-	<LoR	-	-	<LoR	-	-	-	<LoR	-	<LoR
PFAS	All PFAS					-	<0.001	-	-	-	-	<0.001	-	<0.001	-	-	-	-	<0.001	-	<0.001

Notes:
* As refusal was encountered at shallow depth in AH11 this location was merged with AH03 to provide coverage of the fill profile.
All values are presented in mg/kg except where noted (asbestos).
FA = fibrous asbestos, AF = asbestos fines.
ND denotes no asbestos detected.
<LoR indicates concentration below the laboratory limit of reporting.
References:
1. MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated). Soil Contamination Standard - Commercial/industrial land use.
2. Auckland Unitary Plan permitted activity discharge criteria (Standard E30.6.1.4).
3. Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of Inorganic Elements in Soils from the Auckland Region.
4. National Environment Protection Council [Australia] - National Environment Protection Measure (Assessment of Site Contamination). Health Investigation Levels - Commercial/industrial land use (HIL D)
5. MfE, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Tier 1 Soil acceptance criteria, silty clay, contamination <1 m depth, commercial/industrial use. 5b: Protection of Groundwater Quality, groundwater at 2 m.
6. BRANZ, 2017. New Zealand Guidelines for Assessing and Managing Asbestos in Soil.
7. USEPA Regional Screening Levels (RSLs) - Generic Tables as of November 2023.

5. Conceptual Site Model

A conceptual site model (CSM) indicates known and potential sources of contamination, routes of exposure (pathways), and the receptors that are affected by contaminants moving along those pathways. This is discussed in the source – pathway – receptor analysis (CSM) in **Table 9**. Receptors may be people or the environment. *The CSM's purpose is to set out risks to people and the environment (if any) associated with any proposed activity (short or long term) on the land.*

The CSM is presented in **Table 9**. Colour coding in the table is used to indicate the:

- Potentially Complete pathways i.e. those where there may be a risk to people and/or the environment if appropriate controls are not in place; and
- Incomplete exposure pathways where there is no unacceptable risk to human or environmental receptors.

In summary, soil sampling shows that there is low-level contamination of fill and topsoil in the vicinity of the existing building but this does not present a human health or environmental risk. Offsite disposal of these materials during earthworks (if required) would need to be managed since they cannot be considered cleanfill.

Table 9. CSM for potential development of the site as an interim courthouse

Source	Receptor	Exposure pathway	Acceptable risk (Yes/No) and assessment
Topsoil and fill in the vicinity of the existing building	Construction workers and neighbouring site occupants during soil disturbance	Dermal contact, ingestion, inhalation	**Yes** Contaminant concentrations are below applicable human health criteria.
	Future site users	Dermal contact, ingestion, inhalation	
	Ecological receptors at the nearest surface water bodies	Discharges via surface and groundwater	**Yes** Contaminant concentrations are below applicable environmental criteria
	Receptors at the soil receiving site	Discharges to the receiving environment	**No** Potential risks associated with offsite disposal will need to be managed by disposing of surplus material as managed fill.
Landfill gas migration onto site and accumulation within buildings	Construction workers during earthworks and construction.	Inhalation, explosion risk.	**Yes** Gas generation from the closed landfill is shown to present a low risk to the existing building platform. The existing large diameter / deep underground services are expected to be directing landfill gas (if any) away from the existing building.
	Future site users		

6. Development Implications

6.1 Consenting

Contaminated land related consenting requirements are summarised below and discussed in detail in the following sections (**Section 6.1.1** and **6.1.2**). Colour coding is used to indicate where we consider the relevant requirements:

- Can be met or are not applicable.
- Applicable and cannot be met and therefore consent is required.

Regulatory Framework	Rule	Consent required (Y/N and type)
NESCS	5(2) – Removal of a fuel storage system	No – not applicable
	5(3) – Soil sampling	No – not applicable
	5(4) – Disturbing soil	Yes - unable to be definitively confirmed at this time but is expected that the permitted soil disturbance volumes or durations will be exceeded requiring consent as a controlled activity under Regulation 9(1)
	5(5) Subdivision	No – not applicable
	5(6) Change in land use	No – permitted activity requirements can be met
AUP	E30.6.1.2 Discharges of contaminants from soil disturbance activities	No – not applicable because contaminant concentrations comply with permitted activity criteria set out under Standard E30.6.1.4

6.1.1 NESCS

The NESCS sets out nationally consistent planning controls appropriate to district and city councils for assessing potential human health effects related to contaminants in soil. The regulations apply to specific activities on land (soil disturbance and removal, subdivision, bulk soil sampling and land use change) where an activity included on the HAIL has occurred.

Our assessment of the proposed works relative to the soil disturbance and land use change rules in the NESCS shows:

- The NESCS applies to the site because HAIL activities (landfilling) have occurred, related contaminants remain in soil above background levels, and some soil disturbance is expected to be required to facilitate the proposed development.
- It is expected that the permitted activity thresholds for earthworks volumes and/or duration will be exceeded (**Table 10**). In that case earthworks (soil disturbance) will require consent as a Controlled Activity under Part 1 of Regulation 9 of the NESCS because the contaminant are present above background ranges but the relevant standards are not exceeded.
- The proposed development is technically captured under the definition of “changing the use of a piece of land” under the NESCS. However, we consider that the permitted activity standards for land use change (**Table 11**) can be met, the proposed development can therefore be undertaken as a Permitted Activity under Part 4 of Regulation 8 of the NESCS. The same interpretation applies to subdivision of the site should this be considered in future.
- While a low contamination risk has been identified we expect that Council will require that a Site Management Plan (SMP) is submitted in support of the consent application. A simple checklist style SMP will be adequate.

Table 10: Soil disturbance as a permitted activity under NESCS Rule 8(3)

Rule 8(3)	Disturbing soil is a permitted activity while the following requirements are met:	Evaluation
(a)	Implementation of controls to minimise exposure of humans to mobilised contaminants.	Can be met as standard earthworks controls are sufficient
(b)	The soil must be reinstated to an erosion free state within one month of completing the land disturbance.	Expected to be able to be met.
(c)	The volume of the disturbance of the piece of land must be no more than 25 m^3 per 500 m^2. *[The site-specific permitted activity volume for disturbance based on the HAIL area covering the entire site is 396 m^3]*	If the adopted design can reuse the existing building slab this threshold may be able to be met.
(d)	Soil must not be taken away unless it is for laboratory testing or, for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year. *[The site-specific permitted activity volume for soil removal is ~80 m^3 per year. As a year is not defined in the NESCS, works on successive days can be considered as being undertaken over two consecutive years, i.e. 160 m^3 total]*	Even if the design can reuse the existing building slab this threshold is unlikely to be able to be met. New service connections and foundations for the portal frame are likely to generate spoil volumes in excess of 160 m^3 and there is currently no space to retain the materials onsite.
€	Soil taken away must be disposed of at an appropriately licensed facility.	Can be met.
(f)	The duration of land disturbance must be no longer than two months.	Expected to be able to be met if the adopted design can reuse the existing building slab.
(g)	The integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.	Not applicable.

Table 11: Permitted activity provisions for subdivision and change in land use under NESCS Rule 8(4)

Rule 8(4)	Changing the use of the piece of land is a permitted activity while the following requirements are met:	Evaluation
(a)	A preliminary site investigation of the land or piece of land must exist.	This report fulfils the requirements for a PSI.
(b)	The PSI must state that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land.	This combined PSI and DSI shows that soils and landfill gas in the vicinity of the existing building do not pose an unacceptable risk to human health under the proposed use.
(c)	The report must be accompanied by a relevant site plan to which the report is referenced.	The figures provided in this report fulfil this requirement.
(d)	The consent authority must have the report and the plan.	Can be met if this report is provided to Council.

6.1.2 Auckland Unitary Plan

The Auckland Unitary Plan (AUP), Section E30 contains rules that address discharges to the environment, both during works and in the long term. The contaminated land rules of the AUP apply to soils with contaminant levels that exceed the permitted discharge criteria in Standard E30.6.1.4 and earthworks volumes of more than 200 m^3 is proposed. The soil testing results comply with the permitted criteria therefore consent is not required under Section E30 of the AUP.

6.2 Site management and earthworks implications

The key requirements for the proposed redevelopment works at the site are set out in **Table 12.**

Table 12. Key redevelopment requirements

Demolition requirements	**If present asbestos will need to be removed from the existing building and associated infrastructure by a Licensed Asbestos Removalist.** • Given the age of the existing building, the Asbestos Regulations[15] require that an asbestos survey is conducted prior to any refurbishment or demolition work. Where it is being disturbed asbestos will need to be removed by a Licensed Asbestos Removalist. • Asbestos may also be associated with building foundations (e.g. shuttering or formwork) and underground services.
Landfill gas implications	The existing building platform has a low landfill gas risk. On this basis gas mitigation measures are not expected to be required in the design or construction of the interim courthouse. But if a precautionary approach is preferred cutoffs could be installed in new wastewater and stormwater connections to east and south of the courthouse as the existing large diameter / deep underground services are expected to be the most likely pathway by which landfill gas could migrate from the adjoining closed landfill.
Earthworks requirements	• Standard earthworks controls and procedures are applicable to the site as set out in Auckland Council's GD05 – *Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* are applicable for the works, with particular focus on ensuring that there are no discharges of soil or sediment to the stormwater network or surrounding sites. • There are no specific contamination-related health and safety requirements for onsite workers during disturbance of soil. However, good hygiene practices should always be followed, such as washing hands before eating and drinking. • All fill and underlying natural soils can be reused on site if geotechnically suitable. • If surplus to site requirements: - Topsoil, fill and the upper 100-200 mm of underlying natural soil will need to be disposed of as managed fill. - Once overlying fill is removed and the surface of underlying natural soils scraped, natural soil is expected to be able to be disposed offsite as cleanfill. This report can be used to gain disposal facility acceptance of surplus spoil. • If unexpected contamination is identified, the immediate area of works should be isolated and a SQEP (e.g. WWLA) contacted for advice. • While a low contamination risk has been identified we expect that Council will require that an SMP is submitted in support of the consent application. A simple checklist style SMP will be adequate.

[15] Health and Safety at Work (Asbestos) Regulations 2016.

7. Conclusions

This ground contamination report (comprising a PSI and DSI) has been prepared to support Soil and Rock Consultants and their client, MoJ, with developing an interim courthouse at 40 Elliot Street, Papakura. The key findings of this assessment are:

- Review of the site history indicates the site was located on farmland at the edge of the Pahurehure Inlet, with the western boundary partially reclaimed by 1959, likely associated with operation of the Ray Small Park closed landfill known to be located immediately west of the site. In the 1970s the entire site was earthworked, presumably for final levelling for development and the RSA was constructed in the late 1970s.
- Soil investigations show:
  - Topsoil and fill contain low concentrations of metals, SVOCs and asbestos, above expected background ranges but below NESCS and AUP criteria, so these materials do not present unacceptable risks to human health or the environment.
  - Underlying natural soils can be considered cleanfill, once scrapped clean of any overlying fill material.
- Landfill gas screening indicates that the existing building platform has a low landfill gas risk. Landfill gas mitigation measures are therefore not expected to be required to be implemented for the proposed interim courthouse. But if a precautionary approach is preferred cutoffs could be installed in new wastewater and stormwater connections to east and south of the courthouse as the existing large diameter / deep underground services are expected to be the most likely pathway by which landfill gas could migrate from the adjoining closed landfill.
- It is unable to be definitively confirmed at this time but is expected that the permitted soil disturbance volumes or durations will be exceeded requiring consent as a controlled activity under Regulation 9(1) of the NESCS.
- Consent is not required under Section E30 of the AUP.
- Earthworks can be carried out in accordance with standard earthworks controls and no contaminated land-specific health and safety procedures are required.
- Surplus topsoil and fill requires disposal to managed fill. Excluding the upper 100-200 mm underlying natural soils are expected to be suitable for disposal as cleanfill.
- An asbestos survey of the building should be undertaken before any demolition activity. If present asbestos will need to be removed from the existing building and associated infrastructure by a Licensed Asbestos Removalist.

Appendix A. Borelogs

Hand Auger Log

AH03

Project Name: Papakura Courthouse
Project Number: WWLA1078

Location: 40 Elliot Street, Papakura

EXCAVATION DETAILS
Excavation Company: WWLA
Exavation Date: 20 February 2024
Excavation Method: Hand auger

Diameter (mm): 50mm

Depth (m): 2.6

Depth (m)	Lithology	Unit	Lithological Description
0.0 – 0.2		TOPSOIL	TOPSOIL, Silt with trace gravels, medium brown. FILL
0.2 – 0.8		Clayey SILT	Clayey SILT medium brown with dark brown mottles. FILL
0.8 – 2.0		Clayey SILT	Clayey SILT, green brown with orange mottles/mixed. FILL. @1.2 m medium brown with trace orange brown. @1.5 m dark brown/black, no odour. @1.6 m medium brown with orange brown. @1.7 m green blue brown.
2.0 – 2.6		Clayey SILT	Clayey sandy SILT, bluish with white inclusions (~1 mm) shells? INSITU

Grainsize Classification (mm):

Boulders	Cobbles	Gravel			Sand			Silt			Clay
		Coarse	Medium	Fine	Coarse	Medium	Fine	Coarse	Medium	Fine	
200	60	20	6		2	0.6	0.2	0.06	0.02	0.006	0.002

Hand Auger Log

AH03

Project Name: Papakura Courthouse
Project Number: WWLA1078

Location: 40 Elliot Street, Papakura

EXCAVATION DETAILS
Excavation Company: WWLA
Exavation Date: 20 February 2024
Excavation Method: Hand auger

Diameter (mm): 50mm

Depth (m): 3.3

Depth (m)	Lithology	Unit	Lithological Description
0.0 – 0.2		GRAVEL	GRAVELLY SILT, medium brown. FILL
0.2 – 0.8		GRAVEL	Silty GRAVEL, Angular GRAVELS ~ 2-10 mm. FILL
0.8 – 2.0		Silty CLAY	Silty Gravelly CLAY, mixed medium to dark brown, and orange brown. FILL
2.0 – 2.6		GRAVEL	Silty GRAVEL, medium brown to red brown - scoria. Gravels (~2-4 mm) @2.6 m some CLAY and silt. FILL
2.6 – 3.0		Clayey SILT	Clayey SILT, blue with trace gravels. FILL
3.0 – 3.2		Sandy SILT	Sandy SILT, blue with white inclusions. EOH @3.3 m. INSITU

Grainsize Classification (mm):

Boulders	Cobbles	Gravel			Sand			Silt			Clay
		Coarse	Medium	Fine	Coarse	Medium	Fine	Coarse	Medium	Fine	
200	60	20	6		2	0.6	0.2	0.06	0.02	0.006	0.002

Soil&Rock Consultants
Your responsive & cost-effective engineers

CLIENT: Ministry of Justice

PROJECT: Geotechnical Investigation, 40 Elliot Street, Papakura

Auger Hole No: AH08

Sheet 1 of 1

Drill Type:	50mmØ Hand Auger	Project No:	220761	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	GEO3564 - 2/05/2023
Date Started:	9/2/24	Ground Elevation:		Surface Conditions:	Slightly Sloping, Soil
Date Finished:	9/2/24	Water Level:	Groundwater Not Encountered		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"	WATER LEVEL (m)	DEPTH (m)	NATURAL WATER CONTENT △ LIQUID LIMIT ✕ PLASTIC LIMIT □ 50 100 150 (%) SHEAR STRENGTH ○ v REMOULDED SHEAR ◉ r POCKET PENETROMETER ○ p 50 100 150 (kPa)	LABORATORY TESTS
FILL	0.0		SILT, some fine to coarse sand, minor clay, minor fine to coarse angular gravel, brown, very stiff, dry, slightly plastic (FILL) trace brick fragments, trace asphalt fragments		0.0		
	0.5		some fine to coarse angular gravel, minor angular cobblestones to 150mmØ a 100mmØ orange PVC pipe		0.5	16 r, 70 V	
	1.0				1.0	32 r, 105 V	
TG			SILT, minor clay, minor fine sand, grey, orange and orange yellow streaks, very stiff, moist, slightly plastic (PUKETOKA FORMATION)				
	1.5		fine to medium SAND, some silt, some fine to coarse angular gravel, brown, dense, moist		1.5		
			END OF BORE. 1.30 METRES. GRAVEL OBSTRUCTION				
	2.0				2.0		
	2.5				2.5		
	3.0				3.0		
	3.5				3.5		
	4.0				4.0		
	4.5				4.5		
	5.0				5.0		

HAND AUGER LOG 220761 - AH08-13 - 40 ELLIOT STREET - 16FEB24.GPJ S+R_2013.GDT 29/2/24

Soil&Rock Consultants
Your responsive & cost-effective engineers

CLIENT: Ministry of Justice

PROJECT: Geotechnical Investigation, 40 Elliot Street, Papakura

Auger Hole No: AH11

Sheet 1 of 1

Drill Type:	50mmØ Hand Auger	Project No:	220761	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	GEO3564 - 2/05/2023
Date Started:	9/2/24	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	9/2/24	Water Level:	0.90m		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"	WATER LEVEL (m)	DEPTH (m)	NATURAL WATER CONTENT △ LIQUID LIMIT ✕ PLASTIC LIMIT □ 50 100 150 (%) SHEAR STRENGTH ○ v REMOULDED SHEAR ◉ r POCKET PENETROMETER ○ p 50 100 150 (kPa)	LABORATORY TESTS
FILL	0.0		SILT, some fine sand, red brown, stiff, moist, non plastic (FILL)		0.0		
	0.5		fine to coarse angular GRAVEL, some angular cobble to 20mmØ, some silt, brown, grey, medium dense, moist (GRANULAR FILL) very dense 25mmØ orange PVC pipe		0.5		200+ UTP V
	1.0		saturated base of vacuum pit - SILT, some clay, minor fine to coarse sand, minor fine to coarse angular gravel, yellow, orange, yellow brown, stiff, saturated, slightly plastic (FILL)	▽	1.0		223 V
	1.5		END OF BORE. 1.20 METRES. SOLID OBSTRUCTION		1.5		
	2.0				2.0		
	2.5				2.5		
	3.0				3.0		
	3.5				3.5		
	4.0				4.0		
	4.5				4.5		
	5.0				5.0		

HAND AUGER LOG 220761 - AH08-13 - 40 ELLIOT STREET - 16FEB24.GPJ S+R_2013.GDT 29/2/24

Soil&Rock Consultants
Your responsive & cost-effective engineers

CLIENT: Ministry of Justice

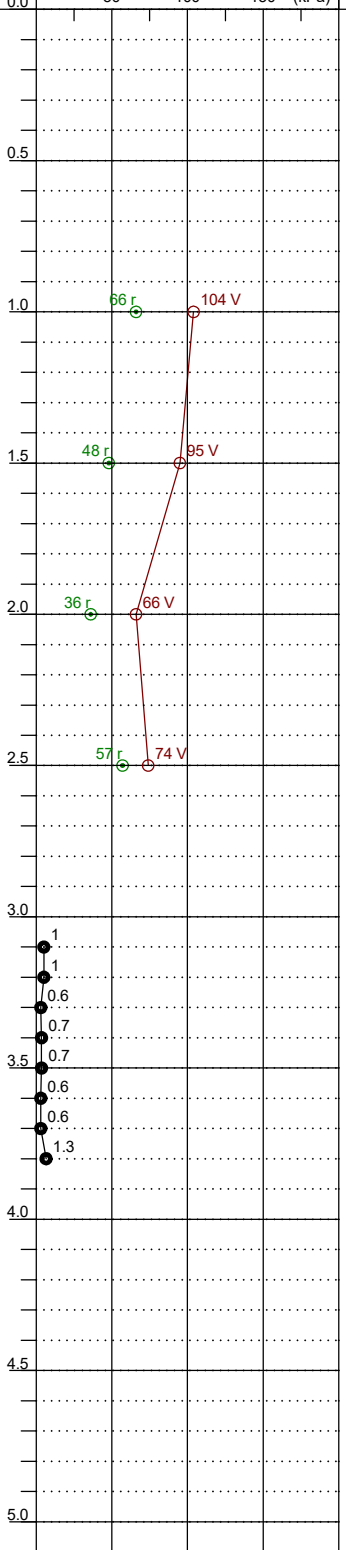
PROJECT: Geotechnical Investigation, 40 Elliot Street, Papakura

Auger Hole No: AH13

Sheet 1 of 1

Drill Type:	50mmØ Hand Auger	Project No:	220761	Logged By:	DM
Drilled By:	DM	Coordinates:		Shear Vane No - Calibration Date:	GEO3562 - 2/05/2023
Date Started:	9/2/24	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	9/2/24	Water Level:	3.00m		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"	WATER LEVEL (m)
	0.0		TOPSOIL	
FILL	0.5		SILT, some fine to coarse sand, some fine to coarse angular gravel, orange brown, brown, very stiff, moist, non plastic (FILL)	
			concrete on building side of pit down to 0.65m deep	
	1.0		base of vacuum pit - silty CLAY, trace fine sand, light grey orange and yellow, stiff, moist, highly plastic (PUKETOKA FORMATION)	
TAURANGA GROUP	1.5			
	2.0		SILT, some clay, some fine to medium sand, dark orange, orange, stiff, moist, slightly plastic	
			yellow, wet	
	2.5		light yellow	
	3.0		fine to medium sandy SILT, minor clay, blue, light grey, yellow, firm, wet, slightly plastic	▽
			fine to medium SAND, minor silt, blue and grey, very loose, saturated, 50% sample recovery	
	3.5		SILT, trace clay, some fine to medium sand, light grey, light orange, very soft, saturated, non plastic, 20% sample recovery	
	4.0		no sample recovery	
	4.5		END OF BORE. 4.20 METRES. NO RECOVERY	
	5.0			



LABORATORY TESTS

HAND AUGER LOG WITH SCALA 220761 - AH08-13 - 40 ELLIOT STREET - 16FEB24.GPJ S+R_2013.GDT 29/2/24

Appendix B. Laboratory Transcripts

Semi Quantitative Analysis of Soil

Client: Williamson Water and Land Advisory
Contact: Wendi Williamson
Tel: +64 21 65 4422
Email: wendi.williamson@wwla.kiwi
Address: 10/1 Putaki Drive, Kumeu, Auckland

Eurofins | Focus
Unit C1, 4 Pacific Rise
Mount Wellington
Auckland 1060
Tel: +64 (0) 9 525 0568

Site: : WWLA1078

Date sample(s) received: 15/02/2024

Date sample(s) analysed: 21/02/2024

Samples taken by: Alistair

Certificate / Job Number: Q-00614/WWLA1078

Qualitative Analysis of Asbestos

Lab ID	Sample ID	Sample Details	Sample Weight (g) (as received)	Fibres Identified
1	AH11 0-0.1		614	**ORF, NAD**
2	AH11 0.9-1.0		623	**ORF, NAD**
3	AH04 0-0.1		514	**AMO, ORF**
4	AH04 0.4-0.5		583	**CHR, ORF**
5	AH04 0.9-1.0		592	**ORF, NAD**
6	AH08 0-0.1		519	**CHR, ORF**
7	AH08 0.4-0.5		548	**ORF, NAD**
8	AH13 0-0.1		413	**ORF, NAD**
9	AH13 0.4-0.5		479	**ORF, NAD**
10	AH05 0-0.1		357	**ORF, NAD**

Fibre Identification Key:

CHR – Chrysotile (White Asbestos)
AMO – Amosite (Brown / Grey Asbestos)
CRO – Crocidolite – (Blue Asbestos)
UMF – Unknown Mineral Fibre
ORF – Organic Fibre
SMF – Synthetic Mineral Fibre
NFD – No Fibres Detected
NAD – No Asbestos Detected

Scope of Accreditation:

1. The analytical comments marked (*) stated in the semi-quantitative analysis and the calculations in the semi-quantitative analysis of asbestos in soil are beyond Eurofins | Focus scope of accreditation.
2. The laboratory is not responsible for sampling errors when we have not taken the sample.
3. This certificate should be read in its entirety and shall not be reproduced except in full, without written approval of the laboratory.

*Semi Quantitative Analysis of Soil

*Semi Quantitative Analysis of Asbestos in Soil

Date sample(s) received: 15/02/2024
Date sample(s) analysed: 21/02/2024

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product [a]	Total mass of Asbestos in sample [b]	Bonded Asbestos containing material in sample (% w/w) [c]	Asbestos as FA (% w/w) [d]	Asbestos as AF (% w/w) [e]	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) [f]
1	AH11 0-0.1	614.0	511.0	16.8	(>10mm) Fraction	43.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	244.3	-	NAD	-					
					(<2mm) Fraction	223.1	-	NAD	-					
2	AH11 0.9-1.0	622.8	525.0	15.6	(>10mm) Fraction	81.2	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	270.3	-	NAD	-					
					(<2mm) Fraction	173.5	-	NAD	-					
3	AH04 0-0.1	513.5	429.8	16.2	(>10mm) Fraction	26.7	-	NAD	-	0.0001	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	213.4	-	NAD	-					
					(<2mm) Fraction	189.7	0.0001	FFF	100					
4	AH04 0.4-0.5	583.3	490.8	15.8	(>10mm) Fraction	43.6	-	NAD	-	0.0022	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	227.9	0.0116	CMP	15					
					(<2mm) Fraction	219.3	0.0005	FFF	100					
5	AH04 0.9-1.0	591.6	498.6	15.6	(>10mm) Fraction	23.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	278.0	-	NAD	-					
					(<2mm) Fraction	197.1	-	NAD	-					

*Semi Quantitative Analysis of Soil

*Semi Quantitative Analysis of Asbestos in Soil

Date sample(s) received: 15/02/2024
Date sample(s) analysed: 21/02/2024

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product [a]	Total mass of Asbestos in sample [b]	Bonded Asbestos containing material in sample (% w/w) [c]	Asbestos as FA (% w/w) [d]	Asbestos as AF (% w/w) [e]	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) [f]
6	AH08 0-0.1	519.3	409.5	21.1	(>10mm) Fraction	25.9	-	NAD	-	0.0003	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	188.0	-	NAD	-					
					(<2mm) Fraction	195.6	0.0003	FFF	100					
7	AH08 0.4-0.5	548.4	421.0	23.2	(>10mm) Fraction	23.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	225.9	-	NAD	-					
					(<2mm) Fraction	171.3	-	NAD	-					
8	AH13 0-0.1	413.4	338.7	18.0	(>10mm) Fraction	18.4	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	131.0	-	NAD	-					
					(<2mm) Fraction	189.3	-	NAD	-					
9	AH13 0.4-0.5	479.2	343.7	28.2	(>10mm) Fraction	0.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	180.8	-	NAD	-					
					(<2mm) Fraction	162.9	-	NAD	-					
10	AH05 0-0.1	357.4	259.9	27.2	(>10mm) Fraction	0.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	123.7	-	NAD	-					
					(<2mm) Fraction	136.2	-	NAD	-					

Analysis Method:

Samples submitted have been analysed to determine the mass fraction of asbestos in soil using low powered stereo microscopy followed by polarised light microscopy (PLM) including dispersion staining techniques as documented in (AS 4964-2004), Method for the qualitative identification of asbestos in bulk samples, BRANZ, New Zealand Guidelines for Assessing and Managing Asbestos in Soils:2017 and (TP 04) our internal method Technical Procedure for Qualitative and Semi Qualitative analysis of asbestos in soil.

Product Identification Key:

BTP	Bituminous Product	LSE	Loose Fill Insulation
CMP	Cement Product	NAD	No Asbestos Detected
COM	Composite	PPR	Paper Product
FFF	Free Fibres	RPL	Reinforced Plastics
FIB	Fibre Board	TXC	Textured Coating
GCP	Gaskets (compressed)	VNP	Vinyl Products
GRW	Gaskets (rope/woven)	VPP	Vinyl with paper backing
INB	Insulating Board	WVP	Woven Product

Interpretation of Key:

[a] Percentage of Asbestos in product is adopted from HSG 264 - 2012, Asbestos the survey guide, Appendix 2, ACMS in buildings and categorized in our internal Technical Procedure (TP04) for Qualitative and Semi-Quantitative analysis of asbestos in soil. A dash (-) denotes that there was no asbestos found in that fraction.

[b] Total Mass of Asbestos is the sum mass of asbestos-by-asbestos type in product type([a]) plus the mass of free fibre asbestos. A dash (-) denotes that there was no total mass of asbestos calculated asbestos found in that fraction.

[c] Bonded Asbestos Containing Material in the greater than 10mm fraction as percentage of the total sample (% w/w). A dash (-) denotes that there was no bonded asbestos containing materials found in that fraction.

[d] Asbestos as Fibrous Asbestos (FA) in greater than 10mm fraction as percentage of total sample (% w/w).

[e] Asbestos as Asbestos Fines (AF) in less than 10mm fraction as a percentage of total sample (% w/w).

[f] Total Friable Asbestos combining Fibrous Asbestos and Asbestos Fines as the percentage weight for weight of the total sample (% w/w).

Sample Retention: Hold soil samples will only be stored for one month from date of receipt.

Analyst Name: Colin Wang **Analyst Signature:** Colin Wang

Reviewed By KTP: Colin Wang **Reviewer Signature:** Colin Wang

Semi Quantitative Analysis of Soil

Client: Williamson Water and Land Advisory
Contact: Wendi Williamson
Tel: +64 21 65 4422
Email: wendi.williamson@wwla.kiwi
Address: 10/1 Putaki Drive, Kumeu, Auckland

Eurofins | Focus
Unit C1, 4 Pacific Rise
Mount Wellington
Auckland 1060
Tel: +64 (0) 9 525 0568

Site: : WWLA1078

Date sample(s) received:	22/02/2024	Date sample(s) analysed:	5/03/2024
Samples taken by:	Cherise	Certificate / Job Number:	Q-00633/WWLA1078

Qualitative Analysis of Asbestos

Lab ID	Sample ID	Sample Details	Sample Weight (g) (as received)	Fibres Identified
1	AH03 1-1.5		552	**ORF, NAD**
2	AH04 1.1-2.1		674	**ORF, NAD**

Fibre Identification Key:

CHR – Chrysotile (White Asbestos)
AMO – Amosite (Brown / Grey Asbestos)
CRO – Crocidolite – (Blue Asbestos)
UMF – Unknown Mineral Fibre
ORF – Organic Fibre
SMF – Synthetic Mineral Fibre
NFD – No Fibres Detected
NAD – No Asbestos Detected

Scope of Accreditation:

1. The analytical comments marked (*) stated in the semi-quantitative analysis and the calculations in the semi-quantitative analysis of asbestos in soil are beyond Eurofins | Focus scope of accreditation.
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3. This certificate should be read in its entirety and shall not be reproduced except in full, without written approval of the laboratory.

*Semi Quantitative Analysis of Soil

*Semi Quantitative Analysis of Asbestos in Soil

Date sample(s) received: 22/02/2024
Date sample(s) analysed: 5/03/2024

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product [a]	Total mass of Asbestos in sample [b]	Bonded Asbestos containing material in sample (% w/w) [c]	Asbestos as FA (% w/w) [d]	Asbestos as AF (% w/w) [e]	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) [f]
1	AH03 1-1.5	552.2	397.6	28.0	(>10mm) Fraction	8.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	233.7	-	NAD	-					
					(<2mm) Fraction	155.1	-	NAD	-					
2	AH04 1.1-2.1	674.3	520.1	22.8	(>10mm) Fraction	56.1	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	308.7	-	NAD	-					
					(<2mm) Fraction	155.3	-	NAD	-					

Analysis Method:

Samples submitted have been analysed to determine the mass fraction of asbestos in soil using low powered stereo microscopy followed by polarised light microscopy (PLM) including dispersion staining techniques as documented in (AS 4964-2004), Method for the qualitative identification of asbestos in bulk samples, BRANZ, New Zealand Guidelines for Assessing and Managing Asbestos in Soils:2017 and (TP 04) our internal method Technical Procedure for Qualitative and Semi Qualitative analysis of asbestos in soil.

Product Identification Key:

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GCP	Gaskets (compressed)	VNP	Vinyl Products
GRW	Gaskets (rope/woven)	VPP	Vinyl with paper backing
INB	Insulating Board	WVP	Woven Product

Interpretation of Key:

[a] Percentage of Asbestos in product is adopted from HSG 264 - 2012, Asbestos the survey guide, Appendix 2, ACMS in buildings and categorized in our internal Technical Procedure (TP04) for Qualitative and Semi-Quantitative analysis of asbestos in soil. A dash (-) denotes that there was no asbestos found in that fraction.

[b] Total Mass of Asbestos is the sum mass of asbestos-by-asbestos type in product type([a]) plus the mass of free fibre asbestos. A dash (-) denotes that there was no total mass of asbestos calculated asbestos found in that fraction.

[c] Bonded Asbestos Containing Material in the greater than 10mm fraction as percentage of the total sample (% w/w). A dash (-) denotes that there was no bonded asbestos containing materials found in that fraction.

[d] Asbestos as Fibrous Asbestos (FA) in greater than 10mm fraction as percentage of total sample (% w/w).

[e] Asbestos as Asbestos Fines (AF) in less than 10mm fraction as a percentage of total sample (% w/w).

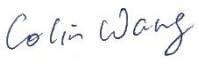
[f] Total Friable Asbestos combining Fibrous Asbestos and Asbestos Fines as the percentage weight for weight of the total sample (% w/w).

Sample Retention: Hold soil samples will only be stored for one month from date of receipt.

Analyst Name: Elsie Xu

Analyst Signature: 

Reviewed By KTP: Colin Wang

Reviewer Signature: 

Williamson Water and Land Advisory Limited
Unit 10 | 1 Putaki Drive
Kumeu
Auckland 0810

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: **SHANE MOORE**

Report **1069726-S**
Project name CH
Project ID WWLA 1078
Received Date Feb 16, 2024

Client Sample ID			**AH11 0-0.1**	**AH11 0.9-1.0**	**AH04 0-0.1**	**AH04 0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**K24-Fe0043972**	**K24-Fe0043973**	**K24-Fe0043974**	**K24-Fe0043975**
Date Sampled			**Feb 15, 2024**	**Feb 15, 2024**	**Feb 15, 2024**	**Feb 15, 2024**
Test/Reference	LOR	Unit				
Total Petroleum Hydrocarbons (NZ MfE 1999)						
TPH-SG C7-C9	5	mg/kg	< 5	< 5	< 5	< 5
TPH-SG C10-C14	10	mg/kg	< 10	< 10	< 10	< 10
TPH-SG C15-C36	20	mg/kg	< 20	< 20	< 20	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	< 35	< 35	< 35	< 35
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Comments			G01		G01	
Acenaphthene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Anthracene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.04
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.05
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	0.04	0.4	0.07
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	0.08	0.8	0.09
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.06
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.04
Chrysene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Fluoranthene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.05
Fluorene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Naphthalene	0.1	mg/kg	< 0.3	< 0.1	< 0.3	< 0.1
Phenanthrene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	< 0.03
Pyrene	0.03	mg/kg	< 0.3	< 0.03	< 0.3	0.05
Total PAH*	0.1	mg/kg	< 0.3	< 0.1	< 0.3	0.2
p-Terphenyl-d14 (surr.)	1	%	94	124	INT	119
2-Fluorobiphenyl (surr.)	1	%	117	119	147	133
Metals M7 (NZ MfE)						
Arsenic	0.1	mg/kg	8.8	5.0	6.4	8.6
Cadmium	0.01	mg/kg	0.22	0.01	0.21	0.15
Chromium	0.1	mg/kg	25	9.7	39	47
Copper	0.1	mg/kg	29	3.7	23	21
Lead	0.1	mg/kg	110	12	34	33
Nickel	0.1	mg/kg	17	3.6	23	23
Zinc	5	mg/kg	150	20	77	62

Client Sample ID			AH11 0-0.1	AH11 0.9-1.0	AH04 0-0.1	AH04 0.4-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043972	K24-Fe0043973	K24-Fe0043974	K24-Fe0043975
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	15	21	15	15

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Total Petroleum Hydrocarbons (NZ MfE 1999)						
TPH-SG C7-C9	5	mg/kg	-	< 5	-	< 5
TPH-SG C10-C14	10	mg/kg	-	< 10	-	< 10
TPH-SG C15-C36	20	mg/kg	-	< 20	-	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	-	< 35	-	< 35
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Comments				G01		G01
Acenaphthene	0.03	mg/kg	-	< 0.3	-	< 0.3
Acenaphthylene	0.03	mg/kg	-	< 0.3	-	< 0.3
Anthracene	0.03	mg/kg	-	< 0.3	-	< 0.3
Benz(a)anthracene	0.03	mg/kg	-	< 0.3	-	< 0.3
Benzo(a)pyrene	0.03	mg/kg	-	0.43	-	< 0.3
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	0.6	-	< 0.3
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	0.7	-	0.4
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	0.9	-	0.8
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	-	0.63	-	< 0.3
Benzo(g.h.i)perylene	0.03	mg/kg	-	< 0.3	-	< 0.3
Benzo(k)fluoranthene	0.03	mg/kg	-	0.51	-	< 0.3
Chrysene	0.03	mg/kg	-	< 0.3	-	< 0.3
Dibenz(a.h)anthracene	0.03	mg/kg	-	< 0.3	-	< 0.3
Fluoranthene	0.03	mg/kg	-	0.54	-	< 0.3
Fluorene	0.03	mg/kg	-	< 0.3	-	< 0.3
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	< 0.3	-	< 0.3
Naphthalene	0.1	mg/kg	-	< 0.3	-	< 0.3
Phenanthrene	0.03	mg/kg	-	< 0.3	-	< 0.3
Pyrene	0.03	mg/kg	-	0.54	-	< 0.3
Total PAH*	0.1	mg/kg	-	2.7	-	< 0.3
p-Terphenyl-d14 (surr.)	1	%	-	97	-	82
2-Fluorobiphenyl (surr.)	1	%	-	132	-	133
Metals M7 (NZ MfE)						
Arsenic	0.1	mg/kg	6.1	11	7.0	21
Cadmium	0.01	mg/kg	0.15	0.29	0.24	0.34
Chromium	0.1	mg/kg	47	28	21	57
Copper	0.1	mg/kg	25	37	26	33
Lead	0.1	mg/kg	38	100	70	76
Nickel	0.1	mg/kg	31	18	15	33
Zinc	5	mg/kg	68	160	88	160
Sample Properties						
% Moisture	1	%	15	19	24	15

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Volatile Organics (NZ MfE)						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dibromoethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2.4-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3.5-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	< 10	-	< 10	-
4-Chlorotoluene	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	-	< 0.5	-
Allyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Bromobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromodichloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromoform	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon disulfide	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Chlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroform	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Iodomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	-	< 0.5	-
Methylene Chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	-	< 0.3	-
Styrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Tetrachloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Toluene	0.1	mg/kg	< 0.1	-	< 0.1	-
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Volatile Organics (NZ MfE)						
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Vinyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Total MAH*	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	111	-	131	-
Toluene-d8 (surr.)	1	%	84	-	108	-
Semivolatile Organics						
Comments			G01		G01	
1-Chloronaphthalene	0.5	mg/kg	< 0.5	-	< 0.5	-
Total PAH*	0.1	mg/kg	< 0.3	-	< 0.3	-
1-Naphthylamine	0.5	mg/kg	< 5	-	< 5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.2.3-Trichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.2.3.4-Tetrachlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.2.3.5-Tetrachlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.2.4-Trichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.2.4.5-Tetrachlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.3.5-Trichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 5	-	< 5	-
2-Chloronaphthalene	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Chlorophenol	0.5	mg/kg	< 5	-	< 5	-
2-Fluorobiphenyl (surr.)	1	%	87	-	INT	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 50	-	< 50	-
2-Methylnaphthalene	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 5	-	< 5	-
2-Naphthylamine	0.5	mg/kg	< 5	-	< 5	-
2-Nitroaniline	0.5	mg/kg	< 5	-	< 5	-
2-Nitrophenol	1	mg/kg	< 10	-	< 10	-
2-Picoline	0.5	mg/kg	< 5	-	< 5	-
2.3.4.6-Tetrachlorophenol	5	mg/kg	< 5	-	< 5	-
2.4-Dichlorophenol	0.5	mg/kg	< 5	-	< 5	-
2.4-Dimethylphenol	0.5	mg/kg	< 5	-	< 5	-
2.4-Dinitrophenol	5	mg/kg	< 50	-	< 50	-
2.4-Dinitrotoluene	0.5	mg/kg	< 5	-	< 5	-
2.4.5-Trichlorophenol	1	mg/kg	< 10	-	< 10	-
2.4.6-Tribromophenol (surr.)	1	%	134	-	INT	-
2.4.6-Trichlorophenol	1	mg/kg	< 10	-	< 10	-
2.6-Dichlorophenol	0.5	mg/kg	< 5	-	< 5	-
2.6-Dinitrotoluene	0.5	mg/kg	< 5	-	< 5	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 10	-	< 10	-
3-Methylcholanthrene	0.5	mg/kg	< 0.5	-	< 0.5	-
3.3'-Dichlorobenzidine	0.5	mg/kg	< 5	-	< 5	-
4-Aminobiphenyl	0.5	mg/kg	< 5	-	< 5	-
4-Bromophenyl phenyl ether	0.5	mg/kg	< 5	-	< 5	-
4-Chloro-3-methylphenol	1	mg/kg	< 5	-	< 5	-
4-Chlorophenyl phenyl ether	0.5	mg/kg	< 5	-	< 5	-
4-Nitrophenol	5	mg/kg	< 50	-	< 50	-

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Semivolatile Organics						
4.4'-DDD	0.01	mg/kg	< 0.1	-	< 0.1	-
4.4'-DDE	0.01	mg/kg	< 0.1	-	< 0.1	-
4.4'-DDT	0.01	mg/kg	< 0.1	-	< 0.1	-
7.12-Dimethylbenz(a)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
a-HCH	0.01	mg/kg	< 0.1	-	< 0.1	-
Acenaphthene	0.03	mg/kg	< 0.3	-	< 0.3	-
Acenaphthylene	0.03	mg/kg	< 0.3	-	< 0.3	-
Acetophenone	0.5	mg/kg	< 5	-	< 5	-
Aldrin	0.01	mg/kg	< 0.1	-	< 0.1	-
Aniline	0.5	mg/kg	< 5	-	< 5	-
Anthracene	0.03	mg/kg	< 0.3	-	< 0.3	-
b-HCH	0.01	mg/kg	< 0.1	-	< 0.1	-
Benz(a)anthracene	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzo(a)pyrene	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	-	0.4	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	-	0.8	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	-	< 0.3	-
Benzyl chloride	0.5	mg/kg	< 5	-	< 5	-
Bis(2-chloroethoxy)methane	0.5	mg/kg	< 5	-	< 5	-
Bis(2-chloroisopropyl)ether	0.5	mg/kg	< 5	-	< 5	-
Bis(2-ethylhexyl)phthalate	0.5	mg/kg	< 5	-	< 5	-
Butyl benzyl phthalate	0.5	mg/kg	< 5	-	< 5	-
Chrysene	0.03	mg/kg	< 0.3	-	< 0.3	-
d-HCH	0.01	mg/kg	< 0.1	-	< 0.1	-
Di-n-butyl phthalate	0.5	mg/kg	< 5	-	< 5	-
Di-n-octyl phthalate	0.5	mg/kg	< 5	-	< 5	-
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.3	-	< 0.3	-
Dibenz(a.j)acridine	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibenzofuran	0.5	mg/kg	< 5	-	< 5	-
Dieldrin	0.01	mg/kg	< 0.1	-	< 0.1	-
Diethyl phthalate	0.5	mg/kg	< 5	-	< 5	-
Dimethyl phthalate	0.5	mg/kg	< 5	-	< 5	-
Dimethylaminoazobenzene	0.5	mg/kg	< 5	-	< 5	-
Diphenylamine	0.5	mg/kg	< 5	-	< 5	-
Endosulfan I	0.01	mg/kg	< 0.1	-	< 0.1	-
Endosulfan II	0.01	mg/kg	< 0.1	-	< 0.1	-
Endosulfan sulphate	0.01	mg/kg	< 0.1	-	< 0.1	-
Endrin	0.01	mg/kg	< 0.1	-	< 0.1	-
Endrin aldehyde	0.01	mg/kg	< 0.1	-	< 0.1	-
Endrin ketone	0.01	mg/kg	< 0.1	-	< 0.1	-
Fluoranthene	0.03	mg/kg	< 0.3	-	< 0.3	-
Fluorene	0.03	mg/kg	< 0.3	-	< 0.3	-
g-HCH (Lindane)	0.01	mg/kg	< 0.1	-	< 0.1	-
Heptachlor	0.01	mg/kg	< 0.1	-	< 0.1	-
Heptachlor epoxide	0.01	mg/kg	< 0.1	-	< 0.1	-
Hexachlorobenzene	0.01	mg/kg	< 5	-	< 5	-

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Semivolatile Organics						
Hexachlorobutadiene	0.5	mg/kg	< 5	-	< 5	-
Hexachlorocyclopentadiene	0.5	mg/kg	< 5	-	< 5	-
Hexachloroethane	0.5	mg/kg	< 5	-	< 5	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	-	< 0.3	-
Methoxychlor	0.01	mg/kg	< 0.1	-	< 0.1	-
N-Nitrosodibutylamine	0.5	mg/kg	< 5	-	< 5	-
N-Nitrosodipropylamine	0.5	mg/kg	< 5	-	< 5	-
N-Nitrosopiperidine	0.5	mg/kg	< 5	-	< 5	-
Naphthalene	0.1	mg/kg	< 0.3	-	< 0.3	-
Nitrobenzene	0.5	mg/kg	< 5	-	< 5	-
Nitrobenzene-d5 (surr.)	1	%	92	-	INT	-
Pentachlorobenzene	0.5	mg/kg	< 5	-	< 5	-
Pentachloronitrobenzene	0.5	mg/kg	< 5	-	< 5	-
Pentachlorophenol	1	mg/kg	< 10	-	< 10	-
Phenanthrene	0.03	mg/kg	< 0.3	-	< 0.3	-
Phenol	0.5	mg/kg	< 5	-	< 5	-
Phenol-d6 (surr.)	1	%	94	-	INT	-
Pronamide	0.5	mg/kg	< 5	-	< 5	-
Pyrene	0.03	mg/kg	< 0.3	-	< 0.3	-
Trifluralin	0.5	mg/kg	< 5	-	< 5	-
PFASs Summations						
Sum (PFHxS + PFOS)*[N16]	1	ug/kg	< 1	-	< 1	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*[N16]	1	ug/kg	< 1	-	< 1	-
Sum of PFASs (n=30)*[N16]	1	ug/kg	< 1	-	< 1	-
Sum of US EPA PFAS (PFOS + PFOA)*[N16]	1	ug/kg	< 1	-	< 1	-
Sum of WA DWER PFAS (n=10)*[N16]	1	ug/kg	< 1	-	< 1	-
Perfluoroalkyl sulfonamido substances- Trace						
Perfluorooctane sulfonamide (FOSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11, N16]	1	ug/kg	< 1	-	< 1	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11, N16]	1	ug/kg	< 1	-	< 1	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
13C8-FOSA (surr.)[N16]	1	%	67	-	58	-
D3-N-MeFOSA (surr.)[N16]	1	%	81	-	77	-
D5-N-EtFOSA (surr.)[N16]	1	%	108	-	101	-
D7-N-MeFOSE (surr.)[N16]	1	%	135	-	152	-
D9-N-EtFOSE (surr.)[N16]	1	%	88	-	81	-
D5-N-EtFOSAA (surr.)[N16]	1	%	105	-	90	-
D3-N-MeFOSAA (surr.)[N16]	1	%	93	-	79	-

Client Sample ID			AH04 0.9-1.0	AH08 0-0.1	AH08 0.4-0.5	AH13 0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0043976	K24-Fe0043977	K24-Fe0043978	K24-Fe0043979
Date Sampled			Feb 15, 2024	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluorobutanoic acid (PFBA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoropentanoic acid (PFPeA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorohexanoic acid (PFHxA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoroheptanoic acid (PFHpA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorooctanoic acid (PFOA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorononanoic acid (PFNA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorodecanoic acid (PFDA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorotridecanoic acid (PFTrDA)[N15, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoroundecanoic acid (PFUnDA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorododecanoic acid (PFDoDA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorotetradecanoic acid (PFTeDA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
13C4-PFBA (surr.)[N16]	1	%	90	-	86	-
13C5-PFPeA (surr.)[N16]	1	%	148	-	122	-
13C5-PFHxA (surr.)[N16]	1	%	130	-	112	-
13C4-PFHpA (surr.)[N16]	1	%	99	-	78	-
13C8-PFOA (surr.)[N16]	1	%	96	-	91	-
13C5-PFNA (surr.)[N16]	1	%	94	-	84	-
13C6-PFDA (surr.)[N16]	1	%	134	-	120	-
13C2-PFUnDA (surr.)[N16]	1	%	102	-	93	-
13C2-PFDoDA (surr.)[N16]	1	%	93	-	98	-
13C2-PFTeDA (surr.)[N16]	1	%	80	-	85	-
Perfluoroalkyl sulfonic acids (PFSAs)- Trace						
Perfluorobutanesulfonic acid (PFBS)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorononanesulfonic acid (PFNS)[N15, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoropropanesulfonic acid (PFPrS)[N15, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoropentanesulfonic acid (PFPeS)[N15, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorohexanesulfonic acid (PFHxS)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluoroheptanesulfonic acid (PFHpS)[N15, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorooctanesulfonic acid (PFOS)[N11, N16]	1	ug/kg	< 1	-	< 1	-
Perfluorodecanesulfonic acid (PFDS)[N15, N16]	1	ug/kg	< 1	-	< 1	-
13C3-PFBS (surr.)[N16]	1	%	137	-	133	-
18O2-PFHxS (surr.)[N16]	1	%	113	-	101	-
13C8-PFOS (surr.)[N16]	1	%	111	-	113	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11, N16]	1	ug/kg	< 1	-	< 1	-
13C2-4:2 FTSA (surr.)[N16]	1	%	146	-	86	-
13C2-6:2 FTSA (surr.)[N16]	1	%	177	-	84	-
13C2-8:2 FTSA (surr.)[N16]	1	%	187	-	132	-
13C2-10:2 FTSA (surr.)[N16]	1	%	99	-	110	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Total Petroleum Hydrocarbons (NZ MfE 1999)				
TPH-SG C7-C9	5	mg/kg	-	< 5
TPH-SG C10-C14	10	mg/kg	-	< 10
TPH-SG C15-C36	20	mg/kg	-	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	-	< 35
Polycyclic Aromatic Hydrocarbons (NZ MfE)				
Acenaphthene	0.03	mg/kg	-	< 0.03
Acenaphthylene	0.03	mg/kg	-	< 0.03
Anthracene	0.03	mg/kg	-	< 0.03
Benz(a)anthracene	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	-	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	-	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	-	0.06
Chrysene	0.03	mg/kg	-	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	-	< 0.03
Fluoranthene	0.03	mg/kg	-	0.04
Fluorene	0.03	mg/kg	-	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	< 0.03
Naphthalene	0.1	mg/kg	-	< 0.1
Phenanthrene	0.03	mg/kg	-	< 0.03
Pyrene	0.03	mg/kg	-	0.06
Total PAH*	0.1	mg/kg	-	0.2
p-Terphenyl-d14 (surr.)	1	%	-	INT
2-Fluorobiphenyl (surr.)	1	%	-	INT
Metals M7 (NZ MfE)				
Arsenic	0.1	mg/kg	11	8.2
Cadmium	0.01	mg/kg	0.09	0.17
Chromium	0.1	mg/kg	22	23
Copper	0.1	mg/kg	20	24
Lead	0.1	mg/kg	26	54
Nickel	0.1	mg/kg	17	14
Zinc	5	mg/kg	110	110
Sample Properties				
% Moisture	1	%	27	28
Volatile Organics (NZ MfE)				
1.1-Dichloroethane	0.5	mg/kg	< 0.5	-
1.1-Dichloroethene	0.5	mg/kg	< 0.5	-
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-
1.2-Dibromoethane	0.5	mg/kg	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.2-Dichloroethane	0.5	mg/kg	< 0.5	-
1.2-Dichloropropane	0.5	mg/kg	< 0.5	-
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Volatile Organics (NZ MfE)				
1.2.4-Trimethylbenzene	0.5	mg/kg	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.3-Dichloropropane	0.5	mg/kg	< 0.5	-
1.3.5-Trimethylbenzene	0.5	mg/kg	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	< 10	-
4-Chlorotoluene	0.5	mg/kg	< 0.5	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	-
Allyl chloride	0.5	mg/kg	< 0.5	-
Benzene	0.1	mg/kg	< 0.1	-
Bromobenzene	0.5	mg/kg	< 0.5	-
Bromochloromethane	0.5	mg/kg	< 0.5	-
Bromodichloromethane	0.5	mg/kg	< 0.5	-
Bromoform	0.5	mg/kg	< 0.5	-
Bromomethane	0.5	mg/kg	< 0.5	-
Carbon disulfide	0.5	mg/kg	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	-
Chlorobenzene	0.5	mg/kg	< 0.5	-
Chloroethane	0.5	mg/kg	< 0.5	-
Chloroform	0.5	mg/kg	< 0.5	-
Chloromethane	0.5	mg/kg	< 0.5	-
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-
Dibromochloromethane	0.5	mg/kg	< 0.5	-
Dibromomethane	0.5	mg/kg	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	-
Ethylbenzene	0.1	mg/kg	< 0.1	-
Iodomethane	0.5	mg/kg	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	-
Methylene Chloride	0.5	mg/kg	< 0.5	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	-
Styrene	0.5	mg/kg	< 0.5	-
Tetrachloroethene	0.5	mg/kg	< 0.5	-
Toluene	0.1	mg/kg	< 0.1	-
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-
Trichloroethene	0.5	mg/kg	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	-
Vinyl chloride	0.5	mg/kg	< 0.5	-
Total MAH*	0.5	mg/kg	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	142	-
Toluene-d8 (surr.)	1	%	106	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Semivolatile Organics				
1-Chloronaphthalene	0.5	mg/kg	< 0.5	-
Total PAH*	0.1	mg/kg	< 0.1	-
1-Naphthylamine	0.5	mg/kg	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.2.3-Trichlorobenzene	0.5	mg/kg	< 0.5	-
1.2.3.4-Tetrachlorobenzene	0.5	mg/kg	< 0.5	-
1.2.3.5-Tetrachlorobenzene	0.5	mg/kg	< 0.5	-
1.2.4-Trichlorobenzene	0.5	mg/kg	< 0.5	-
1.2.4.5-Tetrachlorobenzene	0.5	mg/kg	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.3.5-Trichlorobenzene	0.5	mg/kg	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	-
2-Chloronaphthalene	0.5	mg/kg	< 0.5	-
2-Chlorophenol	0.5	mg/kg	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	139	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-
2-Methylnaphthalene	0.5	mg/kg	< 0.5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-
2-Naphthylamine	0.5	mg/kg	< 0.5	-
2-Nitroaniline	0.5	mg/kg	< 0.5	-
2-Nitrophenol	1	mg/kg	< 1	-
2-Picoline	0.5	mg/kg	< 0.5	-
2.3.4.6-Tetrachlorophenol	5	mg/kg	< 5	-
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-
2.4-Dinitrophenol	5	mg/kg	< 5	-
2.4-Dinitrotoluene	0.5	mg/kg	< 0.5	-
2.4.5-Trichlorophenol	1	mg/kg	< 1	-
2.4.6-Tribromophenol (surr.)	1	%	111	-
2.4.6-Trichlorophenol	1	mg/kg	< 1	-
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-
2.6-Dinitrotoluene	0.5	mg/kg	< 0.5	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-
3-Methylcholanthrene	0.5	mg/kg	< 0.5	-
3.3'-Dichlorobenzidine	0.5	mg/kg	< 0.5	-
4-Aminobiphenyl	0.5	mg/kg	< 0.5	-
4-Bromophenyl phenyl ether	0.5	mg/kg	< 0.5	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-
4-Chlorophenyl phenyl ether	0.5	mg/kg	< 0.5	-
4-Nitrophenol	5	mg/kg	< 5	-
4.4'-DDD	0.01	mg/kg	< 0.01	-
4.4'-DDE	0.01	mg/kg	< 0.01	-
4.4'-DDT	0.01	mg/kg	< 0.01	-
7.12-Dimethylbenz(a)anthracene	0.5	mg/kg	< 0.5	-
a-HCH	0.01	mg/kg	< 0.01	-
Acenaphthene	0.03	mg/kg	< 0.03	-
Acenaphthylene	0.03	mg/kg	< 0.03	-
Acetophenone	0.5	mg/kg	< 0.5	-
Aldrin	0.01	mg/kg	< 0.01	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Semivolatile Organics				
Aniline	0.5	mg/kg	< 0.5	-
Anthracene	0.03	mg/kg	< 0.03	-
b-HCH	0.01	mg/kg	< 0.01	-
Benz(a)anthracene	0.03	mg/kg	< 0.03	-
Benzo(a)pyrene	0.03	mg/kg	< 0.03	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	-
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	-
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	-
Benzyl chloride	0.5	mg/kg	< 0.5	-
Bis(2-chloroethoxy)methane	0.5	mg/kg	< 0.5	-
Bis(2-chloroisopropyl)ether	0.5	mg/kg	< 0.5	-
Bis(2-ethylhexyl)phthalate	0.5	mg/kg	< 0.5	-
Butyl benzyl phthalate	0.5	mg/kg	< 0.5	-
Chrysene	0.03	mg/kg	< 0.03	-
d-HCH	0.01	mg/kg	< 0.01	-
Di-n-butyl phthalate	0.5	mg/kg	< 0.5	-
Di-n-octyl phthalate	0.5	mg/kg	< 0.5	-
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	-
Dibenz(a.j)acridine	0.5	mg/kg	< 0.5	-
Dibenzofuran	0.5	mg/kg	< 0.5	-
Dieldrin	0.01	mg/kg	< 0.01	-
Diethyl phthalate	0.5	mg/kg	< 0.5	-
Dimethyl phthalate	0.5	mg/kg	< 0.5	-
Dimethylaminoazobenzene	0.5	mg/kg	< 0.5	-
Diphenylamine	0.5	mg/kg	< 0.5	-
Endosulfan I	0.01	mg/kg	< 0.01	-
Endosulfan II	0.01	mg/kg	< 0.01	-
Endosulfan sulphate	0.01	mg/kg	< 0.01	-
Endrin	0.01	mg/kg	0.02	-
Endrin aldehyde	0.01	mg/kg	< 0.01	-
Endrin ketone	0.01	mg/kg	< 0.01	-
Fluoranthene	0.03	mg/kg	< 0.03	-
Fluorene	0.03	mg/kg	< 0.03	-
g-HCH (Lindane)	0.01	mg/kg	< 0.01	-
Heptachlor	0.01	mg/kg	< 0.01	-
Heptachlor epoxide	0.01	mg/kg	< 0.01	-
Hexachlorobenzene	0.01	mg/kg	< 0.01	-
Hexachlorobutadiene	0.5	mg/kg	< 0.5	-
Hexachlorocyclopentadiene	0.5	mg/kg	< 0.5	-
Hexachloroethane	0.5	mg/kg	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	-
Methoxychlor	0.01	mg/kg	< 0.01	-
N-Nitrosodibutylamine	0.5	mg/kg	< 0.5	-
N-Nitrosodipropylamine	0.5	mg/kg	< 0.5	-
N-Nitrosopiperidine	0.5	mg/kg	< 0.5	-
Naphthalene	0.1	mg/kg	< 0.1	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Semivolatile Organics				
Nitrobenzene	0.5	mg/kg	< 0.5	-
Nitrobenzene-d5 (surr.)	1	%	132	-
Pentachlorobenzene	0.5	mg/kg	< 0.5	-
Pentachloronitrobenzene	0.5	mg/kg	< 0.5	-
Pentachlorophenol	1	mg/kg	< 1	-
Phenanthrene	0.03	mg/kg	< 0.03	-
Phenol	0.5	mg/kg	< 0.5	-
Phenol-d6 (surr.)	1	%	110	-
Pronamide	0.5	mg/kg	< 0.5	-
Pyrene	0.03	mg/kg	< 0.03	-
Trifluralin	0.5	mg/kg	< 0.5	-
PFASs Summations				
Sum (PFHxS + PFOS)*[N16]	1	ug/kg	< 1	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*[N16]	1	ug/kg	< 1	-
Sum of PFASs (n=30)*[N16]	1	ug/kg	< 1	-
Sum of US EPA PFAS (PFOS + PFOA)*[N16]	1	ug/kg	< 1	-
Sum of WA DWER PFAS (n=10)*[N16]	1	ug/kg	< 1	-
Perfluoroalkyl sulfonamido substances- Trace				
Perfluorooctane sulfonamide (FOSA)[N11, N16]	1	ug/kg	< 1	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11, N16]	1	ug/kg	< 1	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11, N16]	1	ug/kg	< 1	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11, N16]	1	ug/kg	< 1	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11, N16]	1	ug/kg	< 1	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11, N16]	1	ug/kg	< 1	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11, N16]	1	ug/kg	< 1	-
13C8-FOSA (surr.)[N16]	1	%	51	-
D3-N-MeFOSA (surr.)[N16]	1	%	76	-
D5-N-EtFOSA (surr.)[N16]	1	%	96	-
D7-N-MeFOSE (surr.)[N16]	1	%	114	-
D9-N-EtFOSE (surr.)[N16]	1	%	76	-
D5-N-EtFOSAA (surr.)[N16]	1	%	59	-
D3-N-MeFOSAA (surr.)[N16]	1	%	52	-
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				
Perfluorobutanoic acid (PFBA)[N11, N16]	1	ug/kg	< 1	-
Perfluoropentanoic acid (PFPeA)[N11, N16]	1	ug/kg	< 1	-
Perfluorohexanoic acid (PFHxA)[N11, N16]	1	ug/kg	< 1	-
Perfluoroheptanoic acid (PFHpA)[N11, N16]	1	ug/kg	< 1	-
Perfluorooctanoic acid (PFOA)[N11, N16]	1	ug/kg	< 1	-
Perfluorononanoic acid (PFNA)[N11, N16]	1	ug/kg	< 1	-
Perfluorodecanoic acid (PFDA)[N11, N16]	1	ug/kg	< 1	-
Perfluorotridecanoic acid (PFTrDA)[N15, N16]	1	ug/kg	< 1	-
Perfluoroundecanoic acid (PFUnDA)[N11, N16]	1	ug/kg	< 1	-
Perfluorododecanoic acid (PFDoDA)[N11, N16]	1	ug/kg	< 1	-
Perfluorotetradecanoic acid (PFTeDA)[N11, N16]	1	ug/kg	< 1	-
13C4-PFBA (surr.)[N16]	1	%	68	-

Client Sample ID			AH13 0.4-0.5	AH05 0-0.1
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0043980	K24-Fe0043981
Date Sampled			Feb 15, 2024	Feb 15, 2024
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				
13C5-PFPeA (surr.)[N16]	1	%	85	-
13C5-PFHxA (surr.)[N16]	1	%	88	-
13C4-PFHpA (surr.)[N16]	1	%	65	-
13C8-PFOA (surr.)[N16]	1	%	72	-
13C5-PFNA (surr.)[N16]	1	%	73	-
13C6-PFDA (surr.)[N16]	1	%	100	-
13C2-PFUnDA (surr.)[N16]	1	%	76	-
13C2-PFDoDA (surr.)[N16]	1	%	78	-
13C2-PFTeDA (surr.)[N16]	1	%	62	-
Perfluoroalkyl sulfonic acids (PFSAs)- Trace				
Perfluorobutanesulfonic acid (PFBS)[N11, N16]	1	ug/kg	< 1	-
Perfluorononanesulfonic acid (PFNS)[N15, N16]	1	ug/kg	< 1	-
Perfluoropropanesulfonic acid (PFPrS)[N15, N16]	1	ug/kg	< 1	-
Perfluoropentanesulfonic acid (PFPeS)[N15, N16]	1	ug/kg	< 1	-
Perfluorohexanesulfonic acid (PFHxS)[N11, N16]	1	ug/kg	< 1	-
Perfluoroheptanesulfonic acid (PFHpS)[N15, N16]	1	ug/kg	< 1	-
Perfluorooctanesulfonic acid (PFOS)[N11, N16]	1	ug/kg	< 1	-
Perfluorodecanesulfonic acid (PFDS)[N15, N16]	1	ug/kg	< 1	-
13C3-PFBS (surr.)[N16]	1	%	87	-
18O2-PFHxS (surr.)[N16]	1	%	87	-
13C8-PFOS (surr.)[N16]	1	%	85	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11, N16]	1	ug/kg	< 1	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11, N16]	1	ug/kg	< 1	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11, N16]	1	ug/kg	< 1	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11, N16]	1	ug/kg	< 1	-
13C2-4:2 FTSA (surr.)[N16]	1	%	53	-
13C2-6:2 FTSA (surr.)[N16]	1	%	55	-
13C2-8:2 FTSA (surr.)[N16]	1	%	64	-
13C2-10:2 FTSA (surr.)[N16]	1	%	71	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Petroleum Hydrocarbons (NZ MfE 1999)	Auckland	Mar 01, 2024	14 Days
- Method: LTM-ORG-2010 TRH and BTEX in Soil and Water by GC FID and PT GCMS			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Auckland	Mar 01, 2024	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS			
Metals M7 (NZ MfE)	Auckland	Feb 19, 2024	6 Months
- Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS			
% Moisture	Auckland	Feb 19, 2024	14 Days
- Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry			
Volatile Organics (NZ MfE)	Auckland	Mar 01, 2024	14 Days
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Semivolatile Organics	Auckland	Mar 01, 2024	14 Days
- Method: LTM-ORG-2190 SVOC in Water & Soil by GC-MS			
Per- and Polyfluoroalkyl Substances (PFASs) - Trace			
Perfluoroalkyl sulfonamido substances- Trace	Brisbane	Feb 21, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl carboxylic acids (PFCAs) - Trace	Brisbane	Feb 21, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl sulfonic acids (PFSAs)- Trace	Brisbane	Feb 21, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace	Brisbane	Feb 21, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			

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Site# 2370

Company Name: Williamson Water and Land Advisory Ltd
Address: Unit 10 | 1 Putaki Drive
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Auckland 0810

Project Name: CH
Project ID: WWLA 1078

Order No.:
Report #: 1069726
Phone: s 9(2)(a)
Fax:

Received: Feb 16, 2024 3:52 PM
Due: Feb 27, 2024
Priority: 7 Day
Contact Name: SHANE MOORE

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						HOLD	Moisture Set	Metals M7 (NZ MfE)	Eurofins Suite B4B-NZ: TPH, PAH (NZ MfE)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace	SVV: SVOC/VOC (NZ MfE)
Auckland Laboratory - IANZ# 1327						X	X	X	X		X
Auckland (asbestos) Laboratory - IANZ# 1308											
Christchurch Laboratory - IANZ# 1290											
Tauranga Laboratory - IANZ# 1402											
Brisbane Laboratory - NATA # 1261 Site # 20794										X	
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	AH11 0-0.1	Feb 15, 2024		Soil	K24-Fe0043972		X	X	X		
2	AH11 0.9-1.0	Feb 15, 2024		Soil	K24-Fe0043973		X	X	X		
3	AH04 0-0.1	Feb 15, 2024		Soil	K24-Fe0043974		X	X	X		
4	AH04 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043975		X	X	X		
5	AH04 0.9-1.0	Feb 15, 2024		Soil	K24-Fe0043976		X	X		X	X
6	AH08 0-0.1	Feb 15, 2024		Soil	K24-Fe0043977		X	X	X		
7	AH08 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043978		X	X		X	X
8	AH13 0-0.1	Feb 15, 2024		Soil	K24-Fe0043979		X	X	X		
9	AH13 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043980		X	X		X	X

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Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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Sample Detail						HOLD	Moisture Set	Metals M7 (NZ MfE)	Eurofins Suite B4B-NZ: TPH, PAH (NZ MfE)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace	SVV: SVOC/VOC (NZ MfE)
Auckland Laboratory - IANZ# 1327						X	X	X	X		X
Auckland (asbestos) Laboratory - IANZ# 1308											
Christchurch Laboratory - IANZ# 1290											
Tauranga Laboratory - IANZ# 1402											
10	AH05 0-0.1	Feb 15, 2024		Soil	K24-Fe0043981		X	X	X		
11	AH11 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043982	X					
12	AH08 0.8-0.9	Feb 15, 2024		Soil	K24-Fe0043983	X					
13	AH03 0-0.1	Feb 15, 2024		Soil	K24-Fe0043984	X					
14	AH03 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043985	X					
15	AH03 0.9-1.0	Feb 15, 2024		Soil	K24-Fe0043986	X					
16	AH13 0.9-1.0	Feb 15, 2024		Soil	K24-Fe0043987	X					
17	AH05 0.4-0.5	Feb 15, 2024		Soil	K24-Fe0043988	X					
18	AH05 0.9-1.0	Feb 15, 2024		Soil	K24-Fe0043989	X					
Test Counts						8	10	10	7	3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C7-C9	mg/kg	< 5			5	Pass	
TPH-SG C10-C14	mg/kg	< 10			10	Pass	
TPH-SG C15-C36	mg/kg	< 20			20	Pass	
TPH-SG C7-C36 (Total)	mg/kg	< 35			35	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Method Blank							
Metals M7 (NZ MfE)							
Arsenic	mg/kg	< 0.1			0.1	Pass	
Cadmium	mg/kg	< 0.01			0.01	Pass	
Chromium	mg/kg	< 0.1			0.1	Pass	
Copper	mg/kg	< 0.1			0.1	Pass	
Lead	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 0.1			0.1	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Volatile Organics (NZ MfE)							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.4-Trimethylbenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3.5-Trimethylbenzene	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
2-Butanone (MEK)	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Propanone (Acetone)	mg/kg	< 0.5			0.5	Pass	
4-Chlorotoluene	mg/kg	< 0.5			0.5	Pass	
4-Methyl-2-pentanone (MIBK)	mg/kg	< 0.5			0.5	Pass	
Allyl chloride	mg/kg	< 0.5			0.5	Pass	
Benzene	mg/kg	< 0.1			0.1	Pass	
Bromobenzene	mg/kg	< 0.5			0.5	Pass	
Bromochloromethane	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon disulfide	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroethane	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Dichlorodifluoromethane	mg/kg	< 0.5			0.5	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Isopropyl benzene (Cumene)	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Styrene	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Semivolatile Organics							
1-Chloronaphthalene	mg/kg	< 0.5			0.5	Pass	
1-Naphthylamine	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3.4-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3.5-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.4-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.4.5-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3.5-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
2-Chloronaphthalene	mg/kg	< 0.5			0.5	Pass	
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylnaphthalene	mg/kg	< 0.5			0.5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Naphthylamine	mg/kg	< 0.5			0.5	Pass	
2-Nitroaniline	mg/kg	< 0.5			0.5	Pass	
2-Nitrophenol	mg/kg	< 1			1	Pass	
2-Picoline	mg/kg	< 0.5			0.5	Pass	
2.3.4.6-Tetrachlorophenol	mg/kg	< 5			5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
2.4-Dinitrotoluene	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.6-Dinitrotoluene	mg/kg	< 0.5			0.5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
3-Methylcholanthrene	mg/kg	< 0.5			0.5	Pass	
3.3'-Dichlorobenzidine	mg/kg	< 0.5			0.5	Pass	
4-Aminobiphenyl	mg/kg	< 0.5			0.5	Pass	
4-Bromophenyl phenyl ether	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
4-Chlorophenyl phenyl ether	mg/kg	< 0.5			0.5	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
4.4'-DDD	mg/kg	< 0.01			0.01	Pass	
4.4'-DDE	mg/kg	< 0.01			0.01	Pass	
4.4'-DDT	mg/kg	< 0.01			0.01	Pass	
7.12-Dimethylbenz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
a-HCH	mg/kg	< 0.01			0.01	Pass	
Acetophenone	mg/kg	< 0.5			0.5	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
Aniline	mg/kg	< 0.5			0.5	Pass	
b-HCH	mg/kg	< 0.01			0.01	Pass	
Benzyl chloride	mg/kg	< 0.5			0.5	Pass	
Bis(2-chloroethoxy)methane	mg/kg	< 0.5			0.5	Pass	
Bis(2-chloroisopropyl)ether	mg/kg	< 0.5			0.5	Pass	
Bis(2-ethylhexyl)phthalate	mg/kg	< 0.5			0.5	Pass	
Butyl benzyl phthalate	mg/kg	< 0.5			0.5	Pass	
d-HCH	mg/kg	< 0.01			0.01	Pass	
Di-n-butyl phthalate	mg/kg	< 0.5			0.5	Pass	
Di-n-octyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.j)acridine	mg/kg	< 0.5			0.5	Pass	
Dibenzofuran	mg/kg	< 0.5			0.5	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Diethyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dimethyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dimethylaminoazobenzene	mg/kg	< 0.5			0.5	Pass	
Diphenylamine	mg/kg	< 0.5			0.5	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
g-HCH (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Hexachlorobutadiene	mg/kg	< 0.5			0.5	Pass	
Hexachlorocyclopentadiene	mg/kg	< 0.5			0.5	Pass	
Hexachloroethane	mg/kg	< 0.5			0.5	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
N-Nitrosodibutylamine	mg/kg	< 0.5			0.5	Pass	
N-Nitrosodipropylamine	mg/kg	< 0.5			0.5	Pass	
N-Nitrosopiperidine	mg/kg	< 0.5			0.5	Pass	
Nitrobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachlorobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachloronitrobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Pronamide	mg/kg	< 0.5			0.5	Pass	
Trifluralin	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 1			1	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 1			1	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 1			1	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 1			1	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 1			1	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 1			1	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 1			1	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	ug/kg	< 1			1	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 1			1	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 1			1	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 1			1	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 1			1	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 1			1	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 1			1	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/kg	< 1			1	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 1			1	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 1			1	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 1			1	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 1			1	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 1			1	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 1			1	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 1			1	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 1			1	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 1			1	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 1			1	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 1			1	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 1			1	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 1			1	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 1			1	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 1			1	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C7-C36 (Total)	%	103			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	103			70-130	Pass	
Acenaphthylene	%	107			70-130	Pass	
Anthracene	%	106			70-130	Pass	
Benz(a)anthracene	%	97			70-130	Pass	
Benzo(a)pyrene	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	%	80			70-130	Pass	
Benzo(g.h.i)perylene	%	79			70-130	Pass	
Benzo(k)fluoranthene	%	86			70-130	Pass	
Chrysene	%	91			70-130	Pass	
Dibenz(a.h)anthracene	%	86			70-130	Pass	
Fluoranthene	%	101			70-130	Pass	
Fluorene	%	119			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	117			70-130	Pass	
Phenanthrene	%	81			70-130	Pass	
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Metals M7 (NZ MfE)							
Arsenic	%	105			80-120	Pass	
Cadmium	%	107			80-120	Pass	
Chromium	%	103			80-120	Pass	
Copper	%	104			80-120	Pass	
Lead	%	103			80-120	Pass	
Nickel	%	103			80-120	Pass	
Zinc	%	104			80-120	Pass	
LCS - % Recovery							
Volatile Organics (NZ MfE)							
1.1-Dichloroethane	%	103			70-130	Pass	
1.1-Dichloroethene	%	109			70-130	Pass	
1.1.1-Trichloroethane	%	100			70-130	Pass	
1.1.2-Trichloroethane	%	119			70-130	Pass	
1.2-Dibromoethane	%	119			70-130	Pass	
1.2-Dichlorobenzene	%	105			70-130	Pass	
1.2-Dichloroethane	%	115			70-130	Pass	
1.2-Dichloropropane	%	96			70-130	Pass	
1.2.4-Trimethylbenzene	%	98			70-130	Pass	
1.3-Dichlorobenzene	%	100			70-130	Pass	
1.3-Dichloropropane	%	118			70-130	Pass	
1.3.5-Trimethylbenzene	%	94			70-130	Pass	
1.4-Dichlorobenzene	%	101			70-130	Pass	
4-Chlorotoluene	%	94			70-130	Pass	
Benzene	%	83			70-130	Pass	
Bromobenzene	%	115			70-130	Pass	
Bromochloromethane	%	109			70-130	Pass	
Bromodichloromethane	%	101			70-130	Pass	
Bromomethane	%	114			70-130	Pass	
Carbon disulfide	%	81			70-130	Pass	
Carbon Tetrachloride	%	97			70-130	Pass	
Chloroform	%	122			70-130	Pass	
cis-1.2-Dichloroethene	%	123			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
cis-1.3-Dichloropropene	%	102			70-130	Pass	
Dibromochloromethane	%	101			70-130	Pass	
Dibromomethane	%	115			70-130	Pass	
Dichlorodifluoromethane	%	119			70-130	Pass	
Ethylbenzene	%	95			70-130	Pass	
Iodomethane	%	104			70-130	Pass	
Isopropyl benzene (Cumene)	%	106			70-130	Pass	
m&p-Xylenes	%	93			70-130	Pass	
o-Xylene	%	111			70-130	Pass	
Xylenes - Total	%	99			70-130	Pass	
Styrene	%	115			70-130	Pass	
Tetrachloroethene	%	82			70-130	Pass	
Toluene	%	76			70-130	Pass	
trans-1.3-Dichloropropene	%	101			70-130	Pass	
Trichloroethene	%	110			70-130	Pass	
Trichlorofluoromethane	%	122			70-130	Pass	
LCS - % Recovery							
Semivolatile Organics							
1-Chloronaphthalene	%	85			70-130	Pass	
1.2-Dichlorobenzene	%	104			70-130	Pass	
1.2.3-Trichlorobenzene	%	109			70-130	Pass	
1.2.3.4-Tetrachlorobenzene	%	97			70-130	Pass	
1.2.3.5-Tetrachlorobenzene	%	101			70-130	Pass	
1.2.4-Trichlorobenzene	%	105			70-130	Pass	
1.2.4.5-Tetrachlorobenzene	%	97			70-130	Pass	
1.3-Dichlorobenzene	%	102			70-130	Pass	
1.3.5-Trichlorobenzene	%	106			70-130	Pass	
1.4-Dichlorobenzene	%	98			70-130	Pass	
2-Chloronaphthalene	%	100			70-130	Pass	
2-Chlorophenol	%	102			25-130	Pass	
2-Methyl-4.6-dinitrophenol	%	96			25-130	Pass	
2-Methylnaphthalene	%	97			70-130	Pass	
2-Methylphenol (o-Cresol)	%	95			25-130	Pass	
2-Naphthylamine	%	99			70-130	Pass	
2-Nitrophenol	%	84			25-130	Pass	
2.4-Dichlorophenol	%	81			25-130	Pass	
2.4-Dimethylphenol	%	99			25-130	Pass	
2.4.5-Trichlorophenol	%	100			25-130	Pass	
2.4.6-Trichlorophenol	%	84			25-130	Pass	
2.6-Dichlorophenol	%	104			25-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	88			25-130	Pass	
3-Methylcholanthrene	%	76			70-130	Pass	
4-Aminobiphenyl	%	105			70-130	Pass	
4-Bromophenyl phenyl ether	%	95			70-130	Pass	
4-Chlorophenyl phenyl ether	%	116			70-130	Pass	
4-Nitrophenol	%	102			25-130	Pass	
4.4'-DDD	%	75			70-130	Pass	
4.4'-DDE	%	122			70-130	Pass	
4.4'-DDT	%	118			70-130	Pass	
7.12-Dimethylbenz(a)anthracene	%	109			70-130	Pass	
a-HCH	%	118			70-130	Pass	
Acetophenone	%	98			70-130	Pass	
Aldrin	%	88			70-130	Pass	
b-HCH	%	106			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzyl chloride	%	102			70-130	Pass	
Bis(2-chloroethoxy)methane	%	100			70-130	Pass	
Bis(2-chloroisopropyl)ether	%	114			70-130	Pass	
Butyl benzyl phthalate	%	77			70-130	Pass	
d-HCH	%	122			70-130	Pass	
Di-n-butyl phthalate	%	112			70-130	Pass	
Dibenzofuran	%	111			70-130	Pass	
Dieldrin	%	113			70-130	Pass	
Diethyl phthalate	%	115			70-130	Pass	
Dimethyl phthalate	%	125			70-130	Pass	
Diphenylamine	%	98			70-130	Pass	
Endosulfan I	%	103			70-130	Pass	
Endosulfan II	%	112			70-130	Pass	
Endosulfan sulphate	%	93			70-130	Pass	
Endrin	%	85			70-130	Pass	
Endrin aldehyde	%	116			70-130	Pass	
Endrin ketone	%	95			70-130	Pass	
g-HCH (Lindane)	%	119			70-130	Pass	
Heptachlor	%	96			70-130	Pass	
Heptachlor epoxide	%	114			70-130	Pass	
Hexachlorobenzene	%	86			70-130	Pass	
Hexachlorobutadiene	%	94			70-130	Pass	
Hexachlorocyclopentadiene	%	115			70-130	Pass	
Hexachloroethane	%	117			70-130	Pass	
Methoxychlor	%	112			70-130	Pass	
N-Nitrosodibutylamine	%	83			70-130	Pass	
N-Nitrosodipropylamine	%	89			70-130	Pass	
N-Nitrosopiperidine	%	92			70-130	Pass	
Pentachlorobenzene	%	110			70-130	Pass	
Pentachloronitrobenzene	%	104			70-130	Pass	
Pentachlorophenol	%	115			25-130	Pass	
Pronamide	%	94			70-130	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	%	150			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	95			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	66			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	69			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	87			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	87			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	96			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	%	90			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	89			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	95			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	110			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	107			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	97			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	98			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	114			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	94			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	93			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	137			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	%	77			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	65			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	78			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	68			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	88			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	84			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	82			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	95			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	91			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	131			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	100			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	K24-Fe0054021	NCP	%	82			70-130	Pass	
Acenaphthylene	K24-Fe0054021	NCP	%	94			70-130	Pass	
Anthracene	K24-Fe0054762	NCP	%	89			70-130	Pass	
Benz(a)anthracene	K24-Fe0043972	CP	%	88			70-130	Pass	
Benzo(a)pyrene	K24-Fe0043972	CP	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	K24-Fe0043972	CP	%	87			70-130	Pass	
Benzo(k)fluoranthene	K24-Fe0043972	CP	%	91			70-130	Pass	
Chrysene	K24-Fe0043972	CP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	K24-Fe0054762	NCP	%	73			70-130	Pass	
Fluoranthene	K24-Fe0043972	CP	%	118			70-130	Pass	
Fluorene	K24-Fe0054762	NCP	%	95			70-130	Pass	
Indeno(1.2.3-cd)pyrene	K24-Fe0043972	CP	%	75			70-130	Pass	
Naphthalene	K24-Fe0043972	CP	%	75			70-130	Pass	
Phenanthrene	K24-Fe0054762	NCP	%	95			70-130	Pass	
Pyrene	K24-Fe0043972	CP	%	105			70-130	Pass	
Spike - % Recovery									
Metals M7 (NZ MfE)				Result 1					
Lead	K24-Fe0073063	NCP	%	112			75-125	Pass	
Zinc	K24-Fe0073063	NCP	%	119			75-125	Pass	
Spike - % Recovery									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1					
TPH-SG C7-C36 (Total)	K24-Fe0043973	CP	%	104			70-130	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances- Trace				Result 1					
Perfluorooctane sulfonamide (FOSA)	K24-Fe0047253	NCP	%	136			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	K24-Fe0047253	NCP	%	102			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	K24-Fe0047253	NCP	%	64			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	K24-Fe0047253	NCP	%	67			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	K24-Fe0047253	NCP	%	58			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	K24-Fe0047253	NCP	%	89			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	K24-Fe0047253	NCP	%	107			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1					
Perfluorobutanoic acid (PFBA)	K24-Fe0047253	NCP	%	83			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	K24-Fe0047253	NCP	%	86			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	K24-Fe0047253	NCP	%	101			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	K24-Fe0047253	NCP	%	103			50-150	Pass	
Perfluorooctanoic acid (PFOA)	K24-Fe0047253	NCP	%	114			50-150	Pass	
Perfluorononanoic acid (PFNA)	K24-Fe0047253	NCP	%	116			50-150	Pass	
Perfluorodecanoic acid (PFDA)	K24-Fe0047253	NCP	%	97			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	K24-Fe0047253	NCP	%	123			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	K24-Fe0047253	NCP	%	98			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	K24-Fe0047253	NCP	%	95			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	K24-Fe0047253	NCP	%	138			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)- Trace				Result 1					
Perfluorobutanesulfonic acid (PFBS)	K24-Fe0047253	NCP	%	82			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	K24-Fe0047253	NCP	%	65			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	K24-Fe0047253	NCP	%	72			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	K24-Fe0047253	NCP	%	72			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	K24-Fe0047253	NCP	%	80			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	K24-Fe0047253	NCP	%	82			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	K24-Fe0047253	NCP	%	83			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	K24-Fe0047253	NCP	%	99			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	K24-Fe0047253	NCP	%	118			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	K24-Fe0047253	NCP	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	K24-Fe0047253	NCP	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	K24-Fe0047253	NCP	%	82			50-150	Pass	
Spike - % Recovery									
Metals M7 (NZ MfE)				Result 1					
Arsenic	K24-Fe0043977	CP	%	109			75-125	Pass	
Cadmium	K24-Fe0043977	CP	%	116			75-125	Pass	
Chromium	K24-Fe0043977	CP	%	114			75-125	Pass	
Copper	K24-Fe0043977	CP	%	117			75-125	Pass	
Nickel	K24-Fe0043977	CP	%	115			75-125	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Volatile Organics (NZ MfE)				Result 1					
1.1-Dichloroethane	K24-Fe0043980	CP	%	92			70-130	Pass	
1.1-Dichloroethene	K24-Fe0043980	CP	%	117			70-130	Pass	
1.1.1-Trichloroethane	K24-Fe0043980	CP	%	95			70-130	Pass	
1.1.2-Trichloroethane	K24-Fe0043980	CP	%	116			70-130	Pass	
1.2-Dibromoethane	K24-Fe0043980	CP	%	118			70-130	Pass	
1.2-Dichlorobenzene	K24-Fe0043980	CP	%	87			70-130	Pass	
1.2-Dichloroethane	K24-Fe0043980	CP	%	111			70-130	Pass	
1.2-Dichloropropane	K24-Fe0043980	CP	%	90			70-130	Pass	
1.2.4-Trimethylbenzene	K24-Fe0043980	CP	%	80			70-130	Pass	
1.3-Dichlorobenzene	K24-Fe0043980	CP	%	80			70-130	Pass	
1.3-Dichloropropane	K24-Fe0043980	CP	%	116			70-130	Pass	
1.3.5-Trimethylbenzene	K24-Fe0043980	CP	%	75			70-130	Pass	
1.4-Dichlorobenzene	K24-Fe0043980	CP	%	82			70-130	Pass	
4-Chlorotoluene	K24-Fe0043980	CP	%	77			70-130	Pass	
Allyl chloride	K24-Fe0043980	CP	%	99			70-130	Pass	
Benzene	K24-Fe0043980	CP	%	78			70-130	Pass	
Bromobenzene	K24-Fe0043980	CP	%	111			70-130	Pass	
Bromochloromethane	K24-Fe0043980	CP	%	121			70-130	Pass	
Bromodichloromethane	K24-Fe0043980	CP	%	97			70-130	Pass	
Bromomethane	K24-Fe0043980	CP	%	87			70-130	Pass	
Carbon disulfide	K24-Fe0043980	CP	%	106			70-130	Pass	
Carbon Tetrachloride	K24-Fe0043980	CP	%	91			70-130	Pass	
Chloroethane	K24-Fe0043980	CP	%	124			70-130	Pass	
Chloroform	K24-Fe0043980	CP	%	118			70-130	Pass	
cis-1.3-Dichloropropene	K24-Fe0043980	CP	%	99			70-130	Pass	
Dibromochloromethane	K24-Fe0043980	CP	%	109			70-130	Pass	
Dichlorodifluoromethane	K24-Fe0043980	CP	%	124			70-130	Pass	
Ethylbenzene	K24-Fe0043980	CP	%	91			70-130	Pass	
Iodomethane	K24-Fe0043980	CP	%	91			70-130	Pass	
Isopropyl benzene (Cumene)	K24-Fe0043980	CP	%	103			70-130	Pass	
Methylene Chloride	K24-Fe0043980	CP	%	111			70-130	Pass	
m&p-Xylenes	K24-Fe0043980	CP	%	90			70-130	Pass	
o-Xylene	K24-Fe0043980	CP	%	108			70-130	Pass	
Xylenes - Total	K24-Fe0043980	CP	%	96			70-130	Pass	
Styrene	K24-Fe0043980	CP	%	111			70-130	Pass	
Tetrachloroethene	K24-Fe0043980	CP	%	81			70-130	Pass	
Toluene	K24-Fe0043980	CP	%	78			70-130	Pass	
trans-1.3-Dichloropropene	K24-Fe0043980	CP	%	97			70-130	Pass	
Trichloroethene	K24-Fe0043980	CP	%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1	Result 2	RPD			
TPH-SG C7-C9	K24-Fe0048163	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
TPH-SG C10-C14	K24-Fe0048163	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
TPH-SG C15-C36	K24-Fe0048163	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TPH-SG C7-C36 (Total)	K24-Fe0048163	NCP	mg/kg	< 35	< 35	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Benzo(b&j)fluoranthene	K24-Fe0054020	NCP	mg/kg	0.05	0.05	7.7	30%	Pass	
Benzo(g.h.i)perylene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K24-Fe0054020	NCP	mg/kg	0.04	0.04	20	30%	Pass	
Chrysene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a.h)anthracene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K24-Fe0054020	NCP	mg/kg	0.04	0.05	39	30%	Fail	Q15
Fluorene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K24-Fe0054020	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K24-Fe0054020	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K24-Fe0054020	NCP	mg/kg	0.04	0.05	40	30%	Fail	Q15
Duplicate									
Metals M7 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K24-Fe0043976	CP	mg/kg	6.1	6.3	3.9	30%	Pass	
Cadmium	K24-Fe0043976	CP	mg/kg	0.15	0.15	1.4	30%	Pass	
Chromium	K24-Fe0043976	CP	mg/kg	47	47	<1	30%	Pass	
Copper	K24-Fe0043976	CP	mg/kg	25	24	1.7	30%	Pass	
Lead	K24-Fe0043976	CP	mg/kg	38	35	7.0	30%	Pass	
Nickel	K24-Fe0043976	CP	mg/kg	31	31	<1	30%	Pass	
Zinc	K24-Fe0043976	CP	mg/kg	68	69	2.2	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K24-Fe0043976	CP	%	15	15	2.3	30%	Pass	
Duplicate									
Volatile Organics (NZ MfE)				Result 1	Result 2	RPD			
1.1-Dichloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1-Trichloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2-Trichloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dibromoethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloropropane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.3-Trichloropropane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.4-Trimethylbenzene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichloropropane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3.5-Trimethylbenzene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.4-Dichlorobenzene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Butanone (MEK)	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chlorotoluene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Methyl-2-pentanone (MIBK)	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Allyl chloride	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzene	K24-Fe0043976	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Bromobenzene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromochloromethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromodichloromethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromoform	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromomethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Carbon Tetrachloride	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorobenzene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroform	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.2-Dichloroethene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.3-Dichloropropene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Volatile Organics (NZ MfE)				Result 1	Result 2	RPD			
Dibromochloromethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromomethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorodifluoromethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethylbenzene	K24-Fe0043976	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Isopropyl benzene (Cumene)	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
m&p-Xylenes	K24-Fe0043976	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	K24-Fe0043976	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	K24-Fe0043976	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Tetrachloroethene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Toluene	K24-Fe0043976	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
trans-1.2-Dichloroethene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.3-Dichloropropene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloroethene	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichlorofluoromethane	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Vinyl chloride	K24-Fe0043976	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Semivolatile Organics				Result 1	Result 2	RPD			
2-Chlorophenol	K24-Fe0054020	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	K24-Fe0054020	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	K24-Fe0054020	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	K24-Fe0054020	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dichlorophenol	K24-Fe0054020	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dimethylphenol	K24-Fe0054020	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	K24-Fe0054020	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
2.4.5-Trichlorophenol	K24-Fe0054020	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	K24-Fe0054020	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	K24-Fe0054020	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	K24-Fe0054020	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Chloro-3-methylphenol	K24-Fe0054020	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
4-Nitrophenol	K24-Fe0054020	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
4.4'-DDD	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDE	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDT	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
a-HCH	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-HCH	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-HCH	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-HCH (Lindane)	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	K24-Fe0054020	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	K24-Fe0054020	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Phenol	K24-Fe0054020	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances- Trace				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)- Trace				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	K24-Fe0047252	NCP	ug/kg	< 1	< 1	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
N16	Analysis performed by Eurofins Environment Testing Australia
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Katyana Gausel	Analytical Services Manager
Jonathon Angell	Senior Analyst-PFAS
Raymond Siu	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Organic
Raymond Siu	Senior Analyst-Volatile

Raymond Siu
Senior Instrument Chemist (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Williamson Water and Land Advisory Limited
Unit 10 | 1 Putaki Drive
Kumeu
Auckland 0810

ACCREDITED TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: **SHANE MOORE**

Report **1072988-S**
Project name
Project ID WWLA 1078
Received Date Feb 28, 2024

Client Sample ID			**AH03 1.5-1.6**	**AH03 1.6-1.7**	**AH03 2.0-2.1**	**AH04 2.1-2.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**K24-Fe0069672**	**K24-Fe0069673**	**K24-Fe0069674**	**K24-Fe0069675**
Date Sampled			**Not Provided**[I12]	**Not Provided**[I12]	**Not Provided**[I12]	**Not Provided**[I12]
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture[N16]	1	%	33	31	24	13
PFASs Summations						
Sum (PFHxS + PFOS)*[N16]	0.1	ug/kg	< 1	-	-	< 1
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*[N16]	0.1	ug/kg	< 1	-	-	< 1
Sum of PFASs (n=30)*[N16]	0.5	ug/kg	< 1	-	-	< 1
Sum of US EPA PFAS (PFOS + PFOA)*[N16]	0.1	ug/kg	< 1	-	-	< 1
Sum of WA DWER PFAS (n=10)*[N16]	0.5	ug/kg	< 1	-	-	< 1
Perfluoroalkyl sulfonamido substances- Trace						
Perfluorooctane sulfonamide (FOSA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
13C8-FOSA (surr.)[N16]	1	%	91	-	-	102
D3-N-MeFOSA (surr.)[N16]	1	%	92	-	-	112
D5-N-EtFOSA (surr.)[N16]	1	%	76	-	-	78
D7-N-MeFOSE (surr.)[N16]	1	%	112	-	-	106
D9-N-EtFOSE (surr.)[N16]	1	%	101	-	-	114
D5-N-EtFOSAA (surr.)[N16]	1	%	81	-	-	95
D3-N-MeFOSAA (surr.)[N16]	1	%	94	-	-	113
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluorobutanoic acid (PFBA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
Perfluoropentanoic acid (PFPeA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorohexanoic acid (PFHxA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluoroheptanoic acid (PFHpA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorooctanoic acid (PFOA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorononanoic acid (PFNA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorodecanoic acid (PFDA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorotridecanoic acid (PFTrDA)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1

Client Sample ID			AH03 1.5-1.6	AH03 1.6-1.7	AH03 2.0-2.1	AH04 2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0069672	K24-Fe0069673	K24-Fe0069674	K24-Fe0069675
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluoroundecanoic acid (PFUnDA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorododecanoic acid (PFDoDA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorotetradecanoic acid (PFTeDA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
13C4-PFBA (surr.)[N16]	1	%	90	-	-	93
13C5-PFPeA (surr.)[N16]	1	%	112	-	-	118
13C5-PFHxA (surr.)[N16]	1	%	97	-	-	91
13C4-PFHpA (surr.)[N16]	1	%	124	-	-	137
13C8-PFOA (surr.)[N16]	1	%	120	-	-	107
13C5-PFNA (surr.)[N16]	1	%	125	-	-	126
13C6-PFDA (surr.)[N16]	1	%	137	-	-	128
13C2-PFUnDA (surr.)[N16]	1	%	107	-	-	107
13C2-PFDoDA (surr.)[N16]	1	%	119	-	-	119
13C2-PFTeDA (surr.)[N16]	1	%	140	-	-	137
Perfluoroalkyl sulfonic acids (PFSAs)- Trace						
Perfluorobutanesulfonic acid (PFBS)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorononanesulfonic acid (PFNS)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluoropropanesulfonic acid (PFPrS)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluoropentanesulfonic acid (PFPeS)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorohexanesulfonic acid (PFHxS)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluoroheptanesulfonic acid (PFHpS)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorooctanesulfonic acid (PFOS)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
Perfluorodecanesulfonic acid (PFDS)[N15, N16]	0.1	ug/kg	< 1	-	-	< 1
13C3-PFBS (surr.)[N16]	1	%	133	-	-	120
18O2-PFHxS (surr.)[N16]	1	%	130	-	-	114
13C8-PFOS (surr.)[N16]	1	%	93	-	-	100
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11, N16]	0.5	ug/kg	< 1	-	-	< 1
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11, N16]	0.1	ug/kg	< 1	-	-	< 1
13C2-4:2 FTSA (surr.)[N16]	1	%	75	-	-	51
13C2-6:2 FTSA (surr.)[N16]	1	%	91	-	-	77
13C2-8:2 FTSA (surr.)[N16]	1	%	73	-	-	76
13C2-10:2 FTSA (surr.)[N16]	1	%	102	-	-	97
Volatile Organics (NZ MfE)						
1.1-Dichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
1.1.1-Trichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.2-Trichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dibromoethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichloropropane	0.5	mg/kg	-	< 0.5	-	-
1.2.3-Trichloropropane	0.5	mg/kg	-	< 0.5	-	-

Client Sample ID			AH03 1.5-1.6	AH03 1.6-1.7	AH03 2.0-2.1	AH04 2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0069672	K24-Fe0069673	K24-Fe0069674	K24-Fe0069675
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Volatile Organics (NZ MfE)						
1.2.4-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-	-
1.3-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.3-Dichloropropane	0.5	mg/kg	-	< 0.5	-	-
1.3.5-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-	-
1.4-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
2-Butanone (MEK)	0.5	mg/kg	-	< 0.5	-	-
2-Propanone (Acetone)	0.5	mg/kg	-	< 0.5	-	-
4-Chlorotoluene	0.5	mg/kg	-	< 0.5	-	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	-	< 0.5	-	-
Allyl chloride	0.5	mg/kg	-	< 0.5	-	-
Benzene	0.1	mg/kg	-	< 0.1	-	-
Bromobenzene	0.5	mg/kg	-	< 0.5	-	-
Bromochloromethane	0.5	mg/kg	-	< 0.5	-	-
Bromodichloromethane	0.5	mg/kg	-	< 0.5	-	-
Bromoform	0.5	mg/kg	-	< 0.5	-	-
Bromomethane	0.5	mg/kg	-	< 0.5	-	-
Carbon disulfide	0.5	mg/kg	-	< 0.5	-	-
Carbon Tetrachloride	0.5	mg/kg	-	< 0.5	-	-
Chlorobenzene	0.5	mg/kg	-	< 0.5	-	-
Chloroethane	0.5	mg/kg	-	< 0.5	-	-
Chloroform	0.5	mg/kg	-	< 0.5	-	-
Chloromethane	0.5	mg/kg	-	< 0.5	-	-
cis-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
cis-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-	-
Dibromochloromethane	0.5	mg/kg	-	< 0.5	-	-
Dibromomethane	0.5	mg/kg	-	< 0.5	-	-
Dichlorodifluoromethane	0.5	mg/kg	-	< 0.5	-	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	-	-
Iodomethane	0.5	mg/kg	-	< 0.5	-	-
Isopropyl benzene (Cumene)	0.5	mg/kg	-	< 0.5	-	-
Methylene Chloride	0.5	mg/kg	-	< 0.5	-	-
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-	-
o-Xylene	0.1	mg/kg	-	< 0.1	-	-
Xylenes - Total	0.3	mg/kg	-	< 0.3	-	-
Styrene	0.5	mg/kg	-	< 0.5	-	-
Tetrachloroethene	0.5	mg/kg	-	< 0.5	-	-
Toluene	0.1	mg/kg	-	< 0.1	-	-
trans-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
trans-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-	-
Trichloroethene	0.5	mg/kg	-	< 0.5	-	-
Trichlorofluoromethane	0.5	mg/kg	-	< 0.5	-	-
Vinyl chloride	0.5	mg/kg	-	< 0.5	-	-
Total MAH*	0.5	mg/kg	-	< 0.5	-	-
4-Bromofluorobenzene (surr.)	1	%	-	INT	-	-
Toluene-d8 (surr.)	1	%	-	INT	-	-

Client Sample ID			AH03 1.5-1.6	AH03 1.6-1.7	AH03 2.0-2.1	AH04 2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0069672	K24-Fe0069673	K24-Fe0069674	K24-Fe0069675
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Semivolatile Organics						
1-Chloronaphthalene	0.5	mg/kg	-	< 0.5	-	-
Total PAH*	0.1	mg/kg	-	< 0.1	-	-
1-Naphthylamine	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2.3-Trichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2.3.4-Tetrachlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2.3.5-Tetrachlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2.4-Trichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2.4.5-Tetrachlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.3-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.3.5-Trichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.4-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
2-Chloronaphthalene	0.5	mg/kg	-	< 0.5	-	-
2-Chlorophenol	0.5	mg/kg	-	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	-	77	-	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	-	< 5	-	-
2-Methylnaphthalene	0.5	mg/kg	-	< 0.5	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	< 0.2	-	-
2-Naphthylamine	0.5	mg/kg	-	< 0.5	-	-
2-Nitroaniline	0.5	mg/kg	-	< 0.5	-	-
2-Nitrophenol	1	mg/kg	-	< 1	-	-
2-Picoline	0.5	mg/kg	-	< 0.5	-	-
2.3.4.6-Tetrachlorophenol	5	mg/kg	-	< 5	-	-
2.4-Dichlorophenol	0.5	mg/kg	-	< 0.5	-	-
2.4-Dimethylphenol	0.5	mg/kg	-	< 0.5	-	-
2.4-Dinitrophenol	5	mg/kg	-	< 5	-	-
2.4-Dinitrotoluene	0.5	mg/kg	-	< 0.5	-	-
2.4.5-Trichlorophenol	1	mg/kg	-	< 1	-	-
2.4.6-Tribromophenol (surr.)	1	%	-	80	-	-
2.4.6-Trichlorophenol	1	mg/kg	-	< 1	-	-
2.6-Dichlorophenol	0.5	mg/kg	-	< 0.5	-	-
2.6-Dinitrotoluene	0.5	mg/kg	-	< 0.5	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	< 0.4	-	-
3-Methylcholanthrene	0.5	mg/kg	-	< 0.5	-	-
3.3'-Dichlorobenzidine	0.5	mg/kg	-	< 0.5	-	-
4-Aminobiphenyl	0.5	mg/kg	-	0.7	-	-
4-Bromophenyl phenyl ether	0.5	mg/kg	-	< 0.5	-	-
4-Chloro-3-methylphenol	1	mg/kg	-	< 1	-	-
4-Chlorophenyl phenyl ether	0.5	mg/kg	-	< 0.5	-	-
4-Nitrophenol	5	mg/kg	-	< 5	-	-
4.4'-DDD	0.01	mg/kg	-	< 0.01	-	-
4.4'-DDE	0.01	mg/kg	-	< 0.01	-	-
4.4'-DDT	0.01	mg/kg	-	< 0.01	-	-
7.12-Dimethylbenz(a)anthracene	0.5	mg/kg	-	< 0.5	-	-
a-HCH	0.01	mg/kg	-	< 0.01	-	-
Acenaphthene	0.03	mg/kg	-	< 0.03	-	-
Acenaphthylene	0.03	mg/kg	-	< 0.03	-	-
Acetophenone	0.5	mg/kg	-	< 0.5	-	-
Aldrin	0.01	mg/kg	-	< 0.01	-	-

Client Sample ID			AH03 1.5-1.6	AH03 1.6-1.7	AH03 2.0-2.1	AH04 2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0069672	K24-Fe0069673	K24-Fe0069674	K24-Fe0069675
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Semivolatile Organics						
Aniline	0.5	mg/kg	-	0.7	-	-
Anthracene	0.03	mg/kg	-	< 0.03	-	-
b-HCH	0.01	mg/kg	-	< 0.01	-	-
Benz(a)anthracene	0.03	mg/kg	-	< 0.03	-	-
Benzo(a)pyrene	0.03	mg/kg	-	< 0.03	-	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	< 0.03	-	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	0.04	-	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	0.08	-	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	-	< 0.03	-	-
Benzo(g.h.i)perylene	0.03	mg/kg	-	< 0.03	-	-
Benzo(k)fluoranthene	0.03	mg/kg	-	< 0.03	-	-
Benzyl chloride	0.5	mg/kg	-	< 0.5	-	-
Bis(2-chloroethoxy)methane	0.5	mg/kg	-	< 0.5	-	-
Bis(2-chloroisopropyl)ether	0.5	mg/kg	-	< 0.5	-	-
Bis(2-ethylhexyl)phthalate	0.5	mg/kg	-	< 0.5	-	-
Butyl benzyl phthalate	0.5	mg/kg	-	< 0.5	-	-
Chrysene	0.03	mg/kg	-	< 0.03	-	-
d-HCH	0.01	mg/kg	-	< 0.01	-	-
Di-n-butyl phthalate	0.5	mg/kg	-	< 0.5	-	-
Di-n-octyl phthalate	0.5	mg/kg	-	< 0.5	-	-
Dibenz(a.h)anthracene	0.03	mg/kg	-	< 0.03	-	-
Dibenz(a.j)acridine	0.5	mg/kg	-	< 0.5	-	-
Dibenzofuran	0.5	mg/kg	-	< 0.5	-	-
Dieldrin	0.01	mg/kg	-	< 0.01	-	-
Diethyl phthalate	0.5	mg/kg	-	< 0.5	-	-
Dimethyl phthalate	0.5	mg/kg	-	< 0.5	-	-
Dimethylaminoazobenzene	0.5	mg/kg	-	< 0.5	-	-
Diphenylamine	0.5	mg/kg	-	< 0.5	-	-
Endosulfan I	0.01	mg/kg	-	< 0.01	-	-
Endosulfan II	0.01	mg/kg	-	< 0.01	-	-
Endosulfan sulphate	0.01	mg/kg	-	< 0.01	-	-
Endrin	0.01	mg/kg	-	< 0.01	-	-
Endrin aldehyde	0.01	mg/kg	-	< 0.01	-	-
Endrin ketone	0.01	mg/kg	-	< 0.01	-	-
Fluoranthene	0.03	mg/kg	-	< 0.03	-	-
Fluorene	0.03	mg/kg	-	< 0.03	-	-
g-HCH (Lindane)	0.01	mg/kg	-	< 0.01	-	-
Heptachlor	0.01	mg/kg	-	< 0.01	-	-
Heptachlor epoxide	0.01	mg/kg	-	< 0.01	-	-
Hexachlorobenzene	0.01	mg/kg	-	< 0.01	-	-
Hexachlorobutadiene	0.5	mg/kg	-	< 0.5	-	-
Hexachlorocyclopentadiene	0.5	mg/kg	-	< 0.5	-	-
Hexachloroethane	0.5	mg/kg	-	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	< 0.03	-	-
Methoxychlor	0.01	mg/kg	-	< 0.01	-	-
N-Nitrosodibutylamine	0.5	mg/kg	-	< 0.5	-	-
N-Nitrosodipropylamine	0.5	mg/kg	-	< 0.5	-	-
N-Nitrosopiperidine	0.5	mg/kg	-	< 0.5	-	-
Naphthalene	0.1	mg/kg	-	< 0.1	-	-

Client Sample ID			AH03 1.5-1.6	AH03 1.6-1.7	AH03 2.0-2.1	AH04 2.1-2.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Fe0069672	K24-Fe0069673	K24-Fe0069674	K24-Fe0069675
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Semivolatile Organics						
Nitrobenzene	0.5	mg/kg	-	< 0.5	-	-
Nitrobenzene-d5 (surr.)	1	%	-	81	-	-
Pentachlorobenzene	0.5	mg/kg	-	< 0.5	-	-
Pentachloronitrobenzene	0.5	mg/kg	-	< 0.5	-	-
Pentachlorophenol	1	mg/kg	-	< 1	-	-
Phenanthrene	0.03	mg/kg	-	< 0.03	-	-
Phenol	0.5	mg/kg	-	< 0.5	-	-
Phenol-d6 (surr.)	1	%	-	88	-	-
Pronamide	0.5	mg/kg	-	< 0.5	-	-
Pyrene	0.03	mg/kg	-	< 0.03	-	-
Trifluralin	0.5	mg/kg	-	< 0.5	-	-
Total Petroleum Hydrocarbons (NZ MfE 1999)						
TPH-SG C7-C9	5	mg/kg	-	-	< 5	-
TPH-SG C10-C14	10	mg/kg	-	-	< 10	-
TPH-SG C15-C36	20	mg/kg	-	-	< 20	-
TPH-SG C7-C36 (Total)	35	mg/kg	-	-	< 35	-
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	-	-	< 0.03	-
Acenaphthylene	0.03	mg/kg	-	-	< 0.03	-
Anthracene	0.03	mg/kg	-	-	< 0.03	-
Benz(a)anthracene	0.03	mg/kg	-	-	< 0.03	-
Benzo(a)pyrene	0.03	mg/kg	-	-	< 0.03	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	-	< 0.03	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	-	0.04	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	-	0.08	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	-	-	< 0.03	-
Benzo(g.h.i)perylene	0.03	mg/kg	-	-	< 0.03	-
Benzo(k)fluoranthene	0.03	mg/kg	-	-	< 0.03	-
Chrysene	0.03	mg/kg	-	-	< 0.03	-
Dibenz(a.h)anthracene	0.03	mg/kg	-	-	< 0.03	-
Fluoranthene	0.03	mg/kg	-	-	< 0.03	-
Fluorene	0.03	mg/kg	-	-	< 0.03	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	-	< 0.03	-
Naphthalene	0.1	mg/kg	-	-	< 0.1	-
Phenanthrene	0.03	mg/kg	-	-	< 0.03	-
Pyrene	0.03	mg/kg	-	-	< 0.03	-
Total PAH*	0.1	mg/kg	-	-	< 0.1	-
p-Terphenyl-d14 (surr.)	1	%	-	-	92	-
2-Fluorobiphenyl (surr.)	1	%	-	-	79	-
Metals M7 (NZ MfE)						
Arsenic	0.1	mg/kg	-	-	6.6	-
Cadmium	0.01	mg/kg	-	-	0.03	-
Chromium	0.1	mg/kg	-	-	12	-
Copper	0.1	mg/kg	-	-	7.1	-
Lead	0.1	mg/kg	-	-	22	-
Nickel	0.1	mg/kg	-	-	5.4	-
Zinc	5	mg/kg	-	-	15	-

Client Sample ID			AH04 2.4-2.5	AH04 3.2-3.3
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0069676	K24-Fe0069677
Date Sampled			Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit		
Sample Properties				
% Moisture[N16]	1	%	12	29
Volatile Organics (NZ MfE)				
1.1-Dichloroethane	0.5	mg/kg	< 0.5	-
1.1-Dichloroethene	0.5	mg/kg	< 0.5	-
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-
1.2-Dibromoethane	0.5	mg/kg	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.2-Dichloroethane	0.5	mg/kg	< 0.5	-
1.2-Dichloropropane	0.5	mg/kg	< 0.5	-
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	-
1.2.4-Trimethylbenzene	0.5	mg/kg	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	-
1.3-Dichloropropane	0.5	mg/kg	< 0.5	-
1.3.5-Trimethylbenzene	0.5	mg/kg	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	< 0.5	-
4-Chlorotoluene	0.5	mg/kg	< 0.5	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	-
Allyl chloride	0.5	mg/kg	< 0.5	-
Benzene	0.1	mg/kg	< 0.1	-
Bromobenzene	0.5	mg/kg	< 0.5	-
Bromochloromethane	0.5	mg/kg	< 0.5	-
Bromodichloromethane	0.5	mg/kg	< 0.5	-
Bromoform	0.5	mg/kg	< 0.5	-
Bromomethane	0.5	mg/kg	< 0.5	-
Carbon disulfide	0.5	mg/kg	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	-
Chlorobenzene	0.5	mg/kg	< 0.5	-
Chloroethane	0.5	mg/kg	< 0.5	-
Chloroform	0.5	mg/kg	< 0.5	-
Chloromethane	0.5	mg/kg	< 0.5	-
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-
Dibromochloromethane	0.5	mg/kg	< 0.5	-
Dibromomethane	0.5	mg/kg	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	-
Ethylbenzene	0.1	mg/kg	< 0.1	-
Iodomethane	0.5	mg/kg	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	-
Methylene Chloride	0.5	mg/kg	< 0.5	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	-
Styrene	0.5	mg/kg	< 0.5	-
Tetrachloroethene	0.5	mg/kg	< 0.5	-

Client Sample ID			AH04 2.4-2.5	AH04 3.2-3.3
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0069676	K24-Fe0069677
Date Sampled			Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit		
Volatile Organics (NZ MfE)				
Toluene	0.1	mg/kg	< 0.1	-
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-
Trichloroethene	0.5	mg/kg	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	-
Vinyl chloride	0.5	mg/kg	< 0.5	-
Total MAH*	0.5	mg/kg	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	144	-
Toluene-d8 (surr.)	1	%	98	-
Semivolatile Organics				
Comments			G01	
1-Chloronaphthalene	0.5	mg/kg	< 0.5	-
Total PAH*	0.1	mg/kg	< 0.3	-
1-Naphthylamine	0.5	mg/kg	< 5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 5	-
1.2.3-Trichlorobenzene	0.5	mg/kg	< 5	-
1.2.3.4-Tetrachlorobenzene	0.5	mg/kg	< 5	-
1.2.3.5-Tetrachlorobenzene	0.5	mg/kg	< 5	-
1.2.4-Trichlorobenzene	0.5	mg/kg	< 5	-
1.2.4.5-Tetrachlorobenzene	0.5	mg/kg	< 5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 5	-
1.3.5-Trichlorobenzene	0.5	mg/kg	< 5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 5	-
2-Chloronaphthalene	0.5	mg/kg	< 0.5	-
2-Chlorophenol	0.5	mg/kg	< 2	-
2-Fluorobiphenyl (surr.)	1	%	83	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-
2-Methylnaphthalene	0.5	mg/kg	< 0.5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 2	-
2-Naphthylamine	0.5	mg/kg	< 5	-
2-Nitroaniline	0.5	mg/kg	< 5	-
2-Nitrophenol	1	mg/kg	< 2	-
2-Picoline	0.5	mg/kg	< 5	-
2.3.4.6-Tetrachlorophenol	5	mg/kg	< 5	-
2.4-Dichlorophenol	0.5	mg/kg	< 2	-
2.4-Dimethylphenol	0.5	mg/kg	< 2	-
2.4-Dinitrophenol	5	mg/kg	< 5	-
2.4-Dinitrotoluene	0.5	mg/kg	< 5	-
2.4.5-Trichlorophenol	1	mg/kg	< 2	-
2.4.6-Tribromophenol (surr.)	1	%	INT	-
2.4.6-Trichlorophenol	1	mg/kg	< 2	-
2.6-Dichlorophenol	0.5	mg/kg	< 2	-
2.6-Dinitrotoluene	0.5	mg/kg	< 5	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 2	-
3-Methylcholanthrene	0.5	mg/kg	< 0.5	-
3.3'-Dichlorobenzidine	0.5	mg/kg	< 5	-
4-Aminobiphenyl	0.5	mg/kg	< 5	-
4-Bromophenyl phenyl ether	0.5	mg/kg	< 5	-
4-Chloro-3-methylphenol	1	mg/kg	< 2	-

Client Sample ID			AH04 2.4-2.5	AH04 3.2-3.3
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0069676	K24-Fe0069677
Date Sampled			Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit		
Semivolatile Organics				
4-Chlorophenyl phenyl ether	0.5	mg/kg	< 5	-
4-Nitrophenol	5	mg/kg	< 5	-
4.4'-DDD	0.01	mg/kg	< 0.1	-
4.4'-DDE	0.01	mg/kg	< 0.1	-
4.4'-DDT	0.01	mg/kg	< 0.1	-
7.12-Dimethylbenz(a)anthracene	0.5	mg/kg	< 0.5	-
a-HCH	0.01	mg/kg	< 0.1	-
Acenaphthene	0.03	mg/kg	< 0.3	-
Acenaphthylene	0.03	mg/kg	< 0.3	-
Acetophenone	0.5	mg/kg	< 5	-
Aldrin	0.01	mg/kg	< 0.1	-
Aniline	0.5	mg/kg	< 5	-
Anthracene	0.03	mg/kg	< 0.3	-
b-HCH	0.01	mg/kg	< 0.1	-
Benz(a)anthracene	0.03	mg/kg	< 0.3	-
Benzo(a)pyrene	0.03	mg/kg	< 0.3	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.3	-
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.3	-
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	-
Benzyl chloride	0.5	mg/kg	< 5	-
Bis(2-chloroethoxy)methane	0.5	mg/kg	< 5	-
Bis(2-chloroisopropyl)ether	0.5	mg/kg	< 5	-
Bis(2-ethylhexyl)phthalate	0.5	mg/kg	< 5	-
Butyl benzyl phthalate	0.5	mg/kg	< 5	-
Chrysene	0.03	mg/kg	< 0.3	-
d-HCH	0.01	mg/kg	< 0.1	-
Di-n-butyl phthalate	0.5	mg/kg	< 5	-
Di-n-octyl phthalate	0.5	mg/kg	< 5	-
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.3	-
Dibenz(a.j)acridine	0.5	mg/kg	< 0.5	-
Dibenzofuran	0.5	mg/kg	< 5	-
Dieldrin	0.01	mg/kg	< 0.1	-
Diethyl phthalate	0.5	mg/kg	< 5	-
Dimethyl phthalate	0.5	mg/kg	< 5	-
Dimethylaminoazobenzene	0.5	mg/kg	< 5	-
Diphenylamine	0.5	mg/kg	< 5	-
Endosulfan I	0.01	mg/kg	< 0.1	-
Endosulfan II	0.01	mg/kg	< 0.1	-
Endosulfan sulphate	0.01	mg/kg	< 0.1	-
Endrin	0.01	mg/kg	< 0.1	-
Endrin aldehyde	0.01	mg/kg	< 0.1	-
Endrin ketone	0.01	mg/kg	< 0.1	-
Fluoranthene	0.03	mg/kg	< 0.3	-
Fluorene	0.03	mg/kg	< 0.3	-
g-HCH (Lindane)	0.01	mg/kg	< 0.1	-
Heptachlor	0.01	mg/kg	< 0.1	-

Client Sample ID			AH04 2.4-2.5	AH04 3.2-3.3
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Fe0069676	K24-Fe0069677
Date Sampled			Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit		
Semivolatile Organics				
Heptachlor epoxide	0.01	mg/kg	< 0.1	-
Hexachlorobenzene	0.01	mg/kg	< 5	-
Hexachlorobutadiene	0.5	mg/kg	< 5	-
Hexachlorocyclopentadiene	0.5	mg/kg	< 5	-
Hexachloroethane	0.5	mg/kg	< 5	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	-
Methoxychlor	0.01	mg/kg	< 0.1	-
N-Nitrosodibutylamine	0.5	mg/kg	< 5	-
N-Nitrosodipropylamine	0.5	mg/kg	< 5	-
N-Nitrosopiperidine	0.5	mg/kg	< 5	-
Naphthalene	0.1	mg/kg	< 0.3	-
Nitrobenzene	0.5	mg/kg	< 5	-
Nitrobenzene-d5 (surr.)	1	%	79	-
Pentachlorobenzene	0.5	mg/kg	< 5	-
Pentachloronitrobenzene	0.5	mg/kg	< 5	-
Pentachlorophenol	1	mg/kg	< 2	-
Phenanthrene	0.03	mg/kg	< 0.3	-
Phenol	0.5	mg/kg	< 2	-
Phenol-d6 (surr.)	1	%	79	-
Pronamide	0.5	mg/kg	< 5	-
Pyrene	0.03	mg/kg	< 0.3	-
Trifluralin	0.5	mg/kg	< 5	-
Total Petroleum Hydrocarbons (NZ MfE 1999)				
TPH-SG C7-C9	5	mg/kg	< 5	< 5
TPH-SG C10-C14	10	mg/kg	< 10	< 10
TPH-SG C15-C36	20	mg/kg	< 20	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	< 35	< 35
Polycyclic Aromatic Hydrocarbons (NZ MfE)				
Comments			G01	
Acenaphthene	0.03	mg/kg	< 0.3	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.3	< 0.03
Anthracene	0.03	mg/kg	< 0.3	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.3	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.3	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.3	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.3	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	< 0.03
Chrysene	0.03	mg/kg	< 0.3	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.3	< 0.03
Fluoranthene	0.03	mg/kg	< 0.3	< 0.03
Fluorene	0.03	mg/kg	< 0.3	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	< 0.03
Naphthalene	0.1	mg/kg	< 0.3	< 0.1
Phenanthrene	0.03	mg/kg	< 0.3	< 0.03
Pyrene	0.03	mg/kg	< 0.3	< 0.03
Total PAH*	0.1	mg/kg	< 0.3	< 0.1

Client Sample ID			AH04 2.4-2.5	AH04 3.2-3.3
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**K24-Fe0069676**	**K24-Fe0069677**
Date Sampled			**Not Provided**[I12]	**Not Provided**[I12]
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons (NZ MfE)				
p-Terphenyl-d14 (surr.)	1	%	78	60
2-Fluorobiphenyl (surr.)	1	%	83	55
Metals M7 (NZ MfE)				
Arsenic	0.1	mg/kg	2.1	6.0
Cadmium	0.01	mg/kg	0.08	0.04
Chromium	0.1	mg/kg	23	8.6
Copper	0.1	mg/kg	48	2.3
Lead	0.1	mg/kg	7.9	20
Nickel	0.1	mg/kg	85	3.3
Zinc	5	mg/kg	55	34

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
% Moisture	Auckland	Feb 28, 2024	14 Days
- Method: LTM-GEN-7080 Moisture			
- Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry			
Per- and Polyfluoroalkyl Substances (PFASs) - Trace			
Perfluoroalkyl sulfonamido substances- Trace	Brisbane	Mar 04, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl carboxylic acids (PFCAs) - Trace	Brisbane	Mar 04, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl sulfonic acids (PFSAs)- Trace	Brisbane	Mar 04, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace	Brisbane	Mar 04, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Volatile Organics (NZ MfE)	Auckland	Mar 07, 2024	14 Days
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Semivolatile Organics	Auckland	Mar 07, 2024	14 Days
- Method: LTM-ORG-2190 SVOC in Water & Soil by GC-MS			
Total Petroleum Hydrocarbons (NZ MfE 1999)	Auckland	Mar 07, 2024	14 Days
- Method: LTM-ORG-2010 TRH and BTEX in Soil and Water by GC FID and PT GCMS			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Auckland	Mar 07, 2024	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS			
Metals M7 (NZ MfE)	Auckland	Feb 28, 2024	6 Months
- Method: LTM-MET-3040 Metals in Waters Soils Sediments by ICP-MS			

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Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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Welshpool
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+61 8 6253 4444
NATA# 2377
Site# 2370

Company Name: Williamson Water and Land Advisory Ltd
Address: Unit 10 | 1 Putaki Drive
Kumeu
Auckland 0810

Project Name:
Project ID: WWLA 1078

Order No.: WWLA 1078
Report #: 1072988
Phone: s 9(2)(a)
Fax:

Received: Feb 28, 2024 10:42 AM
Due: Mar 8, 2024
Priority: 7 Day
Contact Name: SHANE MOORE

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail	HOLD	Moisture Set	Moisture Set	Metals M7 (NZ MfE)	Eurofins Suite B4B-NZ: TPH, PAH (NZ MfE)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace	SVV: SVOC/VOC (NZ MfE)
Auckland Laboratory - IANZ# 1327	X	X	X	X	X		X
Auckland (asbestos) Laboratory - IANZ# 1308							
Christchurch Laboratory - IANZ# 1290							
Tauranga Laboratory - IANZ# 1402							
Brisbane Laboratory - NATA # 1261 Site # 20794		X	X			X	
External Laboratory							

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID							
1	AH03 1.5-1.6	Not Provided		Soil	K24-Fe0069672		X				X	
2	AH03 1.6-1.7	Not Provided		Soil	K24-Fe0069673			X				X
3	AH03 2.0-2.1	Not Provided		Soil	K24-Fe0069674			X	X	X		
4	AH04 2.1-2.2	Not Provided		Soil	K24-Fe0069675		X				X	
5	AH04 2.4-2.5	Not Provided		Soil	K24-Fe0069676			X	X	X		X
6	AH04 3.2-3.3	Not Provided		Soil	K24-Fe0069677			X	X	X		
7	AH03 2.3-2.6	Not Provided		Soil	K24-Fe0069678	X						
8	AH04 1.4-1.5	Not Provided		Soil	K24-Fe0069679	X						
9	AH04 1.5-1.6	Not Provided		Soil	K24-Fe0069680	X						

eurofins

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Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Eurofins Environment Testing Australia Pty Ltd
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Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
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Auckland Laboratory - IANZ# 1327						X	X	X	X	X		X
Auckland (asbestos) Laboratory - IANZ# 1308												
Christchurch Laboratory - IANZ# 1290												
Tauranga Laboratory - IANZ# 1402												
10	AH04 2.8-2.9	Not Provided		Soil	K24-Fe0069681	X						
Test Counts						4	6	6	3	3	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 0.5			0.5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 0.5			0.5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 0.5			0.5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 0.5			0.5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 0.5			0.5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 0.5			0.5	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	ug/kg	< 0.5			0.5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 0.1			0.1	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 0.1			0.1	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 0.1			0.1	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 0.1			0.1	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 0.1			0.1	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 0.1			0.1	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/kg	< 0.1			0.1	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 0.1			0.1	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 0.1			0.1	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 0.1			0.1	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 0.1			0.1	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 0.1			0.1	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 0.1			0.1	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 0.1			0.1	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 0.1			0.1	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 0.1			0.1	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 0.1			0.1	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 0.1			0.1	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 0.1			0.1	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 0.5			0.5	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 0.1			0.1	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 0.1			0.1	Pass	
Method Blank							
Volatile Organics (NZ MfE)							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.2.4-Trimethylbenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3.5-Trimethylbenzene	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
2-Butanone (MEK)	mg/kg	< 0.5			0.5	Pass	
2-Propanone (Acetone)	mg/kg	< 0.5			0.5	Pass	
4-Chlorotoluene	mg/kg	< 0.5			0.5	Pass	
4-Methyl-2-pentanone (MIBK)	mg/kg	< 0.5			0.5	Pass	
Allyl chloride	mg/kg	< 0.5			0.5	Pass	
Benzene	mg/kg	< 0.1			0.1	Pass	
Bromobenzene	mg/kg	< 0.5			0.5	Pass	
Bromochloromethane	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon disulfide	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroethane	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Dichlorodifluoromethane	mg/kg	< 0.5			0.5	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Isopropyl benzene (Cumene)	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Styrene	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Semivolatile Organics							
1-Chloronaphthalene	mg/kg	< 0.5			0.5	Pass	
1-Naphthylamine	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3.4-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.3.5-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.4-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2.4.5-Tetrachlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3.5-Trichlorobenzene	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
2-Chloronaphthalene	mg/kg	< 0.5			0.5	Pass	
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylnaphthalene	mg/kg	< 0.5			0.5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Naphthylamine	mg/kg	< 0.5			0.5	Pass	
2-Nitroaniline	mg/kg	< 0.5			0.5	Pass	
2-Nitrophenol	mg/kg	< 1			1	Pass	
2-Picoline	mg/kg	< 0.5			0.5	Pass	
2.3.4.6-Tetrachlorophenol	mg/kg	< 5			5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
2.4-Dinitrotoluene	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.6-Dinitrotoluene	mg/kg	< 0.5			0.5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
3-Methylcholanthrene	mg/kg	< 0.5			0.5	Pass	
3.3'-Dichlorobenzidine	mg/kg	< 0.5			0.5	Pass	
4-Aminobiphenyl	mg/kg	< 0.5			0.5	Pass	
4-Bromophenyl phenyl ether	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
4-Chlorophenyl phenyl ether	mg/kg	< 0.5			0.5	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
4.4'-DDD	mg/kg	< 0.01			0.01	Pass	
4.4'-DDE	mg/kg	< 0.01			0.01	Pass	
4.4'-DDT	mg/kg	< 0.01			0.01	Pass	
7.12-Dimethylbenz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
a-HCH	mg/kg	< 0.01			0.01	Pass	
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Acetophenone	mg/kg	< 0.5			0.5	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
Aniline	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
b-HCH	mg/kg	< 0.01			0.01	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzyl chloride	mg/kg	< 0.5			0.5	Pass	
Bis(2-chloroethoxy)methane	mg/kg	< 0.5			0.5	Pass	
Bis(2-chloroisopropyl)ether	mg/kg	< 0.5			0.5	Pass	
Bis(2-ethylhexyl)phthalate	mg/kg	< 0.5			0.5	Pass	
Butyl benzyl phthalate	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
d-HCH	mg/kg	< 0.01			0.01	Pass	
Di-n-butyl phthalate	mg/kg	< 0.5			0.5	Pass	
Di-n-octyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dibenz(a.j)acridine	mg/kg	< 0.5			0.5	Pass	
Dibenzofuran	mg/kg	< 0.5			0.5	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Diethyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dimethyl phthalate	mg/kg	< 0.5			0.5	Pass	
Dimethylaminoazobenzene	mg/kg	< 0.5			0.5	Pass	
Diphenylamine	mg/kg	< 0.5			0.5	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
g-HCH (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Hexachlorobutadiene	mg/kg	< 0.5			0.5	Pass	
Hexachlorocyclopentadiene	mg/kg	< 0.5			0.5	Pass	
Hexachloroethane	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
N-Nitrosodibutylamine	mg/kg	< 0.5			0.5	Pass	
N-Nitrosodipropylamine	mg/kg	< 0.5			0.5	Pass	
N-Nitrosopiperidine	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Nitrobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachlorobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachloronitrobenzene	mg/kg	< 0.5			0.5	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Pronamide	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Trifluralin	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C7-C9	mg/kg	< 5			5	Pass	
TPH-SG C10-C14	mg/kg	< 10			10	Pass	
TPH-SG C15-C36	mg/kg	< 20			20	Pass	
TPH-SG C7-C36 (Total)	mg/kg	< 35			35	Pass	
Method Blank							
Metals M7 (NZ MfE)							
Arsenic	mg/kg	< 0.1			0.1	Pass	
Cadmium	mg/kg	< 0.01			0.01	Pass	
Chromium	mg/kg	< 0.1			0.1	Pass	
Copper	mg/kg	< 0.1			0.1	Pass	
Lead	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 0.1			0.1	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances- Trace							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctane sulfonamide (FOSA)	%	110			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	126			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	108			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	131			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	127			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	112			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	141			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	%	118			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	91			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	127			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	91			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	82			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	117			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	127			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	116			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	128			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	111			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	123			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	%	113			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	102			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	109			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	119			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	128			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	110			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	114			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	98			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	146			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	143			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	125			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	124			50-150	Pass	
LCS - % Recovery							
Volatile Organics (NZ MfE)							
1.1-Dichloroethene	%	125			70-130	Pass	
1.1.1-Trichloroethane	%	116			70-130	Pass	
1.1.1.2-Tetrachloroethane	%	118			70-130	Pass	
1.1.2-Trichloroethane	%	116			70-130	Pass	
1.2-Dibromoethane	%	113			70-130	Pass	
1.2-Dichlorobenzene	%	97			70-130	Pass	
1.2-Dichloroethane	%	125			70-130	Pass	
1.2-Dichloropropane	%	114			70-130	Pass	
1.2.4-Trimethylbenzene	%	83			70-130	Pass	
1.3-Dichlorobenzene	%	89			70-130	Pass	
1.3-Dichloropropane	%	113			70-130	Pass	
1.3.5-Trimethylbenzene	%	79			70-130	Pass	
1.4-Dichlorobenzene	%	94			70-130	Pass	
4-Chlorotoluene	%	87			70-130	Pass	
Allyl chloride	%	113			70-130	Pass	
Benzene	%	95			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Bromobenzene	%	118			70-130	Pass	
Bromodichloromethane	%	107			70-130	Pass	
Bromomethane	%	95			70-130	Pass	
Carbon disulfide	%	117			70-130	Pass	
Carbon Tetrachloride	%	108			70-130	Pass	
Chlorobenzene	%	102			70-130	Pass	
Chloroethane	%	119			70-130	Pass	
Chloroform	%	123			70-130	Pass	
Chloromethane	%	111			70-130	Pass	
cis-1.2-Dichloroethene	%	116			70-130	Pass	
cis-1.3-Dichloropropene	%	110			70-130	Pass	
Dibromochloromethane	%	116			70-130	Pass	
Dibromomethane	%	122			70-130	Pass	
Dichlorodifluoromethane	%	103			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
Iodomethane	%	110			70-130	Pass	
Isopropyl benzene (Cumene)	%	105			70-130	Pass	
Methylene Chloride	%	121			70-130	Pass	
m&p-Xylenes	%	96			70-130	Pass	
o-Xylene	%	106			70-130	Pass	
Xylenes - Total	%	100			70-130	Pass	
Styrene	%	113			70-130	Pass	
Tetrachloroethene	%	97			70-130	Pass	
Toluene	%	94			70-130	Pass	
trans-1.2-Dichloroethene	%	110			70-130	Pass	
trans-1.3-Dichloropropene	%	109			70-130	Pass	
Trichloroethene	%	107			70-130	Pass	
Trichlorofluoromethane	%	88			70-130	Pass	
Vinyl chloride	%	105			70-130	Pass	
LCS - % Recovery							
Semivolatile Organics							
1-Naphthylamine	%	78			70-130	Pass	
1.2-Dichlorobenzene	%	75			70-130	Pass	
1.2.3-Trichlorobenzene	%	94			70-130	Pass	
1.2.3.4-Tetrachlorobenzene	%	82			70-130	Pass	
1.2.3.5-Tetrachlorobenzene	%	86			70-130	Pass	
1.2.4-Trichlorobenzene	%	82			70-130	Pass	
1.2.4.5-Tetrachlorobenzene	%	85			70-130	Pass	
1.3-Dichlorobenzene	%	81			70-130	Pass	
1.3.5-Trichlorobenzene	%	82			70-130	Pass	
1.4-Dichlorobenzene	%	79			70-130	Pass	
2-Chloronaphthalene	%	80			70-130	Pass	
2-Chlorophenol	%	82			25-130	Pass	
2-Methyl-4.6-dinitrophenol	%	110			25-130	Pass	
2-Methylnaphthalene	%	81			70-130	Pass	
2-Methylphenol (o-Cresol)	%	80			25-130	Pass	
2-Nitroaniline	%	82			70-130	Pass	
2-Nitrophenol	%	90			25-130	Pass	
2.3.4.6-Tetrachlorophenol	%	87			70-130	Pass	
2.4-Dichlorophenol	%	86			25-130	Pass	
2.4-Dimethylphenol	%	82			25-130	Pass	
2.4-Dinitrotoluene	%	84			70-130	Pass	
2.4.5-Trichlorophenol	%	94			25-130	Pass	
2.4.6-Trichlorophenol	%	92			25-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.6-Dichlorophenol	%	88			25-130	Pass	
2.6-Dinitrotoluene	%	89			70-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	81			25-130	Pass	
3-Methylcholanthrene	%	85			70-130	Pass	
4-Bromophenyl phenyl ether	%	79			70-130	Pass	
4-Chloro-3-methylphenol	%	85			25-130	Pass	
4-Chlorophenyl phenyl ether	%	79			70-130	Pass	
4.4'-DDD	%	100			70-130	Pass	
4.4'-DDE	%	90			70-130	Pass	
4.4'-DDT	%	108			70-130	Pass	
7.12-Dimethylbenz(a)anthracene	%	85			70-130	Pass	
a-HCH	%	85			70-130	Pass	
Acenaphthene	%	79			70-130	Pass	
Acenaphthylene	%	84			70-130	Pass	
Acetophenone	%	89			70-130	Pass	
Aldrin	%	82			70-130	Pass	
Anthracene	%	82			70-130	Pass	
b-HCH	%	88			70-130	Pass	
Benz(a)anthracene	%	89			70-130	Pass	
Benzo(a)pyrene	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	%	91			70-130	Pass	
Benzo(g.h.i)perylene	%	86			70-130	Pass	
Benzo(k)fluoranthene	%	90			70-130	Pass	
Benzyl chloride	%	79			70-130	Pass	
Bis(2-chloroethoxy)methane	%	81			70-130	Pass	
Bis(2-chloroisopropyl)ether	%	112			70-130	Pass	
Bis(2-ethylhexyl)phthalate	%	92			70-130	Pass	
Butyl benzyl phthalate	%	91			70-130	Pass	
Chrysene	%	83			70-130	Pass	
d-HCH	%	99			70-130	Pass	
Di-n-butyl phthalate	%	84			70-130	Pass	
Di-n-octyl phthalate	%	86			70-130	Pass	
Dibenz(a.h)anthracene	%	89			70-130	Pass	
Dibenz(a.j)acridine	%	83			70-130	Pass	
Dibenzofuran	%	81			70-130	Pass	
Dieldrin	%	87			70-130	Pass	
Diethyl phthalate	%	80			70-130	Pass	
Dimethyl phthalate	%	79			70-130	Pass	
Dimethylaminoazobenzene	%	81			70-130	Pass	
Diphenylamine	%	84			70-130	Pass	
Endosulfan I	%	85			70-130	Pass	
Endosulfan II	%	87			70-130	Pass	
Endosulfan sulphate	%	91			70-130	Pass	
Endrin	%	94			70-130	Pass	
Endrin aldehyde	%	81			70-130	Pass	
Endrin ketone	%	94			70-130	Pass	
Fluoranthene	%	76			70-130	Pass	
Fluorene	%	82			70-130	Pass	
g-HCH (Lindane)	%	94			70-130	Pass	
Heptachlor	%	89			70-130	Pass	
Heptachlor epoxide	%	84			70-130	Pass	
Hexachlorobenzene	%	76			70-130	Pass	
Hexachlorobutadiene	%	83			70-130	Pass	
Hexachlorocyclopentadiene	%	97			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachloroethane	%	80			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	87			70-130	Pass	
Methoxychlor	%	106			70-130	Pass	
N-Nitrosodibutylamine	%	77			70-130	Pass	
N-Nitrosodipropylamine	%	84			70-130	Pass	
N-Nitrosopiperidine	%	83			70-130	Pass	
Naphthalene	%	82			70-130	Pass	
Nitrobenzene	%	95			70-130	Pass	
Pentachlorobenzene	%	84			70-130	Pass	
Pentachloronitrobenzene	%	85			70-130	Pass	
Pentachlorophenol	%	81			25-130	Pass	
Phenanthrene	%	106			70-130	Pass	
Phenol	%	93			25-130	Pass	
Pronamide	%	78			70-130	Pass	
Pyrene	%	85			70-130	Pass	
Trifluralin	%	81			70-130	Pass	
LCS - % Recovery							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C7-C36 (Total)	%	107			70-130	Pass	
LCS - % Recovery							
Metals M7 (NZ MfE)							
Arsenic	%	109			80-120	Pass	
Cadmium	%	106			80-120	Pass	
Chromium	%	106			80-120	Pass	
Copper	%	107			80-120	Pass	
Lead	%	110			80-120	Pass	
Nickel	%	111			80-120	Pass	
Zinc	%	114			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Semivolatile Organics				Result 1					
4.4'-DDE	K24-Ma0005452	NCP	%	78			70-130	Pass	
4.4'-DDT	K24-Ma0005452	NCP	%	105			70-130	Pass	
a-HCH	K24-Ma0005452	NCP	%	74			70-130	Pass	
Acenaphthene	Z24-Fe0073887	NCP	%	71			70-130	Pass	
Acenaphthylene	Z24-Fe0073887	NCP	%	90			70-130	Pass	
Aldrin	K24-Ma0005452	NCP	%	71			70-130	Pass	
Anthracene	Z24-Fe0073887	NCP	%	71			70-130	Pass	
b-HCH	K24-Ma0005452	NCP	%	78			70-130	Pass	
Benz(a)anthracene	Z24-Fe0073887	NCP	%	84			70-130	Pass	
Benzo(a)pyrene	Z24-Fe0073887	NCP	%	83			70-130	Pass	
Benzo(b&j)fluoranthene	Z24-Fe0073887	NCP	%	89			70-130	Pass	
Benzo(g.h.i)perylene	K24-Fe0069922	NCP	%	98			70-130	Pass	
Benzo(k)fluoranthene	K24-Fe0069922	NCP	%	123			70-130	Pass	
Chrysene	Z24-Fe0073887	NCP	%	83			70-130	Pass	
d-HCH	K24-Ma0005452	NCP	%	84			70-130	Pass	
Dibenz(a.h)anthracene	Z24-Fe0073887	NCP	%	75			70-130	Pass	
Dieldrin	K24-Ma0005452	NCP	%	78			70-130	Pass	
Endosulfan I	Z24-Fe0073887	NCP	%	76			70-130	Pass	
Endosulfan II	K24-Ma0005452	NCP	%	78			70-130	Pass	
Endosulfan sulphate	K24-Ma0005452	NCP	%	86			70-130	Pass	
Endrin	K24-Ma0005452	NCP	%	88			70-130	Pass	
Endrin aldehyde	K24-Ma0005452	NCP	%	79			70-130	Pass	
Endrin ketone	K24-Ma0005452	NCP	%	95			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluoranthene	Z24-Fe0073887	NCP	%	73			70-130	Pass	
Fluorene	Z24-Fe0073887	NCP	%	76			70-130	Pass	
g-HCH (Lindane)	K24-Ma0005452	NCP	%	76			70-130	Pass	
Heptachlor	K24-Ma0005452	NCP	%	77			70-130	Pass	
Heptachlor epoxide	K24-Ma0005452	NCP	%	76			70-130	Pass	
Hexachlorobenzene	K24-Fe0069922	NCP	%	82			70-130	Pass	
Indeno(1.2.3-cd)pyrene	Z24-Fe0073887	NCP	%	74			70-130	Pass	
Methoxychlor	K24-Ma0005452	NCP	%	106			70-130	Pass	
Naphthalene	Z24-Fe0073887	NCP	%	73			70-130	Pass	
Phenanthrene	Z24-Fe0073887	NCP	%	96			70-130	Pass	
Pyrene	Z24-Fe0073887	NCP	%	79			70-130	Pass	
Spike - % Recovery									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1					
TPH-SG C7-C36 (Total)	K24-Ma0000383	NCP	%	119			70-130	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances- Trace				Result 1					
Perfluorooctane sulfonamide (FOSA)	K24-Fe0069675	CP	%	75			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	K24-Fe0069675	CP	%	102			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	K24-Fe0069675	CP	%	97			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	K24-Fe0069675	CP	%	79			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	K24-Fe0069675	CP	%	99			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	K24-Fe0069675	CP	%	80			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	K24-Fe0069675	CP	%	99			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1					
Perfluorobutanoic acid (PFBA)	K24-Fe0069675	CP	%	86			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	K24-Fe0069675	CP	%	81			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	K24-Fe0069675	CP	%	102			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	K24-Fe0069675	CP	%	83			50-150	Pass	
Perfluorooctanoic acid (PFOA)	K24-Fe0069675	CP	%	70			50-150	Pass	
Perfluorononanoic acid (PFNA)	K24-Fe0069675	CP	%	103			50-150	Pass	
Perfluorodecanoic acid (PFDA)	K24-Fe0069675	CP	%	101			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	K24-Fe0069675	CP	%	70			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	K24-Fe0069675	CP	%	99			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	K24-Fe0069675	CP	%	81			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	K24-Fe0069675	CP	%	89			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)- Trace				Result 1					
Perfluorobutanesulfonic acid (PFBS)	K24-Fe0069675	CP	%	97			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	K24-Fe0069675	CP	%	90			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	K24-Fe0069675	CP	%	97			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	K24-Fe0069675	CP	%	106			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorohexanesulfonic acid (PFHxS)	K24-Fe0069675	CP	%	94			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	K24-Fe0069675	CP	%	96			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	K24-Fe0069675	CP	%	92			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	K24-Fe0069675	CP	%	86			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	K24-Fe0069675	CP	%	114			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	K24-Fe0069675	CP	%	119			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	K24-Fe0069675	CP	%	94			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	K24-Fe0069675	CP	%	105			50-150	Pass	
Spike - % Recovery									
Metals M7 (NZ MfE)				Result 1					
Arsenic	K24-Fe0069676	CP	%	107			75-125	Pass	
Cadmium	K24-Fe0069676	CP	%	107			75-125	Pass	
Chromium	K24-Fe0069676	CP	%	110			75-125	Pass	
Copper	K24-Fe0069676	CP	%	111			75-125	Pass	
Lead	K24-Fe0069676	CP	%	101			75-125	Pass	
Nickel	K24-Fe0069676	CP	%	115			75-125	Pass	
Zinc	K24-Fe0069676	CP	%	114			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Perfluoroalkyl sulfonamido substances- Trace				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1	Result 2	RPD			
Perfluoroundecanoic acid (PFUnDA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)- Trace				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	B24-Ma0018961	NCP	ug/kg	< 0.5	< 0.5	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B24-Ma0018961	NCP	ug/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K24-Fe0069673	CP	%	31	32	3.0	30%	Pass	
Duplicate									
Volatile Organics (NZ MfE)				Result 1	Result 2	RPD			
Benzene	K24-Fe0021616	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	K24-Fe0021616	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	K24-Fe0021616	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	K24-Fe0021616	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	K24-Fe0021616	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Toluene	K24-Fe0021616	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1	Result 2	RPD			
TPH-SG C7-C9	K24-Fe0074096	NCP	mg/kg	160	190	16	30%	Pass	
TPH-SG C10-C14	K24-Fe0074096	NCP	mg/kg	100	110	1.9	30%	Pass	
TPH-SG C15-C36	K24-Fe0074096	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TPH-SG C7-C36 (Total)	K24-Fe0074096	NCP	mg/kg	270	300	11	30%	Pass	

Duplicate									
Metals M7 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K24-Fe0069674	CP	mg/kg	6.6	6.2	6.0	30%	Pass	
Cadmium	K24-Fe0069674	CP	mg/kg	0.03	0.03	5.8	30%	Pass	
Chromium	K24-Fe0069674	CP	mg/kg	12	12	<1	30%	Pass	
Copper	K24-Fe0069674	CP	mg/kg	7.1	7.2	1.5	30%	Pass	
Lead	K24-Fe0069674	CP	mg/kg	22	23	2.3	30%	Pass	
Nickel	K24-Fe0069674	CP	mg/kg	5.4	5.5	2.1	30%	Pass	
Zinc	K24-Fe0069674	CP	mg/kg	15	15	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
N16	Analysis performed by Eurofins Environment Testing Australia

Authorised by:

Swati Oberoi	Analytical Services Manager
Jonathon Angell	Senior Analyst-PFAS
Raymond Siu	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Organic
Raymond Siu	Senior Analyst-Volatile

Raymond Siu
Senior Instrument Chemist (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Appendix C. Gas Monitoring Records

Site name	Date sampled	Atmospheric pressure (Stable, rising, falling)	Equipment calibration	Weather conditions	Sampled by

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%			ppm	ppm	m btoc
S1	21/2	1016	Peak			Peak during 5 minute period		400				
			Static			0m,	0	[illegible]	20.9	0	0	
Additional comments						0.25	0	450	20.9	0	0	
						1.30	0	575	"	0	0	
						Out	0	>10000	19.6	9	0	
						After	11	11	20	0	6	
						Max	0	0	0	0	0	

1m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S2			Peak			Peak during 5 minute period						
			Static			0m	0	400	20.9	0	0	
Additional comments						0.25	0	450	20.9	0	0	
						1.30m	0	600	20.9	0	0	
						Out	0	600	20.9	0	0	
						After	0	2050	20.9	0	0	
						Max	0	0	0	0	0	

1m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S3			Peak			Peak during 5 minute period						
			Static			0m	0	400	20.9	0	0	
Additional comments						0.25	0	625	20.9	0	0	
						1.30	0	500	20.9	0	0	
						Out	0	1450	20.9	0	0	
						After	0	2100	20.9	0	0	
						Max	0	0	0	0	0	

1m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S4	22/2	1026	Peak			Peak during 5 minute period						
			Static			0	0	575	20.9	0	0	
Additional comments						0.25	1	525	20.9	0	0	
						1.30	3	850	20.9	0	0	
						Out	3	950	20.9	0	0	
						After	4	1250	20.9	0	0	
						Max	0	0	0	0	0	

1m

Site name	Date sampled	Atmospheric pressure (Stable, rising, falling)	Equipment calibration	Weather conditions	Sampled by

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S5	22/2		Peak			Peak during 5 minute period						
			Static			1	0	0				
Additional comments						2	0.5					
						3	1.0					
						4	out					
						5	After					
						Max	0	0	0	0	0	

Install to 1m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S5	22/2		Peak			Peak during 5 minute period						
			Static			0	0	500	20.9	0	0	
Additional comments						0.5	0	645	20.9	0	0	
						1.0	1	525	20.9	22	0	
					1.5	~~Out~~	0	775	20.9	1	0	
					2.0	~~After~~	0	775	20.9	1	0	
					0	Max	1	7010	20.9	10	0	
						After	0	<10000	19.8	0	0	

Install to 2m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S6			Peak			Peak during 5 minute period						
			Static			0.5	0	1200	20.9	15	2	
Additional comments						1.0	0	750	20.9	7	0	
						Out.	0	575	20.9	0	0	
						After.	11	76550	14.8	28	0	
						5						
						Max	0	0	0	0	0	

Install to 2m

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S7			Peak			Peak during 5 minute period						
			Static			0	0	600	20.9	0	0	
Additional comments						1m.	7	1000	20.9	30	0	
						2m	0	625	20.9	0	0	
						Out						
						After	1	2450	20.9	0	0	
						Max	0	0	0	0	0	

2m.

Site name	Date sampled	Atmospheric pressure (Stable, rising, falling)	Equipment calibration	Weather conditions	Sampled by

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
88			Peak			Peak during 5 minute period						
			Static			0 1	0	500	20.9	0	0	
Additional comments						0 2.5	0	560	20.9	0	0	
						1 3 0	1	575	20.9	0	0	
						Out 4						
						After 5	1	10000	18.5	0	0	
						Max	0	0	0	0	0	

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
			Peak			Peak during 5 minute period						
			Static			1						
Additional comments						2						
						3						
						4						
						5						
						Max	0	0	0	0	0	

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
			Peak			Peak during 5 minute period						
			Static			1						
Additional comments						2						
						3						
						4						
						5						
						Max	0	0	0	0	0	

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
			Peak			Peak during 5 minute period						
			Static			1						
Additional comments						2						
						3						
						4						
						5						
						Max	0	0	0	0	0	

W

Site name	Date sampled	Atmospheric pressure (Stable, rising, falling)	Equipment calibration	Weather conditions	Sampled by
Rakaunga Count		Rising.	G5 10132 / 17/9/24	Cloudy	CHM

Balance.

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S2	27/3	1013	Peak		0	~~Peak during 5 minute period~~	0	1.3	19.6	0	0	
			Static			1	0	0.2	20.2	0	0	
Additional comments						2	0	0.2	20.2	0	0	
						3	0	0.1	20.2	0	0	
						4	0	0.1	20.2	0	0	
						5	0	0.1	20.1	0	0	
						Max	0	0	0	0	0	

19.4
19.6
19.6
19.7
19.7
19.7

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S1	27/3	1014	Peak		+0.1	Peak during 5 minute period	0	5.7	17.1	4	0	
			Static			1	0	1.8	18.9	0	0	
Additional comments						2	0	1.5	19.1	0	0	
						3	0	1.4	19.1	0	0	
						4	0	1.9	19.2	0	0	
						5	0	1.3	19.2	0	0	
						Max	0	0	0	0	0	

18.7.
19.3
19.4
19.4
19.4.

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S7		1015	Peak		0.	Peak during 5 minute period						
			Static			1						
Additional comments						2						
Pump stopped, GW was pumping to ~~Ground~~ surface						3						
						4						
						5						
						Max	0	0	0	0	0	

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S6		1015.	Peak		0.1	Peak during 5 minute period	0.1	5.8	18.5	39	1	
			Static			1	0.0	1.9	18.4	1	0	
Additional comments						2	0.0	1.0	19.3	0	0	
						3	0.0	0.9	19.4	0	0	
						4	0	0.8	19.6	0	0	
						5	0	0.7	19.6	0	0	
						Max	0	0	0	0	0	

19.9.
19.8
19.7
19.7
19.6.

Site name	Date sampled	Atmospheric pressure (Stable, rising, falling)	Equipment calibration	Weather conditions	Sampled by

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
SS		1015	Peak	7.91	0.0	Peak during 5 minute period	0	6.5	19.8	30	19	
			Static			1						
Additional comments						2	Pump failed					
						3						
						4						
						5						
						Max	0	0	0	0	0	

80.4

3 times

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S3		1015	Peak	0.80		Peak during 5 minute period	0	0.1	20.3	33	1	
			Static			1	0	1.2	19.3	2	1	
Additional comments						2	0	1.2	19.3	1	0	
						3	0	1.2	19.2	1	0	
						4	0	1.2	19.2	1	0	
						5	0	1.2	19.2	1	0	
						Max	0	0	0	0	0	

78.8
79.6.
79.6.
79.6.
79.6.
79.5.

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S4		1016.	Peak	11.09	0	Peak during 5 minute period	0	6.1	20.1	9	0	79.8.
			Static			1						
Additional comments						2						
						3	Pump failed.					
						4						
						5						
						Max	0	0	0	0	0	

Location	Date and time	Pressure		Diff pressure	Flow	Time	CH4	CO2	O2	CO	H2S	Water level
		mbars		mbars	L/hr	minutes	%	%	%	ppm	ppm	m btoc
S8		1016.	Peak	~~0.01~~ -0.1		Peak during 5 minute period	0	0.1	20.2	1	0	
			Static	-0.11		1	0	1.3	19.3	0	0	
Additional comments						2	0	1.2	19.4	0	0	
						3	0	1.2	19.4	0	0	
						4	0	1.2	19.4	0	0	
						5	0	1.2	19.4	0	0	
						Max	0	0	0	0	0	

79.4.
79.4
79.4
79.4.
79.4